Facility:	VC SUMMER	Scenario No.:	1	Op Test No.:	**2009 NRC**
Examiners:		Operators:			

Initial Conditions:
- IC-11, 75% Power, MOL
- RB Spray Pump "B" is tagged out for cleaning and maintenance of the breaker cubicle. 64 hours remain on TS 3.6.2.1.
- Radiation Monitor RM-A2, Reactor Building Particulate Monitor failed to ZERO 12 hours ago. Planning & Scheduling is preparing a work package. The Action Statement for TS 3.4.6.1.a is in effect.
- The National Weather Service has issued a severe weather alert due to a line of heavy thunderstorms moving into the area.

Turnover:
- Start Condensate Pump "C" and shutdown Condensate Pump "A" then raise power to 100% in accordance with requirements for conditioned fuel. GOP-4A, Step 3.16.e is in effect.

Critical Task:
- Energize ESF Bus 1DB prior to performing EOP-6.0, Step 6.
- Start the TDEFW Pump before WR level in any two SGs is less than 15%.
- Open MVG-8801B before reporting the completion of EOP-1.0, Attachment 3.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N – BOP, CRS R – RO	Shift operating Condensate Pumps. Raise power.
2	CVC010B	I – RO	VCT Level Channel LT-115 Fails LO.
3	FWM012	C – BOP	Condensate Flow to Dearator Flow controller fails HI.
4	ANN DG014	TS – CRS	Emergency Diesel Generator (DG) "A" Low Lube Oil Temperature Alarm.
5	XMTFW017O	I – BOP	MFP Discharge Header Pressure Transmitter PT-508 Fails HI.
6	PRS001B	I – RO TS – CRS	PZR Pressure Transmitter PT-445 Fails HI.
7	EPS001	M – Crew	Loss of Off-site Power.
8	EPS006B	C – Crew	DG "B" Fails to Start Automatically (EOP-6.0 implementation).
9	FWM003B MSS0017A	C – BOP	MDEFW Pump "B" Breaker Trip. TDEFW Pump Fails to Start Automatically.
10	RCS006A	M – Crew	600 gpm SBLOCA after Bus 1DB Recovery.
11	VLVSI004P	C – RO/BOP	MVG-8801B (HI HEAD CL INJECTION MOV) fails to OPEN.
			Terminate when cooldown is initiated in EOP-2.1.

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

VC Summer NRC Scenario #1

The crew will assume the watch having pre-briefed on the Initial Conditions, the plan for this shift and the related operating procedures: (1) shift operating Condensate Pumps; (2) resume the power escalation.

The BOP will shift from Condensate Pumps "A" and "B" in operation to Condensate Pumps "B" and "C" in operation in accordance with SOP-208, CONDENSATE SYSTEM. After the Condensate Pumps are shifted, the crew will commence a power escalation to 100% in accordance with GOP-4A, POWER OPERATION (MODE 1 – ASCENDING). The Lead Evaluator can cue Event 2, VCT Level Channel LT-115 Fails LO, when the evaluating team is satisfied with the power change.

The RO will respond to the VCT Level Channel failure in accordance with the Alarm Response Procedure (ARP). The AUTO Makeup should be terminated by placing the mode selector switch in MANUAL. The crew should determine that any subsequent makeup will have to be done in MANUAL. The Lead Evaluator can cue Event 3, Condensate Flow to Deaerator Flow Controller fails HI, when desired.

The BOP will initially respond to the Condensate Flow to Dearator Flow Controller failure in accordance with the ARP for low hotwell level. The ARP does not lead the crew directly to the problem therefore the crew must diagnose the problem considering factors affecting hotwell inventory. Once diagnosed, the BOP should take MANUAL control of 1FK-3136, CONDENSATE FLOW TO DEAERATOR FLOW CONTROL VALVE, and restore conditions to normal. While it is unlikely, failure to act in a timely manner will result in a Condensate Pump trip on HI-HI DA Tank level and implementation of AOP-208.1, CONDENSATE PUMP TRIP. The Lead Evaluator can cue Event 4, Emergency Diesel Generator (DG) "A" Low Lube Oil Temperature Alarm, when desired.

The BOP will respond to the DG "A" alarm in accordance with the ARP. The dispatched field operator will report local lubricating oil temperature below the value which requires the DG to be declared inoperable. The CRS should declare the DG inoperable and enter TS 3.8.1.1. The Lead Evaluator can cue Event 5, MFP Discharge Header Pressure Transmitter PT-508 Fails LO, after the DG TS declaration. DG "A" will fail to start in AUTO and MANUAL when the loss of off-site power occurs.

The BOP will respond to the failed MFP Discharge Header Pressure Transmitter in accordance with multiple SG level deviation alarms or an observed change in feedwater flow. The crew should enter AOP-210.3, FEEDWATER PUMP MALFUNCTION, place the Feedwater Pump MASTER SPEED CNTRL in MANUAL and restore the proper D/P relationship. The Lead Evaluator can cue Event 6, PZR Pressure Transmitter PT-445 Fails HI, when SG levels and feedwater flow are restored to normal.

Pressurizer pressure alarms or observation of lowering RCS pressure will alert the RO to PZR Pressure Transmitter PT-445 Fails HI. The RO should rapidly diagnose the problem and perform the immediate actions of AOP-401.5, PRESSURIZER PRESSURE CONTROL CHANNEL FAILURE, closing any open PZR PORV and then taking control of PZR Spray. The CRS should enter TS 3.4.4 for inoperable PZR PORV(s) and enter and exit TS 3.2.5 (DNB) for PZR Pressure.

On cue from the Lead Evaluator, a loss of off-site power will occur; resulting in an automatic reactor trip. DG "A" will not start in AUTO or MANUAL. DG "B" will fail to automatically start but

can be started in MANUAL. The TD Emergency Feedwater (EFW) Pump will fail to AUTO start. The crew will perform the immediate actions of EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION, and may transition to EOP-6.0, LOSS OF ALL ESF AC POWER. However, they may avoid entry into EOP-6.0 by manually starting DG "B" in accordance with management expectations regarding compensatory actions for AUTO failures. For the same reason, they may also initiate a MANUAL start of the Turbine-Driven Emergency Feedwater Pump before a procedural step is reached. After the crew transitions to EOP-1.1, REACTOR TRIP, a progressive small break LOCA will initiate. The crew will perform EOP-1.1, REACTOR TRIP, for a short period of time but will return to EOP-1.0 when a MANUAL or AUTO SI occurs. If the crew pursues to investigate the failure of DG "A" then manual start capability will be restored when Attachment 3 – SI EQUIPMENT VERIFICATION has been reported as completed. The crew should start DG "A", verify loading, and will eventually transition to EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT. They will perform EOP-2.0 to the transition to EOP-2.1, POST-LOCA COOLDOWN AND DEPRESSURIZATION, to initiate a plant cooldown.

The Lead Evaluator can terminate the scenario when the cooldown is underway.

VCS08 NRC Scenario 1 Simulator Setup

INITIAL CONDITIONS

- IC-11, 75% Power.
- Tag on RB Spray Pump "B"
- Tag(on) on RM-A2 particulate
- Reactivity Management Plan/Turnover Sheet for IC.
- Provide a copy of SOP-208, Section B, for shifting Condensate Pumps
- Provide copy of GOP-004A, marked up through Step 3.15.d.2), STP102.002 - Power Range Heat Balance.
- Crew should pre-brief on procedures, the steps in effect and turnover so that they are prepared to commence actions when the watch is assumed.

PRE-LOAD

- OVR-SP008A RB Spray Pump "B" cleared and tagged
- OVR-SP008F RB Spray Pump "B" cleared and tagged
- MAL-RMS001D {SET To 0}RM-A2 particulate failed
- MAL-EPS006A DG 'A' Failure {SET To FAIL}
- MAL-EPS006B DG 'B' Failure {SET To NO AUTO START}
- MAL-MSS0017A: TDEFW Pump AUTO start failure
- FWM003B: MDEFW Pump B breaker trip coincident with AUTO start. {Pre-loaded with Trigger-29}
- VLV-SI004P: MVG-8801B SI HI HEAD INJ FAIL POSITION {SET To 0} MVG-8001B fails to automatically OPEN on AUTO SI actuation

TRIGGERS

- Trigger 2 CVC010B: VCT Level Channel LT-115 Fails LO
- Trigger 3 FWM012: Condensate Flow to Dearator Flow Controller fails to 100%
- Trigger 4 ANN DG014: Emergency Diesel Generator (DG) "A" Low Lube Oil Temperature ....Alarm
- Trigger 5 XMTFW017O: MFP Discharge Header Pressure Transmitter PT-508 Fails LO
- Trigger 6 PRS001B: PZR Pressure Transmitter PT-445 Fails HI
- Trigger 7 EPS001: Loss of Off-site Power
- Trigger 10 RCS006A: SBLOCA – 600 GPM
- Trigger 29 EFW Pump 'B' Trips 30 seconds after Auto Start
- Trigger 30 Delete Malfunction on MVG 8801B {allows opening of MVG-8801B when handswitch taken to open}

Op Test No.: 1	Scenario # 1	Event # 1	Page 5 of 43
Event Description:	Shift Operating Condensate Pumps; Raise Power		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		**When/if contacted, report "C" Condensate Pump ready for start. When/if contacted post-start, report that conditions are normal.**
Indications Available:		**N/A**
Evaluator's Note:		**The crew assumes the watch with power at 75% and an escalation on hold to facilitate a swap from Condensate Pump "C" to Condensate Pump "B". After the Condensate Pumps are swapped the crew will begin raising power to 100%.**
	BOP	Enters SOP-208, CONDENSATE SYSTEM, Section III.B.
	BOP	Determines INITIAL CONDITIONS (Section 1.0) are met.
Evaluator's Note:		**Expected alarms when pump is started:** • **XCP-6271-3, FW HTR 5,6 LVL HI HI** • **XCP-625-1-4 (2-4, 3-4), FWP A (B, C) SL WTR TEMP HI** • **The BOP should make an announcement prior to the start of the pump**
	BOP	Ensure the discharge valve for the pump to be started is closed:
		• XVB-614C, C DISCH ISOL.
	BOP	Start one of the following: (**PEER √**)
		• XPP-0042C, CO PUMP C.
	BOP	Open the associated pump discharge valve: **(PEER √)**
		• XVB-614C, C DISCH ISOL.

Op Test No.: 1	Scenario # 1	Event # 1	Page 6 of 43
Event Description:	Shift Operating Condensate Pumps; Raise Power		

Time	Position	Applicant's Actions or Behavior
	BOP	Enters SOP-208, CONDENSATE SYSTEM, Section III.C.
	BOP	Verifies INITIAL CONDITIONS are met (two pumps running)
	BOP	Stop one of the following:
		• XPP-0042A, COP PUMP A.
	BOP	Verify the associated pump discharge valve closes:
		• XVB-614A, A DISCH ISOL.
	BOP	Reports completion of the Condensate Pump swap.
Evaluator's Note:		**The Lead Evaluator can cue Event 2 (VCT Level Channel LT-115 Fails LO) with the power change in progress but should wait until the evaluators are satisfied with control of the evolution since the crew may terminate the power change when an alarm actuates.**
Evaluator's Note:		**The crew may start a dilution before commencing the power change. Alternate Dilute steps are not in GOP-004A but are included for evaluator use.**
	CRS	Returns to GOP-4A, POWER OPERATION (MODE 1 – ASCENDING).
	BOP	Select 1/2 on LOAD RATE LMT-% PER MIN.
	BOP	Slowly raise LOAD SET to attain 80% Reactor Power while continuing with this procedure.
	BOP	At 80% Reactor Power, align Control Valve drain valves as follows:

Op Test No.: 1	Scenario # 1	Event # 1	Page 7 of 43
Event Description:	Shift Operating Condensate Pumps; Raise Power		

Time	Position	Applicant's Actions or Behavior
		• Ensure PVG-2898B, DV-4, is open as follows:
		• Verify Control Valve #4 is closed.
		• Verify PVG-2898B, DV-4, is open.
		• If both PVG-2898B, DV-4, and Control Valve #4 are closed, open PVG-2898B, DV-4, by opening MVG-2898D, STM LEAD DRN FOR CV-1.
		• Open MVG-2897, COMB CNTRL VLV BSD.
	BOP	When Control Valve #4 indicates greater than 5% open, perform the following:
		• Ensure PVG-2898B, DV-4, is CLOSED.
		• Ensure PVG-2898B, DV-4, is CLOSED.
ALTERNATE DILUTE STEPS (SOP-106, Section E)		
Procedure Note:		• **Energizing additional Pressurizer Heaters will enhance mixing.** • **LCV-115A, LTDN DIVERT TO HU-TK, will begin to modulate to the HU-TK position at 70% level on LI-115, VCT LEVEL %.**
	RO	Verify at least one Reactor Coolant Pump is running.
	RO	Place RX COOL SYS MU switch to STOP.
		Place RX COOL SYS MU MODE SELECT switch to ALT DIL. **(Peer √)**
	RO	Adjust FCV-168, TOTAL MU FLOW SET PT, to desired flow rate.
	RO	Set FIS-168, TOTAL MU FLOW, batch integrator to desired

Op Test No.: 1	Scenario # 1	Event # 1	Page 8 of 43
Event Description:	Shift Operating Condensate Pumps; Raise Power		

Time	Position	Applicant's Actions or Behavior
		volume. **(Peer √)**
	RO	Place RX COOL SYS MU switch to START.
	RO	Verify desired flow rate on FR-113, TOTAL MU GPM (F-168).
	RO	Verify dilution stops when preset volume is reached on FIS-168, TOTAL MU FLOW, batch integrator.
	RO	Place RX COOL SYS MU switch to STOP.
	RO	Place RX COOL SYS MU MODE SELECT switch to AUTO. **(Peer √)**
	RO	Adjust FCV-168, TOTAL MU FLOW SET PT, to 7.5 (120 gpm).
	RO	Place RX COOL SYS MU switch to START.
Lead Evaluator: **Cue Event 2, VCT Level Channel LT-115 Fails LO (CVC010B), when desired but not during a dilution operation.**		

Op Test No.: 1	Scenario # 1	Event # 2	Page 9 of 43
Event Description:	VCT Level Channel LT-115 Fails LO		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		**On cue from the Lead Evaluator, activate trigger for VCT Level XMTR LT-115 fails LO**
Indications Available:		**XCP-613-3-1, VCT LVL HI/LO**
	RO	Responds to and reports alarm XCP-613-3-1, VCT LVL HI/LO
	CREW	Enters ARP-001-XCP-613-3-1
Evaluator's Note:		**The RO may immediately recognize the failure of LT-115 and place the RX Cool SYS MU Switch to STOP to terminate the unwarranted automatic makeup.**
		ARP-613-3-1
		PROBABLE CAUSE:
		• Makeup flow in excess of Charging flow.
		• Makeup system not armed for automatic makeup.
		• Failure of ILT00115, VOLUME CONTROL TANK LEVEL TRANSMITTER.
		• Failure of ILT00112, VOLUME CONTROL TANK LEVEL TRANSMITTER.
	RO	Reports failure of LT-115.
		ARP-613-3-1
		AUTOMATIC ACTIONS:
		• Automatic makeup should start at 20% and stop at 40%.
		• At 70%, LCV-115A, LTDN DIVERT TO HU-TK, will position to begin diverting letdown to the Recycle Holdup Tank.
		• At 80%, LCV-115A, LTDN DIVERT TO HU-TK, will position to full divert.
		• At 5%, the Charging Pump suction will align to the RWST.

Op Test No.: 1 Scenario # 1 Event # 2 Page 10 of 43

Event Description: VCT Level Channel LT-115 Fails LO

Time	Position	Applicant's Actions or Behavior
	RO	Places the RX COOL SYS MU Switch to STOP.
		ARP-613-3-1
		CORRECTIVE ACTIONS:
		• Verify the appropriate automatic action.
		• Verify VCT level on LI-112A, LEVEL %, if ILT00115, VOLUME CONTROL TANK LEVEL TRANSMITTER, has failed.
		• Verify VCT level on LI-115, LEVEL %, if ILT00112, VOLUME CONTROL TANK LEVEL TRANSMITTER, has failed.
	RO	Determines LT-112A must be used for VCT level indication.
		ARP-613-3-1
		SUPPLEMENTAL ACTIONS
		• If auto makeup control is lost, refer to SOP-106.
		• If necessary, attempt to makeup to the VCT manually per SOP-106.
		• If makeup flow is high, reduce makeup flow.
		• If Charging Pump suction swaps to RWST, 2300 ppm boron may be injected into RCS. Reduce load and trip the turbine, if necessary, to establish control.
	RO	Acknowledges that use of MANUAL Makeup in accordance with SOP-106 may be required.
	CRS	Contacts Work control and/or I&C for assistance.
Booth Operator Note:		**If contacted, remove the failed channel from service but do not repair the channel before the scenario is terminated. Report that it appears that the D/P Cell needs to be replaced**

Op Test No.: 1	Scenario # 1	Event # 2	Page 11 of 43
Event Description:	VCT Level Channel LT-115 Fails LO		

Time	Position	Applicant's Actions or Behavior
		and a work plan will be required.
		Lead Evaluator:
		Cue Event 3, Condensate Flow to Deaerator Flow Controller fails HI, when desired.

Op Test No.: 1	Scenario # 1	Event # 3	Page 12 of 43
Event Description:	Condensate Flow to Dearator Flow controller Fails HI		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**XCP-627-2-1, CNDSR HOTWELL LVL LO** **XCP-627-1-3, CO PP DISCH HDR PRESS HI/HI HI**
	BOP	Responds to alarm XCP-627-2-1, CNDSR HOTWELL LVL LO, or change in indicated Deaerator flow/Hotwell level
	BOP	Enters ARP-001-XCP-627-2-1
Evaluator's Note:		**The ARP will NOT lead the crew directly to the problem. The problem must be diagnosed by looking at Deaerator Tank and Hotwell level. While it is unlikely, failure to act in a timely manner will result in a Condensate Pump trip on HI-HI DA Tank level and implementation of AOP-208.1, CONDENSATE PUMP TRIP.**
		ARP-001-XCP-627-2-1
		PROBABLE CAUSE:
		• Hotwell level control system malfunction.
		AUTOMATIC ACTIONS:
		• None
		CORRECTIVE ACTIONS:
		• Verify flow from the CST to the Condenser Hotwell as indicated on FR-3009.
	BOP	Verifies flow on FR-3009.
		ARP-001-XCP-627-2-1
		SUPPLEMENTAL ACTIONS:
		• Dispatch an operator to verify proper operation of the

Op Test No.: 1	Scenario # 1	Event # 3	Page 13 of 43
Event Description:	Condensate Flow to Dearator Flow controller Fails HI		

Time	Position	Applicant's Actions or Behavior
		hotwell level control system.
		• Open XVT00655-CO, COND A HOTWELL EMER MU CONT VLV BYPASS (TB-412), to bypass ILV03011-CO, COND A HOTWELL EMER MAKE-UP CONT VLV (TB-412), to regain normal hotwell level.
		• Check operation of ILV03000-CO, COND REJECT TO COND STG TK CONTROL VLV (TB-412).
	CREW	Dispatches AO to investigate problem/check valve lineup.
Booth Operator Note:		**If dispatched, wait 3 minutes then report that the hotwell level control system appears to be operating properly but level is not recovering. ILV03011-CO, COND A HOTWELL EMER MAKE-UP CONT VLV, is OPEN and ILV03000-CO, COND REJECT TO COND STG TK CONTROL VLV, is SHUT.**
	BOP	Reports IFK-3136, CONDENSATE FLOW TO DEAERATOR FLOW CONTROL VALVE, is 100% OPEN
	BOP	Places IFK-3136 in MANUAL and lowers flow to re-establish normal DA Tank and Hotwell levels.
	CRS	Contacts Work Control/I&C for assistance.
Lead Evaluator:		
Cue Event 4 (EDG "A" Low Lube Oil Temperature Alarm) when secondary-side conditions have stabilized and corrective actions will not be jeopardized by the alarm. The purpose of the next event is for a TS call and to set up the first major event. There are limited control room actions.		

Op Test No.: 1	Scenario # 1	Event # 4	Page 14 of 43
Event Description:	Emergency Diesel Generator (DG) "A" Low Lube Oil Temperature Alarm		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**XCP-636-6-3, DG A ENG TEMP TRBL**
	BOP	Responds to/reports alarm XCP-636-6-3, DG A ENG TEMP TRBL
	BOP	Enters ARP-001-XCP-636-6-3
		ARP-001-XCP-636-6-3
		PROBABLE CAUSE:
		High/Low lube oil temperature:
		• Lube Oil Heater failure.
		• Lube Oil Filter Pump not running.
		• Loss of Service Water to Lube Oil Cooler.
		High/Low coolant temperature:
		• Coolant Heater failure.
		• Jacket Water Pump not running.
		• Loss of Service Water to Jacket Water Cooler.
		AUTOMATIC ACTIONS:
		• The diesel will trip at 195°F (coolant high temp.) or 175°F (lube oil high temp.), unless it was started by an Emergency Start signal, in which case PVG-3105A, FS TO DG A, will open to cool the diesel.
	BOP	Automatic action N/A – DG not running.
		CORRECTIVE ACTIONS:
		• Dispatch an operator to identify the cause of the alarm.
		• Ensure AUTOMATIC ACTIONS have occurred if the alarm is due to High Temp.

Op Test No.: 1	Scenario # 1	Event # 4	Page 15 of 43
Event Description:	Emergency Diesel Generator (DG) "A" Low Lube Oil Temperature Alarm		

Time	Position	Applicant's Actions or Behavior
		• Perform Corrective Actions per ARP-004-XCX-5201.
	CREW	Dispatches AO to DG "A" to investigate.
Booth Operator Note:		**Wait 3-5 minutes then report: Local alarm ARP-004-XCX-5201-1-3, LOW LUBE OIL TEMPERATURE, is actuated. Lube Oil Temperature is 108 °F and the heater will not energize from the switch. If electrical maintenance is contacted, wait 5 more minutes and then report that the DG must be cleared and tagged to replace the failed heater.**
		ARP-001-XCP-636-6-3
		SUPPLEMENTAL ACTIONS:
		• Perform Supplemental Actions per ARP-004-XCX-5201.
	CRS	• When lube oil temperature or jacket water temperature is low, monitor and record the applicable temperature on a generic log once every two hours.
		• If the diesel generator is inoperable, refer to Tech Spec 3.8.1.
Evaluator's Note:		**Per a note in ARP-004-XCX-5201-1-3, the DG is inoperable when LO temperature is less than 110 °F.**
	CRS	Enters TS 3.8.1.1.b, Action b.
		1. Demonstrate the OPERABILITY of the A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1 within 1 hour and at least once per 8 hours thereafter, and
		2. If the EDG became inoperable due to any cause other than preplanned preventive maintenance or testing:
		a) determine the OPERABLE EDG is not inoperable due to a common cause failure within 24 hours, or
		b) demonstrate the OPERABILITY of the remaining EDG by performing Surveillance Requirement 4.8.1.1 .2.a.3 within 24 hours, and

Op Test No.: 1	Scenario # 1	Event # 4	Page 16 of 43
Event Description:	Emergency Diesel Generator (DG) "A" Low Lube Oil Temperature Alarm		

Time	Position	Applicant's Actions or Behavior
		3. Within 4 hours, verify that required systems, subsystems, trains, components and devices that depend on the remaining EDG as a source of emergency power are also OPERABLE and in MODE 1, 2, or 3, that the Turbine Driven Emergency Feed Pump is OPERABLE. If these conditions are not satisfied within 4 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
Lead Evaluator: **Cue Event 5 (MFP Discharge Header Pressure Transmitter PT-508 Fails LO) after the CRS Evaluator has completed his/her evaluation of the TS entry and/or elects to follow up after the scenario is terminated.**		

Op Test No.: 1	Scenario # 1	Event # 5	Page 17 of 43
Event Description:	MFP discharge Header Pressure Transmitter PT-508 Fails LO		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		**On cue from the Lead Evaluator, activate the trigger for MFP Discharge Header Pressure Transmitter PT-508 Fails LO**
Indications Available:		**XCP-624-1-5; 2-5; 3-5, SG LVL DEV**
	BOP	Responds to multiple SG LVL DEV alarms and/or change in feedwater flow.
Evaluator's Note:		• **The crew may first enter an ARP but could go directly to AOP-210.3, FEEDWATER PUMP MALFUNCTION, based on multiple alarms or early diagnosis. The scenario guide is conservatively written as if an ARP will be entered.** • **At some point prior to or during procedure implementation the BOP should diagnose the problem as a Feedwater Header Pressure instrument (PT-508) failure.**
	BOP	Enters ARP-001-XCP-624-1-5 or 2-5 or 3-5
		ARP-001-XCP-624-1-5
		PROBABLE CAUSE:
		• Step load increase or decrease.
		• Steam Generator A level control system malfunction.
		• FCV-478, A FCV, malfunction.
		• Testing in progress.
		• Instrument failure.
	BOP	Determines all SG's are responding in the same manner.
		ARP-001-XCP-624-1-5
		AUTOMATIC ACTIONS:
		• FCV-478, A FCV, will modulate to restore level to 61.6%.

