

Facility: PALISADES NUCLEAR PLANT Scenario No.: ONE Op-Test No.: NRC-2017

Examiners: _____ Operators: _____

Initial Conditions: The Plant is 60% power, middle of core life. P-1A Main Feedwater Pump was just started after maintenance. P-54A, Containment Spray pump was tagged out of service for seal cooler inspection yesterday. It is estimated that it will be restored to operable in 6 hours. Severe weather has been noted in the area. AOP-38, Acts of Nature, entry is not required.

Turnover: Shift orders are to alternate CCW Pumps to P-52A in service with P-52B and P-52C in standby and continue the power escalation to full power at 12%/hr. GOP-5 is in progress with GCL 5.1 completed up to Step 4.2.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	BOP (N) SRO (N)	Alternate operating CCW pumps
2	N/A	ATC (R) BOP (R) SRO (R)	Commence power escalation
3	CV10	ATC (C) SRO (C)	Uncontrolled Dilution
4	PC02A	BOP (C) SRO (C,T)	Thermal Margin Monitor Channel 'A' Power Failure
5	RM08G	BOP (I) SRO (I,T)	West ESS room ventilation rad monitor failure
6	TC04D	ATC (C) SRO (C)	Turbine Governor Valve GV4 fails closed
7	N/A	BOP (C) SRO (C)	Failure of turbine to auto trip
8	MS03A	ALL (M)	ESDE ('A' Main Steamline Rupture) inside containment (ramped in at time of trip)
9	SI16B/C HS-3001-C HS-3002-C	ATC (C) SRO (C)	Automatic Containment Spray Actuation Failure
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Scenario ONE - Simulator Operator Instructions

- Initialize Simulator to Protected IC-196.
- Load Scenario #1 Schedule and Event Triggers from jump drive.
- Validate Malfunctions, Remotes and Overrides from Table below in DIRECTOR.
- Validate Triggers from Table below in EVENT TRIGGERS.

Event #	Remote or Trigger #	Instructions
N/A	Active Malfunction	TC02 (PIDTC01) Failure of Automatic Turbine Trip: Final Value = ACTIVE
N/A	Active Malfunction	SI16B (PIDSI03) P-54B, CSS Pump Auto Start Fail: Final Value = ACTIVE SI16C (PIDSI03) P-54C, CSS Pump Auto Start Fail: Final Value = ACTIVE
N/A	Active Remote	SI28 (PIDSI03) P-54A, CSS Pump Breaker: Final Value = RACKOUT
N/A	Active Override	HS-3001-C (Panel C-03) CV-3001 CHP Bypass Switch in Bypass: F.V. = ON HS-3002-C (Panel C-03) CV-3002 CHP Bypass Switch in Bypass: F.V. = ON
1	N/A	Alternate Operating CCW Pumps: No actions required.
2	N/A	Commence Power Escalation: No actions required.
3	Remote 1	CV10 (PIDCV02) Inadvertent PCS Dilution: Final Value = ACTIVE
4	Remote 2	PC02A (PIDPC01) TMM Channel 'A' Power Failure: Final Value = ACTIVE
5	Remote 3	RM08G (PIDRM04) RIA-1811, West ESS Room rad monitor fail: Final Value = ACTIVE
6	Remote 4	TC04D (PIDTC01) Turbine Governor Valve #4 Fail Closed: Final Value = ACTIVE
7	N/A	Reactor Trip / Turbine Fails to Trip: No actions required.
8	Trigger 5	"rdsr(1)" < 100.0 SD Group A Rod 1 less than 100.0 inches MS03A (PIDMS01) 'A' S/G ESDE Inside Containment: Final Value = 2.0; Ramp = 00:07:00
9	N/A	Automatic Containment Spray Actuation Failure: No actions required.

Special instructions:

- Ensure P-52B, CCW Pump in service, with P-52A/C, CCW Pumps in Standby.
- Ensure P-54A, Containment Spray Pump Breaker racked out and place Caution Tag on P-54A Handswitch.
- Ensure 'A' PLCS and PPCS selected as controlling channels.

Scenario ONE - Turnover Information

The Plant is 60% power, middle of core life. P-1A Main Feedwater Pump was just started after maintenance. P-54A, Containment Spray pump was tagged out of service for seal cooler inspection yesterday. It is estimated that it will be restored to operable in 6 hours (LCO 3.6.6.A.1 - 72 hours). Severe weather has been noted in the area. AOP-38, Acts of Nature, entry is not required.

Shift orders are to alternate CCW Pumps to P-52A in service with P-52B and P-52C in standby per SOP-16 and continue power ascension to full power at 12% per hour. GOP-5 is in progress with GCL 5.1 completed up to Step 4.2.

Op-Test No.: 1	Scenario No.: ONE	Event No.: 1	Page 1 of 1
Event Description: Alternate operating CCW Pumps			
Time	Position	Applicant's Actions or Behavior	
	BOP	Refers to SOP-16, section 7.3.6.	
	BOP	Ensures locked open all available CCW pp. suction/discharge valves.	
Simulator Operator: if asked as NPO, report: <ul style="list-style-type: none"> MV-CC919 and MV-CC940, P-52A suction and discharge valves are locked open MV-CC556, P-52A Vent, is opened and closed to vent air from the casing Initial CCW Hx ΔPs are E-54A = 6.6 psid, E-54B = 6.8 psid. 			
	BOP	Verifies both CCW Heat Exchangers in operation.	
	BOP	Starts P-52A by placing control switch to TRIP and then to START. <ul style="list-style-type: none"> Verify proper pump response (amps and discharge pressure) 	
	BOP	Stops P-52C by placing control switch to TRIP.	
	BOP	Places P-52C in standby: <ul style="list-style-type: none"> Depress amber STANDBY button above handswitch Verify amber light is LIT 	
	BOP	May request final reading on CCW Heat Exchangers differential pressure, but not required.	
Simulator Operator: If asked as NPO after starting P-52A report: <ul style="list-style-type: none"> CCW Hx ΔPs are: E-54A = 6.7 psid, E-54B = 6.8 psid. 			
Continue to Event 2			

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Event Description: Commence Power Escalation				
Time	Position	Applicant's Actions or Behavior		
At the Lead Examiner's discretion, INSERT Remote 1 during this event.				
	SRO	Enters and directs the actions of GOP-5.		
	SRO	Reviews GOP-5 Precautions and Limitations with crew.		
Note: CRS may notify ENPM, BA, RP, and Chemistry of impending load change.				
	SRO	Performs reactivity brief with crew.		
Note: Crew should use "Cycle 25 Reactivity Management Briefing"				
	BOP	Select ramp speed and rate (at 12% per hour), using SOP-8 Att 10. <ul style="list-style-type: none"> • ENTER Setter value on numeric keypad • PRESS SELECT on the numeric keypad and observe the following: <ul style="list-style-type: none"> • HOLD displayed in the upper right corner of the CRT • HOLD light/pushbutton illuminates on the Manual Panel • PRESS TAB RIGHT on the cursor keypad • ENTER desired acceleration rate using numeric keypad • PRESS SELECT on the numeric keypad 		

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Scenario No.: ONE Event No.: 2

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Event Description: **Commence Power Escalation**

Time	Position	Applicant's Actions or Behavior
	ATC	<p>MAINTAIN T_{AVE} within 3°F of T_{REF} during the power escalation by regulating dilution and/or regulating rod withdrawal.</p> <p>For Dilution (SOP-2A Att 11):</p> <ul style="list-style-type: none"> • ENSURE CLOSED CV-2155 M/U Stop • ENSURE one of the following in MANUAL and the other in OFF. <ul style="list-style-type: none"> • P-90A, PW M/U Pump • P-90B, PW M/U Pump • ENSURE RESET and in AUTO FIC-0210A, PW M/U Boration flow • ENSURE ZERO output signal on FIC-0210A, PW M/U Boration flow • SET quantity and batch flow limit on FIC-0210A, PW flow controller • OPEN CV-2155, M/U Stop • PUSH start pushbutton on FIC-0210A • When dilution complete, VERIFIES FIC-0210A output signal at zero • PUSH start pushbutton on FIC-0210A • VERIFIES FIC-0210A output signal at zero when dilution complete • CLOSSES CV-2155 • MONITORS reactor power using highest indicated dT power and T_{AVE} <p>For Control Rod manipulations:</p> <ul style="list-style-type: none"> • Operates Rod Control Switch to WITHDRAW Group 4 Regulating Rods in increments specified by CRS • MONITORS reactor power using highest indicated dT power and T_{AVE}
	ATC	<p>May Divert around the VCT due to rising VCT level from the dilution, by:</p> <ul style="list-style-type: none"> • Placing CV-2056 to CWRT
	BOP	<p>Initiate load change (SOP-8 Att 10):</p> <ul style="list-style-type: none"> • ENSURE Limiter setting will not interfere with desired change. • PERFORM One of the following: <ul style="list-style-type: none"> ○ PRESS GO pushbutton on Manual Panel ○ PRESS GO/HOLD custom key on Display keypad ○ PRESS SELECT on numeric keypad, then PRESS START on control keypad • OBSERVE HOLD light extinguishes and GO light illuminates. • When ramp is complete, VERIFY GO/HOLD light extinguished.
Continue to Event 3		

Op-Test No.: 1		Scenario No.: ONE	Event No.: 3	Page 1 of 1
Event Description: Uncontrolled Dilution				
Time	Position	Applicant's Actions or Behavior		
	ATC	<p>Operator should notice uncontrolled dilution:</p> <p>Indications:</p> <ul style="list-style-type: none"> CV-2165, PMU Batch Controller flow rising uncontrollably VCT level and pressure rising uncontrollably <p>May get alarm (if reaching the end of the batch):</p> <ul style="list-style-type: none"> EK-0711, Pri Makeup Water Leakage / FIC-0210A Trouble EK-0730, Boric Acid Critical Heat Trace Temp Hi/Lo EK-1368, Rad Waste Panel C40 Off Norm 		
<p>Note:</p> <p>CRS should direct placing the ramp on HOLD.</p>				
	SRO	Enters and directs action from AOP-4		
	ATC	<p>Secures uncontrolled dilution:</p> <ul style="list-style-type: none"> ENSURE CLOSED CV-2155, M/U Stop <ul style="list-style-type: none"> May dispatch NPO to investigate ENSURE CLOSED CV-2165, BA M-51 PMU Inlet Control by ensuring a zero output signal on FIC-0210A, PMU controller <ul style="list-style-type: none"> Dispatch NPO to verify CV-2165 is closed locally. STOP P-90A, PMU Pump <u>OR</u> P-90B, PMU Pump 		
<p>Simulator Operator:</p> <p>When requested by NCO, inform NCO that CV-2165 is closed locally.</p>				
<p>Note:</p> <p>Uncontrolled dilution will be secured upon securing PW M/U pump(s)</p>				
	ATC	INSERT Group 4 Regulating Rods in increments specified by CRS to maintain temperature (TAVE and highest indicated dT power) due to the uncontrolled dilution after securing the turbine ramp.		
	ATC	<p>May continue to perform actions to further locally isolate the dilution:</p> <ul style="list-style-type: none"> CLOSE MV-CVC2201, BA Blender M-51 PMU Isolation CLOSE MV-CVC2162, PMU to Blender M-51 Isolation ENSURE CLOSED MV-CVC2047, Purif Demin T-51A Flush Water from T-90 ENSURE CLOSED MV-CVC2049, Purif Demin T-51B Flush Water from T-90 ENSURE CLOSED MV-CVC2051, Deborating Demin T-52 Flush Water from T-90 <p>May continue to perform MCB actions to further isolate the dilution:</p> <ul style="list-style-type: none"> PLACE in BYPASS CV-2023, Demin T-51A/B & T-52 Bypass 		
<p>When Uncontrolled Dilution is secured OR at the Lead Examiner's discretion, INSERT REMOTE 2.</p>				

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Event No.: 4

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Event Description: **Thermal Margin Monitor Channel 'A' Power Failure**

