Simulation Facility	Calvert Cliffs	Scenario No.: 1	Op Test No.:	1
Examiners:	_____	Operators:	_____	SRO
	_____		_____	RO
	_____		_____	CRO

Objectives: To evaluate the applicant's ability to conduct a unit power decrease and implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including failure of a VCT level Transmitter with an intermediate indication on suction switchover, erratic operation of a FW controller, and a dropped CEA. After the unit is stabilized, the System Operator directs power be reduced 100 MWe in the next 10 minutes. Once power is stabilized, a high SGFP vibration alarm occurs followed shortly thereafter by a SGFP trip. After it is determined the SGFP cannot be reset, the unit is tripped and EOP-0 entered. The feed system perturbation causes a feed rupture. A blockage in the AFW suction line prevents AFW flow from being established requiring EOP-3 be implemented. The crew will attempt to restore feed and then initiate OTCC. Upon initiation of OTCC, PORV Block Valve, MOV-403, will not open.

Initial Conditions: The plant is at 100% Power, MOC

500KV Bkr., 552-23 tripped open 2 hours ago.

13 HPSI Pp is OOS.

13 SRW Pp is OOS

12A Travelling Screen – flow switch is jumpered

12 4KV Bus is on the Alternate Feeder

Turnover: Present plant conditions: 100% power, MOC; Unit 2 is in MODE 5 – no CW Pps and 23 AFW Pp unavailable.

Power history: 100% power for previous 68 days.

Equipment out of service:

1) 500KV Bkr., 552-23 tripped open 2 hours ago. Investigating.

2) 13 HPSI Pp motor bearing failure during STP two (2) days ago. It is nearly reassembled, expected to be returned to service in 3 hours. T.S. 3.5.2 Action Statement entered 49 hours ago.

3) 13 SRW Pp has a broken shaft, expected return - tomorrow.

4) 12A Travelling Screen – flow switch is jumpered – will be worked tomorrow.

5) 12 4KV Bus is on Alternate Feeder, 152-1209 – the Normal Feeder, 152-1201, has a loudly buzzing relay, electricians will be investigating later this shift.

Surveillances due: None

Instructions for shift:

1) Maintain 100% power.

2) Perform PMT on 13 HPSI when returned to service.

Event No.	Malf. No.	Event Type*	Event Description
Preload	RF-rackout RF-rackout PNL OVR PNL OVR (CD-161) RF-161		13 HPSI Pp OOS. 13 SRW Pp OOS. RWT Outlet 1-SI-504-MOV – GREEN light ON, PWR ON light ON. AFW pump suction blockage - (12 CST suction valve shut and indicating open.)
1	CVCS009 (LO)	I RO	Several minutes after the crew takes the watch, VCT Level transmitter LT-227 fails low. This causes Chg. Pp suction to shift to the RWT. The RO informs the CRS. After verifying it is an instrument failure, the CRS directs the RO to shift Chg. Pp suction back to the VCT. RO may note the failure of RWT Outlet (504-MOV) to go fully open. The CRS directs MOV-501 be reopened and MOV-504 to be shut. The ABO should be dispatched to check VCT level and MOV-504 position locally. The OWC is contacted for assistance.
2	RCS021 (5% over 2 min)	C RO	Next, PORV-402 starts to leak. The RO should acknowledge the Quench Tank alarm and note on the acoustic monitor the indicated leakage. The ARM will be referenced and the CRS will direct the PORV Block Valve, RC-403-MOV be closed. The CRS will refer to T. S. 3.4.11. The OWC will be contacted for assistance.
3	FW007_01	I CRO	FRV Controller 1111 begins to operate erratically. The CRO should notice oscillating SGFP RPM, MWe, and SG level. The CRS should direct the Controller be shifted to manual and AOP-3G implemented. The PDI Control Switch is placed in MAIN FAIL and level controlled on the PDI. The CRS should then direct the controller be placed in bypass override. The CRS contacts the OWC for assistance. (Note: The crew may not go to manual soon enough to prevent failure of both CPUs, in this case AOP-3G will be implemented for failure of 2 CPUs.)
4	CEDS012_32	C RO	After the 1111 failure, CEA 32 drops. The RO should acknowledge the alarms, inform the CRS and refer to the ARM. The CRS should implement AOP-1B and address T.S. 3.1.4. The primary will be stabilized and realignment time determined. Maintenance will be notified, and realignment will be attempted.
5	Load reduction	R RO N CRO	Next, the System Operator calls the Control Room and reports a transformer cooling problem at Waugh Chapel and requests they reduce unit load by 100 MWe within the next 10 minutes. The CRS should brief the crew and commence a rapid downpower to ≈85%.
6	PNL OVR on C-69 and Status Panel (Supervisory Inst.) FW004_01	C CRO	After power has been stabilized, a SGFP supervisory alarm is received on 11 SGFP. The alarm is determined to be a valid vibration alarm in the danger range at about 7 mils. The TBO or PPO and the System Engineer are dispatched to the pump. After a course of action is determined, (reduce load on the SGFP), 11 SGFP trips. The CRS may direct an attempted reset of 11 SGFP pump. The SGFP will not reset. The CRS will direct the RO to trip the unit and EOP-0 be implemented. (Note: if the crew does not trip to low SG levels, then activate the rupture in event 7)
7	CD008 – 20% no ramp	M All	After the reactor trip, an unisolable rupture occurs on the feed pump suction (upstream of 1-FW-101). The feed and condensate headers will have to be isolated. When the CRO attempts to initiate AFW flow, flow will not be able to be established due to the common AFW Pump suction being blocked. The CRS should evaluate the EOP-0 flowchart and determine EOP-3 should be implemented.

Event No.	Malf. No.	Event Type*	Event Description
8	OTCC	M All	Prior to EOP-3 entry blowdown will be isolated and the RCPs tripped. A rapid cooldown to less than 465°F will be commenced. When both SG levels are less than –350", OTCC will be initiated. When the RO attempts to open PORV–402 block valve (403) it will not open. The crew should evaluate Attachment 17 and determine the potential success of OTCC. After this assessment, the scenario can be terminated.

*(N)ormal, ®eactivity (I)nstrument, ©omponent, (M)ajor Transient

SCENARIO 1 OVERVIEW

The candidates will take the shift at 100% power with instructions to maintain power.

Several minutes after the crew takes the watch, VCT Level transmitter LT-227 fails low. This causes Chg. Pp suction to shift to the RWT. The RO informs the CRS. After verifying it is an instrument failure, the CRS directs the RO to shift Chg. Pp suction back to the VCT. RO may note the failure of RWT Outlet (504-MOV) to go fully open. The CRS directs MOV-501 be reopened and MOV-504 to be shut. The ABO should be dispatched to check VCT level and MOV-504 position locally. The OWC is contacted for assistance.

Next, PORV-402 starts to leak. The RO should acknowledge the Quench Tank alarm and note on the acoustic monitor the indicated leakage. The ARM will be referenced and the CRS will direct the PORV Block Valve, RC-403-MOV be closed. The CRS will refer to T. S. 3.4.11. The OWC will be contacted for assistance.

FRV Controller 1111 begins to operate erratically. The CRO should notice oscillating SGFP RPM, MWe, and SG level. The CRS should direct the Controller be shifted to manual and AOP-3G implemented. The PDI Control Switch is placed in MAIN FAIL and level controlled on the PDI. The CRS should then direct the controller be placed in bypass override. The CRS contacts the OWC for assistance. (Note: The crew may not go to manual soon enough to prevent failure of both CPUs, in this case AOP-3G will be implemented for failure of 2 CPUs.)

After the 1111 failure, CEA 32 drops. The RO should acknowledge the alarms, inform the CRS and refer to the ARM. The CRS should implement AOP-1B and address T.S. 3.1.4. The primary will be stabilized and realignment time determined. Maintenance will be notified, and realignment will be attempted.

Next, the System Operator calls the Control Room and reports a transformer cooling problem at Waugh Chapel and requests they reduce unit load by 100 MWe within the next 10 minutes. The CRS should brief the crew and commence a rapid downpower to ≈85%.

After power has been stabilized, a SGFP supervisory alarm is received on 11 SGFP. The alarm is determined to be a valid vibration alarm in the danger range at about 7 mils. The TBO or PPO and the System Engineer are dispatched to the pump. After a course of action is determined, (reduce load on the SGFP), 11 SGFP trips. The CRS may direct an attempted reset of 11 SGFP pump. The SGFP will not reset. The CRS will direct the RO to trip the unit and EOP-0 be implemented. (Note: if the crew does not trip to low SG levels, then activate the rupture in event 7)

After the reactor trip, an unisolable rupture occurs on the feed pump suction (upstream of 1-FW-101). The feed and condensate headers will have to be isolated. When the CRO attempts to initiate AFW flow, flow will not be able to be established due to the common AFW Pump suction being blocked. The CRS should evaluate the EOP-0 flowchart and determine EOP-3 should be implemented.

Prior to EOP-3 entry blowdown will be isolated and the RCPs tripped. A rapid cooldown to less than 465°F will be commenced. When both SG levels are less than –350", OTCC will be initiated. When the RO attempts to open PORV–402 block valve (403) it will not open. The crew should evaluate Attachment 17 and determine the potential success of OTCC. After this assessment, the scenario can be terminated.

Scenario No:	1	Event No.	1	Page 5 of 15
Event Description:	**VCT Level Transmitter, 1-LT-227 fails low**			
Time	Position	Applicant's Actions or Behavior		
	CUE:	Annunciator – F-46 CHG PP SUCT FROM RWT Charging Pump suction swaps to the RWT		
	RO	• Acknowledges alarm, notes Charging Pump suction shifted to the RWT, and informs the SRO • Checks VCT level (LT-226) and other parameters/lineup and determines suction shift is invalid • Refers to ARM (CRO may breakout ARM)		
	SRO	• Acknowledges report: • Directs RO to shift Charging suction back to the VCT • Directs RO to monitor primary parameters • Directs CRO to reduce turbine load as necessary to maintain Tc on program		

	RO	• Shifts Charging suction back to the VCT
		  • Opens CVC-501-MOV
		  • Shuts CVC-504-MOV
		  • Notes RWT suction valve (MOV-504) did not fully open, informs SRO (RO may not notice this)
		• Monitors primary parameters		

	SRO	• May direct ABO to:
		  • Look in VCT room for signs of leakage
		  • Verify position of MOV-504 (if noticed)		

	CRO	• Maintains Tc on program		
	SRO	• Contacts OWC for support for failure of 1-LT-227 and failure of MOV-504 to fully open (if noticed)		

Scenario No:	1	Event No.	2	Page 6 of 15
Event Description:	**PORV 402 Leakage**			
Time	Position	Applicant's Actions or Behavior		
	CUE:	Annunciator Alarm - E-1, QUENCH TK TEMP LVL PRESS Quench Tank computer alarm		
	RO	• Notes alarms on 1C06 and informs SRO • Refers to ARM • Determines, based on acoustic monitor indications (or print) that PORV 402 or Safety RV-200 is leaking		
	SRO	• Acknowledges report and concurs with the ROs diagnosis. • Directs RO to close PORV 402 block valve, 1-RC-403 • (May direct RO to vent the Quench Tank per OI-1B)		
	RO	• Performs action as directed by the SRO • When Block valve 403 is closed, informs the SRO PORV leakage to the Quench Tank has stopped		
	SRO	• Directs RO to return Quench Tank parameters to normal per OI-1B, Quench Tank Operations • Refers to T.S. 3.4.11		

Scenario No:	1	Event No.	3	Page 7 of 15
Event Description:	**Erratic Output of FIC-1111**			

Time	Position	Applicant's Actions or Behavior
	CUE:	SG level deviation alarm (computer alarm) Varying SGFP speed MCPU light on the FRV controller **(Note: The crew may not go to manual soon enough to prevent failure of both CPUs, in this case AOP-3G will be implemented for failure of 2 CPUs.)**
	RO	• Acknowledges alarm, checks SG levels, notes oscillations, informs the SRO

	SRO	• Acknowledges report
		• Implements AOP-3G, <u>MALFUNCTION OF MAIN FEEDWWATER SYSTEM</u>
		• Directs CRO to:
		  • Place 1111 FRV and/or SGFP in Manual
		  • Place the 1111 PDI (I-HS-4516C) in MAIN FAIL position
		  • Adjust the PDI CONTR to maintain zero inches
		  • Shifts FRV BYP to BYP OVERRIDE (may decide to wait on BYPASS OVERRIDE pending input form the system engineer)

	CRO	• If directed, places 1111FRV and/or 11 SGFP in Manual
		• Places 1111 in MAIN FAIL
		• Adjusts PDI CONTR to maintain zero inches
		• Shifts 11 FRV BYP to BYP OVERRIDE (may wait on BYPASS OVERRIDE if directed by SRO)
		  • Places 11 FRV and BYP in Manual
		  • At View Point Plasma Display, shifts to ENABLED
		  • Adjusts 11 FRV and BYP so level is at zero inches and the BYP valve 50% open
		  • Places BYP FRV in AUTO

		OR

CPUs	SRO	• Acknowledges report
		• Implements AOP-3G, <u>MALFUNCTION OF MAIN FEEDWWATER SYSTEM</u>
		• Directs CRO to:
		  • Verify 11 SGFPT, 11 SG FW REG MAIN CONTR and 11 SG FW BYPASS CONTR have all shifted to Manual
		  • Maintain SG levels ≈ zero inches by adjusting 11 SGFP speed to within 100 RPM of 12 SGFP

	CRO	• Operates 11 SGFP to maintain speed within 100 RPM of 12 SGFP • Maintains SG level ≈ 0 inches
	SRO	• Directs OWC to investigate FIC-1111 and to contact the system engineer.

Scenario No:	1	Event No.	4	Page 8 of 15
Event Description:	**Dropped CEA**			
Time	Position	Applicant's Actions or Behavior		
	CUE:	Annunciator alarms 1C05 - D-31 SECONDARY CEA POSITION DEVIATION +/- 4" D-32 CEA MOTION INHIBIT Dropping Rx power, RCS temp. and press.		
	RO	• Acknowledges alarms, identifies CEA #32 has dropped and informs SRO		
	SRO	• Acknowledges report • Directs CRO to reduce turbine load to restore Tc to program • Implements AOP-1B, CEA MALFUNCTION		
	RO	• Monitors reactor power, SUR, temp. etc. • Refers to the ARM		

	CRO	• Coordinates with RO and reduces turbine load to restore Tc to program
		  • Uses load limit pot to reduce turbine load
		  • Monitors turbine parameters		

	SRO	• Determines CEA realignment time • Contacts OWC/Fuels Group to obtain support • Directs RO to attempt CEA realignment (FrT is 1.56, realignment time ≈42 minutes) • Directs RO and CRO to NOT allow reactor power to rise above the power the unit was stabilized at while the CEA is being aligned		

	RO	• Performs actions as directed by SRO
		• Attempts to realign:
		  • Maintains reactor power
		  • Selects Group 3
		  • Selects CEA 32
		  • Selects Manual Individual Mode
		  • With CMI – Depresses the Group Inhibit Bypass pushbutton and Depresses and Holds the Motion Inhibit Bypass pushbutton for at least 5 seconds before and after CEA motion
		  • Uses the Pull and Wait method – pulls 5.25 inches and waits 15 seconds
		• Reports to the SRO the CEA has moved off the bottom		

	SRO	• Refers to T.S. 3.1.4.		

Scenario No:	1	Event No.	5	Page 9 of 15
Event Description:	**Rapid Downpower**			

Time	Position	Applicant's Actions or Behavior
	CUE:	System Operator directs a rapid power reduction of 100 MWe in the next 10 minutes

	SRO	• Acknowledges direction from System Operator
		
		• Directs the crew to commence a rapid downpower to take off 100 MWe in the next 10 minutes
		  • Directs the CRO to maintain SG level due to 11 SG feedwater control problems
		  • May direct alternate path or increased monitoring of charging pump suction since CVC-504-MOV did not fully open, if noticed previously

	RO	• Commences boration from the BASTs followed by shifting suction to the RWT:
		  • Opens BA direct makeup valve, MOV-514
		  • Verifies two charging pumps running
		  • Runs BA Pp for 30 seconds
		  • After BA Pp is secured, shuts BA direct makeup valve, MOV-514
		  • Verifies open RWT outlet valve
		  • Monitors CVC-504-MOV position and charging pump suction as directed by SRO
		  • Verifies Shut VCT outlet
		
		• If not noticed previously, RO should note here CVC-504-MOV did not fully open and inform the SRO (if not noticed previously, actions listed in event 1 for CVC-504 problem should be completed here)
		
		• Initiates PZR spray flow to equalize RCS Boron:
		  • Energizes all PZR backup heater banks
		  • Adjusts PZR Pressure Controller setpoint to maintain 2250 psia
		
		• Inserts CEAs, if necessary, and maintains ASI within the limits of the COLR
		• Requests Peer checks for reactivity manipulations

	CRO	• Reduces turbine load to maintain Tc within 5°F of program
		• Monitors turbine parameters not to exceed
		  • 150°F/hr rate of change of 1st stage shell inner metal temperature (Point 6 on TR-4404)
		  • 75°F 1st stage shell metal temperature differential (Diff between Points 6 & 7 on TR-4404)
		  • Unloading rate of 10% step change or 5%/min

	SRO	• Coordinates power reduction between RO and CRO
	SRO	• After about 75 MWe have been taken off, directs charging pump suction be shifted back to the VCT • Directs the unit be stabilized and Tc restored to program • Conducts crew brief on plant status

Scenario No:	1	Event No.	6	Page 10 of 15
Event Description:	**11 SGFP Trip/Reactor Trip**			

Time	Position	Applicant's Actions or Behavior
	CUE:	SGFP Status Panel Alarm, C-69, and 11 SGFP Status Panel Supervisory Inst. Alarm
	CRO	• Acknowledges alarm and reports alarm to SRO • Refers to the ARM
	SRO	• Dispatches TBO/PPO to 11 SGFP • Directs CRO to monitor 11 SGFP parameters •

	SRO	• When receives report of high vibration on 11 SGFP
		  • Directs OWC to get assistance from system engineer
		  • Directs CRO to shift load to 12 SGFP

	CRO	• Shifts load to 12 SGFP by raising bias on 12 SGFP and lowering on 11 SGFP
	SRO	• When receives recommendation from system engineer to reduce load on 11 SGFP and take off line • Directs CRO to continue to reduce load using bias pots • Notifies the System Operator a power reduction is being commenced to 70% to take 11 SGFP offline • Directs crew to begin a rapid downpower per OP-3 •
	CRO	• Reports trip of 11 SGFP to SRO
	SRO	• May direct attempt at resetting 11 SGFP (it won't reset) • Directs the reactor be tripped and EOP-0 be implemented
		Note: If the crew is able to avoid a reactor trip due to the SGFP loss then initiate the rupture of event 7 here.

