

Final Submittal

(Blue Paper)

*HARRIS EXAM
2007-301*

As Given Simulator Scenario Operator Actions ES-D-2

Facility:	SHEARON-HARRIS	Scenario No.:	1	Op Test No.:	NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions:	<ul style="list-style-type: none"> IC-19, 100% power, MOL. GP-006, Step 5.2.3 has been completed. MDAFW Pump "A" is cleared and tagged for motor bearing replacement. 60 hours remain on TS 3.7.1.2.a Action a. REM-01TV-3534, Condenser Vacuum Pump Effluent Monitor is out-of-service. SG "A" Tube Leakage is 4 GPD. 				
Turnover:	<ul style="list-style-type: none"> Beginning at GP-006, Step 5.2.4, reduce power to $\leq 90\%$ @ 4 DEH Units/minute to perform turbine valve testing this shift. The Load Dispatcher has been notified. 				
Critical Task:	<ul style="list-style-type: none"> Start the TDAFW Pump before RCS Feed and Bleed criteria is met. Establish a high head injection flowpath before exiting PATH-1. 				
Event No.	Malf. No.	Event Type*	Event Description		
1	N/A	N - BOP, SRO R - RO	Lower power.		
2	CVC05A	C - RO, SRO TS - SRO	Charging Pump "A" breaker trips.		
3	N/A	N - RO	Restore normal letdown.		
4	XN21A34 CND04A	C - BOP, SRO	Vacuum Pump "A" lube oil problem and trip.		
5	PT:444	I - RO, SRO	Controlling PZR Pressure Channel (PT-444) fails HI.		
6	LT:486	I - BOP, SRO TS - SRO	Controlling SG "B" Level Channel (LT-486) fails LO.		
7	LT:484 RPS01B	M - ALL	Second SG "B" Level Channel fails LOW ATWS		
8	CFW01B Z1974 TDI Z1975 TDI	C - BOP, SRO	MDAFW Pump "B" trips. TDAFW Pump fails to start automatically.		
9	SGN04 SIS020 SIS017	C - ALL	One Main Steam Safety Valve on SG "C" sticks OPEN. 1SI-3 and 1SI-4 fail to align for injection.		
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>					

Scenario Event Description
Shearon-Harris 2007 NRC Scenario 1

The crew assumes the watch having pre-briefed on the procedure to lower power to 90% for turbine valve testing. Motor-driven Auxiliary Feedwater Pump "A" (MDAFW Pump "A") is tagged out-of-service and will be out for the entire shift.

On cue from the Lead Evaluator, Charging-Safety Injection Pump "A" (CSIP "A") will trip. The crew should respond to alarms and enter AOP-018, REACTOR COOLANT PUMP ABNORMAL CONDITIONS, due to the loss of seal injection flow. The reactor operator should isolate letdown as part of the immediate actions. The procedure will direct starting of CSIP "B" and restoration of charging and letdown. Three different TS action statements apply but all have the same duration for action.

When charging and letdown are restored and the TS for the CSIP entered, the Lead Evaluator can cue the running Vacuum Pump problem. The Simulator Operator will actuate alarm ALB-21-6-1, indicating a lube oil pressure problem on the running (1A) Condenser Vacuum Pump. The Auxiliary Operator (AO) will report an oil leak and slowly decreasing lube oil pressure. Two minutes after the AO report, the running vacuum pump will trip. The SRO should direct the BOP operator to start the standby Condenser Vacuum Pump. This can be done using the alarm response procedure or the system operating procedure. Depending on crew response time, AOP-012, PARTIAL LOSS OF CONDENSER VACUUM, may be entered.

On cue from the Lead Evaluator, PT-444, the controlling Pressurizer Pressure Channel, will fail HI. The crew should respond to multiple alarms and enter AOP-019, MALFUNCTION OF RCS PRESSURE CONTROL. The RO should complete the immediate actions by closing the open Pressurizer PORV and gaining control of the Pressurizer Spray Valves. Depending on crew response time, a short OTΔT turbine runback may occur. It is likely that the SRO will be required to enter the DNB technical specification for RCS pressure. The crew should be allowed to complete AOP-019 to stabilize the plant but the channel does not have to be removed from service to continue the scenario.

On cue from the Lead Evaluator, LT-486, the controlling level channel on Steam Generator "B" (SG "B"), will fail LOW. The BOP should respond to flow mismatch and/or SG level deviation alarms and take manual control of the affected feedwater regulating valve in accordance with the alarm response procedures and management guidance for controlling malfunctioning automatic equipment. The SRO should enter the TS action statements for reactor trip instrumentation and for ESF instrumentation.

On cue from the Lead Evaluator, a second level channel on SG "B" will fail LOW; generating a reactor trip demand signal. The SRO should direct a MANUAL Reactor Trip but the MANUAL and AUTO Reactor Protection System trips are blocked. MDAFW Pump "B" will trip and automatic start of the Turbine-driven AFW Pump (TDAFW Pump) is blocked. The crew should enter PATH-1 and then transition to FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS. The BOP should start the TDAFW Pump and the SRO should direct an AO to open the reactor trip breakers. The reactor will trip after the RO has initiated Emergency Boration. Coincident with the reactor trip a safety valve on SG "C" will stick open; causing an AUTO SI but valves in the high head injection path will not align properly. The SRO should transition back to PATH-1 after the reactor trip is confirmed. The crew should align the alternate high head injection path and work through PATH-1 to the faulted SG diagnostic steps. The SRO should then transition to EPP-14, FAULTED STEAM GENERATOR ISOLATION. The crew should isolate SG "C" in accordance with EPP-14 and terminate SI flow. The Lead Evaluator can terminate the scenario after high head SI flow is terminated.

SIMULATOR SETUP

SPECIAL INSTRUCTIONS

- Clip a copy of GUIDE-1 Attachment 1 (SI Alignment) and Attachment 6 (Safeguards Actuation Verification) to each scenario guide for use by the evaluators.

INITIAL CONDITIONS:

- IC-19
- MDAFW Pump "A" OOS (CFW026)
- Clearance Tag on MDAFW Pump "A"
- Remove REM-3534, Condenser Vacuum Pump Effluent Monitor from service
- Ensure status board is current
- Provide Reactivity Plan for power reduction to 90%
- Turnover Sheet
- Ensure rod step counters reset to the correct value

PRE-LOAD:

- RPS01B (ATWS)
- CFW01B (MDAFW Pump breaker trips during AUTO start)
- Z1974TDI Fail deenrg (TDAFW Pump fails to AUTO start)
- Z1975TDI Fail deenrg (TDAFW Pump fails to AUTO start)
- SIS020 - ENGAGED (1SI-3 fails to re-position in AUTO or MANUAL)
- SIS017 - ENGAGED (1SI-4 fails to re-position in AUTO or MANUAL)

TRIGGERS:

- ET-2: CVC05A (Charging Pump "A" trips)
- ET-4: XN21A34 (ALARM ON, ALB-21-6-1, CONDENSER VACUUM PUMPS LUBE OIL LOW PRESS)
- ET-15: CND04A (1A Condenser Vacuum Pump trips approximately two minutes after the AO report)
- ET-5: PT:444 (Controlling PP Channel fails HIGH)

Scenario Event Description
Shearon-Harris 2007 NRC Scenario 1

- ET-6: LT:486 (SG "B" Level Channel fails LOW)
- ET-7: LT:484 (SG "B" Level Channel fails LOW)
- ET-16: Clear RPS01B
- ET-9: SGN04C (Main Steam Safety Valve fails OPEN on SG "C")
- ET-18 and ET-19: Guide 1, Attachment 6 field actions

Op Test No.:	<u>1</u>	Scenario #	<u>1</u>	Event #	<u>1</u>	Page	<u>5</u>	of	<u>38</u>
Event Description:		Lower Power							
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions:		
Indications Available:		
LEAD EVALUATOR:	Cue Event 2 (Charging Pump "A" trip) when the evaluating team has completed their evaluation of the power change. It is not necessary to reach 90% power to continue the scenario.	
EVALUATOR NOTE:	The crew may elect to manually crack open a PRZ Spray Valve to establish PRZ Surge line flow and thereby maintain PRZ/RCS boron concentrations within limits.	
	SRO	GP-006, Step 5.2.4.
PROCEDURE NOTE:	<p>When PRZ backup heaters are energized in manual, PK-444A1, PRZ Master Pressure Controller (a PI controller) will integrate up to a greater than normal output, opening PRZ Spray Valves to return and maintain RCS pressure at setpoint. The result is as follows:</p> <ul style="list-style-type: none"> • PORV PCV-444B will open at a lower than expected pressure. • ALB-009-3-2, PRESSURIZER HIGH PRESS DEVIATION CONTROL, will activate at a lower than expected pressure. • Increased probability for exceeding Tech Spec DNB limit for RCS pressure. 	
	RO	ENERGIZE all available Pressurizer Backup Heaters.
PROCEDURE NOTE:	Routine load changes should be coordinated with the Load Dispatcher to meet system load demands.	

Op Test No.:	<u>1</u>	Scenario #	<u>1</u>	Event #	<u>1</u>	Page	<u>6</u>	of	<u>38</u>
Event Description:		Lower Power							
Time	Position	Applicant's Actions or Behavior							

	SRO	INFORMS Load Dispatcher that a load reduction to 90% will begin. (N/A, per Initial Conditions)
<p>PROCEDURE CAUTION: A failure of the Vidar in the DEH computer has resulted in a plant trip in the past. This failure would affect operation in Operator Auto, and can be detected in either of the following ways:</p> <ul style="list-style-type: none"> • If OSI-PI is available, the process book PLANTSTATUS.PIW, DEH Trends function of the Plant Process Computer: DEH (menu) contains a point for DEH MEGAWATTS. With a failure of the Vidar, this point will not be updating. • If OSI-PI is NOT available, accessing the ANALOG INPUTS screen on the Graphics display computer (in the Termination Cabinet room near the ATWS panel) will show several points, most of which should be updating if the Vidar is functioning properly. 		
	SRO	DIRECTS BOP to start power reduction and specifies a rate. May direct initiation of a boration before the power reduction begins.
	BOP	DEPRESS the LOAD RATE MW/MIN push-button.
	BOP	ENTER the desired rate, NOT to exceed 5 MW/MIN, in the DEMAND display. (4 DEH Units/minute)
	BOP	DEPRESS the ENTER push-button.
	BOP	DEPRESS the REF push-button.
	BOP	ENTER the desired load (120 MW if shutting down) in the DEMAND display. (Approx. 870 MW)

Op Test No.:	1	Scenario #	1	Event #	1	Page	7	of	38
Event Description:		Lower Power							
Time	Position	Applicant's Actions or Behavior							

	BOP	DEPRESS the ENTER push-button. The HOLD push-button should illuminate.
PROCEDURE NOTE: The unloading of the unit can be stopped at any time by depressing the HOLD push-button. The HOLD lamp will illuminate and the GO lamp will extinguish. The load reduction can be resumed by depressing the GO push-button. The HOLD lamp will extinguish and the GO lamp will illuminate.		
	BOP	DEPRESS the GO push-button to start the load reduction.
	BOP	VERIFY the number in the REFERENCE display decreases.
	BOP	VERIFY Generator load is decreasing.
	BOP	WHEN Turbine load is less than 95%, THEN VERIFY the 3A and 3B Feedwater Vents have been opened per OP-136, Section 7.2.
SIMULATOR OPERATOR: Acknowledge direction. No simulator response actions are required.		
	RO	MONITORS primary systems response.
	RO	INITIATES boration, as necessary (with SRO concurrence).
EVALUATOR'S NOTE: OP-107 is a "Reference Use" procedure.		
	RO	DETERMINE the reactor coolant boron concentration from chemistry OR the Main Control Room status board.

Op Test No.:	<u>1</u>	Scenario #	<u>1</u>	Event #	<u>1</u>	Page	<u>8</u>	of	<u>38</u>
Event Description:		Lower Power							
Time	Position	Applicant's Actions or Behavior							

	RO	DETERMINE the magnitude of boron concentration increase required.
	RO	DETERMINE the volume of boric acid to be added using the reactivity plan associated with the IC.
EVALUATOR'S NOTE: FIS-113, BORIC ACID BATCH COUNTER, has a tenths position.		
PROCEDURE CAUTION: If the translucent covers associated with the Boric Acid and Total Makeup Batch counters FIS-113 and FIS-114, located on the MCB, are not closed, the system will not automatically stop at the preset value.		
	RO	SET FIS-113, BORIC ACID BATCH COUNTER, to obtain the desired quantity.
PROCEDURE NOTE: Boration of the RCS will be dependent on charging and letdown flow rate. Placing additional letdown orifices in service will increase the boric acid delivery rate to the RCS.		
	RO	SET controller 1CS-283, FK-113 BORIC ACID FLOW, for the desired flow rate.
	RO	VERIFY the RMW CONTROL switch has been placed in the STOP position.
	RO	VERIFY the RMW CONTROL switch green light is lit.
	RO	PLACE control switch RMW MODE SELECTOR to the BOR position.

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Event Description: Lower Power

Time	Position	Applicant's Actions or Behavior
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PROCEDURE NOTE:

When PRZ backup heaters are energized in manual, PK 444A1, PRZ Master Pressure Controller (a PI controller) will integrate up to a greater than normal output, opening PRZ Spray Valves to return and maintain RCS pressure at setpoint. The result is as follows:

- PORV PCV-444B will open at a lower than expected pressure.
- ALB-009-3-2, PRESSURIZER HIGH PRESS DEVIATION CONTROL, will activate at a lower than expected pressure.
- Increased probability for exceeding Tech Spec DNB limit for RCS pressure.

	RO	OPERATE the pressurizer backup heaters as required to limit the difference between the pressurizer and RCS boron concentration to less than 10 ppm.
	SRO/RO	FOR large boron changes, PERFORM the following:
		<ul style="list-style-type: none"> • DIRECT Chemistry to sample the RCS for boron concentration.
		<ul style="list-style-type: none"> • MAKE boron concentration adjustments as dictated from sample results.

PROCEDURE NOTE:

Boration may be manually stopped at any time by turning control switch RMW CONTROL to STOP.

	RO	START the makeup system as follows:
		<ul style="list-style-type: none"> • TURN control switch RMW CONTROL to START momentarily.
		<ul style="list-style-type: none"> • VERIFY the RED indicator light is LIT.

PROCEDURE CAUTION:

The operation should be stopped if an unanticipated reactivity effect is seen. Do not resume the operation until the cause has been corrected.

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Event Description: Lower Power

Time	Position	Applicant's Actions or Behavior
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	RO	VERIFY Tav _g responds as desired.
	RO	IF rod control is in AUTO, THEN VERIFY the control rods are stepping out to the desired height.
	RO	VERIFY boration automatically terminates when the desired quantity of boron has been added.
	RO	PLACE Reactor Makeup in Auto per Section 5.1.
	RO	VERIFY the RMW CONTROL switch:
		• Is in the STOP position.
		• The GREEN light is LIT.
	RO	PLACE the RMW MODE SELECTOR to AUTO.
	RO	START the makeup system as follows:
		• TURN control switch RMW CONTROL to START momentarily.
		• VERIFY the RED indicator light is LIT.

Op Test No.: 1 Scenario # 1 Event # 2 and 3 Page 11 of 38

Event Description: Charging Pump "A" Breaker Trips; Letdown restoration

Time	Position	Applicant's Actions or Behavior
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Booth Operator Instructions: Actuate ET-2 (CSIP "A" trips).

Indications Available: ALB-06-1-1 CHARGING PUMP DISCHARGE HEADER HIGH-LOW FLOW; ALB-06-1-2 CHRG PUMP A TROUBLE, ALB-06-1-3 CHRG PUMP A TRIP OR CLOSE CKT TROUBLE; ALB-08-2-1 RCP SEAL WATER INJECTION LOW FLOW

	RO	RESPONDS to multiple alarms on ALB-06 (1-1, 1-2, 1-3) and ALB-08-2-1.
	RO	REPORTS CSIP "A" tripped.
	SRO	ENTERS AOP-018, RCP Abnormal Conditions.
	RO	PERFORMS immediate actions.
Immediate Action	RO	CHECK ANY CSIP RUNNING. (NO)
Immediate Action	RO	ISOLATE letdown by verifying the following valves SHUT:
		• 1CS-7, 45 GPM Letdown Orifice A
		• 1CS-8, 60 GPM Letdown Orifice B
		• 1CS-9, 60 GPM Letdown Orifice C
	SRO	REFER to PEP-110, Emergency Classification and Protective Action Recommendations, AND ENTER the EAL Network at entry point X.

Booth Operator: The crew should dispatch an AO to investigate. Wait 3-4 minutes then report a breaker overcurrent trip flag on Phase A and no obvious problem on pump.

Evaluator Note: The SRO will likely stop the power reduction by directing the BOP to place the turbine in HOLD.

Op Test No.: 1 Scenario # 1 Event # 2 and 3 Page 12 of 38

Event Description: Charging Pump "A" Breaker Trips; Letdown restoration

Time	Position	Applicant's Actions or Behavior
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Procedure NOTE: Minimum allowable flow for a CSIP is 60 gpm which is provided by normal miniflow during normal operation and alternate miniflow during safety injection. Maintaining CSIP flow greater than or equal to 60 gpm also satisfies this requirement.

	SRO	EVALUATE plant conditions AND GO TO the appropriate section:		
		MALFUNCTION	SECTION	PAGE
		Loss of CCW and/or Seal Injection to RCPs	3.1	5
	RO	CHECK ALB-5-1-2A, RCP Thermal Bar HDR High Flow, alarm CLEAR. (YES)		
	SRO	CHECK ALL RCPs operating within the limits of Attachment 1. (YES)		
	RO	CHECK ALL RCPs RUNNING. (YES)		
	RO	CHECK the following NORMAL for ALL RCPs:		
		• CCW flow (YES)		
		• Seal Injection flow (NO)		
	SRO	RESTORE using the applicable attachment:		
		MALFUNCTION	ATTACHMENT	
		Loss of Seal Injection flow only	Attachment 4 (Page 32)	
	RO	CHECK at least one CSIP RUNNING. (NO)		
	RO	PLACE controller FK-122.1, Charging Flow in MANUAL AND SHUT.		

Op Test No.: 1 Scenario # 1 Event # 2 and 3 Page 13 of 38

Event Description: Charging Pump "A" Breaker Trips; Letdown restoration

Time	Position	Applicant's Actions or Behavior
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	RO	SHUT HC-186.1, RCP Seal WTR INJ Flow.
	RO	VERIFY a suction path for the standby CSIP by performing the following:
		<ul style="list-style-type: none"> VERIFY CSIP suction flowpath from VCT as follows:
		<ul style="list-style-type: none"> VERIFY greater than 5% level is established in VCT. (YES)
		<ul style="list-style-type: none"> VERIFY the following valves are OPEN:
		<ul style="list-style-type: none"> LCV-115C, VCT Outlet (1CS-165) (YES)
		<ul style="list-style-type: none"> LCV-115E, VCT Outlet (1CS-166) (YES)
SRO NOTE: If required and with Unit SCO concurrence, the standby CSIP may be started without the auxiliary lube oil pump in service.		
BOOTH OPERATOR NOTE: When requested: A CSIP Aux Oil OFF, B CSIP Aux Oil AUTO, use Remote Functions: CVC057 STOP; CVC058 AUTO.		
	RO	START the standby CSIP. (CSIP "B")
		Evaluator Note: The answer to "CHECK seal injection flow LOST for less than 5 minutes" could be NO. If so, the crew will be directed to restore seal injection flow in accordance with Attachment 4 which will limit the cooldown rate of the seal inlet and pump radial bearings to 1 °F/minute.
	RO	CHECK seal injection flow LOST for less than 5 minutes. (YES)
	RO	ADJUST HC-186.1, RCP Seal WTR INJ Flow, to establish seal injection flow as necessary to maintain the following:
		<ul style="list-style-type: none"> LESS than 31 gpm total flow to all RCPs
		<ul style="list-style-type: none"> BETWEEN 8 and 13 gpm to all RCPs

Op Test No.:	<u>1</u>	Scenario #	<u>1</u>	Event #	<u>2 and 3</u>	Page	<u>14</u>	of	<u>38</u>
Event Description:		Charging Pump "A" Breaker Trips; Letdown restoration							
Time	Position	Applicant's Actions or Behavior							

	SRO	START CSIP room ventilation per OP-172, Reactor Auxiliary Building HVAC System. (AH-9B)
	RO	RESTORE Charging and Letdown flow per OP-107, Chemical and Volume Control System. EVALUATOR NOTE: The steps for evaluating restoration of letdown begin at the bottom of this page.
	SRO	INITIATE action to determine and correct the cause of the loss of the CSIP.
		<ul style="list-style-type: none"> Completes an Equipment Failure Checklist and contacts WCC for assistance.
	RO	CHECK seal injection flow between 8 and 13 gpm has been established to all RCPs.
	SRO	WHEN seal injection flow has been established between 8 and 13 gpm, THEN PERFORM OST-1126, Reactor Coolant Pump Seals Controlled Leakage Evaluation Monthly Interval Modes 1-4. (Will not be completed before next event)
EVALUATOR'S NOTE:		After CSIP "B" has been started, the TS declaration made, and letdown is restored, cue Event 4 (Vacuum Pump 1A lube oil problem).
	SRO	ENTERS TS: <ul style="list-style-type: none"> 3.1.2.2, Boron Injection Flowpaths 3.1.2.4, CSIP's 3.5.2, ECCS Subsystems All are 72 hours to restore action statements.
	RO	OP-107, 5.5 – Initiating Normal Letdown

Op Test No.: 1 Scenario # 1 Event # 2 and 3 Page 15 of 38

Event Description: Charging Pump "A" Breaker Trips; Letdown restoration

Time	Position	Applicant's Actions or Behavior
		Verifies Initial Conditions:
		<ul style="list-style-type: none"> Charging flow established
		<ul style="list-style-type: none"> PRZ Level > 17%
		<ul style="list-style-type: none"> CS-7, CS-8, CS-9 (Letdown Orifice Isolation valves) SHUT
		PROCEDURE CAUTION: If Charging flow was stopped or greatly reduced prior to letdown being secured, there is a possibility that the Letdown line contains voids due to insufficient cooling. This is a precursor to water hammer, and should be evaluated prior to initiating letdown flow.
		VERIFY 1CC-337, TK-144 LTDN TEMPERATURE, controller is: <ul style="list-style-type: none"> in AUTO <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> set for 110 to 120 °F (4.0 to 4.7 on potentiometer) normal operation
		PROCEDURE NOTE: PK-145.1 LTDN PRESSURE, 1CS-38, may have to be adjusted to control at lower pressures.
		VERIFY 1CS-38 Controller, PK-145.1 LTDN PRESSURE, in MAN with output set at 50%.
		VERIFY open the following Letdown Isolation Valves: <ul style="list-style-type: none"> 1CS-2, LETDOWN ISOLATION LCV-459 1CS-1, LETDOWN ISOLATION LCV-460

Op Test No.: 1 Scenario # 1 Event # 2 and 3 Page 16 of 38

Event Description: Charging Pump "A" Breaker Trips; Letdown restoration

Time	Position	Applicant's Actions or Behavior										
		<p>PROCEDURE NOTE: The following table gives the minimum charging flow required to keep the regenerative heat exchanger temperature below the high temperature alarm when letdown is established:</p> <table><tr><th>Letdown Flow (to be established)</th><th>Minimum Charging Flow necessary when letdown is established</th></tr><tr><td>45 gpm</td><td>20 gpm</td></tr><tr><td>60 gpm</td><td>26 gpm</td></tr><tr><td>105 gpm</td><td>46 gpm</td></tr><tr><td>120 gpm</td><td>53 gpm</td></tr></table>	Letdown Flow (to be established)	Minimum Charging Flow necessary when letdown is established	45 gpm	20 gpm	60 gpm	26 gpm	105 gpm	46 gpm	120 gpm	53 gpm
Letdown Flow (to be established)	Minimum Charging Flow necessary when letdown is established											
45 gpm	20 gpm											
60 gpm	26 gpm											
105 gpm	46 gpm											
120 gpm	53 gpm											
		<p>PROCEDURE NOTE: If Pressurizer level is above the programmed level setpoint, charging flow should be adjusted to a point above the minimum required to prevent regenerative heat exchanger high temperature alarm but low enough to reduce pressurizer level.</p>										
		<p>ADJUST controller 1CS-231, FK-122.1 CHARGING FLOW, as required to:</p> <ul style="list-style-type: none">• maintain normal pressurizer level program• keep regenerative heat exchanger temperature below the high temperature alarm when the desired letdown orifice is placed in service.										
		<p>OPEN an Orifice Isolation Valve (1CS-7, 1CS-8, 1CS-9) for the orifice to be placed in service.</p>										
		<p>ADJUST 1CS-38 position by adjusting PK-145.1 output as necessary to control LP LTDN Pressure (PI-145.1) at 340 to 360 psig, to prevent lifting the LP Letdown Relief.</p>										
		<p>WHEN Letdown pressure has stabilized at 340 to 360 psig on PI-145.1, LP LTDN PRESS, THEN PERFORM the following:</p> <ol style="list-style-type: none">ADJUST PK-145.1 LTDN PRESSURE setpoint to 58%PLACE the controller in AUTO.										

Op Test No.:	<u>1</u>	Scenario #	<u>1</u>	Event #	<u>2 and 3</u>	Page	<u>17</u>	of	<u>38</u>
Event Description:		Charging Pump "A" Breaker Trips; Letdown restoration							
Time	Position	Applicant's Actions or Behavior							

		VERIFY PK-145.1 LTDN PRESSURE Controller maintains Letdown pressure stable at 340 to 360 psig.
		OPEN additional orifice isolation valves (1CS-7, 1CS-8, 1CS-9) as required.
		ADJUST charging flow as necessary to: <ul style="list-style-type: none"> • prevent high temperature alarm (per table above) • maintain pressurizer programmed level.
		PLACE PRZ level controller, LK-459F, in MAN to cancel any integrated signal.
		PLACE PRZ level controller, LK-459F, in AUTO.
		WHEN the following occurs: <ul style="list-style-type: none"> • Program pressurizer level is matching the current pressurizer level <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> • Letdown and seal return are balanced with seal injection flow and charging flow. <p>THEN place controller 1CS-231, FK-122.1 CHARGING FLOW, in AUTO.</p>
		COMPLETE Section 5.5.3. (Position Verification)

Op. Test No.: 1 Scenario # 1 Event # 4 Page 18 of 38

Event Description: Vacuum Pump 1A Lube Oil Problem

Time	Position	Applicant's Actions or Behavior
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Booth Operator Instructions: Event Trigger 4 (Alarm ALB-021-6-1). {After two minutes, trip Vacuum Pump 1A using Event Trigger 15.}

Indications Available: ALB-021-6-1, CONDENSER VACUUM PUMPS LUBE OIL LOW PRESS

Evaluator Note: If it has not already been stopped manually, Vacuum Pump 1A will trip two minutes after the AO reports the oil leak (Event Trigger 15).

	RO	RESPONDS to ALB-021-6-1, CONDENSER VACUUM PUMPS LUBE OIL LOW PRESS and enters APP-ALB-021-6-1.
	BOP	CONFIRM alarm using:
		<ul style="list-style-type: none"> Status indicating light for Vacuum Pump Main & Auxiliary Oil Pumps
		<ul style="list-style-type: none"> Reports normal control board indication for Vacuum Pump A.
	BOP	VERIFY Automatic Functions:
		<ul style="list-style-type: none"> Loss of lube oil, PS-1921A (B), 12.5 psig decreasing, will auto start the Auxiliary Oil Pump on the running Vacuum Pump.
		<ul style="list-style-type: none"> Loss of lube oil, PS-1922A (B), 10.5 psig decreasing, will auto start the standby Vacuum Pump due to loss of lube oil pressure in the operating pump.
	BOP/SRO	DISPATCHES AO to investigate.
		<ul style="list-style-type: none"> ENSURE lube oil pump pressure normal, discharge 13 to 35 psig and 15 to 25 psig on the header.
		<ul style="list-style-type: none"> CHECK operation of auxiliary pump.
		<ul style="list-style-type: none"> DETERMINE if malfunction of main pump may cause auxiliary pump to fail.