Op Test No.: 1 Scenario # 1 Event # 5 Page 18 of 43

Event Description: MFP discharge Header Pressure Transmitter PT-508 Fails LO

Time	Position	Applicant's Actions or Behavior
	BOP	Determines all FCV's are responding the same way.
		ARP-001-XCP-624-1-5
		CORRECTIVE ACTIONS:
	BOP	• Evaluate SG A Narrow Range level indicators LI-474, LI-475, and LI-476.
		• If required, restore Steam Generator A level to between 60% and 65% by performing either or both of the following:
		• Manually control PVT-478, SG A FWF, as required.
		• Manually control Feedwater Pump speed as follows:
		• Place the Feedwater Pump MASTER SPEED CNTRL in MAN.
		• Adjust the differential pressure between Feedwater Pump discharge header pressure and Main St
		• If FCV-478, A FCV, malfunctioned go to AOP-210.1, Feedwater Flow Control Valve Failure.
		• If a Main Feedwater Pump has tripped or is malfunctioning go to AOP-210.3, Feedwater Pump Malfunction.
		• If an instrument channel failed, go to AOP-401.11, Steam Generator Level Control and Protection Channel Failure.
	BOP	Places Feedwater Pump MASTER SPEED CNTRL in MAN and adjusts to restore SG levels
	CRS	Enters AOP-210.3, FEEDWATER PUMP MALFUNCTION.
	BOP	Performs Immediate Actions
		• Verify at least one Feedwater Pump is running **(YES)**
		• Check if a Feedwater Pump trip occurred **(NO)**
	CRS	GO TO Step 13

Op Test No.: 1 Scenario # 1 Event # 5 Page 19 of 43

Event Description: MFP discharge Header Pressure Transmitter PT-508 Fails LO

Time	Position	Applicant's Actions or Behavior
	BOP	Manually control Feedwater Pump speed using MCB MASTER SPEED CONTROL
		• Place the Feedwater Pump MASTER SPEED CNTRL in MAN.
		• Adjust Feedwater Pump speed to maintain discharge header pressure 150 to 250 PSIG greater than Main Steam Header Pressure on:
		• PI-508, FW PP DISCH HDR PRESS PSIG.
		• PI-464C, MS HDR PRESS PSIG.
		• Adjust PUMP A(B)(C) SPEED CNTRL (MCB M/A Stations) setpoint potentiometers, as necessary to balance all operating Feedwater Pumps speed to within 120 rpm of each other.
	CRS	Determine and correct the cause of the Feedwater Pump speed control malfunction.
Evaluator's Note:		**The previous AOP-210.3 step remains in effect until the malfunction is repaired. The channel will NOT be repaired prior to the end of the scenario.**
	CRS	Contacts I&C and/or Work Control for assistance.
Booth Operator:		**When SG levels are under control, call the control room as an AO. Report the wind picking up and a dark sky on the horizon with significant lightning visible.**
Lead Evaluator: **Cue Event 6 (PZR Pressure PT-445 Fails HI) when SG levels are under control, channel repair actions have been initiated, and the degrading weather report is made to the control room.**		

Op Test No.: 1	Scenario # 1	Event # 6	Page 20 of 43
Event Description:	PZR Pressure Transmitter PT-445 Fails HI		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**XCP-616-2-3, PZR PRESS HI/LO;** **XCP-616-2-6, PZR CNTRL PRESS HI**
Evaluator Note:		**The DNB Pressure TS (2206 PSIG) will be exceeded and exited during this event.**
	RO	Responds to alarms.
	RO	Reports PZR Pressure channel failure.
	RO	Performs immediate actions of AOP-401.5, PRESSURIZER PRESSURE CONTROL CHANNEL FAILURE.
IMMEDIATE ACTION STEP 1		Verify the PZR PORV's are closed **(NO)**
		• If PZR PRESS is less than 2300 PSIG **(YES)**, then perform the following:
		• Close the affected PORV's:
		• PCV-445A, PWR RELIEF
		• PCV-445B, PWR RELIEF
IMMEDIATE ACTION STEP 2		Compare the PZR control channel indication to the protection channel indications:
		• PI-455, PRESS PSIG.
		• PI-456, PRESS PSIG.
		• PI-457, PRESS PSIG.
	RO	Reports PI-445 reading higher than any protection channel.
IMMEDIATE ACTION		Check if PI-444, CNTRL CHAN PRESS PSIG, indication is normal **(YES)**

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Event Description: PZR Pressure Transmitter PT-445 Fails HI

Time	Position	Applicant's Actions or Behavior
STEP 3		
	CRS	Enters AOP-401.5
Procedure Note:		**Throughout this procedure, "AFFECTED" refers to any PZR PORV that has actuated as the result of the instrument failure.**
Step 2 Note:		**PZR PRESS control channels PI-444 and PI-445 connect to the same reference leg as protection channel PI-457.**
	CRS	Reads immediate actions.
	RO	Verifies immediate actions.
	RO	Check if PI-445, CNTRL CHAN PRESS PSIG, indication is normal **(NO)**
	RO	If PI-445 is failed, then within one hour close the affected PORV Block Valves:
		• MVG-8000A, RELIEF 445 A ISOL
		• MVG-8000C, RELIEF 445 B ISOL
	RO	Ensure ROD CNTRL BANK SEL Switch is in AUTO.
	RO	Maintain RCS pressure between 2220 psig and 2250 psig.
	CRS	Determine and correct the cause of the channel failure.
	CRS	Contacts I&C and/or Work Control for assistance.

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Event Description: PZR Pressure Transmitter PT-445 Fails HI

Time	Position	Applicant's Actions or Behavior
Evaluator's Note:		• **While the following TS-related action has already been directed by the AOP, the CRS must still enter TS 3.4.4.a.**
	CRS	Enters TS 3.4.4.a.
		• With one or more PORV(s) inoperable and capable of being manually cycled, within 1 hour
		• restore the PORV(s) to OPERABLE status or
		• close the associated block valve(s) and maintain power to the block valve; otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
Lead Evaluator: **Cue Event 7 (Loss of Offsite Power with emergency diesel generator and EFW failures) when the TS actions are complete.**		

Op Test No.: 1	Scenario # 1	Event # 7, 8, 9, 10, & 11	Page 23 of 43
Event Description:	Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		**On cue from the Lead Evaluator, activate the trigger for the Loss of Offsite power.**
Indications Available:		**Multiple reactor trip and electrical lockout related alarms and lighting shifts.**
	CRS	Enters EOP-1.0, Step 1.
Procedure Note:		• **Steps 1 through 5 are Immediate Operator Actions.** • **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.** • **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
Evaluator's Note:		**The EOP REFERENCE PAGE requirements that apply to this scenario <u>after the SI actuation</u> are:** • **Reduce Control Room Emergency Ventilation to one train in operation within 30 minutes of actuation.**
Booth Operator Note:		**When/if the Electrical System Controller is contacted regarding the availability of off-site power, report the following: There is a major problem on the grid that is still being analyzed. I will contact you when a projected return time becomes available.**
	RO	Verify Reactor Trip:
		• Trip the Reactor using either Reactor Trip Switch.
		• Verify all Reactor Trip and Bypass Breakers are open. **(YES)**
		• Verify all Rod Bottom Lights are lit. **(YES)**
		• Verify Reactor Power level is decreasing. **(YES)**

Op Test No.: 1	Scenario # 1	Event # 7, 8, 9, 10, & 11	Page 24 of 43
Event Description:	Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN		

Time	Position	Applicant's Actions or Behavior
	BOP	Verify Turbine/Generator Trip:
		• Verify all Turbine STM Stop VLVs are closed. **(YES)**
		• Ensure Generator Trip (after 30 second delay):
		• Ensure the GEN BKR is open. **(YES)**
		• Ensure the GEN FIELD BKR is open. **(YES)**
		• Ensure the EXC FIELD CNTRL is tripped. **(YES)**
	BOP	Verify both ESF buses are energized. **(NO)**
	BOP	Perform the following:
		• Verify at least one ESF bus is energized: **(NO)**
		• 7.2 KV BUS 1DA is energized.
		OR
		• 7.2 KV BUS 1DB is energized.
		IF no ESF bus is energized, THEN try to restore power to at least one ESF bus using the DG.
		IF power can NOT be restored to at least one ESF bus, THEN GO TO EOP-6.0, LOSS OF ALL ESF AC POWER, Step 1.
Evaluator Note:		**The crew may avoid EOP-6.0 entry if the crew manually starts EDG "B" in accordance with management expectations for compensatory actions relative to automatic failures. If so, then proceed to Scenario Guide Page 27 for continuation of EOP-1.0 actions.**
	CRS	Enters EOP-6.0, LOSS OF ALL ESF AC POWER.

Op Test No.: 1	Scenario # 1	Event # 7, 8, 9, 10, & 11	Page 25 of 43
Event Description:	Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN		

Time	Position	Applicant's Actions or Behavior
Procedure Notes:		• **Steps 1 and 2 are Immediate Operator Actions.** • **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.** • **Critical Safety Function status trees should be monitored for information only. Procedures referenced from the status trees should NOT be used during this procedure.** • **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
	RO	Verify reactor Trip:
		• Trip the Reactor using either Reactor Trip Switch.
		• Verify all Reactor Trip and Bypass Breakers are open.
		• Verify Reactor Power level is decreasing.
	BOP	Verify Turbine/Generator Trip:
		• Verify all Turbine STM Stop VLVs are closed.
		• Ensure Generator Trip (after 30 second delay):
		• Ensure the GEN BKR is open.
		• Ensure the GEN FIELD BKR is open.
		• Ensure the EXC FIELD CNTRL is tripped.
	RO	Isolate the RCS.
	RO	Verify all PZR PORVs are closed **(YES)**.
	RO	Ensure all Letdown Isolation Valves are closed:
		• PVT-8149A(B)(C), LTDN ORIFICE A(B)(C) ISOL. (CLOSES)

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Event Description: Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN

Time	Position	Applicant's Actions or Behavior
		• LCV-459 and LCV-460, LTDN LINE ISOL. (CLOSES)
		• PVT-8153 and PVT-8154, XS LTDN ISOL. **(YES)**
	CREW	Ensure all PZR AND RCS sample valves are closed:
		• SVX-9364B and SVX-9365B, RCS LP B SMPL ISOL.
		• SVX-9364C and SVX-9365C, RCS LP C SMPL ISOL.
		• SVX-9356A, PZR STM SMPL ISOL.
		• SVX-9356B, PZR LIQ SMPL ISOL.
		• SVX-9357, PZR SMPL ISOL.
	BOP	Verify total EFW flow to INTACT SGs is GREATER THAN 450 gpm. **(NO)**
		Perform the following:
		• Ensure all TD EFW Flow Control Valves FCV-3536(3546)(3556), TD EFP TO SG A(B)(C) are open. **(YES)**
		Start the TD EFW Pump:
CRITICAL TASK		• **Open PVG-2030, STM SPLY TO TD EFP TRN A(B) before wide range level in any two SGs is less than 15%.**
		ENSURE AT LEAST ONE OF THE FOLLOWING safety injection MONITOR LIGHTS IS DIM:
		• XCP-6103 3-5 (MS LOOP C TO TDEFP 2802B)
		• XCP-6103 4-16 (MS LOOP B TO TDEF 2802A).

Op Test No.: 1	Scenario # 1	Event # 7, 8, 9, 10, & 11	Page 27 of 43
Event Description:	Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN		

Time	Position	Applicant's Actions or Behavior
Procedure Caution Step 5:		• **If power can NOT be restored to at least one ESF bus within ten minutes, all RCPs should be stopped to prevent RCP damage.** • **When a DG is running, the Service Water System must be in operation OR PVG-3105A(B), FS TO DG A(B), must be open to supply cooling water.**
	BOP	Try to restore power to any ESF bus:
		• Attempt to start any DG from the Main Control Board (starts "B")
CRITICAL TASK		• **Energize ESF bus 1DB from the running DG before performing Step 6 of EOP-6.0**
		• Verify the energized ESF Bus voltage is normal and frequency is stable.
Procedure Note – Step 5.d		**Procedures referenced in EOP-12.0, MONITORING OF CRITICAL SAFETY FUNCTIONS, may now be implemented.**
	CRS	RETURN TO the Procedure and Step in effect.
Booth Operator:		**Ramp in the SBLOCA from 0 to 600 GPM over 5 minutes when the crew transitions to EOP-1.1.**
	CRS	Returns to EOP-1.0, RNO Step 3.b
		• Try to restore power to the deenergized bus while continuing with this procedure. REFER TO AOP-304.1, LOSS OF BUS 1DA (1DB) WITH THE DIESEL NOT AVAILABLE.

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Event Description:	Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN		

Time	Position	Applicant's Actions or Behavior
Booth Operator/Evaluator Note: • **If the crew has dispatched operator(s) to investigate the EDG "A" failure then wait until EOP-1.0 – Attachment 3 has been completed, call the control room indicating controls have been reset and specify that a start attempt can be made.** • **The scenario guide assumes that the crew power will restore power to Bus 1DA.**		
	RO	Check if SI is actuated: **(NO)**
		• Check if either:
		• SI ACT status light is bright on XCP-6107 1-1. **(NO)**
		OR
		• Any red first out SI annunciator is lit on XCP-626 top row. **(NO)**
	CRS	Go to Step 5.
Evaluator's Note: • **The crew will go to EOP-1.1, REACTOR TRIP, begin performing steps then determine that PZR level cannot be maintained greater than 12%, initiate a MANUAL SI and return to EOP-1.0.** • **Adverse Containment values will be reached during the scenario.**		
	RO	Check if SI is required: **(NO)**
		• Check if any of the following conditions exist:
		• PZR pressure LESS THAN 1850 psig.
		OR
		• RP pressure GREATER THAN 3.6 psig.
		OR
		• Steamline pressure LESS THAN 675 psig.

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Event Description: Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN

Time	Position	Applicant's Actions or Behavior
		OR
		• Steamline differential pressure GREATER THAN 97 psid.
	CRS	Transitions to EOP-1.1, REACTOR TRIP
Procedure CAUTION: **If SI actuation occurs during this procedure, EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION, should be performed to stabilize the plant.**		
Procedure NOTE: • **Main Turbine vibration should be monitored during coastdown.** • **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.**		
	CREW	Announce plant conditions over the page system.
	BOP	Check FW status:
		a. Check if RCS Tavg is LESS THAN 564 °F. **(YES)**
		b. Verify FW Isolation:
		• Ensure the FW Flow Control Valves, FCV-478(488)(498), are closed. **(YES)** • Ensure the Main FW Isolation Valves, PVG-1611A(B)(C), are closed. **(YES)** • Ensure the FW Flow Control Bypass Valves, FCV-3321(3331)(3341), are closed. **(YES)**
	BOP	Ensure EFW Pumps are running:
		1) Ensure both MD EFW Pumps are running. **(NO)**

Op Test No.: 1	Scenario # 1	Event # 7, 8, 9, 10, & 11	Page 30 of 43
Event Description:	Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN		

Time	Position	Applicant's Actions or Behavior
		2) Verify the TD EFW Pump is running if necessary to maintain SG levels. **(Evaluators: See critical task criteria on Page 26)**
	BOP	Verify total EFW flow is GREATER THAN 450 gpm.
	BOP	Trip all Main FW Pumps.
	RO	Check RCS temperature:
		• With any RCP running, RCS Tavg is stable at OR trending to 557 °F. **(YES)**
Evaluator Note:		**The Scenario Guide assumes that the EOP-1.1 REFERENCE PAGE for SI Initiation has been met at this time or the CRS has made a conservative decision to manually initiate.**
	RO	Actuate SI using either SI ACTUATION Switch.
Evaluator's Note:		**Actions for ATTACHMENT 3, SI EQUIPMENT VERIFICATION, are provided on the final 3 pages of this scenario guide.**
	BOP	Initiate ATTACHMENT 3, SI EQUIPMENT VERIFICATION.
	CREW	Announce plant conditions over the page system.
	RO	Verify RB pressure has remained LESS THAN 12 psig on PR-951, RB PSIG (P-951), red pen **(YES)**
	RO	Check RCS temperature:

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Event Description: Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN

Time	Position	Applicant's Actions or Behavior
		• With any RCP running, RCS Tavg is stable at OR trending to 557°F.
		• With no RCP running, RCS Tcold is stable at OR trending to 557°F. **(YES)**
	RO	Check PZR PORVs and Spray Valves:
		• PZR PORVs are closed. **(YES)**
		• PZR Spray Valves are closed. **(YES)**
		• Verify power is available to at least one PZR PORV Block Valve: **(YES)**
		• MVG-8000A, RELIEF 445 A ISOL.
		• MVG-8000B, RELIEF 444 B ISOL
		• MVG-8000C, RELIEF 445 B ISOL.
		• Verify at least one PZR PORV Block Valve is open. **(YES)**
Procedure Note:		**Seal Injection flow should be maintained to all RCPs.**
	RO	Check if RCPs should be stopped: (None running)
	BOP	Verify no SG is FAULTED:
		• No SG pressure is decreasing in an uncontrolled manner. **(YES)**
		• No SG is completely depressurized. **(YES)**
	CREW	Verify Secondary radiation levels indicate SG tubes are NOT RUPTURED: **(YES to all)**
		• RM-G19A (B) (C) STMLN HI RNG GAMMA
		• RM-A9, CNDSR EXHAUST GAS ATMOS MONITOR.
		• RM-L3, STEAM GENERATOR BLOWDOWN LIQUID MONITOR.

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Event Description: Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN

Time	Position	Applicant's Actions or Behavior
		• RM-L10, SG BLOWDOWN CW DISCHARGE LIQUID MONITOR.
	RO	Check if the RCS is INTACT: **(NO to any or all)**
		• RB radiation levels are normal on:
		• RM-G7, CONTAINMENT HI RNG GAMMA
		• RM-G18, CNTMNT HI RNG GAMMA.
		• RB Sump levels are normal.
		• RB pressure is LESS THAN 1.5 psig.
		• The following annunciators are NOT lit:
		• XCP-606 2-2 (RBCU 1A/2A DRN FLO HI)
		• XCP-607 2-2 (RBCU 1B/2B DRN FLO HI)
	CRS	Transitions to EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT.
Procedure Note:		• **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.** • **Seal Injection flow should be maintained to all RCPs.** • **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
	RO	Check if RCPs should be stopped (NONE running).
	BOP	Verify no SG is FAULTED:
		• No SG decreasing in an uncontrolled manner **(YES)**
		• No SG completely depressurized **(YES)**

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Event Description: Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN

Time	Position	Applicant's Actions or Behavior
	BOP	Check Intact SG levels:
		• NR level in intact SGs >30% [50%]
		• Control EFW flow to maintain 40 [50%]-60% NR level
	RO	Reset both SI RESET TRAIN A(B) Switches.
	RO	Reset Containment Isolation:
		• RESET PHASE A - TRAIN A(B) CNTMT ISOL.
		• RESET PHASE B - TRAIN A(B) CNTMT ISOL.
	RO/BOP	Check if Secondary radiation levels are normal: **(YES to all)**
		• Check radiation levels normal on:
		• RM-G19A(B)(C), STMLN HI RNG GAMMA.
		• RM-A9, CNDSR EXHAUST GAS ' ATMOS MONITOR.
		• RM-L3, STEAM GENERATOR ' BLOWDOWN LIQUID MONITOR.
		• RM-L10, SG BLOWDOWN CW ' DISCHARGE LIQUID MONITOR.
		• Place SVX-9398A(B)(C), SG A(B)(C) SMPL ISOL, in AUTO.
		• Notify Chemistry to sample all SG secondary sides, and screen samples for abnormal activity using a frisker.
	RO	Check PZR PORVs and Block Valves:
		• Verify power is available to the PZR PORV Block Valves: MVG-8000A, B, C **(NO – power has been removed from the leaking PORV isolation valve)**
		• Verify all PZR PORVs are closed. **(YES)**
		• Verify at least one PZR PORV Block Valve is open. **(YES)**

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Event Description: Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Place both ESF LOADING SEQ A(B) RESETS to:
		• NON-ESF LCKOUTS
		• AUTO-START BLOCKS
	RO	Establish Instrument Air to the RB:
		• Start one Instrument Air Compressor and place the other in Standby.
		• Open PVA-2659, INST AIR TO RB AIR SERV.
		• Open PVT-2660, AIR SPLY TO RB.
	RO	Check if SI flow should be reduced:
		• RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 30 °F. **(YES)**
		• Secondary Heat Sink is adequate **(YES)**
		• RCS Pressure is stable or increasing **(NO)**
	CRS	GO TO Step 11.
	RO	Check if RB Spray should be stopped:
		• Check if any RB Spray Pumps are running. **(NO)**
	CRS	GO TO Step 12. Observe the CAUTION prior to Step 12.
Procedure Caution:		**RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to LESS THAN 250 psig, the RHR Pumps must be manually restarted to supply water to the RCS.**
	RO	Check if RHR Pumps should be stopped:

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Event Description: Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN

Time	Position	Applicant's Actions or Behavior
		• Check RCS pressure:
		• RCS pressure is GREATER THAN 250 psig. **(YES)**
		• Check if RCS Pressure is stable or increasing **(NO)**
	CRS	GO TO Step 13.
	RO	Check if RCS pressure is stable or decreasing. **(YES)**
	BOP	Check if pressure in all SGs is stable or increasing. **(YES)**
	BOP	Check if DGs should be stopped:
		• Verify both ESF buses are energized by offsite power. **(NO)**
		• Restore offsite power to both ESF buses. REFER TO the appropriate procedure, based on existing plant conditions:
		• SOP-304, 7.2 KV SWITCHGEAR.
		• SOP-306, EMERGENCY DIESEL GENERATOR.
		• AOP-304.1, LOSS OF BUS 1DA(1DB) WITH THE DIESEL NOT AVAILABLE.
		• IF offsite power is NOT available, THEN REFER TO AOP-304.3, LOSS OF ALL BALANCE OF PLANT BUSES, to supply necessary BOP loads from ESF buses.
		• Stop any unloaded DG. REFER TO SOP-306, EMERGENCY DIESEL GENERATOR. (N/A)
	RO	Verify equipment is available for Cold Leg Recirculation:
		• Verify power is available for at least one RHR Pump:
		• PUMP A. **(YES)**
		• PUMP B. **(YES)**
		• Open both MVB-9503A(B), CC TO RHR HX A(B).

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Event Description: Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN

Time	Position	Applicant's Actions or Behavior
Procedure Caution:		• **If the swing CCW Pump is NOT available, the running pump should NOT be secured to shift it to fast speed, to prevent damage to the Charging Pump on that train.** • **If CCW can NOT be shifted to fast speed, this procedure should be continued. CCW alignment will be addressed in EOP-2.2, TRANSFER TO COLD LEG RECIRCULATION.**
		• Shift the CCW Train to fast speed in the Active Loop. REFER TO SOP-118, COMPONENT COOLING WATER.
		• Consult with TSC personnel to determine if equipment required for Cold Leg Recirculation is available.
Procedure Note – Step 17		**Presence of abnormally high levels of radioactivity in the AB indicates that a Containment breach may be in progress. Conditions for upgrading the Emergency status should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
	RO	Check the AB for evidence of ECCS leakage: **(No leakage indicated because all questions will be answered YES)**
		• Verify AB radiation levels are normal on:
		• RM-A3
		• RM-A13
		• RM-A11
		• Local area monitors.
		• Verify annunciator XCP-631 6-1 is NOT lit (AB SMP LVL HI).
		• Verify annunciators XCP-606 3-4 and XCP-607 3-4 are NOT lit (LD TRBL AB SMP/FLDRN LVL HI).

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Event Description:	Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN		

Time	Position	Applicant's Actions or Behavior
	RO	Obtain necessary Chemistry samples:
		• Ensure all RCS sample valves are in AUTO:
		• SVX-9364B and SVX-9365B, RCS LP B SMPL ISOL.
		• SVX-9364C and SVX-9365C, RCS LP C SMPL ISOL.
		• Notify Chemistry to sample the following:
		• RCS.
		• All SGs for isotopic activity.
	BOP	Shut down and stabilize the Secondary Plant. REFER TO AOP-214.1, TURBINE TRIP.
	RO	Check if RCS cooldown and depressurization is required:
		• RCS pressure is GREATER THAN 250 psig. **(YES)**
	CRS	GO TO EOP-2.1, POST-LOCA COOLDOWN AND DEPRESSURIZATION, Step 1.
Procedure Note:		• **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.** • **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
	BOP	Verify all AC buses are energized by offsite power. **(NO)**
	CRS	Restore offsite power to all AC buses. Refer to the appropriate procedure based on existing plant conditions.
		• SOP-304, 115KV/7.2KV OPERATIONS.
		• SOP-306, EMERGENCY DIESEL GENERATOR.

Op Test No.: 1 Scenario # 1 Event # 7, 8, 9, 10, & 11 Page 38 of 43

Event Description: Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN

Time	Position	Applicant's Actions or Behavior
		• AOP-304.1, LOSS OF BUS 1DA(1DB) WITH THE DIESEL NOT AVAILABLE.
		• AOP-304.3, LOSS OF ALL BALANCE OF PLANT BUSES.
		• AOP-304.3A(B)(C), LOSS OF BALANCE OF PLANT BUS 1A(1B)(1C).
		IF offsite power can NOT be restored to BOP buses, THEN REFER TO AOP-304.3, LOSS OF ALL BALANCE OF PLANT BUSES, to supply necessary BOP loads from ESF buses.
Procedure Caution – Step 2		**PZR Heaters should NOT be energized until PZR water level is GREATER THAN the minimum level recommended by TSC personnel to ensure the heaters are covered.**
	RO	Deenergize PZR Heaters:
		• Place both BU GRP 1(2) Switches in PULL TO LK NON-A.
		• Secure the CNTRL GRP Heaters.
		• Consult TSC personnel for a minimum indicated PZR water level that will ensure heaters are covered.
Procedure Caution:		**RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to LESS THAN 250 psig, the RHR Pumps must be manually restarted to supply water to the RCS.**
Evaluator Note:		**If RCS Pressure has stabilized when the next step is read then the crew will stop both RHR Pumps.**
	CRS	Check if RHR Pumps should be stopped.
		• Check if any RHR Pump is running with suction aligned to the RWST **(YES)**
		Check RCS Pressure:

Op Test No.: 1 Scenario # 1 Event # 7, 8, 9, 10, & 11 Page 39 of 43

Event Description: Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN

Time	Position	Applicant's Actions or Behavior
		• RCS Pressure is greater than 250 PSIG **(YES)**
		• RCS Pressure is stable or increasing **(NO)**
	BOP	Check Intact SG levels:
		• NR level in intact SGs greater 40% [50%]
		• Control EFW flow to maintain 40 [50%] - 60% NR level
Procedure Note – Step 5		
		• **Before the Low Steamline Pressure SI signal is blocked, Main Steam Isolation will occur if the Low Steam Pressure rate setpoint is exceeded.** • **Shutdown margin should be monitored during RCS cooldown.**
	CRS	Initiate RCS cooldown to Cold Shutdown:
		• Maintain the cooldown rate in the RCS Cold Legs LESS THAN 100 °F/hr.
		• Use the RHR System if it is in service. REFER TO SOP-115, RESIDUAL HEAT REMOVAL.
		• WHEN RCS Tavg is LESS THAN P-12 (552 °F), THEN: Place both STM DUMP INTERLOCK Switches to BYP INTLK. Place both STMLN SI TRAIN A(B) Switches to BLOCK.
		• Close the MS Isolation Valves, PVM-2801A(B)(C), for any FAULTED or RUPTURED SGs.
	BOP	Dump steam from each intact SG to the condenser.
		• Verify permissive C-9 light is bright on XCP-6114-1-3. **(NO)**
	BOP	Dump steam from each intact SG using the Steamline PORVs:

Op Test No.: 1	Scenario # 1	Event # 7, 8, 9, 10, & 11	Page 40 of 43
Event Description:	Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN		

Time	Position	Applicant's Actions or Behavior
		• Place the Steamline Power Relief A(B)(C) Mode Switch(s) in PWR RLF.
		• Adjust the PWR RELIEF A(B)(C) SETPT Controller(s) to establish the desired cooldown rate.
LEAD EVALUATOR: **Terminate the scenario anytime after the cooldown is started.**		

Op Test No.: 1	Scenario # 1	Event # 7, 8, 9, 10, & 11	Page 41 of 43
Event Description:	Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN		

Time	Position	Applicant's Actions or Behavior
		EOP-1.0, ATTACHMENT 3
		Evaluator's Note: • **Only equipment powered from Bus 1DB will have power available when Attachment 3 is performed.** • **There will be no flow indicated from RHR because RCS Pressure will remain above the shutoff head.**
	BOP	Ensure EFW Pumps are running:
		• Ensure both MD EFW pumps are running. **(NO)**
		• Verify the TD EFW Pump is running if necessary to maintain SG levels. **(AUTO start is blocked)**
	BOP	Ensure the following EFW valves are open: **(YES)**
		• FCV-3531 (3541)(3551), MD EFP TO SG A(B)(C).
		• FCV-3536(3546)(3556), TD EFP TO SG A(B)(C)
		• MVG-2802A(B), MS LOOP B(C) TO TD EFP.
	BOP	Verify total EFW flow is GREATER THAN 450 gpm.
	BOP	Ensure FW Isolation:
		• Ensure the following are closed: **(YES)**
		• FW Flow Control
		• FW Isolation, PVG-1611A(B)(C).
		• FW Flow Control Bypass, FCV-3321(3331)(3341).
		• SG Blowdown, PVG-503A(B)(C).
		• SG Sample, SVX-9398A(B)(C).
		• Ensure <u>all</u> Main FW Pumps are tripped.

