Facility: BVPS-1 Scenario No.: 1 Op Test No.: NRC

Examiners: _____ Candidates: _____ CRS

_____ _____ RO

_____ _____ PO

Initial Conditions: MOL, 100% Power, EQU Xe, CB "D" = 228, RCS Boron = 905 PPM (IC 211)

LHSI Pump B OOS. (PMP suction vlv MOV-SI-862B maintenance)

MDAFW B OOS (Pump Brng replacement)

PZR Spray Valve B in manual due to controller problems

Turnover: Reduce power to 90% due to high bushing temperature on the Main Transformer. Engineering is requesting immediate reduction, OPS Mngmt concurs, crew is to use reactivity placard, Rx engineering will provide detailed plan should further reductions be required.

Critical Tasks: Establish 1 train of Quench Spray flow

Establish 1 train of LHSI flow

Event No.	Malf. No.	Event Type*	Event Description
1		(R) RO (N) PO, US	Reduce Power due to high bushing temperature on Main Transformer
2		(I) PO, US (TS) US	First Stage Pressure Transmitter PT-447 Fails Low
3		(I) RO, US (TS) US	Pzr Master Pressure Controller setpoint fails low
4		(C) PO, US	River Water Pump Trip – Manual start of backup pump required
5		(C) RO, US (TS) US	RCS leak (80 gpm)
6		(M) ALL	RCS leak degrades to LOCA (LB)
7		(C) RO	Train A QSS Pump Discharge Valve fails to open in AUTO. Manual operation required
8		(C) PO	LHSI Pump A fails to start in AUTO. Manual start required.

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

Scenario 1
Scenario Overview

The crew will assume the shift with instructions to reduce power to 90% due to high bushing temperature on the Main Transformer. Engineering is requesting immediate reduction, OPS Mngmt concurs, crew is to use reactivity placard, Rx engineering will provide detailed plan should further reductions be required.

When the power reduction has been started, the Turbine First Stage pressure transmitter will fail low. The crew will take action to stop any rod motion and stabilize the plant. Technical Specifications will be addressed for P-13

When the plant is stabilized, the PZR Master Pressure Controller setpoint will fail low, requiring action to stop the RCS pressure decrease. The RO will take manual control of spray and energize PZR backup heaters. Technical Specifications will be addressed.

A River Water Pump will trip, and the backup pump will fail to start, requiring manual start and alignment of the backup pump.

An RCS leak will develop, requiring the crew to raise charging and isolate letdown. The SM/US will evaluate and enter Technical Specifications.

The RCS leak will degrade to a Large Break LOCA, resulting in a reactor trip, SI, CIA and CIB/CNMT Spray actuation.

Train B emergency bus normal feeder will trip on differential, making the bus unavailable.

Train A QSS Pump discharge valve will fail to open in response to an automatic signal. The critical task is to open the valve manually.

Train A LHSI Pump will fail to start automatically. The critical task is to manually start the Train A LHSI pump.

EOP Flow Path: E-0, E-1

(Possibly FR-P.1 on rapid RCS cooldown)

INITIAL CONDITIONS:

- 100% Power, MOL, 905 ppm boron, CB D = 228 steps
- LHSI B OOS
- MDAFW B OOS, Place placard stating FW-P-2 aligned to "B" Header
- PZR Spray Valve B Controller in manual

ADDITIONAL LINEUP CHANGES	STICKERS	VOND MARKINGS
MOV-SI-862B shut /de-energized	YCT	Fig 11-1, G3 MOV-SI-862B SHUT
SI-P-1B PTL	YCT	
FW-P-3B PTL	YCT	Fig 24-2, F5 WT-227 SHUT
PCV-RC-455B controller MANUAL/0%	YCT	Fig 24-2, E5 FW-41 SHUT
TV-DG-108B CLOSED	YCT	Fig 24-2, D7 FW-39 OPEN, FW-36 SHUT
EQUIPMENT STATUS	**DATE/TIME OOS**	**TECHNICAL SPECIFICATION(S)**
SI-P-1B/MOV-SI-862B	Yesterday 0100	3.5.2
FW-P-3B FW-P-2 aligned to "B" Header	Today 0600	3.7.5
PCV-RC-455B	Today 0700	N/A

SHIFT TURNOVER INFORMATION

1. Protected Train is Train "A"
2. High bushing temperature on Main Transformer requires power reduction to 90%
3. SI-P-1B OOS due to maintenance on MOV-SI-862B (pmp suction vlv). Pump WILL NOT be returned this shift