Scenario No:	1	Event No.	7	Page 11 of 15
Event Description:	**Reactor Trip/Condensate Ruputre/EOP-0**			

Time	Position	Applicant's Actions or Behavior
	CUE:	Manual Reactor Trip initiated

	RO	Perform Post-Trip Immediate Actions:
		
		• Depresses ONE set of Manual RX TRIP buttons
		• Checks reactor tripped
		  • Prompt drop in NI power
		  • Negative SUR
		
		• Checks ALL CEAs fully inserted
		
		• Verifies demin water makeup to RCS is secured
		  • 11 & 12 RCMU pumps secured
		  • VCT M/U valve 1-CVC-512-CV is shut
		  • If RCS M/U is in DIRECT LINEUP, RWT CHG PP SUCT valve 1-CVC-504-MOV is shut (1-CVC-501-MOV must be opened first)
		
		Informs SRO Reactivity Safety Function is complete

	CRO	• Checks reactor has tripped
		
		• Ensures turbine has tripped:
		  • Depresses Turbine TRIP button
		  • Checks the Turbine MAIN STOP VALVES shut
		  • Checks Turbine SPEED drops
		  • Verifies turbine generator output breakers open:
		
		  • 11 GEN BUS BKR, 0-CS-552-22
		  • 11 GEN TIE BKR, 0-CS-552-23
		
		  • Verifies 11 GEN and EXCITER FIELD BKRs 1-CS-41 and 1-CS-41E are open
		  • Ensure both MSR 2nd STG STM SOURCE MOVs are shut:
		  • 1-MS-4025-MOV (11MSR)
		  • 1-MS-4026-MOV (12 MSR)
		
		Informs SRO the Turbine is Tripped

	SRO
	CRO
		• Notes various secondary alarms indicative of a condensate/feed header rupture or report of rupture
		• SRO directs the condensate and feed header to be isolated
		  • Directs the SGFPs, HDPs, CBPs, and Cond. Pps all be placed in P-T-L
		  • Directs the SG FW ISOL MOVs be closed (MOVs 4516, 4517)
		  • May start AFW now

	CRO	• Performs actions directed by SRO
	CRO	• Checks 11 OR 14 4KV Vital Bus energized • Checks 125 VDC and 120 VAC busses energized • Verifies CCW flow to RCPs Informs SRO Vital Auxiliaries Safety Function is complete.

Scenario No:	1	Event No.	7	Page 12 of 15
Event Description:	**Reactor Trip/Condensate Ruputre/EOP-0**			

Time	Position	Applicant's Actions or Behavior
	RO	• Ensures PZR pressure stabilizes between 1850 psia and 2300 psia and is trending to 2250 psia • Determines PZR level is stabilizing between 80 and 180 inches or trending to 160 inches • Ensures RCS subcooling GREATER THAN 30°F Informs SRO RCS Pressure and Inventory Safety Function can is complete

	CRO	• Verifies Turbine Bypass Valves or ADVs operating to maintain:
		  • SG pressures between 850 and 920 psia
		  • Tcold between 525° and 535°F
		• Checks at least one SG available for controlled heat removal
		  • SG level between -170 and +30 inches
		  • Initiates Aux Feedwater to maintain S/G level
		  • Attempts to start an AFW pump, if not done previously
		  • Notes pump has no flow and fluctuating discharge pressure and informs SRO
		  • Secures that pump and attempts to start other AFW pump
		  • Notes similar indications as with other AFW pump, informs SRO and secures that pump
		  • Dispatches TBO/OSO to check AFW pump suction lineup
		  • Checks Tc >525°F
		• Checks at least one RCP operating in a loop with a SG available for heat removal
		• Checks loop delta T is <10°F
		Informs SRO Core and RCS Heat Removal Safety Function is can not be met due to no main or aux. feed

	SRO	• Directs OWC to contact maintenance for support for AFW pump suction problem and for rupture in the feed header • May direct OSO to shift CSTs

	CREW	• Checks Containment pressure is <0.7 psig
		• Checks Containment temperature is <120°F.
		• Checks containment radiation monitor alarms CLEAR with NO unexplained trends
		• Checks RMS alarms CLEAR with NO unexplained trends:
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		Informs SRO CNMNT Environment and Rad Levels External to CNMNT are complete

	SRO	• Conducts EOP-0 mid-brief and directs operators to reverify Safety Function
	Crew	• Reverifies Safety Functions

Scenario No:	1	Event No.	7	Page 13 of 15
Event Description:	**Reactor Trip/Condensate Ruputre/EOP-0**			
Time	Position	Applicant's Actions or Behavior		
	SRO	• Determines Recovery Procedure per Diagnostic Flowchart: • All Safety Functions met – NO • Event Diagnosis – Loss of Feed • Directs transition to EOP-3		

Scenario No:	1	Event No.	8	Page 14 of 15
Event Description:	**Loss of Feed/EOP-3**			

Time	Position	Applicant's Actions or Behavior
	SRO	• Directs RO to stop all RCPs (may have been done previously) • Directs CRO to isolate blowdown and to place the ADVs in manual • Performs EOP-3 entrance brief

	RO	• Commences RCS boration
		  • Shuts CVC-512
		  • Opens CVC-514
		  • Opens BAST Gravity Feed valves CVC-508, 509
		  • Start all BA Pps
		  • Shut CVC-501
		  • Start all Charging Pps

	CRO	• Commences rapid natural Circ RCS C/D to <465°F
		  • Blocks SGIS when permitted alarm received.
		  • Uses TBVs to commence rapid cooldown
		  • Opens to 12-17% and informs SRO of setting (actual setting not critical)
		  • Maintains PZR level >50" by controlling C/D rate

	SRO/ CRO	• Continue attempts to establish feed flow
	SRO	• When both SG levels are less than –350" directs the crew to initiate OTCC • When less than -380 directs the SGs be isolated to prevent dryout

	RO	Note: These steps maybe performed out of the sequence listed below as allowed by the EOP
		• Initiates OTCC
		  • Places all PZR heaters in off
		  • Shuts L/D CNMNT ISOL valves CVC-515,516
		  • Starts all Charging Pumps
		  • Blocks PZR Press. SIAS when received
		  • Opens both PORVs by taking handswitches to MANUAL OPEN
		  • Verifies both PORVs Open
		  • Informs SRO PORV-402 block valve (MOV-403) failed to open
		  • Starts all HPSI pumps
		  • Opens the MAIN and AUX HPSI HDR valves
		  • Open All CNMNT CLR EMER OUT valves
		  • Start all CACs
		  • Verifies HPSI flow per EOP Att. 10
		  • Directs PWS to locally initiate A6 and B6
		  • Verifies successful OTCC per EOP Att. 17
		  • Determines with one PORV OTCC will not be successful and informs SRO

	SRO	• SRO determines/confirms OTCC is only adequate for core cooling for 5 hours with only one PORV available with existing conditions

Scenario No:	1	Event No.	8	Page 15 of 15
Event Description:	**Loss of Feed/EOP-3**			
Time	Position	Applicant's Actions or Behavior		
	CRO	• When S/G level is less than –380" initiates action to prevent dryout of the S/G • Isolates the S/G per step J.3 when level is below –380": • Shifts ADV to 1C43 and verifies controller at minimum output • Shuts SIV • Verifies the MSIV bypass is shut • Shuts S/G FW Isolation valve • Shuts AFW Block valves • Verifies S/G B/D valves shut • Shuts the Main Steam Upstream Drain valves • Dispatches a plant operator to observe locally from the Aux. Bldg. Roof the S/G Safeties are shut		
	SRO	Contacts OWC to investigate PORV-402 block valve (MOV-403) failing to open Note: ERPIP call for this scenario should be an ALERT due to QA5, loss of all feedwater.		

SCENARIO #1 SETUP

OVERVIEW/OBJECTIVES

To evaluate the applicant's ability to conduct a unit power decrease and implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including failure of a VCT level Transmitter with an intermediate indication on suction switchover, erratic operation of a FW controller, and a dropped CEA. After the unit is stabilized, the System Operator directs power be reduced 100 MWe in the next 10 minutes. Once power is stabilized, a high SGFP vibration alarm occurs followed shortly thereafter by a SGFP trip. After it is determined the SGFP cannot be reset, the unit is tripped and EOP-0 entered. The feed system perturbation causes a feed rupture. A blockage in the AFW suction line prevents AFW flow from being established requiring EOP-3 be implemented. The crew will attempt to restore feed and then initiate OTCC. Upon initiation of OTCC, one PORV block valve will not open.

INSTRUCTOR SCENARIO INFORMATION

____ 1. Reset to IC-13. Draft Spin #0303

____ 2. Perform switch check. Spin # Used _____

____ 3. Place simulator in CONTINUE, advance charts and clear alarm display.

____ 4. Place simulator in FREEZE.

____ 5. Enter Malfunctions

____ a. VCT Level Transmitter LT-227 Fails Low
CVCS009 (LO) on F1

____ b. PORV-402 leakage
RCS021 (0-5% over 2 minutes) on F2

____ c. 11 FRV Controller Operates Erratically
FW007_01 on F3

____ d. CEA 01 Drops
CEDS012_32 on F4

____ e. 11 SGFP Trips
FW004_01 on F5

____ f. Condensate Header Rupture
CD008 to 20%, no ramp, on F6

____ 6. Enter Panel Overrides

a. 1C04 –12 CST outlet, 1-CD-161, indicating open.

b. 1C07 – RWT Outlet, 1-SI-504-MOV, Green light ON, Power available Light ON.

c. 1C13 – Annunciators (2) for 13 SRW Pp tagout- OFF.

d. 1C07 – Annunciators (2) for 13 HPSI Pp tagout- OFF.

____ 7. Enter Remote Functions / Administrative

a. Caution tag 13 SRW. Pp

b. Caution tag 13 HPSI Pp.

c. Open Breaker 552-23 and the associated disconnects. (pinkies).

e. Place 12 4KV Bus on the Alternate Feeder. (pinkies)

f. Remote Function to SHUT 12 CST Outlet, 1-CD-161.

h. Remote Functions to rackout 13 SRW Pp.

g. Remote Functions to rackout 13 HPSI Pp.

____ 8. Set simulator time to real time, then place simulator in CONTINUE.

____ 9.Give crew briefing.

a.	Present plant conditions:	100% power - MOC/10,885 MWD/MTU. Unit 2 is in Mode 5. RCS Boron - 897 PPM.
b.	Power history:	100% for previous 68 days.
c.	Equipment out of service:	13 HPSI Pp motor bearing failure during STP two (2) days ago. It is nearly reassembled, expected to be returned to service in 3 hours. T.S. 3.5.2 Action Statement entered 49 hours ago. 13 SRW Pp has a broken shaft, expected return - tomorrow.
d.	Abnormal conditions:	500KV Bkr., 552-23 tripped open 2 hours ago. Investigating. 12 4KV Bus is on Alternate Feeder, 152-1209 – the Normal Feeder, 152-1201, has a loudly buzzing relay, electricians will be investigating later this shift. 12A Travelling Screen – flow switch is jumpered – will be worked tomorrow.
e.	Surveillances due:	None.
f.	Instructions for shift:	Maintain 100% per OP-3. Perform PMT on 13 HPSI when returned to service.

SCENARIO #1 SETUP

____ 10. Allow crew 3-5 minutes to acclimate themselves with their positions.

____ 11. Instructions for the Booth Operator.

a. With the lead examiner's concurrence activate **F1** (VCT Transmitter).

b. Activate malfunction **F2** (PORV leakage) when cued by the lead examiner.

c. When the crew closes MOV-403 (PORV Block Valve), **Panel override** the HS for the PORV block valve to CLOSE.

d. Activate the malfunctions **F3** (11 FRV) and **F4** (Dropped CEA) when cued by the lead examiner.

e. Delete **F4** after it is inserted.

f. After power is stabilized and CEA recovery has begun, **call** as system operator and request a 100 MWe load reduction in the next ten minutes due to problems at Waugh Chapel.

g. After power is stabilized, activate SGFP Status Panel Alarm (C-69) and 11 SGFP status panel supervisory Inst. alarm simultaneously.

h. When a reduction in 11SGFP load has been directed, and when cued by the lead examiner, activate **F5** (11 SGFP trip). Note: If the unit is not tripped due to the SGFP trip then initiate the feed/condensate rupture when they have turned SG level. (Note: If the crew does not trip on the loss of 11 SGFP, with lead examiner concurrence, initiate F6 here.)

i. After reactivity control safety function is complete, activate **F6** (Condensate/feed header leak).

j. If they haven't noticed the rupture after several minutes, CRO may be off doing Vital Auxiliaries, then call as TBO and report rupture on feed header, not sure of exact location yet.

SCENARIO #1 SETUP

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1.	OWC investigate failure of VCT Level Transmitter LT-227.	Acknowledge request.
2.	OWC notify system engineer of leaking PORV.	Acknowledge request.
3.	OWC investigate erratic operation of 11 FRV.	Acknowledge request.
4.	OWC/electricians investigate dropped CEA.	Acknowledge request.
5.	Fuels Group informed of dropped CEA and request latest FrT and FxyT.	Acknowledge report. Report latest FrT is 1.56 and FxyT is 1.62 and are 3 days old.
6.	OWC/TBO/PPO investigate 11 SGFP Supervisory Alarm.	Acknowledge request. After three minutes, report a valid vibration alarm in ALERT range reading about 7 mils.
7.	System Engineer and PWS dispatched to 11 SGFP.	Acknowledge request. After 3 minutes, System engineer recommends reducing load as soon as possible on 11 SGFP if alarm does not clear will have to take the SGFP offline.
8.	PWS/TBO investigate possible condensate/feed header rupture.	Acknowledge request. After 4 minutes report an unisolable leak upstream of 1-FW-101. Looks like have to take the whole condensate and feed header down.
9.	OSO/PWS/TBO investigate AFW pump suction path.	Acknowledge request. After 4 minutes OSO reports lineup from CSTs look normal. TBO reports suction pressure at AFW pumps is about 2 psi.
10.	OSO/PWS align other CSTs.	Acknowledge request. After several minutes report realigned. **Note, depending on which tank is directed, use panel overrides to make it appear the other tank is aligned then report.**
11.	Mechanics or other support for feed header rupture or AFW suction problem.	Acknowledge request. After 5-10 minutes report no success.
12.	OWC investigate failure of PORV-402 to open.	Acknowledge request.

SCENARIO #1 SETUP

Critical Task Justification

CT 1 – Condensate/Feed Header Rupture.

This task is critical Per ES-Appendix D because failure to isolate the rupture will result in a significant degradation of the plant's ability to provide a secondary heat sink. It is cued by various secondary alarms, i.e., low suction pressure and oscillating pump parameters. It is measurable by the operator closing the appropriate valves and stopping the appropriate pumps to isolate the leak and the operator can determine successful completion by using the pump and valve indications.

CT-2 – Commence a rapid cooldown to <465°F.

This task is critical Per ES-Appendix D because cooling down rapidly to <465°F is necessary to establish Condensate Booster Pump Injection as a source of feed to the SGs to provide a secondary heat sink and also to use the available SG inventory for removing sensible heat vice decay heat. The lower temperature also provides a better chance of success initiating OTCC. This action is cued by procedure direction (EOP-3). The initiation of a rapid cooldown is observable by monitoring RCS parameters. The operator can determine successful performance of these steps by observing RCS indications.

CT-3 – Initiate OTCC.

This task is critical Per ES-Appendix D because initiation of OTCC is necessary to provide core cooling since the secondary heat sink has been lost. The SRO and/or RO should determine that OTCC with only one PORV is only adequate for a minimum of 5 hours. Knowing this, the ERO would be expected determine a plan of action for longer term core cooling. Initiation of OTCC will be cued by both SG levels being <-350 inches or CETs rising uncontrollably by >5°F. Successful initiation is measured by rising PZR level and indication of HPSI injection into the RCS. The operator can determine if his actions have been successful by using the same plant parameters.

SCENARIO #1 SETUP

SHIFT TURNOVER

I.	Present Plant Conditions	100%
II.	Burnup:	10885 MWD/MTU (MOC)
III.	Power History	100% for previous 68 days.
IV.	Equipment out of Service:	13 HPSI Pp motor bearing failure during STP two (2) days ago. It is nearly reassembled, expected to be returned to service in 3 hours. T.S. 3.5.2 Action Statement entered 49 hours ago. 13 SRW Pp has a broken shaft, expected return - tomorrow.
V.	Abnormal Conditions:	500KV Bkr., 552-23 tripped open 2 hours ago. Investigating. 12A Travelling Screen – flow switch is jumpered – will be worked tomorrow. 12 4KV Bus is on Alternate Feeder, 152-1209 – the Normal Feeder, 152-1201, has a loudly buzzing relay, electricians will be investigating later this shift.
VI.	Surveillances Due:	1B DG STP-O-8 due today. SM will bring to CR when ready.
VII.	Instructions for Shift	Maintain 100% power. Perform PMT on 13 HPSI when returned to service.
VIII.	U2 Status and Major Equipment OOS:	Mode 5 – no CW Pps and 23AFW Pp is OOS.

U-1 Reactor Operator Shift Briefing Sheet

Date: Today

Reactor Power:	*Level:*	100%
	RCS Boron:	897 PPM
	Burnup:	10885
	History:	At 100% for 68 days

ASI	*Value:*	0.011 (middle of the core)
	Trend:	Steady

Xenon:	*Trend:*	2.38 Equilibrium

Reactivity Thumbrules: *(Good until 11200 MWD/MTU)*	*Tcold:*	1.4°F
	Dilution:	164 gal
	Boration:	*BAST:* 14.1 gal or 2.5 ppm
		RWT: 103.9 gal/% @ 2500ppm
	CEA's:	7.5"/%
	Neutral Blend:	3/30
	Last Add:	8 & 100 @ 0618
	Recent CEA movements:	ARO on Grp 5 @ 6 days ago
Ion Exchanger Status:	*Purification:*	12
	Delithiation:	11

SCENARIO #1 SETUP

SHIFT TURNOVER INFORMATION SHEET

For Training Only

DATE: Today **ON-COMING SHIFT: DAY**

UNIT STATUS

PARAMETER	UNIT 1	UNIT 2
MODE:	1	5
% POWER:	100	0
RCS TEMPERATURE:	547.5	108
RCS PRESSURE:	2250	atmos
RCS BORON	897	2538
MWe NET:	860	0
GROSS RCS LEAKAGE:	0.08	N/A
BULK POWER NOTIFICATION	Normal	

NON-ROUTINE SURVEILLANCE REQUIREMENTS [B0125]

List non-routine, conditional, & mode dependent surveillances (e.g. chemistry samples, operability verifications, ETP's, < 7 day STP's)

UNIT	SURVEILLANCE

EVOLUTIONS IN PROGRESS

SURVEILLANCE TESTS

UNIT 1		UNIT 2	
DATE	STP	DATE	STP

TBD
Shift Manager

Maintain 100% power.