Op Test No.: 1 Scenario # 1 Event # 7, 8, 9, 10, & 11 Page 42 of 43

Event Description: Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN

Time	Position	Applicant's Actions or Behavior
	BOP	Ensure SI Pumps are running: **(Only B Train available)**
		• Two Charging Pumps are running.
		• Both RHR Pumps are running.
	BOP	Ensure two RBCU Fans are running in slow speed (one per train) **(Only B Train available)**
	BOP	Verify Service Water to the RBCUs: **(Only B Train available)**
		• Ensure two Service Water Pumps are running.
		• Ensure both Service Water Booster Pumps A(B) are running.
		• Verify GREATER THAN 2000 gpm flow for each train on:
		• FI-4466, SWBP A DISCH FLOW GPM.
		• FI-4496, SWBP B DISCH FLOW GPM.
	BOP	Verify two CCW Pumps are running. **(Only B Train available)**
	BOP	Ensure two Chilled Water Pumps and Chillers are running. **(Only B Train available)**
	BOP	Check if Main Steamlines should be isolated: **(NO)**
		• Check if any of the following conditions are met:
		• RB pressure GREATER THAN 6.35 psig. OR
		• Steamline pressure LESS THAN 675 psig. OR
		• Steamline flow GREATER THAN 1.6 MPPH AND Tavg LESS THAN 552°F.
		• Ensure ALL the following are closed:
		• MS Isolation Valves, PVM-2801A(B)(C).

Op Test No.: 1	Scenario # 1	Event # 7, 8, 9, 10, & 11	Page 43 of 43
Event Description:	Loss of Off-site Power; DG "B" Fails to Start Automatically (EOP-6.0 Implementation); MDEFW Pump "B" Breaker Trip, TDEFW Pump Fails to Start Automatically; 600 GPM SBLOCA After Bus 1DB Recovery; MVG-8801B (HI HEAD CL INJECTION MOV) Fails to OPEN		

Time	Position	Applicant's Actions or Behavior
		• MS Isolation Bypass Valves, PVM-2869A(B)(C).
	BOP	Ensure Excess Letdown Isolation Valves are closed: **(YES)**
		• PVT-8153, XS LTDN ISOL.
		• PVT-8154, XS LTDN ISOL.
	BOP	Verify ESF monitor lights indicate Phase A and Containment Ventilation Isolation on XCP-6103, 6104, and 6106. **(YES)**
		REFER TO ATTACHMENT 4, CONTAINMENT ISOLATION VALVE MCB STATUS LIGHT LOCATIONS, as needed.
	BOP	Verify proper SI alignment:
CRITICAL TASK		• Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104. **(NO - Opens MVG-8801B, HI HEAD TO CL INJECTION VALVE, before reporting the completion of this Attachment)**
		• Verify all SAFETY INJECTION monitor lights are dim on XCP-6106.
		• Verify SI flow on FI-943, CHG LOOP B COLD/HOT LG FLOW GPM.
		• Check if RCS pressure is LESS THAN 250 psig.
		• Verify RHR flow on:
		• FI-605A, RHR DISCHARGE PUMP A FLOW GPM
		AND
		• FI-605B, RHR DISCHARGE PUMP B FLOW GPM.

Facility:	VC SUMMER	Scenario No.: 2	Op Test No.: **2009 NRC**
Examiners:		Operators:	
Initial Conditions:	• IC-10, 100% Power, MOL		
	• RB Spray Pump "B" is tagged out for cleaning and maintenance of the breaker cubicle. 64 hours remain on TS 3.6.2.1.		
	• Radiation Monitor RM-A2, Reactor Building Particulate Monitor failed to ZERO 12 hours ago. Planning and Scheduling is preparing a work package. The Action Statement for TS 3.4.6.1.a is in effect.		
	• The National Weather Service has issued a severe weather alert due to a line of heavy thunderstorms moving into the area.		
Turnover:	• Maintain 100% power.		
Critical Task:	• Isolate steam from the ruptured SG to the TDEFW Pump before performing Step 6 of EOP-4.0.		
	• Isolate affected SG before NR level reaches 100%.		
	• Trip all RCP's before exiting EOP-2.0.		

Event No.	Malf. No.	Event Type*	Event Description
1	FWM006A	N – BOP, CRS R – RO	Feedwater Booster Pump "A" Trip. Power Reduction.
2	NIS003D	I – RO TS – CRS	PRNIS Channel N-44 Fails LO.
3	EH001 EH002	C – BOP	EHC Pump Trip/Standby EHC Pump AUTO start failure.
4	RCS002B	C – RO TS – CRS	SG "B" SGTL Not Requiring SI.
5	FWM023A	C – BOP	SG "A" Feedwater Control Valve (FCV-478) fails to respond in AUTO during power reduction.
6	EPS004C	M – ALL	Loss of Service Bus 1C.
7	PCS009AB PCS—9BB	C – RO	AUTO Reactor Trip Failure Rupture a different 5/6 fails its PORV open
8	RCS002B VLVRC005P VLVRC013P	M – ALL	SG "B" 600 gpm SGTR After Reactor Trip. PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI.
9	MSS006B	C – BOP	SG "B" MSIV Fails to Close.
			Terminate at the transition to EOP-4.2, SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

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

VC Summer NRC Scenario #2

The crew assumes the watch with power at 100% and instructions to maintain current conditions. They will have pre-briefed on the Initial Conditions.

Within one minute after assuming the watch, Feedwater Booster Pump "A" will trip. The BOP will respond to the associated alarm and enter the ARP. The ARP directs a power reduction to 95% in accordance with GOP-4C, RAPID POWER REDUCTION. The Lead Evaluator can cue Event 2, PRNIS Channel N-44 Fails LO, when the plant is stable at or below 95% and the reactivity control evaluation is complete.

When PRNIS Channel N-44 Fails LO the RO should respond to alarms and uncontrolled rod motion then perform the immediate actions of AOP-401.1, POWER RANGE CHANNEL FAILURE; placing rod control in MANUAL. The crew should remove the channel from service and the CRS should enter Technical Specification (TS) 3.3.1. When Tavg has been restored, the actions of AOP-401.1 are complete, and the TS declaration made, the Lead Evaluator can cue Event 3: EHC Pump trip/Standby EHC Pump AUTO start failure.

The BOP should respond to the EHC Pump trip in accordance with the Alarm Response Procedure (ARP). This involves a manual start of the standby pump, dispatching an AO to investigate, and diagnosing indications to verify that the cause is not a problem that will be common to both pumps. The Booth Operator will initiate Event 4, SG "B" SGTL Not Requiring SI, coincident with the EHC Pump problem.

The SG "B" tube leak will initiate and stabilize at 12 GPM until the TS entry is complete. The crew should respond to indications of RCS inventory loss/rising secondary-side radiation and enter AOP-112.2, STEAM GENERATOR TUBE LEAK NOT REQUIRING SI. The crew should estimate SGTL as greater than the TS limit and the CRS should enter TS 3.4.6.2.c. After the TS entry is complete, the leak will be ramped up to 50 GPM to require some additional AOP actions by the crew. The RO will stabilize PZR level by raising charging and minimizing letdown. The CRS should direct a shutdown to HOT STANDBY in accordance with the requirements of AOP-112.2 since the shutdown rate specified by that procedure is greater than that specified by the TS.

When the shutdown is initiated, SG "A" Feedwater Control Valve FCV-478 will fail "AS-IS" in AUTO. If the BOP fails to recognize that FCV-478 is not responding in AUTO then a SG "A" level deviation alarm will actuate. In either case, the BOP should take MANUAL control of FCV-478 and restore SG "A" level. When SG "A" level is under control, the Lead Evaluator can cue Event 6: Loss of Service Bus "C".

When Service Bus "C" trips then power to RCP "C" is lost but the automatic reactor trip is blocked. The RO should recognize the reactor trip demand, initiate a MANUAL reactor trip and the crew will perform EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION. Coincident with the reactor trip, the SG "B" tube leakage will ramp up to 600 GPM. The crew will likely go to EOP-1.1, REACTOR TRIP RECOVERY, then initiate a MANUAL SI based on the EOP-1.1 REFERENCE PAGE Criteria and return to EOP-1.0. When SI is initiated, one PZR PORV will fail open. Reactor Coolant Pumps should be stopped in accordance with EOP-1.0 REFERENCE PAGE Criteria. When the PZR PORV and associated block valve cannot be closed, the crew will transition to EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT.

Based on EOP-2.0 REFERENCE PAGE Criteria for uncontrolled SG level rise, the crew should transition to EOP-4.0, STEAM GENERATOR TUBE RUPTURE. In EOP-4.0, the crew should isolate EFW to SG "B", isolate SG "B", and trip the TDEFW Pump to terminate the release through that path. They will initiate a cooldown to a target temperature and then be directed to EOP-4.2, SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED, because of the open and unisolated PZR PORV.

The Lead Evaluator can terminate the scenario at the transition to EOP-4.2.

VCS08 NRC Scenario 2 Simulator Setup

SPECIAL INSTRUCTIONS:

- Attach a copy of the current revision of SOP-106, IV.D - BORATING THE RCS USING THE EMERGENCY BORATION VALVE to this scenario guide for evaluator use if that boration method is implemented by the crew.

INITIAL CONDITIONS

- IC-10, 100% Power.
- Tag on RB Spray Pump "B"
- Tag(on) on RM-A2 particulate
- Reactivity Management Plan/Turnover Sheet for IC.
- Crew should pre-brief on the Initial Conditions so that they are prepared to assume the watch with minimum delay.

PRE-LOAD

- OVR-SP008A RB Spray Pump "B" cleared and tagged
- OVR-SP008F RB Spray Pump "B" cleared and tagged
- MAL-RMS001D RM-A2 particulate failed
- MAL-PCS009AB {Set To AUTO UV} Blocks the AUTO Reactor trip on A Train
- MAL-PCS009BB {Set To AUTO UV} Blocks the AUTO Reactor trip on B Train
- MAL-MSS006B {Set To FAILURE TO CLOSE}: Blocks AUTO and MANUAL closure of MSIV "B"
- PMP-EH002F Blocks the AUTO start of EHC Pump "B"

TRIGGERS

- Trigger 1 MAL-FWM006A: Feedwater Booster Pump "A" trip
- Trigger 2 MAL-NIS003D: PRNIS Channel 44 fails to ZERO
- Trigger 3 PMP-EH001T: Trip of EHC Pump "A"
- Trigger 3 MAL-RCS002B: SG "B" Tube Leak 12 GPM @ 1GPM
- Trigger 4 MAL-FWM023A: FCV-478 fails "AS-IS" in AUTO when the power reduction begins
- Trigger 5 MAL-EPS004C: Loss of Service Bus "1C"
- Trigger 27 Leak rate on SG 'B' increase to 50 GPM over 10 minutes when leak rate reaches 12 GPM
- Trigger 28 MAL-RCS002B: SG "B" Tube Leak ramps to 600 GPM over 10 minutes coincident with the reactor trip breakers opening
- Trigger 29 VLV-RC005B: PCV-445B fails open coincident with the MANUAL or AUTO SI
- Trigger 30 VLV-RC013P Blocks the closure of MVG-8000C , coincident with the MANUAL or AUTO SI

Op Test No.: 1	Scenario # 2	Event # 1	Page 5 of 39
Event Description:	Feedwater Booster Pump "A" Trip, Power Reduction		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**XCP-625-1-2, FWPB A/B/C/D TRIP**
Evaluator/ Booth Operator Note:		**The crew has pre-briefed on the Initial Conditions. Initiate Event 1, Feedwater Booster Pump Trip, approximately 30-60 seconds after the crew assumes the watch.**
	BOP	Responds to alarm XCP-625-1-2, FWBP A/B/C/D TRIP.
	CREW	Enters ARP-001-XCP-625-1-2.
		PROBABLE CAUSE:
		• Pump or pump motor malfunction.
		• Breaker overload trip.
		• Low level in Deaerator Storage Tank at 468'6" (equivalent to 2'6" as read on wide range indicator LI-3135).
		• Low oil pressure trip at 5 psig decreasing sensed by one of the following:
		• IPS03408B.
		• IPS03418B.
		• IPS03428B.
		• IPS03438B.
		AUTOMATIC ACTIONS:
		• Recirculation valve associated with the tripped Feedwater Booster Pump opens.
Procedure Note:		This alarm has reflash capabilities.
		CORRECTIVE ACTIONS:

Op Test No.: 1	Scenario # 2	Event # 1	Page 6 of 39
Event Description:	Feedwater Booster Pump "A" Trip, Power Reduction		

Time	Position	Applicant's Actions or Behavior
		• If the number of Feedwater Booster Pumps in operation is less than the number of Feedwater Pumps in operation, immediately trip the Reactor and enter EOP-1.0, REACTOR TRIP SAFETY INJECTION ACTUATION. (NO - 3/3)
		• If three Feedwater Booster Pumps and three Feedwater Pumps are in operation, reduce Reactor power to 95% per GOP-4C, RAPID POWER REDUCTION. **(YES)**
	CRS	Enters GOP-4C.
	CRS	Verifies Initial Conditions:
		• The plant is in Mode 1. **(YES)**
		• Conditions exist that do not require a Reactor Trip but do require the Reactor to be in Mode 2 in less time than would be allowed by performing a normal shutdown. (NO, but the ARP has directed use of GOP-4C)
Note 3.1 through 3.10 • **If time allows, load reductions should be discussed with the Load Dispatcher.** • **Thermal Power changes of greater than 15% in any one hour require completion of Attachment III.H. of GTP-702.**		
	CREW	Informs Load Dispatcher.
		Commence rapid Plant Shutdown as follows:
	RO	• Energize all Pressurizer Heaters.
Procedure Note 3.1.b • **Setting FCV-113A&B, BA FLOW SET PT to 8.3 will yield 33 gpm Boration flow rate.**		

Op Test No.: 1	Scenario # 2	Event # 1	Page 7 of 39
Event Description:	Feedwater Booster Pump "A" Trip, Power Reduction		

Time	Position	Applicant's Actions or Behavior
		Maintain the following with rod motion or boron concentration changes:
		• Tavg within 10°F and trending to Tref.
		• ΔI within limits.
		• Control Rods above the rod insertion limit.
Evaluator's Note:		**The crew may initiate a boration before or after the power reduction. Boration steps are not in GOP-4C but are included for evaluator use following the load reduction steps.**
	BOP	Reduce load by either of the following methods:
		• By use of the DEC LOAD RATE circuit as follows:
		• De-energize LOAD LIMIT circuit.
		• Energize DEC LOAD RATE circuit.
		• Select desired rate on LOAD RATE LMT-% PER MIN, up to 5% per minute.
		• Decrease LOAD SET to the load desired.
		• By use of the load limiter as follows:
		• Ensure LOAD LMT light is lit.
		• Turn the LOAD LMT SET potentiometer counterclockwise, up to a nominal 5% per minute, until the desired load is reached.
BORATION STEPS (SOP-106, Section F – All steps performed by the RO)		
Evaluator Note:		**The RO could elect to borate in accordance with SOP-106, Section IV.D – BORATING THE RCS USING THE EMERGENCY BORATION VALVE. A copy of that procedure page is attached at the end of this scenario guide.**

Op Test No.: 1	Scenario # 2	Event # 1	Page 8 of 39
Event Description:	Feedwater Booster Pump "A" Trip, Power Reduction		

Time	Position	Applicant's Actions or Behavior
Procedure Note 2.0		• **Energizing additional Pressurizer Heaters will enhance mixing.** • **LCV-115A, LTDN DIVERT TO HU-TK, will begin to modulate to the HU-TK position at 70% level on LI-115, VCT LEVEL %.**
	RO	Ensure at least one Reactor Coolant Pump is running.
		Place RX COOL SYS MU Switch to STOP.
		Place RX COOL SYS MU MODE SELECT switch to BOR. **(Peer √)**
		Set FIS-113, BA TO BLNDR FLOW, Batch Integrator to the desired volume **(Peer √)**
		Place RX COOL SYS MU Switch to START.
Procedure Note 2.6		**Step 2.6 may be omitted when borating less than 10 gallons.**
		Place FCV-113 A&B, BA FLOW, controller in AUTO.
Procedure Note 2.7		**The AUTO setpoint dial for FCV-113A&B, BA FLOW, controller may be adjusted slowly to obtain the desired flow rate.**
		Verify the desired Boric Acid flow rate on FR-113, BA TO BLNDR GPM (F-113).
		When the preset volume of boric acid has been reached,

Op Test No.: 1 Scenario # 2 Event # 1 Page 9 of 39

Event Description: Feedwater Booster Pump "A" Trip, Power Reduction

Time	Position	Applicant's Actions or Behavior
		perform the following:
		• Place FCV-113A&B, BA flow controller in MAN.
		• Verify boration stops.
		Place RX COOL SYS MU switch to STOP.
Procedure Note 2.10		• **If plant conditions require repeated borations, Step 2.10 may be omitted.** • **The volume in the piping between the blender and the VCT outlet is approximately 3.8 gallons.**
		Alternate Dilute 4 to 6 gallons of Reactor Makeup Water to flush the line downstream of the blender by performing the following:
		• Place RX COOL SYS MU MODE SELECT switch to ALT DIL. **(Peer √)**
		• Adjust FCV-168, TOTAL MU FLOW SET PT, to desired flow rate.
		• Set FIS-168, TOTAL MU FLOW, batch integrator to desired volume. **(Peer √)**
		• Place RX COOL SYS MU switch to START.
		• Verify desired flow rate on FR-113, TOTAL MU GPM (F-168).
		• Verify alternate dilution stops when preset volume is reached on FIS-168, TOTAL MU FLOW, batch integrator.
		• Place RX COOL SYS MU switch to STOP.
		Place RX COOL SYS MU MODE SELECT switch to AUTO. **(Peer √)**
		Adjust FCV-168, TOTAL MU FLOW SET PT, to 7.5 (120 gpm).

Op Test No.: 1	Scenario # 2	Event # 1	Page 10 of 39
Event Description:	Feedwater Booster Pump "A" Trip, Power Reduction		

Time	Position	Applicant's Actions or Behavior
		In MAN, adjust FCV-113 A&B, BA FLOW OUTPUT, to the required position which will ensure proper Boric Acid addition for subsequent Automatic Makeup operations.
		Adjust FCV-113A&B, BA FLOW SET PT, to the desired position to ensure proper boric acid addition for subsequent Automatic Makeup operations.
		Place RX COOL SYS MU switch to START.
		Place RX COOL SYS MU switch to START.
		Start XPP-13A(B), BA XFER PP A(B), for the in-service Boric Acid Tank.
		If necessary, start XPP-13A(B), BA XFER PP A(B), for the Boric Acid Tank on recirculation.
Lead Evaluator: **Cue Event 2 (PRNIS Channel N-44 Fails LO) when power is stabilized at (or below) the required value and the reactivity control evaluation is complete.**		

Op Test No.: 1	Scenario # 2	Event # 2	Page 11 of 39
Event Description:	PRNIS Channel N-44 Fails LO		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**XCP-620-1-4, PR CHAN DEV**
	RO	Responds to alarm XCP-620-1-4, PR CHAN DEV, and/or rod motion.
Evaluator's Note:		**The crew will likely go directly to AOP-401.10, POWER RANGE CHANNEL FAILURE, rather than to implement the ARP.**
	RO	Enters ARP-001-XCP-620-1-4
		PROBABLE CAUSE:
		• Dropped Rod.
		• Quadrant Power Tilt.
		• Power Range channel in test.
		• Power Range channel failure.
		AUTOMATIC ACTIONS:
		• None
		CORRECTIVE ACTIONS:
		• Observe Power Range meters NI-41B, NI-42B, NI-43B, and NI-44B.
		• Verify proper Control Rod positions.
		SUPPLEMENTAL ACTIONS:
		• If a rod dropped, refer to AOP-403.6, DROPPED CONTROL ROD. **(NO)**
		• Determine if a quadrant power tilt exists by: **(NO)**
		• Display TFMMI on the IPCS.

Op Test No.: 1 Scenario # 2 Event # 2 Page 12 of 39

Event Description: PRNIS Channel N-44 Fails LO

Time	Position	Applicant's Actions or Behavior
		• If the IPCS is not available, perform STP-108.001, QUADRANT POWER TILT RATIO.
		• If a Power Range channel is in test, place the COMPARATOR CHANNEL DEFEAT switch to the channel being tested.
		• If an instrument failure is suspected, refer to AOP-401.10, POWER RANGE FAILURE.
	CRS	Enters AOP-401.10
	RO	Performs immediate actions
		• Verify normal indication on Power Range Channel N-44. **(NO)**
		• IF Power Range Channel N-44 has failed, THEN place the ROD CNTRL BANK SEL Switch in MAN.
		• Stabilize any plant transients in progress.
	CREW	Maintain stable plant conditions.
	CREW	Verify no testing is in progress on the operable Power Range channels.
	BOP	Place ROD STOP BYPASS Switch (on the MISCELLANEOUS CONTROL AND INDICATION PANEL) for the failed Power Range channel in BYPASS.
	RO	Verify the appropriate Rod Stop Bypass status light is bright:
		• For N-44, B2 OP ROD STOP BYP (XCP-6111 4-4).
	RO	Adjust Control Rods to maintain Tavg within 1.0 °F of Tref.

Op Test No.: 1	Scenario # 2	Event # 2	Page 13 of 39
Event Description: PRNIS Channel N-44 Fails LO			

Time	Position	Applicant's Actions or Behavior
	CRS	Notify the I&C Department to record detector currents and status lights on POWER RANGE A and POWER RANGE B drawers.
Procedure Caution – Step 9		**The empty fuse holders should NOT be reinstalled as this will allow a small amount of current flow through the blown fuse indicator.**
Evaluator Note:		**The following are expected alarms when the fuses are pulled in the next step:** • **XCP-620-1-1, PR HI SETPT FLUX HI** • **XCP-620-1-2, PR LO SETPT FLUX HI** • **XCP-620-1-5, PR UP DET FLUX HI DEV AUTO DEFEAT** • **XCP-620-1-6, PR LOW DET FLUX HI DEV AUTO DEFEAT** • **XCP-620-2-1, PR DET VOLT LOSS** • **XCP-620-2-2, PR FLUX HI RATE SINGLE CHAN ALERT**
	BOP	Deenergize the failed Power Range channel:
		• Remove the CONTROL POWER fuses from the POWER RANGE A drawer.
		• Remove the INSTR POWER fuses from the POWER RANGE B drawer.
Evaluator Note:		**The following alarms will clear during the next step:** • **XCP-620-1-4, PR CHAN DEV** • **XCP-620-1-5, PR UP DET FLUX HI DEV AUTO DEFEAT** • **XCP-620-1-6, PR LOW DET FLUX HI DEV AUTO DEFEAT**
	BOP	Align the Power Range channel comparator circuits:

Op Test No.: 1 Scenario # 2 Event # 2 Page 14 of 39

Event Description: PRNIS Channel N-44 Fails LO

Time	Position	Applicant's Actions or Behavior
		• Place the following switches to the failed Power Range channel position:
		• COMPARATOR CHANNEL DEFEAT Switch (on the COMPARATOR AND RATE drawer).
		• UPPER SECTION Switch (on the DETECTOR CURRENT COMPARATOR drawer).
		• LOWER SECTION Switch (on the DETECTOR CURRENT COMPARATOR drawer).
	RO	Ensure NR-45 is selected to the appropriate operable channels.
	RO	Check if Reactor power is LESS THAN 75%. **(NO)**
		• Initiate GTP-702, Attachment IV.F. (AFD Monitoring)
	RO	Check if Reactor power is LESS THAN 50%. **(NO)**
		• Initiate GTP-702, Attachment IV.D. (QPTR Monitoring)
	CRS	Within 72 hours, place the failed channel protection bistables in a tripped condition:
		• Identify the associated bistables for the failed channel. REFER TO Attachment 1.
		• Record the following for each associated bistable on SOP-401, REACTOR PROTECTION AND CONTROL SYSTEM, Attachment I:
		• Instrument
		• Associated Bistable.
		• Bistable Location.
		• STPs.
		• Notify the I&C Department to place the identified bistables in trip.

Op Test No.: 1	Scenario # 2	Event # 2	Page 15 of 39
Event Description:	PRNIS Channel N-44 Fails LO		

Time	Position	Applicant's Actions or Behavior
	CRS	Refer to Tech Spec 3.3.1.
		Determines ACTION 2 applies:
		With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:
		• The inoperable channel is placed in the tripped condition within 72 hours.
		• The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.3.1.1.
		• Either, THERMAL POWER is restricted to less than or equal to 75% of RATED THERMAL POWER and the Power Range Neutron Flux trip setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER within 4 hours; or, the QUADRANT POWER TILT RATIO is monitored at least once per 12 hours per Specification 4.2.4.2.
	CRS	Determine and correct the cause of the Power Range channel failure.
Lead Evaluator: **Cue Event 3 (EHC Pump trip/Standby EHC Pump AUTO start failure) after the TS declaration and the channel is bypassed.**		

Op Test No.: 1	Scenario # 2	Event # 3	Page 16 of 39
Event Description:	EHC Pump Trip/Standby EHC Pump AUTO Start Failure		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: • **When dispatched to investigate pump failure, report no leaks or apparent reason.** • **Inform the Lead Evaluator then activate the trigger for the 12 GPM SG "B" Tube leak while this event is in progress.**		
Indications Available:		**XCP-631-1-4, EHC PP A MOTOR OVRLD** **XCP-631-1-2, EHC FLUID PRESS LO**
	BOP	Responds to alarm XCP-631-1-4, EHC PP A MOTOR OVRLD
	BOP	Enters ARP-001-XCP-631-1-4
		PROBABLE CAUSE:
		• Excessive flow due to an internal leak within the servo valves.
		• Excessive flow due to an external leak.
		• Mechanical binding of the pump or motor.
		• Breaker XSW1C1 06D, EHC FLUID PUMP A XPT0003-PP1-EH, racked out.
Evaluator's Note:		**The BOP may start the standby pump before the automatic start setpoint is reached since no EHC Pump is running.**
		AUTOMATIC ACTIONS:
		• The pump may trip if the condition is not corrected.
		• If the pump trips, the standby pump starts at 1300 psig.
	BOP	If EHC PUMP A is still running, verify high amps. (NO. Pump tripped)
	BOP	Start EHC PUMP B and observe motor amps.

