

Exelon Nuclear

2013
ILT 12-1 NRC Exam

**Scenario Number:
NRC Exam Scenario 1**

Revision Number: 0

Date: 06/14/13

Developed By:	_____	_____
	Instructor	Date
Validated By:	_____	_____
	SME or Instructor	Date
Reviewed By:	_____	_____
	Operations Representative	Date
Approved By:	_____	_____
	Training Department	Date

Appendix D

Scenario Outline

Form ES-D-1

Facility: Clinton Power Station ILT 12-1 NRC Scenario No.: 1 Op-Test No.: 2013301

Examiners: _____ Operators: _____

Initial Conditions:

- Mode 1 at 97% power
- Weather conditions are calm and clear

Turnover:

- Maintain current power

Event No.	Malf. No.	Event Type*	Event Description
1	None	BOP N	Shift to the Emergency Seal Oil Pump (NEW)
2	ROD2821TFIA3	ATC C SRO (TS)	Rod drift OUT (TS)
3	YP_XMFTB_5010	BOP C SRO (TS)	MCR HVAC Supply Fan trip (TS)
4	A04_A01_07_1_TVM Steady (Annunciator 5010-7A)	BOP C SRO	Failure of RAT 'B' cooling
5	MS0ES002AFSP 0% MS0ES002BFSP 0% MS0ES004AFSP 0%	ATC R	Lower Power for Loss of FW Heating
6	A01_A03_01_2_TVM Steady (Annunciator 5002-1B)	ATC C	'A' TDRFP Trouble
7	YARITPLA_1 0.2%	CREW M	Unisolable leak in RCIC, 4 stuck rods will not insert
8	XPXMALSE_253	CREW M	2 nd area exceeds Max Safe, perform EOP 3 with a low power ATWS

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

<p><u>ES-301-4 Quality Checklist Attributes:</u></p> <p>Total Malfunctions (5-8): 7 Malfunction(s) after EOP (1-2): E7 & E8 Abnormal Events (2-4): E2, E5, E6, E7 Major Transient(s) /E-Plan entry (1-2): E7 EOPs (1-2): EOP-1, EOP-8 EOP Contingencies (0-2): E-8 (EOP-3) Critical Tasks (2-3): SC-1.1, SC-1.2, RPV-6.3</p>	<p><u>ES-301-5 Transient/Event Checklist Attributes:</u></p> <p>BOP Normal: E1 ATC Reactivity (1 per set): E5 BOP I/C (4 per set): E3 & E4 ATC I/C (4 per set): E2 & E6 SRO-I I/C (4 per set inc 2 as ATC): E2, E3, E4, E6 SRO Tech Spec (2 per set): E2 & E3 ALL Major Transients (2 per set): E7</p>
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Narrative Summary

Event #	Description
1. Shift to the Emergency Seal Oil Pump (NEW)	The FIN Team leader contacts the MCR and reports that they have found excessive vibration on the Main Seal Oil Pump (MSOP), 1T007P. He recommends taking it out of service and states that it will be out of service for an extended period of time. The BOP starts the Emergency Seal Oil Pump, secures the Main Seal Oil Pump (MSOP), the Seal Oil Vacuum Pump (SOVP), and the Recirculation Seal Oil Pump (RSOP) IAW CPS 3109.01 Generator Seal Oil (SO) Section 8.2.7 Failure of/Maintenance on MSOP and 8.2.1 Operation with Emergency Seal Oil Pump.
2. Rod drift OUT (TS)	Annunciator ROD DRIFT (5006-4G) comes in due to rod 28-21 drifting outward. The ATC Operator will take the Immediate Actions and applicable Subsequent Actions as directed by the SRO for an Inadvertent Rod Movement per CPS 4007.02 Inadvertent Rod Movement. Rod 28-21 will drift outward until individually scrambled at the Hydraulic Control Unit (HCU). Technical Specification LCO 3.1.3 Actions C.1 and C.2 will be evaluated requiring full insertion of the inoperable control rod in 3 hours <u>and</u> disarming the associated CRD in 4 hours. Technical Specification LCO 3.1.6 will also be evaluated and found not to apply.
3. MCR HVAC Supply Fan trip (TS)	Annunciator AUTO TRIP PUMP/FAN DIVISION 1 (5050-1A) comes in due to the Train A Control Room Supply Fan (0VC03CA) tripping. The BOP Operator will coordinate with the Equipment Operator to shift Control Room HVAC (VC) to Train B per CPS 3402.01 Section 8.1.7 and CPS 3402.01P001 Control Room HVAC (VC) Train Shifting. Technical Specification LCO 3.7.3 Action A.1 will be evaluated requiring restoration of control room ventilation subsystem to an operable status within 7 days.
4. Failure of RAT 'B' cooling	Annunciator 5010-7A High Temp Res Aux Transf A(B)[C] will be received. The MCR will dispatch an Equipment Operator to check the cooling systems for RATs A, B, and C. The Equipment Operator will report that the cooling systems for RAT 'A' and 'C' are operating normally, and the cooling system for RAT 'B' has 2 fans running with oil temperature at 82°C and winding temperatures indicating 90°C and slowly rising. IAW CPS 3505.01 345 & 138KV Switchyard (SY) Section 8.3.4 Degraded RAT and ERAT Cooling Systems, the SRO will determine that RAT 'B' may remain in operation with temperatures < 95°C. The SRO will direct the BOP to transfer 4160V Bus 1A1, 1B1, and 1C1 to the ERAT to reduce loads on RAT 'B'.
5. Lower Power for loss of FW Heating	The Extraction Steam Valves for High Pressure Feedwater Heaters 6A & 6B, and Low Pressure Feedwater Heater 5A close, causing final feedwater temperature to lower ~ 50°F and power rising to ~ 100% (from 97%). This will require entry into CPS 4005.01 Loss of Feedwater Heating. The loss of feedwater heating will require the ATC to lower reactor power within 15 minutes of the initiating event to at or below the original power level and within the limits of the Stability Control & Power / Flow Operating Map.
6. TDRFP Trouble	Annunciator 5002-1B Trouble RFPT 1A Pump/Turb is received due to active thrust bearing wear. The degraded condition of the thrust bearing will also cause 'A' TDRFP vibrations to rise. The degraded condition of the 1A TDRFP will require tripping of the 'A' TDRFP, which will result in a Reactor Recirculation Flow Control Valve Runback. Off normal procedures CPS 4008.01 Abnormal Coolant Flow, CPS 4100.02 Core Stability Control, and CPS 4002.01 Abnormal RPV Level/Loss of Feedwater At Power will be entered and actions taken to mitigate the event.

7. Unisolable leak in RCIC , 4 stuck rods will not insert

Annunciator 5065-6F Sec. Cnmt. Area High Temp will be received. The BOP will monitor secondary containment temperatures on 1TR-CM326 and 1TR-CM327 and will report rising temperatures in the RCIC Pump Room (1TR-CM326 points 8 and 9). When temperatures exceed max normal values, EOP-8 Secondary Containment Control and CPS 4001.01 Reactor Coolant Leakage will be entered. The SRO will direct the RCIC Steam supply to be isolated, but when isolation is attempted, 1E51-F063 RHR & RCIC Stm Supp Inbd Isol Valve will fail to close and the leak into the secondary containment will continue. The SRO will direct the reactor to be scrammed before temperatures in the RCIC Pump Room exceed max safe values listed in EOP-8 Secondary Containment Control. When the reactor is scrammed, four control rods will fail to insert requiring entry into EOP-1 RPV Control and then transitioning into EOP-1A ATWS RPV Control.

8. 2nd area exceeds Max Safe, perform EOP 3 with a low power ATWS

After the reactor is scrammed, the leak into the secondary containment will worsen, causing two areas to exceed max safe values, requiring blowdown per EOP-3 Emergency RPV Depressurization. RPV injection will be terminated and prevented, and then the BOP will initiate ADS and verify that only 5 ADS valves open (7 valves are required). The BOP will open 2 additional SRVs until a total of 7 SRVs are opened. The operating crew will monitor RPV pressure, and recommence RPV injection with only preferred injection sources when RPV pressure reaches 138 psig. The scenario is terminated when reactor power is below 5% and reactor water level is being maintained between -162" and Level 8 (+52").

CRITICAL TASKS

- SC-1.1, Scram before Max Safe
- SC-1.2, ED when 2 areas >max Safe
- RPV-6.3 Terminate and Prevent Injection Into The RPV

Shift Turnover Information

⇒ **Day of week and shift**

- ◆ Today Day Shift.

⇒ **Weather conditions**

- ◆ Calm and Clear

⇒ **(Plant power level)**

- ◆ 97% ◆
- ◆ 3373- MWth / 1116 MWe ◆
- ◆ 84.3 Mlbm/hr Core Flow

⇒ **Thermal Limit Problems/Power Evolutions**

- ◆ None ◆
- ◆ ◆

⇒ **Existing LCOs, date of next surveillance**

- ◆ None

⇒ **Surveillances or major maintenance**

- ◆ None

⇒ **Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment**

- ◆ None

⇒ **Comments, evolutions, problems, etc.**

- ◆ Online Risk is Green ◆
- ◆ ◆

Operator Actions

Event No.(s): 1		Page 1 of 1
Description: Shift to the Emergency Seal Oil Pump		
Initiation: Following shift turnover and when directed by the Lead Examiner		
Cues: Report from the FIN Team Leader of excessive vibration on the Main Seal Oil Pump.		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> None		
<u>Expected Annunciators:</u> 5018-2A, 5017-5B		
<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 and notifies the SRO of any unusual or unexpected conditions. ○ Monitors generator hydrogen gas pressure.
	BOP	<ul style="list-style-type: none"> • Starts the ESOP, 1T008P. ○ Monitors generator hydrogen gas purity. ○ Monitors generator hydrogen gas pressure. • Secures the MSOP, 1T007P. • Directs an EO to shut the Vac/Stor Tnk Oil Supp Hdr Isol, 1SOH09. • Secures the Seal Oil Vacuum Pump, 1T006P. • Secures the Recirc Seal Oil Pump, 1T009P. ○ Makes log entries. ○ Initiates an Issue Report.
	SRO	<ul style="list-style-type: none"> • Directs BOP to start the ESOP and secure the MSOP IAW CPS 3109.01 Generator Seal Oil (SO). • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. ○ Calls FIN Team Leader to report that the ESOP is secured
Terminus: Emergency Seal Oil Pump is running and the MSOP, SOVP, and RSOP are secured.		

NOTES:

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|---|
| <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 2
Description: Rod Drift OUT		
Initiation: When directed by the Lead Examiner, activate Remote 2.		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> Rod 28-21 position changing on the P680 full core display		
<u>Expected Annunciators:</u> 5006-4G Rod Drift		
<u>Automatic Actions:</u> None		
	ATC	<ul style="list-style-type: none"> • Depresses ROD DRIFT or ALL RODS button on the Operator Control Module (OCM) to determine which control rod is drifting. • Reports issue to SRO. <p>Per CPS 4007.02, Inadvertent Rod Movement Immediate Actions:</p> <ul style="list-style-type: none"> • Selects Rod 28-21 (individual rod vice gang) and fully inserts 28-21 by depressing the In Timer Skip button on the OCM. <p>Per CPS 4007.02, Inadvertent Rod Movement Subsequent actions:</p> <ul style="list-style-type: none"> • Once 28-21 is fully inserted, releases the In Timer Skip button. • Observes rod 28-21 recommences withdrawal. • Reinserts rod 28-21 with the In Timer Skip button. • Releases In Timer Skip button after 28-21 has been individually scrammed. ○ Dispatches an Equipment Operator to the HCU for rod 28-21. ○ Directs Equipment Operator to check for flow noises or other abnormalities at the HCU for rod 28-21. ○ Directs Equipment Operator or Reactor Operator to individually scram rod 28-21. ○ Monitors/verifies operation within the limits of the power to flow map. <p>Per CPS 3304.01, section 8.2.5 Hydraulically Disarming Control Rods:</p> <ul style="list-style-type: none"> ○ Directs Equipment Operator to close 1C11-F103 Drive Water Riser Valve and 1C11-F105 Exhaust Water Riser Valve. ○ Directs Equipment Operator to return the SRI toggle switches for 28-21 to normal.
	BOP	<ul style="list-style-type: none"> ○ Monitors reactor to ensure operations remain within established bands. • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions. ○ Dispatches an Equipment Operator to the HCU for rod 28-21. ○ Directs Equipment Operator to check for flow noises or other abnormalities at the HCU for rod 28-21. ○ Directs Equipment Operator or Reactor Operator to individually scram rod 28-21. ○ Evaluates MSL rad monitor values. ○ Evaluates OG Rad levels. <p>Per CPS 3304.01, Control Rod Hydraulic & Control (RD) section 8.2.5 Hydraulically Disarming Control Rods:</p> <ul style="list-style-type: none"> ○ Directs Equipment Operator to close 1C11-F103 Drive Water Riser Valve and 1C11-F105 Exhaust Water Riser Valve. ○ Directs Equipment Operator to return the SRI toggle switches for 28-21 to normal.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP.

		<ul style="list-style-type: none"> • Enters and executes CPS 4007.02 Inadvertent Rod Movement. • Directs ATC/BOP to individually scram and then hydraulically isolate rod 28-21. • Evaluates and enters Technical Specification LCO 3.1.3 action C.1 and C.2. • Evaluates and enters Technical Specification LCO 3.1.5 action A.1 or A.2 after control rod 28-21 has been individually scrammed and the accumulator has been discharged. • 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, Radiation Protection, and Chemistry ○ Evaluates thermal limits. ○ Conducts a brief.
<p>Terminus: Rod 28-21 is fully inserted, individually scrammed and Tech Specs referenced.</p>		

NOTES:

Operator Actions

Event No.(s): 3		Page 1 of 1
Description: 'A' MCR HVAC Supply Fan trip		
Initiation: Following Event 2 and when directed by the Lead Examiner, activate Remote 3 to trip the 'A' MCR HVAC Supply Fan 0VC03CA		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> Amber light for 0VC03CA lit.</p> <p><u>Expected Annunciators:</u> 5050-1A, AUTO TRIP PUMP/FAN DIVISION 1</p> <p><u>Automatic Actions:</u> Control Room Rtrn Fan, 0VC04CA trips; Control Room HVAC Heating Coil, 0VC01AA trips; Control Room Chiller, 0VC13CA trips; Control Room Ch Wtr Pmp, 0VC08PA trips; Control Room HVAC Train A dampers reposition for shutdown</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. ○ Dispatches Equipment Operator to investigate/prepare to shift VC trains.
	BOP	<ul style="list-style-type: none"> • Reports issue to SRO. <ul style="list-style-type: none"> ○ Dispatches Equipment Operator to investigate/prepare to shift VC trains. <p>Per 3402.01P001, VC Train Shifting</p> <ul style="list-style-type: none"> • Directs Equipment Operator to perform local operations. • Shuts Locker Room EXH Fan ISOL DMPR 0VC69Y. • Shuts Locker Room EXH Fan ISOL DMPR 0VC70Y. ○ Stops Cont Rm HVAC Eq Rm Sply Fan 0VC18CA. • Stops Cont Rm Trn A Supply Fan 0VC03CA. • Verifies VC Dampers reposition. • Starts Cont Rm Trn B Supply Fan 0VC03CB. • Verifies VC Dampers reposition. • Verifies MCR D/P increasing in the positive direction. ○ Starts Cont Rm HVAC Eq Rm Sply Fan 0VC18CB. • Opens Locker Room EXH Fan ISOL DMPR 0VC69Y. • Opens Locker Room EXH Fan ISOL DMPR 0VC70Y. • Directs Equipment Operator to perform VC Chiller 'B' Startup.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. <ul style="list-style-type: none"> ○ Directs BOP to shift MCR Ventilation Trains. • Evaluates and enters TS 3.7.3 Action A.1. • 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. ○ Contacts Maintenance to investigate and repair 0VC03CA.
Terminus: VC train B is running and Technical Specifications evaluated.		

