Facility: COLUMBIA   **Scenario No.:** 1   **Op-Test No.:** 1

Examiners: _____ **Operators:** _____

        _____   _____

        _____   _____

Plant Status: The reactor has been operating at 100% power for the last 131 days except for a few minor down powers for control rod adjustments. Thirty days remain until the start of the next refueling outage. Reactor water cleanup pump RWCU-P-1B was isolated and tagged out of service at 0345 this morning to repair a leak on the pump shaft. Mechanical maintenance completed the work near the end of the previous shift, the tags have been lifted, and the pump needs to be run for 24 hours as a post maintenance test. SRV MS-RV-5B has a high tail pipe temperature alarm and engineering is working on developing a troubleshooting plan.

Turnover: Maintain reactor power at 100%. Using SOP-RWCU-START complete placing RWCU-P-1B in service starting at step 5.5.5c. The 40 minute run has just been completed. Run RWCU-P-1B for at least 24 hours. Completing this procedure should be done expeditiously because RWCU-P-1A also needs to have the shaft seals adjusted. After completion of SOP-RWCU-START perform control rod surveillance OSP-CRD-W701, Control Rod Exercise for Fully Withdrawn Control Rods starting with rod 18-59 working from left to right, top to bottom. Closely monitor SRV MS-RV-5B for increased leakage.

Scenario: This scenario includes two normal evolutions (shifting RWCU pumps and performing control rod overtravel surveillances), two component failures (RWCU pump seal failure/trip and a control rod overtravel), one instrument failure (Main Steam Line flow element fails high) and one main event. The main event is initiated with a ground fault on the Division 3 4160 volt bus supply breaker that causes a fire in the Division 3 auxiliary transformer and a loss of the Division 3 4160 bus. This causes a lockout on SM-2, a loss of one condensate and one booster pump. This causes a RFW trip on low suction and a subsequent reactor scram on low RPV water level. SM-1 and SM-3 will fail to auto transfer to the startup transformer but power may be restored manually. At –50" RCIC initiates and the MSIVs close. RCIC trips on startup causing a loss of all high pressure injection systems (except CRD). MS-RV-5B fails open when actuated but will close when the 'C' solenoid is de-energized per ABN-SRV. The crew should restart a Condensate pump and a Condensate Booster Pump and reduce RPV pressure to facilitate feeding the RPV with the booster pump.

Event	Malf. No.	Event	Event Description

No.		Type*	
1.	Initiated by turnover T=0	N (BOP)	Place RWCU-P-1B in service and secure RWCU-P-1A.
2.	Initiated by turnover T=0	N (RO)	Perform rod over travel surveillance OSP-CRD-W701.
3.	Active at start T=15 min	C (RO)	The third rod tested fails the overtravel surveillance. The control rod is driven full in, withdrawn, and recoupled successfully.
4.	Trigger 1 T=25	I (BOP)	Main steam line flow instrument MS-DPIS-10B fails high.
5.	Trigger 2 T=45 min	C (BOP)	RWCU-P-1B trips.
6.	Trigger 3 T=55 min	M (All)	Fire alarm in the HPCS DG Room. SM-2 and SM-4 ground fault alarms and lockout of SM-2 and SM-4.
7.	Active at start of scenario	C (BOP)	Failure of SM-1, SM-2 and SM-3 to close in Startup Power on Main Turbine Trip.
8.	Active at start of scenario	C (BOP/ RO)	RCIC turbine over speed trip on startup. (Loss of all high pressure injection systems.)
9.	Active at start	C (BOP/ RO)	MS-RV-5B will not close when initially opened.

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

Event No. 1
Description: Place RWCU-P-1B in service and shutdown RWCU-P-1A.
This event is initiated by the turnover sheet. The event endpoint occurs when RWCU-P-1A is shutdown.

Time	Position	Applicants Actions or Behavior
T=0	SRO	Directs the BOP to place RWCU-P-1B in service and secure RWCU-P-1A per SOP-RWCU-START.
	BOP	Carries out actions of SOP-RWCU-START: When RWCU-P-1B has run on its Discharge Bypass valve for 40 minutes, OPEN RWCU-V-13B. BOP operator contacts OPS2 and directs him to open RWCU-V-13B at the local panel Reactor Building 522'. **BOOTH OPERATOR: RWCU-V-13B to open is LOA-RWCU-012.** VERIFY an increase in RWCU-FI-609 Pump Suction Flow. STOP RWCU-P-1A. VERIFY normal system flow at RWCU-FI-609. Close RWCU-V-13A for the previously running pump. BOP operator contacts OPS2 and directs him to close RWCU-V-13A at the local panel Reactor Building 522'. **BOOTH OPERATOR: RWCU-V-13A to close is LOA-RWCU-011.**

		Place the RWCU Demineralizers in service per SOP-RWCU-DEMIN. BOP informs the CRS that RWCU-P-1B is in service and RWCU-P-1A has been secured.

Note: Use LOA-RWU003 to increase flow to 120 gpm with a 60 sec ramp.

COMMENTS:

Event No. 2

Description: Perform control rod over travel surveillance for 3 control rods.

This event is initiated by the turnover sheet. The end point occurs when the third control rod fails the over travel test.