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Event Description: Vacuum Pump 1A Lube Oil Problem

Time	Position	Applicant's Actions or Behavior
SIMULATOR OPERATOR NOTE: <ul style="list-style-type: none"> • Wait one to two minutes then report oil leaking onto the floor around Vacuum Pump "A" and oil pressure at 12 psig and lowering slowly. • If directed, acknowledge assignment to perform pre-start checks on Vacuum Pump "B" and then report back as complete. • Two minutes after making the initial report, actuate the trigger for CND04A to trip Vacuum Pump "A" (Event Trigger 15) 		
EVALUATOR'S NOTE: The SRO may elect to enter AOP-012. If entered, the only Control Room action performed is the same as that for ALB-021-6-1: Start the standby Condenser Vacuum Pump.		
	SRO	IF necessary, THEN START the standby Vacuum Pump.
	BOP	STARTS Vacuum Pump "B". (May utilize OP-133.)
	BOP	STOPS Vacuum Pump "A".
	SRO	Completes an Equipment Failure Checklist and contacts WCC for assistance. EVALUATOR NOTE: This will occur when time permits.
	SRO	IF Condenser vacuum is degrading, THEN GO TO AOP-012, Partial Loss of Condenser Vacuum.
LEAD EVALUATOR: Cue Event 5 (Controlling PZR Pressure Channel fails HIGH) anytime after the vacuum pumps have been swapped.		

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Event Description: Controlling PZR Pressure Channel (PT-444) Fails HI

Time	Position	Applicant's Actions or Behavior
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Booth Operator Instructions: Actuate Trigger 5 (Controlling PZR Pressure Channel fails HIGH).

Indications Available:

- ALB-09-3-2 PRESSURIZER HIGH PRESS DEVIATION CONTROL
- ALB-09-5-1 PRESSURIZER HIGH-LOW PRESS
- ALB-09-8-1 PRESSURIZER RELIEF TANK HIGH-LOW LEVEL PRESS OR TEMP
- ALB-09-8-2 PRESSURIZER RELIEF DISCHARGE HIGH TEMP

	RO	Responds to ALB-09 alarms.
	RO	Reports channel failure or malfunction of RCS Pressure control.
	SRO	Enters AOP-019, MALFUNCTION OF RCS PRESSURE CONTROL.
	RO	Perform AOP-019 Immediate Actions.
Immediate Action	RO	CHECK that a bubble exists in the PRZ. (YES)
Immediate Action	RO	VERIFY ALL PRZ PORVs AND associated block valves properly positioned for current PRZ pressure and plant conditions. (NO)
		<ul style="list-style-type: none"> • IF ANY PRZ PORV will NOT shut when required, THEN SHUT its associated block valve.
Immediate Action	RO	CHECK Both PRZ spray valves properly positioned for current PRZ pressure and plant conditions. (NO)
Immediate Action	RO	CONTROL PRZ spray valves in MANUAL using ONE of the following (listed in order of preference):

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Event Description: Controlling PZR Pressure Channel (PT-444) Fails HI

Time	Position	Applicant's Actions or Behavior
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Immediate Action		<ul style="list-style-type: none"> PK-444A, Master Pressure Controller
		OR
Immediate Action		<ul style="list-style-type: none"> Both individual spray valve controllers
	SRO	GO TO Section 3.1, Pressure Control Malfunctions While Operating With a Pressurizer Bubble.
		Evaluator Note: Dependent on crew response time, the PRT rupture disk may fail causing containment radiation monitor alarms.
	SRO	Inform SSO to REFER to PEP-110, Emergency Classification and Protective Action Recommendations, AND ENTER the EAL Network at entry point X.
	RO	MONITOR PRZ pressure by observing other reliable indication.
	SRO	CHECK plant in MODE 1 OR 2. (YES)
	RO	CHECK PRZ pressure CONTROLLED. (YES)
	RO	CHECK PRZ pressure 2335 PSIG OR LESS. (YES)
	RO	CHECK ALL of the following PRZ PORV block valves OPEN:
		<ul style="list-style-type: none"> 1RC-117 (for PCV-445A SA) (YES)
		<ul style="list-style-type: none"> 1RC-115 (for PCV-445B) (YES)
		<ul style="list-style-type: none"> 1RC-113 (for PCV-44B SB) (YES)
	RO	CHECK that a malfunction of one or more of the following has occurred:
		<ul style="list-style-type: none"> PT-444 (YES)

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Event Description: Controlling PZR Pressure Channel (PT-444) Fails HI

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> • PK-444A (NO)
		<ul style="list-style-type: none"> • PRZ heater(s) (NO)
		<ul style="list-style-type: none"> • PRZ spray valve(s) or controller(s) (NO)
	RO	CHECK PK-444A controlling properly in AUTO. (NO)
	RO	PERFORM the following:
		<ul style="list-style-type: none"> • VERIFY PK-444A in MANUAL.
		<ul style="list-style-type: none"> • ADJUST PK-444A output as necessary, to attempt to restore and maintain PRZ pressure.
	RO	CONTROL PRZ pressure as follows:
PROCEDURE NOTE: If individual spray valve controllers are already in MAN, do NOT return to AUTO.		
	RO	CHECK BOTH PRZ spray valve controllers in AUTO AND BOTH spray valves operating as desired. (YES)
	RO	CHECK ALL PRZ heaters operating as desired. (YES)
		<ul style="list-style-type: none"> • Manually OPERATE control switches for heater groups as necessary to control PRZ pressure. (N/A)
	RO	CHECK at least one of the following conditions present:
		<ul style="list-style-type: none"> • PRZ pressure is UNCONTROLLED (NO)
		<ul style="list-style-type: none"> • Status of a normal spray valve or a PRZ heater bank is UNCONTROLLED (NO)
	SRO	REFER TO Tech Spec 3.2.5 (DNB Parameters) AND IMPLEMENT action where appropriate. (Limit is 2185 psig – restore within 2 hours)

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Event Description: Controlling PZR Pressure Channel (PT-444) Fails HI

Time	Position	Applicant's Actions or Behavior
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	SRO	Completes an Equipment Failure Checklist and contacts WCC for assistance.
LEAD EVALUATOR:		Cue Event 6 (SG "B" Level Channel fails LOW) after TS 3.2.5 has been evaluated or AOP-019 is complete.

Op Test No.: 1 Scenario # All Event # 6 Page 24 of 38

Event Description: Controlling SG "B" Level Channel (LT-486) Fails LO

Time	Position	Applicant's Actions or Behavior
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Booth Operator Instructions: Actuate ET-6 (SG "B" Level Channel fails LOW)**Indications Available: ALB-014-5-3A STEAM GEN B NR LOW LEVEL****EVALUATOR'S NOTE:**

It is NOT necessary for the crew to enter AOP-010, FEEDWATER MALFUNCTION or the APP-ALB-014-5-3A for this instrument failure. It is a management expectation that control room operators will take manual control of malfunctioning equipment.

	BOP	RESPONDS to alarm ALB-014-5-3A and/or flow transient.
	BOP	ENTERS APP-ALB-014-5-3A.
	BOP	CONFIRM alarm using:
		<ul style="list-style-type: none"> LI-484 SA, LI-485 SB, LI-486 SA, Steam Generator B Narrow Range level indicators.
		<ul style="list-style-type: none"> REPORTS LT-486 failed LOW.
	BOP	PERFORM Corrective Actions:
		<ul style="list-style-type: none"> IF the alarm is NOT due to a failed instrument, THEN: (N/A)
		<ul style="list-style-type: none"> CHECK steam flow (FI-484, FI-485) AND feed flow (FI-486, FI-487) for deviation. (YES)
		<ul style="list-style-type: none"> IF SG B auto level controller FCV-488 is NOT sufficiently correcting level, THEN:
		<ul style="list-style-type: none"> SWITCH to MANUAL
		<ul style="list-style-type: none"> RESTORE level to normal (57% NR).
	SRO	<p>Enters TS:</p> <ul style="list-style-type: none"> 3.3.1, Reactor Trip Instrumentation, Table 3.3-1 Items 13/14, Action 6 3.3.2, ESF Instrumentation, Table 3.3-3 Item 5b, Action 19 <p>Both require trip of the inoperable channel within 6 hours.</p>

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Event Description: Controlling SG "B" Level Channel (LT-486) Fails LO

Time	Position	Applicant's Actions or Behavior
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SIMULATOR OPERATOR NOTE: Insert Event 7 (Second level channel fails on SG "B") when SG level is under control and/or trending to the band and the TS entry is complete. LT-486 does not have to be removed from service to continue with the scenario.		

Op Test No.:	<u>1</u>	Scenario #	<u>All</u>	Event #	<u>7, 8, & 9</u>	Page	<u>26</u>	of	<u>38</u>
Event Description:		Second LOW-LOW SG signal; ATWS; MDAFW Pump "B" Trips, TDAFW Pump Fails to Start Automatically; One Main Steam Safety Valve on SG "C" Sticks OPEN; 1-SI-3 and 1SI-4 Fail to Align for Injection							
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions: Actuate ET-7 (Second level channel fails LOW on SG "B"). The following preloads should occur: The Reactor should fail to trip (RPS01B), TDAFW will fail to start automatically (Z1974TDI and Z1975TDI), and MDAFW will attempt to start and trip off (CFW01B).

Indications Available: Reactor trip demand on ALB-012-4-3 REACTOR TRIP STEAM GEN B LOW-LOW LEVEL

	BOP	RESPONDS to alarms and reports reactor trip signal.
	SRO	DIRECTS a MANUAL reactor trip.
	RO	Attempts to initiate a MANUAL Reactor Trip.
	SRO	Enters PATH-1.
	SRO	Transitions to FRP-S.1.
	SRO	Directs the operators to perform the immediate actions of FRP-S.1
Immediate Action	RO	Verify Reactor Trip:
		<ul style="list-style-type: none"> Check for all of the following:
		<ul style="list-style-type: none"> Check for any of the following:
		<ul style="list-style-type: none"> Trip breakers RTA AND BYA – OPEN (NO)
		<ul style="list-style-type: none"> Trip breakers RTB AND BYB – OPEN (NO)
		<ul style="list-style-type: none"> Rod bottom lights – LIT (NO)
		<ul style="list-style-type: none"> Neutron flux – DECREASING (NO)

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Event Description: Second LOW-LOW SG signal; ATWS; MDAFW Pump "B" Trips, TDAFW Pump Fails to Start Automatically; One Main Steam Safety Valve on SG "C" Sticks OPEN; 1-SI-3 and 1SI-4 Fail to Align for Injection

Time	Position	Applicant's Actions or Behavior
Immediate Action		IF the reactor will NOT trip (automatically OR using either manual trip switch), THEN verify negative reactivity inserted by any of the following while continuing with this procedure:
		<ul style="list-style-type: none"> Manually insert control rods.
		<ul style="list-style-type: none"> Verify control rods inserting in automatic. (YES) EVALUATOR NOTE: The RO should switch to MANUAL Rod Control when/if AUTO rod speed lowers to < 48 SPM.
Immediate Action	BOP	Verify Turbine Trip:
		<ul style="list-style-type: none"> Check for any of the following:
		<ul style="list-style-type: none"> All turbine throttle valves – SHUT (NO)
		<ul style="list-style-type: none"> All turbine governor valves – SHUT (NO)
		Manually trip turbine from MCB. (YES)
Immediate Action	BOP	Verify All AFW Pumps – RUNNING. (NO)
		<ul style="list-style-type: none"> Reports AFW Pump "B" tripped.
Critical Task		<ul style="list-style-type: none"> Manually start the TDAFW Pump before any two SG WR Level indicators decrease to less than 15% (RCS feed and bleed criteria) to ensure maintenance of a secondary heat sink with an operable AFW Pump.
Immediate Action	RO	Check Reactor Trip Status:
		<ul style="list-style-type: none"> Check reactor – TRIPPED (NO)
Immediate Action	RO/SRO	Direct an NLO to contact OR report to the main control room (to receive instructions to locally trip the reactor).

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Event Description: Second LOW-LOW SG signal; ATWS; MDAFW Pump "B" Trips, TDAFW Pump Fails to Start Automatically; One Main Steam Safety Valve on SG "C" Sticks OPEN; 1-SI-3 and 1SI-4 Fail to Align for Injection

Time	Position	Applicant's Actions or Behavior
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SIMULATOR OPERATOR'S NOTE: If the announcement is made in the step above then wait until Emergency Boration is initiated and CNMT Ventilation Isolation has been completed then actuate ET-16 to delete RPS01B.

Actuate ET-9 (SG "C" Safety Valve fails OPEN) when the crew transitions back to PATH-1.

	SRO	Perform the following:
		<ul style="list-style-type: none"> Inform STA to initiate monitoring the Critical Safety Function Status Trees.
		<ul style="list-style-type: none"> Inform SSO to Evaluate EAL Network using entry point X (Refer to PEP-110).
	RO	Initiate Emergency Boration of RCS:
		<ul style="list-style-type: none"> Check SI flow – GREATER THAN 200 GPM. (NO)
		<ul style="list-style-type: none"> Emergency borate from the BAT:
		<ul style="list-style-type: none"> Start a boric acid pump.
		<ul style="list-style-type: none"> Perform any of the following (listed in order of preference):
		<ul style="list-style-type: none"> Open Emergency Boric Acid Addition valve:
		1CS-278
		<ul style="list-style-type: none"> Open normal boration valves:
		FCV-113A
		FCV-113B
		<ul style="list-style-type: none"> Verify boric acid flow to CSIP suction – AT LEAST 30 GPM.
		<ul style="list-style-type: none"> Verify CSIP flow to RCS – AT LEAST 30 GPM.
	RO	Check PRZ Pressure – LESS THAN 2335 PSIG. (YES)

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Event Description: Second LOW-LOW SG signal; ATWS; MDAFW Pump "B" Trips, TDAFW Pump Fails to Start Automatically; One Main Steam Safety Valve on SG "C" Sticks OPEN; 1-SI-3 and 1SI-4 Fail to Align for Injection

Time	Position	Applicant's Actions or Behavior	
	BOP	Isolate CNMT Ventilation:	
		<ul style="list-style-type: none">Stop the following fans: (If running)	
		<ul style="list-style-type: none">AH-82A NORMAL PURGE SUPPLY FAN	
		<ul style="list-style-type: none">AH-82B NORMAL PURGE SUPPLY FAN	
		<ul style="list-style-type: none">E-5A CNMT PRE-ENTRY PURGE EXHAUST FAN	
		<ul style="list-style-type: none">E-5B CNMT PRE-ENTRY PURGE EXHAUST FAN	
		Verify the valves and dampers listed in the table – SHUT.	
		TRAIN A Components	TRAIN B Components
		1CB-2 SA VACUUM RELIEF	1CB-6 SB VACUUM RELIEF
		CB-D51 SA VACUUM RELIEF	CB-D52 SB VACUUM RELIEF
		1CP-9 SA NORMAL PURGE INLET	1CP-6 SB NORMAL PURGE INLET
		1CP-5 SA NORMAL PURGE	1CP-3 SB NORMAL PURGE DISCH
		1CP-10 SA PRE-ENTRY PURGE INLET	1CP-7 SB PRE-ENTRY PURGE INLET
		1CP-4 SA ENTRY PURGE DISCH	1CP-1 SB PRE-ENTRY PURGE DISCH
	RO	Reports the reactor is tripped.	
	BOP	Check turbine – TRIPPED (YES)	
	RO	Check Reactor Subcritical:	
		<ul style="list-style-type: none">Check for both of the following:	
		<ul style="list-style-type: none">Power range channels – LESS THAN 5% (YES)	
		<ul style="list-style-type: none">Intermediate range startup rate channels – NEGATIVE (YES)	
	SRO	Implement Function Restoration Procedures As Required.	
	SRO	RETURN TO PATH-1.	
SIMULATOR OPERATOR'S NOTE: Actuate ET-9 (SG "C" Safety Valve fails OPEN) when the crew transitions back to PATH-1.			

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Event Description: Second LOW-LOW SG signal; ATWS; MDAFW Pump "B" Trips, TDAFW Pump Fails to Start Automatically; One Main Steam Safety Valve on SG "C" Sticks OPEN; 1-SI-3 and 1SI-4 Fail to Align for Injection

Time	Position	Applicant's Actions or Behavior
	RO	AUTO or MANUAL reactor trip successful. (YES)
	RO/BOP	Verify Turbine Trip. (YES)
	BOP	1A-SA and 1B-SB Buses energized by off-site power or EDGs (YES)
	RO	SI actuated (YES – may report symptoms/indications)
	SRO	Perform the following:
		<ul style="list-style-type: none"> Initiate monitoring the Critical Safety Function Status Trees.
		<ul style="list-style-type: none"> Inform SSO to evaluate EAL Network using entry point X (Refer to PEP-110).
	SRO	Foldout A applies.
EVALUATOR'S NOTE: <ul style="list-style-type: none"> The SRO may review the foldout categories with the crew. The RO should verify that the CSIP Miniflow valves isolate when RCS Pressure decreases < 1800 psig. The RO should inform the SRO when RCS Pressure decreases to < 1400 psig and SI flow is > 200 GPM, then stop all RCP's. 		
	RO	Verify ALL CSIPs AND RHR pumps – RUNNING. (NO – CSIP "A" not available)
	RO	Check SI Flow:
		<ul style="list-style-type: none"> SI flow – GREATER THAN 200 GPM. (NO)

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Event Description: Second LOW-LOW SG signal; ATWS; MDAFW Pump "B" Trips, TDAFW Pump Fails to Start Automatically; One Main Steam Safety Valve on SG "C" Sticks OPEN; 1-SI-3 and 1SI-4 Fail to Align for Injection

Time	Position	Applicant's Actions or Behavior
	SRO	GO TO Step 8c.
	RO	Align SI valves using Attachment 1.
	RO	Attempts to open 1SI-3 and 1SI-4.
EVALUATOR'S NOTE: The next step is not detailed in PATH-1 but is in GUIDE 1. The crew may perform the step without using GUIDE 1.		
	RO	Establish any other high head injection flowpath (listed in order of preference):
Critical Task		<ul style="list-style-type: none"> Open Alternate High Head SI to Cold Legs Valve (1SI-52) to establish a HHSI flowpath before transitioning out of PATH-1. PATH-1 and GUIDE-1 Attachment 1 provide the last set of procedurally directed actions for establishing at least one train of HHSI flow with an uncontrolled cooldown in progress.
	RO	RCS pressure – LESS THAN 230 PSIG. (NO)
		Evaluator Note: Prior to or at this next step the crew may recognize SG "C" as faulted and initiate pre-emptive isolation actions.
	BOP	Check Main Steam Isolation:
		<ul style="list-style-type: none"> Main steam isolation – ACTUATED. (YES/NO)
		<ul style="list-style-type: none"> Verify all MSIVs and bypass valves – SHUT. (YES)
	RO	Check CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG. (YES)

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Event Description:		Second LOW-LOW SG signal; ATWS; MDAFW Pump "B" Trips, TDAFW Pump Fails to Start Automatically; One Main Steam Safety Valve on SG "C" Sticks OPEN; 1-SI-3 and 1SI-4 Fail to Align for Injection							
Time	Position	Applicant's Actions or Behavior							

	RO/BOP	Check AFW Status:
		<ul style="list-style-type: none"> AFW flow – AT LEAST 210 KPPH AVAILABLE. (YES)
	BOP	Verify Alignment of Components From Actuation of ESFAS Signals Using Attachment 6, "Safeguards Actuation Verification", while continuing with this procedure.
EVALUATOR'S NOTE: The RO will perform all board actions until the BOP completes Attachment 6. The BOP is permitted to properly align plant equipment in accordance with Attachment 6 without SRO approval. The Scenario Guide still identifies tasks by board position because the time frame for completion of Attachment 6 is not predictable.		
BOOTH OPERATOR NOTE: When directed to shift 1A and 1B Air Compressor to the LOCAL Mode and to energize the breakers for the CSIP Suction Cross Connect Valves, do so using ET-8 and ET-9.		
EVALUATOR'S NOTE: The only action available to control RCS temperature is to limit AFW flow but a flow reduction to < 210 kpph should not be initiated until SG levels have recovered to at least 25% in one SG.		
	BOP	Control RCS Temperature:
		<ul style="list-style-type: none"> Control feed flow and steam dump to stabilize RCS temperature between 555°F AND 559°F using Table 1.
	BOP	Verify AC buses 1A1 AND 1B1 energized (YES).
	RO	Check PRZ PORVs – SHUT (YES)
	RO	Check PZR PORV block valves – AT LEAST ONE OPEN. (YES)

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Event Description:		Second LOW-LOW SG signal; ATWS; MDAFW Pump "B" Trips, TDAFW Pump Fails to Start Automatically; One Main Steam Safety Valve on SG "C" Sticks OPEN; 1-SI-3 and 1SI-4 Fail to Align for Injection							
Time	Position	Applicant's Actions or Behavior							

	RO	PRZ spray valves – SHUT. (YES)
	BOP	Identify any faulted SG:
		Check for any of the following:
		<ul style="list-style-type: none"> Any SG pressures – DECREASING IN AN UNCONTROLLED MANNER (YES - "C")
		<ul style="list-style-type: none"> Any SG – COMPLETELY DEPRESSURIZED. (NO)
	SRO	GO TO EPP-014, "FAULTED STEAM GENERATOR ISOLATION", Step 1.
	SRO	PROCEDURE CAUTION
		<ul style="list-style-type: none"> At least one SG must be maintained available for RCS cooldown.
		<ul style="list-style-type: none"> Any faulted SG OR secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown.
	SRO	Implement Function Restoration Procedures As Required.
	BOP	Check MSIVs AND Bypass Valves:
		<ul style="list-style-type: none"> Verify all MSIVs – SHUT (YES)
	BOP	Verify all MSIV bypass valves – SHUT (YES)
	BOP	Check Any SG NOT Faulted:
		<ul style="list-style-type: none"> Any SG pressure - STABLE OR INCREASING (YES, "A" and "B")

Op Test No.:	<u>1</u>	Scenario #	<u>All</u>	Event #	<u>7, 8, & 9</u>	Page	<u>34</u>	of	<u>38</u>
Event Description:		Second LOW-LOW SG signal; ATWS; MDAFW Pump "B" Trips, TDAFW Pump Fails to Start Automatically; One Main Steam Safety Valve on SG "C" Sticks OPEN; 1-SI-3 and 1SI-4 Fail to Align for Injection							
Time	Position	Applicant's Actions or Behavior							

	BOP	Identify Any Faulted SG:
		Check for any of the following:
		<ul style="list-style-type: none"> Any SG pressure - DECREASING IN AN UNCONTROLLED MANNER (YES, "C")
		<ul style="list-style-type: none"> Any SG - COMPLETELY DEPRESSURIZED (NO)
	BOP	Isolate Faulted SG(s):
		<ul style="list-style-type: none"> Verify faulted SG(s) PORV – SHUT (YES)
		<ul style="list-style-type: none"> Verify Main FW isolation valves – SHUT (YES)
		<ul style="list-style-type: none"> Verify MDAFW AND TDAFW pump isolation valves to faulted SG(s) - SHUT
		<ul style="list-style-type: none"> Shut faulted SG(s) steam supply valve to TDAFW pump
		<ul style="list-style-type: none"> Closes only MS-72, Supply from SG "C"
		<ul style="list-style-type: none"> Verify main steam drain valve(s) - SHUT: (YES)
		<ul style="list-style-type: none"> SG A: 1MS-231
		<ul style="list-style-type: none"> SG B: 1MS-266
		<ul style="list-style-type: none"> SG C: 1MS-301
		<ul style="list-style-type: none"> Verify SG blowdown isolation valves – SHUT (YES)
		<ul style="list-style-type: none"> Verify main steam analyzer isolation valves – SHUT (YES)
	BOP	Check CST Level - GREATER THAN 10% (YES)
PROCEDURE NOTE: A SG may be suspected to be ruptured if it fails to dry out following isolation of feed flow. Local checks for radiation can be used to confirm primary-to-secondary leakage.		
	SRO	Check Secondary Radiation:
		Check for all of the following:

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Event Description: Second LOW-LOW SG signal; ATWS; MDAFW Pump "B" Trips, TDAFW Pump Fails to Start Automatically; One Main Steam Safety Valve on SG "C" Sticks OPEN; 1-SI-3 and 1SI-4 Fail to Align for Injection

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> • SG blowdown radiation – NORMAL (YES)
		<ul style="list-style-type: none"> • Main steamline radiation – NORMAL (YES)
	BOP	Check SG Levels:
		<ul style="list-style-type: none"> • Any level - INCREASING IN AN UNCONTROLLED MANNER (NO)
	RO	Check If SI Has Been Terminated:
		<ul style="list-style-type: none"> • SI flow - GREATER THAN 200 GPM (YES)
	SRO	GO TO Step 12.
	RO	Check SI Termination Criteria:
		Check Subcooling - GREATER THAN
		<ul style="list-style-type: none"> • 10 °F [40 °F] – C (YES)
		<ul style="list-style-type: none"> • 20 °F [50 °F] – M (YES)
	BOP	Check secondary heat sink by observing any of the following:
		<ul style="list-style-type: none"> • Level in at least one intact SG – GREATER THAN 25% [40%] (YES/NO)
		<ul style="list-style-type: none"> • Total feed flow to SGs - GREATER THAN 210 KPPH (YES)
	RO	RCS pressure - STABLE OR INCREASING (YES)
		PRZ level - GREATER THAN 10% [30%] (YES)
	RO	Reset SI.

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Event Description: Second LOW-LOW SG signal; ATWS; MDAFW Pump "B" Trips, TDAFW Pump Fails to Start Automatically; One Main Steam Safety Valve on SG "C" Sticks OPEN; 1-SI-3 and 1SI-4 Fail to Align for Injection

Time	Position	Applicant's Actions or Behavior
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	SRO	Manually Realign Safeguards Equipment Following A Loss Of Offsite Power.
	RO	Reset Phase A AND Phase B Isolation Signals.
	RO	Establish Instrument Air AND Nitrogen To CNMT:
		Open the following valves:
		• 1IA-819
		• 1SI-287
	RO	Stop All But One CSIP.
	RO	Check RCS Pressure - STABLE OR INCREASING (YES)
	RO	Isolate High Head SI Flow:
		Check CSIP suction - ALIGNED TO RWST (YES)
		Open normal miniflow isolation valves:
		• 1CS-182
		• 1CS-196
		• 1CS-210
		• 1CS-214
		Shut BIT outlet valves:
		• 1SI-3
		• 1SI-4
		Verify cold leg AND hot leg injection valves - SHUT

Op Test No.:	<u>1</u>	Scenario #	<u>All</u>	Event #	<u>7, 8, & 9</u>	Page	<u>37</u>	of	<u>38</u>
Event Description:		Second LOW-LOW SG signal; ATWS; MDAFW Pump "B" Trips, TDAFW Pump Fails to Start Automatically; One Main Steam Safety Valve on SG "C" Sticks OPEN; 1-SI-3 and 1SI-4 Fail to Align for Injection							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> 1SI-52 (OPEN to provide alternate HHSI path)
		<ul style="list-style-type: none"> 1SI-86
		<ul style="list-style-type: none"> 1SI-107
	SRO	Observe CAUTION prior to Step 21 AND GO TO Step 21.
PROCEDURE CAUTION: High head SI flow should be isolated before continuing.		
	RO	Establish Charging Lineup:
		Shut charging flow control valve: FK-122.1
		Open charging line isolation valves:
		<ul style="list-style-type: none"> 1CS-235
		<ul style="list-style-type: none"> 1CS-238
PROCEDURE NOTE: RCS temperature must be stabilized to allow evaluation of PRZ level trend.		
	RO	Monitor RCS Hot Leg Temperature:
		Check RCS hot leg temperature – STABLE (YES)
	BOP	Manually steam dump AND control feed flow to stabilize RCS temperature while continuing with this procedure.
SRO PROCEDURE CAUTION: Charging flow should NOT exceed 150 GPM to prevent damage to the regenerative heat exchanger.		
	RO	Control Charging Flow To Maintain PRZ Level:
		Control charging using charging flow control valve:

Op Test No.: 1 Scenario # All Event # 7, 8, & 9 Page 38 of 38

Event Description: Second LOW-LOW SG signal; ATWS; MDAFW Pump "B" Trips, TDAFW Pump Fails to Start Automatically; One Main Steam Safety Valve on SG "C" Sticks OPEN; 1-SI-3 and 1SI-4 Fail to Align for Injection

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none">FK-122.1
	RO	Maintain charging flow less than 150 GPM.
	RO	PRZ Level - CAN BE MAINTAINED STABLE OR INCREASING (YES)
LEAD EVALUATOR: Terminate the scenario when charging flow is being controlled at < 150 GPM.		