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Diagnose the Loss of TMM Channel 'A':</p> <p>Indications:</p> <ul style="list-style-type: none"> • Loss of power to 'A' TMM drawer <p>Alarms:</p> <ul style="list-style-type: none"> • Rack A K-0601, Variable High Power Level Ch Trip • Rack A K-0605, Variable High Power Level Ch. Pre-Trip • Rack A K-0606, High Power Rate Ch. Pre-Trip ASI • EK-0749, "A" TM/LP Setpoint Low
	BOP	<p>Check instrumentation for input faults:</p> <ul style="list-style-type: none"> • Check Thot instruments • Check Tcold instruments • Check Power Range NIs <p>Identifies no instrumentation faults</p>
	BOP	<p>BYPASS TMLP trips per SOP-36 Section 7.4.2 for</p> <ul style="list-style-type: none"> • KS-RPS-AW5 #1 (key #289) 'Hi Power Trip' • KS-RPS-AW5 #9 (key #297) 'TM/LO PRS Trip' <p>Perform the following to bypass each TMLP trip:</p> <ul style="list-style-type: none"> • ENSURE the RPS Bypass Key is the correct key for the RPS Trip Unit to be bypassed • INSERT bypass key above affected RPS Trip Unit • TURN key 90 deg clockwise • VERIFY the yellow light above the bypass keyswitch is ON • RECORD the evolution in the Ops Log as necessary.
	SRO	<p>Enters the following applicable LCOs</p> <ul style="list-style-type: none"> • LCO 3.3.1 Function 1 • ORM 3.17.6 Item 16 <p>Determines the following LCOs not applicable:</p> <ul style="list-style-type: none"> • LCO 3.1.6 • LCO 3.3.7 Functions 1,2,5 • LCO 3.3.8 Function 5,6,7 • LCO 3.4.12 • ORM 3.17.6 Item 12
When CRS has entered/reviewed the appropriate Tech Specs or at Lead Examiner's discretion, INSERT REMOTE 3		

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Event Description: **West ESS room ventilation rad monitor failure**

Time	Position	Applicant's Actions or Behavior
Note: Event 4 takes approximately 5 minutes for indication of rad monitor failure		
	ATC	INFORMS the CRS of alarms: <ul style="list-style-type: none"> EK-1371, Rad Monitor Sys Ckt Failure
	ATC	COORDINATES with BOP on status of RIA-1811
	BOP	CHECKS RIA-1811 on Panel C-11 and notes failure low condition: <ul style="list-style-type: none"> RANGE light is LIT FAIL light is LIT Reports to CRS that RIA-1811 is failed.
	SRO	Enters LCO 3.3.10.A.1 and directs NCO to close West ESS Room Dampers.
	BOP	Refer to ARP-8 and SOP-38 (no applicable actions). Take actions as directed by CRS from LCO 3.3.10.A.1: <ul style="list-style-type: none"> PLACE keyswitch to CLOSE for West ESS Room Damper PO-1811 DIRECTS NPO to check status of remote damper PO-1812
Simulator Operator: If asked as NPO to check status of remote ventilation damper PO-1812, report that it is closed		
	SRO	May refer to ODCM. Action 5 of Table 1-1 specifies that if either channel fails low or is otherwise inoperable, the ventilation dampers associated with that channel shall be closed immediately and action shall be taken to have the affected channel repaired. (This is identical to action statement in LCO 3.3.10.A.1.)
Note: Prior to inserting Remote 4, ensure BOP is away from the turbine controls to allow for ATC to respond to Event 6.		
After CRS has briefed on West ESS Room ventilation rad monitor failure OR at the discretion of the Lead Examiner, <u>INSERT REMOTE 4</u>		

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Event No.: 6

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Event Description: ***Turbine Governor Valve GV4 fails closed***

Time	Position	Applicant's Actions or Behavior
	ATC	Diagnoses turbine control valve GV 4 failing closed: <ul style="list-style-type: none"> • EK-0318, TURBINE PANEL TROUBLE, alarms • Indication on DEH panel • Load lowering • Steam pressure rising • PCS temperature rising • Reactor power lowering
	SRO	If time permits, enter and direct the actions of AOP-1, "Loss of Load."
	ATC	Ensures Turbine Controls in MANUAL Ensures at least one EHC pump running.
	SRO	Orders reactor trip due to being above 15% power
INSERT Trigger 5 (Event 8) upon Reactor Trip. <ul style="list-style-type: none"> • ESDE is ramped in upon initiation, approximately 7 minutes to reach full break flow. 		
	ATC	Depresses Reactor Trip pushbutton on Panel C-02.
Note: Reactor will trip and Turbine will FAIL to auto-trip.		
Continue to Event 7		

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Event Description: **Failure of turbine to auto trip**

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	Perform EOP-1.0 immediate actions.
	BOP	Diagnoses Turbine did not auto trip on RX trip. Manually TRIP Turbine by any of the following methods: <ul style="list-style-type: none"> • DEPRESSES pushbutton on panel C-16 (will not work). • CLOSE MSIVs
CRITICAL TASK: Manually Trip the Turbine within 1 minute of failure to automatically trip following a Reactor trip.		
	SRO	Commence EOP-1.0 verbal verifications.
	ATC	Reactivity Control: <ul style="list-style-type: none"> • Reactor power lowering • negative SUR • maximum of one control rod not inserted
	BOP	Main Turbine Generator criteria: <ul style="list-style-type: none"> • Main Turbine tripped • TRIP Turbine from C-01 pushbutton (will not work) • CLOSE MSIVs • Generator disconnected from grid
	BOP	Feedwater criteria: <ul style="list-style-type: none"> • PLACES MFP Controller to 'MANUAL' and RAMPS to minimum speed • Main FRVs and bypass valves CLOSED
	BOP	Vital Auxiliaries-Electric: <ul style="list-style-type: none"> • Buses 1C and 1D energized • Bus 1E energized (If SIAS is not actuated) • Bus 1A and 1B energized • EY-01 energized • 3 of 4 Preferred AC Buses energized • Six DC Buses energized <ul style="list-style-type: none"> • Main Feed Pump Trip Power available lights LIT • AFW Pump control power lights LIT • MSIV control power lights LIT
	BOP	VERIFY adequate PCP seal cooling <ul style="list-style-type: none"> • At least one CCW Pump operating • At least one SW Pump operating • Both Critical SW headers in operation with pressure > 42 psig • CCW Containment Isol Valves open, CV-0910 / 0911 / 0940

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Event Description: **Failure of turbine to auto trip**

Time	Position	Applicant's Actions or Behavior
	ATC	PCS Inventory Control: <ul style="list-style-type: none"> PZR level 20% - 85% and trending toward normal (42% - 57%) PCS 25°F subcooled (use Thot for forced circulation)
	ATC	PCS Pressure Control: <ul style="list-style-type: none"> PZR pressure 1650 to 2185 psia and trending toward normal (2010 to 2100 psia) Manually operates PPCS in MANUAL and operate PZR heaters and sprays to maintain EOP Supplement 1 limits. When PCS pressure is < 1605 psia, verify safety injection initiated: <ul style="list-style-type: none"> Verify EK-1342 in alarm Verify all available HPSI and LPSI pumps in service and valves open When PCS pressure is < 1300 psia, stop 'A' and 'D' PCPs
	ATC	Core Heat Removal: <ul style="list-style-type: none"> At least one PCP operating Verify Loop ΔT less than 10°F Verify PCS at least 25°F subcooled
	BOP	PCS Heat Removal: <ul style="list-style-type: none"> Verify at least one S/G has; level 5% - 70% and Feedwater available SECURE all feedwater flow to the most affected S/G <i>Note: feedwater will be secured only if the crew diagnoses the S/G fault while in EOP-1.0</i> Verify TAVE 525°F - 540°F Verify BOTH S/G pressures 800–970 psia, IF not: <ul style="list-style-type: none"> Stop dumping steam from affected S/G. Close TBV, ADVs, and both MSIVs If either S/G pressure is < 500 psia, also close affected S/G FRV and bypass
CRITICAL TASK: Isolate all Feedwater to the most affected S/G within 30 minutes of fault.		
	ATC	Containment Isolation: <ul style="list-style-type: none"> Containment pressure < 0.85 psig When Containment pressure > 4.0 psig: <ul style="list-style-type: none"> VERIFY EK-1126 "CIS Initiated" in alarm ENSURE CLOSED: Both MSIVs (MO-0510 and MO-0501); Main FRVs; Main FRV Bypasses; CCW Isolation Valves ENSURE EK-1342 "Safety INJ Initiated" OR PUSH High Radiation Initiate pushbuttons on Panel EC-13 ENSURE all available HPSI and LPSI Pumps operating with associated loop isolation valves open.

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Event Description: **Failure of turbine to auto trip**

Time	Position	Applicant's Actions or Behavior
	BOP	Containment Isolation: <ul style="list-style-type: none"> • Verify Containment Area Monitor alarms clear • Verify Condenser Off Gas Monitor alarm clear • Verify Main Steam Line Monitor alarms clear
Note: The Operator may identify the ESDE during the next step. Continue to Event 8 and 9 for the ESDE and CS Actuation Failure.		
	ATC	Containment Atmosphere: <ul style="list-style-type: none"> • Verify Containment temperature less than 125F. • Verify Containment pressure less than 0.85psig. <ul style="list-style-type: none"> • When Containment pressure > 4.0 psig, <ul style="list-style-type: none"> • ENSURE OPERATING all CAC 'A' fans (V-1A, 2A, 3A, 4A) • ENSURE OPEN all available CS valves <ul style="list-style-type: none"> • Open CV-3001 and CV-3002 • ENSURE OPERATING all available CS Pumps <ul style="list-style-type: none"> • Start P-54B CS Pump • ENSURE spray flow 2850 gpm
CRITICAL TASK: Establish at least one full train of Containment Cooling per the in-use EOP in time to prevent exceeding containment design parameters.		
	BOP	VERIFY IA pressure > 85 psig
	ATC	VERIFY SIRWT level > 25%
	BOP	ENSURE CR HVAC is aligned for Emergency Mode Operation within 20 mins of time of Reactor Trip. <ul style="list-style-type: none"> • VERIFY Supply Fan V-95 or V-96 for desired train is ON • ENSURE Air Filter Unit Fan V-26A or V-26B for desired train is ON • ENSURE OFF V-94 Purge Fan and V-47 Swgr Exh Fan
	BOP	VERIFY at least one Condensate Pump and one Cooling Tower Pump operating.
	BOP	VERIFY MSIVs are open OR MSIV Bypass valves are open (closed due to ESDE) <ul style="list-style-type: none"> • ENSURE TRIPPED both Main Feed Pumps
	SRO	Commence EOP Supplement 45 "SFP Monitoring"
	SRO	Diagnose ESDE using EOP-1.0 Att 1 "Event Diagnostic Flow Chart" and transition to EOP-6.0
Continue to Event 8 and 9		

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Event Description: ESDE inside containment (ramped in at time of trip) / Containment Spray Actuation Failure		
Time	Position	Applicant's Actions or Behavior
	ATC/BOP	Diagnose Main Steam line rupture inside containment: <ul style="list-style-type: none"> • S/G pressures and PCS temperatures and pressures lowering • Containment humidity, temperature, and pressure rising • Containment sump level rising • PCS subcooling rising • Numerous Control Room alarms (CAC DRY PAN Hi-LEVEL)
	SRO	Enters and directs the actions of EOP-6.0.
	SRO	May direct NPO to check for source of steam release.
Simulator Operator: If contacted by Control Room as NPO to check on steam leak, wait a few minutes and REPLY back: there are no Steam Generator relief valves blowing by or leaking on SIRWT roof area.		
	ATC/BOP	Determine Containment Spray Actuation did NOT occur at 4.0 psig in Cnmt: <ul style="list-style-type: none"> • Containment Spray valves NOT properly aligned and pumps not running.
	ATC	STOP all operating PCPs (due to CIS and no cooling water supply)
CRITICAL TASK: Stop all PCPs prior to PCPs demonstrating distress via high vibration alarms or high seal temperature alarms.		
	SRO	Determine that Containment Atmosphere acceptance criteria NOT met.
	SRO	May verify Attachment 1, "Safety Function Status Check Sheet", acceptance criteria are satisfied at intervals of approximately every 15 mins.