Time	Position	Applicants Actions or Behavior
	SRO	Directs RO to perform OSP-CRD-W701, Control Rod Exercise of Fully Withdrawn Control Rods starting at rod 18-59 and work left to right and top to bottom.
	RO	If available, obtain a control rod position printout (provided).
		Select a control rod to be moved and initial on Attachment 9.1 (provided).
		A second licensed operator or STA/SNE is to verify the correct control rod is selected and initial Attachment 9.1.
		Insert the control rod one notch (to notch 46) as indicated on Four-Rod display.
		Verify the indicated control rod position changes during control rod movement.
		Continuously withdraw the control rod one notch (to notch 48) as indicated on the Four-Rod display.
		Verify the indicated control rod position changes during control rod movement.
		NOTE: A valid coupling integrity check requires the ROD OVERTRAVEL annunciator (H13-P603-A7-1.8) not received when a continuous withdrawal signal is applied to the control rod drive.

The ROD OVERTRAVEL alarm is received on control rod 26-59, the third rod tested.

Verify coupling integrity of the control rod.

Verify position 48 is illuminated or verify the FULL OUT indicating light is illuminated.

For control rods that were highlighted per step 7.4 re-perform steps 7.5.9 and 7.5.10 to promote the restoration of cooling. <u>NA</u>

Initial on Attachment 9.2 for each control rod that has been exercised satisfactorily.

A second licensed Operator or STA is to verify the correct final control rod position after the settle function light has extinguished. Initial on attachment 9.2.

Record any difficulties while performing this exercise on Attachment 9.3.

This may include double notches, failure to notch, or increase drive water pressure required.

Repeat Steps 7.5.2 through 7.5.14 for all rods to be exercised.

If available, obtain a control rod position printout and compare it   with Step 7.5.1. Notify the CRS/SM and STA of any discrepancies.

<u>CAUTION</u>: If any rod is accidentally inserted more than one notch, the rod should be withdrawn one notch at a time to avoid overnotching on the withdrawal.

COMMENTS:

Event No. 3

Description: A control rod fails the rod over travel surveillance.

This event is initiated by the procedure addressed in Event #2. The event endpoint occurs when the control rod is recoupled and restored to the original position.

Time	Position	Applicants Actions or Behavior
T=20	RO	Receives ROD OVERTRAVEL alarm (P603 A7 1-8), pulls the Alarm Response Procedure, and gives to CRS.
	SRO	Notify the Shift Manager and Shift Engineer of the control rod over travel alarm. **BOOTH OPERATOR: If the SNE is contacted inform the CRS that rod 26-59 insertion and withdrawal is permitted.** Directs the RO to insert the affected control rod to position 00 to accomplish recoupling.
	RO	Inserts the control rod to attempt recoupling. **The control rod is recoupled on the first attempt.** **BOOTH OPERATOR: DELETE THE ROD UNCOUPLING MALFUNCTION WHEN THE CONTROL ROD IS BEING INSERTED.**
	SRO	Directs RO to withdraw rod to notch 48 to determine if the rod has been recoupled.
	RO	Withdraws control rod 26-59 and reports to CRS that the control rod is recoupled.

COMMENTS: This event is terminated by the initiation of the next event, which should occur after control rod 26-59 coupling check is performed and is satisfactory.

Event No. 4

Description: Main steam line flow instrument MS-DPIS-810B fails high.

This event is initiated when the coupling check for 26-59 has been satisfactorily completed by ___**INITIATING TRIGGER 1**___.

Time	Position	Applicants Actions or Behavior
	BOP	Reports MSIV Half Trip System B and NSSSS ISOL MSL FLOW HIGH alarms.
		Pulls Alarm Response Procedure. Checks backpanels and reports that MS-RLY K3B on H13-P611 is deenergized.
	SRO	Contacts Work Control and requests investigation of MS-dPIS-8B, 9B, 810B and 11B to determine failed instrument.
		Refers to TS 3.3.6.1.A and is required to place channel B in the tripped condition within 24 hours.

Cue: If contacted as OPS 2 report that MS-DPIS-810B has failed upscale. This instrument is located on H22-P022 RB 471 M5/7.9

COMMENTS:

Event No. 5		

Description: RWCU-P-1B trips.

This event is initiated when the SRO has determined possible TS actions for a failed instrument by **_INITIATING TRIGGER 2_**. *The event endpoint occurs when RWCU-P-1B is in service.*

Time	Position	Applicants Actions or Behavior
	BOP/RO	Acknowledges alarm and reports that RWCU-P-1B has tripped.
	SRO	Directs BOP to perform a quick restart of RWCU-P-1A.

	BOP	From SOP-RWCU-START directs OPS 2 to open RWCU-V-13A
		Refers to SOP-RWCU-START section 5.6.
		Open RWCU-V-1.
		
		Open RWCU-V-4.
		
		Ensure RWCU-V-104 is closed.
		
		NOTE: Perform the following two steps simultaneously.
		    a. PLACE and HOLD RWCU-RMS-P/1A to START.
		
		    b. THROTTLE OPEN RWCU-V-44 until RWCU PUMP FLOW LOW Annunciator CLEARS.
		
		    c. VERIFY RWCU-FI-609 system flow is GT 70 gpm.
		
		    d. RELEASE RWCU-RMS-P/1A.
		
		PLACE filter demineralizers in service per SOP-RWCU-DEMIN.