Facility:	SHEARON-HARRIS	Scenario No.:	2	Op Test No.:	2007 NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions:	<ul style="list-style-type: none"> 62% Power, BOL GP-005, Step 134 has been completed MDAFW Pump "A" is cleared and tagged for motor bearing replacement. 60 hours remain on TS 3.7.1.2.a, Action a. REM-01TV-3534, Condenser Vacuum Pump Effluent Monitor is out-of-service. SG "A" Tube Leakage is 4 GPD. 				
Turnover:	The previous shift started MFWP "A" following replacement of a bearing and has completed GP-005, Step 134. Resume raising power at 4 DEH units/minute.				
Critical Task:	<ul style="list-style-type: none"> Start RHR Pump "B" to establish one train of low head SI flow in accordance with the accident analysis. 				
Event No.	Mal. No.	Event Type*	Event Description		
1	N/A	N – BOP, SRO R – RO	Raise power.		
2	SIS03A	N – RO TS – SRO	ECCS Accumulator "A" N2 leak.		
3	SWS07A	C – RO, SRO	Normal Service Water Pump "A" sheared shaft.		
4	XP2I130 JMSEHPAS	C – BOP, SRO	EHC Pump trip.		
5	PT.495	I – BOP, SRO TS - SRO	Controlling Steam Pressure Channel fails HI.		
6	RCS18A CVC17	C – RO, SRO	Progressive RCS Leak. FCV-122, Charging Flow control Valve, fails to raise charging flow.		
7	RCS01C EPS01	M – ALL	LBLOCA with coincident loss of off-site power.		
8	DSG01A ZDSQ2:52B DSG04B-3	C – RO, SRO	EDG "A" failure leaves Vital Bus 1A-SA de-energized. Load Sequencer "B" partial Block 2 failure.		
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>					

Scenario Event Description
Shearon-Harris 2007 NRC Scenario 2

The crew assumes the watch having pre-briefed on the procedure to raise power. Motor-driven Auxiliary Feedwater Pump "A" (MDAFW Pump "A") is tagged out-of-service and will be out for the entire shift. It will not be a factor in this scenario.

In order to ensure the proper position responds, the cue for Event 2 should not come while a reactivity change is in progress. On cue from the Lead Evaluator, a nitrogen leak will develop in ECCS Accumulator "A". The RO will respond to the decreasing accumulator pressure trend or alarm ALB-1-7-1, ACCUMULATOR TANK A HIGH/LOW PRESSURE. The SRO should enter TS 3.5.1.a. The crew should restore pressure in accordance with OP-110, SAFETY INJECTION.

On cue from the Lead Evaluator, the shaft will shear on Normal Service Water (NSW) Pump 1A. System pressure will degrade because the standby pump will not start. The crew should respond in accordance with NSW header pressure alarms on ALB-2 and enter AOP-022, LOSS OF SERVICE WATER. This will direct start of the standby pump. There are no TS's associated with the NSW Pumps.

After NSW system pressure is restored and the plant is stabilized, the running EHC Pump will trip and the standby pump will fail to start. System pressure will degrade slowly as the system accumulators bleed down and an EHC low pressure alarm will actuate on ALB-20. The BOP should respond in accordance with the alarm response procedure and start the standby pump.

When EHC fluid pressure is restored, the Lead Evaluator can cue the failure of the controlling steam pressure channel on SG "C". The BOP should respond to multiple SG "C" alarms on ALB-14 and take manual control of the affected feedwater regulating valve in accordance with the alarm response procedures and management guidance for controlling malfunctioning automatic equipment. The SRO should enter the TS for reactor trip instrumentation (3.3.1) and for ESF instrumentation (3.3.2). The channel does not have to be removed from service to continue the scenario. The channel will be removed from service in accordance with the OWP if the evaluating team allows the scenario to progress to that point.

When power is stable then the Lead Evaluator can cue initiation of a small RCS leak. The RO should recognize an RCS leak trend or may respond to a Pressurizer level deviation alarm since FCV-122, Charging Flow Control Valve, will not be responding properly in automatic. The SRO should enter AOP-016, EXCESSIVE PRIMARY PLANT LEAKAGE. The crew should maintain pressurizer level by manually controlling charging flow and minimizing or securing letdown.

On cue from the Lead Evaluator, a large break LOCA and coincident loss of off-site power will occur. Emergency Diesel Generator "A" will fail during the start; leaving Vital Bus 1A-SA de-energized. Load Sequencer "B" will fail to start RHR Pump "B" and Containment Spray Pump "B" will fail to start. The containment spray failure will result in an ORANGE Critical Safety Function on Containment Environment. The crew will enter and perform PATH-1. Among other actions, they should start RHR Pump "B" to provide low-head SI injection flow. Following the LOCA diagnostic steps the SRO should proceed to PATH-1, Entry Point C and then transition to FRP-J.1, RESPONSE TO HIGH CONTAINMENT PRESSURE. If the crew has dispatched an operator or notified the WCC regarding the failure of Containment Spray Pump "B" then it will be made available after FRP-J.1 is entered. The crew should start any available equipment and transition back to PATH-1 when FRP-J.1 has been completed. RHR Pump "B" may be started in accordance with PATH-1 or EOP GUIDE 1, ATTACHMENT 6 – SAFEGUARDS ACTUATION

Scenario Event Description

Shearon-Harris 2007 NRC Scenario 2

VERIFICATION. The crew will continue in PATH-1 to a point where a "loop back" repeats until the transition criteria for EPP-10, TRANSFER TO COLD LEG RECIRCULATION, is met. The Lead Evaluator can terminate the scenario at the first "loop back" or following a crew brief relative to cold leg recirculation criteria.

NRC 2 SIMULATOR SETUP

SPECIAL INSTRUCTIONS:

- Clip a copy of GUIDE-1 Attachment 1 (SI Alignment) and Attachment 6 (Safeguards Actuation Verification) to each scenario guide for use by the evaluators.

INITIAL CONDITIONS:

- 62 % power, BOL
- MDAFW Pump "A" cleared and tagged (CFW026)
- Tag MDAFW Pump "A" on the control board
- Remove REM-3534, Condenser Vacuum Pump Effluent Monitor from service
- GP-005 completed through Step 134
- Reactivity Plan for intended evolution (Raise power at 4 DEH Units/minute)
- Turnover Sheet
- Ensure rod step counters reset to the correct value

PRE-LOAD:

- DSG01A (EDG "A" fails during AUTO start)
- CNS02B (Containment Spray Pump "B" trips during startup)
- DSG04A:3-B (RHR Pump "B" fails to start from Load Sequencer)

TRIGGERS:

- ET-2: SIS03A (ECCS Accumulator N2 leak)
- ET-3: NSW07A (NSW Pump "A" shaft shear)
- ET-4: XP2I130 & JMSEHPAS (EHC Pump "A" trip/EHC Pump "B" fails to AUTO start)
- ET-5: PT:495 (SG "C" Channel 3 Steam Pressure fails HIGH)
- ET-6: RCS18A/CVC17 (Small RCS leak/FCV-122 fails to track)
 - **Prior to actuating this trigger the Booth Operator must read FCV-122 position off of the summary page and type that value into the FINAL VALUE box.**
- ET-7: RCS01A/EPS-01 (Double-ended LBLOCA/Loss of off-site power)
- Field actions for GUIDE 1, Attachment 6
- Clear CNS02B after entry into FRP-J1 to allow manual pump start

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>1</u>	Page	<u>5</u>	of	<u>38</u>
Event Description:		Raise Power							
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions:**Indications Available:****EVALUATOR'S NOTE:**

It will take in excess of 10 minutes after MALF initiation to get to the alarm setpoint for ECCS accumulator pressure. The Lead Evaluator can cue initiation of Event 2 (ECCS Accumulator N2 leak) at any time but ensure makeup is in AUTO so that the RO can respond. Accumulator pressure will degrade at approximately 2 psi/minute.

	SRO	Provides direction per GP-005, Step 135 "VERIFY Main Feed Pump Recirculation Valves 1FW-8 and 1FW-39 are shut when total Main Feed Pump flow is greater than 8600 KPPH".
	BOP	Depresses Load Rate MW/MIN pushbutton.
	BOP	Enters/verifies desired load rate in DEMAND display then depresses ENTER.
	BOP	Depresses REF pushbutton, enters or verifies 960 in DEMAND display.
	BOP	Informs RO/SRO that turbine load increase is being initiated.
	BOP	Depresses GO pushbutton.
	BOP	Monitors turbine and feedwater system response.
	SRO	Direct Radwaste Control Room to supply Auxiliary Steam from Extraction Steam per OP-130.01 Section 8.5 or Section 8.6.

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>1</u>	Page	<u>6</u>	of	<u>38</u>
Event Description:		Raise Power							
Time	Position	Applicant's Actions or Behavior							

SIMULATOR OPERATOR: Respond as Radwaste Operator but no simulator actions are required.		
EVALUATOR'S NOTE: The crew may elect to start a dilution before the power change is initiated.		
EVALUATOR'S NOTE: OP-107 is a "Reference Use" procedure.		
	RO	DETERMINE the volume of makeup water to be added. This may be done by experience or via the reactivity plan associated with the Simulator IC.
	RO	SETS FIS-114, TOTAL MAKEUP WTR BATCH COUNTER, to obtain the desired quantity.
	RO	SET total makeup flow as follows:
		<ul style="list-style-type: none"> IF performing DIL in Step 8, THEN SET controller 1CS-151, FK-114 RWMU FLOW, for less than or equal to 90 gpm.
		<ul style="list-style-type: none"> IF performing ALT DIL in Step 8, THEN SET controller 1CS-151, FK-114 RWMU FLOW, for the desired flow rate.
	RO	VERIFY the RMW CONTROL switch has been placed in the STOP position.
	RO	VERIFY the RMW CONTROL switch green light is lit.
	RO	PLACE the control switch RMW MODE SELECTOR to the DIL OR the ALT DIL position.

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>1</u>	Page	<u>7</u>	of	<u>38</u>
Event Description:		Raise Power							
Time	Position	Applicant's Actions or Behavior							

PROCEDURE NOTE:

When PRZ backup heaters are energized in manual, PK-444A1, PRZ Master Pressure Controller (a PI controller) will integrate up to a greater than normal output, opening PRZ Spray Valves to return and maintain RCS pressure at setpoint. The result is as follows:

- PORV PCV-444B will open at a lower than expected pressure.
- ALB-009-3-2, PRESSURIZER HIGH PRESS DEVIATION CONTROL, will activate at a lower than expected pressure.
- Increased probability for exceeding Tech Spec DNB limit for RCS pressure.

EVALUATOR NOTE:

The crew may elect to manually crack open a PRZ Spray Valve to establish PRZ Surge line flow and thereby maintain PRZ/RCS boron concentrations within limits.

	RO	OPERATE the pressurizer backup heaters as required to limit the difference between the pressurizer and the RCS boron concentration to less than 10 ppm.
NOTE:		SRO concurrence should be obtained prior to energizing the BUH in MANUAL.
	RO	START the makeup system as follows:
		<ul style="list-style-type: none"> • TURN control switch RMW CONTROL to START momentarily.
		<ul style="list-style-type: none"> • VERIFY the red indicator light is lit.
	RO	VERIFY Tavg and rod motion responds as desired.
	RO	VERIFY dilution automatically terminates when the desired quantity has been added.

Op Test No.: 1 Scenario # 2 Event # 1 Page 8 of 38

Event Description: Raise Power

Time	Position	Applicant's Actions or Behavior
	RO	PLACE Reactor Makeup in Auto per Section 5.1.
	RO	VERIFY the RMW CONTROL switch:
		• Is in the STOP position.
		• The green light is lit.
	RO	PLACE the RMW MODE SELECTOR to AUTO.
	RO	START the makeup system as follows:
		• TURN control switch RMW CONTROL to START momentarily.
		• VERIFY the red indicator light is lit.

Op Test No.: 1 Scenario # 2 Event # 2 Page 9 of 38

Event Description: ECCS Accumulator "A" N2 Leak

Time	Position	Applicant's Actions or Behavior
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Booth Operator Instructions: Actuate ET-2 (SI Accumulator "A" N2 leak) on cue from the Lead Evaluator.

Indications Available: Alarm ALB-1-7-1, ACCUMULATOR TANK A HIGH-LOW PRESSURE

	RO	Responds to alarm ALB-1-7-1, ACCUMULATOR TANK A HIGH-LOW PRESSURE.
	RO	Enters APP-ALB-1-7-1
	RO	CONFIRM alarm using SI Accumulator pressure indicators PI-921 and PI-923
		<ul style="list-style-type: none"> No automatic actions associated with this alarm
	RO	PERFORM Corrective Actions:
		<ul style="list-style-type: none"> IF SI Accumulator pressure has risen AND NO rise in level has occurred, THEN: (N/A)
<p>SRO PROCEDURE NOTE: N2 through 1SI-287 is the primary source of motive power to the PRZ PORVs, with Instrument Air as backup. If 1SI-287 is shut in a mode where LTOPS is required operable, and Instrument Air is not available to PORV accumulators, LTOPS must be declared inoperable.</p>		
	RO	IF SI Accumulator pressure has risen AND is accompanied by a rise in level, THEN: (NO)
	RO	IF SI Accumulator pressure has dropped, THEN:
		<ul style="list-style-type: none"> IF pressure drop is accompanied by a drop in level, THEN: (NO)
		<ul style="list-style-type: none"> STOP any accumulator draining in progress.
		<ul style="list-style-type: none"> MONITOR leakage into CNMT Sump.

Op. Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>2</u>	Page	<u>10</u>	of	<u>38</u>
Event Description:		ECCS Accumulator "A" N2 Leak							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> DISPATCH an operator to CNMT to locate and isolate leakage as soon as possible.
		<ul style="list-style-type: none"> REFER TO OP-110, Safety Injection System AND RAISE Accumulator pressure.
	SRO	<p>Completes an Equipment Failure Checklist and contacts WCC for assistance.</p> <p>EVALUATOR NOTE: This action may occur at any time and may include reviewing the system print.</p>
EVALUATOR'S NOTE:		The following TS must be entered if Accumulator pressure lowers to less than 585 PSIG and/or when it is connected to the N2 System.
	SRO	Refer to Technical Specification 3.5.1.
		Enters 3.5.1.d, Action a - With one accumulator inoperable, except as a result of a closed isolation valve or boron concentration not within limits, restore the inoperable accumulator to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and reduce pressurizer pressure to less than 1000 psig within the following 6 hours.
	RO	Enters OP-110, Section 8.2 – Pressurizing the SI Accumulators.
	RO	Verifies Initial Conditions
		<ul style="list-style-type: none"> The Nitrogen System is available per OP-152.01.
		<ul style="list-style-type: none"> Accumulator level is greater than 66%.
		<ul style="list-style-type: none"> If the Accumulators are depressurized, the Accumulator metal temperature must be greater than 70°F before pressurization. (Contact pyrometer can be used or containment ambient temperature) [N/A]

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>2</u>	Page	<u>11</u>	of	<u>38</u>
Event Description:		ECCS Accumulator "A" N2 Leak							
Time	Position	Applicant's Actions or Behavior							

PROCEDURE NOTE: To minimize any potential sluicing between Accumulators through leaking valves, Accumulator pressures should be approximately equal (within 4 psid between lowest and highest ERFIS indications) at the completion of this Section.

		Perform the following Steps on only one Accumulator at a time.
		<ul style="list-style-type: none"> At the MCB, verify open 1SI-287, ACCUMULATORS & PRZ PORV N2 SUPPLY.
		<ul style="list-style-type: none"> Declare the associated Accumulator inoperable per Tech Spec 3.5.1, due to being connected to Non-Safety piping (a one hour action statement in Modes 1 through 3 above 1000 psig).

PROCEDURE NOTE: To prevent exceeding the capacity of the N2 System and maintain train separation for the Accumulators, only one Accumulator should be pressurized at a time.

		<ul style="list-style-type: none"> At the MCB, open the ACCUM N2 SUPPLY/VENT for the Accumulator to be pressurized: 1SI-295 for ACCUMULATOR A N2 Supply & Vent.

PROCEDURE NOTE: The Accumulator should not be pressurized to the upper Technical Specification limit (665 psig) to allow for thermal expansion of the Accumulator gas during plant heatup.

		<ul style="list-style-type: none"> Pressurize the Accumulator to the desired pressure indicated by the associated pressure indicators: PI-921, 923, ACCUMULATOR TK A PRESS.
		<ul style="list-style-type: none"> At the MCB, shut the ACCUMULATOR N2 SUPPLY & VENT valve for the Accumulator that was pressurized: 1SI-295 for ACCUMULATOR A N2 Supply & Vent.
		<ul style="list-style-type: none"> Complete Attachment 6.

Op Test No.: 1 Scenario # 2 Event # 2 Page 12 of 38

Event Description: ECCS Accumulator "A" N2 Leak

Time	Position	Applicant's Actions or Behavior
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EVALUATOR'S NOTE:	The Lead Evaluator can cue Event 3 (NSW Pump shaft shear) after the TS entry is complete and 1SI-295 is closed.
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Op Test No.: 1 Scenario # 2 Event # 3 Page 13 of 38

Event Description: NSW Pump "A" shaft shear

Time	Position	Applicant's Actions or Behavior
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Booth Operator Instructions: Actuate ET-3 for NSW07A on cue from the Lead Evaluator.

Indications Available: ALB-02-6-1, SERV WTR SUPPLY HDR A LOW PRESS; ALB-02-7-1, SERV WTR SUPPLY HDR B LOW PRESS; ALB-02-7-2, SERV WTR PUMPS DISCHARGE LOW PRESS

	RO	Responds to ALB-02 alarms – reports low NSW header pressure with pump running indication.

EVALUATOR NOTE: The ESW Pumps will auto start on low header pressure.

	SRO	Enters AOP-022, LOSS OF SERVICE WATER.
	RO	CHECK ESW flow lost to ANY RUNNING CSIP - MORE THAN 1-minute:
	SRO	GO TO Step 2.
	SRO	CHECK ESW flow lost to ANY RUNNING EDG - MORE THAN 1-minute:

BOOTH OPERATOR: There are several points in the AOP where an AO may be dispatched to check for leaks and proper operation of equipment. Report no leaks, no breaker problems but when dispatched to the pump, report that the coupling appears to have failed and request maintenance assistance.

	SRO	GO TO Step 3.

Op Test No.: 1 Scenario # 2 Event # 3 Page 14 of 38

Event Description: NSW Pump "A" shaft shear

Time	Position	Applicant's Actions or Behavior
	RO/SRO	GO TO the appropriate step as indicated by the parameter LOST:
		<ul style="list-style-type: none"> • NSW Pump failure (YES) • NSW Pump loss of flow
	SRO	Proceeds to Step 6
	RO	CHECK loss of NSW Header due to NSW Pump FAILED or LOSS OF FLOW.
		START standby NSW Pump as follows:
		<ul style="list-style-type: none"> • VERIFY discharge valve for affected pump is CLOSING by placing affected pump control switch to STOP.
		<ul style="list-style-type: none"> • START standby NSW Pump in priming mode by momentarily placing standby NSW Pump control switch to START.
		<ul style="list-style-type: none"> • WHEN discharge valve for affected pump is fully SHUT, THEN PLACE and HOLD control switch for running pump to START to fully OPEN pump discharge valve.
	RO	CHECK ANY NSW Pump - RUNNING. (YES)
	SRO	GO TO Section 3.2 (page 30).
	SRO	CHECK Turbine trip required by ANY of the following conditions - EXIST: (NO)
		<ul style="list-style-type: none"> • No NSW Pump can be operated • Non-isolable leak exists in the NSW system • Major isolable leak exists on the Turbine Building NSW Header AND time does not permit a controlled plant shutdown
	SRO	OBSERVE Note prior to Step 13 AND GO TO Step 13.

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>3</u>	Page	<u>15</u>	of	<u>38</u>
Event Description:		NSW Pump "A" shaft shear							
Time	Position	Applicant's Actions or Behavior							

		PROCEDURE NOTE: Steps 13 through 19 address leaks on NSW turbine building header. Leaks on individual components supplied by the Turbine Building header are addressed by Steps 20 and 21.
	CREW	CHECK for minor isolable leak on Turbine Building header – ANY EXISTING. (NO)
	SRO	GO TO Step 20.
	CREW	CHECK for leak in an individual component - ANY EXISTING. (NO)
	SRO	GO TO Step 22.
	CREW	CHECK for leak on WPB header - ANY EXISTING. (NO)
	SRO	GO TO Step 24.
	RO	CHECK that NSW Pump(s) - MALFUNCTIONED. (YES)
	CREW	PERFORM the following for affected NSW Pump(s):
		CHECK NSW Pump breaker(s) - MALFUNCTIONED. (NO)
	SRO	GO TO Step 25.b.

Op Test No.: 1 Scenario # 2 Event # 3 Page 16 of 38

Event Description: NSW Pump "A" shaft shear

Time	Position	Applicant's Actions or Behavior
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	RO/BOP	CHECK adequate pump suction inventory EXISTS:
		<ul style="list-style-type: none"> LI-9300.1, Service Water PMP A CHMBR LVL, GREATER THAN 51% (ERFIS LSW9300) LI-9302, Service Water PMP B CHMBR LVL, GREATER THAN 51% (ERFIS LSW9302) LI-1931, Cooling Tower Basin Level, GREATER THAN 31 inches
	CREW	Locally VERIFY the following for the affected NSW Pump per OP-139, Service Water System: <ul style="list-style-type: none"> Proper cooling and seal water supply to NSW Pumps. Proper operation of NSW strainer backwash.
	CREW	Locally CHECK NSW Pump(s) for signs of damage (shaft shear or other obvious problems).
	SRO	INITIATE appropriate corrective action for the loss of NSW.
	SRO	Completes an Equipment Failure Checklist and contacts WCC for assistance.
		The Lead Evaluator can cue Event 4 (EHC Pump trip) after the field report of the sheared shaft or the exit from AOP-022.

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>4</u>	Page	<u>17</u>	of	<u>38</u>
Event Description:		EHC Pump "A" trip							
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions: Actuate the ET-4, Trigger for Event 4 (EHC Pump trip) on cue from the Lead Evaluator.

Indications Available: ALB-20-4-2B, EH FLUID LOW PRESS

Booth Operator: When dispatched to investigate, report no leaks but a smell like burned electrical insulation in the area.

	BOP	Responds to ALB-20-4-2B or indication of degrading EHC pressure on PI-4221.
	BOP	Enters APP-ALB-20-4-2B.
	BOP	Confirms alarm using PI-4221.
	BOP	VERIFY Automatic Functions:
		Standby DEH Pump starts at 1500 psig, as sensed by PS-01TA-4223V.
		EVALUATOR NOTE: May immediately start the standby pump or in the next step.
	BOP	Starts EHC Pump "B" and observes pressure returning to normal on PI-4221.
	BOP	PERFORM Corrective Actions:
		a. IF the Reactor is tripped, THEN GO TO EOP-PATH-1. (NO)
		b. START the standby DEH Pump.
		c. DISPATCH an operator to perform the following:
		(1) MONITOR DEH Pump and PCV operation.
		(2) VERIFY OPEN the following:
		(a) 1EH-1, A EH Pump Suction Vlv
		(b) 1EH-8, B EH Pump Suction Vlv
		(c) 1EH-31, Main Hdr Press Switch Isol Vlv
		(3) INVESTIGATE system for leaks.
		(4) IF a leak is found, THEN ISOLATE the leak AND IMMEDIATELY NOTIFY Control Room.

Op Test No.: 1 Scenario # 2 Event # 4 Page 18 of 38

Event Description: EHC Pump "A" trip

Time	Position	Applicant's Actions or Behavior
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	SRO	Completes an Equipment Failure Checklist and contacts WCC for assistance.
		The Lead Evaluator can cue Event 5 (SG "C" Controlling Steam Pressure Channel fails HI) when all actions associated with the EHC failure are complete and the BOP is available to respond to the feedwater control problem.

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>5</u>	Page	<u>19</u>	of	<u>38</u>
Event Description:		SG "C" Controlling Steam Pressure channel (PT-495) Fails HI							
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions:		Actuate ET-5 (SG "C" Controlling Steam Pressure Channel Fails HI) on cue from the Lead Evaluator.
Indications Available:		ALB-014-1-2 and 2-2 (LOOP A and LOOP B HI STEAM LINE ΔP)
	BOP	RESPONDS to alarms ALB-014-1-2 and 2-2 (LOOP HI STEAM LINE ΔP).
EVALUATOR'S NOTE:		THE BOP may take MANUAL control of the associated FRV prior to entering the APP.
	BOP	Enters APP-ALB-014-1-2 and/or 2-2.
	BOP	PLACES FRV for SG "C" in MANUAL and controls flow.
SIMULATOR OPERATOR NOTE:		If directed to investigate locally on RAB 261 rack, report "PT-495 is not leaking".
	SRO	REFERS to OWP-ESF-04 to remove channel from service.
EVALUATOR'S NOTE:		The SRO may direct a swap to Channel 4 to regain auto control. The OWP also accomplishes this action.
	BOP	Selects Channel 4 (PT-496) for control.
	BOP	Restores FRV "C" to AUTO.
	SRO	CONTACTS work control for assistance.

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>5</u>	Page	<u>20</u>	of	<u>38</u>
Event Description:		SG "C" Controlling Steam Pressure channel (PT-495) Fails HI							
Time	Position	Applicant's Actions or Behavior							
	SRO	<p>ENTERS TS:</p> <ul style="list-style-type: none">• 3.3.1.a Reactor Trip Instrumentation, Action 6• 3.3.2.a ESF Instrumentation, Action 19 <p>Both require tripping the inoperable channel within 6 hours.</p> <p>and</p> <ul style="list-style-type: none">• 3.3.3.6.a. Accident Monitoring Instrumentation – restore the inoperable channel within 7 days.							
EVALUATOR'S NOTE:		<p>After the FRV is in AUTO and the TS has been entered, the Lead Evaluator can cue Event 6 (RCS Leak). Delay the cue if re-pressurization of Accumulator "A" is in progress to ensure that the RO responds.</p>							

Op Test No.:	<u>1</u>	Scenario #	<u>All</u>	Event #	<u>6</u>	Page	<u>21</u>	of	<u>38</u>
Event Description:		Progressive RCS Leak, FCV-122, Charging Flow Control Valve, Fails to Raise Charging Flow							
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions:		<p>Prior to actuating this trigger the Booth Operator must read FCV-122 position off of the summary page and type that value into the FINAL VALUE box.</p> <p>Actuate ET-6 (RCS Leak/FCV-122 fails to track in AUTO) on cue from evaluator.</p>
Indications Available:		<p>ALB-009-2-2, PRESSURIZER CONTROL LOW LEVEL DEVIATION</p> <p>ALB-10-4-5, RAD MONITOR SYSTEM TROUBLE</p>
	RO	Responds to alarms and/or indications of RCS leakage.
EVALUATOR'S NOTE: <ul style="list-style-type: none"> Multiple alarms associated with RCS leakage will direct implementation of AOP-016, EXCESSIVE PRIMARY PLANT LEAKAGE. The leak rate is approximately 90 GPM. Letdown will have to be reduced or isolated to stabilize charging flow on scale. The RO may take MANUAL control of FCV-122, Charging Flow Control Valve, at any point after the failure is recognized. 		
	SRO	Enters AOP-016.
PROCEDURE NOTE: <ul style="list-style-type: none"> This procedure contains no immediate actions. Throughout this procedure, as well as all AOPs, actions are based on valid alarms and instrumentation. Actions based on invalid indication are not applicable. When possible (except in the cases of rapidly propagating leaks and leaks approaching Action Level 3), leakage should be qualitatively confirmed prior to declaration of an action level. Leakage is qualitatively confirmed when two different indications (such as grab samples or radiation monitors) trend in the same direction with the same approximate order of magnitude. 		

