

Exelon Nuclear

ILT 18-1 NRC Exam

**Scenario Number:
NRC Exam Scenario 1**

Revision Number: 0

Date: 10/17/18

Developed By:	<u>Bill Kiser</u> Instructor	<u>10/17/18</u> Date
Validated By:	<u>Tim Windingland</u> SME or Instructor	<u>4/30/19</u> Date
Reviewed By:	<u>Pat Bulpitt</u> Operations Representative	<u>6/3/19</u> Date
Approved By:	<u>Tony Jennings</u> Training Department	<u>6/3/19</u> Date

Appendix D

Scenario Outline

Form ES-D-1

Facility: Clinton Power StationScenario No.: 1Operating Test No.: 2019-301Examiners: _____

_____Operators: _____

Initial Conditions:

- Mode 2 Rx Power at 7%.
- Weather conditions are calm and clear.

Turnover:

- Power ascension is in progress. CPS 3002.01 Heatup and Pressurization is complete up to and including step 8.7.2. CPS 3004.01 Turbine Startup and Generator Synchronization is completed up to and including step 5.2.
- Transient annunciator response for Feedwater Heater alarms has been authorized.
- Priorities for the shift are as follows:
 - Complete the remaining steps of CPS 3002.01 Heatup and Pressurization, including the following milestones:
 - Power ascension to 10%.
 - Transition to Mode 1.
 - Perform H₂ Mixing System Operability IAW CPS 9068.01 Hydrogen Mixing System Operability Test (Quarterly Run) starting at step 8.1. Two extra equipment operators are briefed, staged and ready to support the evolution.

Critical Tasks:

- [CT-1] Inserts control rods to shutdown the reactor before containment temperature reaches 185°F.
- [CT-2] Initiates at least one train of Containment Spray (CS):
 - before anticipating blowdown or entering EOP-3 Blowdown, and
 - within the OK To Spray region of Figure O Containment Spray Initiation Limit curve.

Event No.	Malf. No.	Event Type*	Event Description
1	NA	R-ATC	Raise Power with Rods to enter Mode 1
2	LS06_MALF	C-ATC	(NEW) Control Rod Reed Switch Stuck Open
3	YP_XMFTB_4901 Failed	C-ATC	(NEW) Stuck IRM F Detector
4	N/A	N-BOP	(NEW) Perform CPS 9068.01 Hydrogen Mixing System Operability Test (Div 1)
5	1HG02CA-1A=1	TS-SRO	(NEW) 1HG02CA Compressor Motor Failure (Shaft Break)
6	A05_A02_A0103_4_TVM=2 A05_A02_A0108_5_TVM=2 A05_A02_A08S10_2=ON	C-BOP TS-SRO	(NEW) E22N654C RCIC Storage Tank Level Instrument Failure
7	YP_XMFTB_3917	C-BOP	CCW Pump 1A trip
8	YACUL029=50% YP_XMFTB_4963	M-All	(NEW) RT Leak in CNMT/ATWS (ARI Successful)
9	YP_XMFTB_4947	C-ATC/BOP	Div 1 RHR Pump Fails to Auto Start
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor NEW – Not used in the last two (2) NRC exams.			

Appendix D

Scenario Outline

Form ES-D-1

Scenario No.: 1

Operating Test No.: 2019-301

Narrative Summary

Event #	Description
1. Raise Power with Rods to enter Mode 1	The crew will continue the power ascension to 10% by withdrawing control rods in accordance with Step 8.7.3 of CPS 3002.01 Heatup and Pressurization.
2. Control Rod Reed Switch Stuck Open	Following the attempted withdrawal of the second control rod/group, a rod position reed switch fails (stuck open) in one channel of the two channel position probe. The ATC will determine which channel is inaccurate and enter substitute position data IAW CPS 3304.02 Rod Control and Information System (RC&IS) Section 8.2.4 Entering Substitute Data. Once substitute position data has been substituted for the control rod with the failed reed switch, the crew will continue the power ascension.
3. Stuck IRM F Detector	When the ATC operator attempts to withdraw IRM detectors IAW CPS 3306.01 Source/Intermediate Range Monitors (SRM/IRM), the IRM F detector IN light will remain illuminated. The ATC Operator will inform the SRO, review CPS 3306.01 section 8.2.1 Stuck SRM/IRM Detector and recommends attempting to free the detector by driving it in the opposite direction. This action frees the stuck detector and allows all IRM detectors to be withdrawn when attempted the second time.
4. Perform CPS 9068.01 Hydrogen Mixing System Operability Test (Div 1)	Once the Mode Switch has been placed in Run, the SRO will direct the BOP to perform the Div 1 H ₂ Mixing System Operability IAW CPS 9068.01 Hydrogen Mixing System Operability Test starting at step 8.1.
5. 1HG02CA Compressor Motor Failure (Shaft Break)	During the conduct of CPS 9068.01 Hydrogen Mixing System Operability Test (Quarterly Run), the BOP operator will note low dP (~0 psid) reading for the Div 1 Mixing Compressor (1HG02CA) and report to the SRO. If requested, the operator in the field will report a failed shaft coupling device. The BOP operator will secure the Div 1 Mixing Compressor. The SRO will evaluate and enter Technical Specification LCO 3.6.3.3, Action A.1 requiring the restoration of Containment/Drywell Hydrogen Mixing System to OPERABLE status within 30 days.
6. E22N654C RCIC Storage Tank Level Instrument Failure	Annunciator RCIC STORAGE TANK LEVEL LOW (5062-3D), HPCS OUT OF SERVICE (5062-8E) and HPCS D3 ATM CAL OR GR FAIL light come in due to level instrument 1E22-N654C failing low. Based upon review of the ARP the BOP operator will recommend taking manual actions for automatic actions that did not occur – Open 1E22-F015 HPCS Suppression Pool Suction Valve and Close 1E22-F001 HPCS Storage Tank Suction Valve. The SRO will evaluate and enter Technical Specification LCO 3.3.5.1 Action A.1 Enter the condition referenced in table 3.3.5.1-1 for the channel <u>and</u> D.2.1 Place channel in trip <u>or</u> D.2.2 Align the HPCS pump suction to the suppression pool.
7. CCW Pump 1A trip	The following annunciators are received: 5040-1B AUTO TRIP PUMP/MOTOR, 5040-2C LOW PRESS CCW HX OUTLET HEADER and 5003-3D/3K RECIRC MTR A/B WDG CLG WTR FLOW LO. BOP will observe that CCW Pump 1A has tripped, review the ARP and start a standby CCW pump.
8. RT Leak in CNMT/ATWS (ARI Successful)	A leak develops between the RWCU Regenerative and Non-Regenerative Heat Exchangers. Annunciators 5000-2F RWCU HI DIFF FLOW TIMER INITIATED and 5000-5A RWCU HI RM WEST TEMP HI are received. An automatic isolation occurs but the leak continues due to isolation valve leak-by. The MCR will scram the reactor per CPS 4001.02 Automatic Isolation. When the mode switch is placed in shutdown, the reactor will fail to scram requiring entry into EOP-1 RPV Control transitioning into EOP-1A ATWS RPV Control. Control rods will be successfully inserted when ARI is manually initiated. Once shutdown criteria is met, the SRO will exit EOP-1A and re-enter EOP-1. As containment pressure/temperature continues to rise, the SRO will enter EOP-6 Primary Containment Control. The SRO will direct the BOP operator to initiate containment sprays prior to exceeding figure N, Pressure Suppression Pressure.
9. Div 1 RHR Pump Fails to Auto Start	The Div 1 RHR Pump fails to automatically start when DW pressure reaches 1.68 psig and will have to be manually started.

Operator Actions

Event No.(s): 1		Page 1 of 2
Description: Raise power with rods to ~10%		
Initiation: Upon direction of the SRO		
Cues: None		
Time	Position	Applicant's Actions or Behavior
<p>Key Parameter Response: Reactor power, Rod drive parameters (flow, dP), control rod position, BPV position</p> <p>Expected Annunciators: None</p> <p>Automatic Actions: None</p>		
	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 3002.01 Heatup and Pressurization section 8.7.3: <ul style="list-style-type: none"> Raise reactor power to ~ 10% using control rod withdrawal when directed by SRO. Monitors the following items listed below: <ul style="list-style-type: none"> RCIS status - Low Power Alarm Point (LPAP), High Power Setpoint (HPSP), Rod Blocks Bypass Valve (BPV) position Power - Average Power Range Monitor (APRM), Local Power Range Monitor (LPRM), Generator 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. Performs coupling checks for each rod withdrawn to position 48. Verifies Intermediate Range Monitor (IRM)/APRM overlap by verifying all operable APRMs read between 5% and 12% with all operable IRMs on scale. Places Reactor Mode Switch (RMS) in RUN. Verifies 5004-1G, 5004-2G, 5005-1G, and 5005-2G Div 1 (4, 2, 3) MSL A (D, B, C) CL Scram Byp / Not in Run annunciators reset.
	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. Shifts P678 recorders 1C51-R603A/B/C/D to APRM.
	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"> Notifies Shift Manager. Conducts a brief.
Terminus: Clearly observable plant response from change in power level.		

NOTES:

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

Operator Actions

Event No.(s): 2		Page 1 of 1
Description: Control Rod Reed Switch Stuck Open		
Initiation: During Event 1 and following selection of control rod 04-21, release Control Rod Reed Switch Failure .		
Cues: Annunciator 5006-2H Rod Out Block; Data Fault light on the OCM		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response</u>: Control rod position flashes between 'Blank' and current position for the affected control rod.</p> <p><u>Expected Annunciators</u>: 5006-2H Rod Out Block</p> <p><u>Automatic Actions</u>: Rod withdraw block</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 and notifies the SRO of any unusual or unexpected conditions. Reports issue to SRO. Refers to ARP. <p>Per 3304.02 Rod Control And Information System (RC&IS), step 8.2.2 Position Data Faults:</p> <ul style="list-style-type: none"> Determines channel 2 is inaccurate, and enters substitute position data from channel 1. <p>Per 3304.02 RC&IS, step 8.2.4 Entering Substitute Data:</p> <ul style="list-style-type: none"> Selects/verifies individual drive mode. Depresses the SUBST POSITION push-button. Verifies: <ul style="list-style-type: none"> No other gang member of the rod having the defective reed switch is presently using substitute data. Data from the other channel is not substitute data. RAW DATA is not selected. Selects the rod with the defective reed switch. Ensures that the rod is at the position at which the defective reed switch exists. Depresses the ENT SUBST push-button located in the PATTERN CONTROL section of the OCM. Verifies that the data has been entered by depressing the SUBST POSITION push-button. All rods with substitute data are indicated.
	BOP	<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.
	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. Directs continuing power ascension.
Terminus: Substitute position data has been entered for the affected control rod.		

NOTES:

Operator Actions

Event No.(s):		3	Page		1	of	1
Description: Stuck IRM F Detector							
Initiation: During Event 1 and when the ATC attempts to withdraw IRM detectors							
Cues: IRM F detector IN light will remain illuminated							
Time	Position	Applicant's Actions or Behavior					
<p><u>Key Parameter Response:</u> IRM F detector fails to withdraw</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 <ul style="list-style-type: none"> Monitors control room panels, notifies the SRO of unusual/unexpected conditions. Reports issue to the SRO. Per CPS 3306.01 Source/Intermediate Range Monitors (SRM/IRM), section 8.1.2 Withdrawing SRM/IRM Detectors: <ul style="list-style-type: none"> Depresses the POWER ON push-button. Verifies the POWER ON lamp illuminates. Verifies each RETRACT PERMIT lamp is illuminated. Depresses each IRM select pushbutton. Depresses the DRIVE OUT push-button. Verifies the DRIVE OUT & DRIVING OUT lamps illuminate. When the IRM detectors reach the full-out position, verifies the DRIVING OUT lamp extinguishes and the DETECTORS OUT lamps are illuminated. Depresses the DRIVE OUT push-button. Verifies the DRIVE OUT & DRIVING OUT lamps extinguish. Depresses each IRM select pushbutton. Verifies each IRM SELECT lamp extinguishes. Depresses the POWER ON push-button. Verifies the POWER ON lamp extinguishes. Per 3306.01 Source/Intermediate Range Monitors (SRM/IRM), step 8.2.1 Stuck SRM/IRM Detector: <ul style="list-style-type: none"> Stabilizes reactor power Attempts to free the IRM F detector by depressing the Drive In PB. Verifies power to the IRM F detector drive motor. Withdraws IRM F detector by depressing the Drive Out PB. Resumes with the reactor startup when directed by 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. 					
	SRO	<ul style="list-style-type: none"> Acknowledges reports from ATC/BOP. Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards, and approved procedures. Informs the Shift Manager. Conducts a brief. 					
Terminus: IRM F detector withdrawn.							

NOTES:

Operator Actions

Event No.(s): 4, 5		Page 1 of 1
Description: Perform CPS 9068.01 Hydrogen Mixing System Operability Test (Div 1) / 1HG02CA Compressor Motor Failure (Shaft Break)		
Initiation: Following Event 3 and upon direction of the SRO		
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> CGCS Compressor 1A dP</p> <p><u>Expected Annunciators:</u> None</p> <p><u>Automatic Actions:</u> 1HG009A, CGCS Cmpr 1A Suct Valve opens when compressor (1HG02CA) starts.</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. • 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. • Performs Plant Announcements. <p>Per CPS 9068.01, Hydrogen Mixing System Operability Test, Step 8.1 Drywell and Containment Atmosphere Mixing System Startup:</p> <ul style="list-style-type: none"> • On 1H13-P800, place CGCS SYS DIV 1 IN TEST switch in TEST, and observe: <ul style="list-style-type: none"> • CGCS DIV 1 MOV'S IN TEST status light energizes. • NOT AVAILABLE CGCS SYSTEM DIVISION 1 annunciator 5041-7A alarms, unless already in due to plant conditions. • Starts CGCS Hydrogen Cmpr 1A, 1HG02CA, and logs the start time. • Verifies 1HG009A, CGCS Cmpr 1A Suct Valve opens. • Directs EO to verify Supply Fan, 1VR08C starts on CNMT Bldg HVAC System Panel, 1PL68JA. • Records CGCS Compressor 1A dP from CGCS CMPR 1A, 1HG02CA flow indicator [1PDI-1HG052B]. • Recognizes 1HG02CA flow indication [1PDI-1HG052B] is 0 psid. • Dispatches an Equipment Operator to investigate. • Relays Equipment Operator report to the SRO. • Directs EO to obtain Mixing Compressor, 1HG02CA vibration data at VC1, HC1, & AC1 (compressor). • Secures Mixing Compressor, 1HG02CA when report of shaft break is received. • Restores CGCS System per CPS 9068.01.