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Event Description: ESDE inside containment (ramped in at time of trip) / Containment Spray Actuation Failure			
Time	Position	Applicant's Actions or Behavior	
	ATC	Verifies EK-1342, "SAFETY INJ INITIATED" is alarmed due to PZR pressure less than or equal to 1605 psia OR containment pressure greater than or equal to 4.0 psig.	
	BOP	<ul style="list-style-type: none"> ENSURE available safeguards equipment operating (EOP Supplement 5) <i>Note: CS shall be initiated per Step 26 as Supp 5 does not address opening CS Spray header isol valves (CV-3001/3002).</i> VERIFY Containment Isolation (EOP Supplement 6) 	
	BOP	Direct NPO to locally close: <ul style="list-style-type: none"> CV-0944 Evap CCW Supply CV-0977B Evap CCW Return 	
Simulator Operator: When requested by NCO, wait 5 minutes and locally close CV-0944 and CV-0977B.			
CRITICAL TASK: Establish at least one full train of containment cooling per the in-use EOP in time to prevent exceeding containment design parameters.			
	ATC	If PZR level < 36% (40% for degraded containment): <ul style="list-style-type: none"> PLACE HS-2003, HS-2004, HS-2005, Orifice Stop Valves, to CLOSE. 	
	BOP	ENSURE MSIVs and Bypass valves closed	
	ATC	SECURE all PCPs (should already be secured due to loss of cooling, Containment Isolation Signal)	
	ATC	Commence emergency boration per SOP-2A Att 12 to establish PCS boron concentration greater than or equal to boron needed for Tave > 525°F as verified by sample or hand calculation per EOP Supplement 35.	
	BOP	VERIFY one train of CR HVAC operating in Emergency Mode (directed in EOP-1.0)	
	BOP	Determine 'A' S/G is the most affected S/G by evaluating: <ul style="list-style-type: none"> High steam flow from S/G Lowering S/G pressure Lowering S/G level Lowering loop Tcold temperature 	

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Event Description: **ESDE inside containment (ramped in at time of trip) / Containment Spray Actuation Failure**

Time	Position	Applicant's Actions or Behavior
	BOP	Isolate 'A' S/G per EOP Supplement 17 <ul style="list-style-type: none"> • Ensure closed both MSIVs • Ensure closed MO-0510, 'A' S/G MSIV Bypass • Close CV-0701, 'A' S/G Main Feed Reg Valve • Close CV-0742, 'A' S/G Main Feed Reg Block Valve (Key: 143) • Close CV-0735, 'A' S/G Bypass Feed Reg Valve • Close 'A' S/G blowdown valves: <ul style="list-style-type: none"> • CV-0767 • CV-0771 • CV-0739 • Close 'A' S/G AFW flow control valves: <ul style="list-style-type: none"> • CV-0737 • CV-0737A • CV-0749 • Close HS-0522B, Turbine Driven Pump P-8B Steam Supply from SG A CV-0522B
	BOP	Verify the correct S/G is isolated <ul style="list-style-type: none"> • S/G pressure • S/G levels • PCS Loop Tcold temperatures
	BOP	Stabilize PCS temperature by maintaining level in the least affected S/G between 60-70%
	BOP	STEAM the least affected S/G as necessary to maintain the following: <ul style="list-style-type: none"> • Maintain the least affected S/G pressure within 50 psid above the most affected S/G pressure • When Tcold(s) in the affected loop are not lowering, STABILIZE PCS Tcold(s) using the least affected S/G.
When 'A' S/G has been isolated, PCS temperature control has been established <u>OR</u> at discretion of the Lead Examiner, TERMINATE SCENARIO.		

Scenario ONE – Scenario Critical Task Summary**RC-CT01-MAINTYRBTRIP:**

Manually Trip the Turbine within 1 minute of failure to automatically trip following a Reactor trip.

CI-CT14-ESDEISOL(TCA28):

Isolate all Feedwater to the most affected S/G within 30 minutes of the initiation of the ESDE.

CA-CT15-CONTCLG:

Establish at least one full train of containment cooling per the in-use EOP in time to prevent exceeding containment design parameters.

HR-CT23-PCPTrip:

Stop all PCPs prior to PCPs demonstrating distress via high vibration alarms or high seal temperature alarms. (CIS causes loss of cooling water supply).

Facility: **PALISADES NUCLEAR PLANT** Scenario No.: **TWO** Op-Test No.: **NRC-2017**

Examiners: _____ Operators: _____

Initial Conditions: The Plant is at 100% RTP in the middle of core life. P-55B Charging Pump is tagged out of service for an impeller replacement.

Turnover: Severe weather has been noted in the area. AOP-38, Acts of Nature, entry is not required. Shift orders are to cycle control valves CV-3025, CV-3213, and CV-3224 per SOP-3 Section 7.9.2.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	ATC (N) SRO (N)	Cycle Control Valves CV-3025, CV-3213, and CV-3224 per SOP-3
2	CW01B	ATC (R) BOP (R) SRO (R,T)	Cooling Tower Pump P-39B trips and Rapid Downpower (due to degrading vacuum)
3	EG04 ED142	BOP (C) SRO (C)	Main Generator Voltage Regulator fails with concurrent fluctuation in grid voltage
4	RP23B	ATC (I) BOP (I) SRO (I,T)	Hot Leg #2 RTD TE-0122HB fails high
5	RX10A	BOP (I) SRO (I)	S/G 'A' level transmitter LT-701 output fails low
6	RC12D RC13D RC16D	ATC (C) SRO (C)	P-50D lower seal and middle seal failures (sequenced), followed by high vibrations of P-50D
7	RC04	ALL (M)	Small Break LOCA (350 gpm leakage)
8	SI01A	ATC (C) SRO (C)	Failure of Left Channel SIAS to automatically or manually actuate (must manually start/align equipment). HPSI Pump P-66A trips on ground O/C 10 seconds after starting.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Scenario TWO - Simulator Operator Instructions

- Initialize Simulator to Protected IC-197
- Load Scenario #2 Schedule and Event Triggers from jump drive.
- Validate Malfunctions, Remotes, and Overrides and table below in DIRECTOR.
- Validate Triggers from table below in EVENT TRIGGERS (may have to load trigger file manually – check file location in “Schedule”).

Event #	Remote or Trigger #	Instructions
N/A	Active Remote	CV33 (PIDSIO2) Rackout Charging Pump P-55B: Final Value = RACKOUT
N/A	Active Malfunction	ED13A (PIDSIO1) SI Auto Init Sgnl Fail Channel Left: Final Value = ACTIVE
N/A	Active Malfunction	SI07A (PIDSIO1) SI Man Init Sgnl Fail Channel Left: Final Value = ACTIVE
1	N/A	Cycle Control Valves CV-3025, CV-3213, and CV-3224; No action required.
2	Remote 1	CW01B (PIDCW01) Loss of Cooling Tower Pump P-39B: Final Value = ACTIVE
3	Remote 2	EG04 (PIDEG01) Main Gen Auto Volt Regulator Fail: Final Value = ACTIVE
3	Remote 2	ED142 (PIDED03) Infinite Grid Voltage (340K-380K): Final Value = 3.652 e+005
4	Remote 3	RP23B (PIDRPN11) Hot Leg No. 2 RTD Fail TE-0122HB: Final Value = 100
5	Remote 4	RX10A (PIDRX02) Steam Gen Lvl Transmitter Fail LT-0701: Final Value = 0
6	Remote 5	RC12D (PIDRC06) Prim Cool Pmp P-50D Low Mech Seal Fail: Final Value = ACTIVE
6	Remote 5	RC13D (PIDRC06) Prim Cool Pmp P-50D Mid Mech Seal Fail: Final Value = ACTIVE; Delay = 00:05:00
6	Remote 5	RC16D (PIDRC06) Prim Cool Pmp P-50D High Vibration: Final Value = ACTIVE; Delay = 00:01:30
7	Trigger 9	“rdsr(1)”<100.0 SD Group A Rod 1 less than 100.0 inches RC04 (PIDRC01) Primary Coolant Sys Leak into Containment: Final Value = 35
8	N/A	Failure of Automatic and Manual SIAS Actuation Left Channel Only; No action required.
9	Trigger 10	Zlo1p(272)==1 P-66A red light ON SI01A (PIDSIO2) Hi Press Safety Inject Pump Fail P-66A Final Value = ACTIVE; Delay = 00:00:10

Special instructions:

- Ensure P-55B, Charging Pump Breaker racked out and place Caution Tag on P-55B Handswitch.
- Ensure P-55B Auto/Manual Handswitch in MANUAL at C-12 Panel.

Scenario TWO - Turnover Information

The Plant is at 100% RTP in the middle of core life. P-55B Charging Pump is tagged out of service for an impeller replacement. Severe weather has been noted in the area. AOP-38, Acts of Nature, entry is not required. Shift orders are to cycle control valves CV-3025, CV-3213, and CV-3224 per SOP-3 Section 7.9.2.

Event Description: **Cycle Control Valves CV-3025, CV-3213, and CV-3224**

Time	Position	Applicant's Actions or Behavior
	ATC	To cycle CV-3224, E-60A Outlet <ul style="list-style-type: none">• CLOSE CV-3224 (Key 137)• OPEN CV-3224
	ATC	To cycle CV-3213, E-60B Outlet: <ul style="list-style-type: none">• CLOSE CV-3213 (Key 135)• OPEN CV-3213
	ATC	To cycle CV-3025, SDC Hx Outlet: <ul style="list-style-type: none">• CLOSE CV-3224• CLOSE CV-3213• PERFORM the following to OPEN CV-3025<ul style="list-style-type: none">• PLACE HS-3025A, SDC Flow Control in MANUAL (Key 97)• OPEN CV-3025 using HIC-3025A• PERFORM the following to CLOSE CV-3025<ul style="list-style-type: none">• CLOSE CV-3025 using HIC-3025A• PLACE HS-3025A in CLOSE• OPEN CV-3224• OPEN CV-3213
Simulator Operator: When requested by the NCO, verify CV-3025 opens locally and then closes locally.		
When the ATC has communicated completion of the task to the CRS <u>OR</u> at the discretion of the Lead Examiner, INSERT Remote 1		

Event Description: ***P-39B Cooling Tower Pump trip and Rapid Power Reduction***

Time	Position	Applicant's Actions or Behavior
	BOP/SRO	Diagnoses that P-39B has tripped: <ul style="list-style-type: none"> • EK-3523, "CLG TWR PUMP P-39B TRIP" • P-39B red light OUT, green light ON • P-39B ammeter reads ZERO • Possible lowering trend on Main Condenser vacuum.
	SRO	Enters and directs the actions of AOP-6, Loss of Condenser Vacuum and AOP-7, Rapid Power Reduction. <ul style="list-style-type: none"> • Reviews trip criteria of AOP-6 • Reviews trip criteria of AOP-7
NOTE: Reactor trip will occur at < 22" Hg Main Condenser vacuum.		
Note: Power reduction will likely be performed at 100%/hr OR at 300%/hr and then be reduced to 100%/hr.		
	SRO/ATC/BOP	Initiate a rapid power reduction to stabilize condenser vacuum at a rate of $\geq 30\%$ per hour and $\leq 300\%$ per hour, as directed by AOP-6 and as controlled by AOP-7, Rapid Power Reduction.
	ATC	INSERTS Group 4 Control Rods 10 inches: <ul style="list-style-type: none"> • Rod Control Switch operated to INSERT Group 4 Regulating rods 10 inches
Note: NCO is allowed to insert control rods up to 20" to maintain T_{AVE}/T_{REF} per Admin Proc. 4.00 Att 9. This can be 'reset' by the CRS to allow subsequent control rod insertions.		
	BOP	<ul style="list-style-type: none"> • Stabilize reactor power when condenser vacuum stabilizes, as specified by CRS (this will likely be approx. 70-75% power) • COMMENCE turbine load reduction in Operator Auto using RUNBACK at a rate of $\geq 30\%$ per hour and $\leq 300\%$/hour, as ordered by the CRS.
	SRO	Refers to and implements the following Tech Spec LCOs: <ul style="list-style-type: none"> • 3.1.6 Cond A, 2-hour action to restore rods above PDIL <i>Note: Verify applicability with alarm EK-0942 "Group 4 Power Dependent Insertion Limit"</i>

Op-Test No.: 1 Scenario No.: TWO Event No.: 2 Page 2 of 2		
Event Description: <i>P-39B Cooling Tower Pump trip and Rapid Downpower</i>		
Time	Position	Applicant's Actions or Behavior
	SRO	Notify Chemistry to perform an isotopic analysis for iodine when reactor power changes $\geq 15\%$ in any one hour period and notify RP of changing reactor power levels.
Simulator Operator: If Chemistry or RP contacted by CRS, acknowledge sampling and/or posting requirements.		
	BOP	Perform AOP-6, Att 1 for the tripped Cooling Tower Pump. <ul style="list-style-type: none"> CLOSE MV-AE129 Main Condenser E-10 West Side Air Off Take. ENSURE CLOSED MO-5312, Dilution Water Pump Discharge to Mixing Basin ENSURE OPEN MO-5314 and MO-5316, Dilution Water Pump Discharge to Cooling Towers ENSURE CLOSED MO-5326B, Cooling Tower Blowdown Valve Direct NPO to place a 2nd set of SJAEs online
Simulator Operator: <ul style="list-style-type: none"> Acknowledge BOP's request and CLOSE MV-AE129 when requested Acknowledge BOP's request to place a 2nd set of SJAEs in service, if requested. <ul style="list-style-type: none"> OPEN MV-AE111 and MV-AE117, <u>OR</u> OPEN MV-AE112 and MV-AE118 		
	ATC	May balance Group 4 control rods. <ul style="list-style-type: none"> PLACE Rod Selector Switch in the position for the rod to be moved. TURN Group Selector Switch to the position for the group containing the rod to be moved. PLACE Mode Selector Switch to MI (Manual Individual) position PERFORM the following to reposition the rod: <ul style="list-style-type: none"> OPERATE the Raise-Lower Switch. MONITOR Nuclear Instruments and TAVE closely while repositioning rod. IF necessary to maintain power level, THEN STOP single rod motion AND COMPENSATE with Regulating Rods. PLACE the Group Selector Switch to desired position. PLACE the Mode Selector Switch in MS (Manual Sequential) position or as directed by the Shift Manager.
	BOP	May place one Main FW pp. to MANUAL at minimum speed per CRS direction.
After power has been reduced to stabilize condenser vacuum <u>OR</u> at the discretion of the Lead Examiner, INSERT Remote 2 and Continue to Event 3.		