NOTES:

Operator Actions

Event No.(s): 4		Page 1 of 1
Description: Failure of RAT B cooling		
Initiation: Following Event 3 and when directed by the Lead Examiner, activate Remote 4		
Cues: 5010-7A HIGH TEMP RES AUX TRANSF A(B)[C]		
Time	Position	Applicant's Actions or Behavior
Key Parameter Response: NA		
Expected Annunciators: 5010-7A, 5060-1B, 5061-1B, 5062-1A, 5011-7G, 5011-8G		
Automatic Actions: When transferring 4160V Busses 1A1, 1B1, and 1C1 to the ERAT, the Main Feed Breakers will automatically trip and the RAT and ERAT SVCs will freeze.		
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels, notifies the SRO of unusual/unexpected conditions. ○ Directs Equipment Operator to check operation of the RAT A, B, and C cooling systems.
	BOP	<ul style="list-style-type: none"> • Refers to ARP 5010-7A HIGH TEMP RES AUX TRANSF A(B)[C] ○ Directs Equipment Operator to check operation of the RAT A, B, and C cooling systems. • At 1H13-P877/601, transfers 4160V Bus 1A1, 1B1, and 1C1 to the ERAT one bus at a time as follows: <ul style="list-style-type: none"> • Places the Reserve Feed Breaker Sync keylock switch in ON position. • Verifies the respective synchroscope is steady at ~ 12 o'clock position. • Closes the Bus Reserve Feed Breaker. • Verifies the Bus Main Feed Breaker trips. • Places the Bus Main Feed Breaker in Auto after Trip to clear the Auto Trip annunciator. • Places the Reserve Feed Breaker Sync keylock switch in OFF position.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC & BOP operators. • Directs BOP to transfer 4160V Bus 1A1, 1B1, and 1C1 to the ERAT. ○ Refers to ITS LCOs 3.8.1/2, 3.8.7-10. • Reviews CPS 3505.01 345 & 138KV Switchyard (SY) Section 8.3.4 Degraded RAT and ERAT Cooling Systems and determines that RAT 'B' is OPERABLE. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. ○ Informs Shift Manager. ○ Contacts Maintenance to investigate and repair RAT 'B' Cooling System ○ Conducts a brief.
Terminus: 4160V Bus 1A1, 1B1, and 1C1 transferred to the ERAT source.		

NOTES:

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: Lower Power for Loss of FW Heating		
Initiation: Following Event 4 and when directed by the Lead Examiner, activate Remote 5 .		
Cues: 5015-4L Closed LP Heater 5A ES Check Valve, 5016-4F Closed HP Heater 6A ES Check Valve, 5016-4G Closed HP Heater 6B ES Check Valve		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> Feedwater temperature will lower ~50°F. Reactor power will rise to ~ 100% (from 97%).</p> <p><u>Expected Annunciators:</u> Various 5015 and 5016 panel annunciators</p> <p><u>Automatic Actions:</u> None</p>		
	ATC	<ul style="list-style-type: none"> ○ Reports lowering feedwater inlet temperature and rising reactor power. <p>Per CPS 4005.01, Loss of Feedwater Heating:</p> <ul style="list-style-type: none"> ● When directed by the SRO, restores and maintains power to ≤97% power <u>and</u> Within Figure 1, CPS Stability Control & Power/Flow Map, by adjusting RR flow with FCVs or control rods in normal sequence or CRAM RODS. ○ Determines if FW Temperature is within the acceptability region of 4005.01 Table A: FW Temperature Acceptability Region.
	BOP	<ul style="list-style-type: none"> ● Reports receipt of alarms associated with closure of 6A, 6B, and 5A FW Heater Extraction Steam Inlet Valves (5016-4F, 5016-4G, and 5015-4L) to SRO. ● Refers to the ARPs. ○ Obtains an official 3D Monicore Case to evaluate Thermal Limits. Obtains new 3D Cases every 5°F FW Temp Change or 5% Reactor Power Change. ○ Determines if FW Temperature is within the acceptability region of 4005.01 Table A: FW Temperature Acceptability Region ○ Sends Area Operator to 1PL05J Panel to investigate.
	SRO	<ul style="list-style-type: none"> ● Acknowledges reports from ATC/BOP. ● Enters and executes CPS 4005.01 Loss of Feedwater Heating. ● Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. ○ Notifies Ameren, Power Team, and MISO of the change in power. <p>Per CPS 4005.01, Loss of Feedwater Heating:</p> <ul style="list-style-type: none"> ● Directs power to be lowered to ≤ 97% power. ● Verifies the following have not occurred which would necessitate a scram: <ul style="list-style-type: none"> ● RESTRICTED ZONE is entered ● Core instabilities are observed ● FW drops by >100°F ○ Calls for Reactor Engineer. ○ Enters Transient Annunciator Response. ○ Determines if FW Temperature is within the acceptability region of 4005.01 Table A: FW Temperature Acceptability Region.
Terminus: Clearly observable plant response from change in power level.		

Notes:

Operator Actions

Event No.(s): 6		Page 1 of 1
Description: TDRFP Trouble		
Initiation: Following Event 5 and when directed by the Lead Examiner, activate Remote 6 .		
Cues: Annunciators 5002-1B Trouble RFPT 1A Pump/Turb and 5002-2B HIGH VIBR RFP 1A SHAFT		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> RFPT 1A Vibration indications will rise; RFPT 1A Active Thrust Bearing Wear Indicator computer point (FW-BC902) will indicate "HIGH".</p> <p><u>Expected Annunciators:</u> 5002-1B, 5002-2C, 5003-1D, 5003-2D, 5006-3D, 5002-2Q</p> <p><u>Automatic Actions:</u> RR Flow Control Valve Runback when the 'A' TDRFP is tripped with RPV Low Level Alarm locked in.</p>		
	ATC	<p>Per CPS 5002-1B, RFP 1A trouble:</p> <ul style="list-style-type: none"> ○ Monitors RFP 1A bearing vibration on PPC. ○ Monitors FW computer points (listed in 5002-1B ARP) to determine the cause of the trouble alarm. ● Trips the RFP 1A due to high thrust bearing wear and high bearing vibration. ● Monitors plant response to the RR FCV runback. <p>Per CPS 5002-2B High Vibr RFP 1A Shaft:</p> <ul style="list-style-type: none"> ○ Reduces turbine speed until alarm clears. ● If vibration cannot be lowered, removes RFP 1A from service. ○ Verifies lube oil cooler outlet temperature 100°F to 120°F, and seal water pressure ~ 15 psid. <p>Per CPS 4008.01, Abnormal Coolant Flow, monitors for:</p> <ul style="list-style-type: none"> ○ entry into the restricted zone of the Power To Flow Operating Map. ● core instabilities by monitoring SRM period indications, LPRM Upscale and Downscale alarms.
	BOP	<ul style="list-style-type: none"> ○ Dispatches an Equipment Operator to monitor operation of the 'A' TDRFP. ○ Monitors reactor to ensure operations remain within established bands. ● Monitors control room panels and notifies the SRO of any unusual or unexpected conditions. ○ Provides backup to ATC on determining reactor operation within the limits of the P-F Operating Map.
	SRO	<ul style="list-style-type: none"> ● Directs ATC to remove RFP 1A from service. ○ Enters and executes CPS 4100.02, Core Stability Control. ● Enters and executes CPS 4002.01, Abnormal RPV Level Loss of Feed Water at Power. ● Enters and executes CPS 4008.01, Abnormal Reactor Coolant Flow. ● Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. ○ Contacts Shift Manager and recommends notifications.
Terminus: RFP 1A tripped and RPV level stabilized.		

Notes:

Operator Actions

Event No.(s): 7		Page 1 of 2
Description: Unisolable leak in RCIC , 4 stuck rods will not insert		
Initiation: Following Event 6 and when directed by the Lead Examiner, activate Remote 7.		
Cues: Annunciator 5065-6F Sec. Cnmt. Area High Temp.		
Time	Position	Applicant's Actions or Behavior
Key Parameter Response: Points 8 & 9 on 1TR-CM326 (RCIC Pump Room) will rise.		
Expected Annunciators: 5065-6F Sec Cnmt Area High Temp, 5004-3F SPDS CSF Alarm		
Automatic Actions: None		
[CT]	ATC	<ul style="list-style-type: none"> ○ Reports SPDS alarm on High Secondary Containment temperature / delta temperature. ○ Makes plant announcement to evacuate Fuel/Aux buildings. ● [CT] Initiates a manual reactor scram when directed by the SRO. <ul style="list-style-type: none"> ● Places mode switch in Shutdown ● Determines Shutdown Criteria is NOT met (4 control rods will remain at position 48). ● Arms and depresses MANUAL SCRAM push-buttons <u>and</u> initiates ARI. ● Verifies reactor power is lowering. ● WHEN RPV level has turned and is going up: <ul style="list-style-type: none"> ● Places/Verifies S/U Level Controller setpoint at 20" ● Starts the MDRFP by depressing the START push-button. ● WHEN RPV level is ≥ Level 3 (≥ 8.9"), THEN: <ul style="list-style-type: none"> ● Trips TDRFP 'B'. ● Shuts 1FW002B TDRFP 'B' Discharge Valve. ● Verifies S/U Level Controller is in automatic and maintaining RPV level. ● 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 ○ Reports Reactor power < IRM Range 7. ● Performs EOP actions as directed by SRO. <ul style="list-style-type: none"> ● Stabilizes RPV pressure <1065 psig. ● Lowers RPV pressure to reduce the driving head behind the leak. ○ Monitors for re-criticality when reducing RPV pressure. ○ Coordinates with BOP operator to monitor and control RPV level and pressure.
	BOP	<ul style="list-style-type: none"> ○ Reports EOP-8 entry on Hi Secondary Containment temperature / delta temperature. ○ Makes plant announcement to evacuate Fuel/Aux buildings. ● When directed by the SRO, attempts to isolate RCIC steam lines and diagnoses failure to isolate. ● Reports failure of 1E51-F063 RHR & RCIC Stm Supp Inbd Isol Valve to close to the SRO. ● Carries out Scram Choreography by reporting: <ul style="list-style-type: none"> ● Reactor Scram

[CT]		<ul style="list-style-type: none"> • MDRFP may start • Evacuate the RCIC room • Evacuate the Containment • Determines rod status and reports it to the SRO • Performs EOP actions as directed by SRO. <ul style="list-style-type: none"> • Inhibits ADS • [CT] Terminates and prevents injection from HPCS • Terminates and prevents injection from LPCS, and LPCI • Starts Hydrogen Mixing Compressors and Igniters. ○ Announces Group 1 Isolation of the Main Steam Lines.
[CT]	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. <p>Directs entry into EOP-8 and directs EOP actions as entry conditions are met:</p> <ul style="list-style-type: none"> • Isolate all discharges into the affected area except systems needed for: <ul style="list-style-type: none"> – EOP Actions. – Fire Fighting. <p>Per EOP-8 / CPS 4001.01 / CPS 4001.02:</p> <ul style="list-style-type: none"> • Directs BOP to isolate RCIC steam lines. <ul style="list-style-type: none"> ○ Diagnoses failure of RCIC to isolate. ○ Directs evacuating affected areas of Secondary Containment. • [CT] Directs a scram to be inserted prior to exceeding EOP-8 Table T Maximum safe temperature. ○ Notifies Radiation Protection (RP) Department. <p>Directs / Verifies performance of appropriate actions per EOP-1:</p> <ul style="list-style-type: none"> • Mode switch to SHUTDOWN • Arm and Depress MANUAL SCRAM and ARI pushbuttons • Carries out Scram Choreography by performing an Update: <ul style="list-style-type: none"> • Update: • Entering EOP-1 and 8 • Entering the Scram Off-Normal • End of Update <p>Directs / Verifies performance of appropriate actions per EOP-1A:</p> <ul style="list-style-type: none"> • Inhibit ADS • [CT] Directs BOP to terminate and prevent injection from HPCS • Verifies needed automatic actions <ul style="list-style-type: none"> • Isolations • DG Start • Control RPV water level between -162" (TAF) and Level 8 (52"). • Exits EOP-1A power leg and controls power per CPS 4100.01 Reactor Scram. ○ Directs lowering RPV pressure to reduce the driving head of the leak. ○ Directs ATC to monitor for re-criticality when lowering RPV pressure. • Ensures operations are conducted IAW Operations expectations, standards and approved procedures.
<p>Terminus: Reactor scrammed. RPV Pressure and Level being controlled per EOP-1A. Reactor Power controlled per CPS 4100.01 Reactor Scram.</p>		

NOTES:

Operator Actions

Event No.(s):		8	Page 1 of 1	
Description: 2 nd area exceeds Max Safe, perform EOP 3 with a low power ATWS				
Initiation: When the reactor is scrammed in Event 7.				
Cues: Annunciator 5065-6F Sec. Cnmt. Area High Temp and 5065-5F Sec Cnmt Area High High Temp				
Time	Position	Applicant's Actions or Behavior		
<u>Key Parameter Response:</u> Multiple points on 1TR-CM326 and / or 1TR-CM327 above max safe values of EOP-8 Table T				
<u>Expected Annunciators:</u> Annunciator 5065-6F Sec. Cnmt. Area High Temp and 5065-5F Sec Cnmt Area High High Temp				
<u>Automatic Actions:</u> None				
	ATC	<ul style="list-style-type: none"> • Reports SPDS alarm on High - High Secondary Containment temperature. <ul style="list-style-type: none"> ○ Makes plant announcement to evacuate Secondary Containment. • Performs EOP actions as directed by SRO: <ul style="list-style-type: none"> ○ Verifies suppression pool level is above 8 feet. <ul style="list-style-type: none"> • Terminates and prevents injection from Condensate/Feedwater. • Coordinates with BOP operator to monitor and control RPV level and pressure following the blowdown. 		
[CT]	BOP	Per EOP-8 Secondary Containment Control: <ul style="list-style-type: none"> • Sounds the containment evacuation alarm. ○ Verifies suppression pool level is above 8 feet. • Terminates and prevents injection from HPCS, RCIC, LPCS, and LPCI systems • [CT] When directed by the SRO, initiates ADS. • Reports that two ADS Valve did not open. Opens other SRV's until a total of seven SRVs are open. ○ Initiates Suppression Pool Cooling when directed by the SRO. 		
[CT]	SRO	Enters EOP-3, Emergency RPV Depressurization, when two areas are above max safe. <ul style="list-style-type: none"> • [CT] Directs initiation of ADS ○ Directs opening other SRVs until a total of 7 SRVs are open. • Directs reinjection with detail F2 systems when RPV pressure reaches 138 psig per Table J of EOP-1A. ○ Notifies ATC that injecting too fast may damage the core. ○ Directs lowering RPV pressure to reduce the driving head of the leak. ○ Directs ATC to monitor for recriticality when lowering RPV pressure. 		
Terminus: <ul style="list-style-type: none"> • Reactor power is below the APRMs. • ADS has been initiated. • RPV Level is being controlled. • Upon approval of Lead Examiner. 				