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Event Description: EHC Pump Trip/Standby EHC Pump AUTO Start Failure

Time	Position	Applicant's Actions or Behavior
	BOP	If EHC PUMP A is still running with higher amps than EHC PUMP B, secure EHC PUMP A and continue to monitor EHC PUMP B. (EHC Pump A already tripped)
	CREW	Dispatch an operator to check for EHC System leaks.
	BOP	If EHC PUMP B is drawing high amps with EHC PUMP A tripped, attempt to restart EHC PUMP A and run both pumps until an external leak is located or a low level in the EHC fluid tank alarm is received. **(NO)**
	BOP	If EHC PUMP B overload annunciator is received after starting, commence a Turbine Runback at 5% per minute per GOP-4C. (N/A)
Evaluator's Note:		**This step should be completed in its entirety prior to exiting to another procedure.**
	BOP	Upon receipt of a low level alarm in the EHC fluid tank, perform the following: (N/A)
		• If Reactor power is greater than 50% (P-9), perform the following:
		• Trip the Reactor and implement EOP-1.0, Reactor Trip/Safety Injection Actuation.
		• Trip the Main Turbine.
		• Place the EHC Pumps in PULL TO LK NON-A.
	CRS	Contacts Work Control and/or Maintenance for assistance.
Lead Evaluator: **Event 4 (SG "B" SGTL Not Requiring SI) will be in progress during the EHC Pump problem..**		

Op Test No.: 1	Scenario # 2	Event # 4	Page 18 of 39
Event Description:	SG "B" SGTL Not Requiring SI		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: • **Raise SG "B" Tube leakage to 50 GPM after the TS 3.4.6.2.c is entered.** • **Fail Feedwater Flow Control Valve FCV-478 at the existing position (AUTO only) when the power reduction associated with the SGTL begins.**		
Indications Available:		**XCP-642-2-1, MN STM LINE RM-G19 HI RAD**
	CREW	Refer to alarm response procedure.
	RO/BOP	Verify the alarm is valid and identify the Main Steam line affected by observing RM-G19A, B, and C and R/R-8.
	CRS	Request Health Physics perform radiological surveys around Main Steam Lines.
	CRS	Direct Chemistry to sample all SGs for activity.
Booth Operator: In the next step, wait 3 minutes then report: • XVB00110-AR, MN&AUX COND VAC PP CHAR EXH DISCH VALVE, OPEN • XVB00109-AR, MN&AUX COND VAC PUMP ATMOS DISCH VALVE, CLOSED		
	CREW	Align the condenser exhaust to the Auxiliary Building Charcoal exhaust as follows: **(Dispatches AO)**
		• Open XVB00110-AR, MN&AUX COND VAC PP CHAR EXH DISCH VALVE (TB-436).
		• Close XVB00109-AR, MN&AUX COND VAC PUMP ATMOS DISCH VALVE (TB-436).
	BOP	*Reduce all Steam Generator Blowdown Flows to minimum.*
	CRS	Enters AOP-112.2, Steam Generator Tube Leak Not Requiring SI.

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Event Description: SG "B" SGTL Not Requiring SI

Time	Position	Applicant's Actions or Behavior
	RO	Check if PZR level can be maintained:
		• Open FCV-122, CHG FLOW, as necessary to maintain PZR level.
		• Verify PZR level is at or trending to program level **(YES)**
	RO	Reduce Letdown to one 45 gpm orifice:
		• Set PCV-145, LO PRESS LTDN, to 70%.
		• Ensure PVT-8149A, LTDN ORIFICE A ISOL, is open.
		• Close both PVT-8149B(C), LTDN ORIFICE B(C) ISOL.
		• Adjust PCV-145, LO PRESS LTDN, to maintain PI-145, LO PRESS LTDN PRESS PSIG, between 300 psig and 400 psig.
		• Place PCV-145, LO PRESS LTDN, in AUTO.
	CRS/RO	Check if SI is required: **(NO)**
		• Check if any of the following criteria are met:
		• Check if any of the following criteria are met:
		OR
		• PZR level is approaching 12%, OR
		• PZR pressure is approaching 1870 psig
	CRS	Go to Step 3.
	RO	Verify VCT level is being maintained between 20% and 40%.
	CRS/RO	IF Steam Generator primary to secondary tube leakage has not been determined, THEN perform the following:
		• Estimate the RCS leak rate refer to IPCS CHG_{NET}.
		• Calculate the RCS leak rate. REFER TO STP-114.002, OPERATIONAL LEAK TEST.

Op Test No.: 1	Scenario # 2	Event # 4	Page 20 of 39
Event Description:	SG "B" SGTL Not Requiring SI		

Time	Position	Applicant's Actions or Behavior
		• Comply with the applicable Tech Spec 3.4.6.2 action statement.
Evaluator's Note:		**The AOP shutdown requirement is more restrictive than the TS requirement in that it specifies a rate of power reduction. The** CRS **should enter the TS action statement but implement the AOP-112.2, Step 5 table requirement for ≥ 150 GPD.**
	CRS	Determines SGTL exceeds TS 3.4.6.2.c (150 GPD)
		Action a:
		• With any PRESSURE BOUNDARY LEAKAGE or with primary-to-secondary leakage not within limit, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

Procedure Note – Step 5
• **Rate of plant shutdown must be evaluated based on magnitude of RCS leak rate (Steam Generator primary to secondary tube leakage).**
• **Steam Generator primary to secondary tube leakage rate, and rate of increase, is represented by the following IPCS Computer points:**
  • **UR1019, S/G LEAKAGE FROM RMA9 (in gpd).**
  • **UR1019-R, S/G LEAKAGE FROM RMA9-RATE (in gpd/hr).**
• **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**		

	CRS	IF RCS leak rate (Steam Generator primary to secondary tube leakage) is GREATER THAN OR EQUAL TO 75 gpd (.05 gpm), THEN initiate a plant shutdown per the following table using GOP-4B, POWER OPERATION (MODE 1 DESCENDING).

Op Test No.: 1	Scenario # 2	Event # 4	Page 21 of 39
Event Description:	SG "B" SGTL Not Requiring SI		

Time	Position	Applicant's Actions or Behavior
		• Be in Mode 3 within 2 hours.
Evaluator's Note:		**Feedwater Flow Control Valve FCV-478 will fail at the existing position (in AUTO only) when the power reduction begins. Allow the BOP/CREW to deal with that malfunction then the Lead Evaluator can cue Event 6 (Loss of Service Bus 1C).**
	CRS	Initiate a Reactor shutdown: REFER TO GOP-5, REACTOR SHUTDOWN FROM STARTUP TO HOT STANDBY (MODE 2 TO MODE 3), while continuing with this procedure.

Op Test No.: 1	Scenario # 2	Event # 5	Page 22 of 39
Event Description:	SG "A" Feedwater control Valve (FCV-478) Fails to Respond in AUTO During Power Reduction		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**XCP-624-1-5, SG A LVL DEV**
	BOP	Responds to SG LVL DEV alarms and/or observation of different FCV/SG response.
	BOP	Enters ARP-001-XCP-624-1-5.
Evaluator's Note:		**The BOP may take MANUAL control of FCV-478 before an alarm setpoint is reached in accordance with management expectations for operator response.**
		PROBABLE CAUSE:
		• Step load increase or decrease.
		• Steam Generator A level control system malfunction.
		• FCV-478, A FCV, malfunction.
		• Testing in progress.
		• Instrument failure.
		AUTOMATIC ACTIONS:
		• FCV-478, A FCV, will modulate to restore level to 61.6%.
	BOP	Reports FCV-478 appears to not be tracking the AUTO signal.
		• Evaluate SG A Narrow Range level indicators LI-474, LI-475, and LI-476.
		• If required, restore Steam Generator A level to between 60% and 65% by performing either or both of the following:
		• Manually control PVT-478, SG A FWF, as required.
Lead Evaluator: **Cue Event 6 (Loss of Service Bus 1C) when SG A level is under control.**		

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 23 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**Multiple Alarms; FLOW LO P-8 PERMSV**
	CREW	Responds to multiple alarms.
	RO	Reports Reactor Trip demand signal.
	RO	Initiates a MANUAL Reactor trip.
Booth Operator:		**Coincident with the MANUAL Reactor Trip, ramp the SG "B" SGTL to 600 GPM over 10 minutes.**
	CRS	Enters EOP-1.0.
Procedure Note:		• **Steps 1 through 5 are Immediate Operator Actions.** • **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.** • **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
	RO	Verify Reactor Trip:
		• Trip the Reactor using either Reactor Trip Switch.
		• Verify all Reactor Trip and Bypass Breakers are open.
		• Verify all Rod Bottom Lights are lit.
		• Verify Reactor Power level is decreasing.
	BOP	Verify Turbine/Generator Trip:
		• Verify all Turbine STM Stop VLVs are closed.

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Event Description: Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close

Time	Position	Applicant's Actions or Behavior
		• Ensure Generator Trip (after 30 second delay):
		• Ensure the GEN BKR is open.
		• Ensure the GEN FIELD BKR is open.
		• Ensure the EXC FIELD CNTRL is tripped.
	BOP	Verify both ESF buses are energized. **(YES)**
	RO	Check if SI is actuated:
		• Check if either:
		• SI ACT status light is bright on XCP-6107 1-1. **(NO)**
		OR
		• Any red first out SI annunciator is lit on XCP-626 top row. **(NO)**
	CRS	Go to Step 5.
	RO	Check if SI is required: **(NO)**
		• Check if any of the following conditions exist:
		• PZR pressure LESS THAN 1850 psig.
		OR
		• RB pressure GREATER THAN 3.6 psig.
		OR
		• Steamline pressure LESS THAN 675 psig.
		OR
		• Steamline differential pressure GREATER THAN 97 psid.
	CRS	Go to EOP-1.1, REACTOR TRIP RECOVERY.

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 25 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
		Procedure Caution: If SI actuation occurs during this procedure, EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION, should be performed to stabilize the plant.
		Procedure Note: • **Main Turbine vibration should be monitored during coastdown.** • **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.**
		Evaluator's Note: • **The SG "B" SGTR symptoms will become evident during the conduct of EOP-1.1. It is likely that the crew will initiate a MANUAL SI before an AUTO setpoint is reached. Several EOP-1.1 steps are included in the scenario guide.** • **The EOP Reference Page action to be monitored in EOP-1.1 is:** **SI ACTUATION CRITERIA** **IF either of the following conditions occurs, THEN actuate SI and GO TO EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION, Step 1:**
		• **RCS subcooling on TI-499A(B), A(B) TEMP °F, is LESS THAN 30 °F.** **OR** • **PZR level can NOT be maintained GREATER THAN 12%.**
	CREW	Announce plant conditions over the page system.
		Check FW status:
	RO	• Check if RCS Tavg is LESS THAN 564 °F. **(YES)**
	BOP	• Verify FW Isolation:
		• Ensure the FW Flow Control Valves, FCV-478(488)(498), are closed. **(YES)**

Op Test No.: 1 Scenario # 2 Event # 6, 7, 8, & 9 Page 26 of 39

Event Description: Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close

Time	Position	Applicant's Actions or Behavior
		• Ensure the Main FW Isolation Valves, PVG-1611A(B)(C), are closed. **(YES)**
		• Ensure the FW Flow Control Bypass Valves, FCV-3321(3331)(3341), are closed. **(YES)**
	BOP	Ensure EFW Pumps are running:
		• Ensure both MD EFW Pumps are running. **(YES)**
		• Verify the TD EFW Pump is running if necessary to maintain SG levels. (NOT required)
	BOP	Verify total EFW flow is GREATER THAN 450 gpm. **(YES)**
	BOP	Trip all Main FW Pumps.
	RO	Check RCS temperature:
		• With any RCP running, RCS Tavg is stable at OR trending to 557 °F. **(YES)**
Evaluator's Note:		• **At some point early in EOP-1.1, SGTR symptoms will be evident from lowering PZR level and pressure. The** CRS **should direct a MANUAL SI when it is clear that the Reference Page SI Initiation criteria will be met.** • **When SI is initiated a PZR PORV will fail OPEN and will not close or isolate.**
	CRS	Directs a MANUAL SI.
	RO	Initiates a MANUAL SI.
	CRS	Returns to EOP-1.0.

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 27 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
		Evaluator's Note: **The EOP-1.0 Reference Page Criteria that applies in this scenario is:** **RCP TRIP CRITERIA** • **IF Phase B Containment Isolation has actuated (XCP-612 4-2), THEN trip all RCPs.** • **IF both of the following conditions occur, THEN trip all RCPs:** • **SI flow is indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM AND RCS Wide Range pressure is LESS THAN 1400 psig.** **REDUCING CONTROL ROOM EMERGENCY VENTILATION** • **Reduce Control Room Emergency Ventilation to one train in operation within 30 minutes of actuation. REFER TO SOP-505, CONTROL BUILDING VENTILATION SYSTEM.**
		Evaluator's Note: • **Actions for ATTACHMENT 3, SI EQUIPMENT VERIFICATION, are provided on the final 3 pages of this scenario guide.** • **Adverse containment values will be reached during the scenario.**
	BOP	Initiate ATTACHMENT 3, SI EQUIPMENT VERIFICATION.
	CREW	Announce plant conditions over the page system.
	RO	Verify RB pressure has remained LESS THAN 12 psig on PR-951, RB PSIG (P-951), red pen. **(YES)**
	RO	Check RCS temperature:
		• With any RCP running, RCS Tavg is stable at OR trending to 557°F. **(YES)**

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 28 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
	RO	Check PZR PORVs and Spray Valves:
		• PZR PORVs are closed. (NO PCV-455B OPEN)
		• PZR Spray Valves are closed. **(YES)**
		• Verify power is available to at least one PZR PORV Block Valve: **(YES)**
		• MVG-8000A, RELIEF 445 A ISOL.
		• MVG-8000B, RELIEF 444 B ISOL
		• MVG-8000C, RELIEF 445 B ISOL.
		• Verify at least one PZR PORV Block Valve is open. **(YES)**
	RO	Attempts to close PCV-455B and reports it will not close.
	RO	Attempts to close MVG-8000C and reports it will not close.
Booth Operator:		**The crew may direct local closure of the PORV isolation valve. If so, wait 5 minutes and then report that the clamp on ammeter has broken and you are searching for another.**
	CRS	IF the Block Valve can NOT be closed, THEN GO TO EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT, Step 1.
	CRS	Transitions to EOP-2.0.
Procedure Note:		• **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.** • **Seal Injection flow should be maintained to all RCPs.** • **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 29 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
Evaluator's Note:		**The EOP-2.0 Reference Page Criteria that applies in this scenario is:** **RCP TRIP CRITERIA** • **IF Phase B Containment Isolation has actuated (XCP-612 4-2), THEN trip all RCPs.** • **IF both of the following conditions occur, THEN trip all RCPs:** • **SI flow is indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM AND RCS Wide Range pressure is LESS THAN 1400 psig.** **TUBE RUPTURE TRANSITION CRITERIA** • **IF any SG level increases in an uncontrolled manner OR if any SG has abnormal radiation, THEN start Charging Pumps and operate valves as necessary, and GO TO EOP-4.0, STEAM GENERATOR TUBE RUPTURE, Step 1.**
CRITICAL TASK	**RO**	**Stops all running RCP's before exiting EOP-2.0.**
Evaluator's Note:		**The crew may perform some steps in EOP-2.0 but should transition to EOP-4.0, STEAM GENERATOR TUBE RUPTURE, on the Reference Page Criteria shortly after entering EOP-2.0.**
	CRS	Transitions to EOP-4.0.
Evaluator's Note:		**The only EOP-4.0 Reference Page Criteria that applies is a continuation of the requirement to reduce control room ventilation that started with the implementation of EOP-1.0.**
Procedure Note:		• **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.** • **Seal Injection flow should be maintained to all RCPs.**

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 30	of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close			

Time	Position	Applicant's Actions or Behavior
		• **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
	RO	Check if RCPs should be stopped (None running)
Procedure Caution – Step 2		**Radiation levels may have increased in steamlines. Proper radiological precautions must be taken when obtaining samples to minimize personnel exposure.**
	CREW	Identify the RUPTURED SG(s):
		• Narrow Range level in any SG increasing in an uncontrolled manner. (SG "B")
		• As determined by Chemistry sample analysis for abnormal activity using a frisker.
Procedure Caution – Step 3		**At least one SG must be maintained available for RCS cooldown.**
	BOP	Isolate flow from each RUPTURED SG:
		• *Place the Steamline PWR RELIEF B SETPT Controller(s)* in MAN and closed.
		• Adjust the PWR RELIEF B SETPT Controller(s) to 8.85 (1150 psig).
		• Place the Steamline Power Relief B Mode Switch(s) in PWR RLF.
		• Place the PWR RELIEF B SETPT Controller(s) in AUTO.
		• WHEN RCS Tavg is LESS THAN P-12 (552 °F), THEN place both STM DUMP INTERLOCK Switches to BYP INTLK.

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 31 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
		• Verify the Steamline PORV (B) closed.
Procedure Caution:		**If the TD EFW Pump is the only available source of feed flow, the steam supply to the TD EFW Pump must be maintained from at least one SG, to maintain a secondary heat sink.**
Procedure Note – Step 3.g		**If the TD EFW Pump is tripped, it should be reset as time permits.**
	BOP	IF SG B OR SG C is RUPTURED, THEN perform the following:
CRITICAL TASK	BOP	• **IF at least one MD EFW Pump is running, THEN isolate the TD EFW Pump by placing PVG-2030, STM SPLY TO TD EFP TRN A(B), to CLOSE prior to performing EOP-4.0, Step 6 – Determine required core exit - - - .**
		• Notify operators to perform Alternative Action Step 3.g while continuing with this procedure.
	BOP	Close the following for each RUPTURED SG:
		• SG Blowdown, PVG-503B
		• MS Drain Isolation, PVT-2843B
		• MS Drain Isolation, PVT-2877 for SG B
	BOP	Close the following for each ruptured SG:
		• MS Isolation Valves, PVM-2801B
		• MS Isolation Bypass Valves, PVM-2869B
	BOP	Reports MS Isolation Valve, PVM-2801B, will not close
	BOP	Close the following:

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 32 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
		• All remaining MS Isolation AND MS Isolation Bypass Valves.
		• PCV-2058, MS TO AUX STM.
		• MVG-1701, STEAM SEAL FEED VLV.
		• MVG-2896A, SV-1 BSD.
		• MVG-2896B, SV-2 BSD.
		• MVG-2896C, SV-3 BSD.
		• MVG-2896D, SV-4 BSD.
		• IPV-2231, MS/PEGGING STM TO DEAERATOR.
		• At the Digital Control Station for the MSRs, ensure the following are closed:
		• MVG-2811.
		• XVG-2807.
		• Place the STM DUMP CNTRL Controller in MAN and close.
		• Place the ST DUMP MODE SELECT Switch in STM PRESS.
		• Place the following in AUTO and ensure the valves are closed (REFER TO ATTACHMENT 1, ALTERNATE ISOLATION OF RUPTURED STEAM GENERATORS, if necessary to locally isolate valves):
		• PVT-2870, TO MSR A & B DRN.
		• PVT-2875, TO MSR A & B DRN.
		• PVT-2851A, B, C, D, MS LINES TO TURB DRN.
		• PVT-2713A, B, C, D, STM DUMP DRN BYP.
		• PVT-2838A, B, HDR DRNS.
		• Direct the Turbine Building Operator to complete ATTACHMENT 1, ALTERNATE ISOLATION OF RUPTURED STEAM GENERATORS
		• Use INTACT SG(s) Steamline PORV(s) as needed in subsequent steps to dump steam.

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 33 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
	CRS	IF any RUPTURED SG can NOT be isolated from at least one INTACT SG, THEN GO TO EOP-4.2, SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED, Step 1. (N/A)
	BOP	Check level in each RUPTURED SG:
		Verify Narrow Range level in each RUPTURED SG is GREATER THAN 30% [50%].
		• Stop EFW flow to each RUPTURED SG:
CRITICAL TASK		• **Close FCV-3541, MD EFP TO SG B before indicated level reaches 100%.**
		• Close FCV-3536(3546)(3556), TD EFP TO SG A(B)(C).
		• Maintain Narrow Range level in each RUPTURED SG GREATER THAN 40% [50%].
Procedure Caution – Step 5		**The major flowpaths from each RUPTURED SG (MSIV and the TD EFW Pump) must be isolated before performing Step 5, to minimize radiological releases and ensure RCS subcooling is maintained.**
	BOP	Verify each RUPTURED SG pressure is GREATER THAN 350 psig. **(YES)**
	CRS	*Determine the required core exit TC temperature for RCS* cooldown from the table below:
		• Determines _____ as target temperature.
	RO/CRS	Check if any RCP is running. **(NO)**

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 34 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
	CRS	With no RCP running, RCS cooldown and depressurization may cause RUPTURED loop Tcold to falsely indicate a transition to EOP-16.0, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK, is required. Disregard the RUPTURED loop Tcold indication prior to performing Step 34.
Procedure Note – Step 8		**The RCP trip criteria does NOT apply after a controlled cooldown is initiated. Before the Low Steamline Pressure SI signal is blocked, Main Steam Isolation will occur if the Low Steam Pressure rate setpoint is exceeded.**
	BOP	Dump steam from each INTACT SG: (Steam Dump not available with unaffected MSIVs closed)
	BOP	Dump steam from each INTACT SG using the Steamline PORVs:
		• Place the Steamline Power Relief A(C) Mode Switch(s) in PWR RLF.
		• Adjust the PWR RELIEF A(C) SETPT Controller(s) to open
Procedure Note – Step 9		**Steps 11 through 18 should be performed as time permits, while the cooldown is in progress.**
Evaluator's Note:		**The crew will continue in the procedure and return to the cooldown isolation step when the target temperature is reached.**
	RO	Verify core exit TC temperature is LESS THAN the value determined in Step 6. **(NO)**

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 35 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
	CREW	WHEN core exit TC temperature is LESS THAN the value determined in Step 6, then complete Step 10. Go to Step 11
	BOP	Check intact SG levels:
		• Verify Narrow Range level in intact SGs is greater than 30% [50%].
		• Control EFW flow to maintain narrow range level in intact SGs between 40% [50%] and 60%.
	RO	Check PZR PORVs and Block Valves:
		• Verify power is available to PZR PORV Block Valve: **(YES)**
		• MVG-8000A, RELIEF 445 A ISOL.
		• MVG-8000B, RELIEF 444 B ISOL
		• MVG-8000C, RELIEF 445 B ISOL.
Procedure Caution – Step 12.b **If any PZR PORV opens because of high PZR pressure, Step 12.b should be repeated after pressure decreases to LESS THAN 2300 psig, to ensure the PORV recloses.**		
	BOP	Verify all PZR PORVs are closed. **(NO)**
		• IF PZR pressure is LESS THAN 2300 psig, THEN close the PZR PORV.
		• IF any PZR PORV can NOT be closed, THEN close its Block Valve.
		• IF the Block Valve can NOT be closed, THEN GO TO EOP-4.2, SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED, Step 1.
	CRS	Transitions to EOP-4.2, SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED.

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 36 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
Lead Evaluator: Terminate the scenario at the transition to EOP-4.2.		

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 37 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
		EOP-1.0, ATTACHMENT 3
		Evaluator Note: • **There will be no RHR flow indicated because RCS pressure will remain above the discharge head of the pumps.** • **All other equipment should be in the design condition unless pre-emptive actions have been taken based on accident diagnosis.**
	BOP	Ensure EFW Pumps are running:
		• Ensure both MD EFW pumps are running.
		• Verify the TD EFW Pump is running if necessary to maintain SG levels.
	BOP	Ensure the following EFW valves are open:
		• FCV-3531 (3541)(3551), MD EFP TO SG A(B)(C).
		• FCV-3536(3546)(3556), TD EFP TO SG A(B)(C).
		• MVG-2802A(B), MS LOOP B(C) TO TD EFP.
	BOP	Verify total EFW flow is GREATER THAN 450 gpm. **(YES)**
		Ensure FW Isolation:
		• Ensure the following are closed:
		• FW Flow Control
		• FW Isolation, PVG-1611A(B)(C).
		• FW Flow Control Bypass, FCV-3321(3331)(3341).
		• SG Blowdown, PVG-503A(B)(C).
		• SG Sample, SVX-9398A(B)(C).
		• Ensure all Main FW Pumps are tripped.

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 38 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
		Ensure SI Pumps are running:
		• Two Charging Pumps are running.
		• Both RHR Pumps are running.
	BOP	Ensure two RBCU Fans are running in slow speed (one per train).
	BOP	Verify Service Water to the RBCUs:
		• Ensure two Service Water Pumps are running.
		• Ensure both Service Water Booster Pumps A(B) are running.
		• Verify GREATER THAN 2000 gpm flow for each train on:
		• FI-4466, SWBP A DISCH FLOW GPM.
		• FI-4496, SWBP B DISCH FLOW GPM.
	BOP	Verify two CCW Pumps are running.
	BOP	Ensure two Chilled Water Pumps and Chillers are running.
	BOP	Check if Main Steamlines should be isolated:
		• Check if any of the following conditions are met:
		• RB pressure GREATER THAN 6.35 psig. OR
		• Steamline pressure LESS THAN 675 psig. OR
		• Steamline flow GREATER THAN 1.6 MPPH AND Tavg LESS THAN 552°F.
		• Ensure ALL the following are closed:
		• MS Isolation Valves, PVM-2801A(B)(C).
		• MS Isolation Bypass Valves, PVM-2869A(B)(C).

Op Test No.: 1	Scenario # 2	Event # 6, 7, 8, & 9	Page 39 of 39
Event Description:	Loss of Service Bus 1C; AUTO Reactor Trip Failure; SG "B" 600 gpm SGTR After Reactor Trip, PZR PORV 445B Fails OPEN/PORV Isolation Valve Fails to Close Coincident with SI: SG "B" MSIV Fails to Close		

Time	Position	Applicant's Actions or Behavior
	BOP	Ensure Excess Letdown Isolation Valves are closed:
		• PVT-8153, XS LTDN ISOL.
		• PVT-8154, XS LTDN ISOL.
	BOP	Verify ESF monitor lights indicate Phase A and Containment Ventilation Isolation on XCP-6103, 6104, and 6106.
		REFER TO ATTACHMENT 4, CONTAINMENT ISOLATION VALVE MCB STATUS LIGHT LOCATIONS, as needed.
	BOP	Verify proper SI alignment:
		• Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104.
		• Verify all SAFETY INJECTION monitor lights are dim on XCP-6106.
		• Verify SI flow on FI-943, CHG LOOP B COLD/HOT LG FLOW GPM.
		• Check if RCS pressure is LESS THAN 250 psig.
		• Verify RHR flow on:
		• FI-605A, RHR DISCHARGE PUMP A FLOW GPM
		AND
		• FI-605B, RHR DISCHARGE PUMP B FLOW GPM.