Op-Test No.: 1	Scenario No.: TWO	Event No.: 3	Page 1 of 1
Event Description: Main Gen Auto Volt Regulator Trip			
Time	Position	Applicant's Actions or Behavior	
	BOP/SRO	Diagnose Main Gen Auto Voltage Regulator Trip: Indications: <ul style="list-style-type: none"> Lights above Voltage Regulator Control Switch on Panel C-01 are OFF Generator Terminal Voltage is normal Switchyard voltage (F-Bus Voltage) is abnormally high (~364kV) Major alarms: <ul style="list-style-type: none"> EK-0310, Generator Volt Reg Trip EK-0515, 2400V Bus 1C and/or 1D Hi-Lo Voltage / Undervoltage 	
	BOP	Respond per ARP-2 for EK-0310: <ul style="list-style-type: none"> CHECK Generator Terminal Voltage NOT normal. May review SOP-8 to determine Terminal Voltage NOT normal. ADJUST with DC Adjuster by performing the following: <ul style="list-style-type: none"> VERIFY Regulator Balance Meter indicates approximately zero. PLACE 390CS, Voltage Regulator Control Switch to OFF or TEST position. ADJUST 370DC/CS, Voltage Regulator Manual Control Switch to control Generator Terminal Voltage between 21kV and 23kV. 	
Simulator Operator: IF crew does not make terminal voltage adjustment due to terminal voltage being within the normal band, contact CRS as TSC and inform crew that Switchyard voltage needs to be lowered 2kV in an expeditious manner due to a grid disturbance.			
Note: Operators may reference Generator Capability Curve (SOP-8 Att 4) while adjusting generator terminal voltage with respect to VAR loading. Lowering terminal voltage will cause VARs to lower (lag) near the lower limits of the capability curve.			
	SRO	Make notifications to Transmission Systems Coordinator (TSC) and Midwest Independent System Operator (MISO) notifying them that NERC/NPOA requirements are not met.	
At the discretion of the Lead Examiner, INSERT Remote 3 and Continue to Event 4			

Op-Test No.: 1 Scenario No.: TWO Event No.: 4 Page 1 of 1

Event Description: **Hot Leg #2 RTD TE-0122HB fails high**

Time	Position	Applicant's Actions or Behavior
	ATC	<p>Diagnoses low failure of Loop #2 Thot signal</p> <ul style="list-style-type: none"> EK-0772, Loop 2 Hot Leg Hi Temp EK-0924, Group 1 Power Dependent Insertion Limit EK-0967, Loop 1 / Loop 2 T_{AVE} Deviation EK-0969, Loop 2 T_{REF} / T_{AVE} Gross Deviation EK-06 Rack C 01, TM/LO Pressure Ch Trip EK-06 Rack C 05, TM/LO Pressure Ch Pre-Trip EK-06 Rack D 04, Nuclear ΔT Power Deviation / T_{INLET} Off Normal / Calculator Trouble Ch B <p>Lowering of calculated ΔT Power and TM/LP trip setpoint for channel 'B'</p> <ul style="list-style-type: none"> TI-0112HA and TIA-0121H, Loop 2 Hot Leg Temperature, indicate high
	ATC	<ul style="list-style-type: none"> Checks ARP-4, ARP-5 and ARP-21 for alarms present: Reference SOP-1A, Att 1 for PCS Temperature Instrumentation functions. Check ΔT Power for the PIP Node and the SPI Node/Host Computer on a workstation and compare to actual heat balance power
	SRO	Enters and directs actions of AOP-27, T_{AVE}/T_{REF} Controller Failure
	ATC	PLACE the SS-TAVE, T_{AVE} Selector Switch, to Loop 1 T_{AVE}
	ATC	VERIFY PDIL calculations still valid on PPC pages 410,411,412
	BOP	<p>BYPASS TMLP trips per SOP-36 Section 7.4.2 for</p> <ul style="list-style-type: none"> KS-RPS-AW5 #1 (key #289) 'Hi Power Trip' KS-RPS-AW5 #9 (key #297) 'TM/LO PRS Trip' <p>Perform the following to bypass each TMLP trip:</p> <ul style="list-style-type: none"> ENSURE the RPS Bypass Key is the correct key for the RPS Trip Unit to be bypassed INSERT bypass key above affected RPS Trip Unit TURN key 90 degrees clockwise VERIFY the yellow light above the bypass keyswitch is ON RECORD the evolution in the Ops Log as necessary.
	SRO	<p>Refers to and implements the following Tech Spec LCOs:</p> <ul style="list-style-type: none"> 3.1.6 Cond C, Perform SR 3.1.6.1 within 15 minutes of any rod motion 3.3.1 Cond A (Table 3.3.1-1 Items 1 and 9), 7 day action statement <p>Refers to and implements the following ORM LCOs as necessary:</p> <ul style="list-style-type: none"> ORM 3.17.6 (Item 12.1), Prior to next Mode 1 entry from Mode 2 ORM 3.17.6 (Item 16), Prior to next Mode 4 entry from Mode 5
	SRO	Initiates troubleshooting and repairs
After RPS has been bypassed <u>OR</u> at the discretion of the Lead Examiner, INSERT Remote 4 and Continue to Event 5.		

Op-Test No.: 1	Scenario No.: TWO	Event No.: 5	Page 1 of 1
Event Description: S/G 'A' level transmitter LT-701 output fails low			
Time	Position	Applicant's Actions or Behavior	
	BOP	Diagnose failure of 'A' S/G Feedwater flow: Indications: Red 'feed flow' pen on FIC-0701 ('A' S/G) failed off scale low Alarms (may get): <ul style="list-style-type: none"> • Feed flow > Steam flow • Reactor Power rising • EK-0160, Fdwtr Pumps Lo Suction • EK-0961, Steam Gen E-50A HI Level (84.7%) 	
	BOP	Immediate Action from AOP-3: TAKE manual control of Feedwater System to stabilize S/G levels: <ul style="list-style-type: none"> • DEPRESSED 'M' pushbutton on LIC-0701, 'A' S/G Feedwater Controller • LOWER feedwater flow to the 'A' S/G using the lower pushbutton Observe the following indications while adjusting feed flow: <ul style="list-style-type: none"> • FRV position on POI-0701 • S/G levels indications on Panel C-12 and/or PPC 	
Note: S/G High Level Override from LIA-0702 closes FRV CV-0701. Manual Reactor trip is required if S/G level reaches 90% level.			
	SRO	Enters AOP-3, Main Feedwater Transients <ul style="list-style-type: none"> • Directs taking manual control of 'A' S/G FRV, closing valve for less flow 	
	BOP	Operator Actions for EK-0962 (if received): <ul style="list-style-type: none"> • SLOWLY RETURN level to Setpoint per AOP-3 	
	SRO	Initiates troubleshooting and repairs	
	SRO	May exit AOP-3	
After CRS has briefed feedwater event <u>OR</u> at the discretion of the Lead Examiner, INSERT Remote 5 and Continue to Event 6.			

Op-Test No.: 1	Scenario No.: TWO	Event No.: 6	Page 1 of 1
Event Description: <i>P-50D lower seal failure, 5 minutes later the middle seal fails. P-50D high vibrations requiring Reactor Trip.</i>			
Time	Position	Applicant's Actions or Behavior	
	ATC	1 st Lower Seal failure: <ul style="list-style-type: none"> Alarm: EK-0952, PCP P-50D Seal Pressure Off Normal Middle seal pressure approx. 2000 psig Upper seal pressure rising to approx. 1000 psig. 2 nd Middle Seal Failure: <ul style="list-style-type: none"> Alarm: EK-0958, PCP P-50D Seal Hx Hi Temp Leakage Hi Flow Controlled Bleedoff Flow rising Middle and Upper seal pressure approx. equal. 	
Note: 2 nd Middle seal failure will occur 5 minutes after the first seal failure. Upon 2 nd Middle seal failure, high vibration on P-50D will ramp in at 2 mils/min INSERT Remote 6 upon receipt of 2nd Middle seal failure.			
	SRO	Enters AOP-29, PCP Abnormal Conditions	
	ATC	Monitor the following and compare to Att 1: <ul style="list-style-type: none"> PCP Seal Flow Recorder PCP Seal Pressure Recorder 	
	SRO	Verify two seal stages have failed and, <ul style="list-style-type: none"> Commence immediate plant shutdown per GOP-8 STOP affected PCP as soon as Plant conditions permit. 	
	ATC	Identify high vibrations on P-50D: <ul style="list-style-type: none"> EK-0913, PCP Vib Alert / Mon Trouble EK-0915, PCP Vibration Danger PCP Vibration Monitors: <ul style="list-style-type: none"> Red lights LIT for Alert and Danger 	
Note: Reactor Trip criteria for PCP vibration is 29 mils			
	SRO	Directs Reactor Trip, verification of Reactivity Control, and securing P-50D.	
	ATC	TRIP Reactor from C-02 pushbutton	
INSERT Trigger 9 upon Reactor Trip and continue to Event 7			

Op-Test No.: **1** Scenario No.: **TWO** Event No.: **7** Page **1** of **3**Event Description: ***Small Break LOCA (350 gpm leakage from charging line piping at reactor vessel)***

Time	Position	Applicant's Actions or Behavior
	ATC	Diagnose PCS leak: <ul style="list-style-type: none"> • PZR pressure dropping • PZR level dropping • VCT level dropping • Charging maximized
	ATC/BOP	Perform EOP-1.0 immediate actions.
	ATC	SECURE P-50D PCP due to high vibrations.
CRITICAL TASK: Secure P-50D within 10 minutes of demonstrating distress via high vibration alarms or high seal temperature alarms.		
	SRO	Commence EOP-1.0 verbal verifications.
	ATC	Reactivity Control: (met) <ul style="list-style-type: none"> • Reactor power lowering • negative SUR • maximum of one control rod not inserted
	BOP	Main Turbine Generator criteria: (met) <ul style="list-style-type: none"> • Main Turbine tripped • Generator disconnected from grid
	BOP	Feedwater criteria: (met) <ul style="list-style-type: none"> • PLACES MFP Controller to 'MANUAL' and RAMPS to minimum speed • Main FRVs and bypass valves CLOSED
	BOP	Vital Auxiliaries-Electric: (met) <ul style="list-style-type: none"> • Buses 1C and 1D energized • Bus 1E energized (If SIAS is not actuated) • Bus 1A and 1B energized • EY-01 energized • 3 of 4 Preferred AC Buses energized • Six DC Buses energized <ul style="list-style-type: none"> • Main Feed Pump Trip Power available lights LIT • AFW Pump control power lights LIT • MSIV control power lights LIT
	ATC	VERIFY adequate PCP seal cooling: (met) <ul style="list-style-type: none"> • At least one CCW Pump operating • At least one SW Pump operating • Both Critical SW headers in operation with pressure > 42 psig • CCW Containment Isol Valves open, CV-0910 / 0911 / 0940