SCENARIO #1 SETUP

SHIFT TURNOVER INFORMATION SHEET

EQUIPMENT AVAILABILITY (continued)		
ELECTRICAL SYSTEM	UNIT 1	UNIT 2
500KV High Lines	☒5051 ☒5072	☒5052
500KV Buses	☒BLACK	☒RED
13KV Supplies	☒P-13000-1	☒P-13000-2
SMECO Bkr Status	☒252-2301 ☐0SH301	☒ 0SH302
Site Self Power Feeders	☒252-1106	☒252-2106
13KV Buses	☒11 ☒12 ☒23	☒21 ☒22
Voltage Regulators	Auto 1102 Auto 2102 Auto 1101	Auto 1103 Auto 2103 Auto 2101
4KV Transformers	☒U-4000-11 ☒U-4000-21 ☒U-4000-13	☒U-4000-12 ☒U-4000-22 ☒U-4000-23
4KV Buses	☒11 ☒12 ☒13 ☒14	☒21 ☒22 ☒23 ☒24
Diesel Generators	☐1A ☐1B ☐0C	☐2A ☐2B ☐0C
480V Buses	☒11A ☒11B ☒14A ☒ 14B	☒21A ☒21B ☒24A ☒ 24B
125VDC Battery Chargers	☒11 ☒23 ☒12 ☒ 24	☒14 ☒22 ☒13 ☒ 21
125VDC Buses	☒11 ☒12	☒22 ☒21
120VAC Vital Buses	☒11 ☒21 ☒13 ☒ 23	☒14 ☒24 ☒12 ☒ 22

SPENT FUEL EQUIPMENT CHECKOUTS:		
SFHM PE O-81-1-0-O	New Fuel Elevator OI-25B App A	SF Insp Elevator OI-25B App B

OOS SR EQUIPMENT		OOS NSR EQUIPMENT	
UNIT 1 & COMMON	UNIT 2	UNIT 1 & COMMON	UNIT 2
13 HPSI Pp		12 4KV Bus Normal Feed, 152-1201	
13 SRW Pp		12A Travelling Screen flow switch	
		500 KV bkr 552-23	

SCENARIO #1 SETUP

SHIFT TURNOVER INFORMATION SHEET

GENERAL INFORMATION

UNIT 1 AND COMMON

SW PARAMETERS:

Latest STP-0-73A yesterday (11PP, 12PP & 13 PP) Required to perform dewatering operations in OI-29
Max Header Pressure PE 1-12-21-O-W

11 Header	11 PP	13 PP
11 ECCS Clr	897	897
11 CCW HX	6624	6464

12 Header	12 PP	13 PP
12 ECCS	871	-
12 CCW HX	6779	-

Last week	11 Hdr / 11 PP	34 psig
Last week	12 Hdr / 12 PP	35 psig
Yesterday	11 Hdr / 13 PP	34.5 psig
Yesterday	12 Hdr / 13 PP	33 psig

LONG TERM NOTES:

1. Temp Alt 1-02-0065 removed Aux alarm X28 (12B CBO Temp Hi), failed RTD. Computer point T184 is accurate for monitoring 12B CBO temperature. Do not remove T184 from the Selected Computer point group until T/A 1-02-065 is removed.
2. The following ABB breakers may not operate after being closed. Ensure an Operator is stationed locally to open the breaker if it shuts, but does not indicate fully closed (breaker may not trip remotely or automatically, and the associated DG may be OOS). Hi side fdrs U-440-11A (1114), 11B (1102), 14A (1402), 14B (1413). **Pink** Tags on the brkr handswitches.
3. RECO accepted by Ops for Charging Pumps stating Suction Stabilizers do not impact operability. **Discharge Desurgers now impact operability if desurger pressure is below 500 psig**. RECO at CRS desk, RPA submitted for Pes 1/2-041-04-O-M.
4. When stroking 1-SW-5153-CV, have Mechanical Maintenance and Engineering present to locally monitor the valve for sticking, binding or sluggish performance. Report the results to the System Manager.
5. Do not perform any evolution that would cause the migration of Silica from the SFP to SDC, SITs, or RWTs.
6. Place 14 B/U Heater bank in Off prior to performing the plant calorimetric. Non-conservative for calc if you use 300 KW.
7. Log completion of Quarterly PEs and above (e.g., Semi-annual, Annual, etc.) in the CRO Narrative Log to assist tracking.

SHORT TERM NOTES:

1. When it is necessary to divert 2 times in a 24-hour period, the CMF for 1-CVC-325 should be re-evaluated due to ALARA concerns.
2. Fill the SFP from the Unit 1 RWT when required.
3. Per Chemistry request maintain U-1 VCT pressure < 29# when makeup to VCT.
4. Next time we discharge the MWMT Sal Raspa needs to be contacted to perform PMT for MO#0200301363.
5. When updating Webster, you need to update MOPU if the activity has a MO and Ops is the lead RMG. Leave a VM with MOPU x7500 to take the MO to 'W9' Status. Ops STPs are being assigned Mos to allow Ops resource loading.
6. Need to order at least one pallet of boric acid.
7. 12A Travelling Screen – flow switch is jumpered-will be worked tomorrow.
8. 12 4KV Bus is on the alternate feed, 152-1209 – the normal feed, 152-1201, has a loudly buzzing relay, electricians will be investigating later this shift
9. 13 HPSI Pp motor bearing failure during STP two (2) days ago. It is nearly reassembled, expected to be returned to service in 3 hours. T.S. 3.5.2 Action Statement entered 49 hours ago.
10. 13 SRW Pump out of service due to a broken shaft. Estimated return to service is tomorrow-noon.
11. 500KV Bkr. 552-23 tripped open a hours ago, currently being investigated.

OPERATOR WORKAROUNDS / COMP ACTIONS — Nucleis – BWOR104

EQUIPMENT	COMP ACTION / DEFICIENCY	FREQ	WATCH	DATE	IR/MO#	PRI

Simulation Facility	Calvert Cliffs	Scenario No.: 2	Op Test No.:	1

Examiners:	_____	Operators:	_____	SRO
	_____		_____	RO
	_____		_____	CRO

Objectives: To evaluate the applicant's ability to conduct a unit power decrease, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including failure of 11 CCW Pp, a PZR spray valve opening, an RCP seal and the ADV controller. After the ADV controller fails the remaining seals fail on the affected RCP resulting in an RCS leak. After EOP-0 is entered, the RCS leak causes a SIAS actuation. SIAS 'A' fails to actuate requiring 11 or 12 HPSI Pump to be started manually to establish HPSI flow. As EOP-0 progresses, a steam leak begins in CNMNT from 12 SG requiring EOP-8 be implemented. The ADV Controller will not operate from the Control Room, the crew will have to operate the ADVs locally.

Initial Conditions: The plant is at 100% Power, MOC

13 HPSI Pp is OOS.

13 CCW Pp is OOS

12A Travelling Screen – flow switch is jumpered

12 4KV Bus is on the Alternate Feeder

Turnover: Present plant conditions: 100% power, MOC; Unit 2 is in MODE 5 – no CW Pps and 23 AFW Pp unavailable.

Power history: 100% power for previous 68 days.

Equipment out of service:

1) 13 HPSI Pp motor bearing failure during STP two (2) days ago. It is nearly reassembled, expected to be returned to service in 3 hours. T.S. 3.5.2 Action Statement entered 49 hours ago.

2) 13 CCW Pp has a bad bearing, expected return on night shift.

3) 12A Travelling Screen – flow switch is jumpered – will be worked tomorrow.

4) 12 4KV Bus is on Alternate Feeder, 152-1209 – the Normal Feeder, 152-1201, has a loudly buzzing relay, electricians will be investigating later this shift.

Surveillances due: STP-0-29 (CEA Movement Test) due by end of shift. SM will discuss with CRS shortly after turnover.

Instructions for shift:

1) Maintain 100% power.

Event No.	Malf. No.	Event Type*	Event Description
Preload	ESFA002_01 ESFA001_01 RF-rackout RF-rackout		SIAS 'A' fails to actuate automatically and manually. 13 HPSI Pp OOS. 13 CCW Pp OOS.
1	CCW002_01	C CRO	About 3 minutes after the crew takes the watch, 11 CCW Pp trips. The CRO will acknowledge the alarms, inform the CRS and refer to the ARM. The crew will check for common mode failure and the CRS will direct the CRO to start 12 CCW Pp. The CRS refers to AOP-7C and T.S. 3.7.5 and 3.6.6. The CRS contacts the OWC for assistance.
2	RCS016	I RO	PRZR Spray Valve 100E fails open. The RO will note lowering RCS pressure and inform the CRS of the open spray valve. May refer to the PZR pressure ARM. Spray valve control will be shifted from 'both' to '100F'. 100E will be verified to be going shut and RCS pressure restored. The CRS contacts the OWC for assistance.
3	RCS011_01 (0-100% over 3 min)	C RO	Next, the lower seal (first stage) fails on 11A RCP. The RO notes the alarm, informs the CRS and refers to the ARM. The crew should determine the lower seal on 11A RCP has failed. The OWC and system engineer are contacted for assistance.
4	MS015 (high)	I CRO	Two minutes after the notifications have been made the ADV controller fails high causing the ADVs to open. The CRO will inform the CRS. The CRS should direct the CRO to take manual control of the ADVs and shut them. The RO should maintain reactor power less than 100%. The CRS refers to AOP-7K. The CRS contacts the OWC for assistance.
5	RCS012_01 (0-100% over 2 min)	R RO N CRO	After the CRS has referenced AOP-7K, the 11A RCP middle seal fails. The crew should implement ARM guidance and begin an expeditious shutdown. The CRS refers to OP-3 for guidance on for the shutdown.
6	RCS013_01 (over 2 min) RCS003 (50 gpm over 3 min) RCS014_01 (over 4 min)	M All	After power has been reduced at least 5%, the 11A upper seal begins to fail followed shortly thereafter by the failure of the vapor seal. With all the seals failed, RCS leakage begins via the seals. The CRS will trip the unit based on high RCP seal temperature and EOP-0 is implemented. The CRS will direct reactivity be performed then 11A RCP be tripped. When SIAS actuates, train 'A' fails to automatically and manually initiate. To establish HPSI flow 11 or 12 HPSI must be started manually.
7	MS010_02 (0-25% over 3 min) Panel Override ADVs closed & in manual	M All	After the first pass through the safety functions is complete, a steam break in CNMNT begins. The CRS should recognize two events are taking place and implement EOP-8. Success Paths will be selected and implemented. When the crew attempts to operate the ADVs, they will not operate from the Control Room. To establish heat removal via 11 SG, the ADV will have to be operated locally. After 12 SG is isolated, the scenario can be terminated.

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

SCENARIO 2 OVERVIEW

The candidates will take the shift at 100% power with instructions to maintain power.

After the crew has taken the shift, 11 CCW Pp trips. The CRO will acknowledge the alarms, inform the CRS and refer to the ARM. The crew will check for common mode failure and the CRS will direct the CRO to start 12 CCW Pp. The CRS should refer to AOP-7C and T.S. 3.7.5 and 3.6.6. The CRS contacts the OWC for assistance.

PRZR Spray Valve 100E fails open. The RO will note lowering RCS pressure and inform the CRS of the open spray valve. May refer to the PZR pressure ARM. Spray valve control will be shifted from 'both' to '100F'. 100E will be verified to be going shut and RCS pressure restored. The CRS contacts the OWC for assistance.

Next, the lower seal (first stage) fails on 11A RCP. The RO notes the alarm, informs the CRS and refers to the ARM. The crew should determine the lower seal on 11A RCP has failed. The OWC and system engineer are contacted for assistance.

Two minutes after the notifications have been made the ADV controller fails high causing the ADVs to open. The CRO diagnoses the open ADVs and inform the CRS. The CRS directs the CRO to take manual control of the ADVs and shut them. The RO should maintain reactor power less than 100%. The CRS refers to AOP-7K. The CRS contacts the OWC for assistance.

After the CRS has referenced AOP-7K, the 11A RCP middle seal fails. The crew should implement ARM guidance and begin an expeditious shutdown in accordance with OP-3. The CRS refers to OP-3 and directs the unit shutdown at a rate less than 30%/hour. The appropriate notifications should be made.

After power has been reduced at least 5%, the 11A RCP upper seal begins to fail followed shortly thereafter by the failure of the vapor seal. With all the seals failed RCS leakage begins via the seals. The CRS will trip the unit based on high RCP Controlled Bleed Off temperature and EOP-0 implemented. The CRS will direct reactivity be performed then 11A RCP be tripped. When SIAS actuates, train 'A' fails to initiate automatically and manually. To establish HPSI flow 11 or 12 HPSI must be started manually.

After the first pass through the safety functions is complete, a steam break in CNMNT begins. The CRS should recognize two events are taking place and implement EOP-8. Success Paths will be selected and implemented. When the crew attempts to operate the ADVs, they will not operate from the Control Room. To establish heat removal via 11 SG, the ADV will have to be operated locally. After 12 SG is isolated, the scenario can be terminated.

Scenario No:	2	Event No.	1	Page 4 of 13
Event Description:	**11 CCW Pp Trips.**			

Time	Position	Applicant's Actions or Behavior
	CUE	After the crew takes the watch, the following alarms occur: Annunciator Alarm - 1C13 – K-09 - CC PP DISCH PRESS LO RCP Status Panel Alarms CCW pressure indicates zero
	CRO	• Acknowledges alarms, notes 11 CCW Pp has tripped, informs the SRO
	SRO	• Acknowledges report and directs CRO to check for common mode failure (head tank level, motor overload alarm) • Directs RO to monitor RCP parameters • Directs CRO to check for common mode failure and check head tank level • Directs CRO to start 12 CCW Pp • Directs CRO to place 11 CCW Pp in P-T-L • Implements AOP-7C, LOSS OF COMPONENT COOLING WATER
	RO	• Monitors RCP temperatures
	CRO	• Performs actions as directed by the SRO • Verifies 12 CCW Pp is running normally with normal system parameters • May refer to the ARM but may not since alarms will be clear at this point
	SRO	• Refers to T.S. 3.7.5. and 3.6.6 and exits AOP-7C • Contacts OWC for assistance • Directs the 11 CCW Pp breaker be rackedout to restore common electrical alarm function • Directs 'protected equipment' green chains be placed around 12 CCW PP Bkr

Scenario No:	2	Event No.	2	Page 5 of 13
Event Description:	**PZR Spray Valve 100E Fails Open**			
Time	Position	Applicant's Actions or Behavior		
	CUE:	Annunciator alarm 1C06 - E-29 PZR CH 100 PRESS (may notice lowering pressure prior to alarm) PZR Spray valve 100E comes full open Lowering RCS pressure		
	RO	• Acknowledges alarm, if received • Refers to the ARM (if received) • Notes PZR Spray Valves 100E is open		

	SRO	• Acknowledges report and directs RO to:
		  • Shift PZR Spray Valve control to 100F
		  • Verify PZR spray valve 100E goes closed
		  • Restore RCS pressure to normal		

	RO	• Performs actions as directed by SRO • Notes spray valve 100E is going closed and then closes and informs the SRO • Informs SRO in T.S. action for DNB if RCS pressure goes less than 2200 psia • Restores RCS pressure to normal band		
	SRO	• Contacts OWC/I&C to investigate failure of PZR Spray Valve 100E		

Scenario No:	2	Event No.	3	Page 6 of 13
Event Description:	**1st Stage (Lower) Seal Fails on 11A RCP**			
Time	Position	Applicant's Actions or Behavior		
	CUE:	Annunciator E-55 – 11A RCP SEAL - TEMP HI - PRESS		
	RO	• Acknowledges alarm, checks RCP parameters, reports suspected seal failure on 11A RCP • Refers to the ARM		
	SRO	• Identifies/acknowledges report of 11A RCP seal failure • Determines along with RO 11A RCP the lower seal has failed • Directs RO to monitor parameters • Contacts System Engineer • Notes if a second seal fails on 11A RCP the unit will have to be shutdown expeditiously		
	RO	• Monitors RCP parameters (bleedoff flow, pressures, temperatures)		
	SRO	• Contacts OWC/GS and System Engineer regarding 11A RCP seal failure		

Scenario No:	2	Event No.	4	Page 7 of 13
Event Description:	**Atmospheric Dump Valves Fail Open**			
Time	Position	Applicant's Actions or Behavior		
	CUE:	Audible steam dump to atmosphere occurring Open indication of both ADVs RCS temperature and pressure lowering		
	CRO	• Identify and report both ADVs have gone full open, recommends taking to manual and closing		

	SRO	• Identifies/acknowledges report of open ADVs
		• Directs CRO to take ADV controller to manual and shut ADVs
		• Implements AOP-7K, <u>OVER COOLING EVENT IN MODE ONE OR TWO</u>
		  • Determines a reactor trip is not required
		  • Monitors reactor power:
		  • Directs RO to insert CEAs or borate (if necessary)
		  • Directs CRO to reduce/adjust turbine load as necessary to restore/maintain Tc on program (if necessary)		

	RO	• Monitors reactor power and borates or inserts CEAs if necessary to maintain power less than 100%		
	CRO	• Takes ADV controller to manual and verifies both ADVs go closed • Adjusts turbine load as necessary to maintain Tc on program		
	SRO	• Contacts OWC to investigate failure of ADV Controller		

Scenario No:	2	Event No.	5	Page 8 of 13
Event Description:	**2nd Stage (Middle) Seal Fails on 11A RCP/Power Reduction**			

Time	Position	Applicant's Actions or Behavior
	CUE:	Degrading parameters on 11A RCP seals. (Lowering middle seal d/p and increased pressure drop across the upper seal)
	RO	• Reports suspected 2nd seal failure on 11A RCP • Refers to the ARM
	SRO	• Identifies/acknowledges report of 11A RCP middle seal failure • Determines along with RO that two stages of 11A RCP seals have failed • Notes with a second seal failure on 11A RCP an expeditious shutdown is required
	RO	• Monitors RCP parameters (bleed-off flow, pressures, temperatures)
	SRO	• Contacts OWC/GS and System Engineer regarding 11A RCP seal failures

	SRO	• Performs brief of expeditious power reduction per OP-3 (may decide to use rapid downpower)
		• Notifies the System Operator a power reduction is being commenced to take the unit offline
		• Directs crew to begin a power reduction (at specified rate) per OP-3, Section 6.4
		• Instructs crew to:
		  • Use RPS Delta T power as primary power indication
		  • Energize all PRZR backup heaters
		  • Adjusts the PRZR pressure spray controller to maintain PRZR pressure at 2250
		  • Reduce power by use of boration (and CEAs if necessary)
		  • Maintain Tc within 2°F of program by reducing turbine load
		• Informs chemistry of expected power reduction of greater than 15% in one hour and requests a boron sample for a power change >5%

	RO	• Initiates PZR spray flow to equalize RCS Boron:
		  • Energizes all PZR backup heater banks
		  • Adjusts PZR Pressure Spray Controller to maintain 2250 psia
		• Commences boration – cycles charging pump suction between the RWT and the VCT to achieve desired rate of power reduction per OP-3
		• Inserts CEAs if necessary and maintains ASI within the limits of the COLR
		• Requests Peer checks for reactivity manipulations

	CRO	• Reduces turbine load to maintain Tc within 2°F of program • Monitors feedstation to verify S/G levels are being maintained approximately 0 inches • Reduces bias on Bias Pots on both SGFPs to maintain level
	SRO	• Coordinates power reduction between RO and CRO