Cue: If called as OPS 2 to investigate ground, tell the control room the 50GX at SL-81 will not reset and that the ground is on MC-8C.	
If sent to the breaker for RWCU-P-1B, tell the control room the overloads will not reset.	
COMMENTS:	

Event No. 6

Description:. Fire alarm in the HPCS DG Room; SM-2 and SM-4 ground fault alarms; lockout on SM-2 and on SM-4 due to breaker 2/4 failing to trip open. Reactor Scram due to lowering RPV Level.

*This event is **initiated with** **TRIGGER 3**. The event endpoint occurs when the scenario is terminated.*

Time	Position	Applicants Actions or Behavior
	BOP	Reports fire alarm in the HPCS DG Room. Directs investigation by OPS 1 and or OPS 2. **BOOTH OPERATOR: After the initial scram report inform the control room that there is a lot of smoke in the HPCS-DG Room. There were sparks and flames coming out of the generator housing and it smells electrical in nature. The flames have gone out and the diesel is not running.**
	RO	Reports lowering RPV level due to the loss of COND-P-1B and COND-P-2B. Reports Reactor Scram on Low RPV level and performs immediate scram actions: a. PLACE Mode switch to Shutdown. b. MONITORS Reactor Power, Pressure, and Level. c. VERIFIES all control rods fully inserted. d. Insert IRMs and SRMs.
	SRO	Enters EOP 5.1.1 and directs RPV Level control with available systems.

	RO	Reports RPV level continues to lower to -50".
	BOP/RO	Reports MSIVs closure and RCIC actuation due to RPV level at -50".
	SRO	Directs RPV pressure control 800-1000 psig with SRV's.
****** Critical Task	BOP/RO	Controls RPV Pressure with SRVs as directed.*
	BOP/RO	Announce PPM 5.2.1 entry on high drywell pressure.
	SRO	Enters PPM 5.2.1 on high drywell pressure.

COMMENTS:

Event No. 7

Description: Failure of Startup power to automatically close in on SM-1 and SM-3.
The malfunctions are activated at the start of the scenario. The event endpoint occurs when the main event scenario is terminated.

Time	Position	Applicants Actions or Behavior
	BOP	Investigates electrical plant status and notes SM-1, SM-2 and SM-3 are not powered.
		Recognizes lockout on SM-2.
		Recognizes failure of startup to close in on SM-1 and SM-3.
		Takes the CB-S1 SYNC SELECTOR switch to MAN and then takes the CB-S1 switch to CLOSE.
		Takes the CB-S3 SYNC SELECTOR switch to MAN and then takes the CB-S3 switch to CLOSE.
		Recognizes SL-11, SL-21 and SL-31 are deenergized.
******* Critical Task		Refers to quick card and energizes SL-11 from SM-1 and SL-31 from SM-3: a. OPEN CB-11/1 (CB-31/3) b. FLAG OPEN then CLOSE CB-1/11 (CB-3/31) c. CLOSE CB-11/1 (CB-31/3)

Refers to quick card and energizes SL-21 from either SL-11 or SL-31:

    a. FLAG CB-21/2 to OPEN

    b. CLOSE CB-21/11 (CB-31/21)

Reports Electrical Plant status to CRS.

COMMENTS:

Event No. 8

Description: Trip of the RCIC turbine on overspeed.

This malfunction is initiated automatically when RCIC turbine speed reaches 3000 rpm.

Time	Position	Applicants Actions or Behavior
	RO/BOP	Recognizes that the RCIC turbine has initiated due to -50" RPV level and has subsequently tripped. Reports trip of the RCIC Turbine to the CRS.
	SRO	Directs that RCIC be restarted.
	RO/BOP	Refers to ABN-RCIC-ISOL/TRIP to reset the RCIC Turbine: a. VERIFY RCIC-V-45 CLOSED b. CLOSE RCIC-V-1 c. CLOSE RCIC-V-45 d. WHEN RCIC-V-45 begins to open, THEN OPEN RCIC-V-1 e. Notes RCIC-V-1 does not open f. Directs OPS2 to RCIC Turbine reset per Attachment 7.1

		BOOTH OPERATOR – Two minutes after request to reset the RCIC mechanical overspeed trip, inform the control room that the turbine will not reset and you will contact mechanical maintenance to investigate. Reports failure of RCIC to reset. If level is reduced to the ADS initiation setpoint, -129 inches, announces the annunciator to the SRO.
	SRO	Directs that ADS inhibit switches be placed in inhibit when below –129 inches. When SM-1, SM-2, SM-3, SL-11, SL-21 and SL-31 are re-energized, directs starting a Condensate and a Condensate Booster Pump to facilitate RPV level control. (Refer to Event 9 for pressure control actions). Directs RPV level be maintained 13" to 54" with condensate.
******* Critical Task	BOP	Inhibits ADS as directed. Starts a Condensate Pump and a Condensate Booster Pump as directed. Controls RPV level as directed.
	BOP/RO	Reports a CAS air compressor needs to be reset and returned to service (may report to CRS for direction or contact OPS3 directly). **BOOTH OPERATOR – Activate TRIGGER 23 to reset CAS A/Cs.**

COMMENTS:

Event No. 9

Description: Failure of MS-RV-5B to close after being opened.

This malfunction is initiated automatically when the control switch is taken to the open position. The end point is when MS-RV-5B is closed due to de-energizing the 'C' solenoid per ABN-SRV.