Op-Test No.: **1** Scenario No.: **TWO** Event No.: **7** Page **2** of **3**Event Description: ***Small Break LOCA (350 gpm leakage from charging line piping at reactor vessel)***

Time	Position	Applicant's Actions or Behavior
	ATC	PCS Inventory Control: (not met) <ul style="list-style-type: none"> • PZR level 20% - 85% and trending toward normal (42% - 57%) • PCS 25°F subcooled (use Thot for forced circulation)
	ATC	PCS Pressure Control: (not met) <ul style="list-style-type: none"> • PZR pressure 1650 to 2185 psia and trending toward normal (2010 to 2100 psia) • VERIFY sprays closed and all heaters ON (trip off on low PZR level) • When PCS pressure is < 1605 psia, verify SIAS initiated: <ul style="list-style-type: none"> • Verify EK-1342 in alarm • Verify all available HPSI and LPSI pumps in service and valves open • When PCS pressure is < 1300 psia, stop 'A' and 'D' PCPs
Note: When verifying PCS Pressure Control, the Operator will verify Safety Injection status. Continue to Event 8 for Safety Injection Actuation failure and Event 9 for P-66A HPSI pump trip.		
	ATC	Core Heat Removal: <ul style="list-style-type: none"> • At least one PCP operating • Verify Loop ΔT less than 10°F <i>Note: Crew may misdiagnose this due to Hot Leg #2 RTD failure.</i> <ul style="list-style-type: none"> • Verify PCS at least 25°F subcooled
	BOP	PCS Heat Removal: <ul style="list-style-type: none"> • Verify at least one S/G has; level 5% - 70% and Feedwater available • Verify TAVE 525°F - 540°F • Verify BOTH S/G pressures 800–970 psia
	ATC	Containment Isolation: <ul style="list-style-type: none"> • Containment pressure < 0.85 psig <ul style="list-style-type: none"> • When Containment pressure > 4.0 psig: <ul style="list-style-type: none"> • VERIFY EK-1126 "CIS Initiated" in alarm • ENSURE CLOSED: Both MSIVs (MO-0510 and MO-0501); Main FRVs; Main FRV Bypasses; CCW Isolation Valves • ENSURE EK-1342 "Safety INJ Initiated" OR PUSH High Radiation Initiate pushbuttons on Panel EC-13 • ENSURE all available HPSI and LPSI Pumps operating with associated loop isolation valves open.

Op-Test No.: **1** Scenario No.: **TWO** Event No.: **7** Page **3** of **3**Event Description: ***Small Break LOCA (350 gpm leakage from charging line piping at reactor vessel)***

Time	Position	Applicant's Actions or Behavior
	BOP	Containment Isolation: <ul style="list-style-type: none"> • Verify Containment Area Monitor alarms clear • IF Cont Rad > 1x10 R/hr, then Ensure Actuated CIS • Verify Condenser Off Gas Monitor alarm clear • Verify Main Steam Line Monitor alarms clear
		Verify Containment Atmosphere: <ul style="list-style-type: none"> • Cnmt temp < 125°F • Ensure operating all CACs <ul style="list-style-type: none"> • V-1A and V-1B, V-2A and V-2B, V-3A and V-3B, V-4A and V-4B • Ensure open all CAC Hi-Cap outlet valves <ul style="list-style-type: none"> • CV-0867, CV-0861, CV-0864, CV-0873 • When Cnmt pressure > 4.0 psig: <ul style="list-style-type: none"> • Ensure both CS pumps start. CS valves open, and CS spray > 2850 gpm
	BOP	VERIFY IA pressure > 85 psig
	ATC	VERIFY SIRWT level > 25%
	BOP	ENSURE CR HVAC is aligned for Emergency Mode Operation within 20 mins of time of Reactor Trip. <ul style="list-style-type: none"> • VERIFY Supply Fan V-95 or V-96 for desired train is ON • ENSURE Air Filter Unit Fan V-26A or V-26B for desired train is ON • ENSURE OFF V-94 Purge Fan and V-47 Swgr Exh Fan
	BOP	VERIFY at least one Condensate Pump and one Cooling Tower Pump operating.
	BOP	VERIFY MSIVs are open OR MSIV Bypass valves are open
	SRO	Commence Emergency Shutdown Checklist (GOP-10)
	SRO	Commence EOP Supplement 45 "SFP Monitoring"
	SRO	Diagnose LOCA using EOP-1.0 Att 1 "Event Diagnostic Flow Chart" and transition to EOP-4.0
Continue to Event 8 and 9		

Op-Test No.: 1 Scenario No.: TWO Event No.: 8 Page 1 of 3

Event Description: **Failure of Left Channel SIAS to automatically or manually actuate / P-66A HPSI Pump trips on ground overcurrent 10 seconds after starting**

Time	Position	Applicant's Actions or Behavior
	SRO	Enters and directs actions of EOP-4.0
	ATC	If PZR Pressure is < 1605 psia OR Containment pressure > 4.0 psig, VERIFY EK-1342, Safety Inj Initiated" is LIT <ul style="list-style-type: none"> PUSH BOTH left and right train INJECTION INITIATE pushbuttons
	ATC	Identifies Left Channel SIAS has not actuated. <ul style="list-style-type: none"> Left train safeguards equipment not operating/aligned. Alarms not received: <ul style="list-style-type: none"> EK-1340, Safety Injection Initiated Signal 'A' EK-1342, Safety Injection Initiated
	ATC	Manually Actuate Left Train SIAS (will not work)
	ATC	Identifies P-66A HPSI Pump has tripped. May attempt to restart (will not start)
	BOP	START the following pumps: <ul style="list-style-type: none"> P-66B HPSI Pump P-67B LPSI Pump OPEN the following valves: <ul style="list-style-type: none"> Left Train <ul style="list-style-type: none"> CV-3010, CV-3009, CV-3011 CV-3008, CV-3007, CV-3013 Right Train <ul style="list-style-type: none"> CV-3012, CV-3066, CV-3064 CV-3014, CV-3068, CV-3062
CRITICAL TASK: Establish required SI flow greater than minimum for current PCS pressure prior to subcooling indicating < 0°F subcooling.		
	SRO	Determine that PCS Inventory acceptance criteria NOT met.
	SRO	May verify Attachment 1, "Safety Function Status Check Sheet", acceptance criteria are satisfied at intervals of approximately every 15 mins.
	BOP	<ul style="list-style-type: none"> ENSURE available safeguards equipment operating (EOP Supplement 5) VERIFY Containment Isolation (EOP Supplement 6)

Op-Test No.: 1 Scenario No.: TWO Event No.: 8 Page 2 of 3

Event Description: **Failure of Left Channel SIAS to automatically or manually actuate / P-66A HPSI Pump trips on ground overcurrent 10 seconds after starting**

Time	Position	Applicant's Actions or Behavior
	ATC	If PZR level < 36% (40% for degraded containment): <ul style="list-style-type: none"> PLACE HS-2003, HS-2004, HS-2005, Orifice Stop Valves, to CLOSE.
	ATC	If PZR pressure lowers to less than 1300 psia and SIAS initiated, <ul style="list-style-type: none"> ENSURE one PCP is stopped in each loop (SECURE P-50A since P-50D is already secured due to high vibes) If PCS is < 25oF subcooled, STOP all PCPs. VERIFY PCP operating limits per EOP Supplement 1
CRITICAL TASK: Secures PCPs as needed to establish one PCP operating in each loop within 3 minutes of PCS pressure lowering to less than 1300 psia.		
	BOP	CLOSE CWRT vent valves CV-1064 and CV-1065
	BOP	Attempt to isolate the LOCA by: <ul style="list-style-type: none"> VERIFY Both PORVs closed ENSURE CLOSED Letdown stop valves CV-2001 / 2009 ENSURE CLOSED PCS Sample Isol valves CV-1910 / 1911 ENSURE CLOSED Reactor Vessel and PZR Vent valves C-11A <ul style="list-style-type: none"> PRV-1067 / 1068 / 1069 / 1070 VERIFY RIA-0915 CCW Rad Monitor, alarm clear VERIFY EK-1172, CCW Surge Tank T-3 Hi-Lo Level, clear VERIFY PZR Relief Valves not lifting <ul style="list-style-type: none"> Acoustic monitors (C-11A) PZR Relief valve discharge temps (C-12) Quench Tank temp/level/pressure
	BOP	PLACE Hydrogen Monitor(s) in service per SOP-38
	ATC	If Containment pressure > 4.0 psig OR Containment Rads > 10 R/hr, VERIFY EK-1126, CIS Initiated, in alarm (should not reach this threshold)
	ATC	IF Containment pressure > 4.0 psig, VERIFY Containment Spray alignment and at least minimal spray flow (should not reach this threshold).
Note: CS should not be actuated at this point, Steps 16-18 are N/A.		

Op-Test No.: **1** Scenario No.: **TWO** Event No.: **8** Page **3** of **3**Event Description: ***Failure of Left Channel SIAS to automatically or manually actuate / P-66A HPSI Pump trips on ground overcurrent 10 seconds after starting***

Time	Position	Applicant's Actions or Behavior
	BOP	<ul style="list-style-type: none"> • VERIFY at least one Cooling Tower Pump operating • VERIFY at least one Condensate Pump operating.
	BOP	VERIFY one train of CR HVAC operating in Emergency Mode (directed in EOP-1.0)
	ATC	Commence emergency boration per SOP-2A Att 12 to establish PCS boron concentration greater than or equal to boron needed for Tave > 525°F as verified by sample or hand calculation per EOP Supplement 35.
	BOP	COMMENCE steaming S/Gs. REFER to <ul style="list-style-type: none"> • EOP Supplement 1 "Pressure Temperature Limit Curves" • EOP Supplement 33 "PCS Heatup/Cooldown Rate Data"
	BOP	When PCS cooldown rate can be controlled within required limits, OPERATE the TBV to cooldown at the maximum allowable rate.
When PCS cooldown is in progress <u>OR</u> at discretion of the Lead Examiner, TERMINATE SCENARIO.		

Scenario TWO – Scenario Critical Task Summary**HR-CT23-PCPTrip:**

Stop affected PCPs demonstrating distress via high vibration alarms or high seal temperature alarms within 10 minutes.

PC-CT16-SIAS/Required Flow:

Manually initiate SI (manual pushbuttons) or start pumps and align loop injection valves as necessary to establish required SI flow greater than minimum for current PCS pressure prior to the PCS (CET) subcooling indicating less than zero degrees subcooling.

HR-CT17-PCP T2L2:

Secure PCPs as needed to establish one PCP operating in each loop within 3 minutes of PCS pressure lowering to less than 1300 psia.

Facility: PALISADES NUCLEAR PLANT Scenario No.: THREE Op-Test No.: NRC-2017

Examiners: _____ Operators: _____

Initial Conditions: The Plant is in the middle of core life at 45% power. P-1B Main Feedwater pump has just been returned to service following repair of an oil leak. P-8A Aux Feedwater Pump was placed OOS 6 hours ago to support a breaker inspection. Severe weather has been noted in the area. AOP-38, Acts of Nature, entry is not required.

Turnover: GOP-5 is in progress at Step 3.5 of GCL 5.1. Shift orders are to place the second Heater Drain pump online per SOP-10 (in-progress at Step 7.2.2.d.7) and continue power ascension to full power at 12% per hour.

Event No.	Malfunction No.	Event Type*	Event Description
1	ED167B	BOP (N) SRO (N,T)	Start second Heater Drain pump per SOP-10. EDG 1-2 will start on undervoltage with an oil leak.
2	N/A	ATC (R) BOP (R) SRO (R)	Commence power escalation
3	CH06A	BOP (C) SRO (C,T)	Loss of 'A' Control Room HVAC Train
4	RX05B	ATC (I) SRO (I)	Channel 'B' Pressurizer Pressure controller failure
5	ED38A	ATC (C) BOP (C) SRO (C,T)	Loss of DC Panel ED-11-1
6	ED01	ALL (M)	Loss of all Offsite Power with two control rods stuck out.
7	ED11A	BOP (C) SRO (C)	Failure of EDG 1-1 output breaker to close

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

Scenario THREE - Simulator Operator Instructions

- Initialize Simulator Protected IC-198
- Load Scenario #3 Schedule and Event Triggers from jump drive.
- Validate Malfunctions, Remotes, and Overrides from Table below.