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. Reset to IC-196 (PW 91448) (97% power). If this is the first reset after swapping simulator loads, reset the IC twice.
4. Load the lesson plan for this scenario.
5. Verify the following commands are active:
 - Rod 2437TFIA4 (Rod 24-37 Stuck at position 48)
 - Rod 2829TFIA4 (Rod 28-29 Stuck at position 48)
 - Rod 3625TFIA4 (Rod 36-25 Stuck at position 48)
 - Rod 4037TFIA4 (Rod 40-37 Stuck at position 48)
 - YVRIMVLK_10 100% (E51F064 Seat Leakage for Event 7)
 - YARIMVFS_9 30% (E51F063 Closing failure for Event 7)
6. Place simulator in RUN.
7. Turn on and advance recorders.
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 36 is complete - Gang 22A is at 48
12. Make sure Sequence A is selected.
13. Make sure Individual Drive Mode is selected on the OCM.
14. Procedures that are expected to be used during this scenario are:
 - CPS 3109.01 Generator Seal Oil
 - CPS 4007.02 Inadvertent Rod Movement
 - CPS 3304.01 Control Rod Hydraulic and Control (RD)
 - CPS 3402.01 / 3402.01P001 Control Room HVAC (VC)
 - CPS 3501.01 High Voltage Auxiliary Power System (AP)
 - CPS 3505.01 345 & 138KV Switchyard (SY)
 - CPS 4005.01 Loss of Feedwater Heating
 - CPS 4100.02 Core Stability Control
 - CPS 4002.01 Abnormal RPV Level Loss of Feed Water at Power
 - CPS 4008.01 Abnormal Reactor Coolant Flow.
 - CPS 3103.01 Feedwater (FW)
 - CPS 4100.01 Reactor Scram
 - CPS 4001.02 & C001 Automatic Isolation & Auto Isolation Checklist
 - CPS 3310.01 Reactor Core Isolation Cooling (RI)
 - CPS 4411.09 RPV Pressure Control Sources
 - CPS 4411.03 Injection / Flooding Sources
 - ITS 3.1.3, 3.1.5, 3.7.3, 3.8.1, 3.8.2, 3.8.7 – 3.8.10,
15. Hang OOS tags on: None
16. Identify T/S issues associated with OOS and turnover: None

17. Operating Equipment: None
18. Provide a marked up: NA
19. Verify simulator conditions match the turnover.

Event Triggers and Role Play

Event

1. Shift to the Emergency Seal Oil Pump

- a. Event Trigger - Following shift turnover and when directed by the Lead Examiner.
- b. Role play :
 - (1) FIN Team Leader - Contact the MCR as the FIN Team leader and report that you have found excessive vibration on the Main Seal Oil Pump (MSOP), 1T007P. Recommend taking it out of service and state that it will be out of service for an extended period of time, at least 2 days. Request that the MCR contact the FIN Team Leader when the ESOP has been secured.
 - (2) FIN Team Leader (if contacted to determine why the ESOP tripped) – cue the SRO (with concurrence by the lead examiner) that the control switch for the ESOP must be held long enough for the starting resistors to be completely removed from the start circuit and recommend trying to start the ESOP again by holding the control switch for at least 5 seconds.
 - (3) EO (if contacted to determine why the ESOP tripped) – “Indications are normal locally at the ESOP and at the breaker on DC MCC 1F.”
 - (4) EO (when contacted to close 1SOH09), acknowledge the order. Wait 1 minute and then report that 1SOH09 is closed.
 - (5) EO (when contacted to investigate annunciator 5018-2A Trouble GC System Local Panel 1PL10J), report the alarm is 5201-3A Emergency Seal Oil Pump Running.
 - (6) EO (when directed to acknowledge alarm on 1PL10J), insert **remote1** YP_XREMT_812 and then report that local alarms on 1PL10J are reset.
 - (7) EO (when directed to frequently monitor Generator H2 purity) – inform the MCR that the D Area Operator will perform hourly checks of H2 Purity indications on 1PL10J.

2. Rod Drift Out (TS)

- a. Event Trigger - Following Event 1 and when directed by the Lead Examiner, **Activate Remote 2** and verify the following command(s):
 - (1) **Insert ROD2821TFIA3** goes active. (Rod Drift Out Malfunction)
- b. Role play
 - (1) WEC Supervisor (when directed to check indicating lights on RGDC or the RACCS) - No problem lights observed at the RGDC or RACCS panels.
 - (2) Reactor Engineer (if scram times are requested) – Respond, “No rods are slow”.
 - (3) Reactor Engineer (if asked to make a reactivity maneuver recommendation after rod 28-21 has been scrammed) respond, “I recommend maintaining current power level until I can evaluate 3D Monicore indications”.
 - (4) RO (when directed to scram control rod 28-21) - Wait 2 minutes and then **Release Event 2**
Subsequent Actions and verify the following commands:
 - a) **Insert ROD2821TFIA9** (Single Rod Scram on Rod 28-21)
 - b) **Delete ROD2821TFIA3** (Deletes Rod Drift Malfunction)
 - c) Report, “Rod 28-21 has been scrammed. Accumulator pressure for rod 28-21 is 1200 psig.”
 - (5) EO (when requested to check indications locally at HCU 28-21) – Report, “All local indications are normal at the HCU for rod 28-21”.
 - (6) EO (when requested to hydraulically isolate HCU 28-21) – Report, “1C11-F103 and 1C11-F105 are SHUT”.
 - (7) RO (when directed to restore SRI toggle switches for 28-21 to normal) – **Release Event 2 SRI to Normal** and verify **Delete ROD2821TFIA9** (Deletes Single Rod Scram on Rod 28-21). Report, “The SRI toggle switches for rod 28-21 are in Normal.”

3. “A” MCR HVAC Supply Fan Trip

- a. Event Trigger - Following Event 2 and when directed by the Lead Examiner, **Activate Remote 3** and verify the following command(s):
 - (1) **Insert YP_XMFTB_5010** goes active.
- b. Role play
 - (1) EO – (when directed to investigate the trip of 0VC03CA 'A' MCR HVAC Supply Fan), acknowledge the order and report that the breaker for 0VC03CA has tripped on overcurrent.
 - (2) EO – when directed to perform the following actions from CPS 3402.01P001:
 - a) Section 8.1.7.1 Humidification Line Up For Shifting VC Trains - wait 1 minute and report, "CPS 3402.01P001 section 8.1.7.1 is complete."
 - b) Section 8.1.7.2 Removing Sidestream Filter Skid From Service - wait 1 minute and report, "CPS 3402.01P001 section 8.1.7.2 is complete."
 - c) Section 8.1.7.3 'A' VC Chiller Shutdown:
 - (1) **Release Event 3 Subsequent Actions** and verify remote function **VC10VC_CHILLERATCC OFF**, (2 minute delay) and then report, "3402.01P001 section 8.1.7.3 is complete. 'A' VC Chiller has been secured."
 - d) Step 8.1.7.4.1 Place Control Room Heating Coil A control switch 0HS-VC032 in OFF – wait one minute and report, "Control Room Heating Coil A control switch 0HS-VC032 has been placed in OFF."
 - e) Steps 8.1.7.5.1 - 8.1.7.5.6 (Local operations for ventilation train startup), wait 2 minutes and report, "Steps 8.1.7.5.1 - 8.1.7.5.6 are complete."
 - f) Step 8.1.7.5.9 Place Control Room Heating Coil B control switch 0HS-VC132 in ON, wait 1 minute and report, "The Control Room Heating Coil B control switch 0HS-VC132 has been placed in ON."
 - g) Step 8.1.7.5.15 Back Draft Damper Position Verification – wait one minute and report, "VC Train 'A' Back Draft Dampers (OVC22YA, 25YA, 28YA, 31YA, 34YA, 37YA, and 40YA) have been verified shut."
 - h) Section 8.1.7.6 'B' VC Chiller Startup:
 - (1) At step 8.1.7.6.6, request the MCR verify 0VC06AB, Cont Rm Ch Wtr Coil Drain Valve control switch is in the FILL position.
 - (2) **Release Event 3 Start B Chiller** and verify the following command **Insert VC10C_CHILLERBTCC On**, then wait five minutes and report, "3402.01P001 section 8.1.7.6 is complete. VC Chiller 'B' is fully loaded and is operating normally. Chemistry has requested that I place the VC B Sidestream Filter Skid in-service per section 8.1.7.7. I have notified Chemistry that the VC Trains have been shifted and that monthly sampling may be required IAW 3402.01P001 step 8.1.7.6.25."
 - (3) 3402.01P001 Appendix A: VC Chiller Start-up Data Log is complete. All VC Chiller 'B' parameters are within specifications.
 - i) Section 8.1.7.7 Placing 1VC01FB In-Service – wait one minute and report, "Section 8.1.7.7 is complete. The VC 'B' Sidestream Filter has been placed in service."
 - j) Section 8.1.7.8 Humidification Lineup After VC Ventilation Train Shift – wait one minute and report, "Section 8.1.7.8 is complete. The VC Humidification Lineup is complete for VC 'B'."
 - (3) Maintenance (when directed to investigate the trip of the 'A' VC Supply fan) - acknowledge the report and inform the SRO that maintenance technicians will be dispatched to investigate.
 - (4) Maintenance (if asked whether maintenance requires the control switch for 0VC03CA to remain in auto after start for troubleshooting) – inform the MCR that the control switch for 0VC03CA can be positioned as desired without adversely affecting troubleshooting.

4. Failure of RAT 'B' cooling

- a. Event Trigger - Following Event 3 and when directed by the Lead Examiner:
- b. **Activate Remote 4** and verify the following command(s):
 - (1) **Insert A04_A01_07_01 TVM** goes active (Annunciator 5010-7A)
- c. Role play:
 - (1) EO (when dispatched to investigate RAT A, B, C cooling systems) - wait 2 minutes and report that:
 - a) only 2 Fans are running on RAT 'B' and RAT 'B' Temperature is 90°F and slowly rising
 - b) RAT 'A' and 'C' cooling systems are operating normally
 - (2) EO (if directed to check RAT 'B' temperatures after 4160V Bus 1A1, 1B1, and 1C1 have been transferred to the ERAT) – Inform the MCR that RAT 'B' temperatures are 90°F and lowering.
 - (3) Maintenance (when directed to investigate RAT 'B' Cooling System malfunction, acknowledge the report and inform the SRO that a troubleshooting team will be assembled to investigate.
- d. When 4160V Bus 1C1 has been transferred to the ERAT (breaker CS is taken to CLOSE), verify the following commands
 - (1) **Delete A04_A01_07_01 TVM** (Annunciator 5010-7A clears after a 1 minute delay)

5. Loss of Feedwater Heating

- a. Event Trigger - Following Event 4 and when directed by the Lead Examiner:
- b. **Activate Remote 5** and verify the following command(s):
 - (1) **Insert MS0ES002AFSP 0%** (Extraction Steam to 6A Heater fails closed)
 - (2) **Insert MS0ES002BFSP 0%** (Extraction Steam to 6B Heater fails closed)
 - (3) **Insert MS0ES004AFSP 0%** (Extraction Steam to 5A Heater fails closed)
- c. Role play:
 - (1) Reactor Engineer (if asked about preferred method to lower power) – Report the following, “I suggest using RR flow to reduce power and then check the P-F map to ensure operation within the MELLA limit.”
 - (2) NSED (if asked to evaluate long-term operation for the loss of feedwater heating IAW 4005.01 4.8.2), report the following, “NSED will perform an evaluation and let you know what our recommendations are.”

6. TDRFP Trouble

- a. Event Trigger - Following Event 5 and when directed by the Lead Examiner:
- b. **Activate Remote 6** and verify the following command(s):
 - (1) **Insert A01_A03_01_2_TVM Steady** (Annunciator 5002-1B, RFP Trouble).
 - (2) **Substitute Thrust Bearing Detector Hi**
 - (3) **Insert YPFPAIVI 4.03 mils**
 - (4) **Insert YPFPAOVI 3.34 mils**
- c. Role play:
 - (1) EO (when directed to check operation of the 'A' TDRFP) – acknowledge the order and tell the MCR that you're on your way to RP for a brief. Wait 5 minutes and report, “Vibrations can be felt on the Turbine Building El. 800 floor. I'm leaving due to safety concerns.”

7. Unisolable leak in RCIC Room

- a. Event Trigger - Following Event 6 and when directed by the Lead Examiner:
- b. **Activate Remote 7** and verify the following command(s):
 - (1) **Insert YARITPLA_1 0.2%** (RCIC Drain Pot Leak)
- c. Role play:
 - (1) **Work Control Supervisor**
 - a) If RCIC ATM's are checked they read 10 times higher than on the last 9000.01 reading.
 - b) When directed to remove the QS relay – release Remove QS from ATWS Actions lesson plan. Wait 1 minute and report that the QS relay has been removed.

(2) Equipment Operator

- a) If directed to check conditions in the RCIC Pump Room – wait one minute and report, “There is heavy steam in the RCIC Pump room.”
- b) If directed to check the breaker for 1E51-F063, wait one minute and report, “The breakers for 1E51-F063 have been checked. No problems were found.”
- c) When asked to bypass the Control Rod Drive suction filters – release Bypass RD Suction Filter from the ATWS Actions lesson plan. Wait 4 minutes and report that 1C11-F116 & 117 are open.
- d) If directed to start a Condenser Vacuum Pump – Launch the Vacuum Pump Operations lesson plan from the ATWS Actions lesson plan. Request that the MCR start the non-running WT Pump. Wait 5 minutes and request the MCR start the A or B Vacuum Pump.
- e) If directed to start an Auxiliary Boiler – Launch the Vacuum Pump Operations lesson plan from the ATWS Actions lesson plan. Release Start Aux Boiler, wait 20 minutes and report that an Auxiliary Boiler is running.

(3) IMD

- a) If requested to perform 4410.00C006 Defeating VP/WO Interlocks sections 3.1 – 3.6 – release Defeat VP-WO Interlocks from the ATWS Actions lesson plan. Wait 12 minutes and report that 4410.00C006 Defeating VP/WO Interlocks sections 3.1 – 3.6 is complete.

8. 2nd area exceeds Max Safe

- a. Event Trigger - When the Mode Switch is taken to SHUTDOWN, verify the following command(s):

- (1) **Insert YPXMALSE_253 1% Ramp=00:05:00** (MSL Line A Rupture in Steam Tunnel)

- b. Role Play

- (1) **Work Control Supervisor**

- a) If requested to monitor secondary containment temperatures on 1TR-CM326 and 1TR-CM327 on 1H13-P678 Standby Information Panel, report to the MCR. Report ONLY information specifically asked for by the SRO.

Turnover

1. The plant is operating at 97% power.
2. Status of Tagged Out Equipment
 - None
3. Today Day Shift
4. Weather Conditions
 - Calm and Clear
5. Thermal Limit Problems or concerns
 - None
 - 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
 - None
10. Risk Levels
 - Green
11. Dose equivalent Iodine 131 is reading 1.5 E-6 μ curies per gram.