Time	Position	Applicants Actions or Behavior
	SRO	Directs RPC pressure control with SRV's 500 to 600 psig to facilitate feeding the RPV with the Condensate Booster Pumps.
	BOP	Opens SRV's to reduce pressure as directed. Notes that MS-RV-5B will not close when the control switch is taken back to "AUTO" position and reports same to CRS.
	SRO	Directs performance of ABN-SRV (may direct individual steps or hand off ABN to BOP).
	BOP/RO	Reports a re-entry into PPM 5.2.1 on high suppression pool temperature.
	SRO	Re-enters PPM 5.2.1
******* Critical Task	BOP	Takes the control switch to the "OFF" position and reports SRV still does not close. Places one loop of RHR (B Preferred) in Suppression Pool Cooling per SOP-RHR-SPC. VERIFIES the ADS SRV Control switch is in AUTO on H13-P628 and H13-P631. REMOVES fuses for MS-RV-5B per Attachment 7.1. In H13-P628, de-energizes A solenoid by removing fuses BB-F13 and

		BB-F14.
		In H13-P631, de-energizes the B solenoid by removing fuses AA-F13 and AA-F14.
		In H13-P628, de-energizes the C solenoid by removing fuses BB-F51 and BB-F52.
		FLOOR OPERATOR AND BOOTH OPERATOR – When fuses are removed to de-energize the C solenoids, the FLOOR OPERATOR needs to inform the BOOTH OPERATOR to delete the malfunction/override associated with MS-RV-5B.
		Notes and reports that MS-RV-5B is closed.

COMMENTS:

SCENARIO ENDPOINT – When RPV water level has been returned to the band of +13" to +54", the scenario may be terminated.

SRO TURNOVER INFORMATION

The reactor has been operating at 100% power for the last 131 days except for a few minor down powers for control rod adjustments. Thirty days remain until the start of the next refueling outage. Maintain reactor power at 100%.

Using SOP-RWCU-START complete placing RWCU-P-1B in service starting at step 5.5.5c. The 40 minute run has just been completed. Run RWCU-P-1B for at least 24 hours. Completing this procedure should be done expeditiously because RWCU-P-1A also needs to have the shaft seals adjusted.

Perform control rod surveillance OSP-CRD-W701, Control Rod Exercise for Fully Withdrawn Control Rods, starting with rod 18-59 working from left to right, top to bottom.

SRV MS-RV-5B has a high tail pipe temperature alarm and engineering is working on developing a troubleshooting plan. Monitor SRV MS-RV-5B for indications of increased leakage.

SIMULATOR SETUP FOR SCENARIO #1

Use IC-233

Facility: Columbia   Scenario Set No: 1   Scenario No: 5

Examiners: _____   Operators: _____

            _____   _____

            _____   _____

Initial conditions: Plant is at approximately 20% with the main turbine generator synchronized and a startup in progress. Reactor feedwater control is in 3 element on feedpump speed control.

Turnover: RCC-P-1A is OOS for motor replacement. BPA is selling power to CA. and power should be increased as soon as possible following turnover. The reactivity brief has been given and the power increase is to begin immediately.

Event No.	Timeline	Event Type*	Event Description
1.	T=0	N SRO RO	Power increase with rods to 24%.
2.	T=5	I ALL	LPRM 08-41A fails upscale. TRG-1
3.	T=15	C SRO BOP	Failure of RB exhaust fan requires entry into PPM 5.3.1. TRG-2
4.		I SRO RO	Failure of RFW-LIC-600 to manual. OVERRIDE TO MANUAL DURING POWER INCREASE.
5.	T=30	M ALL	Loss of SL-81 results in a loss of RCC and subsequent trip of RWCU, RRC, and a manual reactor scram. TRG 3
6.		M ALL	Failure of enough rods to insert such that reactor power is GT 5%. Active at the beginning of the scenario.
7.		C SRO RO	SLC fails – neither squib valve fires. Active at the beginning of the scenario.
8.			Termination Cue: Power is being controlled with level less than LL>

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

Event No. 1

Description: Power escalation.

This event is initiated by the Control Room Supervisor.

Time	Position	Applicants Actions or Behavior
T=0 when crew assumes shift	SRO	Directs RO to increase reactor power to 24% per PPM 3.1.2 step 5.8.8.
	RO	Withdraws control rods to continue the startup per PPM 3.1.2. Closely monitors reactor power during rod withdrawal. Verifies prior to each rod movement: correct rod selected correct start/stop position
	BOP	Monitors plant conditions

COMMENTS: Rod pull starts at RWM group (TBD).

Event No. 2

Description: LPRM 08-41A fails upscale.

The event is initiated by <u>TRIGGER 1</u> *during the control rod withdrawal approximately 5 minutes following*

Time	Position	Applicants Actions or Behavior
T=5	RO	Acknowledges the LPRM UPSCALE annunciator and announces to the SRO. Refers to ARP 4.603.A8 and identifies the upscale LPRM as 08-41A.
	SRO	Directs BOP to the back panel to read the output of the affected LPRM.
	BOP	Using the function and selector switches at P608 and determine that 08-41A is greater than 100 watts/cm^2. Inform the SRO of the upscale reading.
	SRO	Direct that the affected LPRM be bypassed per PPM 9.3.4 Failed or Drifting LPRMs.
	BOP	Using PPM 9.3.4: Notify the SRO to check Tech Spec Table 3.3.1.1-1 to ensure APRM operability. Gets permission from the SRO prior to bypassing the APRM as required by PPM 9.3.4. Bypasses both APRM A and LPRM 08-41A at P608. Notify the SRO that the LPRM is bypassed.
	SRO	Ensure APRM A indicates within ½% of CTP (CGS Admin Requirement per PPM 9.3.4) prior to directing the BOP to un-bypass the APRM.
	BOP	Return APRM A to service.