Event #	Remote or Trigger #	Instructions
N/A	Active Remote	FW165A (PIDFW01) P-8A, Auxiliary Feedwater Pump Breaker: Final Value = RACKOUT
N/A	Active Malfunction	ED11A (PIDED08) Diesel Gen Breaker Fail 1-1: Final Value = ACTIVE
N/A	Active Malfunction	RD16-07 (PIDRD02) CRDM Malfunctions: Final Value = STUCK
N/A	Active Malfunction	RD16-15 (PIDRD02) CRDM Malfunctions: Final Value = STUCK
1	Trigger 5	Zlo3p(510)==1 (Panel C-01) P-10B, Htr Drain Pump Red Light ON: ED167B (PIDED08) D/G 1-2 Local Control: Final Value = 1 (START)
1	Trigger 6	Zlo5p(1310)==1 (Panel C-04) D/G 1-2 Red Light ON: ED167B (PIDED08) D/G 1-2 Local Control: Final Value = 0 (NORMAL)
2	N/A	Commence Power Escalation: No action required.
3	Remote 1	CH06A (PIDCH06) Loss of Control Rm Fans / Trn A: Final Value = ACTIVE
4	Remote 2	RX05B (PIDRX01) Prszer Pres Cntrl Fail Hi Dir PT-0101B: Final Value = ACTIVE
5	Remote 3	ED38A (PIDED14) D11-1 250A Supply Fuse Failure: Final Value = ACTIVE
6	Remote 4	ED01 (PIDED03) Loss of Offsite Power: Final Value = ACTIVE
7	N/A	ED11A (PIDED08) Diesel Gen Breaker Fail 1-1: Final Value = ACTIVE

Special instructions:

- Ensure P-8A, Auxiliary Feedwater Pump Breaker racked out and place Caution Tag on P-8A Handswitch.
- Ensure Remote Function CV-25, T-53B, Boric Acid Storage Addition (PIDCV02) has Final Value = STOP and fill valve indicates CLOSED on PIDCV02.

Scenario THREE - Turnover Information

The Plant is in the middle of core life at 45% power. P-1B Main Feedwater pump has just been returned to service following repair of an oil leak. P-8A Aux Feedwater Pump was placed OOS 6 hours ago to support a breaker inspection (LCO 3.7.5.A.1 – 72 hours). Severe weather has been noted in the area. AOP-38, Acts of Nature, entry is not required.

GOP-5 is in progress at Step 3.5 of GCL 5.1. Shift orders are to place the second Heater Drain pump online per SOP-10 (in-progress at Step 7.2.2.d.7) and continue power ascension to full power at 12% per hour.

Op-Test No.: 1	Scenario No.: THREE	Event No.: 1	Page 1 of 1
Event Description: Start second Heater Drain pump per SOP-10			
Time	Position	Applicant's Actions or Behavior	
	BOP	START P-10B by placing 152-308/CS to CLOSE	
Note: EDG 1-2 will start when P-10B is started.			
	BOP	<ul style="list-style-type: none"> SLOWLY OPEN to MV-HED162 discharge valve until full open VERIFY operating current stable and contacts NPO to verify normal pump operation. 	
	BOP	<ul style="list-style-type: none"> Identifies EDG 1-2 started. Contacts NPO to check the automatic start of the EDG. 	
Simulator Operator: After approximately 3-4 minutes from being dispatched, NPO reports: <ul style="list-style-type: none"> Lube oil leak on EDG 1-2 Will be securing the EDG using the overspeed trip. 			
Simulator Operator: <ul style="list-style-type: none"> Report EDG 1-2 has been tripped using the overspeed trip. Report that, as the NPO, on your way out of the EDG 1-2 room, you saw the FIN Supervisor and notified them of the EDG 1-2 issue and the FIN team is investigating. 			
Note: Enabling the overspeed reset will prevent EDG 1-2 from starting.			
	SRO	Contacts Mechanical Maintenance or Work Week Manager to investigate EDG 1-2 oil leak.	
	BOP	May complete securing of EDG 1-2 by (from MCR): <ul style="list-style-type: none"> PLACE TO STOP G1-2/CS Engine Control switch ENSURE G1-2/CS in NORMAL AFTER STOP with green target CHECK local G1-2/SSS in NORM (LOCAL) RESET voltage check relay targets by depressing target reset (LOCAL) <ul style="list-style-type: none"> 127D-21 127D-22 127D-23 ENSURE 190-D2/CS Voltage Regulator in AUTO When D/G room temperature < 83°F, ENSURE V-24 (A or B) in AUTO and the other fan is in STANDBY. 	
Simulator Operator: When requested, RESET voltage check relay targets and inform NCO upon completion.			
	SRO	Enters Tech Spec LCO 3.8.1 Cond B (1 hour action to perform SR 3.8.1.1 and restore within 7 days).	
Continue to Event 2.			

Op-Test No.: 1	Scenario No.: THREE	Event No.: 2	Page 1 of 2
Event Description: Commence power escalation			
Time	Position	Applicant's Actions or Behavior	
	SRO	Enters and directs the actions of GOP-5 and GCL 5.1	
	SRO	Reviews GOP-5 Precautions and Limitations with crew.	
Note: CRS may notify ENPM, BA, RP, and Chemistry of impending load change.			
	SRO	Performs reactivity brief with crew.	
	BOP	Select ramp speed and rate (at 12% per hour), using SOP-8 Att 10. <ul style="list-style-type: none"> ENTER Setter value on numeric keypad PRESS SELECT on the numeric keypad and observe the following: <ul style="list-style-type: none"> HOLD displayed in the upper right corner of the CRT HOLD light/pushbutton illuminates on the Manual Panel PRESS TAB RIGHT on the cursor keypad ENTER desired acceleration rate using numeric keypad PRESS SELECT on the numeric keypad 	
	ATC	MAINTAIN T_{AVE} within 3°F of T_{REF} during the power escalation by regulating dilution and/or regulating rod withdrawal. For Dilution (SOP-2A Att 11): <ul style="list-style-type: none"> ENSURE CLOSED CV-2155 M/U Stop ENSURE one of the following in MANUAL and the other in OFF. <ul style="list-style-type: none"> P-90A, PW M/U Pump P-90B, PW M/U Pump ENSURE RESET and in AUTO FIC-0210A, PW M/U Boration flow ENSURE ZERO output signal on FIC-0210A, PW M/U Boration flow SET quantity and batch flow limit on FIC-0210A, PW flow controller OPEN CV-2155, M/U Stop PUSH start pushbutton on FIC-0210A When dilution complete, VERIFIES FIC-0210A output signal at zero PUSH start pushbutton on FIC-0210A VERIFIES FIC-0210A output signal at zero when dilution complete CLOSES CV-2155 MONITORS reactor power using highest indicated dT power and T_{AVE} For Control Rod manipulations: <ul style="list-style-type: none"> Operates Rod Control Switch to WITHDRAW Group 4 Regulating Rods in increments specified by CRS MONITORS reactor power using highest indicated dT power and T_{AVE}	

Op-Test No.: 1			Scenario No.: THREE			Event No.: 2			Page 2 of 2		
Event Description: Commence power escalation											
Time	Position	Applicant's Actions or Behavior									
	BOP	Initiate load change (SOP-8 Att 10): <ul style="list-style-type: none"> • ENSURE Limiter setting will not interfere with desired change. • PERFORM One of the following: <ul style="list-style-type: none"> ○ PRESS GO pushbutton on Manual Panel ○ PRESS GO/HOLD custom key on Display keypad ○ PRESS SELECT on numeric keypad, then PRESS START on control keypad • OBSERVE HOLD light extinguishes and GO light illuminates. • When ramp is complete, VERIFY GO/HOLD light extinguished. 									
	SRO	ENSURE secondary chemistry is within specifications prior to exceeding 49.5% power.									
Simulator Operator: If contacted by the CRS, acknowledge secondary chemistry is within limits.											
At the discretion of the Lead Examiner, INSERT REMOTE 1 and Continue to Event 3.											

Op-Test No.: 1	Scenario No.: THREE	Event No.: 3	Page 1 of 2
Event Description: Loss of 'A' Control Room HVAC Train			
Time	Position	Applicant's Actions or Behavior	
Simulator Operator: When Event 3 is initiated, CUE applicant on the back of C-11A showing DPIC-1659/1660 indicating '0' inches H ₂ O			
	BOP	Diagnose loss of 'A' Train CRHVAC: <ul style="list-style-type: none"> • V-95, Air Handling Unit Fan, stops running • Noticeable lowering of background sound • EK-0249, Control Room LOW Pressure DPIC-1659/1660 	
	BOP	Operator actions from EK-0249: <ul style="list-style-type: none"> • VERIFY CRHVAC not operating per SOP-24, Ventilation and Air Conditioning System • START 'B' CRHVAC train per SOP-24 	
	SRO	<ul style="list-style-type: none"> • DIRECTS BOP to place 'B' Train CRHVAC in service per SOP-24. • May direct securing reactive addition, including placing the turbine ramp on HOLD. 	
	BOP	To complete the shutdown of the 'A' CRHVAC train: <ul style="list-style-type: none"> • ENSURE V-26A, VF-26A Control Switch is placed in AUTO <p><i>Note: VC-11 will pump down prior to stopping (approx. 2 mins)</i></p> <ul style="list-style-type: none"> • PLACE VC-11 to OFF/RESET 	
	BOP	To start 'B' CRHVAC train: <ul style="list-style-type: none"> • ENSURE VC-11 has pumped down and stopped • ENSURE V-96 Control switch is ON • PLACE V-95 Control switch to AUTO • PLACE VC-11 Control Switch in AUTO • ENSURE VC-10 Control switch in AUTO • CHECK indications for train 'A' being shutdown: <ul style="list-style-type: none"> • Dampers D-1, D-2, D-3, and D-4 CLOSED • V-95 and VC-11 OFF • Check indications for train 'B' being started: <ul style="list-style-type: none"> • Dampers D-8, D-9, D-10, D-11 OPEN/MODULATING • V-96 and VC-10 ON 	
Simulator Operator: When CRHVAC is restored, CUE applicant on the back of C-11A showing DPIC-1659/1660 indicating > 0.125 inches H ₂ O			

Op-Test No.: 1			Scenario No.: THREE			Event No.: 3			Page 2 of 2		
Event Description: Loss of 'A' Control Room HVAC Train											
Time		Position		Applicant's Actions or Behavior							
		SRO		Refer to Tech Specs and determine the following required actions due to inoperable 'A' CRHVAC train: <ul style="list-style-type: none">• LCO 3.7.10.A.1 (7-day action)• LCO 3.7.11.A.1 (30-day action)							
After CRS has briefed CRHVAC event <u>OR</u> at the discretion of the Lead Examiner, INSERT REMOTE 2 and Continue to Event 4.											

Op-Test No.: 1 Scenario No.: THREE Event No.: 4 Page 1 of 2

Event Description: **Channel 'B' Pressurizer Pressure controller failure**

Time	Position	Applicant's Actions or Behavior
	ATC	Diagnoses failure of 'B' PZR Pressure Controller: Indications: <ul style="list-style-type: none"> PIC-0101B, 'B' Channel PZR Pressure Controller reads 2500 psia Signal output on PIC-0101B in 'full Spray' position PZR Spray CV's 1057/1059 show full open PZR pressure lowering on PI-0104 and PIC-0101A Major Alarms: <ul style="list-style-type: none"> EK-0754 "Pressurizer Pressure OFF Normal HI-LO"
	ATC	Performs Operator Actions for EK-0754: <ul style="list-style-type: none"> Notifies CRS to refer to AOP-28
	SRO	Enters AOP-28, Pressurizer Pressure Control Malfunctions Directs subsequent actions to be taken
Note: Per AOP-28, no immediate operator actions exist.		
	SRO	May direct RO to perform: <ul style="list-style-type: none"> PIC-0101B to the 'M' position Control PZR pressure using Slide Bar Direct a pressure band in which to maintain pressure Swap to PIC-0101A per SOP-1A <u>OR</u> <ul style="list-style-type: none"> PLACE HS 1/PRC-0101 to the 'A' Channel position Refers to SOP-1A, Primary Coolant System
Note: Directing RO to swap controllers and then reference the SOP <u>OR</u> following step by step guidance in SOP are both acceptable		
	ATC	Per SRO direction performs <ul style="list-style-type: none"> PLACES PIC-0101B to the 'M' position Control PZR pressure using Slide Bar Swap to PIC-0101A per SOP-1A <u>OR</u> <ul style="list-style-type: none"> PLACES HS 1/PRC-0101 to the 'A' Channel position Refers to SOP-1A, Primary Coolant System

Op-Test No.: 1	Scenario No.: THREE	Event No.: 4	Page 2 of 2
Event Description: Failure of 'B' Channel PZR Pressure Controller			
Time	Position	Applicant's Actions or Behavior	
	ATC	PLACES PPCS in 'AUTO" per SOP-1A Section 7.2.2: <ul style="list-style-type: none">• ADJUST blue pointer to match red pointer• DEPRESS the 'AUTO' pushbutton on PIC-0101A	
	SRO	The following Tech Spec LCO may apply: <ul style="list-style-type: none">• 3.4.1 Cond A, PZR pressure < 2010 psia, 2 hours	
	SRO	May exit AOP-28, may direct BOP to check instruments on back of C-12.	
After the SRO has briefed the loss of the 'B' Channel Pressurizer Pressure Controller OR at the discretion of the Lead Examiner, INSERT REMOTE 3 and Continue to Event 5.			