Facility:	VC SUMMER	Scenario No.: 3	Op Test No.: **2009 NRC**
Examiners:		Operators:	

Initial Conditions:
- IC- NEW, 100% Power, EOL, MFP "B" Vibration at 2.1 mils.
- RB Spray Pump "B" is tagged out for cleaning and maintenance of the breaker cubicle. 64 hours remain on TS 3.6.2.1.
- Radiation Monitor RM-A2, Reactor Building Particulate Monitor failed to ZERO 12 hours ago. Planning is preparing a work package. The Action Statement for TS 3.4.6.1.a is in effect.
- The National Weather Service has issued a severe weather alert due to a line of heavy thunderstorms moving into the area.

Turnover:
- Maintain current conditions.

Critical Task:
- Initiate a MANUAL Turbine Trip no later than the verification of the EOP-13.0 immediate actions.
- Minimize EFW flow in accordance with EOP-3.1.

Event No.	Malf. No.	Event Type*	Event Description
1	VLVRC04L	C - RO TS – CRS	Leaking PRZ PORV (PCV-445B)
2	CND001A	C – BOP	Condenser Vacuum Pump "A" Trips.
3	TUR012A	I – RO TS – CRS	1st Stage Pressure Channel PT-446 Fails LO.
4	FWP025B	R – RO N – BOP, CRS	Main Feedwater Pump "B" rising vibration Lower Power following the manual trip of MFP "B".
5	FWP014D	I – BOP	MFP Master Speed Controller Fails As-Is.
6	TUR002B	M – ALL	Main Turbine Trip on rising Vibration.
7	PCS009AB PCS009BB	C – ALL	ATWS
8	MSS016	M – ALL	Steam Break Outside RB Following Reactor Trip.
9	MSS006A, B, C	C – BOP	All MSIVs Stuck Open.
			Terminate when normal charging is restored.

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

VC Summer 2009 NRC Scenario #3

The crew has pre-briefed on the Initial Conditions and plan for the shift. The crew will take the watch with directions to maintain current conditions.

The BOOTH OPERATOR will activate the leak through PZR PORV PCV-445B shortly after the crew assumes the watch. The RO will respond to the tailpipe temperature alarm and enter the alarm response procedure (ARP). The ARP will direct the crew to determine the leaking PORV using SOP-101, REACTOR COOLANT SYSTEM, Section V.A – PRESSURIZER PORV TAILPIPE HIGH TEMPERATURE. When the leaking PORV is diagnosed and isolated then the CRS should enter TS 3.4.4.a for the isolated but capable of being cycled PORV.

When the PORV is isolated and the TS entry is complete, the Lead Evaluator can cue the trip of the running Condenser Vacuum Pump (CVP). The BOP should respond in accordance with the ARP; opening the condenser suction valve for CVP "C" and starting CVP "C". The crew may enter AOP-206.1, LOSS OF CONDENSER VACUUM, but essentially the same actions would occur. The dispatched field operator will report a ruptured oil line on CVP "A".

After all relevant actions are completed on the CVP's the Lead Evaluator can cue the Turbine First Stage Pressure Channel LO failure. The RO should respond to the alarm and uncontrolled inward rod motion. The crew should enter AOP-401-7, TURBINE FIRST STAGE PRESSURE CHANNEL FAILURE, and place Rod Control in MANUAL. The RO should restore Tavg to the pre-MALF value and shift to the alternate channel. Rod Control can be returned to AUTO after the channel is shifted. The CRS should enter the TS for both Reactor Trip and ESF instrumentation.

When Tavg is stable, Rod Control in AUTO and the TS entry complete, the Lead Evaluator can cue increasing vibration on Main Feedwater Pump "B". The crew will enter the ARP and determine that the pump must be tripped and power reduced to ≤91% in accordance with GOP-4B, POWER OPERATION (MODE 1 – DESCENDING). During the power reduction, the MASTER Feedwater Pump Speed Controller will fail "AS-IS". The BOP may observe the problem or respond to SG level deviation alarms. The crew will enter AOP-210.3, FEEDWATER PUMP MALFUNCTION. The BOP will take MANUAL control and adjust the speed of Main Feedwater Pumps "A" and "C" to maintain SG levels.

When SG levels are under control and the specified power level is reached, the Lead Evaluator can cue the progressive rise in Main Turbine vibration. The crew should enter the ARP and the CRS should set a target for initiating a Main Turbine trip. Since power is greater that P-9 the reactor should be tripped first. At some point the CRS will direct a reactor/turbine trip. The reactor will fail to trip. The crew should enter EOP-1.0, REACTOR TRIP/SI ACTUATION, and then transition to EOP-13.0, RESPONSE TO NUCLEAR POWER GENERATION. They should trip the main turbine and initiate emergency boration. After emergency boration flow is verified the dispatched operator will trip the reactor locally. The crew will confirm the reactor trip and return to EOP-1.0. Upon return to EOP-1.0, a steam break will initiate downstream of the MSIV's and all MSIV's will fail to close. The crew will continue in EOP-1.0 to the faulted SG diagnostic steps and then transition to EOP-3.0, FAULTED STEAM GENERATOR ISOLATION. Shortly after entering EOP-3.0 they will be directed to EOP-3.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS. After Emergency Feedwater flow is minimized in EOP-3.1, local operations will close all MSIVs and the crew will transition back to EOP-3.0 on EOP-3.1 REFERENCE PAGE Criteria of at least one SG pressurizing. In EOP-3.0 the crew should terminate HHSI flow.

The Lead Evaluator can terminate the scenario when HHSI isolation valves are closed and charging flow is under operator control.

VCS08 NRC Scenario 3 Simulator Setup

INITIAL CONDITIONS

- IC-NEW, 100% Power.
- Tag on RB Spray Pump "B"
- Tag(on) on RM-A2 particulate
- Reactivity Management Plan/Turnover Sheet for IC.
- Crew should pre-brief on procedures, the steps in effect and turnover so that they are prepared to commence actions when the watch is assumed.

PRE-LOAD

- OVR-SP008A RB Spray Pump "B" cleared and tagged
- OVR-SP008F RB Spray Pump "B" cleared and tagged
- MAL-RMS001D {SET To 0} RM-A2 particulate failed
- MAL-PCS009AB {SET To BOTH} Blocks the AUTO Reactor trip on A Train
- MAL-PCS009BB {SET To BOTH } Blocks the AUTO Reactor trip on B Train
- MAL-MSS006A Main Steam Isolation Valve Failure {S/G A} Failure (Set To FAILURE TO CLOSE). SG 'A' MSIV FAILS TO CLOSE
- MAL-MSS006B Main Steam Isolation Valve Failure {S/G B} Failure (Set To FAILURE TO CLOSE) SG 'B' MSIV FAILS TO CLOSE
- MAL-MSS006C Main Steam Isolation Valve Failure {S/G C} Failure (Set To FAILURE TO CLOSE) SG 'C' MSIV FAILS TO CLOSE
- MAL-FWM025B FWP B VIBRATION {SET To 2.1 MILS}

TRIGGERS

- Trigger 2 MAL-FWP014D FWP D (SC-509A) {SET To Current Value of Controller Output} AUTO CONTROL FAILURE: MFW Pump MASTER Speed Controller fails "AS-IS
- Trigger 3 VLV-RC004L {SET To 0.5%): PZR PORV PCV-445A leakage
- Trigger 4 MAL-CND001A: Condenser Vacuum Pump "A" trip
- Trigger 5 MAL-TUR012A {SET To 0}: Turbine First Stage Pressure Channel fails to ZERO
- Trigger 6 MAL-TUR002B {SET To 13 MILS With 10 Minute Ramp}: Rising Main Turbine Bearing # 3 vibration.
- Trigger 25 MAL-MSS016 {SET To 3 Million MPP} Main Steam Line Break Downstream of MSIVs. Occurs on opening of Rx Trip Breakers.
- Trigger 26 Delete Malfunction MAL-PCS009AB (failure of Rx Trip BKR A to open). {When NI-44 < 90% 2 ½ minute delay}
- Trigger 27 Delete Malfunction MAL-PCS009BB (failure of Rx Trip BKR B to open). {When NI-44 < 90% 2 minute delay}
- Trigger 28 MAL-PCS009AA Rx Trip BKR 'A' Failure (Inadvertent Open). {When NI-44 < 90% 2 ½ minute delay}, (Backup to Trigger 26 if no trip signal present)
- Trigger 29 MAL-PCS009AA Rx Trip BKR 'A' Failure (Inadvertent Open). {When NI-44 < 90% 2 ½ minute delay}, (Backup to Trigger 27 if no trip signal present)

- Trigger 30
- REMOVE MAL-MSS006A
- REMOVE MAL-MSS006B
- REMOVE MAL-MSS006C

Op Test No.: 1	Scenario # 3	Event # 1	Page 6 of 40
Event Description:	Leaking PRZ PORV (PCV-445A)		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		**Inform Lead Evaluator and activate Trigger 3 (PZR PORV PCV-445A leakage) approximately 1 minute after the crew assumes the watch.**
Indications Available:		**XCP-616-4-2, PZR RLF LINE TEMP HI** **XCP-616-4-2, PRT LVL LO/TEMP/LVL/PRESS HI**
	RO	Responds to alarm XCP-616-4-2, PZR RLF LINE HI TEMP.
	RO	Enters ARP-001-616-4-2.
		PROBABLE CAUSE:
		• One or more of the following has lifted or is leaking:
		• PCV-444B, PWR RELIEF.
		• PCV-445A, PWR RELIEF.
		• PCV-445B, PWR RELIEF.
		• RTD failure.
		• High energy line leakage inside containment.
		AUTOMATIC ACTIONS:
		• None.
		CORRECTIVE ACTIONS:
		• Determine if a PORV has lifted or is leaking by monitoring the Pressurizer pressure on PI-444(445), CNTL CHAN PRESS PSIG.
		• Monitor the following computer points for individual PORV tailpipes:
		• TI0753(PCV-444B)
		• TI0754(PCV-445A)
		• TI0755(PCV-445B)

Op Test No.: 1	Scenario # 3	Event # 1	Page 7 of 40
Event Description:	Leaking PRZ PORV (PCV-445A)		

Time	Position	Applicant's Actions or Behavior
	RO	• Refer to SOP-101, Section V, PRESSURE PORV TAILPIPE HIGH TEMPERATURE.
		SUPPLEMENTAL ACTIONS:
		• If leakage cannot be stopped, determine if primary system leakage is within the limits of Technical Specification 3.4.6.2.
		• Refer to Technical Specification 3.4.4 for PORV requirements.
	RO	SOP-101, Section V
Procedure Note 2.0		**For properly seated Pressurizer Safety Valves, T1075, T1076 and T1077 should all agree to within approximately 2°F.**
	RO	Observe the following computer points for any indication of valve seat leakage:
		• Pressurizer PORV Tailpipe Temperature (T1074).
		• "C" Pressurizer Safety Tailpipe Temperature (T1075).
		• "B" Pressurizer Safety Tailpipe Temperature (T1076).
		• "A" Pressurizer Safety Tailpipe Temperature (T1077).
	RO	If the alarm is due to an increasing Pressurizer Safety Valve Tailpipe Temperature, go to the appropriate Annunciator Response Procedure. **(NO)**
	RO	If the alarm is due to a higher than normal Pressurizer PORV Tailpipe Temperature, perform the following to determine which PORV is leaking:
		• Close MVG-8000A, RELIEF 445A ISOL.
		• Close MVG-8000C, RELIEF 445B ISOL.
		• Observe Pressurizer PORV Tailpipe Temperatures.

Op Test No.: 1 Scenario # 3 Event # 1 Page 8 of 40

Event Description: Leaking PRZ PORV (PCV-445A)

Time	Position	Applicant's Actions or Behavior
Procedure Note 2.3.d		**If a PORV is leaking, the PORV Tailpipe Temperature should *first decrease as the loop seal passes through and then* begin to increase to the alarm setpoint.**
	RO	If Pressurizer PORV Tailpipe Temperatures decrease, perform the following:
		• Open MVG-8000C, RELIEF 445B ISOL.
		• If PORV Tailpipe Temperatures increase, perform the following:
		• Close MVG-8000C, RELIEF 445B ISOL.
		• Open MVG-8000A, RELIEF 445A ISOL.
		• If PORV Tailpipe Temperatures do not increase, then ensure MVG-8000A, RELIEF 445A ISOL, remains closed.
	RO	If Pressurizer PORV Tailpipe Temperatures do not decrease, then perform the following: (N/A)
		• Open MVG-8000A, RELIEF 445A ISOL.
		• Open MVG-8000C, RELIEF 445B ISOL.
		• Close MVG-8000B, RELIEF 444B ISOL.
	CRS	After determination and isolation of leaking Pressurizer PORV, have Plant Support Engineering evaluate the leaking PORV.
	CRS	After a leaking PORV has been isolated for 12 hours, cycle its associated isolation valve, MVG-8000A(B)(C), full open and reclosed, to prevent potential thermal binding, unless the isolation valve has power removed per Tech Spec 3.4.4.
	CRS	Enters TS 3.4.4.a
		With one or more PORV(s) inoperable and capable of being manually cycled, within 1 hour:

Op Test No.: 1	Scenario # 3	Event # 1	Page 9 of 40
Event Description: Leaking PRZ PORV (PCV-445A)			

Time	Position	Applicant's Actions or Behavior
		• Restore the PORV(s) to OPERABLE status or
		• Close the associated block valve(s) and maintain power to the block valve; otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
Lead Evaluator: Cue Event 2, Condenser Vacuum Pump "A" trip, after the PZR PORV TS declaration is complete.		

Op Test No.: 1	Scenario # 3	Event # 2	Page 10 of 40
Event Description:	Condenser Vacuum Pump "A" Trips		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		**Activate Trigger 4 MAL-CND001A: Condenser Vacuum Pump "A" trip, on cue from the Lead Evaluator.**
Indications Available:		**XCP-628-1-1, VCP A/B/C TRIP**
	BOP	Responds to alarm XCP-628-1-1, CVP A/B/C TRIP
	BOP	Enters ARP-001- XCP-628-1-1
		PROBABLE CAUSE:
		• Pump or motor malfunction causing an overload.
		• Oil pressure less than 4 psig.
		• Discharge air temperature greater than 190°F.
		AUTOMATIC ACTIONS: NONE
Procedure Note:		**This alarm has reflash capabilities.**
Evaluator's Note:		**The crew may go to SOP-206, MAIN AND AUXILIARY CONDENSER AIR REMOVAL SYSTEM, to start Main CVP C.**
		CORRECTIVE ACTIONS:
	BOP	• Determine which vacuum pump tripped. ("A")
		• If Main Vacuum Pump A tripped, perform the following:
		• Open MVB-102A, VAC PP C TO CNDSR A.
		• Start XAC-0001C, MAIN CVP C.
		• Place XAC-0001A, MAIN CVP A, to STOP.
	BOP	Verify vacuum is stable on PI-3006(3016), MAIN A(B) PRESS INCHES HG.

Op Test No.: 1	Scenario # 3	Event # 2	Page 11 of 40
Event Description:	Condenser Vacuum Pump "A" Trips		

Time	Position	Applicant's Actions or Behavior
	CREW	Dispatches AO to check CVP "C" and investigate trip of CVP "A".
Booth Operator:		**As AO, report a broken oil line on CVP "A" and stopping the auxiliary oil pump.**
	BOP	If necessary, start the following per SOP-206: (N/A)
		• XAC-0002A, AUX CVP A.
		• XAC-0002B, AUX CVP B.
	CRS	Refer to AOP-206.1, DECREASING MAIN CONDENSER VACUUM.
	CRS	Contacts Work Control/Maintenance for assistance.
Lead Evaluator: Cue Event 3, Turbine 1st Stage Pressure Channel PT-446 Fails LO, after a standby CVP is running, all field reports have been made, and the crew has verified stable condenser vacuum.		

Op Test No.: 1	Scenario # 3	Event # 3	Page 12 of 40
Event Description:	1st Stage Pressure Channel PT-446 Fails LO		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		**Activate Trigger 5 MAL-TUR012A: Turbine First Stage Pressure Channel fails to ZERO, on cue from the Lead Evaluator.**
Indications Available:		**Uncontrolled Rod Motion** **XCP-615, 2-5, RCS TAVG-TREF HI/LO;** **XCP-624-4-2, 5-2, 6-2; SG A, B, C STM FLO HI**
Evaluator's Note:		**The crew could enter the ARP but it is likely that they will recognize the entry condition for AOP-401.7, TURBINE FIRST STAGE PRESSURE CHANNEL FAILURE.**
	RO	Performs the immediate actions of AOP-401.7
		• Place Rod Control Bank Select Switch to MANUAL
	CRS	Enters AOP-401.7, Turbine First Stage Pressure Channel Failure
	RO	Place Rod Control Bank Select Switch to MANUAL
	RO	Ensure Tref 1st STG PRESS switch is positioned to the operable channel
		• PT-447, CH IV
	RO	Adjust control rods until Tavg is within 1.0 degrees F of Tref
	BOP	Check if Main Turbine load is greater than 10% **(YES)**
	CRS	Within 1 hour, verify the following permissives are dim:
		• P-13, 1st STG PRESS **(YES)**
		• P-7, REACTOR TRIP BLOCKED **(YES)**
	CRS	Restore Automatic Rod Control:

Op Test No.: 1	Scenario # 3	Event # 3	Page 13 of 40
Event Description:	1st Stage Pressure Channel PT-446 Fails LO		

Time	Position	Applicant's Actions or Behavior
		• Check if AUTO rod control is desired
		• Verify reactor power is >15% (C-5 Status Light Dim)
		• Verify Tavg is within 1 degree F of Tref.
		• Place Rod Control Bank Select Switch in AUTO.
	BOP	Place Steam Dump Mode Select Switch in STM PRESS.
	CRS	Notify I&C to place AMSAC in BYPASS.
	CRS	Notify I&C to place the failed channel protection bistables in a tripped condition within 72 hours:
		• FB-474A
		• FB-484A
		• FB-494A
	CRS	Refer to Technical Specifications:
		• Table 3.3-1, Item 19.B, E (Action 7 within 1 hr)
		• Table 3.3-3, Item 4.d (Action 24 within 72 hours)
		Within 72 hours, place the failed channel protection bistables in a tripped condition:
		• Identify the associated bistables for the failed channel. REFER TO Attachment 1.
		• Record the following for each associated bistable on SOP-401, REACTOR PROTECTION AND CONTROL SYSTEM, Attachment I:
		• Instrument.
		• Associated Bistable.
		• Bistable Location.
		• STPs.
		• Notify the I&C Department to place the identified bistables in trip.

Op Test No.: 1	Scenario # 3	Event # 3	Page 14 of 40
Event Description:	1st Stage Pressure Channel PT-446 Fails LO		

Time	Position	Applicant's Actions or Behavior
		• Initiate a 30 day R&R for placing AMSAC in BYPASS.
	CRS	Determine and correct the cause of the channel failure.
Lead Evaluator: Cue Event 4, Rising vibration on MFP "B".		

Op Test No.: 1	Scenario # 3	Event # 4 & 5	Page 15 of 40
Event Description:	MFP "B" Vibration; Lower Power; MFP Master Speed Controller Fails As-Is		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions: • **On cue from the Lead Evaluator, activate the trigger for rising vibration on MFP "B"** • **Fail the AUTO MASTER Feedwater Pump Controller "AS-IS" when the crew begins the power reduction.**		
Indications Available:		**XCP-625-3-2, FWP A/B/C VIBRATION HI**
	BOP	Responds to alarm
	CREW	Enters ARP-001-XCP-625-3-2
		PROBABLE CAUSE:
		• Flow instability.
		• Bearing failure.
		• Instrument failure.
		AUTOMATIC ACTIONS:
		• None
Procedure NOTE: This alarm has reflash capabilities.		
		CORRECTIVE ACTIONS:
		• Monitor GRAPHIC 301, 302 and 303 screens to determine which bearing is in alarm.
		• If either of the following vibration limits are exceeded, and appears to be valid, trip the affected Feedwater Pump and reduce power as necessary per GOP-4B:
		a. ≥ 3.0 mils (sustained).
		b. ≥ 2.0 mils and increasing at a rate of 0.1 mils per hour.
	CRS	Directs BOP to trip MFW Pump "B"

Op Test No.: 1	Scenario # 3	Event # 4 & 5	Page 16 of 40
Event Description:	MFP "B" Vibration; Lower Power; MFP Master Speed Controller Fails As-Is		

Time	Position	Applicant's Actions or Behavior
	BOP	Trips MFW Pump "B"
	CRS	Enters GOP-4B
	CRS	Verifies Initial Conditions:
Procedure CAUTION 3.1 through 3.12		
		• **Thermal Power changes of greater than 15% in any one hour require completion of Attachment III.H. of GTP-702.**
		• **VCS PID Report, POWER CHANGE SEARCH, should be periodically performed to ensure a thermal power change of greater than 15% in any one-hour period is detected.**
Procedure NOTE 3.1 through 3.12		
		a. Step 3.1 lowers Reactor Power from 100% to 90%.
		b. If the RCS will be opened for maintenance during the shutdown, degassing of the RCS should be initiated per SOP-102, Chemical And Volume Control System.
		c. The setpoint for IFK3136, FLOW TO DEAERATOR, should be adjusted during power changes to maintain LI-3136, DEAER STOR TK NR LVL, between 2.5 and 5.0 feet.
	CREW	Informs Load Dispatcher.
Evaluator's Note:		**The crew may initiate a boration before the power reduction begins. Boration steps are not in GOP-4B but are included for evaluator use following the load reduction steps in this scenario guide.**
	BOP	Reduce power to 90% by either of the following methods:
		• By use of the DEC LOAD RATE circuit as follows:

Op Test No.: 1	Scenario # 3	Event # 4 & 5	Page 17 of 40
Event Description:	MFP "B" Vibration; Lower Power; MFP Master Speed Controller Fails As-Is		

Time	Position	Applicant's Actions or Behavior
		• De-energize LOAD LIMIT circuit.
		• Energize DEC LOAD RATE circuit.
		• Select desired rate on LOAD RATE LMT-% PER MIN, up to 5% per minute.
		• Decrease LOAD SET to the load desired.
		• By use of the load limiter as follows:
		• Ensure LOAD LMT light is lit.
		• Turn the LOAD LMT SET potentiometer counterclockwise, up to a nominal 5% per minute, until the desired load is reached.
	BOP	As load decreases, adjust Megavars using GEN FIELD VOLT ADJ as requested by the Load Dispatcher and within the Estimated Generator Capability Curve (Enclosure A).
	RO	Maintain Tavg within the control band by Control Rod motion or boron concentration changes.
	RO	Borate or dilute per SOP-106, Reactor Makeup Water System, to maintain the following parameters:
		1) ΔI within limits.
		2) Control Rods above the Rod Insertion Limit.
BORATION STEPS (SOP-106, Section III.F – All steps performed by the RO)		
Procedure Note 2.0		• **Energizing additional Pressurizer Heaters will enhance mixing.** • **LCV-115A, LTDN DIVERT TO HU-TK, will begin to modulate to the HU-TK position at 70% level on LI-115, VCT LEVEL %.**
	RO	Ensure at least one Reactor Coolant Pump is running.

Op Test No.: 1 Scenario # 3 Event # 4 & 5 Page 18 of 40

Event Description: MFP "B" Vibration; Lower Power; MFP Master Speed Controller Fails As-Is

Time	Position	Applicant's Actions or Behavior
		Place RX COOL SYS MU Switch to STOP.
		Place RX COOL SYS MU MODE SELECT switch to BOR. **(Peer √)**
		Set FIS-113, BA TO BLNDR FLOW, Batch Integrator to the desired volume. **(Peer √)**
		Place RX COOL SYS MU Switch to START.
Procedure Note 2.6		**Step 2.6 may be omitted when borating less than 10 gallons.**
		Place FCV-113 A&B, BA FLOW, controller in AUTO.
Procedure Note 2.7		**The AUTO setpoint dial for FCV-113A&B, BA FLOW, controller may be adjusted slowly to obtain the desired flow rate.**
		Verify the desired Boric Acid flow rate on FR-113, BA TO BLNDR GPM (F-113).
		When the preset volume of boric acid has been reached, perform the following:
		• Place FCV-113A&B, BA flow controller in MAN.
		• Verify boration stops.
		Place RX COOL SYS MU switch to STOP.
Procedure Note 2.10		• **If plant conditions require repeated borations, Step 2.10 may be omitted.** • **The volume in the piping between the blender and the VCT outlet is approximately 3.8 gallons.**

Op Test No.: 1	Scenario # 3	Event # 4 & 5	Page 19 of 40
Event Description:	MFP "B" Vibration; Lower Power; MFP Master Speed Controller Fails As-Is		

Time	Position	Applicant's Actions or Behavior
		Alternate Dilute 4 to 6 gallons of Reactor Makeup Water to flush the line downstream of the blender by performing the following:
		• Place RX COOL SYS MU MODE SELECT switch to ALT DIL. **(Peer √)**
		• Adjust FCV-168, TOTAL MU FLOW SET PT, to desired flow rate.
		• Set FIS-168, TOTAL MU FLOW, batch integrator to desired volume. **(Peer √)**
		• Place RX COOL SYS MU switch to START.
		• Verify desired flow rate on FR-113, TOTAL MU GPM (F-168).
		• Verify alternate dilution stops when preset volume is reached on FIS-168, TOTAL MU FLOW, batch integrator.
		• Place RX COOL SYS MU switch to STOP.
		Place RX COOL SYS MU MODE SELECT switch to AUTO. **(Peer √)**
		Adjust FCV-168, TOTAL MU FLOW SET PT, to 7.5 (120 gpm).
		In MAN, adjust FCV-113 A&B, BA FLOW OUTPUT, to the required position which will ensure proper Boric Acid addition for subsequent Automatic Makeup operations.
		Adjust FCV-113A&B, BA FLOW SET PT, to the desired position to ensure proper boric acid addition for subsequent Automatic Makeup operations.
		Place RX COOL SYS MU switch to START.
		Place RX COOL SYS MU switch to START.