COMMENTS:

Event No. 3

Description: Loss of REA-FN-1B resulting in a high reactor building pressure and entry into EOP Secondary Containment Control, 5.3.1.

This event is MANUALLY initiated with <u>TRIGGER 2</u> *approximately 15 minutes following the start of the scenario..*

Critical Task for this event: Directs or takes action to maintain Secondary Containment Pressure negative with regards to outside pressure

Time	Position	Applicants Actions or Behavior
T=15	BOP	Reports the receipt of the Secondary Containment ΔP High alarm and notes that it is a possible EOP entry. Goes to the back panel (P812) to investigate the cause of the abnormal condition in secondary containment. Reports that REA-FN-1B has tripped and that Reactor Bldg. pressure is positive on REA-DPR-1A(B).
	SRO	**Enters EOP 5.3.1, Secondary Containment Control**, based on Reactor Bldg. pressure at or above 0" H$_2$O

	BOP	Refers to the annunciator response procedures (PPM 4.812.R2, 9-1)
		
		    Attempts to start REA-FN-1A, Rx Bldg. Exhaust Fan *(fan will not start)*
		
		    If neither reactor bldg. exhaust fan can be started:
		
		      Immdiately secures Rx Bldg. Inlet Fan (ROA-FN-1B)

		Closes ROA-V-1 & 2, REA-V-1 & 2 (Inlet and Outlet dampers)
		Starts A train of SGT to maintain Rx Bldg. Pressure negative
		Refers to PPM 2.3.5, SGT System, to verify steps taken to start SGT.
		Notifies Chemistry to monitor Rx Bldg
		Refers to ODCM 6.1.2.1 and LCS 1.3.3.1 (the examinee should inform the SRO that this procedure makes reference to these, it is not expected for the RO/BOP to enter these)
		Refers to ABN-HVAC, HVAC Trouble Procedure, (all applicable actions have already been carried out in the Annunciator Response Procedure)
		Ensures Rx Bldg. pressure is maintained negative (monitors back panel or Secondary Containment ΔP High annunciator on P602)
		May send an equipment operator to investigate the loss of fan 1B and check the start of fan 1A
Cue: If asked to investigate the loss of REA-FN-1B, report that there is no apparent cause identified in your visual inspection. If requested to do pre or post fan start checks on REA-FN-1A or SGT, report that the checks are satisfactory		
	RO	Monitors plant
		Continues with power escalation (see event 1)

	SRO	**May exit EOP 5.3.1, Secondary Containment Control** when Rx Bldg. Pressure is restored and with shift manager permission
Cue: When asked, as the Shift Manager, for permission to exit the EOP 5.3.1, provide permission to exit since the entry condition has cleared and no emergency exists.		
COMMENTS:		

Event No. 4

Description: Failure of RFW-LIC-600 to manual.

The event is initiated shortly after the power increase is started.

Note: Override RFW-LIC-600 to manual.

Time	Position	Applicants Actions or Behavior
T=5	RO	Notes that reactor level is no longer tracking during the power increase and notifies the SRO. Notes that RFW-LIC-600 has gone to manual and tells the SRO. Operates RFW-LIC-600 in manual to maintain reactor level. May refer to ABN-LEVEL and/or PPM 4.603.A8 drop 3-7 depending on conditions when the failure is noticed.
	SRO	May refer to ABN-LEVEL and/or PPM 4.603.A8 drop 3-7 depending on conditions when the failure is noticed. Should direct the RO to attempt to place RFW-LIC-600 back in AUTO. (Authority to operate equipment given in PPM 1.3.1)
	RO	Places RFW-LIC-600 in auto.

COMMENTS:

Event No. 5

Description: Overcurrent on SL-81 causes BKR 8-81 to trip open.
*This event is **MANUALLY initiated by** **TRIGGER 3** ,at approximately 30 minutes following the start of the scenario, and after the crew has exited EOP 5.3.1, Secondary Containment Control, or at the direction of the lead examiner.*

Time	Position	Applicants Actions or Behavior
T=30	BOP	Announces loss of SL-81 due to the trip of BKR 8-81. Refers to PPM 4.800.C5. drop 1-5: Announce monitoring of drywell temperature and pressure. **Refer to ABN-RCC.** Note: The BOP operator must recognize that there is a complete loss of RCC due to the loss of power to RCC-P-1B and 1C with 1A out of service.
******* **Critical Task**	SRO	**Refers to ABN-RCC:** Directs the RO to scram the reactor. Directs the BOP operator to stop both RRC Pumps. Directs the BOP operator to stop RWCU-P-1A/B, close RWCU-V-4, and throttle open RWCU-V-104. Directs the BOP operator to place all RCC pumps in PTL.