Exelon Nuclear

2013
ILT 12-1 NRC Exam

**Scenario Number:
NRC Exam Scenario 2**

Revision Number: 0

Date: 06/23/13

Developed By:	_____	_____
	Instructor	Date
Validated By:	_____	_____
	SME or Instructor	Date
Reviewed By:	_____	_____
	Operations Representative	Date
Approved By:	_____	_____
	Training Department	Date

Appendix D

Scenario Outline

Form ES-D-1

Facility: Clinton Power Station ILT 12-1 NRC Scenario No.: 2 Op-Test No.: 2013301

Examiners: _____ Operators: _____

Initial Conditions:

- Mode 1 at 90% Power

Turnover:

- Perform Drywell Vacuum Breaker Test
- 'B' CY Pump is out of service

Event No.	Malf. No.	Event Type*	Event Description
1	VR1HG010DFP 100%	BOP N SRO (TS)	Drywell Vacuum Breaker Test (TS/ORM) (NEW)
2	S_K603B (Override)	ATC C	'A' RR FCV Drifts open
3	YP_XREMT_782 YPXMALSE_91	BOP C	Air system trouble / Shift Compressors
4	A05_A01_A0208_5 (Annunciator)	SRO (TS)	Low DG Air (TS)
5	GS0VCGSSSFVFP _100%	BOP C	Main Turbine Gland Seal Header High Pressure
6	CD01PA	ATC C	Condensate Pump trip
7	A05_A02_A0706_3 (Annunciator)	BOP C	CRD Pump hi seal leakage / pump shift
8	YFFWPPSS_11 YAFWPPDE_9	ATC R	Rapid Plant Shutdown for loss of CY
9	YPXMALSE_511	CREW M	Recirculation Loop Line Break (LOCA)
10	RAT_A_LOCKOUT YPMALSE_69	CREW M	Loss of high pressure injection, TAF Blowdown, restore RPV water level

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor	
<u>ES-301-4 Quality Checklist Attributes:</u> Total Malfunctions (5-8):8 Malfunction(s) after EOP (1-2): E10 Abnormal Events (2-4): E2, E3, E6, E8 Major Transient(s) /E-Plan entry (1-2): E9 EOPs (1-2): EOP 1 and EOP 6 EOP Contingencies (0-2): 2, ALC and ED Critical Tasks (2-3): RPV-1.1, PC-5.1	<u>ES-301-5 Transient/Event Checklist Attributes:</u> BOP Normal: E1 ATC Reactivity (1 per set): E8 BOP I/C (4 per set): E3, E5, & E7 ATC I/C (4 per set): E2 & E6 SRO-I I/C (4 per set inc 2 as ATC): E2,3,5,6,7 SRO Tech Spec (2 per set): E1 & E4 ALL Major Transients (2 per set): E9

Narrative Summary

Event #	Description
1. Drywell Vacuum Breaker Test	Following shift turnover, the operating crew will perform CPS 9064.01 Drywell Post-LOCA Vacuum Breaker Verification Test. When the BOP depresses the test pushbutton for 1HG010D it will open but fail to reclose. The SRO will enter ITS 3.6.5.6 Drywell Post-LOCA Vacuum Relief System Action A.1 requiring 1HG010D to be reclosed within 4 hours.
2. 'A' RR FCV Drifts Open	The 'A' RR Flow Control Valve slowly drifts open causing reactor power to increase, and requiring the ATC to perform an emergency shutdown of the 'A' RR Hydraulic Power Unit to stop further RR FCV movement. The crew will enter and execute CPS 4008.01 Abnormal Reactor Coolant Flow. Reactor power will be restored to pre-transient values using RR Flow and/or control rods. The crew will evaluate core thermal limits by demanding a 3D Monicore Case to ensure core thermal limits are within TS limits.
3. Air system trouble / Shift Service Air Compressors	An Equipment Operator will report that an air leak can be heard in the Radwaste Building (exact location unknown). The BOP will observe rising amps on the operating Service Air Compressor. The crew will enter CPS 4004.01 Instrument Air Loss. The standby air compressor will fail to start automatically on low service air header pressure, requiring the BOP to start the standby Service Air Compressor when he/she observes that the air compressor is operating at maximum load / amps or when Service Air Header pressure decays to 80 psig. Once the standby Service Air Compressor is running, the Equipment Operator will report that the location of the air leak is on the discharge pressure instrument for the original running air compressor. Once the leak has been isolated, the operating crew will secure the malfunctioning air compressor.
4. Low DG Air (TS)	Annunciator 5061-7F OUT OF SERVICE DIESEL GEN 1B comes in due to low Starting Air Pressure (190 psig). The BOP operator will dispatch an Equipment Operator to investigate. No cause will be evident. The BOP operator will direct the Equipment Operator to manually operate the DG 1B Starting Air Compressors to restore Starting Air Receiver pressure. The SRO will evaluate Technical Specification 3.8.3, Action E.1 requiring starting air receiver pressure to be restored to ≥ 200 psig within 48 hours.
5. Main Turbine Gland Seal Header High Pressure	Annunciator 5019-3D High/Low Pressure Steam Seal Header is received due to failure of 1GS-SSFV, Steam Seal Header Pressure Control Valve. The BOP operator will isolate and bypass the failed pressure control valve and manually control Gland Seal header pressure in the proper operating range.
6. Condensate Pump Trip	Annunciator 5014-2B Low Press Cond Pumps Disch Header comes in due to a trip of the 'A' Condensate Pump. The ATC will start the standby Condensate Pump per the ARP. The crew will enter and execute CPS 4002.01 Abnormal RPV Level / Loss of Feedwater At Power to stabilize RPV level. The crew will dispatch an Equipment Operator and/or Maintenance personnel to determine the cause of the trip.
7. CRD Pump hi seal leakage / pump shift	Annunciator 5068-6C, CRD Pump C001B Seal Leakage High is received. The BOP operator will dispatch an Equipment Operator to determine the status of the B CRD Pump Seals. The Equipment Operator will report that the 'B' CRD Pump seals are spraying water on the floor around the pump. The BOP operator will shift to the 'A' CRD Pump per CPS 3304.01 Control Rod Hydraulic & Control (RD) section 8.1.2 Shifting Drive Water Pumps and then shutting 1C11-F017 Cross Connect Valve to isolate the seal leak.
8. Loss of CY, Rapid Plant Shutdown	The scenario starts with the 'B' CY Pump out of service. In this event the shaft shears on the running CY Pump (0CY01PC). The BOP operator will start the 'A' CY Pump and secure the 'C' CY Pump. However, the 'A' CY pump capacity begins to degrade and annunciator 5014-2B Low Press Cycle Cond Xfer Pump

Disch Hdr will be received. Due to the complete loss of CY system pumps, the crew will perform a Rapid Plant Shutdown and scram the reactor per CPS 3208.01 Cycled / Makeup Condensate (CY/MC).

9. Events 9 / 10 - Recirculation Loop Line Break (LOCA) & Loss of High Pressure Injection

When the reactor is scrammed in event 8, a Reactor Recirculation Loop line break begins resulting in High DW Pressure initiation of the ECCS systems and Emergency Diesel Generators and a lockout of the 'A' RAT transformer, which will result in a loss of Balance of Plant 4160 VAC and 6900 VAC power. The loss of 4160V Buses 1A and 1B will result in a loss of all injection from the CRD and FW systems. The MCR will enter CPS 4001.01 Reactor Coolant Leakage off-normal and EOP-1 RPV Control. When the HPCS Pump starts, a leak will develop in the HPCS pump discharge line, preventing use of HPCS as an injection source. When RPV lowers to the Top of Active Fuel, the MCR will perform a blowdown per EOP-3 Emergency Depressurization (Blowdown) and then inject at maximum with Low Pressure ECCS systems to restore RPV level.

CRITICAL TASKS

- RPV-1.1 ED at TAF
- PC-5.1 Spray the Primary Containment

Shift Turnover Information

⇒ **Day of week and shift**

- ◆ Today Day Shift.

⇒ **Weather conditions**

- ◆ Calm and clear

⇒ **(Plant power level)**

- ◆ 90% ◆
- ◆ 3182- MWt / 1054 MWe ◆
- ◆ 76.8 Mlbm/hr CORE FLOW

⇒ **Thermal Limit Problems/Power Evolutions**

- ◆ Power reduction in progress to perform 9031.10 RPS Main Steam Line Isolation Valve Channel Functional (next shift) ◆
- ◆ ◆

⇒ **Existing LCOs, date of next surveillance**

- ◆ None

⇒ **Surveillances or major maintenance**

- ◆ CPS 9064.01 Drywell Post LOCA Vacuum Breaker Verification Test

⇒ **Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment**

- ◆ None

⇒ **Comments, evolutions, problems, etc.**

- ◆ Online Risk is Green ◆ CY Pump 'A' tagged out due to wiped motor bearing.
- ◆ ◆

Operator Actions

Event No.(s): 1		Page 1 of 1
Description: Drywell Vacuum Breaker Test		
Initiation: Following shift turnover		
Cues: Directed by SRO		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> 1HG10A indicating lights		
<u>Expected Annunciators:</u> None		
<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 and notifies the SRO of any unusual or unexpected conditions. ○ Dispatches Equipment Operator to determine the position of 1HG010D.
	BOP	<p>Per CPS 9064.01 Drywell Post-LOCA Vacuum Breaker Verification Test, tests each of the following valves one at a time:</p> <ul style="list-style-type: none"> • 1HG010A, 11A, 10B, 11B, 10C, and 11C – during testing verifies each vacuum breaker fully opens (Red light on – green light off) and then fully recloses (Green light on – red light off). • Tests 1HG010D and recognizes that the valve fails to close (red light stays on). • Reports failure to SRO. ○ Dispatches Equipment Operator to determine the position of 1HG010D. • Does NOT test 1HG011D.
	SRO	<ul style="list-style-type: none"> • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • References ITS 3.6.5.6 ○ References ORM 2.4.6. ○ Determines ORM 2.4.6 DW Vacuum Breaker Position Indication met. • Enters ITS 3.6.5.6 Action A.1 Close the post-LOCA vacuum relief subsystem within 4 hours (determines the action met with 1HG011D shut). • Does NOT test 1HG011D. ○ Contacts the Shift Manager and maintenance to report failure of 1HG010D and entry into ITS 3.6.5.6 A.1.
Terminus: Testing of 1HG010A, 11A, 10B, 11B, 10C, 11C, and 10D complete. ITS 3.6.5.6 Action A.1 entered.		

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: 'A' RR FCV Drifts open		
Initiation: Upon direction of Lead Examiner, insert Remote 2.		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> Increasing Reactor Power, RR 'A' FCV position		
<u>Expected Annunciators:</u> 5003-1B, 5003-3B, 5003-4B, 5003-5A		
<u>Automatic Actions:</u> None		
	ATC	<ul style="list-style-type: none"> ○ Notifies the SRO that Reactor Power is increasing. ○ Notifies the SRO that the 'A' RR FCV is drifting open. ● Arms and depresses the HPU 'A' Shutdown Switch. ● Verifies the 'A' RR FCV stops opening. ○ Reports RR Loop Flow mismatch. ○ Verifies operation within Figure 1, CPS Stability Control & Power/Flow Operating Map limits. ○ Dispatches an Equipment Operator to investigate for abnormalities at the 'A' RR HPU. ○ Monitors RR Pump 'A' Seal Parameters.
	BOP	<ul style="list-style-type: none"> ○ Monitors reactor to ensure operations remain within established bands. ○ Notifies the SRO that the 'A' RR FCV is drifting open. ● Monitors control room panels and notifies the SRO of any unusual or unexpected conditions. ○ Verifies operation within Figure 1, CPS Stability Control & Power/Flow Operating Map limits. ○ Contacts the Reactor Engineer. ○ Dispatches an Equipment Operator to investigate for abnormalities at the 'A' RR HPU. ○ Checks RR HPU parameters IAW CPS 3302.01 section 8.4.1.2. ○ Demands a 3D Monicore Case.
	SRO	<ul style="list-style-type: none"> ● Acknowledges reports from ATC & BOP operators. ● Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. ● Enters and executes CPS 4008.01 Abnormal Reactor Coolant Flow. ● Evaluates ITS 3.4.1 Recirculation Loops Operating and enters ITS 3.4.1 A.1 if loop flow mismatch exceeds 5% of rated core flow (4.225×10^6 lbm/hr). ○ Informs RE, SM, and TSO and requests assistance in troubleshooting the 'A' RR FCV failure.
Terminus: RR 'A' FCV motion stopped. CPS 4008.01 Abnormal Reactor Coolant Flow entered.		

NOTES:

Operator Actions

Event No.(s): 3		Page 1 of 1
Description: Air system trouble / Shift Compressors		
Initiation: When directed by the Lead Examiner, insert Remote 3 and then report from an Equipment Operator that an air leak can be heard in the Radwaste Building.		
Time	Position	Applicant's Actions or Behavior
<p><u>Key Parameter Response:</u> #1 SA Compressor current, SA Header Pressure indicator on 1H13-P800-5041, Air Compressor indicating lights</p> <p><u>Expected Annunciators:</u> 5040-6F HIGH/LOW PRESS ADS IA SUPPLY DIV 1 OR 2, 5041-3B Trouble Instrument Air Dryer 0SA02J, 5041-3C Trouble Instrument Air Dryer 1SA02J, 5041-3D Trouble Instrument Air Dryer 2SA02J</p> <p><u>Automatic Actions:</u> None (Auto action failure inserted)</p>		
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands. ○ Monitors control room panels and notifies the SRO of any unusual or unexpected conditions. ○ Makes plant announcement for plant personnel to report location of the air leak. • Monitors SDV level • Monitors control rods for drifting • Places mode switch in shutdown if: <ul style="list-style-type: none"> • directed by the SRO, or • SDV level reaches rod block setpoint, or • any control rod begins to drift
	BOP	<ul style="list-style-type: none"> • Determines that the running Service Air Compressor (1SA01C) amps are rising / at maximum. • Manually starts the Standby Service Air Compressor (0SA01C). ○ Dispatches Equipment Operators to locate the source of the air leak. • Secures either 0SA01C or 1SA01C when EO reports the leak on 1PI-SA064 Service Air Compressor 1SA01C Discharge Pressure Instrument has been isolated. ○ Makes plant announcement for plant personnel to report location of the air leak. ○ Places either 0SA01C or 1SA01C in standby, or shifts to 2SA01C in standby per CPS 3214.01 Plant Air (IA & SA).
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. ○ Verifies / directs BOP to start 0SA01C. • Enters and executes CPS 4004.01 Instrument Air Loss. ○ Directs ATC to place the mode switch in shutdown if air pressure lowers to 60 psig and cannot be restored, or if SDV level increases resulting in a rod block, or if any control rod begins to drift. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: One of the three Service Air Compressors is running and a second Service Air Compressor is secured.		

NOTES:

Operator Actions

Event No.(s): 4		Page 1 of 1
Description: Low DG Air		
Initiation: When directed by the Lead Examiner, insert Remote 4.		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> NA		
<u>Expected Annunciators:</u> 5061-7F, OUT OF SERVICE DIESEL GEN 1B		
<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. ○ Dispatches an Equipment Operator to investigate. ○ Directs an Equipment Operator to manually operate DG 1B Air Compressors to restore/maintain DG 1B air receiver pressure from 215 - 250 psig.
	BOP	<ul style="list-style-type: none"> • Reports issue to SRO. ○ Dispatches an Equipment Operator to investigate. • Refers to the ARP for annunciator 5061-7F Out Of Service Diesel Gen 1B. ○ Directs an Equipment Operator to manually operate DG 1B Air Compressors to restore/maintain DG 1B air receiver pressure from 215 - 250 psig.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Directs BOP to manually operate the DG 1B Air Compressors to restore DG air receiver pressure. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. • Evaluates and enters Technical Specification LCO 3.8.3 E.1 (requires starting air receiver pressure be restored to ≥ 200 psig within 48 hours). ○ Informs Shift Manager. ○ Conducts a brief. ○ Contacts Maintenance to investigate.
Terminus: Technical Specification 3.8.3 has been evaluated.		

NOTES:

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: Main Turbine Gland Seal Header High Pressure		
Initiation: When directed by the Lead Examiner, insert Remote 5		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> Rising Gland Seal Header Pressure		
<u>Expected Annunciators:</u> 5019-3D High/Low Press Stm Seal Header, 5019-1B High Pressure Stm Packing Exh Suction		
<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. ○ Dispatches an Equipment Operator to investigate.
	BOP	<ul style="list-style-type: none"> • Reports annunciator 5019-3D High/Low Press Stm Seal Header to SRO. • Refers to the ARP for 5019-3D. • Determines Main Turbine Gland Seal Header Pressure is high (> 4.7 psig). • Throttles open 1GS-S2 Stm Seal Supply Bypass Vlv. • Shuts 1GS-S1, Stm Seal Supply Vlv. • Maintains Gland Seal Header Pressure ~ 4 psig (2.2 to 4.3 psig is acceptable). • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions. ○ Dispatches Equipment Operator to determine cause of GS Header high pressure.
	SRO	<ul style="list-style-type: none"> • Verifies / directs BOP to restore Main Turbine Gland Seal header pressure. • Acknowledges reports from ATC/BOP. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. ○ Conducts brief on problem and status.
Terminus: 1GS-S2 is throttled to maintain GS Header Pressure 2.2 – 4.3 psig; 1GS-S1 is closed.		