Scenario No:	2	Event No.	6	Page 9 of 13
Event Description:	**Failure of All 11A RCP Seals/RCS leak/EOP-0**			

Time	Position	Applicant's Actions or Behavior
	CUE:	Degrading parameters on 11A RCP seals. (Rising RCP temperatures, bleedoff flow) Possibly PZR Level Deviation alarm

	RO	• Reports:
		  • Suspected failure of all RCP seals
		  • Indications of loss of RCS inventory (may be masked by power change)
		  • High 11A RCP seal temperature

	SRO	• Acknowledges report.
		• Directs Unit 1 be tripped and EOP-0 implemented
		  • Directs RO to trip Unit 1
		  • Perform reactivity
		  • Trip 11A RCP

	RO	Perform Post-Trip Immediate Actions:
		
		• Depresses ONE set of Manual RX TRIP buttons
		• Checks reactor tripped
		  • Prompt drop in NI power
		  • Negative SUR
		
		• Checks ALL CEAs fully inserted
		
		• Verifies demin water makeup to RCS is secured
		  • 11 & 12 RCMU pumps secured
		  • VCT M/U valve 1-CVC-512-CV is shut
		  • If RCS M/U is in DIRECT LINEUP, RWT CHG PP SUCT valve 1-CVC-504-MOV is shut (1-CVC-501-MOV must be opened first)
		
		Informs SRO Reactivity Safety Function is complete

	RO	Trips 11A RCP and informs SRO

	CRO	• Checks reactor has tripped
		
		• Ensures Turbine has tripped:
		  • Depresses Turbine TRIP button
		  • Checks the Turbine MAIN STOP VALVES shut
		  • Checks Turbine SPEED drops
		  • Verifies turbine generator output breakers open:
		
		  • 11 GEN BUS BKR, 0-CS-552-22
		  • 11 GEN TIE BKR, 0-CS-552-23
		
		  • Verifies 11 GEN and EXCITER FIELD BKRs 1-CS-41 and 1-CS-41E are open
		  • Ensures both MSR 2nd STG STM SOURCE MOVs are shut:
		  • 1-MS-4025-MOV (11MSR)
		  • 1-MS-4026-MOV (12 MSR)
		
		Informs SRO the Turbine is Tripped

Scenario No:	2	Event No.	6	Page 10 of 13
Event Description:	**Failure of 11A RCP Seals/RCS leak/EOP-0**			

Time	Position	Applicant's Actions or Behavior
	CRO	• Checks 11 OR 14 4KV Vital Bus energized • Checks 125 VDC and 120 VAC busses energized • Verifies CCW flow to RCPs • Verifies Switchgear Ventilation in service Informs SRO Vital Auxiliaries Safety Function is complete
	RO	• Determines PZR pressure is not stable between 1850 psia and 2300 psia and is trending lower • Closes PZR Spray Valves • Determines PZR level is not stabilizing between 80 and 180 inches or trending to 160 inches • Ensures RCS subcooling GREATER THAN 30°F • Verifies SIAS, notes SIAS A should have occurred and did not. (Not required until 1725#) Manually actuates SIAS if RCS pressure is <1725 • Notes SIAS A did not actuate manually and manually starts 11 HPSI (or 12) 11 LPSI and 11 CS Pps and opens HPSI header valves • Trips 12B RCP Informs SRO RCS Pressure and Inventory Safety Function can NOT be met due to low PZR pressure and PZR level

	CRO	• Verifies Turbine Bypass Valves or ADVs operating to maintain: (ADVs are in manual)
		
		  • SG pressures between 850 and 920 psia
		  • Tcold between 525° and 535°F
		
		• Checks at least one SG available for controlled heat removal
		
		  • SG level between -170 and +30 inches
		
		Informs SRO Core and RCS Heat Removal Safety Function is met

	CREW	• Checks Containment pressure less than 0.7 psig
		
		• Checks Containment temperature less than 120°F
		
		• Checks containment radiation monitor alarms CLEAR with NO unexplained trends
		
		• Checks RMS alarms CLEAR with NO unexplained trends:
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		
		• Determines CNMNT parameters cannot be met due to rising press. and temp (negative trends)
		
		Informs SRO CNMNT environment cannot be met and Rad Levels External to CNMNT is met

	SRO	• Conducts EOP-0 mid-brief and directs operators to reverify Safety Function

Scenario No:	2	Event No.	7	Page 11 of 13
Event Description:	**Failure of 11A RCP Seals/RCS leak/EOP-0**			

Time	Position	Applicant's Actions or Behavior
	Crew	• Reverifies safety functions. • Report Reactivity, and Vital Auxiliaries still complete and Pressure and Inventory still out.

	CRO	• Verifies Turbine Bypass Valves or ADVs operating to maintain RCS temperature:
		  • Notes SG pressure is <850 psia and lowering
		  • Notes Tcold is <525°F and lowering
		  • MSIVs will be shut when SG pressure decreases to 800# or on SGIS B
		• Checks at least one SG available for controlled heat removal
		  • SG level between -170 and +30 inches
		  • Verifies SGIS actuation when SGIS signal received
		  • Initiates Aux Feedwater to maintain S/G level
		Informs SRO Core and RCS Heat Removal Safety Function cannot be met due to low Tc, low SG pressure in 12 SG and no RCPs (if secured due to CIS actuation)

	CREW	• Checks Containment pressure less than 0.7 psig (notes rapidly rising CNMNT pressure)
		  • Notes CIS and CSAS actuations have occurred
		  • Verifies CIS and CSAS
		  • Trips all RCPs
		• Checks Containment temperature less than 120°F (notes rapidly rising CNMNT temperature)
		• Checks containment radiation monitor alarms CLEAR with NO unexplained trends (notes rising CNMNT Rad. Levels on CNMNT Hi Range)
		• Checks RMS alarms CLEAR with NO unexplained trends:
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		Informs SRO CNMNT Environment cannot be met due to high CNMNT pressure, temp and rad. levels and Rad Levels External to CNMNT is complete

	SRO	• Determines Recovery Procedure per Diagnostic Flowchart: • All Safety Functions met - NO • Single Event Diagnosis – NO - EOP-8 (EOP flowchart may recommend EOP-4 however SRO should recognize an RCS leak exists due to 11A RCP seals and implement EOP-8) • Directs transition to EOP-8
	SRO	• Briefs crew prior to EOP-8 implementation • Directs actions per EOP-8

Scenario No:	1	Event No.	7	Page 12 of 13
Event Description:	**LOCA with steam line break/EOP-8**			
Time	Position	Applicant's Actions or Behavior		
	SRO	• Directs Chemistry to sample SGs and to place the H2 monitors in service • Directs operators to select success paths for all safety functions • Verifies selected success paths • Determines sequence of success path performance (PIC-4, HR-2, CE-3, RC-1, VA-1, RLEC-2) • Directs operators to implement success paths (PIC and HR first)		

	RO	• Establishes Pressure and Inventory Control:
		  • Verifies SIAS actuation
		  • Verifies SI flow
		  • Maintains subcooling
		  • Throttles SI flow when criteria are met:
		  • Subcooling of >25°F based on CETs
		  • PZR level > 101"
		  • At least one SG available for heat removal:
		  • SG level > -170"
		  • Capable of being supplied with feedwater
		  • Capable of being steamed
		  • RLVMS indicates level above the top of the hot leg
		  • Reactivity Control Safety Acceptance Criteria are met		

	RO	• Attempts RCS leak isolation: (realizes an RCS leak exists via 11A RCP seals)
		  • Verifies letdown isolation
		  • Verifies no PORV leakage
		  • Verifies head and PZR vent valves are shut
		  • Checks for leakage into the CC system		

	CRO	• Establishes Core and RCS heat removal (SG heat sink with SIS operation)
		• Determines if a SGTR exists
		  • SG samples
		  • RMS trends
		  • SG level trends
		  • Determines a SGTR does not exist		

Scenario No:	1	Event No.	7	Page 13 of 13
Event Description:	**LOCA with steam line break/EOP-8**			
Time	Position	Applicant's Actions or Behavior		
	CRO	• Determine if an ESDE exists: • Determines an ESDE does exist and 12 SG is the affected SG: • Isolates 12 SG: • Shifts 12 ADV to 1C43 and verifies controller at minimum output • Shuts 12 MSIV • Verifies the MSIV bypass is shut • Shuts 12 S/G FW Isolation valve • Shuts 12 AFW Block valves • Verifies 12 S/G B/D valves shut • Shuts the Main Steam Upstream Drain valves • Dispatches a plant operator to observe locally from the Aux. Bldg. Roof the S/G Safeties are shut • Verifies 12 SG is isolated • Maintains the unaffected SG within 25°F of the affected SG • Notes ADVs do not operate from the Control Room • Informs SRO • Directs ABO to open 11 ADV locally • Maintains RCS temperature after B/D		
	RO	• Verifies boration in progress • Evaluates the need for HPSI throttling/termination • Throttles SI flow to maintain PZR level • Maintains RCS subcooling between 30 an 140°F • Maintains PZR level between 141" and 190"		
		When 12 SG is isolated and RCS pressure and inventory are being controlled per PIC-4, then the scenario can be terminated. Note: The ERPIP classification for this event is an ALERT based on BA1 for Loss of RCS barrier or OA1 for EOP-8 implementation.		

SCENARIO #2 SETUP

OVERVIEW/OBJECTIVES

To evaluate the applicant's ability to conduct a unit power increase, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including failure of 11 CCW Pp, PZR spray valve 100E failing open, an RCP seal and the ADV controller. After the ADV controller fails the remaining seals fail on the affected RCP resulting in an RCS leak. After EOP-0 is entered, the RCS leak causes a SIAS actuation. SIAS 'A' fails to actuate requiring 11 or 12 HPSI Pump to be started manually to establish HPSI flow. As EOP-0 progresses, a steam leak begins in CNMNT from 12 SG requiring EOP-8 be implemented. The ADV Controller will not operate from the Control Room, the crew will have to operate the ADVs locally.

INSTRUCTOR SCENARIO INFORMATION

____ 1. Reset to IC-13. Draft Spin #0303

____ 2. Perform switch check. Spin # Used _____

____ 3. Place simulator in CONTINUE, advance charts and clear alarm display.

____ 4. Place simulator in FREEZE.

5. Enter Malfunctions

____ a. Failure of SIAS Channels A to Actuate automatically and manually
ESFA001_01 & ESFA002_01 at time zero

b. 11 CCW Pp Trip
CCW002_01 on F1

____ c. PZR Spray Valve 100E Fails Open
RCS016 on F2

d. 11A RCP Lower Seal Failure
RCS011_01 (0-100% over 3 min) on F3

____ e. ADV Controller Fails High
MS015 (High) on F4

____ f. 11A RCP Middle Seal failure
RCS012_01 (0-100% over 2 min) on F5

g. 11A RCP Upper Seal Failure
RCS013_01 (0-100% over 2 min) on F6

h. 11A RCP Vapor Seal Failure
RCS014_01 (0-100% over 4 min) on F7

SCENARIO #2 SETUP

i. RCS Leak
RCS003 (5 to 50 GPM over 3 minutes) on F8

___ j. Steam Break in CNMNT
MS010_02 (0-25% over 3 min) on F9

____ 6. Enter Panel Overrides

a. 1C09 – Annunciators (2) for 13 HPSI Pp tagout- OFF.

b. 1C13 – Annunciators (2) for 13 CCW Pp tagout - OFF.

c. 1C03 – ADV in Manual and Setpoint to Zero. **(Insert in EOP-0 per setup instructions)**

____ 7. Enter Remote Functions / Administrative

a. Caution tag 13 CCW Pump.

b. Caution tag 13 HPSI Pump.

c. Place 12 4KV Bus on the Alternate Feed, and a 'pinky' on the handswitch.

d. Remote Functions to rackout 13 HPSI Pp.

e. Remote Functions to rackout 13 CCW Pp.

____ 8. Set simulator time to real time, then place simulator in CONTINUE.

____ 9. Give crew briefing.

a.	Present plant conditions:	100% power - MOC/10,885 MWD/MTU. Unit 2 is in Mode 5. RCS Boron - 897 PPM.
b.	Power history:	100% for previous 68 days.
c.	Equipment out of service:	13 CCW Pump out of service due to a broken shaft. Estimated return to service is tomorrow-noon. 13 HPSI Pp motor bearing failure during STP two (2) days ago. It is nearly reassembled, expected to be returned to service in 3 hours. T.S. 3.5.2 Action Statement entered 49 hours ago.
d.	Abnormal conditions:	12A Travelling Screen – flow switch is jumpered-will be worked tomorrow. 12 4KV Bus is on the alternate feed, 152-1209 – the normal feed, 152-1201, has a loudly buzzing relay, electricians will be investigating later this shift.

e. Surveillances due: STP-029 (CEA Movement Test) due by end of shift. SM will discuss with CRS shortly after turnover.

f. Instructions for shift: Maintain 100% power.

____ 10. Allow crew 3-5 minutes to acclimate themselves with their positions.

____ 11. Instructions for the Booth Operator.

a. Activate malfunctions **F1-F5** (CCW Pp trip, spray valve failure, lower seal failure, ADV failure, middle seal failure) when each is cued by the lead evaluator.

b. After **F-2** is activated, when the spray valve selector switch is taken to the **100F position by the RO, delete** the malfunction.

c. Activate the next malfunction **F6** (upper seal failure) after about a 5% power move and with the Lead Examiner's concurrence, then activate **F7 and F8** (vapor seal failure, RCS leakage).

d. When the SRO begins the EOP-0 mid-brief activate **F9** (steamline break).

e. When the crew exits EOP-0, **panel override** the ADV controller manual setpoint to Zero.

SCENARIO #2 SETUP

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1.	OWC coordinate investigation of failure of 11 CCW Pump.	Acknowledge request. After 5 minutes the electricians report the breaker is tripped on over current.
2.	OWC/I&C investigate failure of the PRZR spray valve 100E.	Acknowledge request.
3.	OWC/System Engineer contacted regarding 11A RCP lower seal failure.	Acknowledge request.
4.	OWC/E&C investigate failure of the ADV Controller in Auto.	Acknowledge request.
5.	OWC/System Engineer contacted regarding 11A RCP regarding middle seal failure and GS-NPO and ESO of expeditious power reduction	Acknowledge request.
6.	TBO transfer control of 12 ADV to 1C43 with zero percent output.	After three minutes report 12 ADV control has been transferred to 1C43.
7.	Directs ABO to manually open 11 ADV or TBO to operate from 1C43.	After three minutes operate as directed.

SCENARIO #2 SETUP

SHIFT TURNOVER

I.	Present Plant Conditions	100%
II.	Burnup:	10885 MWD/MTU (MOC)
III.	Power History	100% for previous 68 days.
IV.	Equipment out of Service:	13 CCW Pump out of service due to a broken shaft. Estimated return to service is tomorrow-noon. 13 HPSI Pp motor bearing failure during STP two (2) days ago. It is nearly reassembled, expected to be returned to service in 3 hours. T.S. 3.5.2 Action Statement entered 49 hours ago.
V.	Abnormal Conditions:	12A Travelling Screen – flow switch is jumpered-will be worked tomorrow. 12 4KV Bus is on the alternate feed, 152-1209 – the normal feed, 152-1201, has a loudly buzzing relay, electricians will be investigating later this shift.
VI.	Surveillances Due:	STP-029 (CEA Movement Test) due by end of shift. SM will discuss with CRS shortly after turnover.
VII.	Instructions for Shift	Maintain 100% power.
VIII.	U2 Status and Major Equipment OOS:	Mode 5 – no CW Pps and 23AFW Pp is OOS.

SCENARIO #2 SETUP

Critical Task Justification

CT 1 – Verification/Establishing SI flow

This task is critical Per ES-Appendix D because the SIAS actuation failure with 13 HPSI Pp already tagged out is a significant degradation of an ECCS system. It is cued by RCS pressure reaching the SIAS actuation setpoint. It is measurable by the operator initiating SIAS flow by manually actuating SIAS 'A' and then by manually starting either 11 or 12 HPSI Pp and opening the HPSI header isolation valves. The operator can determine successful completion by using 11 or 12 HPSI pump, flow and valve indications.

CT-2 – Isolation of a faulted SG

This task is critical Per ES-Appendix D because isolating a faulted, hot dry SG is isolates a potentially degraded fission product barrier. This isolation is cued by indications of a faulted SG and the actions of the appropriate Optimal EOP. This is measurable by plant indications of the valves which isolate the affected SG. The operator can determine successful performance of these steps by observing the valve position indications for the SG isolation valves listed in the EOP.

U-1 Reactor Operator Shift Briefing Sheet

Date: Today

Reactor Power:	*Level:*	100%
	RCS Boron:	897 PPM
	Burnup:	10885
	History:	At 100% for 68 days

ASI	*Value:*	0.011 (middle of the core)
	Trend:	Steady

Xenon:	*Trend:*	2.38 Equilibrium

Reactivity Thumbrules: ***(Good until 11200 MWD/MTU)***	*Tcold:*	1.4°F
	Dilution:	164 gal
	Boration:	*BAST:* 14.1 gal or 2.5 ppm
		RWT: 103.9 gal/% @ 2500ppm
	CEA's:	7.5"/%
	Neutral Blend:	3/30
	Last Add:	8 & 100 @ 0618
	Recent CEA movements:	ARO on Grp 5 @ 6 days ago
Ion Exchanger Status:	*Purification:*	12
	Delithiation:	11

SCENARIO #2 SETUP

SHIFT TURNOVER INFORMATION SHEET

For Training Only

DATE: Today **ON-COMING SHIFT: DAY**

UNIT STATUS

PARAMETER	UNIT 1	UNIT 2
MODE:	1	5
% POWER:	100	0
RCS TEMPERATURE:	547.5	108
RCS PRESSURE:	2250	atmos
RCS BORON	897	2538
MWe NET:	860	0
GROSS RCS LEAKAGE:	0.08	N/A
BULK POWER NOTIFICATION	Normal	

NON-ROUTINE SURVEILLANCE REQUIREMENTS [B0125]

List non-routine, conditional, & mode dependent surveillances (e.g. chemistry samples, operability verifications, ETP's, < 7 day STP's)

UNIT	SURVEILLANCE

EVOLUTIONS IN PROGRESS

SURVEILLANCE TESTS

UNIT 1		UNIT 2	
DATE	STP	DATE	STP

TBD

Shift Manager

Maintain 100% power.