	RO	Scrams the reactor as directed and gives the scram report of Power, Pressure, and Level, noting an ATWS (hydraulic) condition.
		Takes the immediate scram actions from PPM 3.3.1:
		Place the Mode Switch in SHUTDOWN.
		Monitor reactor power, pressure and level.
		Verify all control rods have inserted and since they did not insert, depress the manual scram pushbuttons and initiate ARI.
		Insert SRMs and IRMs.

Comments:

Event No. 6

Description: Hydraulic ATWS
This event is setup at the beginning of the scenario and occurs automatically.

Critical Task for this event:
1. **Enters PPM 5.1.2 and maintains power with level controlled less than LL.**

Time	Position	Applicants Actions or Behavior

	RO	Announce EOP entry into PPM 5.1.1 on reactor level or the ATWS.
		
		Takes immediate scram actions:
		
		    MS to SHUTDOWN
		
		    Monitor Power, Pressure, and Level
		
		    Verify all CRs have not fully inserted.
		
		    Depress the manual scram pushbuttons
		
		    Initiate ARI.
		
		    Insert SRMs and IRMs.

	SRO	Enters PPM 5.1.1 and directs/verifies that the Mode Switch has been placed in SHUTDOWN and enters the Level, Pressure and Power leg concurrently and **exits PPM 5.1.1 via the Power leg to PPM 5.1.2 RPV Control ATWS.**
		
		Directs BOP to:
		
		    Verify all appropriate isolations and initiations have occurred.
		
		    Verify pressure is being maintained by the main turbine/bypass valves and if not, maintain pressure 800# to 1000# with SRVs.
		
		Directs RO to:
		
		    Ensure both RRC Pumps are off.
		
		    Initiate both SLC pumps before WW temp reaches 110°F.

	RO	Takes actions as directed:
		Stop both RRC Pumps if not already off.
		Initiate both SLC pumps before WW temp reaches 110°F.
		Announce that the SLC Squib valves did not fire and SLC is NOT injecting into the core.
	SRO	Direct the BOP operator to bypass the MSIV isolation interlocks per PPM 5.5.6.
		Call OPS 3 on the radio and align firewater to the air compressors.

Note: Agree as Ops 3 to align firewater to the air compressors. 2 minutes after being called as OPS 3 activate triggers 23 and 24 to align FW to the air compressors.

****** Critical Task	SRO	Direct the RO to:
		Stop and prevent all injection into the RPV except by Boron injection systems, RCIC, and CRD.
		Lower level to a band less than −65 inches but greater than −183 inches. Record the upper limit as LL.
		Maintain level as directed from LL to −183 inches with outside the shroud injection systems listed in Table 5.
	BOP	Takes actions as directed:
		Using PPM 5.5.6, bypass the MSIV isolation interlocks.
	SRO	Directs BOP operator to Perform PPM 5.5.10 and appropriate steps of 5.5.11 for a hydraulic ATWS, Tabs B, F, and G.

****** Critical Task	BOP	Takes actions as directed:
		Performs PPM 5.5.10 Override ARI Logic.
		Performs Tabs B, F, and G of PPM 5.5.11 to:
		Reset, Scram, Reset
		Drive control rods
		Vent the overpiston area

COMMENTS:

Event No. 7

Description: Both SLC Squib valves fail to fire and will not operate.

Note: This failure is discussed under Event #6.

Time	Position	Applicants Actions or Behavior

COMMENTS:

Termination cue for this scenario: Level has been reduced by stopping and preventing injection too less than LL and power is controlled by the evolution.

Initial conditions: Plant is at approximately 20% with the main turbine generator
synchronized and a startup in progress. Reactor feedwater control is in 3
element on feedpump speed control.

Turnover: RCC-P-1A is OOS for motor replacement. BPA is selling power to CA.
and power should be increased as soon as possible following turnover.
The reactivity brief has been given and the power increase is to begin
immediately.

1.   Ensure RCC-P-1A is racked out and tagged out.

Facility: Columbia   Scenario Set No: 1   Scenario No: 10

Examiners: _____   Operators: _____

        _____   _____

        _____   _____

Initial conditions: The plant is operating at 90% power due to economic dispatch. Power is to be increased to 100% immediately following shift turnover.

Turnover Information: HPCS-P-1 is OOS for motor bearing replacement. It is expected to be returned to service in two days. Tech. Spec. 3.5.1, condition B, was entered four hours ago. A reactivity brief for the power increase has been held and power is to be increased to 100% immediately following shift turnover. There are no pre-conditioning limits.