NOTES:

Operator Actions

Event No.(s): 6		Page 1 of 1
Description: 1A Condensate Pump trip		
Initiation: When directed by the Lead Examiner, insert Remote 6.		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> Lowering RFP Suction Pressure & RPV Level		
<u>Expected Annunciators:</u> 5014-2B, Low Press Cond Pumps Disch Header		
<u>Automatic Actions:</u> None		
	ATC	Per 4002.01, Abnormal RPV Level/Loss Of Feedwater At Power <ul style="list-style-type: none"> ○ Determines CD Pump 'A' has tripped ○ Determines Main Condenser Hotwell Level is normal ● Starts the Standby CD Pump (CD Pump 'C') ● Monitors and reports RPV Level ○ Dispatches Equipment Operator to monitor CD Pump 'C' operation and investigate trip of CD Pump 'A'.
	BOP	<ul style="list-style-type: none"> ● Reports annunciator 5014-2B Low Pressure Condensate Pumps Discharge Header to SRO. ● Refers to the ARP for 5014-2B. ○ Determines Main Condenser Hotwell Level is normal ● Monitors control room panels and notifies the SRO of any unusual or unexpected conditions. ○ Dispatches Equipment Operator to monitor CD Pump 'C' operation and investigate trip of CD Pump 'A'.
	SRO	<ul style="list-style-type: none"> ● Enters and executes CPS 4002.01, Abnormal RPV Level/Loss Of Feedwater At Power ● Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. ○ Conducts brief on problem and status.
Terminus: Standby CD pump has been started. RPV Level is restored and stable.		

NOTES:

Operator Actions

Event No.(s): 7		Page 1 of 2
Description: CRD Pump hi seal leakage / pump shift		
Initiation: When directed by the Lead Examiner, insert Remote 7.		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> NA		
<u>Expected Annunciators:</u> 5068-6C, CRD Pump C001B Seal Leakage High		
<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 and notifies the SRO of any unusual or unexpected conditions. ○ Dispatches an Equipment Operator to investigate seal leakage alarm on CRD Pump 'B'. ○ Notifies Radiation Protection of the spill. ○ Communicates annunciator 5068-6C to the SRO.
	BOP	<ul style="list-style-type: none"> ○ Communicates annunciator 5068-6C to the SRO. • Refers to ARP 5068-6C CRD Pump C001B Seal Leakage High. <p>Per CPS 5068-6C, CRD Pump C001B Seal Leakage High:</p> <ul style="list-style-type: none"> • Swaps running CRD Pumps per CPS 3304.01 Control Rod Hydraulic and Control (RD). <p>Per CPS 3304.01, Control Rod Hydraulic and Control (RD):</p> <ul style="list-style-type: none"> • Directs an Equipment Operator to perform prestart local actions. • Directs the Equipment Operator to shut/verify shut 1C11-F014A Pump A Stop Chk Discharge Valve. • Starts standby CRD Aux Oil Pump & allows AOP to run for 1 minute. • Directs the Equipment Operator to verify oil pressure is ≥ 3 psig. • Starts the standby CRD Pump A, 1C11-C001A. • Verifies CRD Pump is running and Aux Oil Pump has auto stopped. • Directs the Equipment Operator to verify gear increaser oil pressure is between 20 and 30 psig. • Directs the Equipment Operator to slowly open 1C11-F014A, Pump A Stop Chk Discharge Valve. • Directs the Equipment Operator to slowly throttle close 1C11-F014B until: <ol style="list-style-type: none"> 1) On-coming pump A amperage increases to $>$ off-going pump's amperage. 2) 1C11-F014B reaches $\leq 25\%$ open. • Stops the off-going CRD Pump B, 1C11-C001B • Directs the Equipment Operator to fully shut the off-going CRD Pump B discharge valve 1C11-F014B. • Directs the Equipment Operator to perform post startup local actions. • Directs Equipment Operator to close 1C11-F017, Cross Connect valve. ○ Notifies Radiation Protection of the spill.
	SRO	<ul style="list-style-type: none"> • Directs BOP to shift to 'A' CRD Pump. • Ensures operations are conducted within the bounds of Tech Specs and IAW

		Operations standards and approved procedures. <ul style="list-style-type: none">○ Enters and executes CPS 4979.06 Radioactive Spill.○ Notifies Radiation Protection of the spill.
Terminus: CRD Pump C001A is in service.		

NOTES:

Operator Actions

Event No.(s): 8		Page 1 of 2
Description: Rapid Plant S/D for loss of CY		
Initiation: When directed by the Lead Examiner, insert Remote 8.		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> None		
<u>Expected Annunciators:</u> Annunciator CPS 5014-2D, Low Press Cycled Cond Xfer Pumps Disch Hdr		
<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 and notifies the SRO of any unusual or unexpected conditions. • When directed by the SRO, performs a Rapid Plant Shutdown IAW CPS 3005.01 Unit Power Changes. <ul style="list-style-type: none"> ○ When directed by the SRO, secures all running Condensate Pumps 1CD01PA, B, C, and D. • Initiates a manual reactor scram when directed by the SRO: <ul style="list-style-type: none"> • Turns mode switch to SHUTDOWN. • Verifies reactor power is lowering. • Verifies Shutdown Criteria is met. • WHEN RPV level is rising with 2 feed pumps operating, THEN Secures 1 Feed Pump and controls RPV water level between Level 3 and Level 8. • Carries out Scram Choreography by reporting. <ul style="list-style-type: none"> • Rod status is... • Reactor Power is... and trend • Reactor pressure is... and trend • Reactor level is... and trend • Any EOPs with entry conditions (no values required). • Performs EOP actions as directed by SRO. • Stabilizes RPV pressure < 1065 psig. ○ Coordinates with BOP operator to monitor and control RPV level and pressure.
	BOP	<ul style="list-style-type: none"> • Reports annunciator 5014-2D Low Press Cycled Cond Xfer Pumps Disch Hdr to the SRO. • Refers to the ARP for 5014-2D. <p>Per CPS 5014-2D, Low Press Cycled Cond Xfer Pumps Disch Hdr:</p> <ul style="list-style-type: none"> • Operates CY transfer pumps consistent with system demand to maintain normal header pressure per CPS 3208.01, Cycled/Makeup Condensate (CY/MC) ○ Operator may go to CPS 3208.01 Section 8.2.2 directly or to 8.3.1 which will then direct him to section 8.2.2. <p>Per CPS 3208.01, Cycled/Makeup Condensate (CY/MC):</p> <ul style="list-style-type: none"> • Starts the 'A' CY Pump: <ul style="list-style-type: none"> • Observes an increase in Cyc Cond Xfer Pmp Disch Hdr Pressure followed by a decrease in Cyc Cond Xfer Pmp Disch Hdr Pressure on 1H13-P870-5014. • Reports annunciator 5014-2D Low Press Cycled Cond Xfer Pumps Disch Hdr has been received again.

		<ul style="list-style-type: none"> • Reports loss of CY to the SRO. • Carries out Scram Choreography by reporting: <ul style="list-style-type: none"> • Reactor Scram • MDRFP may start • Evacuate the RCIC room • Evacuate the Containment • Determines rod status and reports it to the SRO • Performs EOP actions as directed by SRO.
	<p>SRO</p>	<ul style="list-style-type: none"> • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures. • Directs ATC to perform a Rapid Plant Shutdown when it has been determined that CY has been lost. • Enters and executes CPS 4100.01 Reactor Scram. • Carries out Scram Choreography by performing an Update: <ul style="list-style-type: none"> • Update: <ul style="list-style-type: none"> • Entering EOP-1 and 6 • Entering the Scram Off-Normal • End of Update • Directs / verifies performance of appropriate actions per EOP-1: <ul style="list-style-type: none"> • Mode switch to SHUTDOWN • Stabilize RPV pressure below 1065 psig per CPS 4411.09 RPV Pressure Control Sources. • Control RPV water level Level 3 to Level 8 per CPS 4411.03 Injection / Flooding Sources.
<p>Terminus: Rapid Plant Shutdown completed; scram choreography complete.</p>		

NOTES:

Operator Actions

Event No.(s): 9, 10		Page 1 of 2
Description: Recirculation Loop Line Break (LOCA)		
Initiation: Initiated when Reactor Mode Switch is placed in shutdown in Event 8		
Time	Position	Applicant's Actions or Behavior
Key Parameter Response: DW Pressure exceeds 1.68 psig. RAT 'A' trips on differential overcurrent resulting in a loss of non-class 1E 6.9 / 4.16KV Bus power		
Expected Annunciators: Multiple		
Automatic Actions: Auto start of all divisional ESF Systems (ECCS, DGs, VG, SX). CRVICS Group 2, 7, 8, 10, 11, 12, 15, 16, 17, 19, and 20 isolation. 4160V Bus 1A1, 1B1, and 1C1 will automatically transfer to the ERAT.		
[CT] [CT]	ATC	<ul style="list-style-type: none"> ○ Reports rising DW Pressure to the SRO. ● Reports EOP-1 RPV Control entry condition on High DW Pressure and/or Low RPV Water Level. ● Reports EOP-6 Primary Containment Control entry condition on High DW Pressure. ● Reports Loss of FW system as an injection source. ○ Reports RPV Level when level goes below TAF. ○ Reports RPV Level when level goes back above TAF. ● Performs EOP actions as directed by the SRO. ○ Diagnoses HPCS Pump leak. ○ Secures the HPCS Pump. ○ [CT] Places RHR 'A' and 'B' in Containment Spray when directed by the SRO. ○ Performs a manual Group 1 Isolation when directed by the SRO. ○ [CT] Initiates ADS when RPV Level reaches TAF (-160 inches) and when directed by the SRO. ○ Verifies 7 ADS valves open. ○ Maximizes ECCS injection to restore RPV water level above TAF.
[CT] [CT]	BOP	<ul style="list-style-type: none"> ○ Reports rising DW Pressure to the SRO. ○ Performs panel walkdown to determine equipment/plant status. <p>Loss of Reserve Auxiliary Transformers A, B, and C (RAT A, B, C)</p> <ul style="list-style-type: none"> ○ Determines/Reports that RAT 'A', 'B', and 'C' have tripped. ● Verifies transfer of 1E buses to Emergency Reserve Auxiliary Transformer (ERAT). <p>Recirculation Loop Line Break</p> <ul style="list-style-type: none"> ● Monitors the start of the ECCS Systems and Diesel Generators on High DW Pressure. ○ Diagnoses HPCS Pump leak. ○ Secures the HPCS Pump. ○ Dispatches Equipment operator to investigate HPCS failure to inject. ● Performs EOP actions as directed by the SRO. ● [CT] Places RHR 'A' and 'B' in Containment Spray when directed by the SRO. ● Secures Containment Spray when RPV level reaches -100" when directed by the SRO. ● Starts both SLC Pumps when directed by the SRO. ○ Performs a manual Group 1 Isolation when directed by the SRO. ○ Reports RPV Level below TAF (-160"). ○ [CT] Initiates ADS when RPV Level reaches TAF (-160 inches) and when directed by the SRO. ○ Verifies 7 ADS Valves open.

		<ul style="list-style-type: none"> ○ Maximizes ECCS injection to restore RPV water level above TAF. ○ Reports RPV Level above TAF.
[CT]	SRO	<ul style="list-style-type: none"> ○ Enters and executes CPS 4200.01 Loss of AC. ○ Directs BOP to perform a manual Group 1 Isolation due to loss of the CW system. ● Enters and executes EOP-1 RPV Control and EOP-6 Primary Containment Control. <ul style="list-style-type: none"> ● Directs ATC/BOP to maintain RPV Water Level between Level 3 and 8 ● Directs ATC/BOP to maintain RPV Pressure between 800-1065 psig. ○ Directs securing HPCS Pump after leak is diagnosed. ● [CT] Directs placing both loops of RHR in Containment Spray when containment pressure is within the “OK to Spray” region of EOP-6 Fig. O. ● Directs removing both RHR loops from containment spray mode when RPV Level reaches -100”. ○ Directs IMD to perform CPS 4411.04 Throttling ECCS Flow. ○ Directs IMD to perform CPS 4410.00C006 Defeating VP/WO interlocks to restore containment cooling. ○ Directs IMD to perform CPS 4410.00C009 Defeating Injection / Flooding Interlocks to defeat 1E12-F053A/B interlocks ● [CT] Directs entry into EOP-3 Emergency RPV Depressurization (Blowdown) when RPV Level drops to TAF (-160”). ● Ensures operations are conducted IAW Operations expectations, standards and approved procedures. ○ Informs Shift Manager. ○ Conducts a brief.
<p>Terminus: ADS initiated. RPV level maintained between Level 3 and 8 by Low Pressure ECCS Systems.</p>		
<p>NOTES:</p>		

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. Reset to IC-197 (PW 91448).
4. Perform/Verify the following Control Panel operations:
 - Reduce Recirc Flow to achieve 90% power
 - Place the 'B' CY Pump in PTL and tag it out
5. Load the lesson plan for this scenario.
6. Place simulator in RUN.
7. Verify the following commands for Setup:
 - **Insert YP_XREMT_782 Disable** (Standby Service Air Compressor Auto Start disabled)
8. Turn on and advance recorders.
9. Verify RCIC Flow Controller is set at 620 psig.
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 36 is complete - Gang 22A is at 48.
13. Make sure:
 - Sequence A is selected.
 - Individual Drive Mode is selected on the OCM.
 - CY Pump 'C' is running
 - CD Pump 'A' is running
 - RD Pump 'B' is running
14. Procedures that are expected to be used during this scenario are:
 - CPS 9064.01 Drywell Post-LOCA Vacuum Breaker Verification Test
 - CPS 4008.01 Abnormal Reactor Coolant Flow
 - CPS 3302.01 Reactor Recirculation (RR)
 - CPS 4004.01 Instrument Air Loss
 - CPS 3214.01 Plant Air (IA & SA)
 - CPS 3506.01 Diesel Generator and Support Systems (DG)
 - CPS 3107.01 Turbine Gland Seal (GS)
 - CPS 4002.01 Abnormal RPV Level / Loss of Feedwater At Power
 - CPS 3104.01 Condensate – Condensate Booster (CD-CB)
 - CPS 4979.06 Radioactive Spill
 - CPS 3304.01 Control Rod Hydraulic and Control (RD)
 - CPS 3005.01 Unit Power Changes
 - CPS 4100.01 Reactor Scram
 - CPS 3208.01 Cycled / Makeup Condensate (CY/MC)
 - CPS 4411.09 RPV Pressure Control Sources
 - CPS 4411.03 Injection / Flooding Sources

- CPS 4200.01 Loss of AC Power
 - CPS 9082.01 Offsite Source Power Verification
 - ITS 3.6.5.6, 3.8.3, ORM 2.4.6, 3.4.1,
15. Hang OOS tags on CY Pump 'B' control switch
 16. Identify T/S issues associated with OOS and turnover:
 17. Operating Equipment: None
 18. Provide a marked up copy of CPS 9064.01 Drywell Post-LOCA Vacuum Breaker Verification Test.
 19. Ensure the booth operator has a blank copy of 9082.01 ready to hand to the crew when Event 4 is initiated.
 20. Verify simulator conditions match the turnover.

Event Triggers and Role Play

Event

1. Drywell Vacuum Breaker Test
 - a. When 1HG010D is opened verify the following command:
 - (1) **Insert VR1HG010DFP 100%** (HG010D sticks open)
 - b. Role Play
 - (1) Independent Verifier (IV) - as necessary (do NOT cue the examinee)
 - (2) Equipment Operator (when directed to determine the position of 1HG010D) – Wait 3 minutes and report, “1HG010D is fully open”.

2. RR FCV Drifts open
 - a. On the signal of the lead examiner, **Activate Remote2** and verify the following command(s):
 - (1) **Insert S_K603A Open Slow** ('A' Loop FCV overridden Open Slow)
 - b. Role play
 - (1) RE (when contacted about the FCV failure) – “I am on my way to the MCR.”
 - (2) Equipment Operator (when dispatched to the RR HPU to investigate) – “The ‘A’ RR HPU looks normal locally. There are no oil leaks on the skid.”