Op Test No.:	<u>1</u>	Scenario #	<u>All</u>	Event #	<u>6</u>	Page	<u>22</u>	of	<u>38</u>
Event Description:		Progressive RCS Leak, FCV-122, Charging Flow Control Valve, Fails to Raise Charging Flow							
Time	Position	Applicant's Actions or Behavior							

	RO/SRO	CHECK RHR in operation. (NO)
		GO TO Step 3.
	SRO	REFER TO PEP-110, Emergency Classification And Protective Action
		Recommendations, AND ENTER the EAL Network at entry point X.
PROCEDURE NOTE:		This step is a qualitative check for leakage obviously in excess of Make Up capability. Isolation of letdown may be necessary. A formal calculation to determine the leakrate is performed in Step 16.
	RO	CHECK RCS leakage within VCT makeup capability. (YES)
PROCEDURE NOTE:		If CSIP suction is re-aligned to the RWST, negative reactivity addition should be anticipated.
	RO	MAINTAIN VCT level GREATER THAN 5%.
	SRO	GO TO step 10.
PROCEDURE NOTE:		If a Containment Ventilation Isolation signal has occurred, Tech Spec 3.0.3 is applicable, since both trains of Containment Vacuum Relief are inoperable.
	SRO	CHECK valid CNMT Ventilation Isolation monitors (REM-3561A, B, C and D) ALARM CLEAR.
	SRO	CHECK RM 3502A, RCS Leak Detection Radiation Monitor, ALARM CLEAR. (YES/NO)

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Event Description: Progressive RCS Leak, FCV-122, Charging Flow Control Valve, Fails to Raise Charging Flow

Time	Position	Applicant's Actions or Behavior
	BOP	VERIFY CNMT normal purge and supply fans isolate on high radiation level signal.
	SRO	CHECK ALL valid Area Radiation Monitors ALARM CLEAR. (YES)
	SRO	CHECK valid Stack Monitors ALARM CLEAR. (YES)
	SRO	DETERMINE if unnecessary personnel should be evacuated from affected areas, as follows: <ul style="list-style-type: none"> CHECK that an RCS leak outside Containment has caused a valid RMS alarm. (NO)
	SRO	GO TO Step 14.d.
	SRO	CHECK that a valid RMS Secondary Monitor HIGH ALARM indicates a SG tube leak may exist. (NO)
	SRO	GO TO Step 15.
	CREW	NOTIFY Chemistry to stop any primary sampling activities.
EVALUATOR'S NOTE: <ul style="list-style-type: none"> If not already done, in the following step the RO should take MANUAL control of FCV-122. The SRO may direct a reduction in letdown flow in the following step. 		
	RO	PERFORM an RCS flow balance calculation as follows:
	RO	CONTROL charging flow using FK-122.1, to stabilize PRZ level.

Op Test No.:	<u>1</u>	Scenario #	<u>All</u>	Event #	<u>6</u>	Page	<u>24</u>	of	<u>38</u>
Event Description:	Progressive RCS Leak, FCV-122, Charging Flow Control Valve, Fails to Raise Charging Flow								
Time	Position	Applicant's Actions or Behavior							

	RO	OPERATE the following letdown orifice valves as necessary to maintain charging flow on scale:
		• 1CS-7, 45 gpm Letdown Orifice A
		• 1CS-8, 60 gpm Letdown Orifice B
		• 1CS-9, 60 gpm Letdown Orifice C
BOOTH OPERATOR'S NOTE:		When the crew has calculated the rough RCS leak rate, activate the trigger for Event 7 (LBLOCA with LOOP).

Op Test No.: 1 Scenario # 2 Event # 7 & 8 Page 25 of 38

Event Description: LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading

Time	Position	Applicant's Actions or Behavior
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Booth Operator Instructions: Actuate ET-7 (LBLOCA with LOOP).**Indications Available: Multiple alarms/lighting transfer**

	SRO	Enters PATH-1
	RO	VERIFY Reactor Trip:
		• AUTO or MANUAL Reactor Trip successful:
		• CHECK for any of the following:
		• Trip breakers RTA and BYA OPEN (YES)
		• Trip breakers RTB and BYB OPEN (YES)
		• ROD Bottom lights LIT (YES)
		• NEUTRON flux decreasing (YES)
	BOP	VERIFY Turbine Trip:
		• CHECK for any of the following:
		• ALL turbine throttle valves – SHUT (YES)
		• ALL turbine governor valves – SHUT (YES)
	BOP	VERIFY power to AC Emergency Buses
		• 1A-SA AND 1B-SB Buses energized by off-site power or EDG's. (NO – 1A-SA is dead and 1B-SB is powered from the EDG)
	BOP	Check AC emergency bus 1A-SA OR 1B-SB – ENERGIZED (YES – 1B-SB)
	SRO	As time permits restore power to de-energized emergency bus while continuing with EOP implementation.

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>7 & 8</u>	Page	<u>26</u>	of	<u>38</u>
Event Description:		LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading							
Time	Position	Applicant's Actions or Behavior							

BOOTH OPERATOR'S NOTE: When an AO is dispatched to EDG "A" then wait five minutes and report that there appears to be an oil system failure. Lube oil is all over the place and the source is not readily evident. Request assistance.

	RO	CHECK SI Actuation:
		<ul style="list-style-type: none"> CHECK for any of the following – LIT: (YES)
		<ul style="list-style-type: none"> SI Actuated bypass permissive light
		<ul style="list-style-type: none"> ALB-11-2-2
		<ul style="list-style-type: none"> ALB-11-5-1
		<ul style="list-style-type: none"> ALB-11-5-3
		<ul style="list-style-type: none"> ALB-12-1-4
	SRO	Perform The Following:
		<ul style="list-style-type: none"> Initiate monitoring the Critical Safety Function Status Trees.
		<ul style="list-style-type: none"> Evaluate EAL Network using entry point X. (Refer to PEP-110)
	SRO	Informs Crew Foldout A applies.

EVALUATOR NOTE: The crew should brief on the general foldout criteria and the SRO may specify at this time that adverse containment values apply.

EVALUATOR'S NOTE: The following FOLDOUT A criteria apply in this scenario:

ALTERNATE MINIFLOW OPEN/SHUT CRITERIA

- IF RCS pressure decreases to less than 1800 PSIG, THEN verify alternate miniflow isolation OR miniflow block valves – SHUT.

Op Test No.: 1 Scenario # 2 Event # 7 & 8 Page 27 of 38

Event Description: LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading

Time	Position	Applicant's Actions or Behavior
	RO	VERIFY ALL CSIPs AND RHR pumps – RUNNING. (NO – CSIP "B" is running and RHR Pump "B" should be running).
CRITICAL TASK	RO	Starts RHR Pump "B" by no later than the completion of GUIDE-1, Attachment 6 (the last procedurally directed action to verify RHR flow) to establish LHSI flow from one train in accordance with the accident analysis.
	RO	CHECK SI Flow:
		<ul style="list-style-type: none"> SI flow – GREATER THAN 200 GPM. (YES)
	SRO	Go to Step 8.d
	RO	RCS pressure – LESS THAN 230 PSIG. (YES)
	RO	Both RHR HX header flows - GREATER THAN 1000 GPM (NO).
		Verify RHR valves - PROPERLY ALIGNED:
		Verify RWST to RHR pump suction valves - OPEN:
		<ul style="list-style-type: none"> 1SI-322 1SI-323
		Verify RHR HX outlet valves - OPEN:
		<ul style="list-style-type: none"> 1RH-30 1RH-66
		Verify Low Head SI to cold leg valves - OPEN
		<ul style="list-style-type: none"> 1SI-340 1SI-341
	CREW	Dispatches an AO to locally unlock AND turn ON the breakers for the CSIP suction cross-connect valves:

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>7 & 8</u>	Page	<u>28</u>	of	<u>38</u>
Event Description:		LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> 1CS-168 (MCC 1B35-SB-7D)
		<ul style="list-style-type: none"> 1CS-169 (MCC 1A35-SA-4B)
		<ul style="list-style-type: none"> 1CS-170 (MCC 1A35-SA-4A)
		<ul style="list-style-type: none"> 1CS-171 (MCC 1B35-SB-4D)
	BOP	CHECK Main Steam Isolation:
		<ul style="list-style-type: none"> MAIN steam isolation – ACTUATED. (YES)
	BOP	VERIFY Main Steam Isolation Valves SHUT. (YES)
	RO	CHECK CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG. (NO)
<p>EVALUATOR'S NOTE: The crew should apply adverse CNMT values for the remainder of the scenario.</p> <p>BOOTH OPERATOR NOTE: When dispatched to investigate the Containment Spray Pump "B" failure, report a breaker alignment problem and request maintenance assistance.</p> <p>After the crew enters FRP-J.1, clear CNS02B and rack out and then rack in "B" Containment Spray breaker.</p>		
	RO	PERFORM the following:
		<ul style="list-style-type: none"> VERIFY CNMT Spray ACTUATED. (NO – no pumps running)
		<ul style="list-style-type: none"> STOP all RCPs. (None running)
	CREW	Dispatches an operator to investigate failure to start of Containment Spray Pump "B"
	BOP	CHECK AFW Status:

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>7 & 8</u>	Page	<u>29</u>	of	<u>38</u>
Event Description:		LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> AFW flow – AT LEAST 210 KPPH AVAILABLE. (YES)
	SRO	ASSIGNS BOP to perform the following:
		<ul style="list-style-type: none"> VERIFY alignment of components from actuation of ESFAS Signals using Attachment 6, "Safeguards Actuation Verification", while continuing with implementation of EOPs.
EVALUATOR'S NOTE: The RO will perform all board actions until the BOP completes Attachment 6. The BOP is permitted to properly align plant equipment in accordance with Attachment 6 without SRO approval. The Scenario Guide still identifies tasks by board position because the time frame for completion of Attachment 6 is not predictable.		
	BOP	Control RCS Temperature:
		Stabilize AND maintain temperature between 555°F AND 559°F using Table 1.
		TABLE 1: RCS TEMPERATURE CONTROL GUIDELINES FOLLOWING RX TRIP
		<ul style="list-style-type: none"> Guidance is applicable until another procedure directs otherwise.
		<ul style="list-style-type: none"> IF no RCPs running, THEN use wide range cold leg temperature.
EVALUATOR'S NOTE: The only action available to control RCS temperature is to limit AFW flow but a flow reduction to < 210 kpph should not be initiated until SG levels have recovered to at least 25% in one SG.		
	BOP	Control RCS Temperature:
		<ul style="list-style-type: none"> Control feed flow and steam dump to stabilize RCS temperature between 555°F AND 559°F using Table 1.

Op Test No.: 1 Scenario # 2 Event # 7 & 8 Page 30 of 38

Event Description: LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading

Time	Position	Applicant's Actions or Behavior
	RO	Check PRZ PORVs AND Spray Valves:
		<ul style="list-style-type: none"> Verify AC buses 1A1 AND 1B1 – ENERGIZED (No power available to 1A1)
		<ul style="list-style-type: none"> CHECK PRZ PORVs – SHUT (YES)
		<ul style="list-style-type: none"> CHECK PRZ PORV Block Valves – AT LEAST ONE OPEN. (YES)
		<ul style="list-style-type: none"> PRZ spray valves – SHUT. (YES)
	BOP	IDENTIFY any faulted SG:
		<ul style="list-style-type: none"> CHECK for any of the following:
		<ul style="list-style-type: none"> ANY SG pressures – DECREASING IN AN UNCONTROLLED MANNER (NO)
		<ul style="list-style-type: none"> ANY SG – COMPLETELY DEPRESSURIZED. (NO)
	SRO	CHECK Secondary Radiation:
		<ul style="list-style-type: none"> CHECK for all of the following:
		<ul style="list-style-type: none"> CONDENSER vacuum pump effluent radiation – NORMAL. (YES)
		<ul style="list-style-type: none"> SG Blowdown radiation – NORMAL. (YES)
		<ul style="list-style-type: none"> MAIN Steamline radiation – NORMAL. (YES)
	BOP	Check any SG level - INCREASING IN AN UNCONTROLLED MANNER (NO)
	SRO	GO TO Step 17.
	SRO	Check RCS Intact:
		Check for all of the following:
		<ul style="list-style-type: none"> CNMT pressure – NORMAL (NO)

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Event Description: LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading

Time	Position	Applicant's Actions or Behavior
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		<ul style="list-style-type: none"> Go to Step 44 (Path-1, Entry Point C)
	SRO	Implement Function Restoration Procedures As Required.
EVALUATOR'S NOTE: The following Functional Restoration Procedures apply: <ul style="list-style-type: none"> FRP-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK – the crew should enter FRP-P.1 and then exit due to RHR flow. FRP-J.1, RESPONSE TO HIGH CONTAINMENT PRESSURE – the crew should complete this procedure. 		
	SRO	Transitions to FRP-P.1.
	RO	Check RCS Pressure:
		<ul style="list-style-type: none"> Check for both of the following:
		<ul style="list-style-type: none"> RCS pressure – LESS THAN 230 PSIG.
		<ul style="list-style-type: none"> Any RHR HX header flow - GREATER THAN 1000 GPM.
	SRO	<ul style="list-style-type: none"> RETURN to procedure and step in effect.
	SRO	Returns to PATH-1 to FRP-J.1 or directly to FRP-J.1
	RO	Check Phase A Isolation Valves - SHUT (Refer to OMM-004. "POST TRIP/SAFEGUARDS REVIEW", Attachment 4.1)

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>7 & 8</u>	Page	<u>32</u>	of	<u>38</u>
Event Description:		LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading							
Time	Position	Applicant's Actions or Behavior							

		BOOTH OPERATOR: After the crew enters FRP-J.1, clear CNS02B and rack out and then rack in "B" Containment Spray breaker. Report that Containment Spray Pump "B" breaker has been racked out and then racked in and appears to be operable.
	BOP	Verify CNMT Ventilation Isolation Valves – SHUT (Refer to OMM-004. "POST TRIP/SAFEGUARDS REVIEW", Attachment 7.1)
	RO	Check if CNMT Spray is required:
		<ul style="list-style-type: none"> Check CNMT pressure HAS INCREASED TO GREATER THAN 10 PSIG (YES)
		<ul style="list-style-type: none"> Check EPP-012 "LOSS OF EMERGENCY COOLANT RECIRCULATION" IN EFFECT (NO)
		<ul style="list-style-type: none"> GO TO Step 3e.
		Evaluator Note: It will be necessary for the crew to reset the Containment Spray Actuation signal to manually start the pump. This action is not in the procedure.
		<ul style="list-style-type: none"> Verify CNMT Spray Pumps – RUNNING (NO – starts Containment Spray Pump "B")
		<ul style="list-style-type: none"> Verify CNMT spray system valves aligned for injection:
		<ul style="list-style-type: none"> Verify the following valves - OPEN:
		<ul style="list-style-type: none"> 1CT-26
		<ul style="list-style-type: none"> 1CT-71
		<ul style="list-style-type: none"> 1CT-50
		<ul style="list-style-type: none"> 1CT-88
		<ul style="list-style-type: none"> 1CT-11
		<ul style="list-style-type: none"> 1CT-12

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Event Description: LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> Verify Phase B isolation valves - SHUT. (Refer to OMM-004, "POST TRIP/SAFEGUARDS REVIEW" Attachment 9.)
	RO	Stop all RCPs. (None running)
	BOP	Verify CNMT Fan Coolers – ONE FAN PER UNIT RUNNING IN SLOW SPEED (YES – "B" Bus powered only)
	BOP	Check MSIVs AND Bypass Valves:
		<ul style="list-style-type: none"> Verify all MSIVs SHUT
		<ul style="list-style-type: none"> Verify all MSIV bypass valves - SHUT
PROCEDURE CAUTION: At least one SG must remain available for cooldown.		
	BOP	Check If Feed Flow Should Be Isolated To Any SG:
		<ul style="list-style-type: none"> Any SG pressure STABLE OR INCREASING (YES/NO)
	BOP	Check for any of the following:
		<ul style="list-style-type: none"> Any SG pressure - DECREASING IN AN UNCONTROLLED MANNER (NO)
		<ul style="list-style-type: none"> Any SG – COMPLETELY DEPRESSURIZED (NO)
	SRO	GO TO Step 7.
		Check CNMT Spray Pump Status:
	RO	<ul style="list-style-type: none"> Check CNMT spray pumps BOTH RUNNING (NO)
	SRO	<ul style="list-style-type: none"> GO TO Step 7c.
	RO	<ul style="list-style-type: none"> Check CNMT spray pumps - ONE RUNNING (YES)
	SRO	<ul style="list-style-type: none"> GO TO Step 8.

Op Test No.: 1 Scenario # 2 Event # 7 & 8 Page 34 of 38

Event Description: LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading

Time	Position	Applicant's Actions or Behavior
	RO	Check ESW Booster Pump Status:
		Check all of the following:
		<ul style="list-style-type: none"> ESW booster pump A-SA running. (NO)
	SRO	GO TO Step 8c.
	RO	Check any ESW header with both of the following:
		<ul style="list-style-type: none"> Associated ESW Booster Pump RUNNING (YES – B)
		<ul style="list-style-type: none"> Associated orifice bypass isolation valve SHUT (YES)
	RO	Check ESW Booster Pumps:
		Check both of the following:
		<ul style="list-style-type: none"> ESW Booster Pump A-SA RUNNING (NO)
		<ul style="list-style-type: none"> Shut Containment Fan Cooler ESW Isolation valves:
		<ul style="list-style-type: none"> 1SW-91 (No power)
		<ul style="list-style-type: none"> 1SW-92
		<ul style="list-style-type: none"> 1SW-97
		<ul style="list-style-type: none"> 1SW-109
	RO	Check both of the following:
		<ul style="list-style-type: none"> ESW Booster Pump B-SB RUNNING (YES)
		<ul style="list-style-type: none"> Orifice bypass isolation valve ISW-118 – SHUT (YES)
	RO	Monitor Conditions To Restore ESW To Isolated Fan Coolers:
		<ul style="list-style-type: none"> Check ESW - ISOLATED TO ANY FAN COOLERS IN STEPS 8 OR 9 (YES)

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>7 & 8</u>	Page	<u>35</u>	of	<u>38</u>
Event Description:		LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading							
Time	Position	Applicant's Actions or Behavior							

	RO	Check for any of the following:
		<ul style="list-style-type: none"> Check CNMT pressure - LESS THAN 10 PSIG (NO)
	SRO	<ul style="list-style-type: none"> WHEN any of the conditions occurs. THEN do Step 10.c.
		<ul style="list-style-type: none"> Observe NOTE prior to Step 11 AND Continue with Step 11.
		PROCEDURE NOTE: The Containment Status Tree may continue to display a "non-satisfied" condition after completion of the procedure. If this is the case, the appropriate Function Restoration Procedure does not need to be implemented again since all necessary actions have already been performed.
	SRO	RETURN TO Procedure And Step In Effect.
	SRO	Returns to PATH-1
	SRO	INFORMS Crew that Foldouts A AND B apply.
		NOTE: The crew may brief on the foldout criteria.
		EVALUATOR'S NOTE: No FOLDOUT B actions will occur in this scenario. The crew will monitor for implementation of Cold Leg Recirculation but the point will not be reached.
	RO	MAINTAIN RCP Seal Injection flow between 8 GPM AND 13 GPM.
	BOP	CHECK Intact SG Levels:
		<ul style="list-style-type: none"> ANY level – GREATER THAN 25% [40%]. (YES)
		<ul style="list-style-type: none"> CONTROL feed flow to maintain all intact levels between 25% AND 50% [40% AND 50%].

Op Test No.: 1 Scenario # 2 Event # 7 & 8 Page 36 of 38

Event Description: LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading

Time	Position	Applicant's Actions or Behavior
	RO	Check PRZ PORV and Block Valves:
	BOP	<ul style="list-style-type: none"> • VERIFY AC buses 1A1 AND 1B1 – ENERGIZED. (NO – no power to 1A1)
		<ul style="list-style-type: none"> • CHECK PRZ PORVs – SHUT. (YES)
		<ul style="list-style-type: none"> • CHECK block valves – AT LEAST ONE OPEN. (YES)
SRO CONTINUOUS ACTION: IF a PRZ PORV opens on high pressure, THEN verify it shuts after pressure decreases to less than opening setpoint.		
	RO	CHECK SI Termination Criteria:
		<ul style="list-style-type: none"> • RCS subcooling – GREATER THAN
		10°F [40°F] – C (NO)
		20°F [50°F] – M (NO)
	SRO	WHENEVER the SI termination criteria are met, THEN GO TO EPP-008, "SI TERMINATION".
	RO	CHECK any CNMT Spray Pump – RUNNING. (YES)
	SRO	CONSULT plant operations staff to determine if CNMT spray should be placed in standby.
BOOTH OPERATOR: If contacted as plant operations staff: Unless directed by procedure, leave CNMT Spray in service until the TSC has completed an evaluation.		
SRO CONTINUOUS ACTION: WHEN directed by plant operations staff, place CNMT Spray in standby alignment.		

Op Test No.: 1 Scenario # 2 Event # 7 & 8 Page 37 of 38

Event Description: LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading

Time	Position	Applicant's Actions or Behavior
	RO	WHEN flux less than 5×10^{-11} AMPS, THEN do Steps 52b AND c.
		<ul style="list-style-type: none"> • VERIFY source range detectors – ENERGIZED.
		<ul style="list-style-type: none"> • TRANSFER nuclear recorder to source range scale.
	RO	CHECK RHR Pump Status:
		<ul style="list-style-type: none"> • RCS Pressure – GREATER THAN 230 PSIG. (NO)
	RO	FOR each running CCW pump, open the associated CCW Return From RHR HX valve:
		<ul style="list-style-type: none"> • TRAIN A: 1CC-147 (N/A)
		<ul style="list-style-type: none"> • TRAIN B: 1CC-167 (YES)
	BOP	CHECK EDG Status:
		<ul style="list-style-type: none"> • CHECK AC emergency buses 1A-SA AND 1B-SB – ENERGIZED BY OFFSITE POWER. (NO)
		<ul style="list-style-type: none"> • Check AC emergency buses 1A-SA OR 1B-SB - ENERGIZED BY OFFSITE POWER (NO)
		<ul style="list-style-type: none"> • Align and monitor equipment using PATH-1 Guide, Attachment 10.
	SRO	Align AND monitor plant equipment referring to AOP-025, "LOSS OF ONE EMERGENCY AC BUS (6.9KV) OR ONE EMERGENCY DC BUS (125V)".
	BOP	Shutdown any unloaded EDGs using OP-155, Section 7.0 (N/A)
	RO/SRO	RHR system – CAPABLE OF COLD LEG RECIRCULATION. (YES)

Op Test No.: 1 Scenario # 2 Event # 7 & 8 Page 38 of 38

Event Description: LBLOCA With Coincident Loss of Off-Site Power; EDG "A" Failure Leaves Vital Bus 1A-SA De-energized; Load Sequencer "B" Skips Block 2 Loading

Time	Position	Applicant's Actions or Behavior
	SRO	Check auxiliary AND radwaste processing building radiation – NORMAL (YES)
		GO TO Step 58.
	RO	Check RCS Status:
		Check for both of the following:
		• RCS pressure – LESS THAN 230 PSIG
		• Any RHR HX header flow - GREATER THAN 1000 GPM
	SRO	Check Cold Leg Recirculation Switchover Criteria:
		• Check SI system - ALIGNED FOR COLD LEG RECIRCULATION (NO)
		• GO TO Step 59c.
	SRO	Perform a brief on EPP-010, "TRANSFER TO COLD LEG RECIRCULATION" to prepare for transfer to cold leg recirculation.
EVALUATOR'S NOTE: The Lead Evaluator can terminate the scenario at this point. The scenario has not been validated past this point.		

Facility:	SHEARON HARRIS	Scenario No.:	3	Op Test No.:	NRC
Examiners:	_____	Operators:	_____	_____	_____
Initial Conditions:	<ul style="list-style-type: none"> 100% power, BOL. MDAFW Pump "A" is cleared and tagged for motor bearing replacement. 12 hours remain on TS 3.7.1.2.a, Action a. GP-006, NORMAL PLANT SHUTDOWN FROM POWER OPERATION TO HOT STANDBY, has been completed through Step 5.2.3. REM-01TV-3534, Condenser Vacuum Pump Effluent Monitor is out-of-service. SG "A" Tube Leakage is 4 GPD. 				
Turnover:	Plant management has directed a 4 DEH units/minute power reduction to 50% power in accordance with GP-006, NORMAL PLANT SHUTDOWN FROM POWER OPERATION TO HOT STANDBY. This is a conservative action initiated because MDAFW Pump "A" may not be declared operable prior to the TSAS expiration.				
Critical Task:	<ul style="list-style-type: none"> Close SG "A" MSIV and SG "B" MSIV before exiting EPP-14. Stop all RCP's in accordance with FOLDOUT A criteria. Close the MS supply valve from SG "C" to the TDAFW Pump before exiting PATH-2. 				
Event No.	Malf. No.	Event Type*	Event Description		
1	N/A	N – BOP, SRO R – RO	Lower power.		
2	BAT004	TS - SRO	Leak in Boric Acid Tank.		
3	CVC26	C – RO, SRO	Letdown Cooler to CCW leak.		
4	RMS007 MFZCR744	I – BOP, SRO TS – SRO	Containment Rad Monitor failure/interlock fails to actuate.		
5	CFW17A	C – BOP, SRO	Main Feedwater Pump 1A Recirculation Valve (1FW-8) fails OPEN.		
6	CRF008	I – RO, SRO	Tref Processor fails LO.		
7	TUR21 TUR22 CFW019A	C – BOP, SRO	Secondary Load Rejection. SG "A" Main Feedwater Regulating Valve fails to track in AUTO.		
8	CFW034 CFW01B	M – ALL	SG "A" Main Feedwater Regulating Valve fails OPEN. MDAFW Pump "B" trips.		
9	SGN05C	M – ALL	SGTR during EPP-4 (Reactor Trip Response).		
(See next page)					

10	SGN04C MSS05C ZRPK504A ZRPK504B	C – ALL	SG “C” Main Steam Safety Valve fails OPEN. SG “C” Main Steam Isolation Valve fails to close (AUTO and MANUAL). AUTO Main Steamline Isolation fails to actuate.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

The crew assumes the watch having pre-briefed on the procedure to lower power. Motor-driven Auxiliary Feedwater Pump "A" (MDAFW Pump "A") is tagged out-of-service and will be out for the entire shift. This will be a factor in the scenario in that MDAFW Pump "B" will trip when the reactor is tripped and the TDAFW Pump must remain in service with a SGTR in one of the steam supplies (SG "C").

During the power reduction, a leak will begin in the Boric Acid Tank. The tank will drain down to less than the TS limit and stabilize. The RO may recognize the lowering level and/or will respond to alarm ALB-6-6-3, BORIC ACID TANK HIGH/LOW LEVEL. The crew should dispatch an AO to investigate. The AO will report a leak on an upper level tap. The SRO should enter TS 3.1.2.6.a, Action a. and request assistance from Work Control for repairs and to protect the other borated water flowpath(s).

On cue from the Lead Evaluator, a leak will develop in the Letdown Heat Exchanger. The crew should respond to a CCW Radiation Monitor Alarm and/or rising CCW Surge Tank level/alarms. The SRO should enter AOP-014, LOSS OF COMPONENT COOLING WATER. The crew should work through AOP-014 and isolate the leak by securing letdown. The crew should place Excess Letdown in service in accordance with OP-107, CHEMICAL AND VOLUME CONTROL SYSTEM.

After Excess Letdown is in service, the Lead Evaluator can cue failure of Radiation Monitor 3502A, Containment RCS Leak Detection Monitor. The interlock will fail to actuate requiring the BOP to manually align containment purge equipment. The SRO should enter TS 3.3.3.1 (Radiation Monitoring Instrumentation) and 3.4.6.1 (RCS Leakage Detection).

After the TS entry for the RMS failure, the Lead Evaluator can cue the failure open of the recirculation valve (1FW-8) on Main Feedwater Pump 1A. If the valve position change is not observed visually then SG levels will slowly lower until one (or more) level deviation alarms actuate. The BOP may close the valve when the incorrect position is observed. The SRO should enter AOP-010, FEEDWATER MALFUNCTIONS, and work through to manually close or verify the valve closed from the control room.

On cue from the Lead Evaluator, the Rod Control Tref Processor will fail LOW causing a continuous rod insertion. The SRO should direct the RO to perform the immediate actions of AOP-001, MALFUNCTION OF ROD CONTROL AND INDICATION SYSTEM. The crew should work through AOP-001; restoring Tave and maintaining AFD within specifications. Rod Control will remain in MANUAL for the remainder of the scenario. Depending on the extent of the transient, the SRO may enter the DNB TS for RCS Pressure.