SCENARIO #2 SETUP

SHIFT TURNOVER INFORMATION SHEET

EQUIPMENT AVAILABILITY (continued)		
ELECTRICAL SYSTEM	UNIT 1	UNIT 2
500KV High Lines	☒5051 ☒5072	☒5052
500KV Buses	☒BLACK	☒RED
13KV Supplies	☒P-13000-1	☒P-13000-2
SMECO Bkr Status	☒252-2301 ☐0SH301	☒ 0SH302
Site Self Power Feeders	☒252-1106	☒252-2106
13KV Buses	☒11 ☒12 ☒23	☒21 ☒22
Voltage Regulators	Auto 1102 Auto 2102 Auto 1101	Auto 1103 Auto 2103 Auto 2101
4KV Transformers	☒U-4000-11 ☒U-4000-21 ☒U-4000-13	☒U-4000-12 ☒U-4000-22 ☒U-4000-23
4KV Buses	☒11 ☒12 ☒13 ☒14	☒21 ☒22 ☒23 ☒24
Diesel Generators	☐1A ☐1B ☐0C	☐2A ☐2B ☐0C
480V Buses	☒11A ☒11B ☒14A ☒ 14B	☒21A ☒21B ☒24A ☒ 24B
125VDC Battery Chargers	☒11 ☒23 ☒12 ☒ 24	☒14 ☒22 ☒13 ☒ 21
125VDC Buses	☒11 ☒12	☒22 ☒21
120VAC Vital Buses	☒11 ☒21 ☒13 ☒ 23	☒14 ☒24 ☒12 ☒ 22

SPENT FUEL EQUIPMENT CHECKOUTS:		
SFHM PE O-81-1-0-O	New Fuel Elevator OI-25B App A	SF Insp Elevator OI-25B App B

OOS SR EQUIPMENT		OOS NSR EQUIPMENT	
UNIT 1 & COMMON	UNIT 2	UNIT 1 & COMMON	UNIT 2
13 HPSI Pp		12 4KV Bus Normal Feed, 152-1201	
13 CCW Pp		12A Travelling Screen flow switch	

SCENARIO #2 SETUP

SHIFT TURNOVER INFORMATION SHEET

GENERAL INFORMATION

UNIT 1 AND COMMON

SW PARAMETERS:

Latest STP-0-73A yesterday (11PP, 12PP & 13 PP) Required to perform dewatering operations in OI-29
Max Header Pressure PE 1-12-21-O-W

11 Header	11 PP	13 PP
11 ECCS Clr	897	897
11 CCW HX	6624	6464

12 Header	12 PP	13 PP
12 ECCS	871	-
12 CCW HX	6779	-

Last week	11 Hdr / 11 PP	34 psig
Last week	12 Hdr / 12 PP	35 psig
Yesterday	11 Hdr / 13 PP	34.5 psig
Yesterday	12 Hdr / 13 PP	33 psig

LONG TERM NOTES:

1. Temp Alt 1-02-0065 removed Aux alarm X28 (12B CBO Temp Hi), failed RTD. Computer point T184 is accurate for monitoring 12B CBO temperature. Do not remove T184 from the Selected Computer point group until T/A 1-02-065 is removed.
2. The following ABB breakers may not operate after being closed. Ensure an Operator is stationed locally to open the breaker if it shuts, but does not indicate fully closed (breaker may not trip remotely or automatically, and the associated DG may be OOS). Hi side fdrs U-440-11A (1114), 11B (1102), 14A (1402), 14B (1413). **Pink** Tags on the brkr handswitches.
3. RECO accepted by Ops for Charging Pumps stating Suction Stabilizers do not impact operability. **Discharge Desurgers now impact operability if desurger pressure is below 500 psig**. RECO at CRS desk, RPA submitted for Pes 1/2-041-04-O-M.
4. When stroking 1-SW-5153-CV, have Mechanical Maintenance and Engineering present to locally monitor the valve for sticking, binding or sluggish performance. Report the results to the System Manager.
5. Do not perform any evolution that would cause the migration of Silica from the SFP to SDC, SITs, or RWTs.
6. Place 14 B/U Heater bank in Off prior to performing the plant calorimetric. Non-conservative for calc if you use 300 KW.
7. Log completion of Quarterly PEs and above (e.g., Semi-annual, Annual, etc.) in the CRO Narrative Log to assist tracking.

SHORT TERM NOTES:

1. When it is necessary to divert 2 times in a 24-hour period, the CMF for 1-CVC-325 should be re-evaluated due to ALARA concerns.
2. Fill the SFP from the Unit 1 RWT when required.
3. Per Chemistry request maintain U-1 VCT pressure < 29# when makeup to VCT.
4. Next time we discharge the MWMT Sal Raspa needs to be contacted to perform PMT for MO#0200301363.
5. When updating Webster, you need to update MOPU if the activity has a MO and Ops is the lead RMG. Leave a VM with MOPU x7500 to take the MO to 'W9' Status. Ops STPs are being assigned Mos to allow Ops resource loading.
6. Need to order at least one pallet of boric acid.
7. 12A Travelling Screen – flow switch is jumpered-will be worked tomorrow.
8. 12 4KV Bus is on the alternate feed, 152-1209 – the normal feed, 152-1201, has a loudly buzzing relay, electricians will be investigating later this shift
9. 13 HPSI Pp motor bearing failure during STP two (2) days ago. It is nearly reassembled, expected to be returned to service in 3 hours. T.S. 3.5.2 Action Statement entered 49 hours ago.
10. 13 CCW Pump out of service due to a broken shaft. Estimated return to service is tomorrow-noon.

OPERATOR WORKAROUNDS / COMP ACTIONS — Nucleis – BWOR104

EQUIPMENT	COMP ACTION / DEFICIENCY	FREQ	WATCH	DATE	IR/MO#	PRI

Simulation Facility	Calvert Cliffs	Scenario No.: 3 (Spare)	Op Test No.:	1
Examiners:	_____	Operators:	_____	SRO
	_____		_____	RO
	_____		_____	CRO

Objectives: To evaluate the applicant's ability to conduct a unit power increase, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including a failure of the SRW Controller for the Main Generator H2 Cooler, a failure of a letdown backpressure regulator valve and a PZR pressure control channel and selector switch, then a loss of 14 4KV Bus occurs. The crew will shift charging suction back to the VCT, stabilize the unit and implement AOP-7I. Next, a loss of offsite power occurs and the Main Turbine does not Trip. The crew should determine a reactor trip is required, trip the unit and implement EOP-0. The 1A DG does not start and the 0C DG Tie Bus is faulted resulting in a Station Blackout. The crew will implement EOP-7. As actions for EOP-7 are being performed, 11 AFW Pp will trip. The crew will be able to restore AFW using 12 AFW Pump allowing them to remain in the optimal procedure.

Initial Conditions: The plant is at 75% Power, MOC (IC-18)

13 SRW Pp is OOS

12 Charging Pp is OOS

12 4KV Bus is on the Alternate Feeder

Turnover: Present plant conditions: 75% power, MOC; Unit 2 is in MODE 5 – no CW Pps and 23 AFW Pp unavailable.

Power history: 100% power for previous 190 days. Then reduced to ≈68% 3 days ago for 12 SGFP repairs.

Equipment out of service:

1) 13 SRW Pp has a broken shaft, expected repair tomorrow-noon.

2) 12 Charging Pp is OOS due to severe packing leakage. The packing is being replaced. Expected to be ready for PMT in about 4 hours.

3) 12 4KV Bus is on Alternate Feeder, 152-1209 – the Normal Feeder, 152-1201, has a loudly buzzing relay, electricians will be investigating later this shift.

Surveillances due: None.

Instructions for shift:

1) Unit 1 had been at ≈68% power the previous 3 days to repair a steam leak on 12 SGFP. Both SGFPs are operating in parallel. Continue raising power to 100% per OP-3. Raise power as soon as possible, ESO says needed for grid stability, maximum emergency generation.

2) Perform PMT on 12 Charging Pump when returned to service.

Event No.	Malf. No.	Event Type*		Event Description
Preload	DG0C004 DG002_02 RF-rackout TG002 RF-rackout RF- 13 CH. Pp to 14 bus PNL OVR			0C DG tie bus faulted. 1A DG start failure. 13 SRW Pp OOS Turbine fails to trip. 12 Chg Pp OOS Pressurizer Press Controller Selector Switch in channel X.
1	N/A	R N	RO CRO	After the crew takes the watch, the CRS should brief the crew on the power increase to 100% per OP-3 and that the ESO needs the power as quickly as possible. After the brief the RO and CRO coordinate to raise power while maintaining plant parameters within acceptable limits and Tc on program.
2	TG030_01 (closed)	I	CRO	After power has been raised at least 5%, the SRW controller for the Main Generator H_2 cooler fails the valve shut. When the high temperature alarm is received, the CRO acknowledges the alarm, informs the CRS and refers to the ARM. The CRO should determine TIC-1608 has failed low causing the CV to go shut, take manual control and restore H_2 temperature. The OWC is contacted for assistance.
3	CVCS004_02	C	RO	Next, Letdown backpressure valve 1-CVC-201Q fails shut. The RO acknowledges the alarm, informs the CRS and refers to the ARM. The CRS should direct the RO to shift to 1-CVC-201P and restore letdown flow. The OWC is contacted for support.
4	RCS023_01 (high)	I	RO	Next, PRZR Press Channel 100X fails high. The RO acknowledges the alarms, informs the CRS and refers to the ARM. The RO should note the lowering RCS pressure and the open spray valves. Pressure control should be shifted to channel Y and the spray valves verified shut. The RO notes the spray valves did not shut. The CRS should direct the spray controller be taken to manual and the spray valves closed. The CRS contacts the OWC for assistance.
5	4KV001_04	C	CRO	After the RCS is stabilized, 14 4KV Bus is lost. The crew should stop any power increase, diagnose the bus loss, shift Charging Pump suction back to the VCT and stabilize the unit. The CRS implements AOP-7I. The CRO will perform APO-7I actions as directed by the CRS. The OWC is contacted for support.
6	SWYD002	M	ALL	About 5 minutes after the bus loss, a loss of offsite power occurs. 1A DG does not start and 14 4KV bus is locked out. The Main Turbine does not trip automatically. The crew should recognize a reactor trip is required and trip the unit manually. The 0C Diesel will not energize the 0C Tie Bus due to a fault. The crew will implement EOP-0 and diagnose a station blackout exists.
7	AFW001_01	C	ALL	In EOP-7, 11 AFW Pp trips but they can restore AFW using 12 AFW Pump. 1A DG will become available and 11 4KV Bus re-energized. After the bus is re-energized the scenario can be terminated.

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

SCENARIO 3 OVERVIEW

The candidates will take the shift at ≈75% power with instructions to raise power to 100% per OP-3.

After the crew takes the watch, the CRS should brief the crew on the power increase to 100% per OP-3 and that the ESO needs the power as quickly as possible. After the brief the RO and CRO coordinate to raise power while maintaining plant parameters within acceptable limits and Tc on program.

After power has been raised at least 5%, the SRW controller for the Main Generator H2 cooler fails the SRW valve closed. When the generator H_2 high temperature alarm is received, the CRO should acknowledge the alarm, inform the CRS and refer to the ARM. The CRO should determine TIC-1608 has failed low causing the CV to go shut, take manual control and restore H_2 temperature. The OWC should be contacted for assistance.

Next, Letdown backpressure valve 1-CVC-201Q fails shut. The RO acknowledges the alarm, informs the CRS and refers to the ARM. The CRS should direct the RO to shift to 1-CVC-201P and restore letdown flow. The OWC is contacted for support.

Next, PRZR Press Channel 100X fails high. The RO acknowledges the alarms, informs the CRS and refers to the ARM. The RO should note the lowering RCS pressure and the open spray valves. Pressure control should be shifted to channel Y and the spray valves verified shut. The RO notes the spray valves did not shut. The CRS should direct the spray controller be taken to manual and the spray valves closed. The CRS contacts the OWC for assistance.

After the RCS is stabilized, 14 4KV Bus is lost. The crew should stop any power increase, diagnose the bus loss, shift Charging Pump suction back to the VCT and stabilize the unit. The CRS implements AOP-7I. The CRO will perform APO-7I actions as directed by the CRS. The OWC is contacted for support.

About 5 minutes after the bus loss, a loss of offsite power occurs. 1A DG does not start and 14 4KV Bus is locked out. The 0C Diesel will not energize the 0C Tie Bus due to a fault. The Main Turbine will not trip automatically. The crew should recognize a reactor trip is required and trip the unit manually. The crew will implement EOP-0 and diagnose a station blackout exists.

In EOP-7 11 AFW Pp will trip but they can restore AFW using 12 AFW Pump. 1A DG will become available and the 11 4KV Bus energized. After the bus is energized the scenario can be terminated.

Scenario No:	3	Event No.	1	Page 4 of 12
Event Description:	**Power increase to 100%**			

Time	Position	Applicant's Actions or Behavior
	CUE	Turnover directs the crew to raise power to 100% ESO calls and asks power be raised as quickly as possible to aid in grid stability, also a maximum emergency generation day.
	SRO	• Performs brief of power escalation per OP-3 • Notifies the System Operator power is being raised to 100% • Directs crew to begin a power escalation per OP-3 • Verifies boration flow paths for going >80% power
	RO	• Withdraws CEAs • Commences dilution • Monitors reactor power, RCS temperatures during power increase • Requests Peer checks for reactivity manipulations
	CRO	• Raises turbine load to maintain Tc within 2°F of program • Monitors feedstation to verify S/G levels are being maintained approximately 0 inches
	SRO	• Coordinates power escalation between RO and CRO

Scenario No:	3	Event No.	2	Page 5 of 12
Event Description:	**SRW Controller to Main Generator H2 Cooler Fails shut**			
Time	Position	Applicant's Actions or Behavior		
	CUE:	Annunciator alarms 1C02 – B21 – GEN MON STATUS PANEL		
	CRO	• Acknowledges alarm, identifies and reports alarm is due to high generator H2 temperature • Refers to the ARM • Determines 1-TIC-1608 has failed		

	SRO	• Acknowledges report and directs CRO to:
		  • Shift 1-TIC-1608 to manual
		  • Restore H2 temperature
		  • Dispatches TBO to check out the TCV locally		

	CRO	• Perform actions as directed by SRO		
	SRO	• Contacts OWC/I&C to investigate failure of 1-TIC-1608		

Scenario No:	3	Event No.	3	Page 6 of 12
Event Description:	**Letdown Backpressure Valve 1-CVC-201Q Fails shut**			
Time	Position	Applicant's Actions or Behavior		
	CUE	Annunciator F-09 - L/D PRESS F-17 - RAD MON FLOW LO		
	RO	• Acknowledges alarm, notes lowering letdown flow, informs CRS • Refers to the ARM • Determines backpressure valve cvc-201Q has failed shut		

	SRO	• Acknowledges report and directs RO to:
		  • Isolate letdown
		  • Maintain PZR level less than 225"
		  • Shift to CVC-201P
		  • Reestablish letdown flow		

	RO	• Shifts to CVC-201P
		  • Directs ABO to open 1-CVC-108, CVC-201P inlet isolation valve
		  • Directs ABO to shut 1-CVC-110. CVC-201Q inlet isolation valve
		• Reestablishes letdown flow per OI-2A, Section 6.7		

	SRO	• Directs OWC to investigate the failure of 1-CVC-201P		

Scenario No:	3	Event No.	4	Page 7 of 12
Event Description:	**PZR Press. Control Channel 100X Fails High**			
Time	Position	Applicant's Actions or Behavior		
	CUE:	Annunciator alarm 1C06 - E-29 PZR CH 100 PRESS Both PZR Spray valves come full open Lowering RCS pressure		
	RO	• Acknowledges alarm, identifies and reports PT-100X has failed high • Refers to the ARM • Notes both PZR spray valves are open		

	SRO	• Acknowledges report and directs RO to:
		  • Shift PZR pressure control to channel Y
		  • Verify the PZR spray valves go closed
		  • Restore RCS pressure to normal		

	RO	• Perform actions as directed by SRO • Notes the spray valves failed to go closed, RCS pressure is continuing to lower and informs the SRO • Informs SRO in T.S. action for DNB if RCS pressure goes less than 2200 psia		
	SRO	• Directs RO to take 1-HIC-100 to manual and close the spray valves		
	RO	• Takes HIC 100 to manual and demand to minimum • Verifies Spray Valves go closed and RCS pressure restoring to normal • Informs SRO		
	SRO	• Contacts OWC/I&C to investigate failure of 1-PT-100X and failure of spray valves to close		

Scenario No:	3	Event No.	5	Page 8 of 12
Event Description:	**Loss of 14 4KV Bus**			

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator alarm – Numerous Loss of CEA position indication Loss of various control board indications 1-CVC-504-MOV RWT CHG PP SUCT valve open light lit 1-CVC-501-MOV VCT OUT valve closed light lit
	CREW	• Determines a loss of power has occurred and a reactor trip is not required • Directs the RO to monitor the primary • Diagnoses the power loss to be loss of 14 4KV Bus and that the bus is locked out due to a fault

	SRO	• Directs the RO to place at least one of the 2 available Charging Pps in Pull-To-Lock and shift Charging Pp suction back to the VCT
		• Directs the CRO to reduce turbine load as necessary to maintain Tc on program
		• Directs CRO to monitor Main Generator temperatures
		• Implements AOP-7I, <u>LOSS OF 4KV, 480 VOLT OR 208/120 VOLT INSTRUMENT BUS POWER</u>
		• Reviews preliminary section and transitions to Section XXIII, 14 4KV Bus
		  • Directs RO to maintain PZR level within 15 inches of program not to exceed 225 inches
		  • Directs CRO to have plant operator tie 1Y10 to 1Y09

	RO/CRO	• Perform actions directed by the SRO
	SRO	• Directs 13 Chg. Pp, 13 SRW Pp and 13 SW Pp be aligned to 11 4KV Bus (13 Chg. Pp is normally aligned to 11 bus) • Directs monitoring of CNMNT temperatures • Directs 1B DG be shutdown and starting air isolated
	SRO	• When power supplies have been realigned, directs starting of 13 SW and SRW Pps to restore SW and SRW flow to 11 headers • Directs restoration of various plant loads • Directs 1B DG be shutdown by locally tripping the fuel racks
	RO/CRO	• Perform actions directed by the SRO

	SRO	• After 1Y10 is reenergized:
		  • Directs RO to restore charging and letdown per OI-2A, <u>Chemical and Volume Control System</u>
		  • Directs RO to return VCT Outlet and RWT Outlet valves to auto

	RO/CRO	• Perform actions directed by SRO
	SRO	• Reviews T.S. for loss of Bus (3.8.1 and 3.8.9). Note - this is not required prior to proceeding to the next event
	SRO	• Contact OWC or electricians to investigate Loss of 14 4KV Bus

Scenario No:	3	Event No.	6	Page 9 of 12
Event Description:	**Loss of Offsite Power/EOP-0**			
Time	Position	Applicant's Actions or Behavior		
	CUE:	Various annunciators associated with loss of offsite power/reactor trip.		
	SRO	• Directs Unit 1 Reactor Trip and directs operators to implement EOP-0.		