Event No.(s): 4, 5		Page 2 of 2
Description: Perform CPS 9068.01 Hydrogen Mixing System Operability Test (Div 1) / 1HG02CA Compressor Motor Failure (Shaft Break)		
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 ORM 2.5.2 Action 3.5.2 when the CGCS SYS DIV 1 IN TEST switch is in TEST. • Declares Div. 1 H₂ Mixing System INOPERABLE: <ul style="list-style-type: none"> • Applicable LCO - 3.6.3.3 • Applicable Condition(s) – Condition A • Required Action and Completion Time – A.1 within 30 days • Exits ORM 2.5.2 Action 3.5.2 when the CGCS SYS DIV 1 IN TEST switch is in NORMAL. <ul style="list-style-type: none"> ○ Informs Shift Manager. ○ Conducts a brief. ○ Contacts Maintenance to investigate.
Terminus: CGCS Hydrogen Cmpr 1A (1HG02CA) secured. ITS LCO 3.6.3.3 evaluated.		

NOTES:

Operator Actions

Event No.(s):		6	Page		1	of	1
Description: E22N654C RCIC Storage Tank Level Instrument Failure							
Initiation: Following Event 5 and upon direction of the Lead Examiner, insert REMOTE 1 .							
Cues: 5062-3D, RCIC Storage Tank Level Low, 5062-8E, HPCS Out Of Service and HPCS D3 ATM Cal Or Gr Fail light							
Time	Position	Applicant's Actions or Behavior					
Key Parameter Response: RCIC Storage Tank Level							
Expected Annunciators: 5062-3D RCIC Storage Tank Level Low and 5062-8E HPCS Out Of Service							
Automatic Actions: 1E22-F015 HPCS Suppression Pool Suction Valve OPENS, 1E22-F001 HPCS Storage Tank Suction Valve CLOSES (Both automatic actions fail to occur)							
	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. Reports issue to the SRO. Refers to the ARP for 5062-3D RCIC Storage Tank Level Low. Determines that automatic actions to transfer High Pressure Core Spray (HPCS) suction to the suppression pool (SP) failed to occur. When directed, transfers HPCS suction to the SP IAW CPS 3309.01 High Pressure Core Spray (HP) section 8.1.7.1 Shifting HPCS Suction to Suppression Pool. <ul style="list-style-type: none"> Verifies shut 1E22-F010, HPCS First Test Valve To Storage Tank. Verifies shut 1E22-F011, HPCS Second Test Valve To Storage Tank. Places HPCS MOV Test Prep Switch in TEST (optional). Opens 1E22-F015, HPCS Suppr Pool Suction Valve. Verifies 1E22-F001, HPCS Storage Tank Suction Valve shuts. If HPCS MOV Test Prep Switch was placed in TEST, returns HPCS MOV Test Prep Switch to NORMAL. 					
	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. Determines that automatic actions to transfer HPCS suction to the suppression pool failed to occur. Declares ECCS Instrumentation INOPERABLE: <ul style="list-style-type: none"> Applicable LCO – 3.3.5.1 Applicable Condition(s) – A and D Required Action and Completion Time – A.1 immediately, D.2.2 within 24 hours Directs BOP to transfer HPCS suction to the SP IAW CPS 3309.01 High Pressure Core Spray (HP) section 8.1.7.1 Shifting HPCS Suction to Suppression Pool. Contacts Maintenance to investigate failure of RCIC suction shift to SP. Informs the Shift Manager. Conducts a brief. If MOV Test Prep Switch (HPCS) was placed in TEST, enters ORM 2.5.2 Action 3.5.2. When MOV Test Prep Switch (HPCS) is taken back to NORMAL at the completion of the evolution, exits ORM 2.5.2 Action 3.5.2. 					
Terminus: HPCS suction shifted to the SP. ITS 3.3.5.1 evaluated.							

NOTES:

Operator Actions

Event No.(s):		7		Page	1	of	1
Description: CCW Pump 1A trip							
Initiation: Following Event 6 and upon direction of the Lead Examiner, insert REMOTE 2							
Cues: Annunciator 5040-1B Auto Trip Pump/Motor alarm.							
Time	Position	Applicant's Actions or Behavior					
<p><u>Key Parameter Response:</u> Lowering CCW System Header Pressure</p> <p><u>Expected Annunciators:</u> 5040-1B Auto Trip Pump/Motor, 5003-3D RECIRC MTR A WDG CLG WTR FLOW LO, 5003-3K RECIRC MTR B WDG CLG WTR FLOW LO</p> <p><u>Automatic Actions:</u> None</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 SRO of unusual/unexpected conditions. ○ Reports receipt of annunciators 5003-3D and 3K RECIRC MTR A/B WDG CLG WTR FLOW LO. • Refers to ARPs. <ul style="list-style-type: none"> ○ Makes plant announcement. ○ Dispatches EO to investigate CCW Pump trip. ○ Monitors CCW Storage Tank Level. ○ Monitors RR Pump motor and seal parameters. 					
	BOP	<ul style="list-style-type: none"> • Reports issue to SRO. • Monitors control room panels, notifies SRO of unusual/unexpected conditions. <ul style="list-style-type: none"> ○ Monitors reactor to ensure operations remain within established bands. • Refers to ARPs. <p>Per 5040-1B Auto Trip Pump/Motor alarm:</p> <ul style="list-style-type: none"> • Determines CCW Pump A has tripped. • Determines CCW Pump B is running. • Starts CCW Pump C. <ul style="list-style-type: none"> ○ Monitors CCW Storage Tank Level. ○ Dispatches EO to investigate CCW Pump trip. ○ Monitors RR Pump motor and seal parameters. 					
	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. ○ Contacts Maintenance to investigate. ○ Conducts a brief. 					
Terminus: CCW Pumps 'B' and 'C' running.							

NOTES:

Operator Actions

Event No.(s): 8, 9		Page 1 of 2
Description: RT Leak in CNMT/ATWS (ARI Successful) / Div 1 RHR Pump Fails to Auto Start		
Initiation: Following Event 7 and upon direction of the Lead Examiner, insert REMOTE 3		
Cues: Annunciators 5000-2F RWCU HI DIFF FLOW TIMER INITIATED and 5000-5A RWCU HI RM WEST TEMP HI		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response</u>: Rising Containment temperature and pressure.</p> <p><u>Expected Annunciators</u>: 5000-2F RWCU HI DIFF FLOW TIMER INITIATED and 5000-5A RWCU HI RM WEST TEMP HI</p> <p><u>Automatic Actions</u>: Group 4 isolation.</p>		
[CT-1]	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. Reports issue to the SRO. Refers to ARP. <p>Per 5000-5A RWCU HX Rm West Temp Hi:</p> <ul style="list-style-type: none"> Verifies a complete Group 4 isolation. Reports Containment pressure/temperature and drywell pressure rising. When directed by SRO <u>or</u> when DW Pressure reaches 1.3 psig and rising, places the Mode Switch in S/D. Determines Shutdown Criteria <u>is not</u> met. Arms and depresses Manual Scram Pushbuttons and initiates ARI. <p>[CT-1] Inserts control rods to shutdown the reactor before containment temperature reaches 185°F.</p> <ul style="list-style-type: none"> Determines Shutdown Criteria <u>is</u> met. 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 level is... and trend Any EOPs with entry conditions (EOP-1, 6) (EOP-6 only if DW pressure is ≥ 1.68 psig) Secures both RR Pumps within one minute of DW pressure exceeding 1.68 psig. Coordinates with BOP operator to monitor and control RPV level and pressure. Identifies the failure of RHR 'A' Pump to auto start when drywell pressure reaches 1.68 psig and manually starts pump. Performs EOP actions as directed by SRO.
	BOP	<ul style="list-style-type: none"> Reports Containment pressure/temperature and drywell pressure rising. Evacuates the Containment. Carries out ATWS Scram Choreography by: <ul style="list-style-type: none"> Making an Announcement <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 if Shutdown Criteria is met and reports it to the CRS. Verifies Manual Scram/ARI have been initiated

Event No.(s): 8, 9		Page 2 of 2
Description: RT Leak in CNMT/ATWS (ARI Successful) / Div 1 RHR Pump Fails to Auto Start		
Time	Position	Applicant's Actions or Behavior
[CT-2]	BOP (cont.)	<p>Per EOP-6 Primary Containment Control:</p> <ul style="list-style-type: none"> Starts Drywell Mixers, as directed by the SRO. Monitors the start of the ECCS Systems on High Drywell Pressure. Terminates and prevents Low Pressure Core Spray / Low Pressure Coolant Injection systems when directed by the SRO. Identifies the failure of RHR 'A' Pump to auto start when drywell pressure reaches 1.68 psig and manually starts pump. Reports the failure of RHR 'A' Pump to auto start when drywell pressure reaches 1.68 psig to the SRO. [CT-2] Initiates at least one train of Containment Spray (CS): <ul style="list-style-type: none"> before anticipating blowdown <u>or</u> entering EOP-3 Blowdown, and within the OK To Spray region of Figure O Containment Spray Initiation Limit curve. Performs EOP actions as directed by SRO.
[CT-1]	SRO	<ul style="list-style-type: none"> Acknowledges reports from ATC/BOP. <p>Enters and executes 4001.02 Automatic Isolation and 4001.01 Reactor Coolant Leakage:</p> <ul style="list-style-type: none"> Directs ATC/BOP to attempt to locate the source of the leakage. Determines the leak is unisolable. Conducts MCR crew preemptive briefing on the effects of Hi DW pressure on plant systems. <p>Enters CPS 4100.01 Reactor Scram:</p> <ul style="list-style-type: none"> Directs ATC to scram the reactor when leak is determined to be unisolable <u>or</u> when DW Pressure reaches 1.3 psig and rising. Carries out ATWS Scram Choreography by performing an Update: <ul style="list-style-type: none"> Update Entering EOP-1 and 6 Transitioning to EOP-1A Entering the Scram Off-Normal End of Update <p>Enters EOP-1A, ATWS RPV Control, and directs the following:</p> <ul style="list-style-type: none"> [CT-1] Inserts control rods to shutdown the reactor before containment temperature reaches 185°F. Determines Shutdown Criteria is met when ARI pushbuttons have been armed and depressed and transitions from EOP-1A back to EOP-1. <p>Enters EOP-1 RPV Control, and directs the following:</p> <ul style="list-style-type: none"> Stabilize RPV pressure between 800 to 1065 psig with Bypass Valves and then expands the pressure band to 500-1065 psig. Control RPV water level between Level 3 to Level 8 by using Preferred Injection Systems. Directs terminating and preventing Low Pressure Core Spray and Low Pressure Coolant Injection systems before RPV pressure drops to 472 psig.
[CT-2]		<p>Enters EOP-6, Primary Containment Control, and directs the following:</p> <ul style="list-style-type: none"> Start DW Mixing Compressors. [CT-2] Initiates at least one train of Containment Spray (CS): <ul style="list-style-type: none"> before anticipating blowdown <u>or</u> entering EOP-3 Blowdown, and within the OK To Spray region of Figure O Containment Spray Initiation Limit curve.
Terminus: RPV maintained Level 3 - Level 8 and 500 - 1065 psig. Containment Spray in operation.		

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 59567) @ 7% 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:
 - YP_XMFTB_4963
 - YP_XMFTB_4901
 - YP_XMFTB_4947
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 20** is current - **Gang 5A** is at **Position 12**.
12. Make sure Sequence A is selected.
13. Make sure Individual Drive Mode is selected on the OCM.
14. Make sure a stop watch is available (if requested).
15. Make sure the FP bell toggle switch on the OG panel (is in the up position).
16. Procedures that are expected to be used during this scenario are:
 - CPS 3304.02 ROD CONTROL AND INFORMATION SYSTEM (RC AND IS)
 - CPS 3306.01 SOURCE INTERMEDIATE RANGE MONITORS SRM IRM
 - CPS 3309.01 HIGH PRESSURE CORE SPRAY (HPCS)
 - CPS 4001.01 REACTOR COOLANT LEAKAGE
 - CPS 4001.02 AUTOMATIC ISOLATION
 - CPS 4001.02C001 AUTOMATIC ISOLATION CHECKLIST
 - CPS 4100.01 REACTOR SCRAM
 - CPS 4401.01 EOP-1 RPV CONTROL
 - CPS 4402.01 EOP-6 PRIMARY CONTAINMENT CONTROL
 - CPS 4404.01 EOP-1A ATWS RPV CONTROL
 - CPS 5000.02 ALARM PANEL 5000 ANNUNCIATORS - ROW 2
 - CPS 5000.05 ALARM PANEL 5000 ANNUNCIATORS - ROW 5
 - CPS 5004.01 ALARM PANEL 5004 ANNUNCIATORS - ROW 1
 - CPS 5004.02 ALARM PANEL 5004 ANNUNCIATORS - ROW 2
 - CPS 5005.01 ALARM PANEL 5005 ANNUNCIATORS - ROW 1
 - CPS 5005.02 ALARM PANEL 5005 ANNUNCIATORS - ROW 2
 - CPS 5006.02 ALARM PANEL 5006 ANNUNCIATORS - ROW 2
 - CPS 5040.01 ALARM PANEL 5040 ANNUNCIATORS - ROW 1
 - CPS 5062.03 ALARM PANEL 5062 ANNUNCIATORS - ROW 3
 - CPS 5062.08 ALARM PANEL 5062 ANNUNCIATORS - ROW 8
 - ITS 3.3 INSTRUMENTATION (LCO 3.3.5.1)
 - ITS 3.6 CONTAINMENT SYSTEMS (LCO 3.6.3.3)

- ORM 2.5 ELECTRICAL POWER SYSTEMS (ORM 2.5.2)
17. Hang OOS tags on: None
 18. Identify T/S issues associated with OOS and turnover: None
 19. Operating Equipment: None
 20. Marked up copies:
 - CPS 3002.01 HEATUP AND PRESSURIZATION
 - CPS 9068.01 HYDROGEN MIXING SYSTEM OPERABILITY TEST
 - CPS 9068.01D001 HYDROGEN MIXING SYSTEM OPERABILITY TEST DATA SHEET
 21. Verify simulator conditions match the turnover.