On cue from the Lead Evaluator, a turbine runback will result in a load rejection. The SRO should enter AOP-015, SECONDARY LOAD REJECTION. SG "C" Main Feedwater Regulating Valve will fail to track in AUTO. The BOP may note the SG "C" Main Feedwater Regulating Valve not responding or will respond to a level deviation alarm and take manual control in accordance with the alarm response procedures and management guidance for controlling malfunctioning automatic equipment. The RO should coordinate control of Tave by moving rods in MANUAL and by boration to restore the rods to the proper position.

When the plant has been stabilized following the load rejection, the Lead Evaluator can cue the failure of SG "A" Main Feedwater Regulating Valve. The BOP should attempt manual control and then recommend a reactor trip. The crew should perform the immediate actions of PATH-1

Scenario Event Description

Shearon-Harris 2007 NRC Scenario 3

and then transition to EPP-4, REACTOR TRIP RESPONSE. A SG "C" Tube Leak will rapidly escalate to a SGTR while the crew is performing EPP-4. The crew may initiate a MANUAL SI or respond to the AUTO SI and then return to PATH-1. One minute after the SI actuation, a Main Steam Safety Valve will fail open on SG "C". The crew should work through PATH-1 and then transition to EPP-14, FAULTED STEAM GENERATOR ISOLATION. In EPP-14 the intact SG's should be isolated from the faulted SG and the steam supply valve from SG "C" to the TDAFW Pump should be closed. The SRO may transition from EPP-14 back to PATH-1 or directly to PATH-2 based on the manifestation of SGTR symptoms. In either case, the crew should eventually transition to PATH-2 and then to EPP-20, SGTR WITH LOSS OF REACTOR COOLANT, since ruptured SG pressure will be < 260 psig. The Lead Evaluator can terminate the scenario when an RCS cooldown is in progress or one CSIP is stopped in accordance with EPP-20.

SIMULATOR SETUP

SPECIAL INSTRUCTIONS

- Clip a copy of GUIDE-1 Attachment 1 (SI Alignment) and Attachment 6 (Safeguards Actuation Verification) to each scenario guide for use by the evaluators.
- Clip a copy of AOP-005, Attachment 1 (Containment Monitors) to each scenario guide for use by the evaluators.

INITIAL CONDITIONS:

- 100% power
- MDAFW Pump "A" cleared and tagged (CFW026)
- Tag MDAFW Pump "A" on the control board
- Remove REM-3534, Condenser Vacuum Pump Effluent Monitor from service
- Ensure rod step counters reset to the correct value
- GP-006 completed through step 5.2.3
- Reactivity Plan for intended evolution (Reduce power to 50% at 4 DEH Units/minute)
- Turnover Sheet
- LT:161/LT:106 – Adjust BAT levels to approximately 80% in order to reduce "time to alarm" following MALF actuation.

PRE-LOAD:

- CFW01B (MDAFW Pump "B" breaker trip during AUTO start)
- ZRPK504A/ZRPK504B (AUTO Main Steamline isolation fails to actuate)
- MSS05C (SG "C" MSIV cannot be closed from MCR)

TRIGGERS:

- ET-2: BAT004 (Leak in the BAT)
- ET-3: CVC26 (Letdown HX Tube Leak)
- ET-4: RMS007 (CNTMT Rad Monitor 3502A failure/Interlock failure)
MFZCR744 FAIL AS IS
- ET-5: CFW17A (1FW-8 fails OPEN)
- ET-6: CRF008 (Tref Processor fails to 557 °F)
- ET-7: TUR22/TUR21/CFW19A (Secondary Load Rejection with FCV-498 failing to track in AUTO)
- ET-8: CFW034 (FCV-478 fails OPEN)
- ET-9: SGN05C (SG "C" Tube leak ramps to maximum value over 5 minutes)
- ET-10: SGN04C (SG "C" Safety Valve fails OPEN one minute after AUTO or MANUAL SI actuation)

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>1</u>	Page	<u>6</u>	of	<u>52</u>
Event Description:		Lower Power							
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions:		Actuate ET-2 (Boric Acid Tank leak) after the first boration has been initiated and the down power is in progress.
Indications Available:		
	SRO	GP-006, Step 5.2.4.
EVALUATOR NOTE:		
The crew may elect to manually crack open a PRZ Spray Valve to establish PRZ Surge line flow and thereby maintain PRZ/RCS boron concentrations within limits.		
PROCEDURE NOTE:		
When PRZ backup heaters are energized in manual, PK-444A1, PRZ Master Pressure Controller (a PI controller) will integrate up to a greater than normal output, opening PRZ Spray Valves to return and maintain RCS pressure at setpoint. The result is as follows:		
<ul style="list-style-type: none"> • PORV PCV-444B will open at a lower than expected pressure. • ALB-009-3-2, PRESSURIZER HIGH PRESS DEVIATION CONTROL, will activate at a lower than expected pressure. • Increased probability for exceeding Tech Spec DNB limit for RCS pressure. 		
	RO	ENERGIZE all available Pressurizer Backup Heaters.
PROCEDURE NOTE:		
Routine load changes should be coordinated with the Load Dispatcher to meet system load demands.		
	SRO	INFORMS Load Dispatcher that a load reduction to 90% will begin. (N/A, per Initial Conditions)

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>1</u>	Page	<u>7</u>	of	<u>52</u>
Event Description:		Lower Power							
Time	Position	Applicant's Actions or Behavior							

PROCEDURE CAUTION: A failure of the Vidar in the DEH computer has resulted in a plant trip in the past. This failure would affect operation in Operator Auto, and can be detected in either of the following ways:

- If OSI-PI is available, the process book PLANTSTATUS.PIW, DEH Trends function of the Plant Process Computer: DEH (menu) contains a point for DEH MEGAWATTS. With a failure of the Vidar, this point will not be updating.
- If OSI-PI is NOT available, accessing the ANALOG INPUTS screen on the Graphics display computer (in the Termination Cabinet room near the ATWS panel) will show several points, most of which should be updating if the Vidar is functioning properly.

	SRO	DIRECTS BOP to start power reduction and specifies a rate. May direct initiation of a boration before the power reduction begins.
	BOP	DEPRESS the LOAD RATE MW/MIN push-button.
	BOP	ENTER the desired rate, NOT to exceed 5 MW/MIN, in the DEMAND display.
	BOP	DEPRESS the ENTER push-button.
	BOP	DEPRESS the REF push-button.
	BOP	ENTER the desired load (120 MW if shutting down) in the DEMAND display.
	BOP	DEPRESS the ENTER push-button. The HOLD push-button should illuminate.

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>1</u>	Page	<u>8</u>	of	<u>52</u>
Event Description:		Lower Power							
Time	Position	Applicant's Actions or Behavior							

PROCEDURE NOTE:

The unloading of the unit can be stopped at any time by depressing the HOLD push-button. The HOLD lamp will illuminate and the GO lamp will extinguish. The load reduction can be resumed by depressing the GO push-button. The HOLD lamp will extinguish and the GO lamp will illuminate.

	BOP	DEPRESS the GO push-button to start the load reduction.
	BOP	VERIFY the number in the REFERENCE display decreases.
	BOP	VERIFY Generator load is decreasing.
	BOP	WHEN Turbine load is less than 95%, THEN VERIFY the 3A and 3B Feedwater Vents have been opened per OP-136, Section 7.2.

SIMULATOR OPERATOR: Acknowledge direction. No simulator response actions are required.

	RO	MONITORS primary systems response.
	RO	INITIATES boration, as necessary (with SRO concurrence).

NOTE:

OP-107 is a "Reference Use" procedure.

	RO	DETERMINE the reactor coolant boron concentration from chemistry OR the Main Control Room status board.
	RO	DETERMINE the magnitude of boron concentration increase required.

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>1</u>	Page	<u>9</u>	of	<u>52</u>
Event Description:		Lower Power							
Time	Position	Applicant's Actions or Behavior							

	RO	DETERMINE the volume of boric acid to be added using the reactivity plan associated with the IC.
NOTE:		FIS-113, BORIC ACID BATCH COUNTER, has a tenths position.
PROCEDURE CAUTION:		If the translucent covers associated with the Boric Acid and Total Makeup Batch counters FIS-113 and FIS-114, located on the MCB, are not closed, the system will not automatically stop at the preset value.
	RO	SET FIS-113, BORIC ACID BATCH COUNTER, to obtain the desired quantity.
NOTE:		Boration of the RCS will be dependent on charging and letdown flow rate. Placing additional letdown orifices in service will increase the boric acid delivery rate to the RCS.
	RO	SET controller 1CS-283, FK-113 BORIC ACID FLOW, for the desired flow rate.
	RO	VERIFY the RMW CONTROL switch has been placed in the STOP position.
	RO	VERIFY the RMW CONTROL switch green light is lit.
	RO	PLACE control switch RMW MODE SELECTOR to the BOR position.

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>1</u>	Page	<u>10</u>	of	<u>52</u>
Event Description:		Lower Power							
Time	Position	Applicant's Actions or Behavior							

PROCEDURE NOTE:

When PRZ backup heaters are energized in manual, PK 444A1, PRZ Master Pressure Controller (a PI controller) will integrate up to a greater than normal output, opening PRZ Spray Valves to return and maintain RCS pressure at setpoint. The result is as follows:

- PORV PCV-444B will open at a lower than expected pressure
- ALB-009-3-2, PRESSURIZER HIGH PRESS DEVIATION CONTROL, will activate at a lower than expected pressure
- Increased probability for exceeding Tech Spec DNB limit for RCS pressure

	RO	OPERATE the pressurizer backup heaters as required to limit the difference between the pressurizer and RCS boron concentration to less than 10 ppm.
	SRO/RO	FOR large boron changes, PERFORM the following:
		<ul style="list-style-type: none"> • DIRECT Chemistry to sample the RCS for boron concentration.
		<ul style="list-style-type: none"> • MAKE boron concentration adjustments as dictated from sample results.
Procedure Note: Boration may be manually stopped at any time by turning control switch RMW CONTROL to STOP.		
	RO	START the makeup system as follows:
		<ul style="list-style-type: none"> • TURN control switch RMW CONTROL to START momentarily.
		<ul style="list-style-type: none"> • VERIFY the RED indicator light is LIT.

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>1</u>	Page	<u>11</u>	of	<u>52</u>
Event Description:		Lower Power							
Time	Position	Applicant's Actions or Behavior							

PROCEDURE CAUTION: The operation should be stopped if an unanticipated reactivity effect is seen. Do not resume the operation until the cause has been corrected.

	RO	VERIFY Tavg responds as desired.
	RO	IF rod control is in AUTO, THEN VERIFY the control rods are stepping out to the desired height.
	RO	VERIFY boration automatically terminates when the desired quantity of boron has been added.
	RO	PLACE Reactor Makeup in Auto per Section 5.1.
		VERIFY the RMW CONTROL switch:
		<ul style="list-style-type: none"> Is in the STOP position.
		<ul style="list-style-type: none"> The GREEN light is LIT.
		PLACE the RMW MODE SELECTOR to AUTO.
		START the makeup system as follows:
		<ul style="list-style-type: none"> TURN control switch RMW CONTROL to START momentarily.
		<ul style="list-style-type: none"> VERIFY the RED indicator light is LIT.

Op. Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>2</u>	Page	<u>12</u>	of	<u>52</u>
Event Description:		Leak in Boric Acid Tank							
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions:		ET-2 (Boric Acid Tank leak) is initiated during the power reduction.
Indications Available:		ALB-6-6-3, BORIC ACID TANK HIGH/LOW LEVEL
	RO	Responds to alarm ALB-6-6-3, BORIC ACID TANK HIGH/LOW LEVEL, or tank level indicator trend.
	RO	Enters ALB-6-6-3.
	RO	CONFIRM alarm using the following Boric Acid Tank level indicators:
		• LI-106SA
		• LI-161.1SB
	RO	VERIFY Automatic Functions: None
	RO	IF Boric Acid Tank level is HIGH - - - (NO)
	RO	IF Boric Acid Tank level is LOW, THEN:
		• CHECK for boric acid leakage.
	CREW	Dispatches an AO to investigate.
BOOTH OPERATOR:		<ul style="list-style-type: none"> Wait 2-3 minutes and then report boric acid on the floor and leaking down the side of the tank. The leak appears to be coming from or near the upper tap of the level indication piping. A ladder and some help will be needed to investigate further.
	SRO	Completes an Equipment Failure Checklist and contacts WCC for assistance.

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Event Description: Leak in Boric Acid Tank

Time	Position	Applicant's Actions or Behavior
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	SRO	Enters TS 3.1.2.6.a, Action a - With the boric acid tank inoperable and being used as one of the above required borated water sources, restore the boric acid tank to OPERABLE status within 72 hours or be in a t least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN specified in the CORE OPERATING LIMITS REPORT (COLR), plant procedure PLP-106 at 200°F; restore the boric acid tank to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.
LEAD EVALUATOR:		Cue Event 3 (Leak in the Letdown Cooler) anytime after the TS declaration.

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>3</u>	Page	<u>14</u>	of	<u>52</u>
Event Description:		Letdown Cooler to CCW Leak							
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions: Actuate ET-3 (LTDN Cooler leak) on cue from the Lead Evaluator.

Indications Available: ALB-10-4-5, RAD MONITOR SYSTEM TROUBLE

	RO	Responds to alarm ALB-10-4-5, RAD MONITOR SYSTEM TROUBLE, or CCW Surge Tank level indicator trend.
	SRO	Reports CCW Radiation Monitor in alarm.
	SRO	Enters AOP-014, LOSS OF COMPONENT COOLING WATER. EVALUATOR NOTE: The SRO may direct the BOP to perform AOP-005, RADIATION MONITORING SYSTEM, in parallel. No actions will result. The AOP-005 CCW attachment will direct them back to AOP-014.
	SRO	Informs Shift Superintendent to REFER TO PEP-110, Emergency Classification And Protective Action Recommendations, AND ENTER the EAL Network at entry point X.
	SRO	EVALUATE plant conditions AND GO TO the appropriate section:
		Leakage into CCW System – Section 3.1.
	CREW	CONTACT Health Physics and Radwaste Control Room in preparation for draining the CCW System.
	RO	CHECK CCW Surge tank level between 45% and 75%. (YES)
	RO/SRO	MONITOR the following CCW Radiation Monitors:
		• REM-01CC-3501ASA, CCW Train A
		• REM-01CC-3501BSB, CCW Train B

Op Test No.: 1 Scenario # 3 Event # 3 Page 15 of 52

Event Description: Letdown Cooler to CCW Leak

Time	Position	Applicant's Actions or Behavior
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	SRO	Reports REM-01CC-3501ASA in ALERT

PROCEDURE NOTE:

- If the leak location is known, non-applicable steps (Steps 5 through 10) are not required to be performed prior to proceeding to Step 11.
- If the leak location is not known, Steps 5 through 10 may be performed in any order, as directed by the Unit SCO.

EVALUATOR'S NOTE:

The crew may diagnose the problem and go directly to the letdown isolation step.

	SRO	CHECK that the leak location is known. (NO)
		<ul style="list-style-type: none"> • PERFORM Steps 5 through 10, as directed by the Unit SCO.
	RO	CHECK for in-leakage from RHR System, as follows:
		<ul style="list-style-type: none"> • CHECK RHR pressure greater than CCW pressure. (NO)
	SRO	<ul style="list-style-type: none"> • Return to Step 4.
	SRO	CHECK for in-leakage from RCP Thermal Barriers, as follows:
	RO	<ul style="list-style-type: none"> • VERIFY proper seal injection. (YES)
		<ul style="list-style-type: none"> • SHUT 1CC-252, RCP Thermal Barriers Flow Control.
		<ul style="list-style-type: none"> • CHECK CCW Surge Tank level STABLE. (NO)
		<ul style="list-style-type: none"> • PERFORM the following:
		<ul style="list-style-type: none"> • OPEN 1CC-252, RCP Thermal Barriers Flow Control.
	SRO	<ul style="list-style-type: none"> • Return to Step 4.
	SRO	CHECK for in-leakage from Excess Letdown, as follows:
		<ul style="list-style-type: none"> • CHECK Excess Letdown in service. (NO)
		<ul style="list-style-type: none"> • Return to Step 4.

Op. Test No.: 1 Scenario # 3 Event # 3 Page 16 of 52

Event Description: Letdown Cooler to CCW Leak

Time	Position	Applicant's Actions or Behavior
	SRO	CHECK for in-leakage from the Letdown Heat Exchanger, as follows:
	RO	SHUT the following valves:
		• 1CS-7, 45 gpm Letdown Orifice A
		• 1CS-8, 60 gpm Letdown Orifice B
		• 1CS-9, 60 gpm Letdown Orifice C
	RO	CONTROL Charging to maintain Pressurizer Level.
	RO	CHECK CCW Surge Tank level STABLE. (YES)
	SRO	PLACE Excess Letdown in service per OP-107, Chemical and Volume Control.
EVALUATOR'S NOTE: AOP-014 actions continue in this scenario guide. Excess Letdown actions follow the step "WHEN Chemistry results are available, THEN CONSULT Operations Staff for additional actions."		
	CREW	Dispatch an operator to shut the following valves:
		• 1CC-340, Letdown HX CCW Return Line Isolation
		• 1CC-328, CCW Supply Isolation to Letdown HX
		BOOTH OPERATOR NOTE: <ul style="list-style-type: none"> To close CCW-340: CCW040 0.000 To close CCW-328: CCW034 0.000
	CREW	DIRECT Chemistry to sample CCW for activity, boron and proper corrosion inhibitor concentration.

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>3</u>	Page	<u>17</u> of <u>52</u>
Event Description:		Letdown Cooler to CCW Leak					
Time	Position	Applicant's Actions or Behavior					

	SRO	WHEN Chemistry results are available, THEN CONSULT Operations Staff for additional actions.
	SRO	Completes an Equipment Failure Checklist and contacts WCC for assistance.
EVALUATOR'S NOTE: All of the Excess Letdown steps are performed by the RO.		
		OP-107, Chemical and Volume Control, Section 8.2 - Excess Letdown.
		Verifies Initial Conditions:
		<ul style="list-style-type: none"> • CCW is being supplied to the excess letdown heat exchanger per OP-145.
		<ul style="list-style-type: none"> • RCP Seal Return is in service per Section 5.3.
PROCEDURE NOTES: <ul style="list-style-type: none"> • Normally Excess Letdown will go to the VCT. However, if plant conditions warrant, the RCDT may be selected. When the Excess Letdown line has been flushed, the VCT position can then be re-selected. • If Excess Letdown is to remain in service for sufficient time for dilution or boration to be necessary then VCT level should be lowered to accommodate the expected level increase before placing Excess Letdown in service. 		
PROCEDURE CAUTION: Excess Letdown operation during times of BTRS operation may result in damage to the RCP seals (due to increased contaminants and higher pH water). This should not prevent any AOP or EOP actions. The Responsible Engineer for RCP or CVCS may provide additional guidance if needed.		

Op. Test No.: 1 Scenario # 3 Event # 3 Page 18 of 52

Event Description: Letdown Cooler to CCW Leak

Time	Position	Applicant's Actions or Behavior
		INFORM Radwaste Control Room to monitor Seal Water Filter ΔP while Excess Letdown is in service.
		PLACE the excess letdown heat exchanger in operation as follows:
		<ul style="list-style-type: none"> • VERIFY 1CC-188, CCW TO EXCESS LETDOWN HEAT EXCHANGER, is open.
		<ul style="list-style-type: none"> • VERIFY 1CC-202 SB, CCW FM EXCESS LTDN & RCDT HEAT EXCHANGERS, is open.
PROCEDURE NOTE: Flushing the excess letdown line to the RCDT is required if the boron concentration in the excess letdown line from the RCS isolation valves to 1CS-466 is unknown or differs from RCS concentration. The volume of this line is 74 gallons. Two volumes (148 gallons) should be adequate to prevent unexpected reactivity changes in the RCS when flow is aligned to the VCT.		
PROCEDURE CAUTION: 1CS-464, HC-137 EXCESS LTDN FLOW is rated for 1500 psid. Anytime that 1CS-464 is exposed to greater than 1500 psid, leakby should be expected.		
		IF excess letdown flow is to be aligned to the RCDT, THEN PERFORM the following: (N/A)
		PLACE 1CS-461, EXCESS LETDOWN to OPEN.
		PLACE 1CS-460, EXCESS LETDOWN to OPEN.
PROCEDURE NOTE: Seal Water Flow should be observed on FR-154A and FR-154B when adjusting 1CS-464, HC-137 EXCESS LTDN FLOW for the following reasons: <ul style="list-style-type: none"> • RCP No 1 seal leakoff flow will be affected, and 		

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>3</u>	Page	<u>19</u> of <u>52</u>
Event Description:		Letdown Cooler to CCW Leak					
Time	Position	Applicant's Actions or Behavior					
		<ul style="list-style-type: none">• The possibility exists of lifting the 150 psi safety on the excess letdown/No. 1 seal return line.					
Procedure CAUTION:		<ul style="list-style-type: none">• Do NOT exceed 174 °F outlet temperature as indicated on TI-139.• Do NOT exceed 150 psig as indicated on PI-138.					
		ADJUST 1CS-464, HC-137 EXCESS LTDN FLOW as necessary to establish excess letdown flow and not exceed the following parameters:					
		<ul style="list-style-type: none">• 174 °F outlet temperature as indicated on TI-139.					
		<ul style="list-style-type: none">• 150 psig as indicated on PI-138.					
		Reports Excess Letdown in service.					

Op Test No.:	<u>1</u>	Scenario #	<u>1</u>	Event #	<u>4</u>	Page	<u>20</u>	of	<u>52</u>
Event Description:		Containment Rad Monitor Failure/Interlock Fails to Actuate							
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions:		Actuate ET-4 (Containment Radiation Monitor failure) on cue from the Lead Evaluator.
Indications Available:		ALB-10-4-5, RAD MONITOR SYSTEM TROUBLE
	RO	Responds to ALB-10-4-5, RAD MONITOR SYSTEM TROUBLE.
	CREW	CONFIRM alarm using:
		<ul style="list-style-type: none"> RM-23, Radiation Monitoring Panel
BOOTH OPERATOR:		If dispatched to investigate, wait five minutes and then report REM-3502 Gas Channel failed – no power, no indication.
EVALUATOR'S NOTE:		There are automatic actions associated with the failed channel that have been blocked by malfunction. The BOP may take the actions to place equipment in the interlock position or do so in accordance with the OWP. The scenario guide is written as if it will be done in the OWP.
	BOP	VERIFY Automatic Functions:
		<ul style="list-style-type: none"> Automatic Actions are dependent upon which RM-23 Radiation Monitor is in ALARM
	CREW	PERFORM Corrective Actions:
		<ul style="list-style-type: none"> IF the alarm is a Fuel Handling Building High Radiation alarm, THEN MANUALLY START the Spent Fuel Pool Purification System, using OP-116.01, Fuel Pool Cooling Purification System.
		<ul style="list-style-type: none"> IF the alarm is RM-21AV-3509-1SA or an Area Monitor in the vicinity of the VCT Valve Gallery and air is being purge from the VCT to the plant vent per OP-120.07, THEN MANUALLY SECURE the air purge from the VCT to the plant vent per OP-120.07.

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Event Description:		Containment Rad Monitor Failure/Interlock Fails to Actuate							
Time	Position	Applicant's Actions or Behavior							
		<ul style="list-style-type: none"> IF any radiation monitor is in alarm condition, THEN GO TO AOP-005, Radiation Monitoring System. 							
		<ul style="list-style-type: none"> IF maintenance is to be performed, THEN REFER TO OWP-RM, Radiation Monitoring. 							
EVALUATOR'S NOTE:		<p>The scenario guide is written as the validation crew responded. It was diagnosed as a channel failure and the crew implemented the OWP rather than go to AOP-005. AOP-005, Attachment 1 is clipped to the scenario guide for evaluator use if AOP-005 is implemented.</p>							
	SRO	Diagnoses as a failure of Channel 3502A							
	SRO	Implement OWP-RM-03, CONTAINMENT LEAK DETECTION RADIATION MONITORS.							
	SRO	<p>Enters TS 3.3.3.1, Action b (Table 3.3.3-6, Action 26 - Must satisfy the ACTION requirement for Specification 3.4.6.1 and; Action 27 - With less than the Minimum Channels OPERABLE requirement, operation may continue provided the containment purge makeup and exhaust isolation valves are maintained closed).</p>							
		Enters TS 3.4.6.1, Action c - With a. and c. of the above required Leakage Detection Systems inoperable:							
		<ul style="list-style-type: none"> Restore either Monitoring System (a. or c. 1 to OPERABLE status within 72 hours and 							
		<ul style="list-style-type: none"> Obtain and analyze a grab sample of the containment atmosphere for gaseous and particulate radioactivity at least once per 24 hours, and 							
		<ul style="list-style-type: none"> Perform a Reactor Coolant System water inventory balance at least one per 8 hours. 							
		Otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.							

Op Test No.:	<u>1</u>	Scenario #	<u>1</u>	Event #	<u>4</u>	Page	<u>22</u>	of	<u>52</u>
Event Description:		Containment Rad Monitor Failure/Interlock Fails to Actuate							
Time	Position	Applicant's Actions or Behavior							

	BOP	Performs OWP-RM component lineup.
PROCEDURE CAUTION: The control switches for AH-82A and AH-82B must be taken to STOP momentarily to ensure they will not AUTO start.		
	BOP	<ul style="list-style-type: none"> Places AH-82A, Normal Containment Supply Fan, in STOP and releases.
		<ul style="list-style-type: none"> Places AH-82B, Normal Containment Supply Fan, in STOP and releases.
		<ul style="list-style-type: none"> Verifies 1CP-6, Normal Purge Inlet – CLOSED.
		<ul style="list-style-type: none"> Verifies 1CP-9, Normal Purge Inlet – CLOSED.
		<ul style="list-style-type: none"> Verifies 1CP-3, Normal Purge Discharge – CLOSED.
		<ul style="list-style-type: none"> Verifies 1CP-5, Normal Purge Discharge – CLOSED.
		<ul style="list-style-type: none"> 1D21-2B, AH-82 (1A-NNS) Normal Containment Purge Makeup Air Handler in OFF
		<ul style="list-style-type: none"> 1E21-2F, AH-82 (1B-NNS) Normal Containment Purge Makeup Air Handler in OFF
	SRO	Completes an Equipment Failure Checklist and contacts WCC for assistance.
EVALUATOR'S NOTE: The Lead Evaluator can cue Event 5 (1FW-8 fails OPEN) after the TS entries and the OWP has been completed.		

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Event Description: Main Feedwater Pump 1A Recirculation Valve (1FW-8) fails OPEN

Time	Position	Applicant's Actions or Behavior
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Booth Operator Instructions: Actuate ET-5 (1FW-8, MFW Pump "A" Recirculation Valve, fails OPEN). Malfunction is deleted when BOP operates 1FW-8.