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Event Description: MFP "B" Vibration; Lower Power; MFP Master Speed Controller Fails As-Is

Time	Position	Applicant's Actions or Behavior
		Start XPP-13A(B), BA XFER PP A(B), for the in-service Boric Acid Tank.
		If necessary, start XPP-13A(B), BA XFER PP A(B), for the Boric Acid Tank on recirculation.
Event 5 (AUTO MASTER Feedwater Pump Controller fails AS-IS) Actions:		
	BOP	Responds to failure of MFP's A and C to compensate for power reduction or multiple SG LVL DEV alarms.
	BOP	Enters ARP-001-XCP-624-1-5 or 2-5 or 3-5
		ARP-001-XCP-624-1-5
		PROBABLE CAUSE:
		• Step load increase or decrease.
		• Steam Generator A level control system malfunction.
		• FCV-478, A FCV, malfunction.
		• Testing in progress.
		• Instrument failure.
		ARP-001-XCP-624-1-5
		AUTOMATIC ACTIONS:
		• FCV-478, A FCV, will modulate to restore level to 61.6%.
	BOP	Determines/reports all FCV's are responding the same way.
		ARP-001-XCP-624-1-5
		CORRECTIVE ACTIONS:

Op Test No.: 1 Scenario # 3 Event # 4 & 5 Page 21 of 40

Event Description: MFP "B" Vibration; Lower Power; MFP Master Speed Controller Fails As-Is

Time	Position	Applicant's Actions or Behavior
		• Evaluate SG A Narrow Range level indicators LI-474, LI-475, and LI-476.
		• If required, restore Steam Generator A level to between 60% and 65% by performing either or both of the following:
		• Manually control PVT-478, SG A FWF, as required.
		• Adjust the differential pressure between Feedwater Pump discharge header pressure and Main Steam header pressure, as required, to restore Steam Generator water level.
		• If FCV-478, A FCV, malfunctioned go to AOP-210.1, Feedwater Flow Control Valve Failure.
		• If a Main Feedwater Pump has tripped or is malfunctioning go to AOP-210.3, Feedwater Pump Malfunction.
	CRS	Enters AOP-210.3, FEEDWATER PUMP MALFUNCTION.
	BOP	Performs Immediate Actions:
		• Verify at least one Feedwater Pump is running **(YES)**
		• Check if a Feedwater Pump trip occurred **(NO)**
	CRS	GO TO Step 13.
	BOP	Manually control Feedwater Pump speed using MCB MASTER SPEED CONTROL
		• Place the Feedwater Pump MASTER SPEED CNTRL in MAN.
		• Adjust Feedwater Pump speed to maintain discharge header pressure 150 to 250 PSIG greater than Main Steam Header Pressure on:
		• PI-508, FW PP DISCH HDR PRESS PSIG.
		• PI-464C, MS HDR PRESS PSIG.

Op Test No.: 1	Scenario # 3	Event # 4 & 5	Page 22 of 40
Event Description:	MFP "B" Vibration; Lower Power; MFP Master Speed Controller Fails As-Is		

Time	Position	Applicant's Actions or Behavior
		• Adjust PUMP A(C) SPEED CNTRL (MCB M/A Stations) setpoint potentiometers, as necessary to balance all operating Feedwater Pumps speed to within 120 rpm of each other.
	CRS	Determine and correct the cause of the Feedwater Pump speed control malfunction.
Evaluator's Note:		**The previous AOP-210.3 step remains in effect until the malfunction is repaired.**
	CRS	Contacts I&C and/or Work Control for assistance.
Lead Evaluator: When SG level is under control, cue Event 6, Main Turbine Rising Vibration		

Op Test No.: 1	Scenario # 3	Event # 6, 7, 8, & 9	Page 23 of 40
Event Description:	Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		**On cue from Lead Evaluator, activate trigger for rising Main Turbine Vibration**
Indications Available:		**XCP-632-4-2, MN TURB VIB HI** **XCP-632-1-4, TURB SUPERVISORY INSTR**
	BOP	Responds to alarm XCP-632-4-2, MN TURB VIB HI.
Evaluator Note: The crew may initiate a power reduction in an attempt to stabilize vibration.		
	BOP	Enters ARP-001-XCP-632-4-2.
		PROBABLE CAUSE:
		• Insufficient bearing oil flow.
		• Lube oil temperature change.
		• Bearing damage.
		• Turbine operation in the critical speed range.
		• IYR05602-TB, TURBINE VIBRATION RECORDER (CB-463), failure.
		• Low Turbine Exhaust Hood temperature.
		• Gland packing/Turbine Rotor rub.
		• Turbine rotor imbalance.
		• Generator MVARS less than 100 MVARS.
		• Temperature difference between the inlets to the Low Pressure Turbine is greater than 50°F.
		• Hot Reheat Steam temperature changes greater than 125°F/hr.
		AUTOMATIC ACTIONS:
		None.

Op Test No.: 1	Scenario # 3	Event # 6, 7, 8, & 9	Page 24 of 40
Event Description:	Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		**This Annunciator has reflash capabilities.**
		CORRECTIVE ACTIONS:
	CREW	• Evacuate all unnecessary personnel from the Turbine Building.
	BOP	• Monitor Main Turbine vibration levels:
		• IYR05602-TB, TURBINE VIBRATION RECORDER.
		• IPCS, type in TURBRG.
	BOP	Reports Bearing 3 as highest reading point.
Evaluator's Note:		**The vibration limits from the table are:** • **10 mils for 15 minutes** • **12 mils requires immediate trip** • **5 mils acceptable for continued operation** **The CRS should establish guidance as to when to initiate a reactor and turbine trip.**
		• If any of the above vibration trip conditions are exceeded, perform the following:
		• Trip the Main Turbine.
		• Implement AOP-214.1 while monitoring for indications of imminent Turbine damage per Step 4.
		• If vibration levels exceed 14 mils and Turbine speed is greater than 900 RPM perform the following:
		• Evacuate all personnel from the Turbine Building.
		• Break vacuum in the Main Condenser as follows:
		• Stop all operating Condenser Vacuum Pumps.
		• Open MVB-101, CNDSR A & B VAC BKR.

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Event Description: Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open

Time	Position	Applicant's Actions or Behavior
		• When the Turbine Building is accessible, complete the shutdown of the Condenser Air Removal System per SOP-206.
	BOP	Monitors and reports vibration readings.
	CRS	Directs a MANUAL reactor trip.
	CRS	Enters EOP-1.0.
Procedure Note:		• **Steps 1 through 5 are Immediate Operator Actions.** • **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.** • **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
	RO	Verify Reactor Trip:
		• Trip the Reactor using either Reactor Trip Switch.
		• Verify all Reactor Trip and Bypass Breakers are open. **(NO)**
		• Verify all Rod Bottom Lights are lit. **(NO)**
		• Verify Reactor Power level is decreasing. **(NO)**
	CRS	If the reactor is not tripped using both reactor trip switches, or the reactor is NOT subcritical, then go to EOP-13.0, Response to Abnormal Nuclear Power Generation, Step 1.
	CRS	Enters EOP-13.0.

Op Test No.: 1	Scenario # 3	Event # 6, 7, 8, & 9	Page 26 of 40
Event Description:	Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open		

Time	Position	Applicant's Actions or Behavior
Procedure Caution:		**To prevent core damage due to low flow:** • **All three RCPs must remain in operation if Reactor power is above 38%.** • **At least two RCPs must remain in operation if Reactor Power is above 10%.**
Procedure Note:		• **Steps 1 and 2 are Immediate Operator Actions.** • **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVIATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
Procedure Note Step 1:		
		Manual or Automatic rod control may be used to perform Alternative Action Step 1, whichever provides the fastest Control Rod insertion rate.
	RO	Verify reactor Trip: **(NO)**
		• Trip the Reactor using both the Reactor Trip Switches.
		• Verify all Reactor Trip and Bypass Breakers are open.
		• Verify all Rod Bottom Lights are lit.
		• Verify Reactor Power level is decreasing.
	RO	If the reactor will not trip or is not subcritical, then insert control rods.
	CRS	Dispatch an operator to trip the reactor locally IAW EOP-13.0, Attachment 1.
Booth Operator:		• **Trip the reactor locally after Emergency Boration flow has been verified.** • **Initiate the steamline break when the crew returns to EOP-1.0.**

Op Test No.: 1	Scenario # 3	Event # 6, 7, 8, & 9	Page 27 of 40
Event Description:	Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open		

Time	Position	Applicant's Actions or Behavior
	BOP	Verify Turbine/Generator Trip:
		• Verify all Turbine STM STOP VLVs are closed.
		• Ensure Generator Trip (after 30 second delay).
		• Ensure the GEN BKR is open.
		• Ensure the GEN FIELD BKR is open.
		• Ensure the EXC FIELD CNTRL is tripped.
	BOP	Ensure EFW Pumps are running:
		• Ensure both MD EFW Pumps are running. **(STARTS)**
		• Verify the TD EFW Pump is running if necessary to maintain SG levels.
	RO	Initiate emergency boration of the RCS:
		• Ensure at least one charging Pump is running.
		• Verify PZR pressure is LESS THAN 2335 psig.
		• Verify SI ACT status light is NOT lit.
		• Open MVT-8104, EMERG BORATE.
		• Verify XPP-13B, BA XFER PP B, is running.
		• Verify GREATER THAN 30 gpm flow on FI-110, EMERG BORATE FLOW GPM.
Caution – Step 5:		**If an SI signal exists or occurs, Steps 1 through 8 of EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION. Should be performed to verify proper SI actuation, while continuing with this procedure.**
	RO	Verify Containment Ventilation Isolation Valves closed by verifying the following SAFETY INJECTION monitor lights are dim:
		• XCP-6103 3-4 (Post ACCID HR EXH 6057 & 6067).

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Event Description: Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open

Time	Position	Applicant's Actions or Behavior
		• XCP-6103 2-1 (Post ACCID HR EXH 6056/6066).
	RO/CRS	Verify the Reactor is subcritical: **(YES)**
		• Power Range channels indicate LESS THAN 5%.
		• Intermediate Range channels indicate a negative startup rate.
		• GO TO Step 15. Observe the CAUTION prior to Step 15.
Caution – Step 15:		**Boration should be continued to obtain adequate shutdown margin during subsequent actions.**
	CRS	RETURN TO the Procedure and Step in effect.
	CREW	Returns to EOP-1.0, Step 1
Evaluator's Note:		**The crew has the authority in accordance with OAP-103.4 to minimize EFW flow as soon as the accident (all SG's are faulted) is diagnosed.** **The crew may enter and immediately exit EOP-15.0, RESPONSE TO LOSS OF SECONDARY HEAT SINK, during the scenario due to the directed EFW flow reduction.**
Evaluator's Note:		**The EOP REFERENCE PAGE requirements that apply to this scenario are:** • **RCP Trip Criteria** • **Reduce Control Room Emergency Ventilation to one train in operation within 30 minutes of actuation.**
	CREW	Performs immediate actions:
	RO	Verify Reactor Trip: **(YES)**
		• Trip the Reactor using either Reactor Trip Switch.

Op Test No.: 1 Scenario # 3 Event # 6, 7, 8, & 9 Page 29 of 40

Event Description: Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open

Time	Position	Applicant's Actions or Behavior
		• Verify all Reactor Trip and Bypass Breakers are open.
		• Verify all Rod Bottom Lights are lit.
		• Verify Reactor Power level is decreasing.
	BOP	Verify both ESF buses are energized **(YES)**.
	RO	Check if SI is actuated: **(YES)**
		• Check if either:
		• SI ACT status light is bright on XCP-6107 1-1.
		OR
		• Any red first out SI annunciator is lit on XCP-626 top row.
		• Actuate SI using either SI ACTUATION Switch.
		• GO to Step 6.
	CREW	Reports indications of steam break outside RB.
Evaluator's Note:		**Actions for ATTACHMENT 3, SI EQUIPMENT VERIFICATION, are provided on the final 3 pages of the scenario guide.**
	BOP	Initiate ATTACHMENT 3, SI EQUIPMENT VERIFICATION.
	CREW	Announce plant conditions over the page system.
	RO	Verify RB pressure has remained LESS THAN 12 psig on PR-951, RB PSIG (P-951), red pen **(YES)**
	RO	Check RCS temperature:
		• With any RCP running, RCS Tavg is stable at OR trending to 557°F. **(NO)**

Op Test No.: 1 Scenario # 3 Event # 6, 7, 8, & 9 Page 30 of 40

Event Description: Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open

Time	Position	Applicant's Actions or Behavior
	BOP	IF RCS temperature is LESS THAN 557°F AND decreasing, THEN:
		• Close IPV-2231, MS/PEGGING STM TO DEAERATOR.
		• Place the STM DUMP CNTRL Controller in MAN and close.
		• Place the STM DUMP MODE SELECT Switch in STM PRESS.
		• Place the STM DUMP CNTRL Controller in AUTO.
		• Ensure all Steamline PORVs and Condenser Steam Dumps are closed.
		• COMPLETE ATTACHMENT 6, STEAM DRAIN VALVE ISOLATION.
	RO/BOP	• Perform one of the following:
		IF Narrow Range SG level is LESS THAN 30% [50%] in all SGs, THEN reduce EFW flow as necessary to stop the cooldown, while maintaining total EFW flow GREATER THAN 450 gpm.
		OR
		WHEN Narrow Range SG level is GREATER THAN 30% [50%] in at least one SG, THEN control EFW flow as necessary to stabilize RCS temperature at 557 °F.
		• IF RCS cooldown continues, THEN close:
		• MS Isolation Valves, PVM-2801A(B)(C). (Reports none will close)
		• MS Isolation Bypass Valves, PVM-2869A(B)(C).
		• Ensure SG Blowdown Valves, PVG-503A(B)(C), are closed.
	RO	Check PZR PORVs and Spray Valves:
		• PZR PORVs are closed **(YES)**
		• PZR Spray Valves are closed. **(YES)**
		• Verify power is available to at least one PZR PORV Block Valve: **(YES)**

Op Test No.: 1 Scenario # 3 Event # 6, 7, 8, & 9 Page 31 of 40

Event Description: Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open

Time	Position	Applicant's Actions or Behavior
		• MVG-8000A, RELIEF 445 A ISOL.
		• MVG-8000B, RELIEF 444 B ISOL
		• MVG-8000C, RELIEF 445 B ISOL.
		• Verify at least one PZR PORV Block Valve is open. **(YES)**
Procedure Note Step 11: **Seal Injection flow should be maintained to all RCPs.**		
	RO	Check if RCPs should be stopped:
		• Check if either of the following criteria is met:
		• Annunciator XCP-612-4-2 is lit (PHASE B ISOL) OR
		• RCS Pressure is LESS THAN 1400 psig and SI flow is indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM.
		• Stop all RCPs.
	BOP	Verify no SG is Faulted:
		• No SG pressure is decreasing in an uncontrolled manner. (NO, ALL)
		• No SG is completely depressurized.
	CRS	Go to EOP-3.0, Faulted SG Isolation.
Procedure Caution:		• **At least one SG must be maintained available for RCS cooldown.** • **Any FAULTED SG or secondary break should remain isolated during subsequent recovery actions unless needed for RCS Cooldown, to prevent reinitiating the break.**

Op Test No.: 1	Scenario # 3	Event # 6, 7, 8, & 9	Page 32 of 40
Event Description:	Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		**Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
	BOP	Ensure all the following are closed. **(NO)**
		• MS Isolation Valves PVM-2801A(B)(C).
		• MS Isolation Bypass Valves, PVM-2869A(B)(C).
	BOP	Check if any SG is NON FAULTED:
		• Pressure in any SG is stable OR increasing. **(NO)**
		• Any SG is NOT completely depressurized.
	BOP	If all SG pressures are decreasing in an uncontrolled manner or completely depressurized then GO TO EOP-3.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS, Step 1.
	CRS	Transitions to EOP-3.1.
Procedure Note:		• **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.**
		• **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
	BOP	Isolate secondary pressure boundaries for all SGs:
		• Close all of the following valves:
		• MS Isolation, PVM-2801A(B)(C).
		• MS Isolation Bypass, PVM-2869A(B)(C).
		• FW Flow Control, FCV-478(488)(498).
		• FW Isolation, PVG-1611A(B)(C).

Op Test No.: 1 Scenario # 3 Event # 6, 7, 8, & 9 Page 33 of 40

Event Description: Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open

Time	Position	Applicant's Actions or Behavior
		• SG Blowdown, PVG-503A(B)(C).
		• FW Flow Control Bypass, FCV-3321(3331)(3341).
Caution – Step 1.b:		**If the TD EFW Pump is the only available source of feed flow, the steam supply to the TD EFW Pump must be maintained from at least one SG, to maintain a secondary heat sink.**
		Complete isolation of all SGs.
	CREW	Close all of the following valves:
		• SG Chemical Feed Isolation, MVK-1633A(B)(C).
		MS Drain Isolation:
		• PVT-2843A(B)(C)
		• PVT-2877A(B).
	CREW	Locally open the following breakers:
		• XMC1DA2X 05EH, EF PUMP MAIN STEAM BLOCK VLV XVG2802A-MS (IB-463).
		• XMC1DB2Y 05EH, EMERG FEEDWATER PUMP MAIN STEAM BLOCK XVG2802B-MS (AB-463).
	CREW	Locally close the following valves (IB-436 East Pen):
		• XVG02802A-MS, MS HEADER B EF PUMP TURBINE SUPPLY VLV.
		• XVG02802B-MS, MS HEADER C EF PUMP TURBINE SUPPLY VLV.
	BOP	Place all Steamline PWR RELIEF A(B)(C) SETPT Controllers in MAN and closed.
	BOP	Place all Steamline Power Relief A(B)(C) Mode Switches in PWR RLF.

Op Test No.: 1	Scenario # 3	Event # 6, 7, 8, & 9	Page 34 of 40
Event Description:	Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open		

Time	Position	Applicant's Actions or Behavior
Caution – Step 2		**A minimum EFW flow of 50 gpm must be maintained to each SG that has a Narrow Range level LESS THAN 30% [50%], to minimize thermal shock to SG components.**
Note – Step 2		**Shutdown margin should be monitored during RCS cooldown.**
	BOP	Ensure the RCS cooldown is minimized:
		• Place MD EFP RESET to RESET.
		• Place TD EFP RESET to RESET.
	CREW	Verify the cooldown rate in the RCS Cold Legs is LESS THAN 100 °F/hr. **(NO)**
CRITICAL TASK	BOP	**No later than after the Step 2 CAUTION is read, reduce and maintain EFW flow to each SG at no less than 50 gpm until EOP-3.1 is exited.**
	CRS	GO TO Step 2.e
	RO	Verify RCS Thot is stable OR decreasing.
Booth Operator:		**Locally close all MSIV's after EFW flow has been minimized and no adjustments are in progress.**
	BOP	Reports all MSIVs have closed.
	CRS	Transitions back to EOP-3.0 on EOP-3.1 REFERENCE PAGE Criteria:

Op Test No.: 1 Scenario # 3 Event # 6, 7, 8, & 9 Page 35 of 40

Event Description: Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open

Time	Position	Applicant's Actions or Behavior
		• IF any SG pressure increases at any time, except while performing SI Termination in Steps 15 through 20, THEN GO TO EOP-3.0, FAULTED STEAM GENERATOR ISOLATION, Step 1.
	BOP	Identify any FAULTED SG(s): **(NO)**
		• Any SG Pressure decreasing in an uncontrolled manner
		OR
		• Any SG completely depressurized.
	CREW	Search for the initiating break:
		• Ensure steam dump valves are closed
		• Locally investigate the AB, IB and TB for breaks
	CRS	GO TO Step 6
	BOP	Check if secondary radiation levels are normal: **(YES)**
		• Check radiation levels normal on all unisolated radiation monitors:
		• RM-G19A(B)(C). STMLN HI RNG GAMMA.
		• RM-L3. STEAM GENERATOR BLOWDOWN LIQUID MONITOR.
		• RM-L10, SG BLOWDOWN CW DISCHARGE LIQUID MONITOR.
		• RM-A9, CNDSR EXHAUST GAS ATMOS MONITOR.
		• Notify Chemistry to sample all SG secondary sides, and screen samples for abnormal activity using a frisker.
	RO	Check if SI flow should be reduced: **(YES)**
		• RCS subcooling on TI-499A(B) A(B) TEMP °F is GREATER THAN 30°F.

Op Test No.: 1	Scenario # 3	Event # 6, 7, 8, & 9	Page 36 of 40
Event Description:	Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open		

Time	Position	Applicant's Actions or Behavior
	BOP	Secondary Heat Sink is adequate: **(YES)**
		• Total EFW flow to INTACT SGs is GREATER THAN 450 gpm
		OR
		• Narrow Range level is GREATER THAN 30% [50%] in at least one INTACT SG.
	RO	RCS pressure is stable OR increasing. **(YES)**
	RO	PZR level is GREATER THAN 18% [38%]. **(YES)**
	RO	Reset both SI RESET TRAIN A(B) Switches.
	RO	Reset Containment Isolation:
		• RESET PHASE A-TRAIN A(B) CONTMT ISOL.
		• RESET PHASE B-TRAIN A(B) CONTMT ISOL.
	BOP	Place both ESF LOADING SEQ A(B) RESETS TO
		• NON-ESF LCKOUTS
		• AUTO-START BLOCKS
	RO	Establish Instrument Air to the RB:
		• Start one Instrument Air Compressor and place the other in Standby.
		• Open PVA-2659, INST AIR TO RB AIR SERV.
		• Open PVT-2660, AIR SPLY TO RB.
	CRS	GO TO EOP-1.2, SAFETY INJECTION TERMINATION, Step 1.

Op Test No.: 1	Scenario # 3	Event # 6, 7, 8, & 9	Page 37 of 40
Event Description:	Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		**The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.**
	RO	Stop all but one Charging Pump and place in Standby.
	RO	Verify RCS pressure is stable OR increasing. **(YES)**
	RO	Establish Normal Charging:
		• Close FCV-122, CHG FLOW.
		• Open both MVG-8107 and MVG-8108, CHG LINE ISOL.
		• Adjust FCV-122, CHG FLOW, to obtain 60 gpm Charging flow.
		• Close both MVG-8801A(B), HI HEAD TO COLD LEG INJ.
	RO	Control FCV-122, CHG FLOW, to maintain PZR level.
Lead Evaluator: Terminate the scenario after MVG-8801A(B) have been closed and FCV-122 is under operator control.		

Op Test No.: 1 Scenario # 3 Event # 6, 7, 8, & 9 Page 38 of 40

Event Description: Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open

Time	Position	Applicant's Actions or Behavior
		Attachment 3 – SI EQUIPMENT VERIFICATION
		Evaluator NOTE: All equipment verified on Attachment 3 will be in the design condition except: • **A MALF is preventing the MSIV's from closing.** • **The crew may reduce EFW flow to <450 GPM based on the accident diagnosis.** • **There will be no indicated RHR flow because RCS pressure is above the shutoff head.**
	BOP	Ensure EFW Pumps are running:
		• Ensure both MD EFW pumps are running.
		• Verify the TD EFW Pump is running if necessary to maintain SG levels.
	BOP	Ensure the following EFW valves are open:
		• FCV-3531(3541)(3551), MD EFP TO SG A(B)(C).
		• FCV-3536(3546)(3556), TD EFP TO SG A(B)(C).
		• MVG-2802A(B), MS LOOP B(C) TO TD EFP.
	BOP	Verify total EFW flow is GREATER THAN 450 gpm.
	BOP	Ensure FW Isolation:
		• Ensure the following are closed:
		• FW Flow Control
		• FW Isolation, PVG-1611A(B)(C).
		• FW Flow Control Bypass, FCV-3321(3331)(3341).
		• SG Blowdown, PVG-503A(B)(C).
		• SG Sample, SVX-9398A(B)(C).
		• Ensure All Main FW Pumps are tripped.

Op Test No.: 1 Scenario # 3 Event # 6, 7, 8, & 9 Page 39 of 40

Event Description: Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open

Time	Position	Applicant's Actions or Behavior
	BOP	Ensure SI Pumps are running:
		• Two Charging Pumps are running.
		• Both RHR Pumps are running.
	BOP	Ensure two RBCU Fans are running in slow speed (one per train).
	BOP	Verify Service Water to the RBCUs:
		• Ensure two Service Water Pumps are running.
		• Ensure both Service Water Booster Pumps A(B) are running.
		• Verify GREATER THAN 2000 gpm flow for each train on:
		• FI-4466, SWBP A DISCH FLOW GPM.
		• FI-4496, SWBP B DISCH FLOW GPM.
	BOP	Verify two CCW Pumps are running.
	BOP	Ensure two Chilled Water Pumps and Chillers are running.
	BOP	Check if Main Steamlines should be isolated:
		• Check if any of the following conditions are met:
		• RB pressure GREATER THAN 6.35 psig. OR
		• Steamline pressure LESS THAN 675 psig. OR
		• Steamline flow GREATER THAN 1.6 MPPH AND Tavg LESS THAN 552°F.
		• Ensure ALL the following are closed:
		• MS Isolation Valves, PVM-2801A(B)(C).
		• MS Isolation Bypass Valves, PVM-2869A(B)(C).

Op Test No.: 1	Scenario # 3	Event # 6, 7, 8, & 9	Page 40 of 40
Event Description:	Main Turbine Trip on rising Vibration; ATWS; Steam Break Outside RB Following Reactor Trip; All MSIVs Stuck Open		

Time	Position	Applicant's Actions or Behavior
	BOP	Ensure Excess Letdown Isolation Valves are closed:
		• PVT-8153, XS LTDN ISOL.
		• PVT-8154, XS LTDN ISOL.
	BOP	Verify ESF monitor lights indicate Phase A and Containment Ventilation Isolation on XCP-6103, 6104, and 6106.
		REFER TO ATTACHMENT 4, CONTAINMENT ISOLATION VALVE MCB STATUS LIGHT LOCATIONS, as needed.
	BOP	Verify proper SI alignment:
		• Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104.
		• Verify all SAFETY INJECTION monitor lights are dim on XCP-6106.
		• Verify SI flow on FI-943, CHG LOOP B COLD/HOT LG FLOW GPM.
		• Check if RCS pressure is LESS THAN 250 psig.
		• Verify RHR flow on:
		• FI-605A, RHR DISCHARGE PUMP A FLOW GPM
		AND
		• FI-605B, RHR DISCHARGE PUMP B FLOW GPM.

Facility:	VC SUMMER		Scenario No.:	4	Op Test No.: **2009 NRC**
Examiners:			Operators:		
Initial Conditions:	• IC-7, ~ 2% Power, MOL.				
	• A tagout is being removed from Circulating Water Pump "A" following a seal water line repair.				
	• Main Feedwater Pump "A" is running. MFW Pump MASTER Speed Control is in MANUAL.				
	• GOP-004A, Step 3.6.b is complete.				
Turnover:	• Continue performing GOP-004A, beginning at Step 3.6.c.				
Critical Task:	• Stop any running RCP before the transition to EOP-2.0.				
	• Close at least one Phase "A" isolation valve in each unisolated line prior to reporting the completion of EOP-1.0, Attachment 3.				
	• Initiate an RCS cooldown prior to reducing SI flow.				

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N - BOP, CRS R – RO	Raise power in preparation for rolling MTG.
2	CND004B	C – BOP	CWP "B" trips (with CWP "A" available for start).
3	RCS008A	TS – CRS	RCS Loop 1 T_{HOT} RTD Fails LO.
4	CCW001	C – RO	Leak in L/D HX.
5	OVR-ANNEG017	C – BOP	Unit Auxiliary Transformer High Temperature.
6	PRS002A	I – RO	PZR Level Channel LT-459 Fails LO.
7	FWM003A	TS – CRS	MD EFW Pump "A" trips.
8	PCS009AA	M – ALL	Inadvertent Rx Trip (RTB "A" Fails OPEN).
9	PRS008 RHR001A	M – ALL	850 gpm PZR Steam Space Break (After Transition to EOP-1.1) RHR Pump "A" breaker trips.
10	VLVCS042P VLVCS051P VLVIA002P VLVIA003P VLVIA004P	C – RO/BOP	Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure)
11	RHR001B	C – ALL	RHR Pump "B" trips at transition to EOP-2.0.