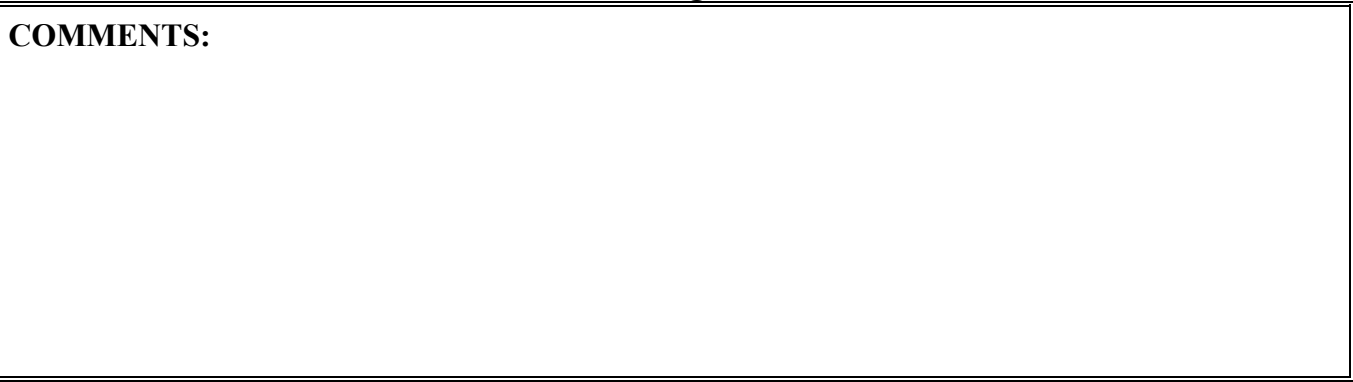| Event No.	Timeline	Event Type*	Event Description
1.	T=0	R SRO RO	Increase power with flow.
2.	When power = 95%	I SRO RO	APRM-A fails upscale Tech Spec TRG 1
3.	T=7	C SRO BOP	DEH-P-1A shaft break with a fail to auto start of DEH-P-1B. TRG 2
4.	T=12	C RO SRO	ASD Channel A2 alarm and fault TRG 3
5/6.	T=20	C ALL	ASD UPS trouble alarm TRG 4 Trip of E-PP-ASD1/4 and ASD CH A1 and B1 fault which results in a manual scram by the crew. TRG 5
7.	T=30	M ALL	OBE and RHR-B Suction Break with a trip of both RFW pumps. TRG 6
8.	T=31	C ALL	RCIC trips on initiation and cannot be re-started Automatic upon RCIC initiation.
9.			Termination cue: The scenario can be terminated when the ED has been performed and reactor level is being controlled in the band from +13 inches to +54 inches.

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

Event No. 1

Description: increase reactor power with flow to 100% power.

Time	Position	Applicants Actions or Behavior
T=0	SRO	Directs the RO to increase reactor power to 100% power with RRC flow at the rate of 10 mwe/minute.
	RO	Increases reactor power with RRC flow as directed.
	BOP	Monitors plant equipment.

COMMENTS:

Event No. 2

Description: APRM-C fails upscale.

This event is triggered with **<u>TRIGGER 1</u>** *when reactor power = 95%.*

Time	Position	Applicants Actions or Behavior

T=5	RO	Reports APRM-A upscale and a ½ scram on RPS-A.
		
		 Refers to ARP and recommends;
		    Consider bypassing APRM-A.
		    Refer to TS 3.3.1.1. LCS 1.3.2.1, and 1.3.3.1
		
		    Verify no rods have scrammed.
		        Recommend resetting the ½ scram
		    Verify Scram Group Lights are illuminated.
		    Verify Backup Scram Lights have extinguished.

	SRO	Acknowledges the report. Refers to Tech Specs and LCS and determines there are no regulatory requirements with this failure. Directs RO to bypass APRM-A. Directs RO to reset the ½ scram. Directs BOP to make announcement to stop all testing and maintenance with a potential for generating a trip in the unaffected channel. Calls PSRO/WC
	BOP	Makes announcement to stop all testing and maintenance with a potential for generating a trip in the unaffected channel.
	RO	Bypasses the APRM. Resets the ½ scram.

COMMENTS:

Event No. 3

Description: DEH-P-1A shaft breaks with a failure of DEH-P-1B to auto start.

This event is triggered with **TRIGGER 2** *approximately 7 minutes following the start of the scenario.*

Time	Position	Applicants Actions or Behavior
	BOP	Announce the loss of pressure to DEH Verify the start of the backup pump, and when it does not start, manually start DEH-P-1B. Verify pressure returns to normal.
Note: When the operator places the control switch for DEH-P-1B in start, delete the override for the control switch for DEH-P-1A.		
	SRO	Acknowledges report. Directs BOP to take actions as directed in the ARP. Directs OPS 3 to check system for indications of failure. Notifies PSRO/WC.
Cue: Call back as OPS 3 with the information that the shaft on DEH-P-1A is sheared.		

	RO	Monitors reactor;
		
		      Power
		
		      Pressure
		
		      Level

	BOP	Verifies system operation per PPM 2.5.1. Sends OPS 3 to verify lineup in ARP. Refers to ABN-DEH-LEAK.

COMMENTS:

Event No. 4		

Description: ASD Channel A2 alarm and fault.

This event is triggered with **TRIGGER 3 10 minutes following the start of the scenario.**

Time	Position	Applicants Actions or Behavior
	RO	Reports ASD 1A/2 alarm and Fault alarms.
		Verifies trip of channel ASD1 A/2.
		Ensures RRC-P-1A has runback to 51 Hz.
		Reports power decrease due to runback.
		Checks ASD video Display Unit for source of alarm.
		Sends OPS4 to investigate @ ASD BLD
	SRO	Directs actions per ARPs.

Cue: Using the telephone, call x2242 and report as OPS4 that there is a GTO freeze alarm on Channel A2.

Time	Position	Applicants Actions or Behavior
	SRO	Directs actions per ARP for high delta flow.
		Directs RO to match RRC loop flows.
		Enters Tech. Spec. 3.4.1.
		Tech. Spec. 3.4.1 flow mismatch is applicable until flows are matched.
		Notifies PSRO/WC
	RO	Reduces RRC-P-1B speed to 51 Hz.
		Performs PPM OSP-RRC-D701, Jet Pump Operability and RRC loop Flow mismatch.