Event Triggers and Role Play

Event #

1. **Raise power with rods to ~10% (Bring up OD-7 in booth)**
 - 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 Plant Manager and Ops Department Head approval to enter Mode 1 requested (CPS 3002.01 step 8.7.4.1) – notify CRS that approval to enter Mode 1 has been granted.
 - (3) If NRC SRI notified of impending change to Mode 1 (CPS 3002.01 step 8.7.4.1.1) – acknowledge the notification.
 - (4) WEC (if requested to verify CPS 3002.01C002 Mode 1 Checklist status) (CPS 3002.01 step 8.7.4.2) – notify CRS that 3002.01C002 is complete and supports transition to Mode 1.
 - (5) Chemistry (if requested to verify chemistry requirements for Reactor Water and Condensate System for Mode 1 are within specifications) (CPS 3002.01 step 8.7.4.3) – report, “Chemistry requirements for Reactor Water and Condensate System for Mode 1 are within specifications”.
 - (6) Chemistry (when directed to perform CPS 3002.01 step 8.7.8 to perform reactor coolant and HVAC stack samples), acknowledge the report.
2. **Control Rod Reed Switch Stuck Open**
 - a. Event Trigger – During Event 1 and following selection of control rod 04-21, **Release Control Rod Reed Switch Failure.** and verify the following command(s):
 - (1) **LS06_MALF.** (RC&IS FAILURE OF SINGLE OPEN REED SWITCH - CH 2).
 - b. Role play - None
3. **Stuck IRM F Detector (Bring up IRM/APRM Overlap Display in booth)**
 - a. Event Trigger – During Event 1 and when the ATC attempts to withdraw IRM detectors (verify YP_XMFTB_4901 is deleted when the Drive In / Driving In pushbutton is depressed).
 - b. Role play
 - (1) Maintenance (if requested): respond “Dispatching personnel to investigate.”
4. **Perform CPS 9068.01 Hydrogen Mixing System Operability Test (Div 1)**
 - a. Event Trigger – None
 - b. Role play
 - (1) EO (when requested) Report, “Supply Fan 1VR08C running” (Ref: CPS 9068.01, step 8.1.4).
 - (2) Booth (if requested) Report, “Containment pressure is indicating +0.1 psig on ATMs E12-N662A-D”.
5. **1HG02CA Compressor Motor Failure (Shaft Break)**
 - a. Event Trigger - CGCS Hydrogen Cmpr 1A (HG02CA) control switch to START and verify the following command(s):
 - (1) **1HG02CA-1A = Shaft Break.** (1HG02CA Compressor Motor Failure)
 - b. Role play
 - (1) EO (when directed to investigate): report “The ‘A’ Hydrogen mixing compressor shaft is sheared.”
 - (2) Maintenance (if requested): respond “Dispatching personnel to investigate.”

6. **E22N654C RCIC Storage Tank Level Instrument Failure**

- a. Event Trigger - Following Event 5 and upon direction of the Lead Examiner, **Activate Remote 1** and verify the following command(s):
 - (1) **A05_A02_A0103_4_TVM=2.** (5062-3D RCIC Storage Tank Level Low)
 - (2) **A05_A02_A0108_5_TVM=2.** (5062-8E HPCS Out Of Service)
 - (3) **A05_A02_A008S10_2=ON.** (HPCS D3 ATM Cal Or Gr Fail PB Lite)
- b. Role play:
 - (1) Maintenance (if asked to investigate ATM malfunction) – “We’ll send a technician to the control room to gather information for the troubleshooting plan.”
 - (2) If RCIC Storage Tank Level ATMs are checked:

ATM	Value	Trip Status
1E22-N654C	(downscale)	Trip 1 LED is lit
1E22-N654G	22 inches	Trip LEDs NOT lit

7. **CCW Pump 1A trip**

- a. Event Trigger – Following Event 6 and upon direction of the Lead Examiner, **Activate Remote 2** and verify the following command(s):
 - (1) **YP_XMFTB_3917.** (CCW Pump 1A Trip)
- b. Role play
 - (1) EO
 - a) (when asked to investigate trip of CCW Pump ‘A’) – “The breaker for CCW Pump ‘A’ is tripped on overcurrent and the motor is very hot to the touch.”
 - b) (when asked to check for proper operation of CCW Pump ‘C’) – “The ‘C’ CCW Pump is operating normally.”
 - (2) Maintenance (if asked to investigate tripped CCW pump) – report “dispatching personnel to investigate”.

8. **RT Leak in CNMT/ATWS (ARI Successful)**

- a. Event Trigger – Following Event 7 and upon direction of the Lead Examiner, **Activate Remote 3** and verify the following command(s):
 - (1) **YVCUMVLK_14 100%.** (G33-F054 Seat Leakage)
 - (2) **YVCUMVLK_13 100%.** (G33-F053 Seat Leakage)
 - (3) **YVCUMVLK_2 100%.** (G33-F004 Seat Leakage)
 - (4) **YVCUMVLK_1 100%.** (G33-F001 Seat Leakage)
 - (5) **YACUL029 50%.** (Leak At Pipe Between RGN HX A/Non RGN HX A)
- b. Role play:
 - (1) Maintenance (after 2 minutes from scram announcement) – report to the MCR as IMD.

9. **Div 1 RHR Pump Fails to Auto Start**

- a. Event Trigger – Initial condition
- b. Role play - none

CT Bases Information

1. [CT-1] Inserts control rods to shutdown the reactor before containment temperature reaches 185°F.
 - a) This critical task was derived from NUREG 1021 R11 Appendix D Simulator Testing Guidelines section D.1.a Safety Significance which states that action taken to prevent a challenge to plant safety is an example of a critical task. In this scenario, RPS fails to trip when DW pressure reaches 1.68 psig allowing primary coolant leakage to increase containment temperature. CPS 4001.01 Reactor Coolant Leakage directs a manual scram to be initiated if DW pressure is 1.3 psig and rising. Inserting a manual scram before containment temperature exceeds 185°F is a safety action for which operation or correct performance prevents exceeding the design temperature limit of the containment and is therefore critical.
2. [CT-2] Initiates at least one train of Containment Spray (CS):
 - a) within the OK To Spray region of Figure O Containment Spray Initiation Limit curve, and
 - b) before anticipating blowdown or entering EOP-3 Blowdown.
 - a. Per the EOP-TB, the Containment Spray Initiation Limit (Figure O) is the lowest containment pressure at which initiation of containment sprays will not result in an evaporative cooling pressure drop to below atmospheric pressure. Unrestricted operation of containment sprays in the shaded region of Fig. O could thus result in a negative differential pressure between the containment and atmosphere large enough to cause a loss of containment integrity. Initiating containment spray subsystem(s) within the OK TO SPRAY region of Figure N is therefore a critical task.
 - b. Per the EOP-TB, operation in the shaded region of Figure N Pressure Suppression Pressure could cause a loss of the pressure suppression function of the containment. Operating containment spray subsystem(s) as necessary to maintain containment pressure and suppression pool level within the OK region of Figure N is therefore a critical task.

Turnover

1. The plant is in Mode 2, operating at ~ 7% power.
 - a. CPS 3002.01 Heatup and Pressurization is complete up to and including step 8.7.2.
 - 1) Shell warming is in progress. An extra RO has been assigned to monitor parameters associated with this evolution.
 - b. CPS 3004.01 Turbine Startup and Generator Synchronization is completed up to and including step 5.2.
 - c. Control rods - Step 20 / Gang 5A @ position 12.
 - d. Transient annunciator response for feedwater heater level is authorized.
2. Status of Tagged Out Equipment
 - None
3. Today Day Shift
4. Weather Conditions
 - Calm and cool.
5. Thermal Limit Problems or concerns
 - Power ascension to 10% IAW CPS 3002.01 Heatup and Pressurization.
 - RE and Rod Verifier are available on request.
6. LCO's in effect
 - None
7. Surveillances in progress
 - None
8. Previous Shift Evolutions completed
 - None
9. Evolutions planned for the shift
 - First Priority – Complete the remaining steps of CPS 3002.01 Heatup and Pressurization, including the following milestones:
 - Power ascension to 10%.
 - Transition to Mode 1.
 - Perform H₂ Mixing System Operability IAW CPS 9068.01 Hydrogen Mixing System Operability Test (Quarterly Run) starting at step 8.1. The WEC will maintain the CPS 9094.01D001 Cumulative Data Report Data Sheet. Extra equipment operators are briefed, staged and ready to:
 - obtain data at the Div 1 Mixing Compressor.
 - monitor VR/VQ operations at 825' Control.
10. Risk Levels
 - Green
 - Protected Equipment: None

Exelon Nuclear

ILT 18-1 NRC Exam

**Scenario Number:
NRC Exam Scenario 2**

Revision Number: 0

Date: 10/10/18

Developed By:	<u>Bill Kiser</u> Instructor	<u>10/10/18</u> Date
Validated By:	<u>Tim Windingland</u> SME or Instructor	<u>4/30/19</u> Date
Reviewed By:	<u>Pat Bulpitt</u> Operations Representative	<u>6/3/19</u> Date
Approved By:	<u>Tony Jennings</u> Training Department	<u>6/3/19</u> Date

Appendix D

Scenario Outline

Form ES-D-1

Facility: <u>Clinton Power Station</u>	Scenario No.: <u>2</u>	Operating Test No.: <u>2019-301</u>
Examiners: _____ _____	Operators: _____ _____	
<p>Initial Conditions:</p> <ul style="list-style-type: none"> Mode 1 Rx Power at 25%. Plant startup is in progress. Weather conditions are calm and clear. Reactor Water Cleanup is in a single pump/single filter demin (F/D) lineup ('A' pump and 'A' F/D in service). <p>Turnover:</p> <ul style="list-style-type: none"> Priorities for the shift are as follows: <ul style="list-style-type: none"> Main EHC pump 1B is in service. Shift hydraulic pumps IAW CPS 3105.02 MAIN EHC HYDRAULIC POWER UNIT (EH) to support hanging a clearance order – First Priority. Continue plant startup by withdrawing control rods in sequence IAW CPS 3004.01 Turbine Startup And Generator Synchronization. Raise reactor power to 30% in preparation for Reactor Recirculation (RR) pump shift to fast speed. Transient annunciator response to Feedwater Heater alarms has been authorized. <p>Critical Tasks:</p> <ul style="list-style-type: none"> [CT-1] Shut SRV prior to Suppression Pool Temperature reaching 110°F. [CT-2] SC-1.1 ATC inserts a manual Scram before area temperature reaches max safe in any one area. [CT-3] Enters and executes EOP-3 Blowdown within 15 minutes of 1TR-CM326 point 12 and 1TR-CM327 point 14 exceeding 140°F. (CT-3 can also be satisfied by anticipating blowdown per EOP-1.) 		

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP	(NEW) Shift Main EHC Pumps
2	N/A	R-ATC	Raise Power With Rods to 30%
3	YPXMALSE_72=50	C-BOP	Inadvertent opening of a SRV
4	RR_A_STATOR_WDG	C-ATC TS-SRO	(NEW) RR 'A' High Stator Temperature / Emergency Loop Shutdown
5	FC01BFC2PBFO	C-BOP	(NEW) 'B' FC Pump trip
6	RT_PUMPA_FAIL_TRIP YFCUPPSS_1	C-ATC	(NEW) RT Pump Shaft Shear/Failure to Trip on Low Flow
7	CAM1PR006ATV_VALUE1	TS-SRO	(NEW) 1RIX-PR006A Fuel Building Exhaust PRM fails high
8	YP_XMFTB_5082	M-All	(NEW) RPV Instrument Line Leak
9	CAM1PR006(A/B/C/D) TV_VALUE1 = 21-24 mr A11_A03_01_4_TVM 4 A11_A03_02_3_TVM 4 A18_A03_S11 = 1 A18_A03_S10 = 1 A12_A01_07_6_TVM 2 A12_A02_07_6_TVM 2	C-BOP	(NEW) Radiation Monitor fails to isolate VF/Startup VG

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

NEW – Not used in the last two (2) NRC exams.

Appendix D

Scenario Outline

Form ES-D-1

Scenario No.: 2

Operating Test No.: 2019-301

Narrative Summary

Event #	Description
1.	<p>Shift Main EHC Pumps</p> <p>Following shift turnover, the SRO will direct the BOP operator to shift Main EHC Pumps IAW CPS 3105.02 MAIN EHC HYDRAULIC POWER UNIT (EH) section 8.1.2 Shifting Hydraulic Pumps to support hanging a clearance order.</p>
2.	<p>Raise Power With Rods to 30%</p> <p>The crew will raise Reactor power with Control Rods to achieve ~30% Reactor Power IAW CPS 3004.01 Turbine Startup And Generator Synchronization in preparation for transferring RR pumps to FAST speed.</p>
3.	<p>Inadvertent opening of a SRV</p> <p>Annunciators 5066-5B ADS OR SAFETY RELIEF VALVE LEAKING and 5067-8L SRV MONITORING SYSTEM TROUBLE come in due to SRV 1B21-F041A failing ~ 50% open. The BOP operator will diagnose and determine the problem is with 1B21-F041A. The BOP operator will sound the containment evacuation alarm, coordinate with the ATC and attempt to close the SRV IAW CPS 4009.01 Inadvertent Opening Safety/Relief Valve. The SRO will enter and execute CPS 4005.01 Loss of Feedwater Heating and direct the ATC to restore and maintain reactor power at or below the original power level. 1B21-F041A will shut when the control switch is placed in OFF at 1H13-P601.</p>
4.	<p>RR 'A' High Stator Temperature / Emergency Loop Shutdown</p> <p>Annunciator 5003-1K RECIRCULATION PUMP/MOTOR A OR B TEMPERATURE HIGH is received. Per the ARP, the BOP Operator will check the Pump/Motor A&B Temp Recorder (1B33-R601) and note that the 'A' RR pump motor stator temperatures (A/B/C phase windings) are reading 270° F and rising. The ARP directs the 'A' RR pump to be stopped if any motor winding temperature is > 266° F and rising. The ATC Operator will perform an emergency loop shutdown of the 'A' RR loop IAW CPS 3302.01H001 RR Loop/Pump Shutdown And Isolation Hardcard. Additionally, the SRO will enter CPS 4008.01 Abnormal Reactor Coolant Flow and ITS 3.4.1 Required Action C.1.</p>
5.	<p>'B' FC Pump trip</p> <p>Annunciators 5040-1E AUTO TRIP PUMP/MOTOR DIVISION 2 and 5040-7D TROUBLE FC SYSTEM LOCAL PNL 0PL45J comes in due to a trip of the 'B' Fuel Pool Cooling (FC) Pump 1FC02PB. The BOP Operator will diagnose the FC pump trip, dispatch an Equipment Operator to investigate, and shut FC supply/return containment isolation valves 1FC007, 1FC008, 1FC036 and 1FC037.</p>
6.	<p>RT Pump Shaft Shear/Failure to Trip on Low Flow</p> <p>Annunciator 5000-2F RWCU HI DIFF FLOW TIMER INITIATED comes in momentarily (can be cleared), 5000-2C F-D SYSTEM TROUBLE reflashes (~ 10 seconds later) and 5000-1A PUMP FLOW LO is received (~ 1 minute later) due to a shaft shear of the 'A' RT pump. The ATC Operator will recognize the failure of the 'A' RT pump to trip and manually trip the 'A' RT pump. The ATC will inform the SRO and review the ARP for any additional actions.</p>
7.	<p>1RIX-PR006A Fuel Building Exhaust PRM fails high</p> <p>A high alarm is received on the MCR AR/PR LAN for 1RIX-PR006A Fuel Building Exhaust PRM. The BOP will verify normal readings for 1RIX-PR006B, 6C, and 6D. The SRO will declare 1RIX-PR006A inoperable and enter TS 3.3.6.2 Secondary Containment Isolation Instrumentation Action A.1.</p>
8.	<p>RPV Instrument Line leak</p> <p>An RPV instrument line will break resulting in a partial loss of RPV instrumentation, a steam leak in the secondary containment and EOP-8 entry. Secondary containment temperatures will rise requiring a reactor scram. Two areas in secondary containment will exceed Maximum Safe temperature requiring blowdown. The crew may Anticipate Blowdown using bypass valves prior to two areas reaching max safe.</p>
9.	<p>Radiation Monitor fails to isolate VF/Startup VG</p> <p>Due to the RPV instrument line leak in the secondary containment, the VF exhaust radiation monitors trend up to the trip isolation set point but fail to actuate VF system isolation and start of VG requiring BOP to manually perform.</p>