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

VC Summer NRC Scenario #4

Evaluator NOTE: All events should be cued before the transfer from EFW to the Feedwater Control Valves begins (GOP-4A, Step 3.7.d.). The transfer process is very time-consuming, will add significant run time to the scenario, and preclude the BOP from performing any other duties while it is in progress.

The crew will assume the watch with GOP-4A, POWER OPERATION (MODE 1 – ASCENDING), in progress at Step 3.6.c – Reset the Feedwater Isolation signal. One Main Feedwater (MFW) Pump is running with the MASTER Speed Controller in MANUAL. Circulating Water Pump "A" has been repaired and is being prepared for start. They will pre-brief on the Initial Conditions, the procedure in progress and the shift plan to be ready to assume the watch. The BOP will reset the Feedwater Isolation Signal and place the MASTER Speed Controller in AUTO. The RO will raise reactor power to the point of shifting from Emergency Feedwater (EFW) to MFW by withdrawing control rods. The Lead Evaluator can begin cueing malfunctions at that time.

On cue from the Lead Evaluator, Circulating Water Pump "B" will trip. The crew will respond in accordance with the alarm response procedure (ARP), verifying the automatic valve alignment and starting the available Circulating Water Pump ("A").

After Circulating Water Pump "A" is started the Lead Evaluator can cue failure of the Loop 1 Thot RTD. The crew will respond in accordance with the ARP(s). There are no actual operations associated with this failure. The CRS should enter the applicable TS for Reactor Trip Instrumentation and ESF Instrumentation.

When the TS declarations are complete for the Loop 1 Thot RTD failure, the Lead Evaluator can cue the leak in the Letdown Heat Exchanger. The crew should respond in accordance with the Component Cooling Water (CCW) radiation monitor ARP(s). Based on CCW Surge Tank level, VCT level and Letdown Pressure Control response, the crew should diagnose the leak location. They should then initiate excess letdown in accordance with SOP-102, CHEMICAL AND VOLUME CONTROL SYSTEM, isolate normal letdown and minimize charging.

When all letdown heat exchanger related operations are complete the Lead Evaluator can cue the Unit Auxiliary Transformer high temperature. The crew should respond in accordance with the ARP and dispatch an AO. The AO will report a high winding temperature with no apparent reason. If necessary, Maintenance and/or System Engineering will emphasize the need to unload the transformer for further testing and analysis. The crew should shift the BOP buses to the alternate source in accordance with SOP-304, 115KV/7.2KV OPERATIONS.

After the BOP buses are on the alternate source the Lead Evaluator can cue the controlling PZR Level channel failure. The crew should respond in accordance with AOP-401.06, PZR LEVEL CONTROL AND PROTECTION CHANNEL FAILURE. Letdown is already isolated but the RO must shift to an operable channel pair and restore PZR heaters to operation. There is a TS associated with this failure but it is not counted in that it is similar to the Loop 1 Thot RTD failure.

When the crew has completed the AOP-401-06 actions, the Lead Evaluator can cue the trip of Motor Driven Emergency Feedwater (MDEFW) Pump "A". If necessary, the BOP will adjust flow from MDEFW Pump "B" and/or the CRS may direct a power reduction and/or start of the Turbine-driven EFW (TDEFW) Pump. The CRS should enter TS 3.7.1.2.a for the inoperable MDEFW Pump.

When the TS declaration is complete for the MDEFW Pump the Lead Evaluator can cue Reactor Trip Breaker "A" opening. The crew should enter EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION, and then transition the EOP-1.1, REACTOR TRIP RECOVERY. After all control rods are confirmed as inserted, a PZR steam space break will occur. This will result in an AUTO SI on RCS pressure and a return to EOP-1.0. Residual Heat Removal (RHR) Pump "A" will fail to start and be lost for the remainder of the scenario. The crew should stop all reactor coolant pumps when the criteria is met and the BOP must close at least one Phase "A" isolation valve in each unisolated line (RCP Seal Return, RB Instrument Air) during the conduct of EOP-1.0, Attachment 3 – SI EQUIPMENT VERIFICATION. The crew will transition to EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT, based on containment conditions. In EOP-2.0, RHR Pump "B" will trip. This will eventually result in a transition to EOP-2.4, LOSS OF EMERGENCY COOLANT RECIRCULATION.

The Lead Evaluator can terminate the scenario in EOP-2.4 after the crew has initiated makeup to the RWST, the RCS cooldown is in progress and one Charging Pump has been stopped.

VCS08 NRC Scenario 4 Simulator Setup

INITIAL CONDITIONS

- IC-7, 2% Power.
- Tag on Circulating Water Pump "A"
- Circulating Water Pump "A" Discharge Valve in MANUAL
- Main Feedwater Pump MASTER Speed Control in MANUAL
- Reactivity Management Plan/Turnover Sheet for IC.
- Provide a copy of SOP-210, FEEDWATER SYSTEM, for placing MFP MASTER Control in AUTO in the brief room.
- Provide marked up copy of GOP-004A, POWER OPERATION (MODE 1 – ASCENDING), in the brief room.
- ***During validation, need to canvas the operators to narrow the scope of the plan for this shift to avoid overload prior to assuming the watch.*** Crew should pre-brief on procedures, the steps in effect and turnover so that they are prepared to commence actions when the watch is assumed.

PRE-LOAD

- Circulating Water Pump "A" cleared and tagged
- RHR001A: RHR Pump "A" trips on ESFLS start
- VLVCS042P/VLVCS051P/VLVIA002P/VLVIA003P/VLVIA004P: Phase "A" isolation valves fail to close

TRIGGERS

- CND004B: CWP "B" trips
- RCS008A: RCS Loop 1 T_{HOT} RTD Fails LO
- CCW001: Leak in CCW HX
- OVR-ANNEG017: Unit Auxiliary Transformer High Temperature
- PRS002A: PZR Level Channel LT-459 Fails LO
- FWM003A: MD EFW Pump "A" trips
- PCS009AA: Reactor Trip Breaker "A" opens
- RHR001B: RHR Pump "B" trips OPEN
- Remote functions to OPEN when RWST fill is initiated:
  - XVD08432-CS, RWST & RHT BA INLET HDR ISOL VALVE.
  - XVD08434-CS, RWST BORIC ACID INLET HEADER ISOL VALVE.

Op Test No.: 1	Scenario # 4	Event # 1	Page 5 of 46
Event Description:	Raise Power in Preparation For Rolling MTG		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**N/A**
Evaluator Note:		**Cue all events before the transfer from EFW to the Feedwater Control Valves begins (GOP-4A, Step 3.7.d.). The transfer process is very time-consuming, will add significant run time to the scenario, and preclude the BOP from performing any other duties while it is in progress.**
	BOP	Reset the Feedwater Isolation signal by momentarily turning the following switches to the right:
		• FW ISOL TRAIN A RESET.
		• FW ISOL TRAIN B RESET.
Procedure Caution 3.6.d:		• **Feedwater Header pressure should be maintained on program prior to opening Feedwater Isolation Valves to minimize water hammer.** • **Annunciator Point XCP-625 3-3 (FIV A/B/C ACCUM PRESS LO) should be verified clear or pressure locally verified greater than 500 psi prior to opening each Feedwater Isolation Valve. (ref. Tech Spec 3.7.1.6)**
	BOP	Open the following:
		• PVG-1611A, A ISOL.
		• PVG-1611B, B ISOL.
		• PVG-1611C, C ISOL.

Op Test No.: 1	Scenario # 4	Event # 1	Page 6 of 46
Event Description:	Raise Power in Preparation For Rolling MTG		

Time	Position	Applicant's Actions or Behavior
Procedure Note 3.6.e:		**Use MANUAL control only if the Master Speed Controller is unable to control in AUTO.**
	BOP	Ensure the MASTER SPEED CNTRL (MCB M/A station) is in Automatic per SOP-210.
		SOP-210, Section E - Step 2.8 steps are below
	BOP	Adjust the Feedwater Pump MASTER SPEED CNTRL (MCB M/A station) to establish program Feedwater Pump DP per Enclosure B.
	BOP	When the operating Feedwater Pump has stabilized, place the MASTER SPEED CNTRL (MCB M/A station) in AUTO.
		• PI-508, FW PP DISCH HDR PRESS PSIG, and PI-464C, MS HDR PRESS PSIG, indicate programmed DP is maintained.
		• Main Feedwater Regulating Valve demand indicates Feedwater pressure is adequate.
		• Narrow Range Steam Generator levels are being maintained between 60% and 65%.
	BOP	When plant load is greater than 15%, close MOV-1-5A(B)(C), TURB DRN VLV (MCB).
	CRS	Complete the plant startup per GOP-4A.
Evaluator's Note:		• **The RO will raise power using MANUAL Rod Control.** • **The RO/CRS should agree on a target power level.**

Op Test No.: 1	Scenario # 4	Event # 1	Page 7 of 46
Event Description:	Raise Power in Preparation For Rolling MTG		

Time	Position	Applicant's Actions or Behavior
Procedure Caution 3.7:		**Reactor Power must be maintained less than or equal to 10% until Emergency Feedwater is aligned per STP-120.003, Emergency Feedwater Valve Verification. (ref. Tech Spec 4.7.1.2.a.4)**
	RO	Prepare the Emergency Feedwater System for power ascension as follows:
		• Commence Reactor Power increase to between 6% and 9%.
	CRS	Log the time and date the plant entered Mode 1
Booth Operator's Note:		**Before initiating Event 2 (Circulating Water Pump "B" trips), clear the tag on Circulating Water Pump "A" and report that it is available for operation.**
Lead Evaluator: Cue Event 2 (Circulating Water Pump "B" trips) and the remaining events before the transfer from EFW to the Feedwater Control Valves begins (GOP-4A, Step 3.7.d.). The transfer process is very time-consuming, will add significant run time to the scenario, and prevent the BOP from performing any other duties.		

Op Test No.: 1	Scenario # 4	Event # 2	Page 8 of 46
Event Description:	CWP "B" Trips (With CWP "A" Available for Start)		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**XCP-628-3-1, CWP A/B/C TRIP**
	BOP	Responds to alarm XCP-628-3-1, CWP A/B/C TRIP.
	BOP	Reports CWP "B" tripped/not running.
	BOP	Enters ARP-001-XCP-628-3-1.
		PROBABLE CAUSE:
		• Pump or motor malfunction causing an overload.
		• Turbine Building flood level.
		AUTOMATIC ACTIONS:
		• The discharge isolation valve for the tripped pump will close.
Procedure Note:		**This alarm has reflash capabilities.**
Evaluator/Booth Operator's Note:		• **Because CWP "A" has just been made available, an operator may be dispatched to verify start conditions are satisfactory.** • **The crew should announce the start of any major equipment.**
		CORRECTIVE ACTIONS:
		• If only two pumps were operating prior to the pump trip, perform the following:
		• Verify the discharge valve for the operating Circulating Water Pump closes to 30% open while performing the next steps.

Op Test No.: 1 Scenario # 4 Event # 2 Page 9 of 46

Event Description: CWP "B" Trips (With CWP "A" Available for Start)

Time	Position	Applicant's Actions or Behavior
		• Verify the discharge valve for the idle Circulating Water Pump is in AUTO.
		• Start the idle Circulating Water Pump.
		• When the discharge valves for the operating Circulating Water Pumps are 30% open, open the discharge valves.
		• When the discharge valves for the operating Circulating Water Pumps are open, place the discharge valves in AUTO.
		• Reduce Turbine load as necessary per GOP-4B to maintain the following: (N/A)
		• Main Condenser vacuum less than 4" Hg absolute.
		• Aux Condenser vacuum less than 9" Hg absolute.
		• Circulating Water outlet temperature less than 113°F.
		• Determine which pump tripped and verify its discharge valve is fully closed.
		SUPPLEMENTAL ACTIONS:
		• Determine the cause of the pump trip and correct as soon as possible.
		• Return the Circulating Water System to normal operation as soon as possible per SOP-207.
Booth Operator's Note:		
		Report the Circulating Water Pump breaker tripped on overload – cause unknown.
	CREW	Dispatches an operator to investigate.
	CRS	Contacts Work Control/Maintenance for assistance.

Op Test No.: 1	Scenario # 4	Event # 2	Page 10 of 46
Event Description:	CWP "B" Trips (With CWP "A" Available for Start)		

Time	Position	Applicant's Actions or Behavior
Lead Evaluator: Event 3 is a TS declaration – no operations are involved. Cue Event 3, RCS Loop 1 T_{HOT} RTD Fails LO, anytime after Circulating Water Pump "A" has been started.		

Op Test No.: 1	Scenario # 4	Event # 3	Page 11 of 46
Event Description:	RCS Loop 1 T_{HOT} RTD Fails LO		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		XCP-615-1-2, RCS TAVG LO; XCP-615-1-2, RCS TAVG LO-LO XCP-615-1-5, RCS TAVG DEV HI/LO; XCP-615-3-5, RCS ΔT DEV HI/LO
	RO	Responds to multiple alarms.
	RO	Enters ARP-001-XCP-615-1-2.
		PROBABLE CAUSE:
		• Normal heatup or cooldown in progress.
		• Channel failure or testing.
		• The Rod Control System is maintaining Tavg at an improper low value.
		• Failure of a Steam Generator safety or a power operated relief valve.
		Reports Loop 1 Thot failed LO.
		AUTOMATIC ACTIONS:
		• With 2 out of 3 channels tripped and a reactor trip signal present, feedwater isolation will occur.
		CORRECTIVE ACTIONS:
		• Monitor TI-412D, TI-422D and TI-432D to determine if a channel failed.
		• Place Rod Control in MAN and match Tavg to Tref. (N/A)
		SUPPLEMENTAL ACTIONS:
		• If a channel has failed, perform the following:
		• Refer to AOP-401.2 to trip all bistables associated with

Op Test No.: 1 Scenario # 4 Event # 3 Page 12 of 46

Event Description: RCS Loop 1 T_{HOT} RTD Fails LO

Time	Position	Applicant's Actions or Behavior
		that channel.
		• Refer to Technical Specification Table 3.3-3 for minimum channel requirements.
		• If the Rod Control System malfunctioned, refer to AOP-403.4, Failure of Control Rods to Move. (N/A)
	CRS	Refers to AOP-401.2, PROTECTION CHANNEL RCS LOOP RTD FAILURE.
	RO	Determine which RCS loop has a failed RTD by comparing loop ΔT and Tavg indicators.
	RO	Reports Loop 1 Thot.
	RO	Ensure an operable loop is selected on ΔT TR-412 INPUT SEL Switch.
Booth Operator's Note:		**Acknowledge direction to trip bistables and report that you will get it done before the end of the shift. The bistables need not be tripped during the scenario.**
	CRS	Within 72 hours, place the failed channel protection bistables in a tripped condition:
		• Identify the associated bistables for the failed channel. REFER TO Attachment 1.
		• Record the following for each associated bistable on SOP-401, REACTOR PROTECTION AND CONTROL SYSTEM, Attachment I:
		• Instrument.
		• Associated Bistable.
		• Bistable Location.
		• STPs.

Op Test No.: 1 Scenario # 4 Event # 3 Page 13 of 46

Event Description: RCS Loop 1 T_{HOT} RTD Fails LO

Time	Position	Applicant's Actions or Behavior
		• Notify the I&C Department to place the identified bistables in trip.
	CRS	Contacts Work Control/I&C for assistance.
	CRS	Determine and correct the cause of the channel failure.
	CRS	Enters TS Table 3.3-1 (Items 7 and 8), Action 6 :
		With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:
		• The inoperable channel is placed in the tripped condition within 72 hours; and
		• The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.3.1.1.
Lead Evaluator cue Event 4, Leak in Letdown HX, after the TS declaration is complete. The bistables need not be tripped to continue the scenario.		

Op Test No.: 1	Scenario # 4	Event # 4	Page 14 of 46
Event Description: Leak in L/D HX			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**XCP-644-1-3 CC LOOP A RM-L2A HI RAD; XCP-644-1-4 CC LOOP A RM-L2A TRBL; XCP-643-3-6 CC SRG TK VENT 7096 CLSD HI RAD**
	RO	Responds to alarm(s).
	RO	Enters ARP-001-XCP-644-1-3.
		PROBABLE CAUSE:
		• Radioactive inleakage into the Component Cooling Water System.
		AUTOMATIC ACTIONS:
		• 1PVV-7096, CC SURGE TK VLV, closes.
		CORRECTIVE ACTIONS:
		• Verify the Automatic Action has occurred.
		• Verify the alarm is valid by observing RM-L2A and R/R-5 for increasing radiation.
		• Notify Health Physics and request a radiological survey.
		• Notify Chemistry and request a sample of the Component Cooling System.
		• Monitor Component Cooling System flows, temperatures and annunciators for any indications of equipment failure.
	CREW	Determines leak is in Letdown HX based on CCW indications, PCV-145 response and VCT level.
		SUPPLEMENTAL ACTIONS:

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Event Description: Leak in L/D HX

Time	Position	Applicant's Actions or Behavior
		• Isolate the source of inleakage when confirmed by sample analysis or a radiological survey.
		• If leakage is from a Reactor Coolant Pump Thermal Barrier, verify adequate seal injection flow and close the associated following valve for the affected pump: (N/A)
		• If leakage is from the Letdown Heat Exchanger, perform the following:
		• Place Excess Letdown in service per SOP-102.
	RO	SOP-102, Section C – Establishing Excess Letdown
		Verifies Initial Conditions:
		• RCS heatup is in progress or increased Letdown is required.
		• Component Cooling Water is in operation per SOP-118.
Procedure Note 2.0:		**Due to the heat loss generated not being an input to the calorimetric thermal power calculation, Core Power should be maintained at less than or equal to 2898 MWt prior to and during Excess Letdown operations.**
	RO	Ensure HCV-137, XS LTDN HX, is closed.
Procedure Note 2.2:		**Excess Letdown should normally be directed to the VCT. If required, Excess Letdown may be aligned to the RCDT.**
	RO	Place PVM-8143, XS LTDN TO VCT OR RCDT to one of the following as desired: (PEER √)
		• VCT (preferred).
		• RCDT (alternate).
	RO	If required, reset Phase A Isolation by depressing the following: (N/A)
		• MVT-8100, SEAL WTR RTN ISOL.

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Event Description: Leak in L/D HX

Time	Position	Applicant's Actions or Behavior
		• MVT-8112, SEAL WTR RTN ISOL.
	RO	Ensure MVG-9583, FROM XS LTDN HX, is open.
	RO	Open PVT-8153, XS LTDN ISOL.
	RO	Open PVT-8154, XS LTDN ISOL.
Procedure Note 2.8:		**When sending Excess Letdown to the RCDT, RCDT level and pump operation should be monitored locally at XPN0007, WASTE PROCESSING/BORON RECYCLE CONT PNL (AB-412).**
	RO	Establish Excess Letdown flow as follows:
		• Slowly throttle open HCV-137, XS LTDN HX.
		• Monitor TI-139, XS LETDOWN HX OUT TEMP °F, to maintain less than 165°F.
		• Monitor the following to ensure flow between 0.2 gpm and 5.0 gpm:
		• FR-154A, RCP SL LKOFF HI RANGE.
		• FR-154B, RCP SL LKOFF LO RANGE.
	RO	Returns to ARP-001-XCP-644-1-3 to complete steps
		• Close PVT-8149A(B)(C), LTDN ORIFICE A(B)(C) ISOL.
		• Close LCV-460, LTDN LINE ISOL.
		• Close LCV-459, LTDN LINE ISOL.
		• Close PVT-8152, LTDN LINE ISOL.
		• Close PCV-145, LO PRESS LTDN.
		• Close FCV-122, CHG FLOW.
		• Adjust HCV-186, INJ FLOW, to maintain 6-13 gpm per pump.

Op Test No.: 1	Scenario # 4	Event # 4	Page 17 of 46
Event Description: Leak in L/D HX			

Time	Position	Applicant's Actions or Behavior
Lead Evaluator cue Event 5, Unit Auxiliary Transformer High Temperature, after HCV-186 has been adjusted or seal injection flow is evaluated as satisfactory.		

Op Test No.: 1	Scenario # 4	Event # 5	Page 18 of 46
Event Description:	Unit Auxiliary Transformer High Temperature		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**XCP-633-6-3, UNIT AUX XFMR XTF-2 TRBL**
	BOP	Responds to alarm.
	BOP	Enters ARP-001-XCP-633-6-3.
		PROBABLE CAUSE:
		• Transformer N2 pressure high: 8.5 psig
		• Transformer N2 pressure low: -1.5 psig
		• Empty N2 cylinder: 200 psig
		• Winding temperature high: 117 °C
		• High oil temperature: 90 °C
		• Low oil level.
		• Loss of voltage.
		• Mechanical relief: 10 psig
		• Sudden pressure: 5.5 psi/sec
		• Combustible limit: 1%
	CREW	Dispatches AO to investigate.
Booth Operator:		• **Wait approximately 3 minutes then (as AO) report winding temperature at 120 °C and rising slowly with all fans running.** • **If contacted as Maintenance or System Engineer, wait 3 minutes then report that the temperature appears to be valid but no reason is apparent. Recommend unloading to allow testing.**

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Event Description: Unit Auxiliary Transformer High Temperature

Time	Position	Applicant's Actions or Behavior
		AUTOMATIC ACTIONS:
		• If the alarm is caused by a sudden pressure, the 86T2-1, UNIT AUX DIFF LOCK-OUT RELAY, will actuate.
		CORRECTIVE ACTIONS:
		• If a trip occurs, refer to UNIT AUX DIFF LCKOUT 86T2-1 (XCP-639 3-2).
		• Dispatch an Operator to XTF0002, UNIT AUXILIARY TRANSFORMER, to determine the cause of the alarm.
		• Notify the System Controller.
		SUPPLEMENTAL ACTIONS:
		• If necessary, transfer loads to the Emergency Auxiliary Transformers per SOP-304.
		• When the cause has been corrected, verify XTF0002, UNIT AUXILIARY TRANSFORMER, auxiliaries are returned to normal operation per SOP-303.
		• Contact Substation Maintenance for further assistance, if necessary.
	CRS	Directs BOP to transfer loads to Emergency Auxiliary Transformers per SOP-304.
	BOP	Verifies Initial Conditions:
		• The AUTO-MAN XFER Switch for each Balance of Plant bus is in AUTO.
		• XTF0031 and XTF0032, EMERGENCY AUXILIARY TRANSFORMER #1 and #2 are in service per SOP-302.
		• Conditions exist which require removal of normal feed for the buses.
		• XTF0001, MAIN TRANSFORMER and XTF0002, UNIT AUXILIARY TRANSFORMER are in service per SOP-302.

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Event Description: Unit Auxiliary Transformer High Temperature

Time	Position	Applicant's Actions or Behavior
		Procedure Note 2.1 through 2.3: **When BUS 1A, 1B, or 1C is aligned to its alternate feed, automatic transfer to its normal feed is not available.**
	BOP	Manually transfer BUS 1A to alternate feed as follows:
		• Place BUS 1A AUTO-MAN XFER Switch in MAN.
		• Close BUS 1A ALT FEED breaker. (PEER √)
		• Open BUS 1A NORM FEED breaker. (PEER √)
		• Verify BUS 1A potential lights remain energized
		• Place BUS 1A AUTO-MAN XFER Switch in AUTO. (PEER √)
	BOP	Manually transfer BUS 1B to alternate feed as follows:
		• Place BUS 1B AUTO-MAN XFER Switch in MAN.
		• Close BUS 1B ALT FEED breaker. (PEER √)
		• Open BUS 1B NORM FEED breaker. (PEER √)
		• Verify BUS 1B potential lights remain energized.
		• Place BUS 1B AUTO-MAN XFER Switch in AUTO. (PEER √)
	CREW	Notify the System Controller of the applicable bus voltage limits from Enclosure B. ***(Determine during validation)***
	CREW	If required, adjust the 115KV and/or 230KV alarm setpoints per Attachment VA and/or Attachment VB for the current lineup. ***(Determine during validation)***
	BOP	Manually transfer BUS 1C to alternate feed as follows:
		• Place BUS 1C AUTO-MAN XFER Switch in MAN.
		• Close BUS 1C ALT FEED breaker. (PEER √)
		• Open BUS 1C NORM FEED breaker. (PEER √)

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Event Description: Unit Auxiliary Transformer High Temperature

Time	Position	Applicant's Actions or Behavior
		• Verify BUS 1C potential lights remain energized.
		• Place BUS 1C AUTO-MAN XFER Switch in AUTO. (PEER √)
Lead Evaluator cue Event 6, Controlling PZR Level Channel fails LO, after all buses have been transferred.		

Op Test No.: 1	Scenario # 4	Event # 6	Page 22 of 46
Event Description: PZR Level Chanel LT-459 Fails LO			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**XCP-614 5-1, CHG LINE FLO HI/LO XCP-616 1-3, BLCK HTRS ISOL LTDN PZR LCS LO XCP-616 1-5, PZR LCS DEV HI/LO XCP-616 3-1, PZR HTR CNTRL OR BU GRP 1/2 TRIP XCP-616 4-6 SCR OUTPT LOSS**
	RO	Responds to multiple alarms.
	CREW	Recognizes entry conditions for AOP-401.06, PZR LEVEL CONTROL AND PROTECTION CHANNEL FAILURE.
	RO	Performs Immediate actions of AOP-401.6
		• Place PZR LEVEL CNTRL Switch to the position with two operable channels.
	CRS	Enters AOP-401.6 and verifies immediate action performance.
	RO	Select an operable channel on PZR LEVEL RCDR.
	RO	Control the PZR Heaters as necessary to maintain PZR pressure:
		• CNTRL GRP Heaters.
		• BU GRP 1 Heaters.
		• BU GRP 2 Heaters.
Evaluator's Note:		**Several steps will be contrary to the pre-event alignment for the Letdown HX leak with letdown isolated and charging minimized. The CRS should make decisions to maintain the pre-event conditions.**
	RO	Verify Letdown is in service. **(NO)**

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Event Description: PZR Level Chanel LT-459 Fails LO

Time	Position	Applicant's Actions or Behavior
	RO	Check if PZR LVL MASTER CONTROLLER is responding appropriately:
		• Verify Charging flow is normal and responding to PZR level error.
		• Verify PZR level is stable at OR trending to program level.
	RO	Place FCV-122, CHG FLOW, in AUTO. REFER TO SOP-102, CHEMICAL AND VOLUME CONTROL SYSTEM.
Booth Operator/Evaluator's Note: **The bistables do NOT need to be tripped to continue the scenario.**		
	CRS	Within six hours, place the failed channel protection bistables in a tripped condition:
		• Identify the associated bistables for the failed channel REFER TO Attachment 1.
		• Record the following for each associated bistable on SOP-401, REACTOR PROTECTION AND CONTROL SYSTEM, Attachment I:
		• Instrument.
		• Associated Bistable.
		• Bistable Location.
		• STPs.
		• Notify the I&C Department to place the identified bistables in trip.
	CRS	Determine and correct the cause of the channel failure.
		• Contacts Work Control/I&C for assistance.
	CRS	Enters TS Table 3.3-1, Item 11 – Action 6

Op Test No.: 1	Scenario # 4	Event # 6	Page 24 of 46
Event Description:	PZR Level Chanel LT-459 Fails LO		

Time	Position	Applicant's Actions or Behavior
		With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:
		• The inoperable channel is placed in the tripped condition within 72 hours; and
		• The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.3.1.1.
Lead Evaluator cue Event 7, MD EFW Pump "A" trips, after the TS determination or as desired. This TS determination is not required to meet the minimum for the scenario.		