Cue: If called as OPS 4 for horsepower on RRC B, inform the control room it is 5700.

COMMENTS:

Event No. 5 and 6

Description: ASD UPS trouble alarm and trip of E-PP-ASD1/4 and ASD CH A1 and B1 fault.

This event is imitated with __*TRIGGER 4*__ *20 minutes following the start of the scenario and should be initiated when RRC loop flows are matched.*

This fault event is activated by __*TRIGGER*__ *5 and is activated 45 seconds after the preceding report from OPS 4.*

Time	Position	Applicants Actions or Behavior
	RO	Reports ASD UPS Trouble Alarm and refers to ARP.
	SRO	Directs actions per ARP for ASD UPS Trouble. Refers to ABN-ASD-INV
	RO	Sends OPS4 to investigate. Notifies PSRO/WC.

Cue: Thirty seconds after Trigger 4 is activated, call x2242 and report as OPS4 that there is arching and sparking coming from E-PP-ASD 1 / 4.

Cue: **45 seconds after the report from OPS4 activate Trigger 5, trip of E-PP-ASD1/4 and ASD CH A1 and B1 fault.**

Time	Position	Applicants Actions or Behavior
	RO	Reports both ASD Channels A1 and B1 are in alarm. Reports that both RRC pumps have tripped. Reports reactor scram.
	SRO	Directs RO to perform PPM 3.3.1Reactor Scram.

	RO	Takes immediate scram actions:
		
		    MS to SHUTDOWN
		
		    Monitor Power, Pressure, and Level
		
		    Verify all CRs have fully inserted.
		
		    Insert SRMs and IRMs.
		
		Reports EOP entry condition on RPV Level into PPM 5.1.1 and loss of feedwater due to reactor high level.

	SRO	Enters PPM 5.1.1 and directs:
		
		    RO to restore and maintain reactor level to the band of +13 inches
		
		    to +54 inches and continue in PPM 5.3.1 with RCIC or reset 1
		
		    feedpump and restart.
		
		    BOP to verify all isolations and initiations and to monitor pressure
		
		    on the turbine BPVs less than 1060 psig

	RO	Reports the trip of RCIC. Reports feedpumps cannot be reset. Performs actions of PPM 3.3.1.
	BOP	Reports initiations and isolations sat and monitors pressure.
	SRO	Directs the BOP to reduce pressure to 500 psig to 600 psig to allow injection with the condensate booster pumps.
	BOP	*Reduces pressure as directed with SRVs.
	RO	Sets up feedwater level control for 10 valve operation. *Injects through the 10 valves with condensate booster pumps when pressure has been reduce to 500psig to 600 psig. Restores reactor level to +13 inches - + 54 inches.

COMMENTS:

Event No. 7 and 8.

Description: OBE and RHR-B Suction Break

*This event is initiated by **TRIGGER 6** approximately 30 minutes following the start of the scenario.*

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Time	**Position**	**Applicants Actions or Behavior**
Cue: As OPS1, call the control room on the radio and report that you felt severe shaking/ movement in the turbine building.		
	BOP	Reports OBE annunciator and goes to the back to Bd. L. Reports indications from Bd. L.
	SRO	Directs actions for earthquake. Directs plant tours to determine damage.
	RO	Reports Suppression Pool level lowering. Reports the trip of both feed pumps. Reports RHR B Room level Hi EOP entry.
	SRO	Enters PPM 5.2.1 on low SP level and directs actions per ABN-FLOODING. Enters PPM 5.3.1 on RHR B room level Hi. Directs OPS2 to investigate water level in RHR B room. Determines that RHR B is not operational due to flooding. May direct the RO to close RHR-V-4B in an attempt to isolate the leak. Directs pulling of RHR-P-2B control power fuses.
	RO	If directed, closes RHR-V-4B. Reports continued lowering trend on Suppression Pool level.
Note: SRO may anticipate the ED on low suppression pool level and direct the MT bypass valves be opened to rapidly reduce pressure.		
	SRO	Determines that Suppression Pool level will not be able to be maintained above 19'2". Determines Emergency Depressurization is required. *Enters PPM 5.1.3 and directs 7 ADS SRVs open.

		Re-enters PPM 5.5.1 concurrently with 5.1.3.
Cue: 2 minutes after being called to reset RCIC, report that RCIC will not reset.		
	RO	*Opens 7 ADS SRVs to depressurize the reactor.
	SRO	Directs injection with systems to return RPV level to +13" to +54".
	RO	*Returns RPV level to band as directed.

Comments:

This scenario will be terminated when the reactor has been emergency depressurized and RPV level is stable/increasing.

SRO TURNOVER INFORMATION

Initial conditions: The crew assumes the shift with the reactor at 90% power.

Turnover Information: HPCS-P-1 is OOS for motor bearing replacement. It is expected to be
                         returned to service in two days. Tech. Spec. 3.5.1, condition B, was
                         entered four hours ago.   A reactivity brief for the power increase has
                         been held and power is to be increased to 100% immediately
following   shift turnover.

1.   Ensure HPCS-P-1 is racked out and tagged out.