Op-Test No.: 1 Scenario No.: **THREE** Event No.: 5 Page 1 of 3Event Description: **Loss of DC Panel ED-11-1**

Time	Position	Applicant's Actions or Behavior
	SRO/ATC/BOP	Respond to numerous alarms <ul style="list-style-type: none"> EK-0523, Bus Transfer Control Ckt Undervoltage EK-0529, Startup Transformer Prot Ckt Undervoltage May enter Transient alarm response
	SRO	Enters AOP-17 "Loss of 125V DC Panel(s)"
	SRO/ATC/BOP	Crew diagnoses loss of ED-11-1 per AOP-17 Att 2: <ul style="list-style-type: none"> P-8A Bkr Ind Lights ON P-81A Bkr Ind Lights ON CV-0510 Pos. Ind. Lights OFF K-7A Trip Power Light ON
	BOP	VERIFY Main Feedwater Pump Recirc valves closed locally: (Note: both are not required to be closed at this power level) <ul style="list-style-type: none"> CV-0710 CV-0711
Simulator Operator: At the NCO's request, report back CV-0710 is closed and CV-0711 is open.		
	ATC	PLACE Letdown Orifice Stop Valve handswitches to CLOSE: <ul style="list-style-type: none"> HS-2003 HS-2004 HS-2005
	BOP	<ul style="list-style-type: none"> Verify P-8B Aux Feedwater Pump is operating Close the following P-8A/B Flow Control valves: <ul style="list-style-type: none"> CV-0727 CV-0749
	ATC	<ul style="list-style-type: none"> CONTROL Pressurizer level manually between 42-57% by operating charging pumps as needed CONTROL Pressurizer pressure <ul style="list-style-type: none"> SECURE P-55A Charging Pump ENSURE OPEN CV-2191, Pri Coolant Pp Controlled Bleedoff Stop
	BOP	IF necessary or desired to shutdown P-8B by actuating the overspeed trip.

Op-Test No.: 1

Scenario No.: **THREE**

Event No.: 5

Page 2 of 3

Event Description: **Loss of DC Panel ED-11-1**

Time	Position	Applicant's Actions or Behavior																												
	BOP	<p>May STOP all Auxiliary Building ventilation per SOP-24</p> <ul style="list-style-type: none"> PLACE in TRIP position, the standby Main Exhaust Fan V-6A or V-6B PLACE Engineered Safeguards Vent Dampers to the CLOSE position <ul style="list-style-type: none"> HS-1810A (Key 310) HS-1811A (Key 311) Stop the following fans: <table border="1"> <thead> <tr> <th>Fans</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>V-70A <u>or</u> V-70B</td> <td>Fuel Handling Area Exhaust Fan</td> </tr> <tr> <td>V-69</td> <td>Fuel Handling Area Supply Fan</td> </tr> <tr> <td>Remaining V-70</td> <td>Fuel Handling Area Exhaust Fan</td> </tr> <tr> <td>V-68A <u>or</u> V-68B</td> <td>Radwaste Area Exhaust Fan</td> </tr> <tr> <td>V-67</td> <td>Radwaste Area Supply Fan</td> </tr> <tr> <td>Remaining V-68</td> <td>Radwaste Area Exhaust Fan</td> </tr> <tr> <td>V-8A <u>or</u> V-8B</td> <td>Fuel Handling Area Exhauster</td> </tr> <tr> <td>V-7</td> <td>Fuel Handling Area Supply Fan</td> </tr> <tr> <td>Remaining V-8</td> <td>Fuel Handling Area Exhauster</td> </tr> <tr> <td>V-14A <u>or</u> V-14B</td> <td>Radwaste Area Exhauster</td> </tr> <tr> <td>V-10</td> <td>Radwaste Area Supply Fan</td> </tr> <tr> <td>Remaining V-14</td> <td>Radwaste Area Exhauster</td> </tr> <tr> <td>V-6A <u>or</u> V-6B</td> <td>Main Exhaust Fan</td> </tr> </tbody> </table>	Fans	Description	V-70A <u>or</u> V-70B	Fuel Handling Area Exhaust Fan	V-69	Fuel Handling Area Supply Fan	Remaining V-70	Fuel Handling Area Exhaust Fan	V-68A <u>or</u> V-68B	Radwaste Area Exhaust Fan	V-67	Radwaste Area Supply Fan	Remaining V-68	Radwaste Area Exhaust Fan	V-8A <u>or</u> V-8B	Fuel Handling Area Exhauster	V-7	Fuel Handling Area Supply Fan	Remaining V-8	Fuel Handling Area Exhauster	V-14A <u>or</u> V-14B	Radwaste Area Exhauster	V-10	Radwaste Area Supply Fan	Remaining V-14	Radwaste Area Exhauster	V-6A <u>or</u> V-6B	Main Exhaust Fan
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V-7	Fuel Handling Area Supply Fan																													
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V-10	Radwaste Area Supply Fan																													
Remaining V-14	Radwaste Area Exhauster																													
V-6A <u>or</u> V-6B	Main Exhaust Fan																													
Simulator Operator: IF asked, inform Control Room that PO-1817, Dirty Waste Tank Room Ventilation damper, is closed																														
	SRO	May NOTIFY Radiation Protection that Aux Bldg Ventilation is Shutdown, and to monitor Control Room radiation levels.																												
	SRO	May Direct more frequent monitoring of the following: <ul style="list-style-type: none"> MFW Suction Pressure T-5, Moisture Separator and Heater Drain Tank, level P-10A and P-10B, Heater Drain Pumps 																												

Op-Test No.: 1

Scenario No.: THREE

Event No.: 5

Page 3 of 3

Event Description: **Loss of DC Panel ED-11-1**

Time	Position	Applicant's Actions or Behavior																																				
	BOP	<p>May PLACE one train of CR HVAC in Emergency Mode</p> <ul style="list-style-type: none"> PLACE the 'B' Air Filter Unit Fan V-26B handswitch to ON ENSURE the remaining component status in at least one Train: <table border="1"> <thead> <tr> <th>COMPONENT NAME</th><th>COMPONENT NUMBER TRAIN "A"</th><th>TRAIN "B"</th><th>POSITION</th></tr> </thead> <tbody> <tr> <td>Filter Heater</td><td>VHX-26A</td><td>VHX-26B</td><td>ON</td></tr> <tr> <td>Discharge Damper</td><td>D-5</td><td>D-12</td><td>OPEN</td></tr> <tr> <td>Recirculation Damper</td><td>D-6</td><td>D-13</td><td>OPEN</td></tr> <tr> <td>Modulating Damper</td><td>D-20</td><td>D-21</td><td>MODULATING</td></tr> <tr> <td>Air Filter Unit Fan</td><td>V-26A</td><td>V-26B</td><td>ON</td></tr> <tr> <td>Recirculation Damper</td><td>D-3</td><td>D-10</td><td>OPEN</td></tr> <tr> <td>Discharge Damper</td><td>D-4</td><td>D-11</td><td>OPEN</td></tr> <tr> <td>Air Handling Unit Fan</td><td>V-95</td><td>V-96</td><td>ON</td></tr> </tbody> </table> <ul style="list-style-type: none"> ENSURE OFF Purge Fan V-94 ENSURE OFF Switchgear Exhaust Fan V-47 	COMPONENT NAME	COMPONENT NUMBER TRAIN "A"	TRAIN "B"	POSITION	Filter Heater	VHX-26A	VHX-26B	ON	Discharge Damper	D-5	D-12	OPEN	Recirculation Damper	D-6	D-13	OPEN	Modulating Damper	D-20	D-21	MODULATING	Air Filter Unit Fan	V-26A	V-26B	ON	Recirculation Damper	D-3	D-10	OPEN	Discharge Damper	D-4	D-11	OPEN	Air Handling Unit Fan	V-95	V-96	ON
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Recirculation Damper	D-3	D-10	OPEN																																			
Discharge Damper	D-4	D-11	OPEN																																			
Air Handling Unit Fan	V-95	V-96	ON																																			
	SRO	Conduct Crew Brief for loss of ED-11-1 affects and potential future contingency actions per AOP-17 Attachment 6.																																				
	SRO	<p>Enter the applicable Tech Spec LCOs:</p> <ul style="list-style-type: none"> 3.4.13 Cond A (4 hours to restore leakage to within limits) 3.8.1 Cond E (2 hours to restore – also reportable event) 3.8.9 Cond C (8 hours to restore DC Bus) <p>May Enter the following Tech Spec LCOs (if Aux Building Ventilation secured):</p> <ul style="list-style-type: none"> 3.3.10 Cond A (Immediately take action to isolate associated ESRV System) 3.7.13 Cond A (Immediately take action to isolate associated ESRV Damper train(s)) 																																				
After CRS has conducted loss of DC brief <u>OR</u> at the discretion of the Lead Examiner, INSERT REMOTE 4 and Continue to Event 6/7.																																						

Op-Test No.: 1 Scenario No.: TWO Event No.: 6 / 7 Page 1 of 7

Event Description: **LOOP coincident with two control rods stuck out / Failure of EDG 1-1 Output Breaker to Close**

Time	Position	Applicant's Actions or Behavior
Note: EDG 1-1 will not automatically start on Bus undervoltage due to a failure of DC Bus ED-11-1		
	ATC/BOP	Recognize the reactor has tripped and a Loss of Offsite Power has occurred: <ul style="list-style-type: none"> Numerous alarms Control Room lights out No charging flow (pumps tripped) No air compressors operating
	ATC/BOP	Perform EOP-1.0 immediate actions.
	SRO	Commence EOP-1.0 verbal verifications.
	ATC	Reactivity Control: (not met) <ul style="list-style-type: none"> Reactor power lowering negative SUR maximum of one control rod not inserted TWO rods stuck out - must verify position via PPC page 410 and will need to Emergency Borate per SOP-2A (cannot perform without power)
	BOP	Main Turbine Generator criteria: (not met) <ul style="list-style-type: none"> Main Turbine tripped Generator disconnected from grid CONNECT jumper between terminals 1 and 10 on Relay 487U (y-phase) inside panel C-04.
	BOP	Feedwater criteria: (met) <ul style="list-style-type: none"> PLACES MFP Controller to 'MANUAL' and RAMPS to minimum speed Main FRVs and bypass valves CLOSED
Note: When a manual start of EDG 1-1 is attempted, the output breaker will not close.		
	BOP	Vital Auxiliaries-Electric: (not met) <ul style="list-style-type: none"> Buses 1C and 1D energized <ul style="list-style-type: none"> Neither energized - Attempt to manually START EDG 1-1 (output breaker will not close) Bus 1E energized (will not be energized, no actions) Bus 1A and 1B energized (will not be energized, no actions) EY-01 energized 3 of 4 Preferred AC Buses energized Six DC Buses energized <ul style="list-style-type: none"> Main Feed Pump Trip Power available lights LIT AFW Pump control power lights LIT MSIV control power lights LIT (not all LIT, ED-11-1 lost)

Op-Test No.: 1 Scenario No.: THREE Event No.: 6 / 7 Page 2 of 7

Event Description: **LOOP coincident with two control rods stuck out / Failure of EDG 1-1 Output Breaker to Close**