	RO	Perform Post-Trip Immediate Actions:
		
		• Depresses ONE set of Manual RX TRIP buttons
		• Checks reactor tripped
		  • Prompt drop in NI power
		  • Negative SUR
		
		• Checks ALL CEAs fully inserted (not able to verify due to loss of power effects)
		
		• Verifies demin water makeup to RCS is secured
		  • 11 & 12 RCMU pumps secured
		  • VCT M/U valve 1-CVC-512-CV is shut
		  • If RCS M/U is in DIRECT LINEUP, RWT CHG PP SUCT valve 1-CVC-504-MOV is shut (1-CVC-501-MOV must be opened first)
		
		Informs SRO Reactivity Safety Function is complete. (may report not met due to inability to assess due to loss of power)		

	CRO	• Checks reactor has tripped
		
		• Ensures Turbine has tripped:
		  • Notes the Main Turbine has failed to trip, Depresses Turbine TRIP button and informs the SRO
		  • Checks the Turbine MAIN STOP VALVES shut (may not be able to assess due to power loss).
		  • Checks Turbine SPEED drops. (may not be able to assess due to power loss)
		  • Verifies turbine generator output breakers open:
		
		  • 11 GEN BUS BKR, 0-CS-552-22
		  • 11 GEN TIE BKR, 0-CS-552-23
		
		  • Verifies 11 GEN and EXCITER FIELD BKRs 1-CS-41 and 1-CS-41E are open
		  • Ensures both MSR 2nd STG STM SOURCE MOVs are shut:
		  • 1-MS-4025-MOV (11MSR)
		  • 1-MS-4026-MOV (12 MSR)
		
		Informs SRO the Turbine is Tripped (may report unable to assess).		

Scenario No:	3	Event No.	6	Page 10 of 12
Event Description:	Loss of Offsite Power/EOP-0			

Time	Position	Applicant's Actions or Behavior

	CRO	• Notes 11 and 14 4KV Vital Buses deenergized
		  • Starts the 0C DG
		  • Verifies 1A DG running,
		  • Notes 1A DG is not running,
		  • Attempts to start the 1A DG
		  • Since 1A DG did not start, dispatches OSO to 1A DG
		  • Dispatches TBO to close 0C DG 11 4KV Bus disconnect, 189-1106
		
		• Checks 125 VDC and 120 VAC busses energized
		• Determines 1Y09 and 1Y10 are deenergized
		
		Informs SRO Vital Auxiliaries cannot be met due to no vital 4KV Buses and no 120 Volt instrument buses and the 1A DG did not start

	RO	• Ensures PZR pressure stabilizes between 1850 psia and 2300 psia and is trending to 2250 psia • Determines PZR level is not stabilizing between 80 and 180 inches or trending to 160 inches • Ensures RCS subcooling GREATER THAN 30°F Informs SRO RCS Pressure and Inventory Safety Function can NOT be met due to low PZR pressure and PZR level

	CRO	• Verifies Turbine Bypass Valves or ADVs operating to maintain: (only ADVs are available locally)
		
		  • SG pressures between 850 and 920 psia
		  • Tcold between 525° and 535°F
		  • Directs ABO to locally open ADVs several turns
		
		• Checks at least one SG available for controlled heat removal
		
		  • SG level between -170 and +30 inches
		  • Initiates Aux Feedwater to maintain S/G level
		
		Informs SRO Core and RCS Heat Removal Safety Function cannot be met due to no RCPs

	SRO	• Directs PWS/PPO/OSO investigate start failure of 1A DG and to attempt to return to service

Scenario No:	3	Event No.	6	Page 11 of 12
Event Description:	Loss of Offsite Power/EOP-0			
Time	Position	Applicant's Actions or Behavior		

	CREW	• Checks Containment pressure less than 0.7 psig
		• Checks Containment temperature less than 120°F
		• Checks containment radiation monitor alarms CLEAR with NO unexplained trends
		• Checks RMS alarms CLEAR with NO unexplained trends:
		  • 1-RIC-5415 U-1 wide range noble gas
		  • 1-RI-1752 Condenser Offgas
		  • 1-RI-4014 Unit 1 SG Blowdown
		  • 1-RI-5415 Unit 1 Main Vent Gaseous
		Informs SRO CNMNT environment cannot be met and Rad Levels External to CNMNT can not be met due loss of power (unable to assess)		

	SRO	• Conducts EOP-0 mid-brief and directs operators to reverify Safety Functions		

	CRO	• When the TBO has reported closing disconnect 189-1106:
		  • CRO attempts to close 07 4KV Bus Tie Bkr, 152-0701
		  • Notes 152-0701 immediately trips open
		  • Informs SRO		

	SRO	• Determines Recovery Procedure per Diagnostic Flowchart: • All Safety Functions met - NO • Single Event Diagnosis – YES- EOP-7 • Directs transition to EOP-7		

Scenario No:	3	Event No.	7	Page 12 of 12
Event Description:	EOP-7, Station Blackout/Loss of AFW Pump			

Time	Position	Applicant's Actions or Behavior
	SRO	• Briefs crew prior to EOP-7 implementation • Directs actions per EOP-7
	SRO	• Contacts System Operator to determine status of offsite power • Contacts OWC for support in DG restoration

	CRO	• Protects the condenser from overpressure and minimizes S/G inventory loss
		  • Shuts both MSIVs
		  • Isolates S/G B/D

	RO	• Minimizes RCS inventory loss
		  • Isolates letdown (already isolated)
		  • Maintains RCP bleedoff flowpath
		  • Shuts RCS sample valve
		  • Verifies RX and PZR vent valves are shut

	RO	• Establishes RCS heat Sink
		  • Operates ADVs locally to control RCS temp. between 525° and 535°F
		  • Ensures AFW flow established
		  • Secures Main Feed System

	CRO	• Aligns electrical system for power restoration
		  • Aligns 13KV and 4KV breakers
		  • Places 4KV Bus LOCI Sequencer keyswitches to ON
		  • Shuts CC CNMNT supply valve

	RO	• Verifies turbine and SGFP emergency oil pumps running
	CREW	• Notes failure of 11 AFW Pp • Informs SRO
	SRO	• Directs TBO to align 12 AFW • May implement EOP-8 although this is not expected or required
	RO	• Monitors SG levels • After 12 AFW Pp is aligned, verifies AFW flow to both SGs

	CRO	• Attempts to restore power to at least one 4KV Bus
		  • When word is received 1A DG is available:
		  • Directs low oil pressure trip be reset
		  • Verifies 1A DG starts and loads on 11 4KV Bus
		  • Verifies Shutdown sequencer loads are operating
		  • Restores CCW flow

	RO	• Verifies Natural Circulation • Maintains RCS subcooling
		When AFW has been established and Power restored to 11 4KV Bus the scenario can be terminated. Note: The ERPIP call for this scenario is a SITE EMERGENCY if power is not restored within 15 minutes of the blackout. This is under category ES1.

SCENARIO #3 SETUP

OVERVIEW/OBJECTIVES

To evaluate the applicant's ability to conduct a unit power increase, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including a failure of the SRW Controller for the Main Generator H2 Cooler, a failure of a letdown backpressure regulator valve and a PZR pressure control channel and selector switch, then a loss of 14 4KV Bus occurs. The crew will shift charging suction back to the VCT, stabilize the unit and implement AOP-7I. Next, a loss of offsite power occurs and the Main Turbine does not Trip. The crew should determine a reactor trip is required, trip the unit and implement EOP-0. The 1A DG does not start and the 0C DG Tie Bus is faulted resulting in a Station Blackout. The crew will implement EOP-7. As actions for EOP-7 are being performed, 11 AFW Pp will trip. The crew will be able to restore AFW using 12 AFW Pump allowing them to remain in the optimal procedure.

INSTRUCTOR SCENARIO INFORMATION

____ 1. Reset to IC-18. Draft Spin #0303

____ 2. Perform switch check. Spin # Used _____

____ 3. Place simulator in CONTINUE, advance charts and clear alarm display.

____ 4. Place simulator in FREEZE.

____ 5. Enter Malfunctions

a. 0C DG Tie Bus Fault
DG0C004 at time zero

b. 1A DG Start Failure
DG002_02 at time zero

c. Main Turbine Fails to Trip Automatically
TG002 at time zero

d. Main Generator Hydrogen cooler SRW Control Valve Fails Shut
TG030_01 (closed) on F1

e. Letdown Backpressure Valve 1-CVC-201Q Fails Shut
CVCS004_02 on F2

f. PZR Press. Control Channel 100X Fails High
RCS023_01 on F3

g. Loss of 14 4KV Bus
4KV001_04 on F4

h. Loss of Offsite
SWYD002 on F5

i. Trip of 11 AFW Pp
AFW001_01 on F6

SCENARIO #3 SETUP

____ 6. Enter Panel Overrides

a. 1C06 – PZR Press Control Selector Switch to Channel X

b. 1C07 – Annunciators (1) for 12 Chg. Pp tagout- OFF.

c. 1C13 – Annunciators (2) for 13 SRW Pp tagout- OFF.

____ 7. Enter Remote Functions/Administrative

a. Caution tag 12 Chg. Pp

b. Caution tag 13 SRW Pp.

c. Remote Functions to rackout 13 SRW Pp.

d. Remote Functions to rackout 12 Chg. Pp.

e. Remote Function to place 13 Chg. Pp on 14 bus

f. Place 12 4KV Bus on the Alternate Feeder

____ 8. Set simulator time to real time, then place simulator in CONTINUE.

____ 9.Give crew briefing.

a.	Present plant conditions:	75% power - MOC/10,885 MWD/MTU. Unit 2 is in Mode 5. RCS Boron – 952 PPM.
b.	Power history:	68% for previous 3 days due to 12 SGFP repairs, Raising power to 100% @ 30% per hour.
c.	Equipment out of service:	12 Chg. Pp out of service for packing replacement. Expected to be ready for PMT in about 4 hours. 13 SRW Pump out of service due to a broken shaft. Estimated return to service is tomorrow-noon.
d.	Abnormal conditions:	12 4KV Bus is on Alternate Feeder, 152-1209 – the Normal Feeder, 152-1201, has a loudly buzzing relay, electricians will be investigating later this shift.
e.	Surveillances due:	None.
f.	Instructions for shift:	Continue to raise power to 100% per OP-3. Perform PMT on 12 Charging Pump when returned to service.

___ 10. Allow crew 3-5 minutes to acclimate themselves with their positions.

SCENARIO #3 SETUP

____ 11. Instructions for the Booth Operator.

a. When cued by the lead examiner, as ESO , call and request power be raised as soon as possible, needed for grid stability, maximum emergency generation.

b. After power has been raised at least 5%, and with the lead examiner's concurrence activate **F1** (H2 Cooler SRW flow controller).

c. Activate the malfunctions **F2-F4** (letdown 201Q failure, PZR press channel 100X failure, loss of 14 4KV Bus) when cued by the lead examiner.

d. About 7 minutes after F4 and after 1Y10 is reenergized, with lead examiner's concurrence, activate **F5** (loss of offsite).

e. Several minutes after the crew enters EOP-7 activate **F6** (loss of 11 AFW Pp).

SCENARIO #3 SETUP

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1.	OWC investigate failure Main Generator H_2 SRW Controller, TIC-1608.	Acknowledge request.
2.	ABO open 1CVC-210P inlet valve 1-CVC-108.	After 2 minutes open and report open 1-CVC-108.
3.	ABO shut 1CVC-210Q inlet valve 1-CVC-110.	After 2 minutes shut and report shut 1-CVC-110.
4.	OWC investigate failure Letdown backpressure valve 1-CVC-201Q.	Acknowledge request.
5.	OWC investigate failure of PZR Pressure control channel 100X (may also request investigate selector switch.	Acknowledge request.
6.	TBO align 13 SRW pump to 11 4KV Bus.	After three minutes realign and report.
7.	OSO trip the 1B DG locally.	After three minutes trip and report.
8.	TBO align 13 Charging pump to 11 bus.	After three minutes realign and report.
9.	OWC/electricians contacted for support for loss of 14 4KV Bus.	Acknowledge request. After ten minutes, report 14 4KV Bus lost due to ground fault and will require further investigation
10.	OWC/PPO tie 1Y09 and 1Y10, 1Y09 supplying.	Acknowledge request. After 3 minutes tie 1Y10 to 1Y09 and report.
11.	Verify MS source valves 1-MS-2025 and 26 shut.	After four minutes close and report.
12.	System Operator contacted regarding power availability.	Acknowledge request. Report a major disturbance on the grid, no estimate of time for power restoration.
13.	PPO get keys and close 0C DG disconnect 189-1106.	Acknowledge request and after 5 minutes close and report.
14.	SMECO report on the availability of SMECO power.	Report not available at this time, no estimate of time for restoration.

SCENARIO #3 SETUP

RESPONSES TO CREW REQUEST (CON'T)

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
15.	OSO/PWS investigate start failure of 1A DG.	Acknowledge request. When the crew enters EOP-7, report 1A DG shut down on low lube oil pressure. No oil leaks present, think pressure switch may be faulty. Several minutes later report the pressure switch is isolated.
16.	OWC/electricians investigate failure of 0C Tie Bus Bkr 152-0701 failure to close.	Acknowledge request. After 5 minutes report the breaker is tripped on overcurrent.
17.	OSO/PWS unisolate 1A DG lube oil pressure switch and start the 1A DG.	After two minutes unisolate the pressure switch and report the engine is running normally.
18.	Take local control of the ADVs.	Operate the ADVs as directed by the Control Room.
19.	Locally shut MFW isolation FW-128 and 131.	After eight minutes report they are shut.
20.	Align N_2 to AFW control valves and control FW discharge pressure locally.	Report as complete 2-3 minutes after task is requested.
21.	Tie MCC-104 to MCC-114.	After 3 minutes tie the MCCs.
22.	Shut 1-CC-284 (CCW supply to Containment manual isolation).	After 3 minutes shut the valve.
23.	TBO investigate trip of 11 AFW Pp and align 12 AFW Pp for service.	Acknowledge request. After three minutes, align 12 AFW Pp for operation.

SCENARIO #3 SETUP

SHIFT TURNOVER

I.	Present Plant Conditions	75%
II.	Burnup:	10885 MWD/MTU (MOC)
III.	Power History	68% for previous 3 days due to 12 SGFP repairs, Raising power to 100% @ 30% per hour.
IV.	Equipment out of Service:	12 Chg. Pp out of service for packing replacement. Expected to be ready for PMT in about 4 hours. 13 SRW Pump out of service due to a broken shaft. Estimated return to service is tomorrow-noon.
V.	Abnormal Conditions:	12 4KV Bus is on Alternate Feeder, 152-1209 – the Normal Feeder, 152-1201, has a loudly buzzing relay, electricians will be investigating later this shift.
VI.	Surveillances Due:	None.
VII.	Instructions for Shift	Continue power increase per OP-3. Perform PMT on 12 Charging Pump when returned to service.
VIII.	U2 Status and Major Equipment OOS:	Mode 5 – no CW Pps and 23AFW Pp is OOS.

SCENARIO #3 SETUP

Critical Task Justification

CT 1 – Establishes an RCS heat sink

This task is critical Per ES-Appendix D because establishment of an RCS heat sink is essential for providing core cooling. This action is cued by increasing RCS temperatures and lowering SG levels. This is measurable by the operator directing local control of the Atmospheric Dump Valves and to maintain temperature and ensuring AFW flow is established. The operator can determine successful completion by monitoring RCS temperatures to ensure they are maintained between 525° and 535° F and by observing AFW flow on 1C04 or SPDS.

CT-2 – Restoration of AC power

This task is critical Per ES-Appendix D because restoration of AC power is critical to long term safety and stability of the plant. Without AC power, essential plant equipment and instrumentation will be lost. This action is measurable by the reenerigzation of a 4KV bus and the associated equipment being powered up. This action is cued by the loss of power to various equipment and control room lighting and the optimal procedure for loss of all AC power (EOP-7). The operator can determine successful performance of these steps by observing power restoration to various plant equipment powered from the reenergized bus.

SCENARIO #3 SETUP

Date: Today

Reactor Power:	*Level:*	75%
	RCS Boron:	952 PPM
	Burnup:	10885
	History:	At 68% for 3 days
ASI	*Value:*	0.02 (middle of the core)
	Trend:	moving toward top
Xenon:	*Trend:*	2.08 Equilibrium
Reactivity Thumbrules: ***(Good until 11200 MWD/MTU)***	*Tcold:*	1.4°F
	Dilution:	164 gal
	Boration:	*BAST:* 14.1 gal or 2.5 ppm
		RWT: 103.9 gal/% @ 2500ppm
	CEA's:	7.5"/%
	Neutral Blend:	4/30
	Last Add:	10 & 100 @ 0618
	Recent CEA movements:	Grp 5 moved 20 minutes ago
Ion Exchanger Status:	*Purification:*	12
	Delithiation:	11

SCENARIO #3 SETUP

SHIFT TURNOVER INFORMATION SHEET

For Training Only

DATE: Today **ON-COMING SHIFT: DAY**

UNIT STATUS

PARAMETER	UNIT 1	UNIT 2
MODE:	1	5
% POWER:	75	0
RCS TEMPERATURE:	544	108
RCS PRESSURE:	2250	atmos
RCS BORON	952	2538
MWe NET:	673	0
GROSS RCS LEAKAGE:	0.08	N/A
BULK POWER NOTIFICATION	Normal	

NON-ROUTINE SURVEILLANCE REQUIREMENTS [B0125]

List non-routine, conditional, & mode dependent surveillances (e.g. chemistry samples, operability verifications, ETP's, < 7 day STP's)

UNIT	SURVEILLANCE

EVOLUTIONS IN PROGRESS

SURVEILLANCE TESTS

UNIT 1		UNIT 2	
DATE	STP	DATE	STP

TBD

Shift Manager

Maintain 100% power.