Indications Available: Change in 1FW-8 indication or any SG Level Deviation alarm (ALB-014-1-1B, 2-1B, 3-1B)

	BOP	Responds to indication change on 1-FW-8 or SG level deviation alarms.
EVALUATOR'S NOTE: The BOP may immediately close 1FW-8 or the crew may enter AOP-10, FEEDWATER MALFUNCTION, and close it by procedural direction. In either case, it is likely that the SRO will enter AOP-010 to ensure all necessary actions are completed.		
	SRO	Enters AOP-010.
	BOP	Performs Immediate Actions:
Immediate Action		<ul style="list-style-type: none"> CHECK ANY Main Feedwater Pump TRIPPED. (NO)
	SRO	Go to Step 5.
	BOP	CHECK DEH controlling Turbine Valves PROPERLY. (YES)
		<ul style="list-style-type: none"> GO TO Step 7.
	SRO	MAINTAIN ALL of the following:
		<ul style="list-style-type: none"> At least ONE Main Feedwater Pump RUNNING
		<ul style="list-style-type: none"> Main Feedwater flow to ALL Steam Generators
		<ul style="list-style-type: none"> ALL Steam Generator levels greater than 30%

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Event Description: Main Feedwater Pump 1A Recirculation Valve (1FW-8) fails OPEN

Time	Position	Applicant's Actions or Behavior
	BOP	CHECK Feedwater Regulator Valves operating properly in AUTO: (YES)
		<ul style="list-style-type: none"> • Response to SG levels
		<ul style="list-style-type: none"> • Valve position indication
		<ul style="list-style-type: none"> • Response to feed flow/steam flow mismatch
PROCEDURE NOTE:		Loss of Main Control Room annunciators concurrent with a turbine runback of greater than 25 %, requires a change of event classification per the HNP Emergency Plan.
	SRO	CHECK Main Control Room annunciators AVAILABLE. (YES)
	BOP	CHECK the following Pump status:
		<ul style="list-style-type: none"> • ALL Feedwater Train Pumps RUNNING (YES)
		<ul style="list-style-type: none"> • Both HD Pumps running (YES)
	SRO	GO TO the applicable section:
		<ul style="list-style-type: none"> • All Condensate/Feedwater Flow Malfunctions (other than pump trips)
		<ul style="list-style-type: none"> • Proceeds to Section 3.1
	BOP	CHECK the following Recirc and Dump Valves operating properly in MODU: <ul style="list-style-type: none"> • Main Feedwater Pumps (NO) • Condensate Booster Pumps • Condensate Pumps • 1CE-293, Condensate Recirc • 1CE-142, Condensate Dump To CST Isolation Valve (SLB-4/7-1)

Op Test No.:	<u>1</u>	Scenario #	<u>1</u>	Event #	<u>5</u>	Page	<u>25</u>	of	<u>52</u>
Event Description: Main Feedwater Pump 1A Recirculation Valve (1FW-8) fails OPEN									
Time	Position	Applicant's Actions or Behavior							

	BOP	IF ANY valve has failed OPEN OR is NOT controlling properly, THEN:
		<ul style="list-style-type: none"> • ATTEMPT to control the valve from the MCB, if available.
		<ul style="list-style-type: none"> • Closes 1FW-8
		Booth Operator Note: When 1FW-8 switch is operated the malfunction 1CFW17A should delete. Verify that this occurs.
	CREW	CHECK the Condensate and Feedwater System INTACT. (YES)
PROCEDURE NOTE: Pumps should be stopped in the order of higher to lower pressure. (To stop a Condensate Pump, stop a Main Feedwater Pump followed by a Condensate Booster Pump and then the Condensate Pump.)		
	BOP	CHECK pumps for NORMAL OPERATION. (YES)
	SRO	NOTIFY Load Dispatcher of ANY load limitations. (N/A)
	SRO	CHECK Reactor thermal power changed by less than 15% in any one hour period. (YES)
	SRO	EXIT this procedure.
	SRO	Completes an Equipment Failure Checklist and contacts WCC for assistance.
EVALUATOR'S NOTE: The Lead Evaluator can cue the next event (Tref Processor fails LOW) when 1FW-8 is closed and the plant is stable.		

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>6</u>	Page	<u>26</u>	of	<u>52</u>
Event Description: Tref Processor failure									
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions:			Actuate ET-6 (Tref Processor failure) on cue from the Lead Evaluator.
Indications Available:			Uncontrolled rod motion
	RO	RESPONDS to uncontrolled rod motion.	
	SRO	ENTERS and directs actions of AOP-001.	
	RO	PERFORMS immediate actions.	
Immediate Action	RO	CHECK that LESS THAN TWO control rods are dropped. (YES)	
Immediate Action	RO	POSITION Rod Bank Selector Switch to MAN.	
Immediate Action	RO	CHECK Control Bank motion STOPPED. (YES)	
	SRO	READS immediate actions and proceeds to Section 3.2.	
	RO	CHECK that instrument channel failure has NOT OCCURRED by observing the following:	
		<ul style="list-style-type: none"> • RCS Tavg (YES) 	
		<ul style="list-style-type: none"> • RCS Tref (NO) 	
	RO	PERFORM the following:	
		<ul style="list-style-type: none"> • IF a power supply is lost, THEN GO TO AOP-024, Loss of Uninterruptible Power Supply. (NO) 	
		<ul style="list-style-type: none"> • IF an individual instrument failed, THEN MAINTAIN manual rod control until corrective action is complete. 	
		<ul style="list-style-type: none"> • IF a Power Range NI Channel failed, THEN BYPASS the failed channel using OWP-RP. (N/A) 	

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Event Description: Tref Processor failure

Time	Position	Applicant's Actions or Behavior
	RO	MANUALLY OPERATE affected control bank to restore the following:
		<ul style="list-style-type: none"> EQUILIBRIUM power and temperature conditions
		<ul style="list-style-type: none"> RODS above the insertion limits of Tech Spec 3.1.3.6 and PLP-106, Technical Specification Equipment List Program and Core Operating Limits Report.
	RO	VERIFY proper operation of the following:
		<ul style="list-style-type: none"> CVCS demineralizers (YES)
		<ul style="list-style-type: none"> BTRS (N/A)
		<ul style="list-style-type: none"> REACTOR Makeup Control System (YES)
	SRO	CHECK that this section was entered due to control banks MOVING OUT. (NO)
	RO	CHECK that NEITHER of the following OCCURRED:
		<ul style="list-style-type: none"> Unexplained RCS boration (NO)
		<ul style="list-style-type: none"> Unplanned RCS dilution (NO)
	SRO	CHECK that an automatic Rod Control malfunction OCCURRED. (YES or NO will yield the same result – Rod Control in MANUAL)
	SRO/RO	MAINTAIN manual rod control until appropriate corrective action is complete.
		<ul style="list-style-type: none"> Completes an Equipment Failure Checklist and contacts WCC for assistance.
	SRO	EXIT this procedure.

Op Test No.: 1 Scenario # 3 Event # 6 Page 28 of 52

Event Description: Tref Processor failure

Time	Position	Applicant's Actions or Behavior
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EVALUATOR'S NOTE:	When Tavg is restored and AOP-001 exited, cue initiation of Event 7 (Secondary Load Rejection).
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Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>7</u>	Page	<u>29</u>	of	<u>52</u>
Event Description:		Secondary Load Rejection, SG "A" Main Feedwater Regulating Valve Fails to Track in AUTO							
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions:		Actuate ET-7 (Secondary Load Rejection/FCV-498 fails to automatically respond to load change) on cue from the Lead Evaluator.
Indications Available:		ALB-20-2-2, TURBINE RUNBACK OPERATIVE
	BOP	Responds to ALB-20-2-2, TURBINE RUNBACK OPERATIVE.
	BOP	Performs APP-ALB-20-2-2.
		CONFIRM alarm using:
		<ul style="list-style-type: none"> PI-446, PI-447, Turbine first stage pressure
		<ul style="list-style-type: none"> Feedwater Pump indication
		<ul style="list-style-type: none"> Heater Drain Pump indication
		<ul style="list-style-type: none"> Reactor coolant loop ΔT setpoint indications versus actual loop ΔT indications
	BOP	Reports no obvious reason for the runback.
	SRO	Enters AOP-015, SECONDARY LOAD REJECTION.
	SRO	IF load rejection was caused by ANY of the following:
		<ul style="list-style-type: none"> Loss of ONE Main FW Pump at greater than 60% turbine load
		<ul style="list-style-type: none"> Both Heater Drain pumps TRIPPED THEN GO TO AOP-010, Feedwater Malfunctions. (NO)
PROCEDURE NOTE:		Turbine runbacks are quickly identified by ALB-020-2-2, TURBINE RUNBACK OPERATIVE, in alarm and RUNBACK OPER light LIT as long as the initiating signal is present on DEH Panel A.

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>7</u>	Page	<u>30</u>	of	<u>52</u>
Event Description:		Secondary Load Rejection, SG "A" Main Feedwater Regulating Valve Fails to Track in AUTO							
Time	Position	Applicant's Actions or Behavior							

	BOP	CHECK DEH controlling Turbine Valves PROPERLY for event: (YES)
		<ul style="list-style-type: none"> Turbine Runback
		<ul style="list-style-type: none"> Load Rejection
		<ul style="list-style-type: none"> Turbine load change
	SRO	GO TO Step 4.
	BOP	CHECK for proper Steam Dump valve operation by ALL of the following: (YES)
		<ul style="list-style-type: none"> Load rejection with power greater than 10%
		<ul style="list-style-type: none"> Steam Dumps in Tavg mode
		<ul style="list-style-type: none"> Steam Dumps operating to reduce temperature
	BOP	CHECK Main Steam pressure less than PORV controller setpoint (nominally 1106 psig). (YES)
EVALUATOR'S NOTE: Rod Control will be in MANUAL due to the Tref Processor failure. The RO may be adjusting Tavg before this step is reached.		
	RO	CHECK control rods INSERTING to reduce Tavg - Tref mismatch. (NO)
	RO	INSERT control rods to reduce Tavg-Tref mismatch to within 2°F.
EVALUATOR'S NOTE: The BOP may note that FRV "C" is not responding in AUTO or may take action when the level deviation alarm actuates.		
	BOP	CHECK SG levels TRENDING to between 52% and 62%. (NO – FCV-478 not responding properly)

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>7</u>	Page	<u>31</u>	of	<u>52</u>
Event Description:		Secondary Load Rejection, SG "A" Main Feedwater Regulating Valve Fails to Track in AUTO							
Time	Position	Applicant's Actions or Behavior							

	BOP	CONTROL feedwater to maintain SG levels between 52% and 62%.
		<ul style="list-style-type: none"> Takes MANUAL control of FCV-498 and maintains SG "C" level.
EVALUATOR'S NOTE: The Lead Evaluator can cue Event 8 (SG "A" FRV fails OPEN) anytime after Tavg and SG "C" level are under control or at the exit from AOP-015.		
	RO	CHECK PZR PORVs SHUT. (YES)
	RO	CHECK PZR pressure, as follows:
		<ul style="list-style-type: none"> PROPER OUTPUT on PK-444A1, Master Pressure Controller (YES)
		<ul style="list-style-type: none"> TRENDING to 2235 psig (YES)
	RO	CHECK PZR Level TRENDING to reference level. (YES)
PROCEDURE NOTE: If both Generator output breakers are open AND a subsequent Turbine trip occurs, AFW should initiate and MDAFW FCVs receive an auto open signal.		
	BOP	CHECK ANY Generator Output Breaker CLOSED. (YES)
	RO	CHECK control rods above insertion limits. (YES)
	BOP	CHECK BOTH Heater Drain pumps RUNNING. (YES)

Op Test No.:	1	Scenario #	3	Event #	7	Page	32	of	52
Event Description:		Secondary Load Rejection, SG "A" Main Feedwater Regulating Valve Fails to Track in AUTO							
Time	Position	Applicant's Actions or Behavior							

	CREW	DISPATCH an operator to check the following SEATED, by observance of tailpipes:
		<ul style="list-style-type: none"> MSR relief valves SG safety valves
	BOP	CHECK Hotwell level trending to between 71% and 76%. (YES)
	RO/SRO	CHECK Reactor thermal power changed by less than 15% in any one hour period. (YES)
	BOP	RESET Loss of Load interlocks as follows:
		<ul style="list-style-type: none"> CHECK C7A or C7B ACTUATED. (NO)
	SRO	<ul style="list-style-type: none"> GO TO Step 19
	BOP	CHECK required Main FW Pump status by BOTH of the following:
		<ul style="list-style-type: none"> Turbine load greater than 60% (YES) Both Main FW Pumps RUNNING (YES)
	SRO	GO TO Step 32.
	SRO	DETERMINE cause of loss of load AND initiate appropriate corrective action.
		<ul style="list-style-type: none"> Contacts WCC and/or I&C for assistance.
PROCEDURE NOTE:		Plant loads may be supplied by either the Main Generator or offsite power during the following step.
PROCEDURE CAUTION:		DO NOT synchronize to the grid UNTIL requested by the Load Dispatcher.

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Event Description: Secondary Load Rejection, SG "A" Main Feedwater Regulating Valve Fails to Track in AUTO

Time	Position	Applicant's Actions or Behavior
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	SRO	CHECK Turbine loading DESIRABLE. (NO)
	SRO	REFER TO GP-006, Normal Plant Shutdown from Power Operation to Hot Standby, to shutdown unneeded plant equipment.
	SRO	Exit this procedure.

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Event Description: SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips;
 SG "C" SGTU Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN,
 SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO
 Main Steamline Isolation Fails to Actuate

Time	Position	Applicant's Actions or Behavior
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Booth Operator Instructions:		Actuate ET-8 (FCV-478 fails OPEN)
Indications Available:		SF-FF Mismatch alarms on SG "A"
	BOP	Responds to multiple alarms and/or FCV-478 indication.
	BOP	Attempts to close FCV-478 in MANUAL and reports that it is not responding.
	SRO	Directs MANUAL reactor trip.
	RO	Initiates a MANUAL reactor trip.
	CREW	Performs PATH-1 immediate actions.
	RO	VERIFY Reactor Trip:
		• AUTO or MANUAL Reactor Trip successful:
		• CHECK for any of the following:
		• TRIP breakers RTA and BYA OPEN (YES)
		• TRIP breakers RTB and BYB OPEN (YES)
		• ROD Bottom lights LIT (YES)
		• NEUTRON flux decreasing (YES)
		VERIFY Turbine Trip:
		• CHECK for any of the following:
		• ALL turbine throttle valves – SHUT (YES)
		• ALL turbine governor valves – SHUT (YES)
	BOP	VERIFY power to AC Emergency Buses:
		• 1A-SA and 1B-SB Buses energized by off-site power or EDG's (YES, off-site power)

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>8, 9, 10</u>	Page	<u>35</u>	of	<u>52</u>
Event Description:		SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTL Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate							
Time	Position	Applicant's Actions or Behavior							

	RO	CHECK SI Actuation (NO)
		SI Required (NO)
	SRO	GO TO EPP-004, "REACTOR TRIP RESPONSE", Step 1.
BOOTH OPERATOR:		Actuate ET-9 for the progressive SGTL in SG "C" at the transition to EPP-4. Should ramp to 100% over 5 minutes.
EVALUATOR'S NOTE:		<p>The crew will perform EPP-4 until the SGTR symptoms are evident. Several EPP-4 steps are included in the scenario guide.</p> <p>The SI actuation Foldout criteria (PRZ Level can NOT be maintained greater than 10%) applies in this scenario.</p>
SRO PROCEDURE NOTE: Foldout applies.		
	SRO	Inform Shift Superintendent to evaluate EAL Network Using Entry Point X.
	SRO	Check RCS Temperature:
		<ul style="list-style-type: none"> • Check SG blowdown isolation valves – SHUT (YES)
	BOP	Stabilize AND maintain temperature between 555 °F AND 559 °F using Table 1.
		<ul style="list-style-type: none"> • Control feed flow and steam dump to stabilize temperature between 555 °F AND 559 °F
	RO	Check RCP Status:

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>8, 9, 10</u>	Page	<u>36</u>	of	<u>52</u>
Event Description:		SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTL Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> Check RCPs - AT LEAST ONE RUNNING (YES)
	BOP	Check Feed System Status:
		<ul style="list-style-type: none"> RCS Temperature - LESS THAN 564 °F
		<ul style="list-style-type: none"> Verify feed reg valves - SHUT
		<ul style="list-style-type: none"> Check feed flow to SGs - GREATER THAN 210 KPPH (YES but may report MDAFW Pump "A" is tagged OOS and MDAFW Pump "B" is tripped)
	CREW	Contacts AO to investigate MDAFW Pump "B" failure.
BOOTH OPERATOR:		If dispatched, report MDAFW Pump "B" breaker tripped – cause unknown.
	RO	Check Control Rod Status:
		<ul style="list-style-type: none"> Check DRPI – AVAILABLE (YES)
		<ul style="list-style-type: none"> Verify all control rods - FULLY INSERTED (YES)
EVALUATOR'S NOTE:		At some point the RO will report that he is unable to maintain PRZ level and/or the BOP may report indications of a SGTR on SG "C". At that point the SRO should direct a MANUAL SI and return to PATH-1, Entry Point "A".
	SRO	Directs a MANUAL SI in accordance with Foldout criteria.
	RO	Initiates a MANUAL SI.
BOOTH OPERATOR:		Insert ET-10 (S/G Safety fails open one minute after SI actuation.
	SRO	Transitions to PATH-1, Entry Point "A".

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Event Description: SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips;
 SG "C" SGTL Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN,
 SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO
 Main Steamline Isolation Fails to Actuate

Time	Position	Applicant's Actions or Behavior
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	SRO	FOLDOUT A applies.
EVALUATOR'S NOTE: The following actions should be taken in accordance with FOLDOUT A criteria during the scenario:		
		<ul style="list-style-type: none"> Stop all RCP's when SI flow is greater than 200 GPM AND RCS Pressure is less than 1400 PSIG.
		<ul style="list-style-type: none"> Verify Alternate Miniflow Isolation Valves or Miniflow Block Valves CLOSE when RCS Pressure lowers to less than 1800 PSIG.
	RO	VERIFY ALL CSIPs AND RHR pumps – RUNNING. (YES)
	RO	CHECK SI Flow:
		<ul style="list-style-type: none"> SI flow – GREATER THAN 200 GPM. (YES)
	RO	RCS pressure – GREATER THAN 230 PSIG. (YES)
	BOP	CHECK Main Steam Isolation:
		<ul style="list-style-type: none"> MAIN steam isolation – ACTUATED. (NO)
	BOP	MAIN steam isolation – REQUIRED. (YES/NO)
		<ul style="list-style-type: none"> Steam line pressure – LESS THAN 601 PSIG.
		<ul style="list-style-type: none"> CNMT pressure – GREATER THAN 3.0 PSIG.
		<ul style="list-style-type: none"> MANUAL closure of all MSIVs AND bypass valves is desired.
	RO	CHECK CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG. (YES)
	BOP	CHECK AFW Status:

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Event Description:		SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTU Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> AFW flow – AT LEAST 210 KPPH AVAILABLE. (YES)
EVALUATOR'S NOTE: Crew may isolate AFW to Steam Generator "C" at this time.		
	BOP	CHECK any SG level – GREATER THAN 25% [40%]. (YES)
	BOP	VERIFY Alignment of Components From Actuation of ESFAS Signals Using Attachment 6, "Safeguards Actuation Verification", While Continuing with this Procedure.
EVALUATOR'S NOTE: The RO will perform all board actions until the BOP completes Attachment 6. The BOP is permitted to properly align plant equipment in accordance with Attachment 6 without SRO approval. The Scenario Guide still identifies tasks by board position because the time frame for completion of Attachment 6 is not predictable.		
	BOP	Control RCS Temperature:
		Stabilize AND maintain temperature between 555°F AND 559°F using Table 1.
		<ul style="list-style-type: none"> Control feed flow and steam dump to stabilize temperature between 555 °F AND 559 °F
	BOP	VERIFY AC buses 1A1 AND 1B1 – ENERGIZED. (YES)
	RO	CHECK PRZ PORVs – SHUT. (YES)
	RO	CHECK block valves – AT LEAST ONE OPEN. (YES-All OPEN)

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Event Description: SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTU Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate

Time	Position	Applicant's Actions or Behavior
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	RO	PRZ spray valves – SHUT. (YES)
	BOP	IDENTIFY any faulted SG:
		<ul style="list-style-type: none"> CHECK for any of the following:
		<ul style="list-style-type: none"> ANY SG pressures – DECREASING IN AN UNCONTROLLED MANNER (YES – "C")
		<ul style="list-style-type: none"> ANY SG – COMPLETELY DEPRESSURIZED. (NO)
	SRO	GO TO EPP-014
BOOTH OPERATOR: If directed to walk down the system to check for leaks: Report one main steam safety valve open on SG "C" and that you cannot get close enough to positively identify which valve. If directed to locally close MSIV "C" then wait five minutes and request maintenance assistance. IA-814 will not open.		
PROCEDURE NOTE: <ul style="list-style-type: none"> At least one SG must be maintained available for RCS cooldown. 		
<ul style="list-style-type: none"> Any faulted SG OR secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown. 		
	SRO	IMPLEMENT Function Restoration Procedures as required.
	BOP	CHECK MSIVs and BYPASS Valves:
		<ul style="list-style-type: none"> VERIFY all MSIVs – SHUT.
CRITICAL TASK		<ul style="list-style-type: none"> Closes MSIV "A" and MSIV "B" before exiting EPP-14 to isolate the affected SG from the unaffected SG's.
		<ul style="list-style-type: none"> REPORTS MSIV "C" will not close.

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Event Description: SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTU Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate

Time	Position	Applicant's Actions or Behavior
	CREW	DISPATCHES AO to shut MSIV "C"
	BOP	VERIFY all MSIV bypass valves – SHUT. (YES)
	BOP	CHECK any SG NOT Faulted:
		<ul style="list-style-type: none"> ANY SG pressure – STABLE OR INCREASING. (YES, "A" and "B").
	BOP	IDENTIFY any Faulted SG:
		<ul style="list-style-type: none"> CHECK for any of the following: ANY SG pressure – DECREASING IN AN UNCONTROLLED MANNER (YES – "C")
	BOP	ISOLATE Faulted SG(s):
		<ul style="list-style-type: none"> VERIFY faulted SG(s) PORV – SHUT (YES) VERIFY Main FW isolation valves – SHUT (YES) VERIFY MDAFW and TDAFW pump isolation valves to faulted SG(s) – SHUT SHUT faulted SG(s) steam supply valve to TDAFW pump – SHUT Closes isolation from SG "C": 1MS-72 VERIFY main steam drain isolation(s) before MSIVs – SHUT: SG A: 1MS-231 (YES) SG B: 1MS-266 (YES) SG C: 1MS-301 (CLOSES) VERIFY SG Blowdown isolation valves – SHUT (YES) VERIFY main steam analyzer isolation valves – SHUT (YES)

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>8, 9, 10</u>	Page	<u>41</u>	of	<u>52</u>
Event Description:		SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTL Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate							
Time	Position	Applicant's Actions or Behavior							

	BOP	CHECK CST Level – GREATER THAN 10% (YES)
PROCEDURE NOTE:		A SG may be suspected to be ruptured if it fails to dry out following isolation of feed flow. Local checks for radiation can be used to confirm primary-to-secondary leakage.
	SRO	CHECK Secondary Radiation:
		<ul style="list-style-type: none"> • SG Blowdown radiation – NORMAL (YES)
		<ul style="list-style-type: none"> • MAIN steamline radiation – NORMAL (YES)
	BOP	CHECK SG Levels:
		<ul style="list-style-type: none"> • ANY level – INCREASING IN AN UNCONTROLLED MANNER (YES, "C")
	SRO	<ul style="list-style-type: none"> • GO TO PATH-2, entry point J.
	SRO	FOLDOUT C applies.
EVALUATOR'S NOTE:		No actions should result from FOLDOUT "C" during the remainder of the scenario.
	SRO	EVALUATE EAL Network using Entry Point U.
	SRO	IMPLEMENT Function Restoration Procedures as required.
PROCEDURE NOTE:		The RCP Trip Criteria is in effect until an RCS cooldown is initiated.
EVALUATOR'S NOTE:		RCP's may have been stopped IAW Foldout A.

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Event Description: SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTU Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate

Time	Position	Applicant's Actions or Behavior
	RO	CHECK RCP Trip Criteria:
		<ul style="list-style-type: none"> ANY RCP – RUNNING (YES)
		<ul style="list-style-type: none"> CHECK all of the following:
		<ul style="list-style-type: none"> SI flow – GREATER THAN 200 GPM (YES)
		<ul style="list-style-type: none"> CHECK RCS pressure – LESS THAN 1400 PSIG (YES)
CRITICAL TASK		<ul style="list-style-type: none"> STOP all RCPs by the completion of PATH-2, Step 4, since this is the last procedurally directed step for stopping RCP's to reduce the rate of coolant loss.
	BOP	IDENTIFY any ruptured SG:
		<ul style="list-style-type: none"> CHECK for any of the following:
		<ul style="list-style-type: none"> SG level – INCREASING IN AN UNCONTROLLED MANNER (YES – "C")
PROCEDURE CAUTION: <ul style="list-style-type: none"> At least one SG must be maintained available for RCS cooldown. If the TDAFW pump is the only available source of feed flow, one steam supply valve from an intact SG must be maintained open. 		
	BOP	ISOLATE Flow From Ruptured SG:
		<ul style="list-style-type: none"> ADJUST ruptured SG PORV controller setpoint to 88% (1145 PSIG) AND place in auto.
		<ul style="list-style-type: none"> CHECK ruptured SG PORV – SHUT. (YES)
		<ul style="list-style-type: none"> SHUT ruptured SG steam supply valve to TDAFW pump:
CRITICAL TASK		<ul style="list-style-type: none"> VERIFIES SG C: 1MS-72 SHUT prior to exiting PATH-2 to isolate the release path after the ruptured SG has been procedurally identified.

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>8, 9, 10</u>	Page	<u>43</u>	of	<u>52</u>
Event Description:		SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTU Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> • VERIFY blowdown isolation valves from ruptured SG – SHUT (YES)
		<ul style="list-style-type: none"> • SHUT ruptured SG main steam drain isolation before MSIV:
		<ul style="list-style-type: none"> • SG A: 1MS-231
		<ul style="list-style-type: none"> • SG B: 1MS-266
		<ul style="list-style-type: none"> • SG C: 1MS-301
		<ul style="list-style-type: none"> • SHUT ruptured SG MSIV and BYPASS valve. (MSIV will NOT close)
	BOP	Ruptured SG MSIV and bypassed valves SHUT (NO)
	BOP	SHUT all remaining MSIVs and Bypass Valves
	BOP	PLACE both Steam Dump Interlock Switches to OFF/RESET
	SRO	Use intact SG PORVs for all further steam dumping
	SRO	Dispatch AO to isolate steam release path from ruptured SG using Attachment 1
	BOP	Any intact SG MSIV and bypass valve shut (YES)
PROCEDURE CAUTION: If ruptured SG is faulted AND is NOT needed for RCS cooldown, THEN feed flow to that SG should remain isolated.		
	BOP	MONITOR Ruptured SG Level:
		<ul style="list-style-type: none"> • RUPTURED SG – FAULTED (YES)
		<ul style="list-style-type: none"> • RUPTURED SG – NEED FOR RCS COOLDOWN (NO)

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Event Description:		SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTU Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate							
Time	Position	Applicant's Actions or Behavior							

	BOP	VERIFY feed flow isolated to ruptured SG.
	SRO	OBSERVE CAUTION prior to Step 9 and GO TO Step 9.
	BOP	CHECK Ruptured SG(s) Pressure – GREATER THAN 260 PSIG [350 PSIG] (NO)
	SRO	Transition to EPP-20, SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY
PROCEDURE NOTE: Foldout applies.		
EVALUATOR'S NOTE: No actions should result from the EPP-20 FOLDOUT during the remainder of the scenario.		
	RO	Reset SI.
	SRO	Manually Realign Safeguards Equipment Following A Loss Of Offsite Power.
		(Refer to PATH-1 GUIDE, Attachment 2.)
	RO	Reset Phase A AND Phase B Isolation Signals.
	RO	Establish Instrument Air AND Nitrogen To CNMT:
		Open the following valves:
		• 1IA-819
		• 1SI-287

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>8, 9, 10</u>	Page	<u>45</u>	of	<u>52</u>
Event Description:		SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTL Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate							
Time	Position	Applicant's Actions or Behavior							

	BOP	Monitor AC Buses:
		Check AC emergency buses 1A-SA AND 1B-SB – ENERGIZED BY OFFSITE POWER: (YES)
		<ul style="list-style-type: none"> Check bus voltages Check breakers 105 AND 125 - CLOSED
	BOP	Check all non-emergency AC buses – ENERGIZED (YES)
	BOP	Check Ruptured SG(s) Level - LESS THAN 78% [60%] (High-High alarm) (YES)
PROCEDURE CAUTION: PRZ heaters should NOT be energized until PRZ water level indicates greater than minimum recommended by plant operations staff to ensure heaters are covered.		
	RO	Secure PRZ Heaters:
		<ul style="list-style-type: none"> Place backup heaters in the OFF position. Verify control heaters - OFF Consult plant operations staff for a recommended minimum indicated PRZ water level that will ensure heaters are covered. (Refer to USER'S GUIDE, "USER'S GUIDE", Attachment 2, Evaluating Pressurizer Water Level Indication.)
	RO	Check CNMT Spray Status:
		<ul style="list-style-type: none"> Check any CNMT spray pump – RUNNING (NO) Observe CAUTION prior to Step 9 AND continue with Step 9.
PROCEDURE CAUTION: IF ruptured SG is faulted AND is NOT needed for RCS cooldown, THEN feed flow to that SG should remain isolated.		