3. Air system trouble / Shift Compressors
 - a. On the signal of the lead examiner, **Activate Remote3**, verify the following command, and issue the following report:
 - (1) **Insert YPXMALSE_88 2.355% (over a 5 minute ramp)** (IA Header Rupture)
 - (2) Call the MCR as an Equipment Operator and issue the following report, “I can hear an air leak in the Radwaste Building. I am attempting to determine the location of the leak.”
 - b. Role play
 - (1) Equipment Operator(s)
 - a) When directed to investigate source of the leak – wait until 0SA01C has been started, and then report that the leak is on 1PI-SA064 (1SA01C discharge pressure instrument) and that the 0SA131B Serv Air Comp 1 Disch Inst Rt has been closed to isolate the leak, then delete **YPXMALSE_88**.
 - b) 3214.01 Section 8.1.2.1 Shifting Service Air Compressors cues:
 - (1) 8.1.2.1.14 – When directed to adjust the off going compressor pressure controller setpoint to ~ 100 # - report that the off going compressor pressure controller setpoint is at ~ 100 #.
 - (2) 8.1.2.1.16 – When directed to verify the compressor inlet line vacuum gauge indicates between 1-5 IN-WC – report the compressor inlet line vacuum gauge indicates 2 IN-WC.
 - (3) 8.1.2.1.17 – 8.1.2.1.21 – When directed to place 0SA01C or 1SA01C Control Panel Mode Switch in Unload and Load positions, insert remote functions:
 - (a) **YP_XREMT_779 Unload** to place the 0SA01C Mode Switch in unload
 - (b) **YP_XREMT_779 Normal** to place the 0SA01C Mode Switch in load
 - (c) **YP_XREMT_780 Unload** to place the 1SA01C Mode Switch in unload
 - (d) **YP_XREMT_780 Normal** to place the 1SA01C Mode Switch in load
 - (4) 8.1.2.1.19 - When directed to verify the prelube pump starts on the off-going Service Air Compressor, report that the prelube pump is running.
 - c) If directed to investigate Air Dryer Trouble alarm(s) – inform the MCR that the trouble alarms are due to high differential pressure.

- d) If directed to perform 3214.01 section 8.1.2.2 to shift Standby Service Air Compressors to 2SA01C in standby, make the following reports:
- (1) 8.1.2.2.1 – “I have verified that the POWER ON light is lit on 2PL11J for 2SA01C.”
 - (2) 8.1.2.2.2 – “I have performed prestart checks for 2SA01C.
 - (3) 8.1.2.2.3 – “The Mode selector switch for 2SA01C is in Unload.”
 - (4) 8.1.2.2.4 – “I have verified that 0SA045C Serv Air Comp Suct Valve is closed and the blowoff valve is open.”
 - (5) 8.1.2.2.6 – “The Prelube Pump Running light is on.”
 - (6) 8.1.2.2.7 – “The Low Oil Pressure trip light is off.
 - (7) 8.1.2.2.8 – “The amber trip lights are reset.”
 - (8) 8.1.2.2.9 – Insert remote function **YP_XREMT_781 Normal**, and then report, “The Mode Selector Switch for 2SA01C is in Load.”
4. Low DG Air (TS)
- a. On the signal of the lead examiner, **Activate Remote4** and verify the following commands:
 - (1) **Insert A05_A01_A0207_6_TVM Steady** (Annunciator 5061-7F ON)
 - b. Role play
 - (1) Equipment Operator
 - a) When directed to investigate DG 1B trouble – wait 1 minute and report, “Both Air Receivers for Div 2 DG are at 190 psig and lowering slowly. The air compressors are not running and no leaks can be heard.”
 - b) When directed to manually operate the DG 1B Starting Air Compressors per 3506.01 section 8.2.5 – Acknowledge report, wait 2 minutes and then delete malfunction **A05_A01_A0207_6_TVM Steady** from the summary page. Report to the MCR that both DG Air Receivers have been repressurized to 230 psig.
5. Main Turbine Gland Seal Header High Pressure
- a. On the signal of the lead examiner, **Activate Remote5** and verify the following commands:
 - (1) Insert GS0VCGSSSFVFP_100% (GSSSFV Failed to Specified Position)
 - b. Role Play
 - (1) Equipment Operator (when directed to investigate GS Header High Pressure) – wait 1 minute and report, “1GS-SSFV appears to be full open.”
6. Condensate Pump trip
- a. On the signal of the lead examiner, **Activate Remote6** and verify the following commands:
 - (1) **Insert CD01PA** (1A Condensate Pump Motor Failure)
 - b. Role play
 - (1) Equipment Operator
 - a) When dispatched to verify proper operation of CD Pump ‘C’ – “CD Pump ‘C’ is operating normally.”
 - b) When dispatched to investigate trip of CD Pump ‘A’ – “CD Pump ‘A’ breaker is tripped on overcurrent and the motor smells hot, but there are no flames or any smoke present.”
7. CRD Pump hi seal leakage / pump shift
- a. On the signal of the lead examiner, **Activate Remote7** and verify the following commands:
 - (1) **Insert A05_A02_A0706_3_TVM Steady** (Annunciator 5068-6C ON)
 - b. Role play
 - (1) Equipment Operator
 - a) When dispatched to Control Rod Drive Pump ‘B’ – wait 1 minute and report, “The ‘B’ RD Pump seal is leaking and spraying water on the floor around the pump.

- b) When directed to support shifting Control Rod Drive Pumps:
- (1) 3304.01 step 8.1.2.1 – wait one minute and report, “The shaft driven oil pump and gear increaser have been primed.”
 - (2) 3304.01 step 8.1.2.3 – “1C11-R017AI and 1C11-R017BI are closed.”
 - (3) 3304.01 step 8.1.2.4 – from the ATWS Actions Lesson Plan, release **Shut RD A Disch Valve 14A**, wait one minute and then report, “1C11-F014A is shut.”
 - (4) 3304.01 step 8.1.2.7 – “Oil pressure is greater than 3 psig.”
 - (5) 3304.04 step 8.1.2.8 – “I’m standing clear of CRD Pump A.”
 - (6) 3304.01 step 8.1.2.9.3 – “Gear increaser oil pressure is 25 psig.”
 - (7) 3304.01 step 8.1.2.10 – “I’ll monitor gear increaser and CRD Pump Oil Cooler outlet temperature and adjust 1WT600A and 1WT601A as necessary.”
 - (8) 3304.01 step 8.1.2.11 – from the ATWS Actions Lesson Plan, release **Open RD A Disch Valve 14A**, wait one minute and then report, “1C11-F014A is open.”
 - (9) 3304.01 step 8.1.2.12 – from the ATWS Actions Lesson Plan, release **Shut RD B Disch Valve 14B**, wait one minute and then report, “1C11-F014B is throttled to < 25% open.”
 - (10) 3304.01 step 8.1.2.14 – “1C11-F014B is fully closed.”
 - (11) 3304.01 step 8.1.2.15 – “1C11-R017AI and 1C11-R017BI are open.”
 - (12) 3304.01 step 8.1.2.16 – “I will monitor CRD Pump ‘A’ Gear Increaser and Oil Cooler temperatures every two hours for the next 24 hours.”
 - (13) When directed to shut 1C11-F017 Cross Connect Valve (5068-6C Operator Action 2) – from the Summary Page, delete **Insert A05_A02_A0706_3_TVM Steady** and then report, “1C11-F017 Cross Connect Valve is shut and seal leakage has stopped”.
8. Rapid S/D for loss of CY
- a. On the signal of the lead examiner, **Activate Remote8** and verify the following commands:
 - (1) **Insert YFFWPPSS_11** (CY Pump ‘C’ Sheared Shaft)
 - (2) **Insert YAFWPPDE_9 90% Ramp=00:00:30** (CY Pump ‘A’ Pumping Efficiency) (triggered when the ‘A’ CY Pump control switch is taken to start).
 - b. Role play
 - (1) Equipment Operator(s):
 - a) When directed to check operation of CY Pump ‘C’ – “The motor is running, but the pump shaft is not turning, and the motor is making noise and vibrating.”
 - b) When directed to check operation of CY Pump ‘A’ – “CY Pump ‘A’ discharge pressure indicates 30 psig locally. The pump is not making any unusual noises. There is no evidence of leakage locally.”
 - (2) ROC Operator
 - a) When informed that the CY system has been lost (3208.01 step 8.3.1.5 - acknowledge report.
 - b) If directed to check for indications of CY leakage – “There are no indications of increased inleakage in the ROC.”
9. Large Line Break LOCA
- a. When the Mode Switch is taken to SHUTDOWN, verify the following commands:
 - (1) **Insert YPXMALSE_527 0.55%** (RR A Suction Line Leak)
 - (2) **Insert RRL23LKA 10%** (RR-F023A Seat Leakage)
 - (3) **Insert RAT_A_LOCKOUT Delay=00:01:00** (RAT A Relay Lockout)
 - b. Role play
 - (1) Equipment Operator(s)

- a) When directed to check HPCS Pump operation – report, “No abnormalities locally.”
 - b) When directed to check operation of ECCS and Diesel Generators, acknowledge the order.
 - c) When directed to check RAT A, B, and/or C, wait 5 minutes and report that the lockout relays are tripped for RAT ‘A’.
- (2) IMD
- a) If requested to perform CPS 4410.00C009 to defeat interlocks for 1E12-F053A and/or 53B, from the ATWS Actions Lesson Plan, release **Defeat 1E12F053A Isol** and **Defeat 1E12F053B Isol**. Wait 3 minutes and report that the isolations have been defeated for 1E12-F053A and 1E12-F053B.
 - b) If requested to perform CPS 4410.00C006 Defeating VP/WO Interlocks, from the ATWS Actions Lesson Plan, release **Defeat VP-WO Interlocks**. Wait 12 minutes and then report that 4410.00C006 steps 3.1 – 3.6 have been completed.
 - c) If requested to perform CPS 4411.04 Throttling ECCS Flow, from the summary page:
 - (1) For LPCS, wait 8 minutes and release **YP-XREMT_754**. Report that 1E21-F005 LPCS Injection Shutoff Valve is throttleable.
 - (2) For LPCI ‘A’, wait 8 minutes and release **YP-XREMT_751**. Report that 1E12-F042A RHR Pump 1A LPCI Injection Spray Valve is throttleable.
 - (3) For LPCI ‘B’, wait 8 minutes and release **YP-XREMT_752**. Report that 1E12-F042B RHR Pump 1B LPCI Injection Spray Valve is throttleable.
 - (4) For LPCI ‘C’, wait 8 minutes and release **YP-XREMT_753**. Report that 1E12-F042C RHR Pump 1C LPCI Injection Spray Valve is throttleable.
10. Loss of high pressure injection, TAF Blowdown, restore RPV water level
- a. When HPCS starts, verify the following command:
 - (1) **Insert YPMALSE_69 Ramp=00:05:00** (HPCS Line Break)
 - b. Role play
 - (1) Equipment Operator(s)
 - a) When directed to check HPCS Pump operation – report, “No abnormalities locally.”
 - b) If directed to perform DC MCC 1E and/or 1F Load Shedding, acknowledge the order.
 - (2) IMD
 - a) If requested to perform CPS 4410.00C009 to defeat interlocks for 1E12-F053A and/or 53B, from the ATWS Actions Lesson Plan, release **Defeat 1E12F053A Isol** and **Defeat 1E12F053B Isol**. Wait 3 minutes and report that the isolations have been defeated for 1E12-F053A and 1E12-F053B.
 - b) If requested to perform CPS 4410.00C006 Defeating VP/WO Interlocks, from the ATWS Actions Lesson Plan, release **Defeat VP-WO Interlocks**. Wait 12 minutes and then report that 4410.00C006 steps 3.1 – 3.6 have been completed.
 - c) If requested to perform CPS 4411.04 Throttling ECCS Flow, from the summary page:
 - (1) For LPCS, wait 8 minutes and release **YP-XREMT_754**. Report that 1E21-F005 LPCS Injection Shutoff Valve is throttleable.
 - (2) For LPCI ‘A’, wait 8 minutes and release **YP-XREMT_751**. Report that 1E12-F042A RHR Pump 1A LPCI Injection Spray Valve is throttleable.
 - (3) For LPCI ‘B’, wait 8 minutes and release **YP-XREMT_752**. Report that 1E12-F042B RHR Pump 1B LPCI Injection Spray Valve is throttleable.
 - (4) For LPCI ‘C’, wait 8 minutes and release **YP-XREMT_753**. Report that 1E12-F042C RHR Pump 1C LPCI Injection Spray Valve is throttleable.

Turnover

1. The plant is operating at 90% power.
2. Status of Tagged Out Equipment
 - 'B' CY Pump is out of service for maintenance
3. Day Shift Today
4. Weather Conditions
 - Calm and Clear
5. Thermal Limit Problems or concerns
 - None
 - RE and Rod Verifier are available on request.
6. LCO's in effect
 - None
7. Surveillances in progress
 - None
8. Previous Shift Evolutions completed
 - Drywell was vented IAW CPS 3316.01 Containment Combustible Gas Control (HG) section 8.3 Drywell Venting to support performance of CPS 9064.01 Drywell Post-LOCA Vacuum Breaker Verification Test.
9. Evolutions planned for the shift
 - Perform CPS 9064.01 Drywell Post-LOCA Vacuum Breaker Verification Test
10. Risk Levels
 - Green
11. Dose equivalent Iodine 131 is reading 1.5 E-6 μ curies per gram.

Exelon Nuclear

2013
ILT 12-1 NRC Exam

**Scenario Number:
NRC Exam Scenario 3**

Revision Number: 0

Date: 06/14/13

Developed By:	_____	_____
	Instructor	Date
Validated By:	_____	_____
	SME or Instructor	Date
Reviewed By:	_____	_____
	Operations Representative	Date
Approved By:	_____	_____
	Training Department	Date

Appendix D

Scenario Outline

Form ES-D-1

Facility: Clinton Power Station ILT 12-1 NRC Scenario No.: 3 Op-Test No.: 2013301

Examiners: _____ Operators: _____

Initial Conditions: At 20% power during Startup
Turnover: Secure the Suppression Pool flush lineup, continue rod withdrawal to raise FCL

Event No.	Malf. No.	Event Type*	Event Description
1	None	BOP N	Secure Suppression Pool Flush
2	None	ATC R	Raise power with Rods to 28% Power
3	A05_A02_A21S07	ATC C	Rod difficult to Withdraw, Raise DP
4	ROD1641TFIA5	ATC C	Un-coupled rod
5	A04_A18_A01_1 0.54	BOP C	TG LO Temp controller failure
6	YP_XMFTB_5041	SRO (TS)	LPCS Room Fan Trip (TS)
7	A11_A02_03_07_TVM Steady (Annunciator 5041-3G)	BOP C	Low flow CW Pump seal water
8	RH0VCE12F028AFP	SRO (TS)	Cont Spray valve breaker trip (TS)
9	YPXMALSE_252 YPCTHOLE 20%	CREW M	Steam LOCA, Auto Scram failure, Drywell Hole
10	RH0VCE12F028BFP	CREW M	Containment Spray failure, EOP 3 for PSP

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

ES-301-4 Quality Checklist Attributes:
 Total Malfunctions (5-8): 8
 Malfunction(s) after EOP (1-2): E10
 Abnormal Events (2-4): E5, E7
 Major Transient(s) /E-Plan entry (1-2): E9
 EOPs (1-2): EOP 6 AND EOP 1
 EOP Contingencies (0-2): E10 (EOP 3)
 Critical Tasks (2-3): RPV-6.1, PC6.1 / 7.1

ES-301-5 Transient/Event Checklist Attributes:
 BOP Normal: E1
 ATC Reactivity (1 per set): E2
 BOP I/C (4 per set): E5 & E7
 ATC I/C (4 per set): E3 & E4
 SRO-I I/C (4 per set inc 2 as ATC): E3,4,5, &
 7
 SRO Tech Spec (2 per set): E6 & E8
 ALL Major Transients (2 per set): E9