Operator Actions

Event No.(s): 1		Page 1 of 1
Description: Shift Main EHC Pumps		
Initiation: Following shift turnover		
Cues: Directed by SRO		
Time	Position	Applicant's Actions or Behavior
<p><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> EHC fluid pressure</p> <p><u>Expected Annunciators:</u> 5017-3A Auto Start EHC Fluid Pump 1A/1B</p> <p><u>Automatic Actions:</u> Auto start of EHC Pump 1B</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. • Refers to ARP(s).
	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. • Refers to ARP(s). <p>Per CPS 3105.02, Main EHC Hydraulic Pump Unit (EH), Step 8.1.2:</p> <ul style="list-style-type: none"> • Starts EHC Pump 1A. ○ Ensures EHC Pump 1A discharge pressure ~ 1700 psig. • Allows EHC Pump 1A to run for at least 30 seconds. • Stops EHC Pump 1B. • Directs Equipment Operator to press the HFPM-B Test push-button. • Verifies EHC Pump 1B starts and its discharge pressure builds up to ~ 1720 psig. • Secures EHC Pump 1B by rotating its control switch counter clockwise to the stop position and then releasing the control switch to the AUTO position.
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures.
Terminus: EHC Pump 1A running, EHC Pump 1B secured.		

NOTES:

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

Operator Actions

Event No.(s): 2		Page 1 of 1
Description: Raise Power With Rods to 30%		
Initiation: Following Event 1 and upon direction of the SRO		
Cues: None		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> Reactor power, Rod drive parameters (flow, dP), control rod position, Generator load</p> <p><u>Expected Annunciators:</u> Annunciator 5006-2H, Rod Out Block</p> <p><u>Automatic Actions:</u> None</p>		
	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 3004.01 Turbine Startup And Generator Synchronization section 8.4.13: <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 • Refers to ARP(s). • 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. <ul style="list-style-type: none"> ○ Monitors reactor to ensure operations remain within established bands.
	SRO	<ul style="list-style-type: none"> • 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"> ○ If 5006-3D OPRM Enabled annunciator is received, enters and executes CPS 4100.02 Core Stability Control. ○ Notifies Shift Manager. ○ Notifies TSO. ○ Conducts a brief.
Terminus: Clearly observable plant response from change in power level.		

NOTES:

Operator Actions

Event No.(s): 3		Page 1 of 2
Description: Inadvertent opening of a SRV		
Initiation: Following Event 2 and upon direction of the Lead Examiner, insert REMOTE 1		
Cues: Annunciators 5066-5B ADS Or Safety Relief Valve Lifting and 5067-8L SRV Monitoring System Trouble		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> Reactor Power, RPV level, Suppression Pool temperature, Feedwater temperature</p> <p><u>Expected Annunciators:</u> 5066-5B ADS Or Safety Relief Valve Lifting and 5067-8L SRV Monitoring System Trouble</p> <p><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. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ● Refers to ARP(s). <p>Per CPS 4009.01 Inadvertent Opening Safety/Relief Valves:</p> <ul style="list-style-type: none"> ○ Sounds the containment evacuation alarm. <p>Per CPS 4005.01 Loss Of Feedwater Heating</p> <ul style="list-style-type: none"> ○ Reduces reactor power using RR flow or control rods to restore and maintain power <u>at or below</u> the original power level and < 3473 MWth. ○ Reports to SRO when SRV 1B21-F041A is shut.
[CT-1]	BOP	<ul style="list-style-type: none"> ○ Reports issue to SRO. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. ● Refers to ARP(s). <p>Per CPS 4009.01 Inadvertent Opening Safety/Relief Valves:</p> <ul style="list-style-type: none"> ○ Sounds the containment evacuation alarm. ○ [CT-1] Before Suppression Pool temperature reaches 110 °F, shuts the open SRV (1B21-F041A) by placing the 1H13-P601 control switch to OPEN, and then back to OFF. ○ Reports to SRO when SRV 1B21-F041A is shut.

Event No.(s): 3		Page 2 of 2
Description: Inadvertent opening of a SRV		
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. • Enters and executes CPS 4009.01 Inadvertent Opening Safety/Relief Valves ○ Enters and executes CPS 4005.01 Loss Of Feedwater Heating. • [CT-1] Before Suppression Pool temperature reaches 110 °F, directs shutting the open SRV (1B21-F041A). ○ Declares APLHGR not within limits (ONLY if FW temperature drops below 50 °F FFWTR curve of CPS 4005.01): <ul style="list-style-type: none"> ○ Applicable LCO – 3.2.1 ○ Applicable Condition – A ○ Required Action – A.1 within 2 hours ○ Declares MCPR not within limits (ONLY if FW temperature drops below 50 °F FFWTR curve of CPS 4005.01): <ul style="list-style-type: none"> ○ Applicable LCO – 3.2.2 ○ Applicable Condition – A ○ Required Action – A.1 within 2 hours ○ Declares LHGR not within limits (ONLY if FW temperature drops below 50 °F FFWTR curve of CPS 4005.01): <ul style="list-style-type: none"> ○ Applicable LCO – 3.2.3 ○ Applicable Condition – A ○ Required Action – A.1 within 2 hours ○ May review ITS 3.4.4 Safety/Relief Valves (S/RVs) and verify applicable LCOs are met. ○ Informs Shift Manager. ○ Conducts a brief.
Terminus: SRV 1B21-F041A is SHUT.		

NOTES:

Event No.(s):	4	Page	1	of	2
Description: RR 'A' High Stator Temperature / Emergency Loop Shutdown					
Initiation: Following Event 3 and upon direction of the Lead Examiner, insert REMOTE 2 .					
Cues: Annunciator, 5003-1K Recirc Pmp Mtr A or B Temp Hi					
Time	Position	Applicant's Actions or Behavior			
<p><u>Key Parameter Response:</u> Rising RR Pump 'A' motor stator phase winding temperatures and motor winding cooling water discharge temperature.</p> <p><u>Expected Annunciators:</u> 5003-1K Recirc Pmp Mtr A or B Temp Hi</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 5003-1K. Per 5003-1K Recirc Pmp Mtr A or B Temp Hi: <ul style="list-style-type: none"> ○ Observes rising temperatures on computer points RR-BA005, RR-BA006, and RR-BA007. ○ Directs BOP Operator to monitor Pump/Motor A&B Temp Recorder display and report abnormalities to the SRO: <ul style="list-style-type: none"> ○ RR Pump 'A' motor stator phase [A/B/C] winding temperatures reading 270° F and rising. ○ RR Pump 'A' motor winding cooling water discharge temperature is elevated. • Recommends to SRO that RR Pump 'A' be immediately stopped due to all three motor winding temperatures > 266° F and rising. Per 3302.01H001 RR Loop/Pump Shutdown and Isolation HARD CARD or 3302.01 section 8.2.3 (may immediately stop based on guidance in ARP without lowering RPV water level setpoint): <ul style="list-style-type: none"> • Determines Emergency Loop Shutdown is required due to high RR stator temperatures. ○ Lowers RPV water level setpoint to ~ 31 inches. • Trips RR Pump 1A by opening any of the following breakers: <ul style="list-style-type: none"> ○ Bkr 1A or 2A • Shuts 1B33-F067A, RX Recirc Pump 1A Disch Block Valve. Per CPS 4008.01 Abnormal Reactor Coolant Flow: <ul style="list-style-type: none"> ○ Monitors RR Pump seal pressure for signs of degradation. ○ Checks operation on the Power to Flow map. 			
	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. ○ Monitors Pump/Motor A&B Temp Recorder display and reports: <ul style="list-style-type: none"> ○ RR Pump 'A' motor stator phase [A/B/C] winding temperatures reading 270° F and rising. ○ RR Pump 'A' motor winding cooling water discharge temperature is elevated. ○ Makes plant announcement. • Demands an official 3D Monicore Case. 			

Event No.(s): 4		Page 2 of 2
Description: RR 'A' High Stator Temperature / Emergency Loop Shutdown		
Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> • Acknowledges report from ATC. • Determines that an Emergency Loop Shutdown of RR Pump 1A is required due to motor stator phase [A/B/C] winding temperatures reading 270° F and rising and directs the ATC to perform an emergency loop shutdown of RR Pump 1A. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. • Declares single recirculation loop in operation technical specification NOT met: <ul style="list-style-type: none"> • Applicable LCO - 3.4.1 • Applicable Condition – C • Required Action and Completion Time - C.1 within 24 hours • Enters and executes 4008.01 Abnormal Reactor Coolant Flow. <ul style="list-style-type: none"> ○ Enters and executes CPS 4100.02 Core Stability Control (due to initially being in OPRM enabled region before tripping RR Pump 'A'). ○ Informs Shift Manager. ○ Conducts a brief.
Terminus: RR Pump 1A secured and ITS 3.4.1 evaluated.		

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: 'B' FC Pump trip		
Initiation: Following Event 4 and upon direction of the Lead Examiner, insert REMOTE 3 .		
Cues: Annunciators 5040-1E, Auto Trip Pump/Motor Division 2 and 5040-7D, Trouble FC System Local Pnl 0PL45J		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> Upper Containment Pool level</p> <p><u>Expected Annunciators:</u> 5040-1E, Auto Trip Pump/Motor Division 2, 5040-7D, Trouble FC System Local Pnl 0PL45J</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. ○ Performs Plant Announcements. ○ Dispatches an Equipment Operator to investigate the trip of FC Pump 'B', support startup of FC Pump 'A', and check Upper Containment Pool level. ○ Notifies ROC Operator to investigate alarm and take appropriate actions at 0PL45J.
	BOP	<ul style="list-style-type: none"> • Reports issue to SRO. • Refers to ARP. ○ Performs Plant Announcements. • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands. <p>Per CPS 5040-1E Auto Trip Pump/Motor Division 2:</p> <ul style="list-style-type: none"> • Shuts the FC Upper Containment Pool Isolation Valves (1FC008, 007, 037, 036). ○ Recommends preparations be made to shutdown FC Pump 'B' and start FC Pump 'A' per CPS 3317.01 Fuel Pool Cooling and Cleanup (FC). ○ Dispatches an Equipment Operator to investigate the trip of FC Pump 'B', support startup of FC Pump 'A', and check Upper Containment Pool level. ○ Notifies ROC Operator to investigate alarm and take appropriate actions at 0PL45J.
	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 4006.02 Loss of Decay Heat Removal in Reactor Vessel Pool / Spent Fuel Pool. ○ Informs Shift Manager. ○ Contacts Maintenance to investigate. ○ Conducts a brief.
Terminus: Upper Containment Pool Isolation Valves (1FC008, 007, 037, 036) have been closed.		

NOTES:

Operator Actions

Event No.(s):		6	Page	1	of	1
Description: RT Pump Shaft Shear / Failure to Trip on Low Flow						
Initiation: Following Event 5 and upon direction of the Lead Examiner, insert REMOTE 4 .						
Cues: Annunciators 5000-2F RWCU Hi Diff Flow Timer Initiated and 5000-2C F-D System Trouble and 5004-1A Pump Flow Lo						
Time	Position	Applicant's Actions or Behavior				
<u>Key Parameter Response:</u> Cleanup Sys Inlet Flow and F-D A Effluent Flow <u>Expected Annunciators:</u> 5000-2F RWCU Hi Diff Flow Timer Initiated (momentary), 5000-2C F-D System Trouble (reflash ~ 10 seconds later) and 5000-1A PUMP FLOW LO (~ 1 minute later) <u>Automatic Actions:</u> Automatic trip of all running RWCU pumps (failure to trip)						
	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 ARPs for annunciators received. ○ Dispatches an Equipment Operator to investigate F-D System Trouble and status. <p>Per ARP Procedure for 5000-1A:</p> <ul style="list-style-type: none"> • Recognizes the failure of the 'A' RT pump to auto trip and manually stops the 'A' RT pump. ○ Refers to CPS 3303.01 Reactor Water Cleanup (RT) for shutdown directions. ○ Verifies the RR Continuous Conductivity Monitor is in service. ○ Notifies Chemistry that the RWCU system has been secured. 				
	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. ○ Dispatches an Equipment Operator to investigate F-D System Trouble and status. ○ Verifies the RR Continuous Conductivity Monitor is in service. ○ Notifies Chemistry that the RWCU system has been secured. 				
	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. ○ Informs Shift Manager. ○ Conducts a brief. 				
Terminus: 'A' RT pump secured.						