Op Test No.: 1	Scenario # 4	Event # 7	Page 25 of 46
Event Description: MD EFW Pump "A" Trips			

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**XCP-622-1-3, MD EFP A TRIP**
	BOP	Responds to alarms
	BOP	Enters ARP-001-XCP-622-1-3
		PROBABLE CAUSE: Pump overload or overcurrent relay actuated.
		AUTOMATIC ACTIONS: None.
Evaluator's Note:		**The CRS could direct the RO to reduce power to ensure MD EFW Pump "B" is sufficient and/or for the BOP to start the TD EFW Pump. The TD EFW Pump is not normally used for SG level control during heatup/cooldown.**
		CORRECTIVE ACTIONS:
		• Start Motor Driven Emergency Feedwater Pump B if necessary to maintain Steam Generator levels.
		• Reduce feedwater demand to less than 400 gpm.
		• Refer to SOP-211.
		SUPPLEMENTAL ACTIONS:
		• If Steam Generator levels cannot be maintained with one motor driven pump, start the Turbine Driven Emergency Feedwater Pump.
		• Place PUMP A control switch in NORMAL-AFTER-STOP to clear the alarm.
		• Determine the cause of the trip and correct as soon as possible.
		• If the pump is inoperable, refer to Tech Spec 3.7.1.2.

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Event Description: MD EFW Pump "A" Trips

Time	Position	Applicant's Actions or Behavior
	CREW	Dispatches an AO to investigate
Booth Operator's Note:		**Wait 2-3 minutes then report MD EFW Pump "A" breaker tripped and the overcurrent relay actuated.**
	CRS	Contacts Work Control and/or Maintenance for assistance.
	CRS	Enters TS 3.7.1.2.a, Action a:
		• With one emergency feedwater pump inoperable, restore the required emergency feedwater pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
Lead Evaluator: When SG levels are under control and the TS entry is complete, cue Event 8, Inadvertent Reactor Trip.		

Op Test No.: 1	Scenario # 4	Event # 8, 9, 10, & 11	Page 27 of 46
Event Description:	Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0		

Time	Position	Applicant's Actions or Behavior
Booth Operator Instructions:		
Indications Available:		**FIRST OUT ANNUNCIATOR – MAN RX TRIP**
	CREW	Responds to multiple alarms.
	RO	Reports Reactor Trip.
	CRS	Enters EOP-1.0.
Procedure Note:		• **Steps 1 through 5 are Immediate Operator Actions.** • **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.** • **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
	RO	Verify Reactor Trip:
		• Trip the Reactor using either Reactor Trip Switch.
		• Verify all Reactor Trip and Bypass Breakers are open.
		• Verify all Rod Bottom Lights are lit.
		• Verify Reactor Power level is decreasing.
	BOP	Verify Turbine/generator Trip:
		• Verify all Turbine STM Stop VLVs are closed.
		• Ensure Generator Trip (after 30 second delay):
		• Ensure the GEN BKR is open.
		• Ensure the GEN FIELD BKR is open.
		• Ensure the EXC FIELD CNTRL is tripped.

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Event Description: Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0

Time	Position	Applicant's Actions or Behavior
	BOP	Verify both ESF buses are energized. **(YES)**
	RO	Check if SI is actuated:
		• Check if either:
		• SI ACT status light is bright on XCP-6107 1-1. **(NO)**
		OR
		• Any red first out SI annunciator is lit on XCP-626 top row. **(NO)**
	CRS	Go to Step 5.
	RO	Check if SI is required: **(NO)**
		• Check if any of the following conditions exist:
		• PZR pressure LESS THAN 1850 psig.
		OR
		• RB pressure GREATER THAN 3.6 psig.
		OR
		• Steamline pressure LESS THAN 675 psig.
		OR
		• Steamline differential pressure GREATER THAN 97 psid.
	CRS	Go to EOP-1.1, REACTOR TRIP RECOVERY.
Procedure Caution:		**If SI actuation occurs during this procedure, EOP-1.0, REACTOR TRIP/SAFETY INJECTION ACTUATION, should be performed to stabilize the plant.**

Op Test No.: 1	Scenario # 4	Event # 8, 9, 10, & 11	Page 29 of 46
Event Description:	Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		• **Main Turbine vibration should be monitored during coastdown.** • **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.**
	CREW	Announce plant conditions over the page system.
	RO	Check FW status:
		• Check if RCS Tavg is LESS THAN 564 °F. **(YES)**
	BOP	Verify FW Isolation:
		• Ensure the FW Flow Control Valves, FCV-478(488)(498), are closed. **(YES)**
		• Ensure the Main FW Isolation Valves, PVG-1611A(B)(C), are closed. **(YES)**
		• Ensure the FW Flow Control Bypass Valves, FCV-3321(3331)(3341), are closed. **(YES)**
	BOP	Ensure EFW Pumps are running:
		• Ensure both MD EFW Pumps are running. (NO – only "B")
		• Verify the TD EFW Pump is running if necessary to maintain SG levels.
	BOP	Verify total EFW flow is GREATER THAN 450 gpm. **(YES)**
	BOP	Trip all Main FW Pumps.
	RO	Check RCS temperature:
		• With any RCP running, RCS Tavg is stable at OR trending to 557 °F. **(YES)**

Op Test No.: 1	Scenario # 4	Event # 8, 9, 10, & 11	Page 30 of 46
Event Description:	Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0		

Time	Position	Applicant's Actions or Behavior
Procedure Note – Step 4:		**If a transition is made to AOP-112.2, STEAM GENERATOR TUBE LEAK NOT REQUIRING SI, the steps of EOP-1.1 which do NOT conflict with AOP-112.2 should be completed as time allows.**
	CRS	IF EOP-1.0 was entered from AOP-112.2, THEN RETURN TO AOP-112.2, STEAM GENERATOR TUBE LEAK NOT REQUIRING SI, Step 7.
Booth Operator's Note:		**Insert PZR Steam Space Break after all control rods are verified inserted.**
	RO	Verify all control rods are fully inserted.
	RO	Reports rapidly lowering RCS Pressure/AUTO SI.
	CRS	Returns to EOP-1.0.

Op Test No.: 1	Scenario # 4	Event # 8, 9, 10, & 11	Page 31	of 46
Event Description:	Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0			

Time	Position	Applicant's Actions or Behavior
Evaluator's Note:		**The EOP-1.0 Reference Page Criteria that applies in this scenario is:** **RCP TRIP CRITERIA** • **IF Phase B Containment Isolation has actuated (XCP-612 4-2), THEN trip all RCPs.** • **IF both of the following conditions occur, THEN trip all RCPs:** • **SI flow is indicated on FI-943, CHG LOOP B CLD/HOT LG FLOW GPM AND RCS Wide Range pressure is LESS THAN 1400 psig.** **REDUCING CONTROL ROOM EMERGENCY VENTILATION** • **Reduce Control Room Emergency Ventilation to one train in operation within 30 minutes of actuation. REFER TO SOP-505, CONTROL BUILDING VENTILATION SYSTEM.**
Evaluator's Note:		**Actions for ATTACHMENT 3, SI EQUIPMENT VERIFICATION, are provided on the final 3 pages of this scenario guide. There is a critical task to close at least one Phase "A" Isolation Valve in two lines that have not properly isolated.** • **RB Instrument Air** • **RCP Seal Water Return**
	BOP	Initiate ATTACHMENT 3, SI EQUIPMENT VERIFICATION.
	CREW	Reports failure of RHR Pump "A"
Booth Operator's Note:		**If dispatched wait 2-3 minutes and then report RHR Pump "A" breaker tripped on overcurrent.**
	CREW	Announce plant conditions over the page system.

Op Test No.: 1 Scenario # 4 Event # 8, 9, 10, & 11 Page 32 of 46

Event Description: Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0

Time	Position	Applicant's Actions or Behavior
	RO	Verify RB pressure has remained LESS THAN 12 psig on PR-951, RB PSIG (P-951), red pen **(YES)**
	RO	Check RCS temperature:
		• With any RCP running, RCS Tavg is stable at OR trending to 557°F.
		• With no RCP running, RCS Tcold is stable at OR trending to 557°F. **(NO)**
	BOP	IF RCS temperature is LESS THAN 557 °F AND decreasing, THEN stabilize temperature by performing the following as required:
		• Close IPV-2231, MS/PEGGING STM TO DEAERATOR.
		• Perform one of the following:
		• IF Narrow Range SG level is LESS THAN 30% [50%] in all SGs, THEN reduce EFW flow as necessary to stop cooldown, while maintaining total EFW flow GREATER THAN 450 gpm. OR
		• WHEN Narrow Range SG level is GREATER THAN 30% [50%] in at least one SG, THEN control EFW flow as necessary to stabilize RCS temperature at 557°F.
		• COMMENCE ATTACHMENT 6, STEAM VALVE ISOLATION, while continuing with this procedure.
		• IF RCS cooldown continues, THEN close:
		• MS Isolation Valves, PVM-2801A(B)(C).
		• MS Isolation Bypass Valves, PVM-2869A(B)(C).
	RO	Check PZR PORVs and Spray Valves:
		• PZR PORVs are closed. **(YES)**
		• PZR Spray Valves are closed. **(YES)**

Op Test No.: 1 Scenario # 4 Event # 8, 9, 10, & 11 Page 33 of 46

Event Description: Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0

Time	Position	Applicant's Actions or Behavior
		• Verify power is available to at least one PZR PORV Block Valve: **(YES)**
		• MVG-8000A, RELIEF 445 A ISOL.
		• MVG-8000B, RELIEF 444 B ISOL
		• MVG-8000C, RELIEF 445 B ISOL.
		• Verify at least one PZR PORV Block Valve is open. **(YES)**
Procedure Note:		**Seal Injection flow should be maintained to all RCPs.**
	RO	Check if RCPs should be stopped:
CRITICAL TASK		• **Stop all RCP's before the transition to EOP-2.0.**
	BOP	Verify no SG is FAULTED:
		• No SG pressure is decreasing in an uncontrolled manner. **(YES)**
		• No SG is completely depressurized. **(YES)**
	CREW	Verify Secondary radiation levels indicate SG tubes are NOT RUPTURED: (YES to all)
		• RM-G19A (B) (C) STMLN HI RNG GAMMA
		• RM-A9, CNDSR EXHAUST GAS ATMOS MONITOR.
		• RM-L3, STEAM GENERATOR BLOWDOWN LIQUID MONITOR.
		• RM-L10, SG BLOWDOWN CW DISCHARGE LIQUID MONITOR.
	RO	Check if the RCS is INTACT: (NO to any or all)
		• RB radiation levels are normal on:
		• RM-G7, CONTAINMENT HI RNG GAMMA

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Event Description:	Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0		

Time	Position	Applicant's Actions or Behavior
		• RM-G18, CNTMNT HI RNG GAMMA.
		• RB Sump levels are normal.
		• RB pressure is LESS THAN 1.5 psig.
		• The following annunciators are NOT lit:
		• XCP-606 2-2 (RBCU 1A/2A DRN FLO HI)
		• XCP-607 2-2 (RBCU 1B/2B DRN FLO HI)
	CRS	Transitions to EOP-2.0, LOSS OF REACTOR OR SECONDARY COOLANT.
Procedure Note:		• **The EOP REFERENCE PAGE should be monitored throughout the use of this procedure.** • **Seal Injection flow should be maintained to all RCPs.** • **Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
Booth Operator's Note:		**Trip RHR Pump "B" as the reading of the first step is in progress. If dispatched to investigate, report the breaker tripped and very hot motor with a smell of burned electrical insulation in the area of the pump.**
	RO	Check if RCPs should be stopped (None running).
	BOP	Verify no SG is FAULTED
		• No SG decreasing in an uncontrolled manner **(YES)**
		• No SG completely depressurized **(YES)**

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Event Description: Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0

Time	Position	Applicant's Actions or Behavior
	BOP	Check Intact SG levels
		• NR level in intact SGs >30% [50%]
		• Control EFW flow to maintain 40 [50%]-60% NR level
	RO	Reset both SI RESET TRAIN A(B) Switches.
	RO	Reset Containment Isolation:
		• RESET PHASE A - TRAIN A(B) CNTMT ISOL.
		• RESET PHASE B - TRAIN A(B) CNTMT ISOL.
	RO/BOP	Check if Secondary radiation levels are normal: (YES to all)
		• Check radiation levels normal on:
		• RM-G19A(B)(C), STMLN HI RNG GAMMA.
		• RM-A9, CNDSR EXHAUST GAS ' ATMOS MONITOR.
		• RM-L3, STEAM GENERATOR ' BLOWDOWN LIQUID MONITOR.
		• RM-L10, SG BLOWDOWN CW ' DISCHARGE LIQUID MONITOR.
		• Place SVX-9398A(B)(C), SG A(B)(C) SMPL ISOL, in AUTO.
		• Notify Chemistry to sample all SG secondary sides, and screen samples for abnormal activity using a frisker.
	RO	Check PZR PORVs and Block Valves:
		• Verify power is available to the PZR PORV Block Valves:
		• MVG-8000A, B, C **(YES)**
		• Verify all PZR PORVs are closed. **(YES)**
		• Verify at least one PZR PORV Block Valve is open. **(YES)**

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Event Description: Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Place both ESF LOADING SEQ A(B) RESETS to:
		• NON-ESF LCKOUTS
		• AUTO-START BLOCKS
	RO	Establish Instrument Air to the RB:
		• Start one Instrument Air Compressor and place the other in Standby.
		• Open PVA-2659, INST AIR TO RB AIR SERV.
		• Open PVT-2660, AIR SPLY TO RB.
	RO	Check if SI flow should be reduced:
		• RCS subcooling on TI-499A(B), A(B) TEMP °F, is GREATER THAN 30 °F. **(NO)**
	CRS	GO TO Step 11.
	RO	Check if RB Spray should be stopped:
		• Check if any RB Spray Pumps are running. **(NO)**
	CRS	GO TO Step 12. Observe the CAUTION prior to Step 12.
	RO	Check if RHR Pumps should be stopped: (None running)
	RO	Check if RCS pressure is stable or decreasing. **(YES)**
	BOP	Check if pressure in all SGs is stable or increasing. **(YES)**
	BOP	Check if DGs should be stopped:

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Event Description: Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0

Time	Position	Applicant's Actions or Behavior
		• Verify both ESF buses are energized by offsite power. **(YES)**
		• Stop any unloaded DG. REFER TO SOP-306, EMERGENCY DIESEL GENERATOR.
	RO	Verify equipment is available for Cold Leg Recirculation:
		• Verify power is available for at least one RHR Pump: (NO – both breakers are tripped)
	CRS	GO TO EOP-2.4, LOSS OF EMERGENCY COOLANT RECIRCULATION.
Procedure Caution:		• **If Emergency Coolant Recirculation capability is restored, further recovery action should continue by RETURNING TO the Procedure and Step in effect, since further actions of this procedure are unnecessary.** • **If the suction source is lost to any SI OR RB Spray Pump, the AFFECTED pump should be stopped to prevent pump damage.**
Procedure Note:		**Conditions for implementing Emergency Plan Procedures should be evaluated using EPP-001, ACTIVATION AND IMPLEMENTATION OF EMERGENCY PLAN.**
Procedure Note – Step 1:		**RHR Sump blockage is indicated by decreased and unstable pump amps, discharge pressure, OR discharge flow.**
	CRS	IF both RHR Pumps are secured due to cavitation, THEN GO TO EOP-2.6, RHR SUMP BLOCKAGE, Step 1. **(NO)**

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Event Description: Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0

Time	Position	Applicant's Actions or Behavior
	CRS	Try to restore at least one train of Emergency Coolant Recirculation:
		• Notify TSC personnel of conditions and indications.
Booth Operator's Note:		**If contacted, report that the TSC is still manning. You will call back when it is activated.**
Procedure Caution – Step 2.b:		**Equipment may be in abnormally high radiation areas. Appropriate radiological precautions must be taken to minimize personnel exposure.**
	CREW	Dispatch emergency repair teams as directed by TSC personnel.
	RO	Reset both SI RESET TRAIN A(B) Switches.
	RO	Reset both LATCHED SI RHR SUMP VLV TRAIN A(B) Switches.
	BOP	Ensure two RBCU Fans are running in slow speed (one per train).
	RO	Verify RWST level is GREATER THAN 6%. **(YES)**
	RO	Check if RB Spray should be aligned for recirculation:
		• Verify at least one RB Spray Pump is running. **(NO)**
	CRS	GO TO Step 9.

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Event Description: Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0

Time	Position	Applicant's Actions or Behavior
	RO	Reset Containment Isolation:
		• RESET PHASE A - TRAIN A(B) CNTMT ISOL.
		• RESET PHASE B - TRAIN A(B) CNTMT ISOL.
	RO/BOP	Place both ESF LOADING SEQ A(B) RESETS to:
		• NON-ESF LCKOUTS
		• AUTO-START BLOCKS
	RO	Establish Instrument Air to the RB:
		• Start one Instrument Air Compressor and place the other in Standby.
		• Open PVA-2659, INST AIR TO RB AIR SERV.
		• Open PVT-2660, AIR SPLY TO RB.
Evaluator's Note:		**The RWST Makeup Initiation steps follow. It is likely that the scenario will be terminated before the makeup terminates. All steps (except field operations) are performed by the RO.**
	RO	Add makeup to the RWST:
		• REFER TO SOP-106, REACTOR MAKEUP WATER SYSTEM.
		• Place RX COOL SYS MU to STOP.
		• Place RX COOL SYS MU MODE SELECT to MAN. (Peer √)

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Event Description:	Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0		

Time	Position	Applicant's Actions or Behavior
Procedure Note 2.3:		**Boric Acid flow rate should be set slightly higher than required mixture rate to ensure Boric Acid flow terminates first and lines are flushed with Reactor Makeup Water.**
		• Adjust FCV-113 A & B, BA FLOW SET PT, for desired flow rate.
		• Set FIS-113, BA TO BLNDR FLOW, batch integrator for desired quantity.(Peer √)
		• Adjust FCV-168, TOTAL MU FLOW SET PT, for desired flow rate.
		• Set FIS-168, TOTAL MU FLOW, Batch Integrator for desired quantity. (Peer √)
Booth Operator's Note:		**Determine REMOTE functions for the following step during validation.**
	CREW	Open the following (AB-436):
		• XVD08432-CS, RWST & RHT BA INLET HDR ISOL VALVE.
		• XVD08434-CS, RWST BORIC ACID INLET HEADER ISOL VALVE.
Procedure Note 2.8:		**Normally open XVD08430-CS, BORIC ACID BLENDER INLET ISOL VALVE, is locked closed in Mode 6 in compliance with Technical Specification surveillance requirement 4.9.1.3.**
		• If required, unlock and open XVD08430-CS, BORIC ACID BLENDER INLET ISOL VALVE (AB-412). (N/A)
		• If XVD08430-CS, BORIC ACID BLENDER INLET ISOL VALVE, is open and it is desired to only transfer boric acid to the RWST, place FCV-168B, MU WTR TO BLENDER, in CLOSE.

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Event Description: Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0

Time	Position	Applicant's Actions or Behavior
		• Place RX COOL SYS MU to START.
		• If desired, place FCV-113, A&B, BA FLOW, controller in AUTO.
		Verify the following:
		• Desired flow rate on FR-113, BA TO BLNDR GPM (F-113).
		• Desired flow rate on FR-113, TOTAL MU GPM (F-168).
		• RWST level increases.
	BOP	Check Intact SG levels:
		• NR level in intact SGs >30% [50%] **(YES)**
		• Control EFW flow to maintain 40 [50%]-60% NR level
Procedure Note – Step 5: • **Before the Low Steamline Pressure SI signal is blocked, Main Steam Isolation will occur if the Low Steam Pressure rate setpoint is exceeded.** • **Shutdown margin should be monitored during RCS cooldown.**		
CRITICAL TASK	CRS	Initiate RCS cooldown to Cold Shutdown: **Initiate an RCS cooldown prior to taking any action to reduce SI flow.**
		• Maintain the cooldown rate in the RCS Cold Legs LESS THAN 100 °F/hr.
		• WHEN RCS Tavg is LESS THAN P-12 (552 °F), THEN:
		• Place both STM DUMP INTERLOCK Switches to BYP INTLK.
		• Place both STMLN SI TRAIN A(B) Switches to BLOCK.

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Event Description: Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0

Time	Position	Applicant's Actions or Behavior
		• Close the MS Isolation Valves, PVM-2801A(B)(C), for any FAULTED or RUPTURED SGs.
	BOP	Dump steam from each intact SG to the condenser.
		• Verify permissive C-9 light is bright on XCP-6114-1-3. **(YES)**
Evaluator's Note:		**The crew could elect to leave the MSIVs closed and initiate the cooldown on the Steamline Power Reliefs.**
	BOP	Perform the following:
		• Verify the MS Isolation Valves PVM-2801A, B, C are open for the intact SGs.
	BOP	Place the STM DUMP CNTRL Controller in MAN and closed.
	BOP	Place the STM DUMP MODE SELECT Switch in STM PRESS.
	BOP	Adjust the STM DUMP CNTRL Controller to obtain the desired cooldown rate.
	RO	Check if SI System is in service.
		• Any Charging Pump is running with flow indicated on FI-940(943), CHG LOOP A(B) CLD/HOT LG FLOW GPM. **(YES)**
		OR
		• Any RHR Pump is running in the SI Mode. **(NO)**
	RO	Establish one train of SI flow to conserve RWST inventory:
		• Ensure only one Charging Pump running. Stops one Charging Pump.

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Event Description: Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0

Time	Position	Applicant's Actions or Behavior
		• Verify RCS pressure is LESS THAN 250 psig. **(NO)**
		• IF RHR is NOT the suction source for the Charging Pumps, THEN stop both RHR Pumps. (Neither running)
	CRS	GO TO Step 17.
Lead Evaluator: Terminate the scenario when Step 17 (Verify no backflow from the RWST - - - -) is started.		

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Event Description: Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0

Time	Position	Applicant's Actions or Behavior
		EOP-1.0, ATTACHMENT 3
		Evaluator Note: • **MDEFW Pump "A" and RHR Pump "A" will not be running.** • **There will be no flow from RHR Pump "B" (until it trips) because RCS pressure will remain above the shutoff head.** • **There is a critical task for isolating two Phase "A" lines.**
	BOP	Ensure EFW Pumps are running:
		• Ensure both MD EFW pumps are running. (NO, "A" is failed)
		• Verify the TD EFW Pump is running if necessary to maintain SG levels.
	BOP	Ensure the following EFW valves are open:
		• FCV-3531 (3541)(3551), MD EFP TO SG A(B)(C).
		• FCV-3536(3546)(3556), TD EFP TO SG A(B)(C)
		• MVG-2802A(B), MS LOOP B(C) TO TD EFP.
	BOP	Verify total EFW flow is GREATER THAN 450 gpm. **(YES)**
	BOP	Ensure FW Isolation:
		• Ensure the following are closed:
		• FW Flow Control
		• FW Isolation, PVG-1611A(B)(C).
		• FW Flow Control Bypass, FCV-3321(3331)(3341).
		• SG Blowdown, PVG-503A(B)(C).
		• SG Sample, SVX-9398A(B)(C).
		• Ensure all Main FW Pumps are tripped.

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Event Description:	Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0		

Time	Position	Applicant's Actions or Behavior
		Ensure SI Pumps are running:
		• Two Charging Pumps are running.
		• Both RHR Pumps are running. (NO – "A" is failed and "B" may trip before Attachment 3 is completed)
	BOP	Ensure two RBCU Fans are running in slow speed (one per train).
	BOP	Verify Service Water to the RBCUs:
		• Ensure two Service Water Pumps are running.
		• Ensure both Service Water Booster Pumps A(B) are running.
		• Verify GREATER THAN 2000 gpm flow for each train on:
		• FI-4466, SWBP A DISCH FLOW GPM.
		• FI-4496, SWBP B DISCH FLOW GPM.
	BOP	Verify two CCW Pumps are running.
	BOP	Ensure two Chilled Water Pumps and Chillers are running.
	BOP	Check if Main Steamlines should be isolated: **(NO)**
		• Check if any of the following conditions are met:
		• RB pressure GREATER THAN 6.35 psig. OR
		• Steamline pressure LESS THAN 675 psig. OR
		• Steamline flow GREATER THAN 1.6 MPPH AND Tavg LESS THAN 552°F.
		• Ensure ALL the following are closed:
		• MS Isolation Valves, PVM-2801A(B)(C).

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Event Description: Inadvertent Rx Trip (RTB "A" Fails OPEN); 850 gpm PZR Steam Space Break (After Transition to EOP-1.1), RHR Pump "A" Breaker Trips; Containment Isolation Phase A Valves Fail As-Is (Require Manual Closure); RHR Pump "B" Trips at Transition to EOP-2.0

Time	Position	Applicant's Actions or Behavior
		• MS Isolation Bypass Valves, PVM-2869A(B)(C).
	BOP	Ensure Excess Letdown Isolation Valves are closed:
		• PVT-8153, XS LTDN ISOL.
		• PVT-8154, XS LTDN ISOL.
	BOP	Verify ESF monitor lights indicate Phase A and Containment Ventilation Isolation on XCP-6103, 6104, and 6106.
		REFER TO ATTACHMENT 4, CONTAINMENT ISOLATION VALVE MCB STATUS LIGHT LOCATIONS, as needed.
CRITICAL TASK		**Closes at least one valve in each of the following pairs:**
		• **8100 AND/OR 8112, RCP Seal Water Return Isolations**
		• **2662A AND/OR 2662B, RB Instrument Air Isolations**
	BOP	Verify proper SI alignment:
		• Verify SI valve alignment by verifying SAFETY INJECTION/PHASE A ISOL monitor lights are bright on XCP-6104.
		• Verify all SAFETY INJECTION monitor lights are dim on XCP-6106.
		• Verify SI flow on FI-943, CHG LOOP B COLD/HOT LG FLOW GPM.
		• Check if RCS pressure is LESS THAN 250 psig. **(NO)**
		• Verify RHR flow on: (No pumps running).