SCENARIO #3 SETUP

SHIFT TURNOVER INFORMATION SHEET

EQUIPMENT AVAILABILITY (continued)		
ELECTRICAL SYSTEM	UNIT 1	UNIT 2
500KV High Lines	☒5051 ☒5072	☒5052
500KV Buses	☒BLACK	☒RED
13KV Supplies	☒P-13000-1	☒P-13000-2
SMECO Bkr Status	☒252-2301 ☐0SH301	☒ 0SH302
Site Self Power Feeders	☒252-1106	☒252-2106
13KV Buses	☒11 ☒12 ☒23	☒21 ☒22
Voltage Regulators	Auto 1102 Auto 2102 Auto 1101	Auto 1103 Auto 2103 Auto 2101
4KV Transformers	☒U-4000-11 ☒U-4000-21 ☒U-4000-13	☒U-4000-12 ☒U-4000-22 ☒U-4000-23
4KV Buses	☒11 ☒12 ☒13 ☒14	☒21 ☒22 ☒23 ☒24
Diesel Generators	☐1A ☐1B ☐0C	☐2A ☐2B ☐0C
480V Buses	☒11A ☒11B ☒14A ☒ 14B	☒21A ☒21B ☒24A ☒ 24B
125VDC Battery Chargers	☒11 ☒23 ☒12 ☒ 24	☒14 ☒22 ☒13 ☒ 21
125VDC Buses	☒11 ☒12	☒22 ☒21
120VAC Vital Buses	☒11 ☒21 ☒13 ☒ 23	☒14 ☒24 ☒12 ☒ 22

SPENT FUEL EQUIPMENT CHECKOUTS:		
SFHM PE O-81-1-0-O	New Fuel Elevator OI-25B App A	SF Insp Elevator OI-25B App B

OOS SR EQUIPMENT		OOS NSR EQUIPMENT	
UNIT 1 & COMMON	UNIT 2	UNIT 1 & COMMON	UNIT 2
12 Chg. pp		12 4KV Bus Normal Feed, 152-1201	
13 SRW Pp			

SCENARIO #3 SETUP

SHIFT TURNOVER INFORMATION SHEET

GENERAL INFORMATION

UNIT 1 AND COMMON

SH PARAMETERS:

Latest STP-0-73A yesterday (11PP, 12PP & 13 PP) Required to perform dewatering operations in OI-29
Max Header Pressure PE 1-12-21-O-W

11 Header	11 PP	13 PP
11 ECCS Clr	897	897
11 CCW HX	6624	6464

12 Header	12 PP	13 PP
12 ECCS	871	-
12 CCW HX	6779	-

Last week	11 Hdr / 11 PP	34 psig
Last week	12 Hdr / 12 PP	35 psig
Yesterday	11 Hdr / 13 PP	34.5 psig
Yesterday	12 Hdr / 13 PP	33 psig

LONG TERM NOTES:

1. Temp Alt 1-02-0065 removed Aux alarm X28 (12B CBO Temp Hi), failed RTD. Computer point T184 is accurate for monitoring 12B CBO temperature. Do not remove T184 from the Selected Computer point group until T/A 1-02-065 is removed.
2. The following ABB breakers may not operate after being closed. Ensure an Operator is stationed locally to open the breaker if it shuts, but does not indicate fully closed (breaker may not trip remotely or automatically, and the associated DG may be OOS). Hi side fdrs U-440-11A (1114), 11B (1102), 14A (1402), 14B (1413). **Pink** Tags on the brkr handswitches.
3. RECO accepted by Ops for Charging Pumps stating Suction Stabilizers do not impact operability. **Discharge Desurgers <u>now</u> impact operability if desurger pressure is below 500 psig**. RECO at CRS desk, RPA submitted for Pes 1/2-041-04-O-M.
4. When stroking 1-SW-5153-CV, have Mechanical Maintenance and Engineering present to locally monitor the valve for sticking, binding or sluggish performance. Report the results to the System Manager.
5. Do not perform any evolution that would cause the migration of Silica from the SFP to SDC, SITs, or RWTs.
6. Place 14 B/U Heater bank in Off prior to performing the plant calorimetric. Non-conservative for calc if you use 300 KW.
7. Log completion of Quarterly PEs and above (e.g., Semi-annual, Annual, etc.) in the CRO Narrative Log to assist tracking.

SHORT TERM NOTES:

1. When it is necessary to divert 2 times in a 24-hour period, the CMF for 1-CVC-325 should be re-evaluated due to ALARA concerns.
2. Fill the SFP from the Unit 1 RWT when required.
3. Per Chemistry request maintain U-1 VCT pressure < 29# when makeup to VCT.
4. Next time we discharge the MWMT Sal Raspa needs to be contacted to perform PMT for MO#0200301363.
5. When updating Webster, you need to update MOPU if the activity has a MO and Ops is the lead RMG. Leave a VM with MOPU x7500 to take the MO to 'W9' Status. Ops STPs are being assigned Mos to allow Ops resource loading.
6. Need to order at least one pallet of boric acid.
7. 12 4KV Bus is on the alternate feed, 152-1209 – the normal feed, 152-1201, has a loudly buzzing relay, electricians will be investigating later this shift
8. 12 Chg. Pp Out of Service for repacking. Expected to be ready for PMT in about 4 hours.
9. 13 SRW Pump out of service due to a broken shaft. Estimated return to service is tomorrow-noon.

OPERATOR WORKAROUNDS / COMP ACTIONS — **Nucleis – BWOR104**

EQUIPMENT	COMP ACTION / DEFICIENCY	FREQ	WATCH	DATE	IR/MO#	PRI

Simulation Facility	Calvert Cliffs	Scenario No.: 4 (spare)	Op Test No.:	1
Examiners:	_____	Operators:	_____	SRO
	_____		_____	RO
	_____		_____	BOP

Objectives: To evaluate the applicants' ability to conduct a unit power increase, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including failure of the hotwell level controller, a TBV failing open, a PRZR ref. line failure including associated instruments and small RCS leak. As the crew is implementing AOP-2A a loss of 1Y03 occurs. The reactor is tripped and EOP-0 entered. After EOP-0 is entered, the RCS leak grows to ≈ 300 gpm. 11 BFRV will fail open causing an overfeed of 11 SG. When the SIAS setpoint is reached it will fail to actuate and will have to be actuated manually. The crew will implement EOP-5 due to the LOCA.

Initial Conditions: The plant is at ≈4% Power, MOC

12 AFW Pp is OOS

12 Main CPU is failed for 12 SG DFWCS

Turnover: Present plant conditions: ≈4% power, MOC; Unit 2 is in MODE 5.

Power history: S/D for 6 days to repair leaking RCS drain line. S/U commenced 8 hours ago, ready to continue turbine start-up after shift change.

Equipment out of service:

1) 12 AFW Pp failed to develop adequate discharge head for STP. It is disassembled, expected to be returned to service in 2 days.

2) 12 Main CPU is failed for 12 SG DFWCS. System engineer is investigating.

Surveillances due: None

Instructions for shift:

1) Continue startup per OP-2 up to step. 6.8.F.1 and OI-43A Step 6.2.B.3.

Event No.	Malf. No.	Event Type*		Event Description
Preload	AFW001_02 FW001_03 ESFA001_01 ESFA001_02			12 AFW Pp OOS. 12 Main CPU on 12 SG DFWCS OOS. SIAS fails to actuate automatically.
1	N/A	R N	RO BOP	The Crew continues the power increase to per OP-3.
2	CD002 (high)	I	CRO	After power has been raised ≈5%, the Hotwell level Cont. (4405) fails high, dumping fully to the CST. The CRO will receive the Hotwell level low alarm, will inform the CRS and refer to the ARM. The CRO should determine 4405 has failed high, take manual control and restore hotwell level. The OWC should be contacted for assistance.
3	RCS026_01 (high)	I	RO	About 3 minutes after the crew has taken manual control of hotwell level, PRZR level contr. (110X) fails high. The RO should acknowledge the alarm, inform the CRS and refer to the ARM. Level control should be shifted to channel Y and the OWC notified.
4	MS009_02	C	CRO	Next, TBV-3942 fails open. The crew should attempt to maintain power less than the trip setpoint and isolate TBV-3942. The RO will insert CEAs/borate as necessary and the CRO will shift TBVs to manual. The CRS will direct the TBO to isolate TBV-3942. The CRS will implement AOP-7K. The CRS should contact the OWC for assistance.
5	RCS024_02 (low) RCS023_01 (low) RCS002 (5-50 gpm over 5 min)	C	RO	About 2 minutes after the TBV is isolated, 100X and 102B PZR pressure channels fail low and an RCS leak begins to ramp in. The crew should refer to the ARM, select channel Y for control and bypass TM/LP and hi pressure trip units for RPS channel B. The CRS should recognize entrance into T.S. 3.3.1 and 3.3.4. The crew should also bypass SIAS, SIAS PP Block and DSS on ESFAS for 102B. The crew should recognize an RCS leak is taking place and implement AOP-2A.
6	120v003_03 RCS002 (300 gpm) Panel Override (open)	M	ALL	As the crew is implementing AOP-2A, a loss of 1Y03 will occur. If 102B has not been bypassed, a reactor trip will result. If bypassed the crew should diagnose a loss of 1Y03. The CRS should direct a reactor trip due to RCS leakage. The crew should implement EOP-0, recognize when a SIAS is necessary, that it has not occurred, and manually initiate SIAS.
7	Overfeed	M	ALL	On the reactor trip, 11 BFRV fails open causing an over feed of 11 S/G. The crew should recognize the overfeed condition, reset the BFRVs and shift to manual. The crew completes EOP-0 and implements EOP-5. AOP-7J may be implemented concurrently with the EOPs for loss of 1Y03. The crew should commence RCS cooldown and depressurization IAW EOP-5. The scenario can be terminated when cooldown and depressurization are commenced and Safety injection flow is throttled.

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

SCENARIO 1 OVERVIEW

The candidates will take the shift at ≈4% power with instructions to continue the power increase per OP-3.

The Crew begins to raise power per the OP.

After power has been raised ≈5%, the Hotwell level Cont. (4405) fails high, dumping fully to the CST. The CRO will receive the Hotwell level low alarm, will inform the CRS and refer to the ARM. The CRO should determine 4405 has failed high, take manual control and restore hotwell level. The OWC should be contacted for assistance.

About 3 minutes after the crew has taken manual control of hotwell level, PRZR level contr. (110X) fails high. The RO should acknowledge the alarm, inform the CRS and refer to the ARM. Level control should be shifted to channel Y and the OWC notified.

Next, TBV-3942 fails open. The crew should attempt to maintain power less than the trip setpoint and isolate TBV-3942. The RO will insert CEAs/borate as necessary and the CRO will shift TBVs to manual. The CRS will direct the TBO to isolate TBV-3942. The CRS will implement AOP-7K. The CRS should contact the OWC for assistance.

About 2 minutes after the TBV is isolated, 100X and 102B PZR pressure channels fail low and an RCS leak begins to ramp in. The crew should refer to the ARM, select channel Y for control and bypass TM/LP and hi pressure trip units for RPS channel B. The CRS should recognize entrance into T.S. 3.3.1 and 3.3.4. The crew should also bypass SIAS, SIAS PP Block and DSS on ESFAS for 102B. The crew should recognize an RCS leak is taking place and implement AOP-2A.

As the crew is implementing AOP-2A a loss of 1Y03 occurs. If 102B has not been bypassed a reactor trip will result. If bypassed, the crew should diagnose a loss of 1Y03. The CRS should direct a reactor trip due to the RCS leakage. The crew should implement EOP-0, recognize when a SIAS is necessary, that it has not occurred, and manually initiate SIAS.

On the reactor trip 11 BFRV fails open causing an over feed of 11 S/G. The crew should recognize the overfeed condition, reset the BFRVs and shift to manual. The crew completes EOP-0 and implements EOP-5. AOP-7J may be implemented concurrently with the EOPs for loss of 1Y03. The crew should commence RCS cooldown and depressurization IAW EOP-5. The scenario can be terminated when cooldown and depressurization are commenced and Safety injection flow is throttled.

Scenario No:	4	Event No.	1	Page 4 of 12
Event Description:	**Power increase Per OP-3**			

Time	Position	Applicant's Actions or Behavior
	CUE	Turnover directs the crew to continue startup using OP-2
	SRO	• Refers to T.S. and determines startup can continue with 12 AFW Pp OOS provided GS-NPO permission has been received • Performs brief of power escalation per OP-2 and turbine startup per OI-43A • Directs crew to continue startup per OP-2 • Directs the CRO to shift the SGFPs to main steam

	RO	• Maintains reactor power ≈ 4%:
		  • Withdraws CEAs
		  • Commences dilution
		  • Monitors reactor power, RCS temperatures during power increase
		  • Monitors ASI per computer point EC933
		• Requests Peer checks for reactivity manipulations

	CRO	• Shifts the 12 SGFP to main steam using OI-12A
		  • OI-12A – section 6.13
		  • Places 12 SGFP miniflow in MANUAL and slowly opens the miniflow and adjusts bias on 11 SGFP to maintain SG D/P and SG level constant
		  • Shifts 12 SGFP to MANUAL HIC control
		  • Slowly lowers 12 SGFP speed to 2600-2900 rpm while adjusting 11 SGFP bias to maintain FRV DP
		  • Places 12 SGFP miniflow controller in AUTO
		  • Lowers 12 SGFP speed to minimum using HIC or OCS control
		  • Shifts 12 SGFP to direct governor mode and verifies the governor valves are closed
		  • Shuts 12 SGFP Aux stm valve, 0-AHB-129
		  • Selects Main steam gain on the OCS
		  • Slowly opens 12 SGFP Main Steam, 1-MS-123
		  • Slowly opens 12 SGFP Reheat, 1-MS-124
		  • Selects HIC or OCS control and raises speed to 2600-2900 rpm
		  • Places 12 SGFP back in parallel operation
		• Lines up Gland Steam to Main Steam
		  • Opens MS to GS, 1-TGS-4659-MOV
		  • Shuts Aux. Stm to GS, 1-TGS-4678-MOV
		  • Checks press 2-6 psig on 1-PI-4664
		• Continues turbine startup per OI-43A
		• Maintains Tc within 2°F of program
		• Monitors feedstation to verify SG levels are being maintained approximately 0 inches

	SRO	• Coordinates power escalation between RO and CRO

Scenario No: 4		Event No. 2	Page 5 of 12
Event Description:		**Failure of Condenser Hotwell level controller (4405) high**	
Time	Position	Applicant's Actions or Behavior	
	CUE:	Annunciator alarms 1C03 - C-16 CNDSR HOTWELL LEVEL	
	CRO	• Acknowledges alarm, identifies and reports 1-CD-4405-CV has failed high • Refers to the ARM	

	SRO	• Acknowledges report and:
		  • Directs CRO to take 4405-CV to manual and shut the dump CV
		  • Implements AOP-3G
		  • Verifies 11 CST level and hotwell level
		  • Restore hotwell level	

	CRO	• Perform actions as directed by SRO • Dispatches TBO to check hotwell level locally	
	SRO	• Contacts OWC/I&C to investigate failure of 1-LIC-4405	

Scenario No: 4		Event No. 3	Page 6 of 12
Event Description:		**PZR Level Transmitter 1-LT-110X Fails High**	
Time	Position	Applicant's Actions or Behavior	
	CUE:	Annunciator alarms 1C06 - E-33 PZR CH X LVL All but selected Charging Pump stop	
	RO	• Acknowledges alarm, identifies and reports LT-110X has failed high • Refers to the ARM	

	SRO	• Acknowledges report and directs RO to:
		
		  • Shift PZR level control to channel Y
		  • Shift PZR heater cutout to channel Y
		  • Refers to instrument failure common tap guidance in NO-1-200	

	RO	• Perform actions as directed by SRO	
	SRO	• Refers to T.S. 3.3.10 (determines T.S. 3.0.4 is not applicable)	
	SRO	• Contacts OWC to investigate failure of 1-LT-110X.	

Scenario No: 4	Event No. 4	Page 7 of 12
Event Description:	**TBV-3942 Fails Open**	

Time	Position	Applicant's Actions or Behavior
	CUE:	Annunciator Alarm - 1C06 - F-9 - L/D PRESS alarm Increasing reactor power, lowering Tc
	CRO	• Identifies and reports TBV 3942 is open, recommends taking the controller to manual and closing

	SRO	• Identifies/acknowledges report of open TBV
		• Directs CRO to take TBV controller to manual to shut the TBV
		• Implements AOP-7K, <u>OVER COOLING EVENT IN MODE ONE OR TWO</u>
		  • Determines a reactor trip is not required
		  • Monitors reactor power:
		  • Directs RO to insert CEAs or borate to maintain reactor power to less than ≈5% (or trip setpoint, 14%)
		  • Directs CRO to reduce/adjust turbine as necessary to restore/maintain Tc on program and directs TBO to isolate TBV-3942 (MS-118)
		• If Tc decreases to <515°F, directs the reactor be tripped

	RO	• Monitors reactor power and borates or inserts CEAs if necessary to maintain power less than ≈ 5%
	CRO	• Takes TBV controller to manual and verifies all TBVs closed, reports TBV-3942 is still open • Directs TBO to isolate TBV-3942 (close MS-118) • Adjusts TBVs as necessary to maintain Tc on program
	SRO	• Contacts OMC/I&C to investigate failure of TBV-3942

Scenario No: 4		Event No. 5	Page 8 of 12
Event Description:		**PZR Press Transmitter 1-PT-100X, 102B fail low and RCS leak**	
Time	Position	Applicant's Actions or Behavior	
	CUE:	Annunciator alarms 1C06 - E-29 PZR CH 100 PRESS E- 05 TM/LP TRIP SETPOINT	
	RO	• Acknowledges alarm, identifies and reports LIC-100X and PT-102B have failed • Refers to the ARM • Reports the primary is stable	

	SRO	• Acknowledges report and directs RO to:
		  • Shift PZR press control to channel Y
		  • Ensure the spray valves are shut
		  • Investigate a possible failed instrument line
		  • Refers to NO-1-200	

	RO	• Performs actions as directed by SRO • Monitors PZR level and determines it is lowering	
	SRO	• Refers to T.S. 3.3.1 and 3.3.4 • Directs the associated trip units (6, 7) and ESFAS channels be bypassed (DSS, SIAS PP and SIAS PPB)	
	CRO	• Bypasses RPS trip units • Reports 110X, 100X and 102B all from the same instrument tap • Reports CNMNT sump alarm and checks CNMNT parameters	

	SRO	• Suspects an RCS leak and implements AOP-2A
		• Directs the RO to:
		  • Isolate letdown (shuts CVC-515, CVC-516)
		  • Perform leak isolation steps (STEP E)	

	RO	• Performs actions as directed by the SRO • Determines the leak is in not on the charging header	
	SRO	• Directs trip of the unit due to the RCS leak (May not get to this point do to loss of 1Y03)	

Scenario No: 4		Event No. 6	Page 9 of 12
Event Description:		**Loss of 1Y03**	
Time	Position	Applicant's Actions or Behavior	
	CUE:	Various Annunciators associated with loss of 120V Vital AC Bus Note: If channel B RPS trip units have not been bypassed a reactor trip will occur. (A low pressure SIAS signal will be generated but will not occur on the bus loss due to SIAS failure)	
	RO	• Acknowledges alarms, monitors the primary • Refers to the ARM	
	CRO	• Determines a trip is not required and that a loss of 1Y03 has occurred • Refers to the ARM	
	SRO	• Determines 1Y03 has been lost, prioritizes and decides to trip the reactor due to RCS leakage rather than implement AOP-7J • Briefs the crew, directs the reactor be tripped and EOP-0 implemented	

Scenario No:	4	Event No.	7	Page 10 of 12
Event Description:	**Reactor Trip with LOCA**			

Time	Position	Applicant's Actions or Behavior
	CUE:	Manual Reactor Trip initiated (or auto if trip units not bypassed)

	RO	Perform Post-Trip Immediate Actions:
		
		• Depresses ONE set of Manual RX TRIP buttons
		• Checks reactor tripped
		  • Prompt drop in NI power
		  • Negative SUR
		
		• Checks ALL CEAs fully inserted
		
		• Verifies demin water makeup to RCS is secured
		  • 11 & 12 RCMU pumps secured
		  • VCT M/U valve 1-CVC-512-CV is shut
		  • If RCS M/U is in DIRECT LINEUP, RWT CHG PP SUCT valve 1-CVC-504-MOV is shut (1-CVC-501-MOV must be opened first)
		
		Informs SRO Reactivity Safety Function is complete

	CRO	• Checks reactor has tripped
		
		• Ensures Turbine has tripped:
		  • Depresses Turbine TRIP button.
		  • Checks the Turbine MAIN STOP VALVES shut.
		  • Checks Turbine SPEED drops
		  • Verifies turbine generator output breakers open:
		
		  • 11 GEN BUS BKR, 0-CS-552-22
		  • 11 GEN TIE BKR, 0-CS-552-23
		
		  • Verifies 11 GEN and EXCITER FIELD BKRs 1-CS-41 and 1-CS-41E are open.
		