NOTES:

Operator Actions

Event No.(s): 7		Page 1 of 1
Description: 1RIX-PR006A Fuel Building Exhaust PRM fails high		
Initiation: Following Event 6 and upon direction of the Lead Examiner, insert REMOTE 5 .		
Cues: MCR AR/PR LAN alarm		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> 1RIX-PR006A fails high <u>Expected Annunciators:</u> AR/PR LAN Hi alarm <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. ○ Contacts RP to perform local radiation surveys.
	BOP	<ul style="list-style-type: none"> • Reports issue to SRO. • Reviews ARP 5140.63. • Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Monitors reactor to ensure operations remain within established bands ○ Dispatches Equipment Operator to investigate. <p>Per CPS 3315.03 Radiation Monitoring (AR-PR) and 5140.63:</p> <ul style="list-style-type: none"> • Determines alarm is not due to a spike. • Determines 1RIX-PR006B, 6C, and 6D are reading normally. ○ Contacts RP to perform local radiation surveys.
	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 expectations, standards and approved procedures. • Declares 1RIX-PR006A inoperable: <ul style="list-style-type: none"> • Applicable LCO - 3.3.6.2 • Applicable Condition – A • Required Action and Completion Time - A.1 within 24 hours ○ Informs Shift Manager. ○ Conducts a brief. ○ Contacts Maintenance to investigate.
Terminus: Technical Specification review complete.		

NOTES:

Operator Actions

Operator Actions

Event No.(s): 8		Page 1 of 2
Description: RPV Instrument Line leak		
Initiation: Following Event 7 and upon direction of the Lead Examiner, insert REMOTE 6 .		
Cues: Multiple Annunciators		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response</u>: Rising temperature on 1TR-CM327 Secondary Containment Temperature Recorder Point 14 (Aux Bldg Gas Cont Boundary).</p> <p><u>Expected Annunciators</u>: Multiple Annunciators</p> <p><u>Automatic Actions</u>: None</p>		
[CT-2]	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. ○ Checks Power to Flow map. ○ Reports EOP-8 entry when 1TR-CM327 secondary containment area temperature recorder point 14 reaches 104°F. ○ Makes plant announcement to evacuate affected areas of Secondary Containment. ○ [CT-2] Initiates a manual reactor scram when directed by the SRO and before 1TR-CM326 point 12 or 1TR-CM327 point 14 reaches 140°F. • 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). • Performs EOP actions as directed by the SRO. ○ Coordinates with BOP to monitor and control RPV level and pressure.
	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 Power to Flow map. ○ Reports EOP-8 entry when 1TR-CM327 secondary containment area temperature recorder point 14 reaches 104°F. ○ Makes plant announcement to evacuate affected areas of Secondary Containment. ○ Monitors secondary containment temperatures on 1H13-P678 recorders 1TR-CM326/327 (May be performed by Work Execution Center Supervisor). ○ Reports secondary containment temperature parameters with trends at SRO direction. ○ Reports to SRO when one area is above Max Safe temperature. • Performs scram choreography actions. <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 met to SRO. ○ Coordinates with ATC to monitor and control RPV level and pressure.

Operator Actions

Event No.(s): 8		Page 2 of 2
Description: RPV Instrument Line leak		
Time	Position	Applicant's Actions or Behavior
[CT-3]	ATC/BOP	<ul style="list-style-type: none"> ○ [CT-3] If directed by SRO, Anticipates Blowdown per EOP-1 by fully opening all six Turbine Bypass Valves. • [CT-3] Initiates ADS (Blowdown) if/when directed by the SRO. • If initiated, 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.
[CT-2] [CT-3]	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 4001.01 Reactor Coolant Leakage. • Enters and executes EOP-8 Secondary Containment Control. • [CT-2] Directs a reactor scram before 1TR-CM326 point 12 or 1TR-CM327 point 14 reaches 140°F. • Enters and executes EOP-1 RPV Control. ○ Directs reducing RPV pressure to 500-600 psig to lower the driving head of the leak. • [CT-3] Enters and executes EOP-3 Blowdown within 15 minutes of 1TR-CM326 point 12 and 1TR-CM327 point 14 exceeding 140°F. (CT-3 can also be satisfied by anticipating blowdown per EOP-1.) <ul style="list-style-type: none"> • Time 1TR-CM326 point 12 and 1TR-CM327 point 14 exceeds 140°F _____ • Time ADS initiated _____ • Time interval NOT longer than 15 minutes YES / NO
Terminus: When either a blowdown has been initiated and RPV level is being maintained between Level 3 and Level 8 <u>or</u> when Secondary Containment temperatures are lowering and all rods are inserted.		

NOTES:

Operator Actions

Event No.(s): 9		Page 1 of 1
Description: Radiation Monitor fails to isolate VF/Startup VG		
Initiation: Triggered by RPV Instrument Line leak (Event 8)		
Cues: Annunciators 5050-7F, 5052-7F and AR/PR 1RIX-PR006B-D monitor alarms		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> 1RIX-PR006B-D Fuel Bldg Exhaust Rad Monitors <u>Expected Annunciators:</u> 5050-7F / 5052-7F High Rad Initiation SGTS Div 1 / 2 <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 EOP-8 entry condition.
	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 EOP-8 entry condition. <p>Performs actions directed by SRO and CPS 5050-7F, 5052-7F, Hi Rad Initiation VG:</p> <ul style="list-style-type: none"> • Verifies alarming condition of 1RIX-PR006B-D. • Places VG in service per CPS 3404.01H001. <ul style="list-style-type: none"> • Stops Fuel Building Ventilation (VF) supply and exhaust fans. • Isolates VF by closing 1VF04Y/9Y <u>AND</u> 1VF06Y/7Y. • Performs startup of one Standby Gas (VG) train.
	SRO	<ul style="list-style-type: none"> • Acknowledges report 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.
Terminus: One VG train started and VF system shutdown and isolated.		

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-210** (PW 59567) @ **25% 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:
 - None
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 27** is in progress - **Gang 10A** is at **Position 48**.
12. Make sure Sequence A is selected.
13. Make sure Individual Drive Mode is selected.
14. Make sure the FP bell toggle switch on the OG panel (is in the up position).
15. Generate a 3D Case.
16. Procedures that are expected to be used during this scenario are:
 - CPS 3004.01 TURBINE STARTUP AND GENERATOR SYNCHRONIZATION
 - CPS 3105.02 MAIN EHC HYDRAULIC POWER UNIT (EH)
 - CPS 3302.01 REACTOR RECIRCULATION (RR)
 - CPS 3302.01H001 RR LOOP PUMP SHUTDOWN AND ISOLATION HARD CARD
 - CPS 3303.01 REACTOR WATER CLEANUP (RT)
 - CPS 3304.02 ROD CONTROL AND INFORMATION SYSTEM (RC&IS)
 - CPS 3315.03 RADIATION MONITORING (AR-PR)
 - CPS 3317.01 FUEL POOL COOLING AND CLEANUP (FC)
 - CPS 3404.01 FUEL BUILDING HVAC (VF)
 - CPS 3404.01H001 PLACING STANDBY GAS TREATMENT INTO SERVICE HARDCARD
 - CPS 4001.01 REACTOR COOLANT LEAKAGE
 - CPS 4005.01 LOSS OF FEEDWATER HEATING
 - CPS 4008.01 ABNORMAL REACTOR COOLANT FLOW
 - CPS 4009.01 INADVERTENT OPENING SAFETY RELIEF VALVE
 - CPS 4100.01 REACTOR SCRAM
 - CPS 4401.01 EOP-1 RPV CONTROL
 - CPS 4406.01 EOP-8 SECONDARY CONTAINMENT CONTROL
 - CPS 4407.01 EOP-3 EMERGENCY RPV DEPRESSURIZATION (BLOWDOWN)
 - CPS 5000.01 ALARM PANEL 5000 ANNUNCIATORS-ROW 1
 - CPS 5000.02 ALARM PANEL 5000 ANNUNCIATORS-ROW 2
 - CPS 5003.01 ALARM PANEL 5003 ANNUNCIATORS-ROW 1
 - CPS 5006.03 ALARM PANEL 5006 ANNUNCIATORS-ROW 3
 - CPS 5017.03 ALARM PANEL 5017 ANNUNCIATORS-ROW 3
 - CPS 5040.01 ALARM PANEL 5040 ANNUNCIATORS-ROW 1
 - CPS 5040.07 ALARM PANEL 5040 ANNUNCIATORS-ROW 7
 - CPS 5050.07 ALARM PANEL 5050 ANNUNCIATORS-ROW 7

- CPS 5052.07 ALARM PANEL 5052 ANNUNCIATORS-ROW 7
- CPS 5066.05 ALARM PANEL 5066 ANNUNCIATORS-ROW 5
- CPS 5140.63 AR PR ANNUNCIATOR – FUEL BUILDING EXHAUST 1RIX-PR006 A,B,C,D
- ITS 3.3 INSTRUMENTATION (LCO 3.3.6.2)
- ITS 3.4 REACTOR COOLANT SYSTEM (LCO 3.4.1 and 3.4.4)

17. Hang OOS tags on: None

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

19. Operating Equipment: None

20. Marked up copies:

- CPS 3004.01 Turbine Startup And Generator Synchronization

21. Verify simulator conditions match the turnover.

Event Triggers and Role Play

Event #

1. **Shift Main EHC Pumps**
 - a. Event Trigger – None
 - b. Role play
 - (1) EO (when requested): report “EHC reservoir level is at +2 inches.”
 - (2) EO (when requested): report “EHC Pump 1A discharge pressure is 1700 psig.”
 - (3) EO (when requested to press the HFPM-B Test push-button to test the standby feature on EHC Pump 1B): acknowledge the order and then **release Event 1 – Shift Main EHC Pumps** and verify the following commands:
 - a) **A04_A28_S02 Start.** (EHC Fluid Pump 1B)
 - b) **A04_A08_03_1_TVM Steady.** (5017-3A Auto Start EHC Fluid Pump 1A/1B)
 - (4) EO (when requested): report “EHC Pump 1B discharge pressure is 1720 psig.”
2. **Raise Power With Rods to 30%**
 - a. Event Trigger – None
 - b. Role play – None
3. **Inadvertent opening of a SRV**
 - a. Event Trigger – Following Event 2 and when directed by the Lead Examiner, **Activate Remote 1** and verify the following command(s):
 - (1) **YPXMAISE_72 = 50.** (F041A Fail to position)
 - b. Role play
 - (1) Maintenance (if requested): respond “Dispatching personnel to investigate.”
 - (2) RE (if requested): acknowledge report and respond, “On my way to MCR to review 3D Monicore case”.
4. **RR ‘A’ High Stator Temperature / Emergency Loop Shutdown**
 - a. Event Trigger - Following Event 3 and when directed by the Lead Examiner, **Activate Remote 2** and verify the following command(s):
 - (1) **RR_A_STATOR_WDG.** (RR Pump A Stator Winding Temperature Control).
 - b. Role play
 - (1) RE (when contacted about the RR ‘A’ Stator Winding Failure) – “I am on my way to the MCR.”
5. **‘B’ FC Pump trip**
 - a. Event Trigger - Following Event 4 and when directed by the Lead Examiner, **Activate Remote 3** and verify the following command(s):
 - (1) **FC01BFC2PBFO.** (FC Pump B Bkr Tripped)
 - b. Role play
 - (1) EO (when directed to investigate trip of the FC Pump): report, “The breaker has tripped.”
 - (2) EO (if directed to support shifting FC Pumps): report, “I’m on my way to RP to receive my high rad brief”.
 - (3) EO (if directed to check upper containment pool level)
 - a) with annunciators 5040-5E and 5F **clear**: report, “Upper Pool level is above the top of the weir wall”.
 - b) with annunciators 5040-5E and 5F **locked in**: report, “Upper Pool level is several inches below the top of the weir wall”.
 - (4) Maintenance (when directed to investigate trip of the FC Pump): report “We’ll have electricians investigate the cause of the breaker trip and get a troubleshooting plan generated”.

6. **RT Pump Shaft Shear/Failure to Trip on Low Flow**

- a. Event Trigger - Following Event 5 and when directed by the Lead Examiner, **Activate Remote 4** and verify the following command(s):
 - (1) **RT_PUMPA_FAIL_TRIP**. (Fail to trip RT Pump A on Low Flow)
 - (2) **YFCUPPSS_1**. (RT Pump A Sheared Shaft)
- b. Role play
 - (1) EO (if directed to investigate loss of RT Pump A):
 - a) Via Camera – Report “No abnormalities noted using RT Pump Room A cameras”.
 - b) In person – Report, “I’m on my way to RP to receive my high rad brief”.
 - (2) EO (if A RT F-D status is requested): respond “the A RT F-D is in HOLD”.
 - (3) EO (if A RT Pump Casing temperature is requested): Report, “RT Pump ‘A’ casing temperature is 280°F.
 - (4) Chemistry (if requested):
 - a) Acknowledge report that RWCU system has been secured.
 - b) Report, “RR Conductivity Monitor is in service”.
 - (5) Maintenance (if requested): respond “Dispatching personnel to investigate.”

7. **1RIX-PR006A Fuel Building Exhaust PRM fails high**

- a. Event Trigger – Following Event 6 and when directed by the Lead Examiner, **Activate Remote 5** and verify the following command(s):
 - (1) **CAM1PR006ATV_VALUE1** (1RIX-PR006A CH1 Value Override)
- b. Role play
 - (1) RP (if asked to check radiation levels around 1RIX-PR006A): “Radiation levels are normal.”
 - (2) Maintenance (if requested to come to the MCR): acknowledge the order and report, I will brief out the technicians and send them up to the MCR”.

8. **RPV Instrument Line leak**

- a. Event Trigger - Following Event 7 and when directed by the Lead Examiner, **Activate Remote 6** and verify the following command(s):
 - (1) **YP_XMFTB_5082**. (Reference leg leak in Gas Control Boundary)
- b. Role play:
 - (1) Maintenance (after 2 minutes from scram announcement) – report to the MCR as IMD.
 - (2) WEC (if asked to determine which FP XL-3 points in alarm) – report, “Multiple AB 737E and 762E points are in alarm.
 - (3) WEC (if directed) – report to MCR to monitor/report secondary containment temperatures.