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Event Description: SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTU Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate

Time	Position	Applicant's Actions or Behavior
	BOP	Monitor Ruptured SG Level:
		<ul style="list-style-type: none"> Ruptured SG – FAULTED (YES) Ruptured SG - NEEDED FOR RCS COOLDOWN (NO) Verify feed flow isolated to ruptured SG. (YES)
	SRO	<ul style="list-style-type: none"> GO TO Step 10.
	RO	Check RHR Pump Status:
		<ul style="list-style-type: none"> RCS pressure - GREATER THAN 230 PSIG (YES) RCS pressure - STABLE OR INCREASING (YES) Check RHR pump suction - ALIGNED TO RWST (YES) Stop RHR pumps.
	CREW	Coordinate With Plant Operations Staff AND Chemistry To Perform The Following To Obtain Primary And Secondary Samples:
		<ul style="list-style-type: none"> Operate the primary AND secondary sample panels. Open CCW to sample HX valves: 1CC-114 1CC-115 Open CCW to GFFD valves: 1CC-304 1CC-305 Align AND obtain activity, hydrogen AND boron samples of the following: RCS hot legs PRZ liquid space All SGs

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Event Description: SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips;
 SG "C" SGTU Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN,
 SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO
 Main Steamline Isolation Fails to Actuate

Time	Position	Applicant's Actions or Behavior
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		(Refer to OP-101, "SAMPLING SYSTEM", Section 5.0.)
		<ul style="list-style-type: none"> IF water has collected in the recirculation sumps (from CNMT spray or RCS leakage), THEN perform the following:
		<ul style="list-style-type: none"> Align and obtain sump samples.
		<ul style="list-style-type: none"> Determine sump water boron concentration AND pH.
	SRO	Initiate Evaluation Of Plant Status:
		<ul style="list-style-type: none"> Check auxiliary building radiation – NORMAL (YES)
		<ul style="list-style-type: none"> Consult plant operations staff to evaluate plant equipment needed for recovery.
		<ul style="list-style-type: none"> Start additional plant equipment needed to assist in recovery as determined by the plant operations staff.
PROCEDURE NOTE:		When SG level decreases to 25%, AFW actuation occurs and the AFW flow control valves receive a full open signal.
	BOP	Check Intact SG Levels:
		<ul style="list-style-type: none"> Any Level - GREATER THAN 25% [40%] (YES)
		<ul style="list-style-type: none"> AFW flow - AT LEAST 210 KPPH AVAILABLE (YES)
		<ul style="list-style-type: none"> Control feed flow to maintain intact SG levels between 30% and 50% [40% and 50%]
PROCEDURE NOTE:		After the low steam pressure SI signal is blocked, main steamline isolation will occur if the high steam pressure rate setpoint is exceeded.
	RO	Check PRZ Pressure:
		<ul style="list-style-type: none"> Pressure - LESS THAN 2000 PSIG (YES)
		<ul style="list-style-type: none"> Block low steam pressure SI.

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Event Description: SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips;
 SG "C" SGTL Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN,
 SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO
 Main Steamline Isolation Fails to Actuate

Time	Position	Applicant's Actions or Behavior
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PROCEDURE CAUTION: If all RCPs are stopped, steps to depressurize the RCS and terminate SI should be performed as quickly as possible after the cooldown has started to minimize potential pressurized thermal shock of the reactor vessel.

EVALUATOR NOTE: The crew should continue in the procedure but NOT initiate a cooldown since 100 °F/HR cooldown has already been exceeded.

	CREW	Initiate RCS Cooldown To Cold Shutdown:
		<ul style="list-style-type: none"> Maintain RCS cooldown rate less than 100 °F/HR.
		<ul style="list-style-type: none"> Check RHR system - OPERATING IN SHUTDOWN COOLING MODE (NO)
		<ul style="list-style-type: none"> GO TO Step 15f.
		<ul style="list-style-type: none"> Check if steam dump to condenser - AVAILABLE: (NO)
		<ul style="list-style-type: none"> GO TO Step 16.
	BOP	Check SG Status For Cooldown: (NO action)
		Check SGs - AT LEAST ONE INTACT SG AVAILABLE
		Dump steam from intact SGs using any of the following (listed in order of preference):
		<ul style="list-style-type: none"> Condenser steam dump
		<ul style="list-style-type: none"> SG PORVs

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Event Description: SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTL Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate

Time	Position	Applicant's Actions or Behavior
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		The Lead Evaluator can terminate the scenario any time after the cooldown steps have been addressed or continue to the SI termination steps. However, SI will be re-initiated in accordance with the FOLDOUT after one CSIP is stopped. The Lead Evaluator should terminate the scenario before SI reinitiation criteria is observed, possibly ending the scenario with the crew believing that they must have made a mistake to reach that point.
	SRO	<p>Monitor Shutdown Margin While Continuing RCS Cooldown:</p> <p>a. Determine boron required for shutdown margin for anticipated RCS temperatures. (Refer to OST-1036, "SHUTDOWN MARGIN CALCULATION".)</p> <p>b. Check RCS boron – GREATER THAN BORON REQUIRED FOR SHUTDOWN MARGIN</p> <p>EVALUATOR NOTE: SI is still in progress. Chemistry may be contacted to sample the RCS.</p>
	RO	Monitor Subcooled Recovery Criteria:
		<ul style="list-style-type: none"> Check RWST level - GREATER THAN 70% (YES)
	SRO	<ul style="list-style-type: none"> GO TO Step 18d.
	BOP	<ul style="list-style-type: none"> Check ruptured SG level - LESS THAN 95% [80%] (YES)
	RO	<p>Check RCS Subcooling – GREATER THAN</p> <ul style="list-style-type: none"> 10 °F [40 °F] - C (YES) 20 °F [50 °F] - M
	RO	Check SI Status:
		<ul style="list-style-type: none"> SI flow - GREATER THAN 200 GPM (YES)
	SRO	<ul style="list-style-type: none"> Observe CAUTION prior to Step 21 AND GO TO Step 21.

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Event Description: SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTL Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate

Time	Position	Applicant's Actions or Behavior
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		PROCEDURE CAUTION: Voiding may occur in the RCS during RCS depressurization. This will result in a rapidly increasing PRZ level.
		PROCEDURE NOTE: RCS depressurization should NOT be stopped if RCS subcooling is lost. Subcooling should be restored as the cooldown continues.
	RO	Depressurize RCS To Refill PRZ:
		<ul style="list-style-type: none"> PRZ level - LESS THAN 25% [40%] (YES)
		<ul style="list-style-type: none"> Depressurize using normal PRZ spray. (NO RCP)
		<ul style="list-style-type: none"> Depressurize using one PRZ PORV.
		<ul style="list-style-type: none"> PRZ level - GREATER THAN 25% [40%]
		<ul style="list-style-type: none"> WHEN level greater than 25% [40%], THEN stop RCS depressurization.
	SRO	Observe CAUTION prior to Step 22 AND GO TO Step 22.
		PROCEDURE CAUTION: <ul style="list-style-type: none"> To prevent inadvertent criticality following natural circulation cooldown AND initiation of backfill, the RCP in the ruptured loop should NOT be the first RCP restarted. Following a complete loss of seal cooling, the affected RCP(s) should NOT be started prior to a status evaluation.
		PROCEDURE NOTE: RCPs should be run in order of priority (B,A,C) to provide normal PRZ spray. (This priority does NOT apply to the first RCP to be restarted.)

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Event Description: SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips; SG "C" SGTU Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN, SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO Main Steamline Isolation Fails to Actuate

Time	Position	Applicant's Actions or Behavior
		EVALUATOR NOTE: The SRO will likely assign the RCP task to the BOP and continue in EPP-20 with the RO.
	CREW	Check RCP Status:
		Check all RCPs – STOPPED (YES)
		RCS subcooling - GREATER THAN <ul style="list-style-type: none"> • 10 °F [40 °F] – C (YES) • 20 °F [50 °F] - M
		PRZ level - GREATER THAN 25% [40%] (YES)
		Establish support conditions AND start one RCP while continuing with this procedure: (OP-100)
		PROCEDURE NOTE: After stopping one CSIP, RCS pressure should be allowed to stabilize OR increase before checking SI termination criteria.
	RO	Check both CSIPs – RUNNING (YES)
		Check RCS subcooling based on RCP status:
		No RCP running: RCS subcooling – GREATER THAN <ul style="list-style-type: none"> • 35 °F [72 °F] – C (YES) • 48 °F [84 °F] - M
	SRO	GO TO Step 23g.
	RO	PRZ level - GREATER THAN 25% [40%] (YES)
	RO	Stop one CSIP.

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Event Description: SG "A" Main Feedwater Regulating Valve Fails OPEN, MDAFW Pump "B" Trips;
SG "C" SGTU Escalates in EPP-4; SG "C" Main Steam Safety Valve Fails OPEN,
SG "C" Main Steam Isolation Valve Fails to Close (AUTO and MANUAL), AUTO
Main Steamline Isolation Fails to Actuate

Time	Position	Applicant's Actions or Behavior
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		EVALUATOR NOTE: During validation, the leak rate at this point was such that SI would be reinitiated in accordance with FOLDOUT criteria. The Lead Evaluator should terminate the scenario before the crew observes that SI should be reinitiated and the scenario ends with the crew believing that they must have made a mistake to reach that point.

Facility:	SHEARON-HARRIS	Scenario No.:	4	Op Test No.:	NRC
Examiners:	_____	Operators:	_____	_____	_____
	_____		_____	_____	_____
	_____		_____	_____	_____
Initial Conditions:	<ul style="list-style-type: none"> From IC-27: 4.2% power, MOL, Boron 1570 PPM. Plant startup to full power in progress. Perform GP-005 to Step 95. No equipment out-of-service. 				
Turnover:	<ul style="list-style-type: none"> The previous shift continued a plant startup following a short maintenance outage. GP-005, POWER OPERATION, is in progress with Step 94 completed. Continue the startup but maintain steady state power at 9-10% while I&C Technicians complete testing of the P-7 permissive. 				
Critical Task:	<ul style="list-style-type: none"> Isolate AFW to the faulted SG before exiting EPP-14. Close at least one Phase B isolation valve in each line by no later than the completion of PATH-1 GUIDE, Attachment 6. 				

Event No.	Malfunction No.	Event Type*	Event Description
1	N/A	N – BOP, SRO R – RO	Shift to the Main Feedwater Regulating Valves/Raise power.
2	CVC31B	C – RO, SRO	Dilution fails to stop automatically.
3	RCS14A	C – RO, SRO TS – SRO	RCP "A" #1 Seal failure.
4	HVA04	C – BOP, SRO TS - SRO	Loss Essential Chiller "A".
5	CVC16A	C – ALL	Running Main Feedwater (MFW) Pump trips.
6	MSS01C	M – ALL	Main Steam break inside Containment (SG "C").
7	ZRPK528A ZRPK528B	C – BOP, SRO	AUTO AFW isolation fails on SG "C".
8	ZRPK632A ZRPK632B ZRPK633A ZRPK633B	I – RO or BOP, SRO	AUTO and MANUAL Phase "B" actuation fails.

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

Shearon-Harris 2007 NRC Scenario #4

The crew will assume the watch pre-briefed on the initial conditions and the procedure in effect (GP-005, POWER OPERATION). No equipment is out-of-service but I&C Technicians are performing P-7 permissive testing. Steady state power must be maintained at < 10% power until the P-7 testing is complete. This direction is actually to ensure power is less than 10% when the running MFW Pump trips.

The BOP will shift from the MFW Bypass Valves to the MFW Regulating Valves in accordance with GP-005. While this is in progress the RO will initiate a dilution to adjust Tave and get the Bank "D" rods in the desired position for the plant conditions. The dilution will fail to terminate automatically from the counter. The RO should stop the dilution and the SRO should enter and conduct AOP-003, MALFUNCTION OF REACTOR MAKEUP CONTROL.

When the MFW Regulating Valves are in AUTO and AOP-003 is complete, the Lead Evaluator can cue the RCP "A" #1 Seal failure. The RO should respond to alarm ALB-8-3-3, RCP A SEAL #1 LEAKOFF HIGH LOW FLOW. The SRO should enter AOP-018, REACTOR COOLANT PUMP ABNORMAL CONDITIONS. Increasing leakoff flow will eventually require stopping RCP "A", closing the affected return isolation valve, and closing the related Pressurizer Spray Valve. The SRO should enter TS 3.4.1.1 and specify that a plant shutdown is required.

After RCP "A" has been stopped and the TS entered, the Lead Evaluator can cue the loss of the running Essential Chiller. The BOP should respond to the Auxiliary Equipment Panel (ALB-23) alarm and report loss of the running chiller. The SRO should enter and conduct AOP-026, LOSS OF ESSENTIAL SERVICE CHILLED WATER SYSTEM. The standby chiller should be started in accordance with OP-148, ESSENTIAL SERVICES CHILLED WATER SYSTEM. The SRO should enter TS 3.7.13.

After the standby chiller is running and the TS is entered, the Lead Evaluator can cue the trip of the running MFW Pump. The BOP should report the loss of the pump and/or respond to alarms. The SRO should enter and conduct AOP-010, FEEDWATER MALFUNCTIONS. Actions will include starting the AFW System and lowering power as necessary to maintain SG levels.

When the plant has been stabilized, the Lead Evaluator can cue initiation of the steam break inside containment. AUTO AFW isolation is blocked on the affected SG and AUTO and MANUAL Phase B Isolation is blocked. The SRO should enter and conduct PATH-1. In PATH-1 the crew should stop the running RCP's, verify proper operation of ECCS equipment and manually close the Phase B isolation valves. At the faulted SG diagnostic steps, the SRO should transition to EPP-14, FAULTED STEAM GENERATOR ISOLATION. The crew should isolate SG "C"; including isolating AFW flow. Depending on crew response time, it is likely that the SRO will transition back to PATH-1 and continue actions until plant conditions warrant a transition to EPP-8, SI TERMINATION. The Lead Evaluator can terminate the scenario when high head safety injection flow has been terminated.

NRC 4 SIMULATOR SETUP

SPECIAL INSTRUCTIONS:

- Attach AOP-018 Attachments 1 and 2 to the back of the scenario guide for evaluator use
- Clip a copy of GUIDE-1 Attachment 1 (SI Alignment) and Attachment 6 (Safeguards Actuation Verification) to each scenario guide for use by the evaluators.

INITIAL CONDITIONS:

- From IC-27, adjust to < 5 % power
- No equipment OOS
- GP-005 completed through Step 94
- Reactivity Plan for intended evolution (Raise power for placing Main Turbine on line)
- Turnover Sheet

PRE-LOAD:

- XB11155 (Standby MFW Pump fails to start)
- ZR211158/ZR211113 (MDAFW Pumps fail to AUTO start)
- XRPK528A/XRPK528B (AUTO AFW Isolation fails on SG "C")
- XRPK632A/XRPK632B/XRPK633A/XRPK633B (AUTO and MANUAL Phase "B" Isolation failure)

TRIGGERS:

- CVC31B (Dilution fails to automatically terminate)
- RC14A (RCP "A" #1 Seal failure)
- HVA04 (Loss of the running Chiller "A")
- CFW16A (MFW Pump 1 trips)
- MSS01C (Steamline Break inside CNMT – SG "C")

Op Test No.:	<u>1</u>	Scenario #	<u>4</u>	Event #	<u>1</u>	Page	<u>4</u>	of	<u>32</u>
Event Description:		Shift to the Main Feedwater Regulating Valves/Raise Power.							
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions:		Actuate ET-1 (Dilution fails to terminate automatically) during a dilution, as directed by the Lead Evaluator.
Indications Available:		
EVALUATOR'S NOTE:		Do not proceed to Event 3 (RCP Seal failure) until the shift to the Feedwater Regulator Valves is complete.
	SRO	Directs BOP to perform Step 95, PREPARE to place the Main Feedwater Regulating valves in service.
	BOP	PREPARE to place the Main Feedwater Regulating valves in service as follows:
		VERIFY the following Main Feedwater Regulating valves are shut with the flow controllers in manual with zero (0 or minimum) controller output:
		• 1FW-133, MAIN FW A REGULATOR (FK-478)
		• 1FW-249, MAIN FW B REGULATOR (FK-488)
		• 1FW-191, MAIN FW C REGULATOR (FK-498)
	BOP	VERIFY SHUT the following Main Feed Regulating Block valves:
		• 1FW-130, MAIN FW A BLOCK VLV
		• 1FW-246, MAIN FW B BLOCK VLV
		• 1FW-188, MAIN FW C BLOCK VLV
		BOOTH OPERATOR NOTE: In the following step, report smooth operation of each FCV. When requested to verify: report 1FW-136, 1FW-252, 1FW-194 (Main Feed Reg Valve Outlet Isolation Valves) all OPEN.

Op Test No.:	<u>1</u>	Scenario #	<u>4</u>	Event #	<u>1</u>	Page	<u>5</u>	of	<u>32</u>
Event Description:		Shift to the Main Feedwater Regulating Valves/Raise Power.							
Time	Position	Applicant's Actions or Behavior							

	BOP	CYCLE the following controllers to open then shut the flow control valves, while monitoring locally for smooth operation:
		• 1FW-133, MAIN FW A REGULATOR (FK-478)
		• 1FW-249, MAIN FW B REGULATOR (FK-488)
		• 1FW-191, MAIN FW C REGULATOR (FK-498)
	BOP	VERIFY OPEN the following Main Feed Regulating Isolation Valves:
		• 1FW-130, MAIN FW A BLOCK VLV
		• 1FW-246, MAIN FW B BLOCK VLV
		• 1FW-188, MAIN FW C BLOCK VLV
		• 1FW-136, MAIN FEED REG VALVE A OUTLET ISOL
		• 1FW-252, MAIN FEED REG VALVE B OUTLET ISOL
		• 1FW-194, MAIN FEED REG VALVE C OUTLET ISOL
	BOP	WHEN Feedwater Regulating Bypass Valve FCV Controller demand is between 70% and 80%, OR when Reactor Power is between 7 and 9%, THEN TRANSFER SG level control to the Main Feedwater Regulating valves as follows:
		PLACE the following Feedwater Regulating Valve Bypass FCV Controllers in MAN:
		• 1FW-140, MN FW A REG BYP FK-479.1
		• 1FW-256, MN FW B REG BYP FK-489.1
		• 1FW-198, MN FW C REG BYP FK-499.1
	BOP	PLACE the Main FW Regulating Valve Controllers in AUTO:
		• 1FW-133, MAIN FW A REGULATOR FK-478
		• 1FW-249, MAIN FW B REGULATOR FK-488
		• 1FW-191, MAIN FW C REGULATOR FK-498

Op Test No.: 1 Scenario # 4 Event # 1 Page 6 of 32

Event Description: Shift to the Main Feedwater Regulating Valves/Raise Power.

Time	Position	Applicant's Actions or Behavior
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PROCEDURE NOTE:		The following Steps verify the Feed Regulating valves will respond prior to fully closing the Feedwater Regulating Valve Bypass FCVs.
	BOP	LOWER the output of the following Feedwater Regulating Valve Bypass FCV Controllers to a position 10% lower than the current output:
		• 1FW-140, MN FW A REG BYP FK-479.1
		• 1FW-256, MN FW B REG BYP FK-489.1
		• 1FW-198, MN FW C REG BYP FK-499.1
PROCEDURE NOTE:		If the demand signal reaches a value of 10% with no response from the Feedwater Regulating Valves, it may be necessary to return the FRV controller to MAN to cancel any integrated signal and assess the situation before continuing.
	BOP	WHEN Feedwater Regulating Valves indicate BOTH of the following responses:
		• Controller output increasing
		• SG level returning to normal
		THEN LOWER output of the following Feedwater Regulating Valve Bypass FCV Controllers to 0% (Minimum output):
		• 1FW-140, MN FW A REG BYP FK-479.1
		• 1FW-256, MN FW B REG BYP FK-489.1
		• 1FW-198, MN FW C REG BYP FK-499.1

Op Test No.: 1 Scenario # 4 Event # 1 Page 7 of 32

Event Description: Shift to the Main Feedwater Regulating Valves/Raise Power.

Time	Position	Applicant's Actions or Behavior
	BOP	At STATUS LIGHT BOX 1, VERIFY SHUT the following Feedwater Regulating Valve Bypass FCVs:
		• A BYP FW-140 (Window 4-1)
		• B BYP FW-256 (Window 4-2)
		• C BYP FW-198 (Window 4-3)
EVALUATOR'S NOTE: The RO should adjust RCS boron and move rods while maintaining Tavg-Tref within 5 °F and power ≤10 %. The RO should request permission and a peer check from the SRO before making a reactivity change.		
	RO	INITIATES dilution, as necessary.
EVALUATOR'S NOTE: OP-107 is a "Reference Use" procedure.		
	RO	DETERMINE the volume of makeup water to be added. This may be done by experience or via the reactivity plan associated with the Simulator IC.
	RO	SETS FIS-114, TOTAL MAKEUP WTR BATCH COUNTER, to obtain the desired quantity.
	RO	SET total makeup flow as follows:
		• IF performing DIL in Step 8, THEN SET controller 1CS-151, FK-114 RWMU FLOW, for less than or equal to 90 gpm.
		• IF performing ALT DIL in Step 8, THEN SET controller 1CS-151, FK-114 RWMU FLOW, for the desired flow rate.
	RO	VERIFY the RMW CONTROL switch has been placed in the STOP position.

Op Test No.:	<u>1</u>	Scenario #	<u>4</u>	Event #	<u>1</u>	Page	<u>8</u>	of	<u>32</u>
Event Description:		Shift to the Main Feedwater Regulating Valves/Raise Power.							
Time	Position	Applicant's Actions or Behavior							

	RO	VERIFY the RMW CONTROL switch green light is lit.
	RO	PLACE the control switch RMW MODE SELECTOR to the DIL OR the ALT DIL position.
PROCEDURE NOTE: When PRZ backup heaters are energized in manual, PK 444A1, PRZ Master Pressure Controller (a PI controller) will integrate up to a greater than normal output, opening PRZ Spray Valves to return and maintain RCS pressure at setpoint. The result is as follows: <ul style="list-style-type: none"> • PORV PCV-444B will open at a lower than expected pressure • ALB-009-3-2, PRESSURIZER HIGH PRESS DEVIATION CONTROL, will activate at a lower than expected pressure • Increased probability for exceeding Tech Spec DNB limit for RCS pressure 		
NOTE: SRO concurrence should be obtained prior to energizing the BUH in MANUAL.		
	RO	OPERATE the pressurizer backup heaters as required to limit the difference between the pressurizer and RCS boron concentration to less than 10 ppm.
	RO	START the makeup system as follows: <ul style="list-style-type: none"> • TURN control switch RMW CONTROL to START momentarily. • VERIFY the RED indicator light is LIT.
PROCEDURE CAUTION: The operation should be stopped if an unanticipated reactivity effect is seen. Do not resume the operation until the cause has been corrected.		

Op Test No.:	<u>1</u>	Scenario #	<u>4</u>	Event #	<u>1</u>	Page	<u>9</u>	of	<u>32</u>
Event Description:		Shift to the Main Feedwater Regulating Valves/Raise Power.							
Time	Position	Applicant's Actions or Behavior							

	RO	VERIFY Tavg responds as desired.
EVALUATOR'S NOTE: For this plant condition, rod control will be in MANUAL.		
	RO	IF rod control is in AUTO, THEN VERIFY the control rods are stepping out to the desired height.
EVALUATOR'S NOTE: On cue from the Lead Evaluator, dilution will fail to automatically terminate at the setpoint. When that occurs, the respective evaluator(s) should go to Event 2 in this scenario guide.		
	RO	VERIFY dilution automatically terminates when the desired quantity has been added.
	RO	PLACE Reactor Makeup in Auto per Section 5.1.
	RO	VERIFY the RMW CONTROL switch:
		• Is in the STOP position.
		• The GREEN light is LIT.
	RO	PLACE the RMW MODE SELECTOR to AUTO.
	RO	START the makeup system as follows:
		• TURN control switch RMW CONTROL to START momentarily.
		• VERIFY the RED indicator light is LIT.

Op Test No.: 1 Scenario # 4 Event # 2 Page 10 of 32

Event Description: Dilution Fails to Stop Automatically

Time	Position	Applicant's Actions or Behavior
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Booth Operator Instructions: Actuate ET-2 (Dilution fails to terminate automatically) on cue from the Lead Evaluator.

Indications Available: RMW Counter fails to stop at setpoint.

	RO	Recognizes/reports dilution has failed to stop.
	RO	Places RMW Control Switch in STOP.
	SRO	Enters AOP-003, MALFUNCTION OF REACTOR MAKEUP CONTROL.
PROCEDURE NOTE: This procedure contains no immediate actions.		
	CREW	CHECK instrument air available. (YES)
	RO	CHECK BOTH LT-112 and LT-115 functioning properly. (YES)
	SRO	GO TO Section 3.2, Reactor Makeup Control System Malfunction.
	RO	CHECK that an overdilution has occurred. (YES)
		Evaluator Note: The next step will be N/A if the malfunction is identified in a timely manner.
	RO	Perform RCS boration to the proper concentration using one of the following:
		<ul style="list-style-type: none"> OP-107, Section 8.27 – Rapid Addition of Boric Acid to the RCS.
		<ul style="list-style-type: none"> Attachment 4, Manual Boration.

Op Test No.: 1 Scenario # 4 Event # 2 Page 11 of 32

Event Description: Dilution Fails to Stop Automatically

Time	Position	Applicant's Actions or Behavior
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	CREW	Contacts an AO to verify the following valves SHUT:
		<ul style="list-style-type: none"> • 1CS-265, Chemical Mixing Tank Inlet
		<ul style="list-style-type: none"> • 1CS-272, Chemical Mixing Tank Outlet
		<ul style="list-style-type: none"> • 1CS-274, Manual Blend From RMWST Isolation
		<ul style="list-style-type: none"> • 1CS-320, Seal return X-conn To BRS Feed Pump
	SRO	GO TO Step 4.
	RO/SRO	CHECK BTRS in service. (NO)
	SRO	GO TO Step 6.
	RO	CHECK that an overboration has occurred. (NO)
	SRO	Go to Step 12
	RO/SRO	CHECK that Reactor Makeup Control System is misoperating. (YES)
	RO	PLACE RMW Control Switch in STOP. (YES)
	SRO	Completes an Equipment Failure Checklist and contacts WCC/ Maintenance to investigate and repair the failure.
BOOTH OPERATOR:		Wait 5-10 minutes after being contacted then report that a dilution batch controller wire has been re-landed. Please notify prior to the next dilution so that operation can be observed.
PROCEDURE NOTE:		Dilution refers to effect on RCS boron concentration rather than mode (dilute, alternate dilute, or manual).

Op Test No.: 1 Scenario # 4 Event # 2 Page 12 of 32

Event Description: Dilution Fails to Stop Automatically

Time	Position	Applicant's Actions or Behavior
	SRO	REFER TO the following table AND PERFORM makeup, boration, and dilution as necessary, using the indicated reference.
		<ul style="list-style-type: none"> No individual valve identified
		<ul style="list-style-type: none"> Makeup: Attachment 2
		<ul style="list-style-type: none"> Dilution: Attachment 3
		<ul style="list-style-type: none"> Boration: Attachment 4
	RO	MAINTAIN VCT level GREATER THAN 5%.
	SRO	GO TO Step 21.
	RO/SRO	CHECK that the instrument malfunction has been repaired. (NO)
	SRO	WAIT until repairs are complete before proceeding.
EVALUATOR'S NOTE:		When the Feedwater Control Valves are in AUTO and AOP-003 is complete, cue Event 3 (RCP "A" #1 Seal failure).

Op Test No.: 1 Scenario # 4 Event # 3 Page 13 of 32

Event Description: RCP "A" #1 Seal Failure

Time	Position	Applicant's Actions or Behavior
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Booth Operator Instructions: Actuate ET-2 (RCP "A" #1 Seal failure) on cue from the Lead Evaluator.

Indications Available: Alarm ALB-008-3-3, RCP-A SEAL #1 LEAKOFF HIGH LOW FLOW

	RO	Responds to Alarm ALB-008-3-3, RCP-A SEAL #1 LEAKOFF HIGH LOW FLOW.
	RO	Enters APP-ALB-008-3-3.
	RO	CONFIRM alarm using:
		• FR-154A & FR-154B, Flow Chart Recorders
		• Associated Valves, 1CS-355, 1CS-470, 1CS-472
		• PI-117, VCT Pressure
	RO	Reports RCP "A" #1 Seal high flow.
	RO	VERIFY Automatic Functions: None
	RO	PERFORM Corrective Actions:

PROCEDURE NOTE: An RCP should not be operated if seal inlet or pump bearing water temperature exceeds 230 °F.