		Informs SRO the Turbine is Tripped

	CRO	• Checks 11 OR 14 4KV Vital Bus energized • Checks 125 VDC and 120 VAC busses energized • Verifies CCW flow to RCPs • Verifies Switchgear Ventilation in service Informs SRO Vital Auxiliaries Safety Function is complete but 1Y03 is deenergized
	RO	• Determines PZR pressure is not stable between 1850 psia and 2300 psia and is trending lower • Determines PZR level is not stabilizing between 80 and 180 inches or trending to 160 inches • Ensures RCS subcooling GREATER THAN 30°F • Notes a SIAS should have occurred and did not. (Not required until 1725#) Manually actuates SIAS when RCS pressure is <1725. • Trips 2 RCPs Informs SRO RCS Pressure and Inventory Safety Function can NOT be met due to low PZR pressure and PZR level

Scenario No:	4	Event No.	7	Page 11 of 12
Event Description:	**Reactor Trip with LOCA**			

Time	Position	Applicant's Actions or Behavior
	CRO	• Verifies Turbine Bypass Valves or ADVs operating to maintain: • SG pressures between 850 and 920 psia • Tcold between 525° and 535°F (notes lowering RCS temp and SG pressure) • Determines 11 BFRV is failed open • MSIVs may be shut if SG press decreases to 800# • Resets the BFRVs, verifies 11 BFRV responds and takes manual control of both BFRVs and controls SG levels • Checks at least one SG available for controlled heat removal • SG level between -170 and +30 inches • Trips SGFPs • Initiates Aux Feedwater to maintain S/G level Informs SRO Core and RCS Heat Removal Safety Function is met (May be delayed due to waiting for Tc recovery from overfeed)
	CREW	• Checks Containment pressure less than 0.7 psig • Checks Containment temperature less than 120°F • Checks containment radiation monitor alarms CLEAR with NO unexplained trends • Checks RMS alarms CLEAR with NO unexplained trends: • 1-RIC-5415 U-1 wide range noble gas • 1-RI-1752 Condenser Offgas • 1-RI-4014 Unit 1 SG Blowdown • 1-RI-5415 Unit 1 Main Vent Gaseous • Determines CNMNT parameters cannot be met due to rising press. and temp (negative trends) Informs SRO CNMNT environment cannot be met and Rad Levels External to CNMNT is met
	SRO	• Conducts EOP-0 mid-brief and directs operators to reverify Safety Function
	SRO	• Determines Recovery Procedure per Diagnostic Flowchart: • All Safety Functions met – NO • Single Event Diagnosis - EOP-5 • Directs transition to EOP-5

Scenario No:	4	Event No.	7	Page 12 of 12
Event Description:	**Reactor Trip with LOCA**			

Time	Position	Applicant's Actions or Behavior
	SRO	• Briefs crew prior to EOP-5 implementation • Directs actions per EOP-5

	RO	• Monitors RCS Depressurization and RCP trip strategy
		  • Verifies SIAS or notes SIAS actuation failure and manually actuates (if not done in EOP-0)
		  • Trips 2 RCPs when RCP pressure is < 1725 (if not done by EOP-0)
		  • Monitors running RCPs for NPSH requirements
		  • Verifies boration

	CRO	• Maintain CNMNT environment
		  • Verifies running in slow due to SIAS
		  • Verifies opens SRW 8" valves

	CRO	• Commences RCS cooldown to < 300°F
		  • Uses TBVs or ADVs to commence cooldown at < 100°F. (will lose TBVs due to SIAS)
		  • Blocks SGIS when block permitted alarm is received
		  • Maintains S/G level

	RO	• Depressurizes the RCS to reduce subcooling and maintain PZR level • Throttles HPSI to maintain PZR level > 101"
		When the cooldown is controlled at < 100°F per hour and HPSI flow is throttled the scenario can be terminated. The ERPIP call for this scenario is an ALERT under BA1 for Loss of the RCS Barrier.

SCENARIO #4 SETUP

OVERVIEW/OBJECTIVES

To evaluate the applicants' ability to conduct a unit power increase, to implement the ARMs, OIs, AOPs, as appropriate, for malfunctioning systems and/or controls including failure of the hotwell level controller, a TBV failing open, a PRZR ref. line failure including associated instruments and small RCS leak. Once the leak is determined to be in CNMNT a loss of 1Y03 occurs. The reactor is tripped and EOP-0 entered. After EOP-0 is entered, the RCS leak grows to ≈ 300 gpm. 11 BFRV will fail open causing an overfeed of 11 SG. When the SIAS setpoint is reached it will fail to actuate and will have to be actuated manually. The crew will implement EOP-5 due to the LOCA.

INSTRUCTOR SCENARIO INFORMATION

____ 1. Reset to IC-20. Draft Spin #0303

____ 2. Perform switch check. Spin # Used _____

____ 3. Place simulator in CONTINUE, advance charts and clear alarm display.

____ 4. Place simulator in FREEZE.

5. Enter Malfunctions

____ a. 12 AFW Pp Trip
AFW001_02 at time zero

____ b. 12 Main CPU on 12 SG DFWCS OOS.
FW001_03 at time zero

____ c. Failure of SIAS Actuation Channels'A' & 'B'
ESFA001_01 & 02 at time zero

____ d. Hotwell Level Controller Fails High
CD002 High on F1

____ e. PRZR Level Cont. Fails High
RCS026_01 (High) on F2

____ g. TBV-3942 Fails Open
MS009_02 on F3

____ f. PRZR Press Control Channel 100X Fails Low
RCS023_01 (Low) on F4

____ h. PRZR Press Prot. Channel 102B Fails Low
RCS024_02 (low) on F5

____ i. RCS Leak
RCS002 (5 to 50 GPM over 5 minutes) on F6

____ j. Loss of 1Y03
120V003_03 on F7

SCENARIO #4 SETUP

7. Enter Panel Overrides/Triggers

____ a. Event Trigger 1 – Use a CEA on the trip for Trigger

____ b. Panel override 12 BFRV open at 1C35 at 100% (on T1, set value to 5.0)

____ c. 12 AFW Pump Tripped and Power Available lights OFF

____ d. TBV-3942 – Set Green Closed light to ON

8. Enter Remote Functions/Administrative

____ a. Caution tag 12 AFW Pump.

____ b. Place abnormal tags on 12 FRV, 12 BFRV and 12 SGFP controllers for 12 MCPU being failed.

____ c. Place all PRZR heaters on.

____ d. Verify 2 Chg. Pps running.

____ e. Place 'on AUX STEAM' tag on 12 SGFP.

____ f. Set 1-MS-118 (TBV 3942 isolation) to 40% open.

____ 9. Set simulator time to real time, then place simulator in CONTINUE.

____ 10. Give crew briefing.

a.	Present plant conditions:	≈4% power – MOC-10,885 MWD/MTU. Unit 2 is in Mode 5. RCS Boron -1254 PPM.
b.	Power history:	Shutdown for the last 6 days to repair an RCS drain line leak.
c.	Equipment out of service:	12 AFW Pump out of service since failing to develop adequate discharge head during the STP. Estimated return to service in 2 days. 12 Main CPU failed for 12 SG DFWCS. System Engineering is investigating.
d.	Abnormal conditions:	None.
e.	Surveillances due:	None.
f.	Instructions for shift:	Continue Start-up per OP-2, step 6.8.F.1 and OI-43A, step 6.2.B.3.

____ 11. Allow crew 3-5 minutes to acclimate themselves with their positions.

SCENARIO #4 SETUP

____ 12. Instructions for the Booth Operator.

a. Activate malfunctions **F1-F3** (hotwell controller, PZR level, and TBV) when each is cued by the lead evaluator.

b. Activate the next malfunction **F4** (ref. Line break) after the plant is stabilized following the TBV failure and on the cue of the lead evaluator, then immediately activate **F5** (PZR Press. channel) and **F6** (RCS leak).

c. When the crew is implementing AOP-2A, activate malfunction **F7** (Loss of 1Y03) when cued by the lead evaluator.

d. When the reactor is tripped **modify** the RCS leak malfunction (RCS002) to 300 gpm, and verify 12 BFRV has failed open.

SCENARIO #4 SETUP

RESPONSES TO CREW REQUEST

If a request and response is not listed, delay response until reviewed with the examiner. Responses to routine requests, which have no effect the scenario, do not require examiner clearance.

	REQUEST	RESPONSE
1.	Has GS-NPO permission been received to startup with 12 AFW Pp out of service?	GS-NPO permission has been received to startup with 12 AFW Pp OOS.
2.	Shift 12 SGFP to Main Steam.	After two minutes report closed the aux. Steam supply valve. After three additional minutes report the main and reheat supply valves open.
3.	OWC investigate failure of the Condenser Hotwell Level Controller, 1-LIC-4405 .	Acknowledge request.
4.	TBO report hotwell levels locally.	After about 3 minutes report hotwell level is low, about 4'3".
5.	OWC investigate failure of the PRZR Level Controller, 1-LT-110X .	Acknowledge request.
6.	TBO isolate TBV-3942 (MS-118).	After three minutes report MS-118 is closed.
7.	OWC investigate TBV-3942 failing open.	Acknowledge request.
8.	Informs Rad con of RCS leakage.	Acknowledge request.
9.	Directs PWS to bypass DSS, PRZR Press SIAS and SIAS PP Block at the Channel B ESFAS cabinet.	After three minutes open the cabinet door and bypass the requested channel units.
10.	OWC investigate loss of 1Y03.	Acknowledge request.

SCENARIO #4 SETUP

SHIFT TURNOVER

I.	Present Plant Conditions	≈ 4% power
II.	Burnup:	10,885 MWD/MTU (MOC)
III.	Power History	Shutdown for the previous 6 days to repair an RCS drain line leak.
IV.	Equipment out of Service:	12 AFW Pump out of service since failing to develop adequate discharge head during the STP. Estimated return to service in 2 days. 12 Main CPU failed for 12 SG DFWCS. System Engineering is investigating.
V.	Abnormal Conditions:	None.
VI.	Surveillances Due:	None
VII.	Instructions for Shift	Continue Start-up per OP-2, step 6.8.F.1 and OI-43A, step 6.2.B.3. Need to shift 12 SGFP to Main Steam.
VIII.	U2 Status and Major Equipment OOS:	Mode 5. No CW Pps and 23 AFW Pp is not available.

SCENARIO #4 SETUP

Critical Task Justification

CT 1 – Manually initiates SIAS

This task is critical Per ES-Appendix D because the SIAS actuation failure is a significant degradation of an ECCS system. It is cued by RCS pressure reaching the SIAS actuation setpoint and failing to actuate automatically on either train. It is measurable by the operator initiating SIAS flow by manually actuating SIAS 'A' and 'B' then verifying the HPSI Pps start and the HPSI header isolation valves open. The operator can determine successful completion by using 11and 13 HPSI pump, flow and valve indications.

CT-2 – Preventing Overfeed of 11 SG

This task is critical Per ES-Appendix D because overfeed of a SG will cause excessive cooldown of the RCS and possible seismic concerns for a SG full to the MSIVs in addition of potential secondary equipment damage. This action is cued by a rapidly rising SG level post trip and an excessive cooldown of the RCS. The operator actions are measurable by observing the operator take manual control of the BFRV and the feed system and maintaining SG level. The operator can determine successful performance of these steps by observing SG feed rates and SG level indications.

U-1 Reactor Operator Shift Briefing Sheet

Date: Today

Reactor Power:	*Level:*	4 %
	RCS Boron:	1254 PPM
	Burnup:	10885
	History:	S/D for last 6 days

ASI	*Value:*	0.017 (middle of the core)
	Trend:	moving toward the top

Xenon:	*Trend:*	0.2 and building in

Reactivity Thumbrules: ***(Good until 11200 MWD/MTU)***	*Tcold:*	1.4°F
	Dilution:	164 gal
	Boration:	*BAST:* 14.1 gal or 2.5 ppm
		RWT: 103.9 gal/% @ 2500 ppm
	CEA's:	7.5"/%
	Neutral Blend:	4/30
	Last Add:	100 DI 30 minutes ago
	Recent CEA movements:	Grp 4 moved 15 minutes ago
Ion Exchanger Status:	*Purification:*	12
	Delithiation:	11

SCENARIO #4 SETUP

SHIFT TURNOVER INFORMATION SHEET

For Training Only

DATE: Today **ON-COMING SHIFT: DAY**

UNIT STATUS		
PARAMETER	**UNIT 1**	**UNIT 2**
MODE:	**1**	**5**
% POWER:	**11**	**0**
RCS TEMPERATURE:	**532.5**	**108**
RCS PRESSURE:	**2250**	**atmos**
RCS BORON	**1254**	**2538**
MWe NET:	**0**	**0**
GROSS RCS LEAKAGE:	**0.08**	**N/A**
BULK POWER NOTIFICATION	**Normal**	

NON-ROUTINE SURVEILLANCE REQUIREMENTS [B0125]	
List non-routine, conditional, & mode dependent surveillances (e.g. chemistry samples, operability verifications, ETP's, < 7 day STP's)	
UNIT	**SURVEILLANCE**

EVOLUTIONS IN PROGRESS		

SURVEILLANCE TESTS			
UNIT 1		**UNIT 2**	
DATE	**STP**	**DATE**	**STP**

TBD

Shift Manager

Maintain 100% power.

SCENARIO #4 SETUP

SHIFT TURNOVER INFORMATION SHEET

EQUIPMENT AVAILABILITY (continued)		
ELECTRICAL SYSTEM	UNIT 1	UNIT 2
500KV High Lines	☒5051 ☒5072	☒5052
500KV Buses	☒BLACK	☒RED
13KV Supplies	☒P-13000-1	☒P-13000-2
SMECO Bkr Status	☒252-2301 ☐0SH301	☒ 0SH302
Site Self Power Feeders	☒252-1106	☒252-2106
13KV Buses	☒11 ☒12 ☒23	☒21 ☒22
Voltage Regulators	**Auto** 1102 **Auto** 2102 **Auto** 1101	**Auto** 1103 **Auto** 2103 **Auto** 2101
4KV Transformers	☒U-4000-11 ☒U-4000-21 ☒U-4000-13	☒U-4000-12 ☒U-4000-22 ☒U-4000-23
4KV Buses	☒11 ☒12 ☒13 ☒14	☒21 ☒22 ☒23 ☒24
Diesel Generators	☐1A ☐1B ☐0C	☐2A ☐2B ☐0C
480V Buses	☒11A ☒11B ☒14A ☒ 14B	☒21A ☒21B ☒24A ☒ 24B
125VDC Battery Chargers	☒11 ☒23 ☒12 ☒ 24	☒14 ☒22 ☒13 ☒ 21
125VDC Buses	☒11 ☒12	☒22 ☒21
120VAC Vital Buses	☒11 ☒21 ☒13 ☒ 23	☒14 ☒24 ☒12 ☒ 22

SPENT FUEL EQUIPMENT CHECKOUTS:		
SFHM PE O-81-1-0-Q	New Fuel Elevator OI-25B App A	SF Insp Elevator OI-25B App B

OOS SR EQUIPMENT		OOS NSR EQUIPMENT	
UNIT 1 & COMMON	UNIT 2	UNIT 1 & COMMON	UNIT 2
12 AFW Pp		12 Main CPU for 12 DFWCS	

SCENARIO #4 SETUP

SHIFT TURNOVER INFORMATION SHEET

GENERAL INFORMATION
UNIT 1 AND COMMON

SW PARAMETERS:

Latest STP-0-73A yesterday (11PP, 12PP & 13 PP) Required to perform dewatering operations in OI-29
Max Header Pressure PE 1-12-21-O-W

11 Header	11 PP	13 PP
11 ECCS Clr	897	897
11 CCW HX	6624	6464

12 Header	12 PP	13 PP
12 ECCS	871	-
12 CCW HX	6779	-

Last week	11 Hdr / 11 PP	34 psig
Last week	12 Hdr / 12 PP	35 psig
Yesterday	11 Hdr / 13 PP	34.5 psig
Yesterday	12 Hdr / 13 PP	33 psig

LONG TERM NOTES:

1. Temp Alt 1-02-0065 removed Aux alarm X28 (12B CBO Temp Hi), failed RTD. Computer point T184 is accurate for monitoring 12B CBO temperature. Do not remove T184 from the Selected Computer point group until T/A 1-02-065 is removed.
2. The following ABB breakers may not operate after being closed. Ensure an Operator is stationed locally to open the breaker if it shuts, but does not indicate fully closed (breaker may not trip remotely or automatically, and the associated DG may be OOS). Hi side fdrs U-440-11A (1114), 11B (1102), 14A (1402), 14B (1413). **Pink** Tags on the brkr handswitches.
3. RECO accepted by Ops for Charging Pumps stating Suction Stabilizers do not impact operability. **Discharge Desurgers <u>now</u> impact operability if desurger pressure is below 500 psig**. RECO at CRS desk, RPA submitted for Pes 1/2-041-04-O-M.
4. When stroking 1-SW-5153-CV, have Mechanical Maintenance and Engineering present to locally monitor the valve for sticking, binding or sluggish performance. Report the results to the System Manager.
5. Do not perform any evolution that would cause the migration of Silica from the SFP to SDC, SITs, or RWTs.
6. Place 14 B/U Heater bank in Off prior to performing the plant calorimetric. Non-conservative for calc if you use 300 KW.
7. Log completion of Quarterly PEs and above (e.g., Semi-annual, Annual, etc.) in the CRO Narrative Log to assist tracking.

SHORT TERM NOTES:

1. When it is necessary to divert 2 times in a 24-hour period, the CMF for 1-CVC-325 should be re-evaluated due to ALARA concerns.
2. Fill the SFP from the Unit 1 RWT when required.
3. Per Chemistry request maintain U-1 VCT pressure < 29# when makeup to VCT.
4. Next time we discharge the MWMT Sal Raspa needs to be contacted to perform PMT for MO#0200301363.
5. When updating Webster, you need to update MOPU if the activity has a MO and Ops is the lead RMG. Leave a VM with MOPU x7500 to take the MO to 'W9' Status. Ops STPs are being assigned Mos to allow Ops resource loading.
6. Need to order at least one pallet of boric acid.
7. 12 AFW Pp failed to develop required D/P during STP. Return to service in 2 days.
8. 12 Mian CPU failed for 12 SG DFWCS. System emgineer is investigating.

OPERATOR WORKAROUNDS / COMP ACTIONS — Nucleis – BWOR104

EQUIPMENT	COMP ACTION / DEFICIENCY	FREQ	WATCH	DATE	IR/MO#	PRI