9. **Radiation Monitor fails to isolate VF/Startup VG**

- a. Event Trigger – After **Remote 6** is actuated and following a 2:33 minute time delay, verify the following command(s):
 - (1) **CAM1PR006(A/B/C/D)TV_VALUE1=20 mr – 24 mr**. (PR006A/B/C/D = 20 mr – 24 mr)
 - (2) **A12_A01_07_6_TVM2**. (Annunciator 5050-7F, Hi Rad Initiation SGTS Div 1)
 - (3) **A12_A02_07_6_TVM2**. (Annunciator 5052-7F, Hi Rad Initiation SGTS Div 2)
- b. Role play
 - (1) EO (If directed to S/D VF locally):
 - a) Wait 3 minutes then release – ‘Shutdown VF locally’.
 - b) Report “VF is shutdown locally”.

CT Bases Information

1. [CT-1] Shuts Safety Relief Valves (SRVs) before Suppression Pool temperature reaches 110°F.
 - a) This critical task was derived from ITS 3.6.2.1 Suppression Pool Average Temperature and EOP-6 Primary Containment Control. Per B3.6.2.1, Average temperature shall be $\leq 110^{\circ}\text{F}$ when THERMAL POWER is $\leq 1\%$ RTP. This requirement ensures that the plant will be shut down at $> 110^{\circ}\text{F}$. The pool is designed to absorb decay heat and sensible heat but could be heated beyond design limits by the steam generated if the reactor is not shut down. Taking mitigating actions to prevent an unnecessary reactor shutdown is therefore critical.
2. [CT-2] ATC inserts a manual scram before area temperature reaches max safe in any one area.
 - 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 are approaching max safe values. 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 scram reduces the rate of energy production and thus the heat input, radioactivity release, and break flow into the secondary containment. An action that mitigates the event and precludes heat input, radioactivity release, and break flow into the secondary containment is therefore critical.
3. [CT-3] Enters and executes EOP-3 Blowdown within 15 minutes of 1TR-CM326 point 12 and 1TR-CM327 point 14 exceeding 140°F. (CT-3 can also be satisfied by anticipating blowdown per EOP-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 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 ~ 25% power.
 - a. CPS 3004.01 Turbine Startup And Generator Synchronization. Section 5.0 Prerequisites are complete. Steps 8.1.1 – 8.4.12 are complete. Step 8.4.13 in progress.
 - b. Transient annunciator response to Feedwater Heater alarms has been authorized.
 - c. Control rods - Step 27 is in progress / Gang 10A @ position 48.
 - d. Reactor Water Cleanup is in a single pump/single filter demin (F/D) lineup ('A' pump and 'A' F/D in service).
2. Status of Tagged Out Equipment
 - None
3. Today Day Shift
4. Weather Conditions
 - Calm and clear.
5. Thermal Limit Problems or concerns
 - Power ascension to 30% per CPS 3004.01 Turbine Startup and Generator Synchronization is in progress.
 - RE and Rod Verifier are available on request.
6. LCO's in effect
 - None
7. Surveillances in progress
 - None
8. Previous Shift Evolutions completed
 - None
9. Evolutions planned for the shift
 - First Priority – Main EHC pump 1B is in service. Shift hydraulic pumps from 1B to 1A in service IAW CPS 3105.02 MAIN EHC HYDRAULIC POWER UNIT (EH) to support hanging a clearance order.
 - Continue power ascension to 30% per CPS 3004.01 Turbine Startup and Generator Synchronization in preparation for transfer of RR pumps to fast speed.
10. Risk Levels
 - Green
 - Protected Equipment: None

Exelon Nuclear

ILT 18-1 NRC Exam

**Scenario Number:
NRC Exam Scenario 3**

Revision Number: 0

Date: 10/18/18

Developed By:	<u>Bill Kiser</u> Instructor	<u>10/18/18</u> Date
Validated By:	<u>Tim Windingland</u> SME or Instructor	<u>5/1/19</u> Date
Reviewed By:	<u>Pat Bulpitt</u> Operations Representative	<u>6/3/19</u> Date
Approved By:	<u>Tony Jennings</u> Training Department	<u>6/3/19</u> Date

Appendix D

Scenario Outline

Form ES-D-1

Facility: Clinton Power StationScenario No.: 3Operating Test No.: 2019-301Examiners: _____

_____Operators: _____

Initial Conditions:

- Mode 1 Rx Power at RTP.
- Weather conditions are calm and clear.
- CRD Drive Water Pump 1A (1C11-C001A) is Out Of Service (OOS) for maintenance.

Turnover:

- Priorities:
 - Cross-tie 480V Buses 1L & 1M with 1L supplying per CPS 3502.01 480 VAC Distribution – First Priority.
 - Maintain Rx Power at RTP.

LCOs in effect:

- 3.3.6.2 (Secondary Containment Isolation Instrumentation) Required Actions A.1, B.1, C.1.1 & C.2.1

Critical Tasks:

- [CT-1] Starts GC pump 'A' prior to bypass valves starting to open.
- [CT-2] Place mode switch in Shutdown within 38 minutes of CRD drive water pump 1B trip.
- 2 minutes (time for Equipment Operator to reach containment and report accumulator pressures).
- 16 minutes (time it takes for second accumulator trouble to come in).
- 20 minutes (once LCO 3.1.5 is met, time in which LCO required action must be taken).

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N-BOP	(NEW) Cross-tie 480V Buses 1L & 1M with 1L supplying
2	A01_A08_A02_4 Manual A01_A08_A02_7 False	C-ATC	(NEW) Hotwell M/U Controller Failure
3	1VF04CA 1VF04CB	C-BOP TS-SRO	(NEW) VF Exhaust and Supply Fans Trip
4	A02_A05_03_8 TVM=2 TFRPC_4=Off TFRPC_3=Off TFRPC_2=Off TFRPC_1=On C34DA014subsf=True C34DA014subsv=-1	TS-SRO	(NEW) RWL Inoperable
5	1GC01PB=3	C-BOP	(NEW) Trip of Operating GC Pump (1GC01PB) / Failure of Standby GC Pump to Auto Start
6	YFCUCTPW_1	C-ATC	(NEW) 'A' RT Filter Demin Trip
7	YPXMALSE_18 3% (ramped over 3 minutes)	R-ATC	(NEW) Loss of Main Generator H ₂ requiring power reduction
8	YP_XMFTB_4853	M-All	(NEW) Trip CRD Drive Water Pump 1B / Complete Loss of CRD / Scram
9	YP_XMFTB_4986	C-All	(NEW) Low SB Hydraulic Pressure due to reservoir leak
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor NEW – Not used in the last two (2) NRC exams.			

Appendix D

Scenario Outline

Form ES-D-1

Scenario No.: 3Operating Test No.: 2019-301

Narrative Summary

Event #	Description
1.	<p>Cross-tie 480V Buses 1L & 1M with 1L supplying Following shift turnover, the SRO will direct the BOP Operator to cross-tie 480V Buses 1L & 1M with 1L supplying per CPS 3502.01 480 VAC Distribution section 8.1.4 Transferring a 480V Bus: Paralleling Method.</p>
2.	<p>Hotwell M/U Controller Failure Annunciator 5014-3B Not Fully Closed Cdsr Emerg M/U Vlv 1CD045 is received and rising hotwell level will be observed. The ATC will diagnose the failure of the Cond Make-Up Controller (1LC-CD057B) and will take manual control per CPS 3104.01 Condensate / Condensate Booster (CD/CB) section 8.6.1 Abnormal Condenser Hotwell Level HIGH Level.</p>
3.	<p>VF Exhaust and Supply Fans Trip The Fuel Building (VF) Exhaust and Supply Fans will trip causing a high differential pressure in the Fuel Building (5042-5D). The SRO will enter ITS 3.3.6.2 (Secondary Containment Isolation Instrumentation) Required Actions A.1, B.1, C.1.1 & C.2.1 and EOP-8 Secondary Containment Control. The VF system will not be able to be restored. The SRO will direct the BOP to manually initiate Standby Gas Treatment System Train A or B IAW CPS 3319.01 Standby Gas Treatment (VG) section 8.2.1 Manual Initiation to restore secondary containment differential pressure.</p>
4.	<p>RWL Inoperable Annunciator 5006-3H LOW POWER ALARM POINT will be received. The ATC operator will observe that the light above HI POWER SET PT, LO POWER ALM PT, and LO POWER SET PT are off and the Turbine 1st Stage Pressure indication on the PPC shows "white data". The SRO will declare the RWL high power function INOPERABLE. Technical Specification LCO 3.3.2.1, Action A.1 will be evaluated requiring any control rod withdrawal to be suspended immediately.</p>
5.	<p>Trip of Operating GC Pump (1GC01PB) / Failure of Standby GC Pump to Auto Start Annunciator AUTO TRIP TURBINE AUXILIARY PUMP / MOTOR (5017-1A) comes in due to the GC1PB breaker trip. The standby GC pump will fail to auto start. The BOP operator will start the standby pump manually <u>before</u> bypass valves start to open, inform the SRO and review the ARP.</p>
6.	<p>'A' RT 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 (EO) to investigate, The ATC will then coordinate with the EO to lineup system for 2 pump / 1 filter demin operation.</p>
7.	<p>Loss of Main Generator H₂ requiring power reduction Annunciator TROUBLE GC SYSTEM LOCAL PNL 1PL10J (5018-2A) comes in and an Equipment Operator (EO) is dispatched to investigate. Main Generator H₂ pressure will begin slowly lowering. EO will report that Annunciators MACH GAS PRESSURE HIGH LOW (5021-1A) and DIFF'L SEAL OIL PRESS LOW (due to a malfunction of the Delta Pressure Reg Valve/ H₂ leak). The BOP will coordinate with the EO to bypass the Delta Pressure Reg Valve IAW CPS 3109.01 GENERATOR SEAL OIL (SO), stopping the leak. The loss of H₂ pressure will also require the ATC to lower reactor power within the limits of CPS 3111.01 GENERATOR GAS (HY, CO) Appendix A GENERATOR ESTIMATED CAPABILITY CURVES.</p>
8.	<p>Trip CRD Drive Water Pump 1B/Complete Loss of CRD/Scram Annunciators 5068-3B CRD DRIVE WATER PUMP AUTO TRIP and 5068-4B CHARGING WATER PRESSURE LOW are received. The BOP will determine that the running RD Pump tripped, review applicable ARPs and report ITS 3.1.5 as an applicable Tech Spec to the SRO. An Equipment operator (EO) will be dispatched to the containment to monitor HCU accumulator pressures. The ATC will coordinate with the EO to determine when each control rod scram accumulator pressure drops below 1520 psig (rendering it INOPERABLE). Technical Specification LCO 3.1.5 Control Rod Scram Accumulators Conditions A, B and D will be evaluated and entered. The SRO will direct the ATC to scram the reactor within 20 minutes of the second accumulator reported as < 1520 psig.</p>
9.	<p>Low SB Hydraulic Pressure due to reservoir leak Annunciator 5006-2L HPU TROUBLE is received due to low fluid pressure cause by a leak in the reservoir of the Steam Bypass & Pressure Control (SB&PC) Hydraulic Power Unit. Once the Generator has tripped off-line (Event 8), the crew will be unable to control pressure using the bypass valves (BPVs). The SRO will direct the ATC or BOP to control Reactor Pressure using an alternate pressure control method IAW EOP-1 RPV Control and CPS 4411.09 RPV Pressure Control Sources.</p>

Operator Actions

Event No.(s): 1		Page 1 of 1
Description: Cross-tie 480V Buses 1L & 1M with 1L supplying		
Initiation: Following shift turnover		
Cues: Directed by SRO		
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" 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> None</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. ○ Makes plant announcement for bus shift
	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. ○ Makes plant announcement for bus shift <p>Per CPS 3502.01, 480V Distribution, Step 8.1.4:</p> <ul style="list-style-type: none"> • Closes the 480V Unit Sub 1L to 1M Tie Breaker 1AP24E. • Opens the 480V Unit Sub 1M Main Breaker 1AP25E. <p>(May refer to CPS 3502.01 Att. 1 for circuit breaker EINs)</p>
	SRO	<ul style="list-style-type: none"> • Directs actions listed above. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures.
Terminus: Unit Subs 1L & 1M are cross tied with the Unit Sub 1M main feeder open.		

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: Hotwell M/U Controller Failure		
Initiation: Following Event 1 and upon direction of the Lead Examiner, insert REMOTE 1		
Cues: Annunciator 5014-3B, Not Fully Closed Condenser Emergency Make-Up Valve 1CD045		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> Rising hotwell level</p> <p><u>Expected Annunciators:</u> 5014-3B Not Fully Closed Condenser Emergency Make-Up Valve 1CD045</p> <p><u>Automatic Actions:</u> Emergency Overflow Valve 1CD020 opens</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. ○ Diagnoses failure of the 1LC-CD057B controller automatic function. <p>Per CPS 3104.01 Condensate/Condensate Booster, Sections 8.6.1/8.3.2:</p> <ul style="list-style-type: none"> • Manually controls Hotwell level between 36 and 55 inches as follows: <ul style="list-style-type: none"> • Places Condenser Makeup Controller 1LC-CD057B in MANUAL • Controls Hotwell level between 36 and 55 inches.
	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. ○ References ARPs, and ensures that the ATC Operator is taking actions per CPS 3104.01 Condensate/Condensate Booster (CD/CB).
	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 1LC-CD057B controller failure.
Terminus: 1LC-CD057B in manual; hotwell level restored to normal band (36-55 inches).		