		HIGH FLOW
		• IF VCT temperature is high, THEN INCREASE CCW to Letdown Heat Exchanger.
		• IF ANY of the following occurs,
		• Seal injection is lost.
		• No. 1 seal is damaged.

Op Test No.:	1	Scenario #	4	Event #	3	Page	14	of	32
Event Description:		RCP "A" #1 Seal Failure							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> Alarm is in conjunction with high bearing water temperature AND high vibration readings.
		THEN GO TO AOP-018, Reactor Coolant Pump Abnormal Conditions.
	SRO	Enters AOP-018.
PROCEDURE NOTE:		<ul style="list-style-type: none"> Step 1 is an immediate action. RCP abnormal conditions may require implementation of the SHNPP Emergency Plan.
	RO	CHECK ANY CSIP RUNNING. (YES)
	SRO	REFER TO PEP-110, Emergency Classification And Protective Action Recommendations, AND ENTER the EAL Network at entry point X.
PROCEDURE NOTE:		Minimum allowable flow for a CSIP is 60 gpm which is provided by normal miniflow during normal operation and alternate miniflow during safety injection. Maintaining CSIP flow greater than or equal to 60 gpm also satisfies this requirement.
	SRO	EVALUATE plant conditions AND GO TO the appropriate section:
		<ul style="list-style-type: none"> Reactor Coolant Pump Seal Malfunction – Section 3.3
EVALUTOR'S NOTE:		The next step is a continuous action. The seal will continue to degrade until it has failed as defined in the attachments. At that time the YES Path should be implemented. AOP-018, Attachments 1 and 2 are attached to this scenario guide for evaluator use.
	RO	CHECK ANY of the following conditions exist:

Op Test No.: 1 Scenario # 4 Event # 3 Page 15 of 32

Event Description: RCP "A" #1 Seal Failure

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> ANY RCP #1 Seal FAILS as defined in Attachment 2 (Page 29) (YES/NO)
		<ul style="list-style-type: none"> ANY RCPs operating outside the limits of Attachment 1 (Page 27)
	RO/SRO	CHECK Rx power greater than P-8 (49%). (NO)
	SRO	GO TO Step 4.
	RO	CHECK more than ONE RCP affected. (NO)
		PERFORM the following:
		<ul style="list-style-type: none"> STOP the affected RCP. (RCP "A")
		<ul style="list-style-type: none"> REFER TO Attachment 7, Operation With Two RCPs.
		<ul style="list-style-type: none"> SHUT the affected RCP Seal Water Return Valve(s) between three and five minutes after securing the RCP:
		<ul style="list-style-type: none"> 1CS-355, RCP A #1 Seal Water Return
	SRO	GO TO Step 12.
	SRO	CHECK all RCPs RUNNING. (NO)
	RO	PERFORM the following:
		<ul style="list-style-type: none"> IF RCP A is SECURED, THEN SHUT 1RC-107, PRZ Spray Loop A.
		<ul style="list-style-type: none"> IF RCP B is SECURED, THEN SHUT 1RC-103, PRZ Spray Loop B. (N/A)
		<ul style="list-style-type: none"> VERIFY SG levels being maintained between 52% and 62%.
		<ul style="list-style-type: none"> MONITOR rod insertion limits. (Refer to Section F curve from Curve Book)
		<ul style="list-style-type: none"> INITIATE a plant shutdown using ONE of the following:

Op Test No.: 1 Scenario # 4 Event # 3 Page 16 of 32

Event Description: RCP "A" #1 Seal Failure

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none">GP-006, Normal Plant Shutdown from Power Operation to Hot Standby, or AOP-038, Rapid Downpower.
	SRO	Enters TS 3.4.1.1 - With less than the above required reactor coolant loops in operation, be in at least HOT STANDBY within 6 hours.
EVALUATOR'S NOTE: When the TS has been entered, RC-107 is shut, and SG "A" level is stabilized, cue Event 4 (Loss of the running chiller).		

Op Test No.: 1 Scenario # 4 Event # 4 Page 17 of 32

Event Description: Loss of Running Essential Chiller

Time	Position	Applicant's Actions or Behavior
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Booth Operator Instructions: Actuate ET-3 (Running Chiller trip).**Indications Available:** ALB-023-1-18, CHILLER WC2-A TROUBLE

	BOP	Responds to Auxiliary Equipment Panel alarm ALB-023-1-18, CHILLER WC2-A TROUBLE.

EVALUATOR'S NOTE: The crew may immediately enter AOP-026, LOSS OF ESSENTIAL SERVICE WATER SYSTEM.

	BOP	Refers to APP-ALB-023-1-18.
	CREW	Dispatches an AO to investigate.

BOOTH OPERATOR'S CUE: When contacted, wait 3-4 minutes then report breaker 1A2-SA-5C, Chill Water Circ Pump (P-4) 1A-SA tripped on overload.

	SRO	Enters AOP-026.

PROCEDURE NOTE: This procedure contains no immediate actions.

	BOP	CHECK the in-service chiller RUNNING. (NO)
	SRO	GO TO Step 3.
	CREW	DISPATCH an operator to determine the cause of the chiller trip.
	SRO	PERFORM ONE of the following using OP-148, Essential Service Chilled Water System:
		<ul style="list-style-type: none"> START the Standby chiller. (YES)

Op Test No.: 1 Scenario # 4 Event # 4 Page 18 of 32

Event Description: Loss of Running Essential Chiller

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> RESTART the tripped chiller. (NO)
	SRO	Directs BOP to start the Standby Chiller in accordance with OP-148.
	SRO	CONTACT Maintenance as necessary for troubleshooting and appropriate corrective actions.
	BOP	Enters OP-148, Section 5.2.
	BOP	Verifies Initial Conditions:
		NOTE: It is necessary to shift associated trains of HVAC units when shifting trains of Essential Services Chilled Water.
		<ul style="list-style-type: none"> Service water is being supplied to the non-operating chiller WC-2 1B-SB.
		<ul style="list-style-type: none"> One train of ESCW is already in operation.
		<ul style="list-style-type: none"> For non-emergency starts the pre-start checks of Attachment 5 have been performed and an operator should be present to observe start of chiller.
		<ul style="list-style-type: none"> Section 8.12, Manual Chiller Reset performed if necessary for non-operating chiller.
		<ul style="list-style-type: none"> The L.O. heaters have been in service for twelve hours. (See Precaution and Limitation 4.0.3 for applicability of this Initial Condition)
PROCEDURE NOTES: <ul style="list-style-type: none"> The local alarm indication for low chilled water flow and low chilled water temperature will lock in until manually reset at the WC-2 control panel. If starting the chiller compressor is delayed following the start of the P-4 Pump in next step, the compressor oil could cool down to the point that the compressor will trip on low oil pressure. 		

Op Test No.:	<u>1</u>	Scenario #	<u>4</u>	Event #	<u>4</u>	Page	<u>19</u> of <u>32</u>
Event Description:		Loss of Running Essential Chiller					
Time	Position	Applicant's Actions or Behavior					
	BOP	At AEP-1, START the non-operating Chiller WC-2 B-SB Chilled Water Pump P-4 B-SB to establish chilled water flow in the non-operating train.					
	BOP	Contacts AO:					
		At the Local Control panel, RESET the Low Chilled Water Flow alarm using the CHILLED WATER NO FLOW TRIP INDICATION RESET push-button.					
BOOTH OPERATOR'S CUE:		If standing by in the area to observe the start, wait 30 seconds and reports the Low Chilled Water Flow alarm reset.					
	BOP	START the chiller by performing ONE of the following:					
		<ul style="list-style-type: none"> At AEP-1, PLACE Water Chiller Compressor WC-2 B-SB control switch to the START position AND RELEASE. 					
	BOP	PLACE additional safety related air handlers in service prior to switchover of the nonessential header.					
NOTE:		ESR 99-00142 has evaluated and determined that long-term closure of the supply and return valves to the NNS AH units will not affect operability of the Essential Services Chiller system. The next two Steps will align the NNS AH units however, if it is desired to maintain the NNS isolation valves shut, then steps 5.2.2.5 and 5.2.2.6 may be skipped.					
	BOP	ISOLATE the supply and return valves to the NNS AH units from the train that was already operating by shutting the following valves:					
		<ul style="list-style-type: none"> 1CH-125 SB (1CH-196 SB) CHILLED WATER FROM NESSR FAN CLRS ISOL 					
		<ul style="list-style-type: none"> 1CH-126 SA (1CH-197 SA) CHILLED WATER FROM NESSR FAN CLRS ISOL 					

Op Test No.:	<u>1</u>	Scenario #	<u>4</u>	Event #	<u>4</u>	Page	<u>20</u>	of	<u>32</u>
Event Description:		Loss of Running Essential Chiller							
Time	Position	Applicant's Actions or Behavior							
		<ul style="list-style-type: none"> 1CH-115 SA (1CH-148 SB) CHILLED WATER TO NESSR FANS CLR ISOL 							
		<ul style="list-style-type: none"> 1CH-116 SB (1CH-149 SA) CHILLED WATER TO NESSR FAN CLRS ISOL 							
	BOP	ALIGN NNS AH units to the train that will remain operating by opening the following valves:							
		<ul style="list-style-type: none"> 1CH-125 SB (1CH-196 SB) CHILLED WATER FROM NESSR FAN CLRS ISOL. 							
		<ul style="list-style-type: none"> 1CH-126 SA (1CH-197 SA) CHILLED WATER FROM NESSR FAN CLRS ISOL. 							
		<ul style="list-style-type: none"> 1CH-115 SA (1CH-148 SB) CHILLED WATER TO NESSR FANS CLR ISOL 							
		<ul style="list-style-type: none"> 1CH-116 SB (1CH-149 SA) CHILLED WATER TO NESSR FAN CLRS ISOL 							
	BOP	Reports Standby Chiller in service.							
	SRO	CHECK EITHER chiller STARTED. (YES)							
	SRO	GO TO Step 16.							
	BOP	VERIFY the following AH units for the operating train chiller are RUNNING:							
		<ul style="list-style-type: none"> AH-15, Control Room Normal Supply 							
		<ul style="list-style-type: none"> AH-17, Fuel Vent FP Pump Room Fan Cooler 							
		<ul style="list-style-type: none"> AH-16, Elec Equip Prot Rm Supply 							
	BOP	VERIFY the following alarm is CLEAR for the running chiller:							
		<ul style="list-style-type: none"> ALB-23-1-20, Expansion TK A LO-LO Level (YES) 							
		<ul style="list-style-type: none"> ALB-23-2-20, Expansion TK B LO-LO Level (YES) 							

Op Test No.:	<u>1</u>	Scenario #	<u>4</u>	Event #	<u>4</u>	Page	<u>21</u> of <u>32</u>
Event Description:		Loss of Running Essential Chiller					
Time	Position	Applicant's Actions or Behavior					

	SRO	REFER TO Tech Spec 3.7.13.
		Enters TS 3.7.13 - With only one Essential Services Chilled Water System loop OPERABLE, restore at least two loops to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
	SRO	EXIT this procedure.
	SRO	If not already done, may complete and Equipment Failure Checklist and contact WCC for assistance.
EVALUATOR'S NOTE:		Cue the next event when the standby chiller is in service and the TS entry has been completed or AOP-026 is exited.

Op Test No.:	<u>1</u>	Scenario #	<u>4</u>	Event #	<u>5</u>	Page	<u>22</u>	of	<u>32</u>
Event Description: Running Main Feedwater (MFW) Pump trips, Standby MFW Pump Fails to Start									
Time	Position	Applicant's Actions or Behavior							

Booth Operator Instructions:	Ensure power is < 10% then actuate ET-4 (Running MFW Pump trip) on cue from the Lead Evaluator.
Indications Available:	ALB-016, FW PUMP A/B HIGH BACK FLOW OR LOW SUCTION PRESS OR TRIP
Evaluator Note:	MFW Pump 2 should not be started due to overfeed concerns.
	BOP Responds to indication of running Main Feedwater (MFW) Pump trip and/or multiple alarms.
	BOP Reports MFW Pump 1 tripped.
	SRO Enters AOP-016, FEEDWATER MALFUNCTION.
	BOP Performs immediate actions of AOP-010.
	<ul style="list-style-type: none"> CHECK ANY Main Feedwater Pump TRIPPED. (YES) CHECK initial Reactor power less than 90%. (YES) CHECK initial Reactor power less than 80%. (YES)
PROCEDURE NOTE:	<ul style="list-style-type: none"> Turbine runback will automatically terminate at approximately 50% power with DEH in AUTO. Turbine runbacks are quickly identified by ALB-020-2-2, TURBINE RUNBACK OPERATIVE, in alarm and RUNBACK OPER light LIT as long as the initiating signal is present on DEH Panel A.
	BOP/RO CHECK initial Reactor power less than 60%. (YES)
	BOP/SRO CHECK DEH controlling Turbine Valves PROPERLY. (N/A – turbine not on line)
	SRO GO TO Step 7.

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Event Description: Running Main Feedwater (MFW) Pump trips, Standby MFW Pump Fails to Start

Time	Position	Applicant's Actions or Behavior
	BOP	MAINTAIN ALL of the following:
		<ul style="list-style-type: none"> At least ONE Main Feedwater Pump RUNNING (NO)
	BOP	PERFORM the following:
		<ul style="list-style-type: none"> IF ANY SG level drops to 30% THEN TRIP the Reactor AND GO TO EOP Path-1.
		<ul style="list-style-type: none"> IF Above POAH AND Reactor power is LESS THAN 10%, THEN:
		<ul style="list-style-type: none"> INITIATE AFW flow to maintain Steam Generator levels between 52 and 62%.
PROCEDURE NOTE: Mode change occurs at 5% Reactor power.		
	RO	REDUCE power as necessary to maintain SG level.
	SRO	IF below POAH, THEN: (N/A)
	BOP	Starts both MDAFW Pump and adjusts flow using the associated flow control valves.
EVALUATOR'S NOTE: The crew will continue in AOP-010 but the procedure actions are not intended for this situation. Allow the crew time to match power to AFW capability then cue the next event (Steam Break inside containment).		
	RO	Adjust power using MANUAL Rod Control and/or boration as directed by the SRO.

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Event Description: Main Steam Break Inside Containment (SG "C"); AUTO AFW Isolation Fails on SG "C"; AUTO and MANUAL Phase "B" Actuation Fails

Time	Position	Applicant's Actions or Behavior
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Booth Operator Instructions:	Actuate ET-5 (Main Steam Break Inside Containment) on cue from the Lead Evaluator.
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Indications Available:	AUTO SI Initiation/rising CNMT Pressure
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	RO	RESPONDS to alarms, reports SI actuation.
	SRO	Enters PATH-1.
	RO	VERIFY Reactor Trip:
		<ul style="list-style-type: none"> AUTO or MANUAL Reactor Trip successful:
		<ul style="list-style-type: none"> CHECK for any of the following:
		<ul style="list-style-type: none"> <ul style="list-style-type: none"> Trip breakers RTA and BYA OPEN (YES)
		<ul style="list-style-type: none"> <ul style="list-style-type: none"> Trip breakers RTB and BYB OPEN (YES)
		<ul style="list-style-type: none"> ROD Bottom lights LIT (YES)
		<ul style="list-style-type: none"> NEUTRON flux decreasing (YES)
	BOP	VERIFY Turbine Trip:
		<ul style="list-style-type: none"> CHECK for any of the following:
		<ul style="list-style-type: none"> <ul style="list-style-type: none"> ALL turbine throttle valves – SHUT (YES)
		<ul style="list-style-type: none"> <ul style="list-style-type: none"> ALL turbine governor valves – SHUT (YES)
	BOP	VERIFY power to AC Emergency Buses
		<ul style="list-style-type: none"> 1A-SA AND 1B-SB Buses energized by off-site power or EDG's. (YES)
	RO	CHECK SI Actuation:
		<ul style="list-style-type: none"> CHECK for any of the following – LIT: (YES)
		<ul style="list-style-type: none"> <ul style="list-style-type: none"> SI Actuated bypass permissive light
		<ul style="list-style-type: none"> <ul style="list-style-type: none"> ALB-11-2-2

Op Test No.:	<u>1</u>	Scenario #	<u>4</u>	Event #	<u>6,7, & 8</u>	Page	<u>25</u>	of	<u>32</u>
Event Description:		Main Steam Break Inside Containment (SG "C"); AUTO AFW Isolation Fails on SG "C"; AUTO and MANUAL Phase "B" Actuation Fails							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> ALB-11-5-1
		<ul style="list-style-type: none"> ALB-11-5-3
		<ul style="list-style-type: none"> ALB-12-1-4
	SRO	PERFORM the following:
		<ul style="list-style-type: none"> Initiate monitoring the Critical Safety Function Status Trees.
		<ul style="list-style-type: none"> DIRECTS SSO to evaluate EAL Network using entry Point X. (Refer to PEP-110)
	SRO	INFORMS crew that Foldout A applies.
EVALUATOR'S NOTE:		Crew should brief on the general foldout criteria. RCPs may be stopped at this time. Adverse CNMT values will apply in this scenario.
EVALUATOR'S NOTE:		The following FOLDOUT A criteria apply in this scenario:
		<u>RCP TRIP CRITERIA</u>
		IF both of the following occur, THEN stop all RCPs:
		<ul style="list-style-type: none"> SI flow - GREATER THAN 200 GPM
		<ul style="list-style-type: none"> RCS pressure - LESS THAN 1400 PSIG
		<u>ALTERNATE MINIFLOW OPEN/SHUT CRITERIA</u>
		<ul style="list-style-type: none"> IF RCS pressure decreases to less than 1800 PSIG, THEN verify alternate miniflow isolation OR miniflow block valves - SHUT
	RO	VERIFY ALL CSIPs AND RHR pumps – RUNNING. (YES)

Op Test No.: 1 Scenario # 4 Event # 6,7, & 8 Page 26 of 32

Event Description: Main Steam Break Inside Containment (SG "C"); AUTO AFW Isolation Fails on SG "C"; AUTO and MANUAL Phase "B" Actuation Fails

Time	Position	Applicant's Actions or Behavior
	RO	CHECK SI Flow:
		<ul style="list-style-type: none"> SI flow – GREATER THAN 200 GPM. (YES)
	RO	RCS pressure – GREATER THAN 230 PSIG. (YES)
	BOP	CHECK Main Steam Isolation:
		<ul style="list-style-type: none"> MAIN steam isolation – ACTUATED. (YES)
	BOP	VERIFY all MSIVs and bypass valves – SHUT. (YES)
EVALUATOR'S NOTE: At the next step, the crew may recognize Phase B valves indicate open, attempt a MANUAL Phase B actuation, and/or manually close the Phase "B" isolation valves.		
	RO	CHECK CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG. (NO)
		PERFORM the following:
		<ul style="list-style-type: none"> VERIFY CNMT Spray ACTUATED. (YES) STOPS all RCPs. (RCPs may already be stopped)
	BOP	CHECK AFW Status:
		<ul style="list-style-type: none"> AFW flow – AT LEAST 210 KPPH AVAILABLE. (YES)
Evaluator Note: The crew may recognize that auto AFW isolation on the faulted SG has failed and manually close the required valves at this time. It is a critical task to close these by no later than the required step in EPP-14.		
		<ul style="list-style-type: none"> 1AF-74 1AF-149

Op Test No.:	<u>1</u>	Scenario #	<u>4</u>	Event #	<u>6, 7, & 8</u>	Page	<u>27</u>	of	<u>32</u>
Event Description:		Main Steam Break Inside Containment (SG "C"); AUTO AFW Isolation Fails on SG "C"; AUTO and MANUAL Phase "B" Actuation Fails							
Time	Position	Applicant's Actions or Behavior							

	SRO	ASSIGNS BOP to perform the following:
		<ul style="list-style-type: none"> VERIFY alignment of components from actuation of ESFAS Signals using PATH-1 GUIDE, Attachment 6.
EVALUATOR'S:		The RO will perform all board actions until the BOP completes Attachment 6. The BOP is permitted to properly align plant equipment in accordance with Attachment 6 without SRO approval. The Scenario Guide still identifies tasks by board position because the time frame for completion of Attachment 6 is not predictable.
Critical Task	BOP	Closes at least one Phase "B" isolation valve in each of the following lines by no later than the completion of GUIDE-1, Attachment 6. The BOP may refer to OMM-4, Attachment 9, Containment Spray Actuation and Containment Isolation Phase B.
		<ul style="list-style-type: none"> 1CC-297 SA RCP BEARING OIL COOLERS RETURN or 1CC-299 SB RCP BEARING OIL COOLERS RETURN
		<ul style="list-style-type: none"> 1CC-249 SA RCP THERMAL BARRIERS RETURN or 1CC-251 SB RCP THERMAL BARRIERS RETURN
		<ul style="list-style-type: none"> 1CC-207 SA CCW TO RCPS or 1CC-208 SB CCW TO RCPS
EVALUATOR'S NOTE:		<p>Control Room actions for RCS temperature control will have no impact at this point in the scenario.</p> <p>In order to energize Bus 1A1, the operator will have to first select PERM on Emergency Load Sequencer "A" because Chiller "A" did NOT start.</p>
	BOP	CONTROL RCS Temperature:
		<ul style="list-style-type: none"> STABILIZE AND maintain temperature between 555°F AND 559°F using Table 1.
	BOP	VERIFY AC buses 1A1 AND 1B1 – ENERGIZED.

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Event Description: Main Steam Break Inside Containment (SG "C"); AUTO AFW Isolation Fails on SG "C"; AUTO and MANUAL Phase "B" Actuation Fails

Time	Position	Applicant's Actions or Behavior
	RO	CHECK PRZ PORVs – SHUT. (YES)
	RO	CHECK PRZ PORV block valves – AT LEAST ONE OPEN. (YES)
	RO	PRZ spray valves – SHUT. (YES)
	RO/BOP	IDENTIFY any faulted SG:
		CHECK for any of the following:
		• ANY SG pressures – DECREASING IN AN UNCONTROLLED MANNER (YES)
		• ANY SG – COMPLETELY DEPRESSURIZED. (YES)
	SRO	GO TO EPP-014, "Faulted Steam Generator Isolation"
	SRO	IMPLEMENT Function Restoration Procedures as required.
	BOP	CHECK MSIVs AND Bypass Valves:
		• VERIFY all MSIVs – SHUT. (YES)
		• VERIFY all MSIV bypass valves – SHUT. (YES)
	BOP	CHECK Any SG NOT Faulted:
		• ANY SG pressure STABLE OR INCREASING. (YES)
	BOP	IDENTIFY Any Faulted SG:
		• CHECK for any of the following:
		• ANY SG pressure – DECREASING IN AN UNCONTROLLED MANNER. (YES-"C")

Op Test No.:	<u>1</u>	Scenario #	<u>4</u>	Event #	<u>6,7, & 8</u>	Page	<u>29</u>	of	<u>32</u>
Event Description:		Main Steam Break Inside Containment (SG "C"); AUTO AFW Isolation Fails on SG "C"; AUTO and MANUAL Phase "B" Actuation Fails							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> ANY SG – COMPLETELY DEPRESSURIZED. (YES - "C")
	BOP	ISOLATE Faulted SG(s):
		<ul style="list-style-type: none"> VERIFY faulted SG(s) PORV – SHUT. (YES)
		<ul style="list-style-type: none"> VERIFY Main FW isolation valves – SHUT. (YES)
		<ul style="list-style-type: none"> VERIFY MDAFW AND TDAFW pump isolation valves to faulted SG(s) – SHUT. (NO, unless valves were closed earlier)
	BOP	Locally shut OR isolate valves.
CRITICAL TASK		<ul style="list-style-type: none"> CLOSES 1AF-74 and 1AF-149 before SI is terminated.
	BOP	Shut faulted SG(s) to steam supply valve to TDAFW pump – SHUT.
		<ul style="list-style-type: none"> SG C: 1MS-72
		<ul style="list-style-type: none"> VERIFY main steam drain isolation(s) before MSIVs – SHUT (YES)
		<ul style="list-style-type: none"> VERIFY SG Blowdown isolation valves – SHUT. (YES)
		<ul style="list-style-type: none"> VERIFY main steam analyzer isolation valves – SHUT. (YES)
	BOP	CHECK CST Level – GREATER THAN 10%. (YES)
PROCEDURE NOTE:		A SG may be suspected to be ruptured if it fails to dry out following isolation of feed flow. Local checks for radiation can be used to confirm primary-to-secondary leakage.
	SRO	CHECK Secondary Radiation:
		<ul style="list-style-type: none"> CHECK for all of the following:
		<ul style="list-style-type: none"> SG Blowdown radiation – NORMAL. (YES)

Op Test No.:	<u>1</u>	Scenario #	<u>4</u>	Event #	<u>6,7, & 8</u>	Page	<u>30</u>	of	<u>32</u>
Event Description:		Main Steam Break Inside Containment (SG "C"); AUTO AFW Isolation Fails on SG "C"; AUTO and MANUAL Phase "B" Actuation Fails							
Time	Position	Applicant's Actions or Behavior							

		<ul style="list-style-type: none"> MAIN steamline radiation – NORMAL. (YES)
	RO	CHECK SG Levels:
		<ul style="list-style-type: none"> ANY level – INCREASING IN AN UNCONTROLLED MANNER. (NO)
	RO	CHECK if SI has been terminated:
		<ul style="list-style-type: none"> SI flow – GREATER THAN 200 GPM. (YES)
	RO	CHECK SI Termination Criteria:
		CHECK Subcooling – GREATER THAN
		<ul style="list-style-type: none"> 10°F [40°F] – C 20°F [50°F] – M. (YES) CHECK secondary heat sink by observing any of the following: <ul style="list-style-type: none"> LEVEL in at least one intact SG – GREATER THAN 25% [40%]. (YES) TOTAL feed flow to SGs – GREATER THAN 210 KPPH. (YES) RCS pressure – STABLE OR INCREASING. (YES) PRZ level – GREATER THAN 10% [30%]. (YES)
EVALUATOR'S NOTE:		Dependent on crew response time, PRZ level may be < 30% at this point. If so, they will continue in PATH-1 until the SI termination criteria are met and then will go to EPP-008, SI TERMINATION.
	RO	RESET SI.
	SRO	CONTINUOUS ACTION: MANUALLY realign Safeguards Equipment following a loss of offsite power.

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Event Description: Main Steam Break Inside Containment (SG "C"); AUTO AFW Isolation Fails on SG "C"; AUTO and MANUAL Phase "B" Actuation Fails

Time	Position	Applicant's Actions or Behavior
	RO	STOP all but ONE CSIP.
	RO	CHECK RCS pressure – STABLE OR INCREASING. (YES)
	RO	ISOLATE High Head SI Flow:
		<ul style="list-style-type: none"> CHECK CSIP suction – ALIGNED TO RWST. (YES)
		<ul style="list-style-type: none"> OPEN normal miniflow isolation valves:
		<ul style="list-style-type: none"> 1CS-182
		<ul style="list-style-type: none"> 1CS-196
		<ul style="list-style-type: none"> 1CS-210
		<ul style="list-style-type: none"> 1CS-214
		<ul style="list-style-type: none"> SHUT BIT outlet valves:
		<ul style="list-style-type: none"> 1SI-3
		<ul style="list-style-type: none"> 1SI-4
		<ul style="list-style-type: none"> VERIFY cold leg AND hot leg injection valves – SHUT
		<ul style="list-style-type: none"> 1SI-52
		<ul style="list-style-type: none"> 1SI-86
		<ul style="list-style-type: none"> 1SI-107
		<ul style="list-style-type: none"> OBSERVE CAUTION prior to Step 19 AND GO TO Step 19.
PROCEDURE CAUTION: High head SI flow should be isolated before continuing.		
		ESTABLISH Charging Lineup:
		<ul style="list-style-type: none"> SHUT charging flow control valve:
		<ul style="list-style-type: none"> FK-122.1
		<ul style="list-style-type: none"> OPEN charging line isolation valves:
		<ul style="list-style-type: none"> 1CS-235

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Event Description: Main Steam Break Inside Containment (SG "C"); AUTO AFW Isolation Fails on SG "C"; AUTO and MANUAL Phase "B" Actuation Fails

Time	Position	Applicant's Actions or Behavior
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		<ul style="list-style-type: none">• 1CS-238
		Terminate Scenario when normal charging has been established.