Time	Position	Applicant's Actions or Behavior
	ATC	VERIFY adequate PCP seal cooling <ul style="list-style-type: none"> No SW Pumps running and Critical SW Header pressures < 42 psig and PCP Seal Cooling not adequate: CLOSE CV-1359 CLOSE PCP Controlled Bleedoff valves: <ul style="list-style-type: none"> CV-2083 CV-2191 CV-2099
	ATC	PCS Inventory Control: (met) <ul style="list-style-type: none"> PZR level 20% - 85% and trending toward normal (42% - 57%) PCS 25°F subcooled (use CET for natural circulation)
	ATC	PCS Pressure Control: (met) <ul style="list-style-type: none"> PZR pressure 1650 to 2185 psia and trending toward Normal (2010 to 2100 psia) Manually operates PPCS in MANUAL and operate PZR heaters and sprays to maintain EOP Supplement 1 limits. When PCS pressure is < 1605 psia, verify safety injection initiated
	ATC	Core Heat Removal: (met) <ul style="list-style-type: none"> Verify Loop ΔT less than 10°F Verify PCS at least 25°F subcooled (use Average QCET for Nat Circ)
	ATC	PCS Heat Removal: (met) <ul style="list-style-type: none"> Verify at least one S/G has; level 5% - 70% and Feedwater available Establish AF flow through CV-0749 and CV-0727 Verify TAVE 525°F - 540°F May close ADVs to maintain PCS temperature and S/G level Verify BOTH S/G pressures 800–970 psia
CRITICAL TASK: Establish feedwater flow to one S/G using an AFW pump Main Feed Pump, or Condensate Pump prior to S/G level reaching -84%.		
	ATC	Containment Isolation: (met) <ul style="list-style-type: none"> VERIFY Containment pressure < 0.85 psig
	BOP	Containment Isolation: (met) <ul style="list-style-type: none"> Verify Containment Area Monitor alarms clear Verify Condenser Off Gas Monitor alarm clear Verify Main Steam Line Monitor alarms clear
	ATC	Containment Atmosphere: (met) <ul style="list-style-type: none"> Verify Containment temperature less than 125F. Verify Containment pressure less than 0.85psig.

Op-Test No.: **1** Scenario No.: **THREE** Event No.: **6 / 7** Page **3** of **7**Event Description: ***LOOP coincident with two control rods stuck out / Failure of EDG 1-1 Output Breaker to Close***

Time	Position	Applicant's Actions or Behavior
	ATC	VERIFY IA pressure > 85 psig
	ATC	VERIFY SIRWT level > 25%
	BOP	ENSURE CR HVAC is aligned for Emergency Mode Operation within 20 mins of time of power restoration (Cannot perform until power is restored)
	ATC	CLOSE MSIVs (no Condensate or Cooling Tower Pumps operating).
	SRO	Commence Emergency Shutdown Checklist (GOP-10)
	SRO	Commence EOP Supplement 45 "SFP Monitoring"
	SRO	Determines Reactivity Control and Maintenance of Vital Auxiliaries – Electric both are not met and transition to EOP-9.0 using EOP-1.0 Att 1 "Event Diagnostic Flow Chart"
	SRO	Enters and directs actions of EOP-9.0
Note: Steps 3-9 cannot be completed without power.		
	SRO	<ul style="list-style-type: none"> Determines Reactivity Control Safety Function is not met and go to EOP-9.0 RC-2 Determines Maintenance of Vital Auxiliaries – Electrical is not met and go to EOP-9.0 AC-2
Note: Going to EOP-9.0 RC-2 is correct in the procedure hierarchy, but required actions cannot be completed without power. Going to EOP-9.0 AC-2 to restore power then immediately performing actions to satisfy the RC safety function is prudent.		
	SRO	May verify Attachment 1, "Safety Function Status Check Sheet", acceptance criteria are satisfied at intervals of approximately every 15 mins.
	SRO	Within 1 hour, VERIFY any of the following AC sources will be restored within 4 hours. (Crew should question restoration capability at this point)

Op-Test No.: 1 Scenario No.: THREE Event No.: 6 / 7 Page 4 of 7

Event Description: **LOOP coincident with two control rods stuck out / Failure of EDG 1-1 Output Breaker to Close**

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK: Restore power to either 1C or 1D bus within 1 hour of any source being available.		
Simulator Operator: When questioned by CRS, Inform the crew that EDG 1-2 repair is completed and the overspeed trip can be reset. EDG 1-2 will START upon resetting the overspeed trip due to bus undervoltage.		
	BOP	May perform EOP Supplement 34 to ENSURE OPEN all feeder and supply breaker on the de-energized 4160 VAC and/or 2400 VAC buses <ul style="list-style-type: none"> • VERIFY OPEN (for 1D Bus, at minimum), the following breakers: <ul style="list-style-type: none"> • 152-211 • 152-213 • 152-203 • 152-202
	BOP	VERIFY the following alarms are clear: <ul style="list-style-type: none"> • EK-1125, C-13 High Temp • EK-1367, Elec Rooms High Ambient • EK-0251, Panel C06 Ventilation Hi Temp
	BOP	May DIRECT NPO to TRIP EDG 1-1 by tripping the overspeed trip level due to no Service Water cooling
	BOP	PERFORM Preliminary actions of EOP Supplement 24 <ul style="list-style-type: none"> • ENSURE CLOSED CCW Isol Valves <ul style="list-style-type: none"> • CV-0911 (key 338) (Note: no C/P due to D11-1 failure) • CV-0940 (key 336) • PLACE HS-1359A Non-Crit Hdr CV-1359 to CLOSE • PLACE the following C/S to TRIP position and release <ul style="list-style-type: none"> • 152-103 (P-7B) • 152-109 (P-52A) • 152-116 (P-52C) • 152-204 (P-7A) • 152-205 (P-7C) • 152-208 (P-52B)
Simulator Operator: When requested by NCO, verify CV-0911 is closed locally		
Note: Time compression must be used to remove breaker fuses		
	BOP	Dispatch NPO to REMOVE Trip and C/P fuses for <u>either</u> P-7A <u>OR</u> P-7C Service Water Pump

Op-Test No.: 1 Scenario No.: THREE Event No.: 6 / 7 Page 5 of 7

Event Description: **LOOP coincident with two control rods stuck out / Failure of EDG 1-1 Output Breaker to Close**

Time	Position	Applicant's Actions or Behavior
Simulator Operator: <ul style="list-style-type: none"> Acknowledge BOP's request to remove Trip and C/P fuses for the requested SW Pump. <ul style="list-style-type: none"> P-7A 152-204 P-7C 152-205 Inform BOP's of the use of time compression to complete this task. 		
Note: Time compression must be used to throttle discharge valves.		
	BOP	<ul style="list-style-type: none"> Stage operators to throttle discharge valves for P-7A <u>OR</u> P-7C <u>AND</u> P-52B Service Water Pump P-7A <ul style="list-style-type: none"> UNLOCK and CLOSE MV-SW102 P-7A discharge valve THROTTLE OPEN two turns MV-SW102 (P-7A discharge valve) Service Water Pump P-7C <ul style="list-style-type: none"> UNLOCK and CLOSE MV-SW104 THROTTLE OPEN two turns MV-SW104 Component Cooling Pump <ul style="list-style-type: none"> UNLOCK and CLOSE MV-CC942 (P-52B discharge valve) THROTTLE OPEN MV-CC942 (P-52B discharge valve)
Simulator Operator: When requested by BOP; <ul style="list-style-type: none"> Unlock and close, THEN throttle open two turns for the pumps directed to be started: <ul style="list-style-type: none"> P-7A: MV-SW102 P-7C: MV-SW104 P-52B: MV-CC942 Inform BOP's of the use of time compression to complete this task. 		
Note: EDG 1-2 will START upon resetting the overspeed trip due to bus undervoltage.		
	BOP	<ul style="list-style-type: none"> VERIFY Bus 1D is not faulted (EK-0532 clear) START EDG 1-2 by DIRECTING NPO to reset overspeed trip ENSURE essential equipment sequences and loads
Simulator Operator: START EDG 1-2 by resetting overspeed trip at the direction of the BOP operator.		
	ATC	PERFORM subsequent actions of EOP Supplement 24. <ul style="list-style-type: none"> When the first SW Pump (P-7A or P-7C) has started, direct NPO to SLOWLY OPEN discharge valve MV-SW102 (P-7A) OR MV-SW104 (P-7C) When the first CCW Pump (P-52B) has started, direct NPO to SLOWLY OPEN discharge valve MV-CC942

Op-Test No.: **1** Scenario No.: **THREE** Event No.: **6 / 7** Page **6** of **7**Event Description: ***LOOP coincident with two control rods stuck out / Failure of EDG 1-1 Output Breaker to Close***

Time	Position	Applicant's Actions or Behavior
Simulator Operator: When requested by BOP, SLOWLY OPEN the pump discharge valves as requested: <ul style="list-style-type: none"> • P-7A SW Pump, MV-SW102 • P-7C SW Pump, MV-SW104 • P-52B CCW Pump, MV-CC942 		
Simulator Operator: When requested by NCO, REINSTALL Trip and C/P fuses for the Service Water Pump P-7A <u>OR</u> P-7C		
	BOP	May START Instrument Air Compressor P-2B per EOP-9.0 MVAA-1
	BOP	<ul style="list-style-type: none"> • ENSURE CLOSED 152-201 • ENSURE 480V MCCs energized as appropriate <ul style="list-style-type: none"> • MCC-2, 52-2006 (Bus 20) • MCC-8, 52-1201 (Bus 12)
	BOP	<ul style="list-style-type: none"> • POWER 125VDC busses from battery chargers on MCC-2 per SOP-30 (direct another operator to perform this step) • VERIFY 125VDC buses powered by a battery charger • VERIFY 480VAC LCC 11 and LCC 12 energized • SUPPLY power to available de-energized bus (SOP-30) When MCC 2 is energized, ENSURE EY-01 is energized
Simulator Operator: When requested, PLACE Battery Charger #3 in service and REMOVE Battery Charger #1 from service.		
	BOP	May OPERATE additional Plant HVAC Fans as needed (SOP-24)
	SRO	VERIFY MVAE-AC-2 is satisfied (when at least one 2400VAC is energized from an EDG.
	SRO	Enter and direct actions of EOP-9.0 RC-2
Note: Direction to perform emergency boration per SOP-2A was given in EOP-1.0. CRS can direct emergency to be performed using that procedural guidance.		

Op-Test No.: **1** Scenario No.: **THREE** Event No.: **6 / 7** Page **7** of **7**

Event Description: ***LOOP coincident with two control rods stuck out / Failure of EDG 1-1 Output Breaker to Close***

Time	Position	Applicant's Actions or Behavior
	ATC	<p>MAXIMIZE boration using the CVCS by:</p> <ul style="list-style-type: none"> • ALIGN Charging Pump suction • START at least one Boric Acid Pump (P-56A / B) • OPEN MO-2140 Boric Acid Pump Feed valve • ENSURE normal charging path aligned as follows: <ul style="list-style-type: none"> • OPEN CV-2111 Charging Line Stop valve • OPEN at least one of CV-2113 or CV-2115 Charging Stop valve • START ALL available Charging Pumps and verify > 33 gpm charging flow <p>Note: May not start additional charging pumps provided flow > 33 gpm</p>
<p>CRITICAL TASK: Initiate charging flow greater than 33 gpm with suction from a CBWAST (T-53A or B) within 10 minutes of restoring AC power.</p>		
<p>When negative reactivity is being inserted via emergency boration <u>OR</u> at the discretion of the Lead Examiner, TERMINATE SCENARIO.</p>		

Scenario THREE – Scenario Critical Task Summary**HR-CT08-FWFLOW:**

Establish feedwater flow to one S/G using an AFW pump Main Feed Pump, or Condensate Pump prior to S/G level reaching -84%.

MVAAC-CT03-Restore:

Ensure at least one (1C or 1D) bus is energized from its associated D/G, the Start-up Transformer, the Safeguards Transformer, or Backfeed (Main Power Transformer) within 1 hour of any source being available.

RC-CT01-EMERGBORATE:

Take actions to initiate charging flow greater than 33 gpm with suction from a CBWAST (T-53A or B) within 10 minutes (following restoration of AC power) of the reactor trip.