NOTES:

Operator Actions

Event No.(s):		3	Page		1	of	2
Description: VF Exhaust and Supply Fans Trip							
Initiation: Following Event 2 and upon direction of the Lead Examiner, insert REMOTE 2							
Cues: Annunciator 5042-5D, High Diff Press Fuel Bldg and 5042-4D, Trouble VF System Local Pnl 1PL44J							
Time	Position	Applicant's Actions or Behavior					
<u>Key Parameter Response:</u> Secondary Containment Differential Pressure <u>Expected Annunciators:</u> 5042-5D High Diff Press Fuel Bldg and 5042-4D Trouble VF System Local Pnl 1PL44J <u>Automatic Actions:</u> Running Fuel Building Supply Fan (1VF03CA/B) trips at 0.0 in. W.C.							
	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. Reports SPDS Alarm on high Secondary Containment differential pressure. 					
	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. Recognizes that the Fuel Building (VF) system is shutdown. Reports issue to the SRO. Refers to the ARP for 5042-5D High Differential Pressure Fuel Building. <p>Per 5042-5D High Differential Pressure Fuel Building:</p> <ul style="list-style-type: none"> Dispatches Equipment Operator to investigate. Informs SRO to refer to ITS LCO 3.6.4.1 Secondary Containment for possible required actions. <ul style="list-style-type: none"> When directed, manually initiates Standby Gas Treatment (SBGT) System (Train A or B) IAW CPS 3319.01 Standby Gas Treatment (VG) section 8.2.1 Manual Initiation to restore secondary containment differential pressure or CPS 3404.01H001 Placing Standby Gas Treatment into Service. <ul style="list-style-type: none"> Verifies/secures all diesel exhaust sources which have the potential of being drawn into VG charcoal beds. Verifies either 0RIX-PR003 or PR004, SGTS Stack PRM in-service and operable. Notifies Chemistry <u>after</u> SGTS flow is initiated to perform sampling per CPS 9940.01, Weekly Chemistry Surveillance Log. Monitors Secondary Containment pressure. Places the selected SGTS train in service by starting SGTS Trn A(B) Exh Fan, 0VG02CA(B). <ul style="list-style-type: none"> Verifies expected automatic actions: <ul style="list-style-type: none"> 1VG17YA(B) closes 1VG16YA(B) closes 1VG04YA(B) opens 1VG05YA(B) opens 1VG06YA(B) opens 1VG02YA(B) opens 0VG01YA(B) opens (modulates) 0VG04AA(B) energizes (SGTS Trn A (B) Heater) 0VG02YA(B) opens 0VG05YA(B) opens 0VG05CA(B) (SGTS Room Fan) starts (local indication) 					

Event No.(s): 3		Page 2 of 2
Description: VF Exhaust and Supply Fans Trip		
Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards, and approved procedures. • Declares Secondary Containment Isolation Instrumentation INOPERABLE: <ul style="list-style-type: none"> • Applicable LCO – 3.3.6.2 • Applicable Condition – A and B • Required Action and Completion Time - A.1 within 24 hours, B.1 within 1 hour. ○ (Note 1) Declares Secondary Containment INOPERABLE: <ul style="list-style-type: none"> ○ Applicable LCO – 3.6.4.1 ○ Applicable Condition – A ○ Required Action and Completion Time - A.1 within 4 hours • Directs BOP to manually initiate Standby Gas Treatment (SBGT) System (train A or B) IAW CPS 3319.01 Standby Gas Treatment (VG) section 8.2.1 Manual Initiation to restore secondary containment differential pressure <u>or</u> CPS 3404.01H001 Placing Standby Gas Treatment into Service. • Enters and executes EOP-8 Secondary Containment Control. <ul style="list-style-type: none"> ○ Exits ITS 3.6.4.1 when secondary containment vacuum has been restored ≥ 0.25 inches of vacuum water gauge. ○ Exits EOP-8 when secondary containment differential pressure has been restored above 0 inches of water. ○ Informs the Shift Manager. ○ Conducts a brief.
Terminus: VG operating, Secondary Containment dP restored. ITS LCOs 3.3.6.2 and 3.6.4.1 evaluated.		

NOTES:

- 1) Entry into ITS LCO 3.6.4.1 is optional. Per the note in ITS SR 3.6.4.1.1, the secondary containment vacuum requirement is not required to be met for 4 hours if analysis demonstrates one standby gas treatment (SGT) subsystem is capable of establishing the required secondary containment vacuum. The examinee may choose one of the following two options:
 - to enter LCO 3.6.4.1 when secondary containment vacuum is lost, and then start SGTS to restore secondary containment vacuum, or
 - utilize the note in ITS 3.6.4.1.1 to start a 4 hour clock to restore secondary containment vacuum without entering LCO 3.6.4.1.

Operator Actions

Event No.(s): 4		Page 1 of 1
Description: RWL Inoperable		
Initiation: Following Event 3 and upon direction of the Lead Examiner, insert REMOTE 3		
Cues: Annunciator 5006-3H, Low Power Alarm Point		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> RPC Mode lights above LO POWER SET PT and LO POWER ALM PT and Turbine 1st Stage Pressure</p> <p><u>Expected Annunciators:</u> 5006-3H Low Power Alarm Point</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.
	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.
	SRO	<ul style="list-style-type: none"> • Acknowledges report from ATC/BOP. • Directs actions listed above. ○ Evaluates CPS 3005.01 Section 6.2 First Stage Turbine Pressure Impacts and determines that the Rod Withdrawal Limiter (RWL) is Inoperable • Declares Control Rod Block Instrumentation INOPERABLE: <ul style="list-style-type: none"> • Applicable LCO - 3.3.2.1 • Applicable Condition – A • Required Action and Completion Time - A.1 immediately • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. ○ Informs Shift Manager. ○ Informs TSO. ○ Conducts a brief.
Terminus: ITS 3.3.2.1 evaluated for inoperable RWL.		

NOTES:

Operator Actions

Event No.(s):		5	Page		1	of	1
Description: Trip of Operating GC Pump (1GC01PB) / Failure of Standby GC Pump to Auto Start							
Initiation: Following Event 4 and upon direction of the Lead Examiner, insert REMOTE 4							
Cues: Annunciator 5017-1A, Auto Trip Turbine Auxiliary Pump/Motor and 5018-2A Trouble GC System Local Pnl 1PL10J							
Time	Position	Applicant's Actions or Behavior					
Key Parameter Response: Low GC flow/pressure (1PL10J)							
Expected Annunciators: 5017-1A, Auto Trip Turbine Auxiliary Pump/Motor and 5018-2A Trouble GC System Local Pnl 1PL10J							
Automatic Actions: Standby GC Pump auto starts on low discharge pressure (failure to auto start)							
	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 1PL10J annunciators and trip of the GC pump 'B' and failure of the standby pump to auto start. 					
[CT-1]	BOP	<ul style="list-style-type: none"> Reports issue to SRO. [CT-1] Recognizes the failure of the standby pump to auto start and manually starts GC pump 'A' prior to bypass valves starting to open. Refers to ARP. Performs Plant Announcements. 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 1PL10J annunciators and trip of the GC pump 'B' and failure of the standby pump to auto start. 					
[CT-1]	SRO	<ul style="list-style-type: none"> Acknowledges reports from ATC/BOP. Directs actions listed above. [CT-1] Recognizes the failure of the standby pump to auto start and directs starting GC pump 'A' prior to Main Turbine Bypass Valves starting to open. 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: GC Pump 'A' in operation.							

NOTES:

Operator Actions

Event No.(s):		6	Page	1	of	1
Description: 'A' Reactor Water Cleanup Filter Demin Trip						
Initiation: Following Event 5 and upon direction of the Lead Examiner, insert REMOTE 5 .						
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. 				
	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. ○ 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): 7		Page 1 of 2
Description: Loss of Main Generator H₂ requiring power reduction		
Initiation: Following Event 6 and upon direction of the Lead Examiner, insert REMOTE 6		
Cues: Annunciator 5018-2A, Trouble Generator Cooling System Local Panel 1PL10J		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> Hydrogen Pressure <u>Expected Annunciators:</u> 5018-2A Trouble Generator Cooling System Local Panel 1PL10J <u>Automatic Actions:</u> None		
	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 issue to the SRO. ○ Per CPS 3111.01 Generator Gas (HY, CO), reviews Generator Estimated Capability Curve and recommends lowering generator load to within the range delineated by the current gas pressure. • Inserts control rods per the control rod sequence and/or lowers Recirc Flow with the Loop Flow Controllers to lower power to within the range delineated by the current gas pressure (~1040 MWe at 55 psig H₂ pressure and 230 MVARs). <ul style="list-style-type: none"> ○ Directs an Equipment Operator to investigate.
	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 issue to the SRO. ○ Makes plant announcement. • Refers to ARP for 5018-2A Trouble Generator Cooling System Local Panel 1PL10J. <ul style="list-style-type: none"> ○ Directs an Equipment Operator to investigate. ○ Per CPS 3111.01 Generator Gas (HY, CO), reviews Generator Estimated Capability Curve and recommends lowering generator load to within the range delineated by the current gas pressure. <p>Per CPS 3109.01, Generator Seal Oil (SO), coordinates with an Equipment Operator to bypass the Delta Press Reg Valve (1SOH19):</p> <ul style="list-style-type: none"> • Directs Equipment Operator to Throttle OPEN Delta Press Reg Vlv Bypass (1SOH21) and controls seal oil pressure at 6-10 psi greater than hydrogen pressure. • Directs Equipment Operator to shut Delta Press Reg Vlv Inlet (1SOH18). • Directs Equipment Operator to shut Delta Press Reg Vlv Outlet (1SOH20). ○ Coordinates with Equipment Operator to restore H₂ pressure IAW CPS 3111.01 Section 8.1.4 Adjust/Maintain Generator H₂ Pressure to 75 psig.

Event No.(s): 7		Page 2 of 2
Description: Loss of Main Generator H₂ requiring power reduction		
Time	Position	Applicant's Actions or Behavior
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Directs actions listed above. • Per CPS 3111.01 Generator Gas (HY, CO), reviews Generator Estimated Capability Curve and directs lowering generator load to within the range delineated by the current gas pressure. • Notifies as soon as practical, but within 15 minutes, TSO/MISO of any change in generator real or reactive load. • 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. ○ Contacts Maintenance to investigate. ○ Conducts a brief.
Terminus: Generator Gas pressure is stable. Observable power decrease has been observed.		

NOTES:

Operator Actions

Event No.(s): 8, 9		Page 1 of 3
Description: Trip CRD Drive Water Pump 1B / Complete Loss of CRD / Scram / Low SB Hydraulic Pressure due to reservoir leak		
Initiation: Following Event 7 and upon direction of the Lead Examiner, insert REMOTE 7		
Cues: Annunciators 5068-3B CRD Drive Water Pump Auto Trip and 5068-4B Charging Water Pressure Low		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> CRD cooling water flow, CRD charging water pressure and CRDM temperatures.</p> <p><u>Expected Annunciators:</u> 5068-3B CRD Drive Water Pump Auto Trip and 5068-4B Charging Water Pressure Low</p> <p><u>Automatic Actions:</u> None</p>		
[CT-2]	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 issue to SRO. ○ Dispatches Equipment Operator(s) to monitor HCU accumulator pressures and investigate the B CRD pump trip. • Refers to ARP/procedure. <p>When it is determined that two or more rod scram accumulators are INOPERABLE and cannot be restored:</p> <ul style="list-style-type: none"> ○ Attempts to perform a Rapid Plant Shutdown IAW CPS 3005.01 Unit Power Changes (RR FCV HPU's fail if attempted). • [CT-2] Places mode switch in Shutdown within 38 minutes of insertion of REMOTE 7 (trip of CRD drive water pump 1B). <ul style="list-style-type: none"> • MARK REMOTE 7 INSERTION TIME _____ • MARK MODE SW TO S/D TIME _____ • Carries out Scram Choreography by reporting. <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 level is... and trend – Any EOPs with entry conditions • Establishes and maintains a RPV level band of Level 3 to Level 8 IAW CPS 4411.03. • Reports Annunciator 5006-2L HPU Trouble – Steam Bypass and Pressure Control (SB & PC) hydraulic power unit failure. • Recognizes and reports a loss of pressure control using bypass valves (BPVs). <ul style="list-style-type: none"> ○ Dispatches an Equipment Operator to investigate SB & PC trouble. ○ Utilizes methods (Main Steam, SRVs, RCIC, etc.) to maintain a RPV pressure band of 800-1065 psig IAW CPS 4411.09.

Event No.(s): 8, 9		Page 2 of 3
Description: Trip CRD Drive Water Pump 1B / Complete Loss of CRD / Scram / Low SB Hydraulic Pressure due to reservoir leak		
Time	Position	Applicant's Actions or Behavior
	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 issue to SRO. ○ Dispatches Equipment Operator(s) to monitor HCU accumulator pressures and investigate the B CRD pump trip. ○ Per CPS 3304.01 Control Rod Hydraulic & Control (RD) section 8.3.8, shuts 1C11-F370 and starts the RR Aux Seal Injection pump. <p>When it is determined that two or more rod scram accumulators are INOPERABLE and cannot be restored:</p> <ul style="list-style-type: none"> ○ Performs a Rapid Plant Shutdown IAW CPS 3005.01 Unit Power Changes: <ul style="list-style-type: none"> ○ Evacuate the containment. ○ Make a plant announcement that the plant is performing a Rapid Plant Shutdown. • Carries out Scram Choreography by: <ul style="list-style-type: none"> • Making an Announcement <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 met to the SRO. ○ Dispatches an Equipment Operator to investigate SB & PC trouble. ○ Utilizes methods (Main Steam, SRVs, RCIC, etc.) to maintain a RPV pressure band of 800-1065 psig IAW CPS 4411.09.

Event No.(s): 8, 9		Page 3 of 3
Description: Trip CRD Drive Water Pump 1B / Complete Loss of CRD / Scram / Low SB Hydraulic Pressure due to reservoir leak		
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 expectations, standards and approved procedures. Declares Control Rod Scram Accumulators INOPERABLE (if scram accumulator(s) become(s) inoperable (< 1550 psig) <u>before</u> scrambling the plant: <ul style="list-style-type: none"> Applicable LCO – 3.1.5 Applicable Conditions – A and B (only if two or more accumulators become inoperable) Required Actions and Completion Times <ul style="list-style-type: none"> A.1 (8 hours), B.1 (20 minutes), and B.2.1 (1 hour) <u>or</u> A.1 (8 hours), B.1 (20 minutes), and B.2.2 (1 hour) <u>or</u> A.2 (8 hours), B.1 (20 minutes), and B.2.1 (1 hour) <u>or</u> A.2 (8 hours), B.1 (20 minutes), and B.2.2 (1 hour) [CT-2] Directs placing mode switch in Shutdown within 38 minutes of insertion of REMOTE 7 (trip of CRD drive water pump 1B). <ul style="list-style-type: none"> MARK REMOTE 7 INSERTION TIME _____ MARK MODE SW TO S/D TIME _____ <p>Enters and executes CPS 4100.01 Reactor Scram:</p> <ul style="list-style-type: none"> Carries out Scram Choreography by performing an Update: <ul style="list-style-type: none"> Update Entering EOP-1 Entering the Scram Off-Normal End of Update <p>Directs/ Verifies:</p> <ul style="list-style-type: none"> Control of RPV Level, Level 3 to Level 8 IAW CPS 4411.03. Control of RPV Pressure 800 to 1065 psig IAW CPS 4411.09. Contacts Maintenance to investigate. Informs Shift Manager. Conducts a brief.
Terminus: Reactor is shutdown. RPV level maintained between Level 3 and Level 8 IAW CPS 4411.03. RPV pressure maintained between 800-1065 psig IAW CPS 4411.09.		