Narrative Summary

Event #	Description
1. Event 1 - Secure Suppression Pool Flush	The operating crew will begin the scenario by securing RHR 'A' from suppression pool flush IAW CPS 3312.01 Residual Heat Removal (RHR) section 8.2.10 Manual Operation of RHR – Pool to Pool.
2. Events 2 & 3 - Raise power with Rods to 28% To Upshift RR Pumps / Rod Difficult to Withdraw	The crew will raise Reactor power with Control Rods to achieve 100% Flow Control Line IAW CPS 3005.01 Unit Power Changes. Control rod 16-41 will not withdraw when using normal drive differential pressure. The crew will perform actions for a difficult to withdraw control rod IAW CPS 3304.01 Control Rod Hydraulic & Control (RD) Section 8.3.4 Control Rod Difficult to Withdraw. The crew will raise drive differential pressure in 50 psig increments until control rod 16-41 is successfully withdrawn.
3. Event 4 - Un-coupled rod	When the first in-sequence control rod reaches position 48, the ATC will perform a coupling check IAW CPS 3304.02 Rod Control And Information System (RC&IS) section 8.1.10 Coupling Check by applying a continuous withdraw to the rod at position 48. Annunciator 5006-5G Rod Overtravel will be received, indicating that the control rod has become uncoupled from its drive mechanism. The operating crew will attempt to recouple the control rod IAW the annunciator response procedure. The SRO will evaluate and enter ITS 3.1.3 Condition C until the control rod is successfully recoupled.
4. Event 5 - Turbine Lube Oil Temp Controller Failure	Annunciator HIGH TEMP TURB GEN LUBE OIL (5018-3A) comes in due to a failure in the auto portion of the TURB OIL CLG WTR Controller. The BOP operator will diagnose the problem with the controller, place the controller in MANUAL and coordinate with the ATC Operator to stabilize and restore turbine oil outlet temperature.
5. Event 6 - LPCS Room Fan Trip	Annunciator 5050-1C Not Available VY System Division 1 will be received. The BOP operator will determine that the LPCS Supply Fan 1VY01C has tripped. If the BOP attempts to restart the fan, the fan will fail to start. The crew will monitor LPCS Pump Room temperature and dispatch an Equipment Operator to determine the cause of the trip. The SRO will evaluate and enter ITS 3.5.1 ECCS – Operating Required Action A.1 Restore low pressure ECCS injection/spray subsystem to OPERABLE status within 7 days.
6. Event 7 - Low flow CW Pump seal water	Annunciator 5041-3G LOW FLOW CW PUMP 1C BRG SEAL WATER comes in due to CW Pump 'C' seal water flow less than the setpoint (15 gpm). The BOP operator will dispatch an Equipment Operator to investigate. Seal water flow to Circulating Water (CW) Pump 1C cannot be restored requiring the BOP operator to trip CW Pump 1C and start CW Pump 1A.
7. Event 8 – RHR Containment Spray Valve (1E12-F028B) breaker trip	Annunciator 5065-8B RHR B Out of Service comes in due to a trip of the breaker for 1E12-F028B RHR B to Cnmt Spray B Shutoff Valve. The operating crew will dispatch an Equipment Operator to investigate the cause of the breaker trip. The SRO will evaluate and enter ITS 3.6.1.7 RHR Containment Spray System Required Action A.1 Restore RHR Containment Spray subsystem to OPERABLE status within 7 days.
8. Event 9 - Steam LOCA / ATWS	The 'D' Main Steam Line will rupture inside the Drywell causing DW pressure to rise. The SRO will enter CPS 4100.01 Coolant Leakage off-normal and direct the reactor to be scrammed. When the ATC places the mode switch in shutdown, the reactor will fail to scram. The ATC will arm and depress the Manual

Scram Pushbuttons and initiate ARI to successfully insert all control rods. The crew will evacuate the containment. The SRO will enter EOP-1A ATWS RPV Control. The SRO will enter EOP-6 Primary Containment Control and will direct the BOP operator to initiate containment spray when Containment pressure reaches the OK to Spray region of EOP-6 Figure O Containment Spray Initiation Limit. When the BOP operator initiates the 'A' loop of Containment Spray, 1E12-F028A will fail to open. When Containment Pressure exceeds EOP-6 Figure N Pressure Suppression Pressure limit, the SRO will direct the crew to perform a reactor blowdown per EOP-3 Emergency Depressurization (Blowdown).

CRITICAL TASKS

- RPV-6.1 EOP Action to Reduce Reactor Power
- PC-6.1/7.1, Emergency Depressurization / Anticipate Emergency Depressurization

Shift Turnover Information

⇒ **Day of week and shift**

- ◆ Today Day Shift.

⇒ **Weather conditions**

- ◆ Calm and clear

⇒ **(Plant power level)**

- | | |
|--|--|
| <ul style="list-style-type: none"> ◆ 25% ◆ 843 MWt / 227 MWe ◆ 31.6 Mlbm/hr CORE FLOW | <ul style="list-style-type: none"> ◆ TDRFP 'B' on SULC in Auto ◆ RR pumps in slow w/ both FCVs locked out ◆ Step 29 is complete (Gang 8D is at position 12) |
|--|--|

⇒ **Thermal Limit Problems/Power Evolutions**

- | | |
|---|--|
| <ul style="list-style-type: none"> ◆ Perform power ascension per attached REMA ◆ CPS 3004.01 in progress; complete up to and including step 8.4.10. | <ul style="list-style-type: none"> ◆ ◆ |
|---|--|

⇒ **Existing LCOs, date of next surveillance**

- ◆ None

⇒ **Surveillances or major maintenance**

- ◆ None

⇒ **Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment**

- ◆ None

⇒ **Comments, evolutions, problems, etc.**

- | | |
|---|---|
| <ul style="list-style-type: none"> ◆ Online Risk is Green ◆ Secure RHR from SP Flush per CPS 3312.01 Section 8.2.10, starting at step 8.2.10.8. | <ul style="list-style-type: none"> ◆ Perform power ascension starting at 3004.01 step 8.4.11. ◆ |
|---|---|

Operator Actions

Event No.(s): 1		Page 1 of 1
Description: Secure Suppression Pool Flush		
Initiation: Following shift turnover		
Cues: Directed by SRO		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> RHR Pump 'A' Flow		
<u>Expected Annunciators:</u> None		
<u>Automatic Actions:</u> 1E12-F064A opens when RHR flow is < 1100 gpm for > 8 sec.		
	ATC	<ul style="list-style-type: none"> • Monitors reactor to ensure operations remain within established bands ○ Monitors control room panels and notifies the SRO of any unusual or unexpected conditions.
	BOP	Per CPS 3312.01 Section 8.2.10: <ul style="list-style-type: none"> • Shuts 1E12-F024A, RHR 'A' Test Valve To Suppression Pool. ○ Verifies 1E12-F064A opens when RHR flow is < 1100 gpm for > 8 sec. • Stops RHR Pump 'A'.
	SRO	<ul style="list-style-type: none"> • Directs BOP to secure manual operation of RHR – Pool To Pool mode. • Acknowledges reports from ATC/BOP. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations standards and approved procedures.
Terminus: 'A' RHR Pool to Pool Secured		

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: Raise power with Rods to 28% to upshift RR Pumps		
Initiation: After Event 1 is complete and upon direction of the SRO		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> Reactor power, Rod drive parameters (flow, dP), control rod position, Generator load <u>Expected Annunciators:</u> None <u>Automatic Actions:</u> None		
	ATC	Per CPS 3004.01 Turbine Startup and Generator Synchronization, NF-CL-721-F-2 Control Rod Move Sheets and CPS 3304.02 RCIS: <ul style="list-style-type: none"> • Withdraws control rods per the control rod sequence to raise power. • Monitors nuclear instruments during rod movement. <ul style="list-style-type: none"> ○ Monitors the Power to Flow Map during power ascension. • Performs a Coupling Check for any control rod(s) withdrawn to position 48.
	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. ○ Monitors the Power to Flow Map during power ascension.
	SRO	<ul style="list-style-type: none"> • Directs ATC to raise power to 28%. • Stays in a position of oversight. • Acknowledges reports from ATC/BOP. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures.
Terminus: Clearly observable plant response from change in power level.		

NOTES:

Operator Actions

Event No.(s): 3		Page 1 of 1
Description: Rod Difficult to Withdraw, Raise DP		
Initiation: Initiated when ATC attempts to withdraw control rod 16-41.		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> CRD Drive Water dP, rod position on P680 OCM		
<u>Expected Annunciators:</u> 5006-3D OPRM Enabled		
<u>Automatic Actions:</u> None		
	ATC	<ul style="list-style-type: none"> • Determines control rod 16-41 will not withdraw. • Informs SRO that 16-41 will not withdraw using normal drive differential pressure. <p>Per CPS 3304.01, Control Rod Hydraulic & Control (RD), Section 8.3.4:</p> <ul style="list-style-type: none"> ○ Increases Drive Water Diff Press in ≈ 50 psid increments to a maximum of 500 psid by throttling closed on C11-F003, CRD Press Control Valve to achieve the desired differential pressure. • At each ≈ 50 psid increment performs the following: <ul style="list-style-type: none"> • While monitoring Drive Water Flow and Drive Water Diff Press, attempts to withdraw rod 16-41 using normal notch withdrawal. ○ IF control rod 16-41 moved; THEN record Drive Water Flow and Drive Water Diff Press in the CPS MCR ESOMs log, and THEN returns Drive Water Diff Press to normal by throttling open on 1C11-F003, CRD Press Control Valve to achieve the desired pressure of 235 - 265 psid.
	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. ○ Increases Drive Water Diff Press in ≈50 psid increments to a maximum of 500 psid by throttling closed on C11-F003, CRD Press Control Valve. • Throttles C11-F003, CRD Press Control Valve to restore drive water differential pressure to the desired band of 235 – 265 psid after 16-41 is successfully withdrawn. ○ Records Drive Water Flow and Drive Water Diff Press in the CPS MCR ESOMs log.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Verifies / directs ATC to perform CPS 3304.01 Control Rod Hydraulic and Control (RD) section 8.3.4 Control Rod Difficult To Withdraw. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. ○ Informs Shift Manager. ○ Conducts a brief. ○ Directs continuing startup.
Terminus: Successful withdrawal of control rod 16-41; rod drive differential pressure restored to normal (235 - 265 psid)		

NOTES:

Operator Actions

Event No.(s): 4		Page 1 of 1
Description: Un-coupled rod		
Initiation: Initiated when 16-41 is withdrawn to position 48.		
<u>General Note</u>		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> Rod position, rod uncoupled light on P680 OCM for control rod 16-41.		
<u>Expected Annunciators:</u> 5006-5G Rod Overtravel		
<u>Automatic Actions:</u> None		
	ATC	<p>Per CPS 3304.02 Rod Control And Information System, section 8.1.10 Coupling Check:</p> <ul style="list-style-type: none"> • After 16-41 is withdrawn to position 48, applies a continuous withdraw signal to verify rod coupling. • Observes 5006-3G Rod Overtravel is received. • Observes red full-out light for 16-41 goes out. • Determines control rod 16-41 is uncoupled by pressing the ROD UNCOUPLED button on the P680 OCM. • Informs SRO that 16-41 is uncoupled. <p>Per CPS 3304.02 Rod Control And Information System, step 8.2.6.1</p> <ul style="list-style-type: none"> • Verifies that the INDIVID DRIVE light is energized on the OCM. If not, selects individual drive by depressing DRIVE MODE push-button. • Inserts the drive 1 or 2 notches in an attempt to recouple the rod. • Determines if the rod has recoupled by fully withdrawing the drive. • Performs the coupling check and determines that the rod is recoupled. ○ Initiates an Issue Report and contacts the Reactor Engineer regarding the uncoupled rod event.
	BOP	<ul style="list-style-type: none"> ○ Monitors reactor to ensure operations remain within established bands. • Monitors control room panels and notifies the SRO of any unusual or unexpected conditions. ○ Initiates an Issue Report and contacts the Reactor Engineer regarding the uncoupled rod event.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Verifies / directs ATC to attempt to recouple rod 16-41. • Enters ITS 3.1.3 Action C.1 to fully insert control rod 16-41 within 3 hours and disarm 16-41 within 4 hours. • Exits ITS 3.1.3 Action C.1 when 16-41 is successfully recoupled. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures.
Terminus: Rod 16-41 recoupled and returned to position 48.		

NOTES:

Operator Actions

Event No.(s): 5		Page 1 of 1
Description: Turbine Lube Oil Temp controller failure		
Initiation: When events 2, 3, and 4 are complete and upon direction of the Lead Examiner, insert REMOTE 5 .		
Cues: Annunciator 5018-3A High Temp Turb-Gen Lube Oil		
<u>General Note</u>		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> Main Turbine Lube Oil Cooler Outlet Temperature		
<u>Expected Annunciators:</u> CPS 5018-3A, High Temp Turb-Gen Lube Oil.		
<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. ○ Dispatches Equipment Operator to investigate. ○ Checks for excessive temperatures across the turbine bearings. ○ Monitors turbine bearing vibrations. ○ Monitors turbine lube oil temperature.
	BOP	<ul style="list-style-type: none"> • Reports issue to SRO. • Refers to the ARP for 5018-3A High Temp Turb-Gen Lube Oil. <ul style="list-style-type: none"> ○ Dispatches an Equipment Operator to investigate. Per CPS 5018-3A, High Temp Turb-Gen Lube Oil: <ul style="list-style-type: none"> • Determines that the Temperature Controller has failed: <ul style="list-style-type: none"> • Places the TURB OIL CLG WTR Controller in MANUAL. • Adjusts open TCV controller as needed to maintain turbine oil outlet temperature 110°F to 120°F. ○ Checks for excessive temperatures across the turbine bearings.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Verifies / directs BOP to take manual control of the TURB OIL CLG WTR Controller to stabilize turbine oil temperature. • 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. ○ Contacts Maintenance to investigate.
Terminus: Turbine Oil Cooling Water Controller in manual and turbine oil temperature stabilized.		

NOTES:

Operator Actions

Event No.(s): 6		Page 1 of 1
Description: LPCS Room Fan Trip		
Initiation: Following Event 5 and upon direction of the Lead Examiner, insert REMOTE 6 .		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> None		
<u>Expected Annunciators:</u> 5050-1C, Not Available VY System Division 1		
<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. ○ Dispatches an Equipment Operator to investigate.
	BOP	<ul style="list-style-type: none"> • Responds to annunciator 5050-1C Not Available VY System Division 1. • Identifies 1VY01C LPCS Supply Fan as the tripped fan. • Monitors LPCS Room Temperature at 1H13-P801-5052 ECCS Pmp Rms Temp Indicator. ○ Dispatches an Equipment Operator to investigate.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Declares LPCS Inoperable due to loss of room cooling and enters T.S. 3.5.1 Required Action A.1 Restore low pressure ECCS injection/spray subsystem to OPERABLE status within 7 days. • 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: ITS 3.5.1 evaluated for loss of LPCS Pump Room Cooling.		