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-202** (PW 59567) @ **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:
 - None
7. Place simulator in RUN.
8. Make sure the FP bell toggle switch on the OG panel (is in the up position).
9. Verify RCIC Flow Controller is set at 620 gpm.
10. Verify the AR/PR server is running and stabilize AR/PR.
11. Verify Rod Drive pressure is in the expected range of 235-265 psid.
12. Provide pull sheets: **Step 29** is current - **Gang 9D** is at **Position 22**.
13. Make sure Sequence A is selected.
14. Procedures that are expected to be used during this scenario are:
 - CPS 3005.01 UNIT POWER CHANGES
 - CPS 3104.01 CONDENSATE/CONDENSATE BOOSTER (CD/CB)
 - CPS 3109.01 GENERATOR SEAL OIL (SO)
 - CPS 3110.01 GENERATOR STATOR COOLING (GC)
 - CPS 3111.01 GENERATOR GAS (HY, CO)
 - CPS 3303.01 REACTOR WATER CLEANUP (RT)
 - CPS 3304.01 CONTROL ROD HYDRAULIC AND CONTROL (RD)
 - CPS 3315.03 RADIATION MONITORING (AR-PR)
 - CPS 3319.01 STANDBY GAS TREATMENT (VG)
 - CPS 3404.01 FUEL BUILDING HVAC VF
 - CPS 3404.01H001 PLACING STANDBY GAS TREATMENT INTO SERVICE HARDCARD
 - CPS 3502.01 480 VAC Distribution
 - CPS 3514.01C020 480V UNIT SUB 1L (1AP24E) OUTAGE
 - CPS 3514.01C021 480V UNIT SUB 1M 1AP25E OUTAGE
 - CPS 4411.03 INJECTION FLOODING SOURCES
 - CPS 4411.09 RPV PRESSURE CONTROL SOURCES
 - CPS 4100.01 REACTOR SCRAM
 - CPS 4401.01 EOP-1 RPV CONTROL
 - CPS 5000.02 ALARM PANEL 5000 ANNUNCIATORS-ROW 2
 - CPS 5006.02 ALARM PANEL 5006 ANNUNCIATORS-ROW 2
 - CPS 5006.03 ALARM PANEL 5006 ANNUNCIATORS-ROW 3
 - CPS 5014.03 ALARM PANEL 5014 ANNUNCIATORS-ROW 3
 - CPS 5017.01 ALARM PANEL 5017 ANNUNCIATORS-ROW 1
 - CPS 5018.02 ALARM PANEL 5018 ANNUNCIATORS-ROW 2
 - CPS 5042.05 ALARM PANEL 5042 ANNUNCIATORS-ROW 5
 - CPS 5050.02 ALARM PANEL 5050 ANNUNCIATORS-ROW 2
 - CPS 5067.08 ALARM PANEL 5067 ANNUNCIATORS-ROW 8
 - CPS 5068.03 ALARM PANEL 5068 ANNUNCIATORS-ROW 3
 - CPS 5068.04 ALARM PANEL 5068 ANNUNCIATORS-ROW 4
 - ITS 3.0 LCO APPLICABILITY (LCO 3.0.5)

- ITS 3.3 INSTRUMENTATION (LCOs 3.3.2.1, 3.3.6.2)
- ITS 3.5 ECCS AND RCIC SYSTEM (3.5.1)
- ITS 3.6 CONTAINMENT SYSTEMS (LCO 3.6.4.1)

15. Generate a 3D Case.
16. Hang OOS tags on: **CRD Drive Water Pump 1A (1C11-C001A)**
17. Identify T/S issues associated with OOS and turnover: None
18. Operating Equipment: None
19. Marked up copies: None
20. Verify simulator conditions match the turnover.

Event Triggers and Role Play

Event

1. **Cross tie Unit Sub 1L & 1M with 1L supplying**
 - a. Event Trigger – None
 - b. Role play – None

2. **Hotwell M/U Controller Failure**
 - a. Event Trigger - Following Event 1 and when directed by the Lead Examiner, **Activate Remote 1** and verify the following command(s):
 - (1) **A01_A08_A02_4 = Manual.** (Make-Up to Cdsr 1LC-CD057B Auto/Man)
 - (2) **A01_A08_A02_7 = False.** (Make-Up to Cdsr 1LC-CD057B Close)
 - b. Role play
 - (1) EO (when directed to investigate 1CD045) – report “no abnormalities noted”.
 - (2) Maintenance (when directed to investigate 1LC-CD057B controller failure) – report “dispatching personnel to investigate”.

3. **VF Exhaust and Supply Fans Trip**
 - a. Event Trigger - Following Event 2 and when directed by the Lead Examiner, **Activate Remote 2** and verify the following command(s):
 - (1) **1VF04CA=Motor Short Circuit.** (1VF04CA Fuel Building HVAC Exhaust Fan Motor Failure)
 - (2) **1VF04CB=Motor Short Circuit.** (1VF04CB Fuel Building HVAC Exhaust Fan Motor Failure)
 - b. Role play
 - (1) EO (when directed to investigate loss of Fuel Building Ventilation) – report “Both VF Exhaust fan breakers have tripped.”
 - (2) EO (when directed to secure VF) – **release Local VF Operations** in the simulator lesson plan and report, “VF Supply and Exhaust Fan control switches are all in PTL at 1PL44J”.
 - (3) EO (when directed to check 1PL44J alarm) – report, “Multiple alarms are locked in, including high dP Fuel Building (unless VG has been started).”
 - (4) EO (when directed to verify that 0VG05CA(B) has started following initiation of SGTS Train ‘A’ or ‘B’) – report “SGTS A(B) Room Fan is running”.
 - (5) EO (if directed to check low fail alarm on 1PR008) – report, “Flow is sat locally”.
 - (6) Maintenance (when directed to investigate loss of Fuel Building Ventilation) – report “dispatching personnel to investigate”.
 - (7) RP/Chemistry (when notified that VG will be started) – acknowledge the report.

4. **RWL Inoperable**
 - a. Event Trigger - Following Event 3 and when directed by the Lead Examiner, **Activate Remote 3** and verify the following command(s):
 - (1) **A02_A05_03_8_TVM=2.** (5006-3H Low Power Alarm Point)
 - (2) **TFRPC_4=Off.** (Above HPSP Light Override)
 - (3) **TFRPC_3=Off.** (Hi Power Setpoint Light Override)
 - (4) **TFRPC_2=Off.** (Low Power Alarm Point Light Override)
 - (5) **TFRPC_1=On.** (Low Power Setpoint Light Override)
 - b. Role play
 - (1) Booth (if requested): respond “ATMs for 1C11-N655A and 1C11-N655B indicate failed low.”

5. **Trip of Operating GC Pump (1GC01PB) / Failure of Standby GC Pump to Auto Start**
 - a. Event Trigger - Following Event 4 and when directed by the Lead Examiner, **Activate Remote 4** and verify the following command(s):
 - (1) **1GC01PB = 3.** (1GC01PB Stator Cooling Water Pump 1B Motor Failure)
 - b. Role play
 - (1) EO (when directed to investigate alarms on 1PL10J): report, "Low GC Flow/Low GC Press alarms are in".
 - (2) EO (if directed to reset alarms on 1PL10J): reset 1PL10J and report, "1PL10J alarms are reset".
 - (3) EO (if directed to investigate the 'B' GC pump breaker trip): acknowledge the request and report, "the GC Pump 'B' breaker tripped on overcurrent."
 - (4) EO (if directed to investigate the 'B' GC pump): acknowledge the request and report, "no abnormalities noted at the 'B' GC Pump."
 - (5) Maintenance (if requested): respond "Dispatching personnel to investigate."

6. **'A' Reactor Water Cleanup Filter Demin Trip**
 - a. Event Trigger – Following Event 5 and when directed by the Lead Examiner, **Activate Remote 5** 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.

7. **Loss of Main Generator H₂ requiring power reduction** (Pull up Turb/Gen Stby Data page)
 - a. Event Trigger – Following Event 6 and when directed by the Lead Examiner, **Activate Remote 6** and verify the following command(s):
 - (1) **YPXMALE_18=3%.** (H₂ Leak From Generator).
 - (2) **HY01HY_HY607TASTEM=0.** (HY607 Vlv Stem Position)
 - b. Role play
 - (1) EO (when requested to investigate 1PL10J annunciators): wait until Gen H₂ pressure is ≤ 58# then report "Annunciators 5201-1A MACHINE GAS PRESSURE HIGH LOW and 5201-2A DIFFERENTIAL SEAL OIL PRESS LOW are alarming."
 - (2) EO (if requested to report 5201-2A Seal Oil Press Low possible causes): report
 - a) Malfunction of 1SOH19, Delta Pressure Reg Valve
 - b) Clogged Seal Oil Filter
 - c) Neither the Main Seal Oil Pump nor the Emergency Seal Oil Pump in operation.
 - (3) EO (when requested to check Generator Seal Oil pressure): report, "Seal Oil Pressure is 0 psi above hydrogen pressure."
 - (4) EO (when directed to restore seal oil pressure and after making sure Gen H₂ pressure is < 58#):
 - a) Throttle OPEN Delta Press Reg Vlv Bypass (1SOH21) and control seal oil pressure at 6-10 psi greater than hydrogen pressure – report "Delta Press Reg Vlv Bypass (1SOH21) is OPEN and seal oil pressure is at 8 psi greater than hydrogen pressure."
 - b) SHUT Delta Press Reg Vlv Inlet (1SOH18) – report "Delta Press Reg Vlv Inlet (1SOH18) is SHUT."
 - c) SHUT Delta Press Reg Vlv Outlet (1SOH20) – report "Delta Press Reg Vlv Outlet (1SOH20) is SHUT."
 - d) Open/verify open 1SOH25 – report "1SOH25 is open".
 - e) Open/verify open 1SOH26 – report "1SOH26 is open".
 - (5) EO (when directed to restore H₂ pressure):
 - a) Obtain CE permission (to ensure reactivity manipulation is complete) and then **release – 'Generator Hydrogen Fill'**

- b) (when directed to stop filling H₂): **release – ‘Secure Generator Hydrogen Fill’.**

8. **Trip CRD Drive Water Pump 1B/Complete Loss of CRD/Scram**

- a. Event Trigger - Following Event 7 and when directed by the Lead Examiner, **Activate Remote 7** and verify the following command(s):
 - (1) **YP_XMFTB_4853.** (CRD Pump 'B' Trip)
 - (2) **A02_A05_01_8_TVM=2.** (Annunciator 5006-1H Accumulator Trouble)
- b. Event Trigger – After the Recirc Loop A/B Flow Control Switch(es) to Slow Close and following a 0:02 second time delay, verify the following command(s):
 - (1) **YP_XMFTB_4975/6.** (HPU A/B Failure)
- c. Role play
 - (1) Equipment Operator (if requested):
 - a) Acknowledge the order to investigate CRD Pump 'B' trip. Wait 5 minutes then report, "a pump bearing has failed".
 - b) Acknowledge the order to investigate CRD Hi Temp alarm. Wait 1 minute then report, "Multiple CRDs are alarming at 255°F and trending up at ~1°F every five minutes.
 - c) Acknowledge the orders to investigate low accumulator pressures (see table below). Wait 2 minutes then report, "Accumulator XX-XX (requested accumulator) is at 1545 psig and lowering".

Accumulator	Approximate Time to Accumulator Trouble in minutes (from event initiation)	Record ACTUAL time report of 1545 psig is made to the MCR
24-45	12	
48-29	16	
24-13	20	
32-45	24	
08-29	28	

- (2) Maintenance (after 2 minutes from scram announcement) – report to the MCR as IMD.

9. **Low SB Hydraulic Pressure due to reservoir leak**

- a. Event Trigger – After the RMS in S/D and following a 1:00 minute time delay, verify the following command(s):
 - (1) **YP_XMFTB_4986.** (Loss of SB Hydraulics – Loss of SB Pumps)
- b. Role play
 - (1) Equipment Operator (if requested): report, "The HPU reservoir is empty. There is no oil in the immediate vicinity of the HPU."

CT Bases Information

1. [CT-1] Starts GC pump 'A' prior to bypass valves starting to open.
 - a) This critical task was derived from NUREG 1021 R11 Appendix D Simulator Testing Guidelines section D.1 Identification of Scenario-Specific Critical Tasks that states that each critical task must have safety significance. A safety significant task includes those actions where omission by an operator will result in direct adverse consequences to the plant and for which the crew demonstrates the ability to prevent an inappropriate action that creates a challenge to plant safety (such as an unintentional reactor protection system (RPS) actuation). Failing to start the standby Generator Stator Cooling Water Pump will result in a Turbine Runback requiring the reactor to be scrammed due to the loss of feed water heating and subsequent insertion of positive reactivity. Starting the Standby GC Pump is an action that will preclude an unnecessary RPS trip and is therefore critical.
2. [CT-2] Place mode switch in Shutdown within 38 minutes of CRD drive water pump 1B trip.
 - a) This critical task was derived from ITS 3.1.5 Control Rod Scram Accumulators. With two or more control rod scram accumulators inoperable and reactor steam dome pressure ≥ 600 psig, adequate pressure must be supplied to the charging water header. With inadequate charging water pressure, all of the accumulators could become inoperable, resulting in a potentially severe degradation of the scram performance. Therefore, within 20 minutes from discovery of charging water header pressure < 1520 psig concurrent with Condition B, adequate charging water header pressure must be restored. The 38 minutes for task completion was derived as follows:
 - 2 minutes (time for Equipment Operator to reach containment and report accumulator pressures).
 - 16 minutes (time it takes for second accumulator trouble to come in).
 - 20 minutes (once LCO 3.1.5 is met, time in which LCO required action must be taken).

Turnover

1. The plant is in Mode 1, operating at Rated Thermal Power (RTP).
 - a. Control rods - Step 29 / Gang 9D @ position 22.
2. Status of Tagged Out Equipment
 - CRD Drive Water Pump 1A (1C11-C001A) is Out Of Service (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
 - None
9. Evolutions planned for the shift
 - First Priority – Cross-tie 480V Buses 1L & 1M with 1L supplying per CPS 3502.01 480 VAC Distribution.
 - Maintain Rx Power at RTP.
10. Risk Levels
 - Green
 - Protected Equipment: None