NOTES:

Operator Actions

Event No.(s): 7		Page 1 of 2
Description: Low Flow CW Pump Seal Water		
Initiation: Following Event 6 and upon direction of the Lead Examiner, insert REMOTE 7 .		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> None		
<u>Expected Annunciators:</u> 5041-3G Low Flow CW Pump 1C Brg Seal Water, 5006-3L RPS Solenoid Inverter A Trouble (when CW Pump 1A is started)		
<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. ○ Dispatches an Equipment Operator to investigate and to verify the status of the Filtered Water Pumps. ○ Dispatches an Equipment Operator to investigate / reset RPS Solenoid Inverter 'A' Trouble.
	BOP	<ul style="list-style-type: none"> • Reports issue to SRO. • Refers to 5041-3G Low Flow CW Pump 1C Brg Seal Water ARP. ○ Dispatches an Equipment Operator to investigate and to verify the status of the Filtered Water Pumps. <p>Per CPS 5041-3G Low Flow CW Pump 1C Brg Seal Water:</p> <ul style="list-style-type: none"> • Directs an Equipment Operator to flush CW Pump 1C TW supply strainer 1TW01MC using 1TW605C Strainer Flush Valve. ○ Monitors CW pump 1C bearing temperatures. • Trips CW Pump 1C. • Verifies 1CW001C CW Pump 1C Discharge Valve closes. • Notifies chemistry of CW pump shift. • Directs an Equipment Operator to verify that CW Pump 1C shaft has stopped rotating. <p>Per CPS 3113.01 Circulating Water (CW):</p> <ul style="list-style-type: none"> • Starts CW Pump 1A. • Verifies CW Pump 1A Discharge Valve 1CW001B opens. • Monitors CW Pump 1A motor current in the MCR. ○ Directs Equipment Operator to monitor CW Pump 1A excitation current locally at the breaker. ○ Directs Equipment Operator to align SI and NaOCl injection to CW Pump 1A. ○ Dispatches an Equipment Operator to investigate / reset RPS Solenoid Inverter 'A' Trouble.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Verifies / directs BOP to secure CW Pump 1C and start CW Pump 1A. • Ensures operations are conducted within the bounds of Tech Specs and IAW Operations expectations, standards and approved procedures. ○ Enters CPS 4004.02, Loss of Vacuum. ○ Contacts Maintenance to investigate. ○ Informs Shift Manager. ○ Conducts a brief.

Terminus: CW Pump 1C secured. CW Pump 1A running.		

NOTES:

Operator Actions

Event No.(s): 8		Page 1 of 1
Description: Containment Spray Valve Breaker Trip		
Initiation: Following Event 7 and upon direction of the Lead Examiner, insert REMOTE 8 .		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> None		
<u>Expected Annunciators:</u> 5065-8B RHR Out of Service		
<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. ○ Dispatches an Equipment Operator to investigate.
	BOP	<ul style="list-style-type: none"> • Responds to annunciator 5065-8B RHR B Out Of Service. • Identifies 1E12-F028B RHR B to Containment Spray B Shutoff Valve as the component that has lost power. ○ Dispatches an Equipment Operator to investigate.
	SRO	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. • Declares RHR 'B' Containment Spray System INOPERABLE and enters ITS 3.6.1.7 Required Action A.1 Restore RHR containment spray subsystem to OPERABLE status within 7 days. • 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: ITS 3.6.1.7 evaluated for loss of power to 1E12-F028B RHR B To Cnmt Spray B Shutoff Vlv.		

NOTES:

Operator Actions

Event No.(s): 9/10		Page 1 of 2
Description: Steam LOCA / ATWS / Containment Spray failure / EOP-3 for Containment >PSP		
Initiation: Following Event 8 and upon direction of the Lead Examiner, insert REMOTE 9 .		
Cues: 5042-7C High/Low Diff Pressure Containment Building, 5068-3A Drywell Ambient Temp High		
Time	Position	Applicant's Actions or Behavior
<u>Key Parameter Response:</u> Rising DW Pressure		
<u>Expected Annunciators:</u> Multiple		
<u>Automatic Actions:</u> RR FCVs lockout at 1.08 psig; ECCS and DGs actuate at 1.68 psig DW Pressure.		
[CT]	ATC	<ul style="list-style-type: none"> ○ Reports DW Pressure rising. ○ Evacuates the Containment. ● Monitors leakage using available LD monitoring systems. ● Attempts to locate and isolate the leakage. ○ Performs a manual Group 1 Isolation. ● Places the Mode Switch in S/D. ● Carries out Scram Choreography by reporting: <ul style="list-style-type: none"> – 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) ● Determines Shutdown Criteria is not met. ● [CT] Arms and depresses Manual Scram Pushbuttons. ○ Initiates ARI. ● <u>IF</u> RPV level is rising with 2 feed pumps operating, <u>THEN</u> Secures 1 Feed Pump and controls RPV water level between Level 3 and Level 8. ○ Verifies Turbine and Generator trip when required. ○ Secures both RR Pumps. ● Performs EOP actions as directed by SRO.
	BOP	<ul style="list-style-type: none"> ○ Reports DW Pressure rising. ○ Evacuates the Containment. ● Monitors leakage using available LD monitoring systems. ● Attempts to locate and isolate the leakage. ○ Performs a manual Group 1 Isolation. <p>Carries out Scram Choreography by:</p> <ul style="list-style-type: none"> ● Announcing: <ul style="list-style-type: none"> – Reactor Scram – MDRFP may start – Evacuate the RCIC room – Evacuate the Containment ● Determines Rod status and reports to CRS. <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.

<p>[CT]</p>		<ul style="list-style-type: none"> • Starts Containment Spray, as directed by the SRO. • Determines failure of 1E12-F028A RHR A To CNMT Spray Shutoff Vlv to automatically or manually open (failure of Containment Spray Loop 'A' to initiate). • Operates ECCS Systems as needed to control RPV Water Level between Level 3 and Level 8 <p>Per EOP-3 Emergency RPV Depressurization (Blowdown):</p> <ul style="list-style-type: none"> • Sounds the Containment Evacuation Alarm • Terminates and prevents LPCS and LPCI injection when directed by the SRO • [CT] Initiates ADS when directed by the SRO • Verifies 7 ADS valves open
<p>[CT]</p>	<p>SRO</p>	<ul style="list-style-type: none"> • Acknowledges reports from ATC/BOP. <ul style="list-style-type: none"> ○ Directs ATC/BOP to perform a manual Group 1 Isolation. <p>Enters and executes 4001.01 Reactor Coolant Leakage:</p> <ul style="list-style-type: none"> • Directs ATC/BOP to attempt to locate the source of the leakage. <p>Enters CPS 4100.01 Reactor Scram:</p> <ul style="list-style-type: none"> • Directs ATC to scram the reactor if DW Pressure reaches 1.3 psig and rising • Carries out 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"> • Inhibit ADS. • Determines Shutdown Criteria is met when Manual Scram 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 or SRVs. • Control RPV water level between Level 3 to Level 8 by using Preferred Injection Systems. <p>Enters EOP-6, Primary Containment Control, and directs the following:</p> <ul style="list-style-type: none"> • Start DW Mixing Compressors • Initiate Containment Spray when Containment Pressure reaches the OK TO Spray Region of Fig. O Containment Spray Initiation Limit curve. <p>Enters EOP-3, Emergency RPV Depressurization, when EOP-6 Figure N Pressure Suppression Pressure limit is exceeded:</p> <ul style="list-style-type: none"> ○ Directs BOP to terminate LPCS and LPCI injection not needed for core cooling • [CT] Directs initiation of ADS ○ Directs the isolation of RT and/or RR. • Ensures operations are conducted IAW Operations standards and approved procedures.
<p>Terminus: 7 SRVs open. RPV level maintained between Level 3 and Level 8.</p>		

Notes:

Simulator Operator Instructions**Initial Setup**

1. Fill out plant status and have Turnover Sheet ready for the crew.
 2. Verify daily lamp test completed.
 3. Reset to IC-198 (PW 91448) (~ 25% Power)
 4. Place simulator in RUN.
 5. Perform/verify the following operations for Setup:
 - Establish RHR in the Suppression Pool Flush mode per CPS 3312.01 Section 8.2.10
 - Place SX A PRM 1RIX-PR038 in service.
 - Open 1E12-F048A, RHR HX A Bypass valve.
 - Start RHR Pump A.
 - Open 1E12-F024A, RHR A Test Valve To Suppression Pool.
 - Establish 5000-5550 gpm flow.
 6. Load the lesson plan for this scenario.
 7. Verify the following commands for setup:
 - **Insert RH0VCE12F028AFP 0%** (Containment Spray E12-F028A failed closed)
 - **Insert RH0VCE12F028BFP 0%** (Containment Spray E12-F028B failed closed)
 - **Insert YP_XMFTB_4964** (RP-02 Auto Scram Failure)
 - **Insert YPXREMPO-3 90** (CW 202 – CNTRL Lake Temperature 33-90 degrees)
 8. Turn on and advance recorders.
 9. Verify RCIC Flow Controller is set at 620 psig.
 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 complete; gang 8D at position 12
 13. Make sure Sequence A is selected.
 14. Make sure Individual Drive Mode is selected on the OCM.
 15. Procedures that are expected to be used during this scenario are:
 - CPS 3004.01 Turbine Startup And Generator Synchronization
 - CPS 3312.01 Residual Heat Removal (RHR)
 - CPS 3304.02 Rod Control and Information System (RC&IS)
 - CPS 3304.01 Control Rod Hydraulic & Control (RD)
 - ITS 3.1.3, 3.5.1, 3.6.1.7
 - CPS 4004.02 Loss of Vacuum
 - CPS 3113.01 Circulating Water (CW)
 - CPS 4100.01 Reactor Scram
 - CPS 4001.01 Reactor Coolant Leakage
 16. Hang OOS tags on: None
 17. Identify T/S issues associated with OOS and turnover: None
- ILT 12-1 NRC Exam Scenario #3 – Submittal Version

18. Operating Equipment: RHR 'A' in pool to pool mode per CPS 3312.01 section 8.2.10 Manual Operation of RHR – Pool To Pool.
19. Provide a marked up: N/A
20. Verify simulator conditions match the turnover.

Event Triggers and Role Play

Event #

1. Secure Suppression Pool Flush
 - a. No trigger
 - b. Role play: None
2. Raise power with Rods to 100% FCL
 - a. No trigger
 - b. Role play - None
3. Rod difficult to Withdraw, Raise DP
 - a. When S2 lesson plan has been executed, verify activation of **Insert ROD1641TFIA4** (Rod 16-41 Is Stuck At Present Location). When drive differential pressure has been raised to 300 psid or above, verify activation of **Delete ROD1641TFIA4**.
 - b. Role Play - None
4. Un-coupled rod
 - a. Verify activation of **Insert ROD1641TFIA5** (Rod 1641 Uncoupled). When control rod 16-41 is inserted, verify activation of **Delete ROD1641TFIA5** (Delete Rod 1625 Malfunction).
 - b. Role play - None
5. TG LO Temp controller failure
 - a. On the signal of the lead examiner, **Activate Remote5** and verify the following commands:
 - (1) **Insert A04_A18_A01_1 0.54** (Turbine Oil Cooling Water Control fails to 0.54)
 - (2) **A04_A18_A01_4 = True** (When Shifted To Manual)
 - (3) **Delete A04_A18_A01_1 0.54** (Deletes Turbine Oil Clg Water Control Malfunction)
 - b. Role play:
 - (1) Equipment Operator (when directed to check Turbine Oil Cooler Temperature Control Valve) – “The Turbine Oil Cooler Temperature Control Valve is shut. The valve looks normal locally.”
6. LPCS Room Fan Trip
 - a. On the signal of the lead examiner, **Activate Remote6** and verify the following commands:
 - (1) **Insert YP_XMFTB_5041** (PC02YA HVAC Fan VY01C Trip)
 - (2) **Insert A12_A03_DS24_Off** (Fan VY01C Amber Light Off)
 - (3) **S_A12_A03_S64=4** (When a manual start is attempted)
 - (4) **Insert A12_A03_DS24_1 On** (Fan VY01C Amber Light On)
 - (5) **S_A12_A03_S64=2** (When a manual stop is attempted)
 - (6) **Insert A12_A03_DS24_1 Off** (Fan VY01C Amber Light Off)
 - b. Role play
 - (1) Equipment Operator (when directed to investigate trip of the 1VY01C), “All indications on 1PL63J LPCS Pump Room VY local control panel are normal. The LPCS Pump Room Fan is not running and appears normal locally.”
7. Low Flow CW Pump Seal Water
 - a. On the signal of the lead examiner, **Activate Remote7** and verify the following commands:
 - (1) **Insert A11_A02_03_7_TVM Steady** (5041-3G CW Pump 1C Low Seal Flow)
 - b. Role Play:
 - (1) Equipment Operator
 - a) When directed to check CW Pump 1C Seal Water Flow locally – “CW Pump 1C Seal Water flow is 8 gpm locally.”
 - b) When directed to flush the CW Pump 1C TW Supply Strainer 1TW 01MC using 1TW605C Strainer Flush Valve – “I have completed flushing 1TW01MC. CW Pump 1C Seal Water flow is still 8 gpm locally.”

- c) When directed to check operation of the Filtered Water Pumps – “Filtered Water Pumps are operating normally.”
 - d) When directed to stop CW Pump Discharge Header – SI Injection {Carrier Water} by performing 3209.01 section 8.2.2 – acknowledge the order.
 - e) When directed to stop CW Pump Suction Bay – NaOCl Injection by performing 3209.01 section 8.2.1 – acknowledge the order.
 - f) When directed to verify CW Pump 1C Discharge Valve limit switch position locally – “1CW001C is closed.”
 - g) When directed to verify CW Pump 1C shaft has stopped rotating – “CW Pump 1C shaft is not rotating.”
 - h) When directed to align [SI] and NaOCl Injection to CW Pump 1A – acknowledge the order.
 - i) When directed to investigate RPS ‘A’ Trouble Alarm – “RPS ‘A’ Inverter has a Low Output Voltage alarm light that is lit. RPS ‘A’ inverter output voltage is currently reading 120 VAC.”
 - j) When directed to reset the alarm on RPS Solenoid Inverter ‘A’ – acknowledge the order and then release **INSERT YP_XREMT_35 Reset** (RP103 – RST RPS SOL INV A TRB ALM).
- (2) Chemistry (when notified that CW Pump 1C has been secured, acknowledge the report.
8. Cont Spray valve breaker trip
- a. On the signal of the lead examiner, **Activate Remote8** and verify the following commands:
 - (1) **Insert RH41FSREM03REMIN = FALSE** (Containment Spray 1E12-F028B Control Power Fuse Removed)
 - b. Role Play
 - (1) Equipment Operator (when dispatched to the breaker for 1E12-F028B) - “The breaker for 1E12-F028B is tripped and there is an acrid odor in the area, but no flames.”
 - (2) Electrical Maintenance (when dispatched to investigate 1E12-F028B breaker trip) – “We’ll dispatch EMD technicians to investigate.”
9. Events 9 & 10 - Steam LOCA / ATWS / Containment Spray failure / EOP-3 for Containment >PSP
- a. On the signal of the lead examiner, **Activate Remote9** and verify the following commands:
 - (1) **Insert YPCTHOLE 20%** (Leak between Drywell and Containment)
 - (2) **Insert YPXMALSE_252 5% Ramp=00:30:00** (MSL D Rupture in DW to 5% over 30 min)
 - b. Role Play
 - (1) Equipment Operator (when directed to check the breaker for 1E12-F028A) – “Breaker for 1E12-F028A is closed locally. No abnormalities noted.”

Turnover

1. The plant is operating at 25% power.
2. Status of Tagged Out Equipment
 - No equipment is out of service for maintenance
3. Day Shift Today
4. Weather Conditions
 - Calm and clear
5. Thermal Limit Problems or concerns
 - Raise power per the approved Control Rod Move Sheets
 - RE and Rod Verifier are available on request.
6. LCO's in effect
 - None
7. Surveillances in progress
 - None
8. Previous Shift Evolutions completed
 - Placed RHR 'A' in Pool to Pool Mode per CPS 3312.01 section 8.2.10 Manual Operation of RHR – Pool To Pool to reduce radiation levels in the pump discharge piping.
9. Evolutions planned for the shift
 - Secure RHR 'A' in Pool to Pool Mode and restore system to standby per CPS 3312.01 Residual Heat Removal (RHR).
10. Risk Levels
 - Green
11. Dose equivalent Iodine 131 is reading 1.5 E-6 μ curies per gram.