4. FW-P-3B OOS due to pump bearing replacement. FW-P-2 has been aligned to the "B" header. FW-P-3B isolated and WILL NOT be returned this shift
5. PCV-RC-455B in MANUAL and SHUT due to erratic operation in AUTO. PCV-RC-455A is controlling pressure in auto without problems. PCV-RC-455B can be used IN MANUAL ONLY, if required. I&C has been informed
6. Rx Engineering will provide detailed reactivity plans for power reductions less than 90% should they be required

SCENARIO SUPPORT MATERIAL REQUIRED

Reactivity plan placard for MOL

1OM-52.4.B Load Follow Procedure

Placard for FW-P-2 position stating FW-P-2 is aligned to "B" header

Place plaque on wall for Protected Train "A"

Ensure ESF Status Lights LIT for TRAIN "B" LHSI Pmp, HHSI Pmp and FW-P-3B

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #1 Reduce Power due to high bushing temperature on Main Transformer			
Lower Reactor Power at least 2%.	Turbine load and reactor power reduction at 12%/Hr or less		Following the Reactivity Plan, Crew lowers reactor power. US directs load decrease. Initiates Turbine load reduction PO initiates turbine load decrease. Set the desired terminal load on the SETTER to < 98% Set the desired rate on the LOAD RATE thumbwheel (5%/min. maximum). As the turbine load reduces, maintain the valve position limiter approximately 5% above turbine load to prevent load excursions.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Depress the GO pushbutton.
			When Power is < 98%, transfer the turbine control to the 1st Stage pressure feedback mode by depressing the 1ST STG IN pushbutton **AND** Verify the following: 1. The 1ST STG OUT lamp is OFF. 2. The 1ST STG IN lamp is ON.
			After transfer to the 1ST Stage pressure feedback mode, Set the desired terminal load on the SETTER.
			Set the desired rate on the LOAD RATE thumbwheel (5%/min. maximum).
			As the turbine load reduces, maintain the valve position limiter approximately 5% above turbine load to prevent load excursions.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Depress the GO pushbutton.
			RO initiates RCS boration as necessary to maintain Tavg-Tref.
			Estimate the volume of boric acid to be added to the RCS using any of the following: a. 1OM-7.5, Figure 7.7, "Boron Addition", **AND** Table 1, "Nomograph Correction Factors". b. WAG tables. c. Reactor Engineer approved computer based methods.
			Estimate the rate of boron concentration change as a function of boric acid flow rate using 1OM-7.5, Figure 7-8, "Boron Addition Rate", **AND** Table 1, "Nomograph Correction Factors".

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Place the 1MU control switch to STOP for greater than 1 second to allow the blender to unarm. (BB-A)
			Place 43/MU control switch to BOR. (BB-A)
			Set [FCV-1CH-113A], Boric Acid to Blender FCV, to the desired boric acid flowrate. (BB-A)
			Set Boric Acid Integrator [YIC-1CH-113] for the desired quantity. (BB-A) a. Reset Boric Acid Integrator [YIC-1CH-113].
			Start the Reactor Makeup Control System by placing 1MU control switch to START. (BB-A)
			Verify boric acid to Blender flow on [FR-1CH-113], Boric Acid Flow. (VB-A)

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
When at 98% or at Lead Examiners (LE) discretion, proceed with next event			Operate the pressurizer spray as required to limit the difference between boron concentration in the pressurizer and that of the RCS to less than 50 ppm. Verify boration automatically stops when Boric Acid Integrator [YIC-1CH-113] reaches the setpoint. (BB-A) When boration is complete, perform the following: a. Place the 1MU control switch to STOP for greater than 1 second. b. Place 43/MU control switch to AUTO. (BB-A) c. Reset Boric Acid Integrator [YIC-1CH-113]. (BB-A) d. Adjust makeup controls for the new RCS boron concentration. e. Place the 1MU control switch to START.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

EVENT #2

First Stage Pressure Transmitter
Fails Low

PT-MS-447 (selected) fails low.

IMF TUR18B (0 0) 0	PT-MS-447 failed low.	Crew notes alarms and informs US that PT-MS-447 failed low.
	Alarms received:	PO informs Crew that PT-447 is the current controlling channel.
	[A6-88], Feedwater Htr Bypass Valve Open	
	[A7-14], LP Feedwater 5th Point Htr 5A Level High	US enters OM 1.24.4.IF, Attachment 5.
	[A7-15], LP Feedwater 5th Point Htr 5B Level High	PO selects HSS-1PM-446 as the controlling channel
	[A7-27], HP Feedwater 1st Point Htr 1B Level High	US directs Power and Temperature to be stabilized
		PO Resets Steam dumps
	[A7-28]Steam Generator Blowdown Flash Tank No. 3 Level High-High	Crew verifies load rejection bistable status lights are off

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	C-20 AMSAC bypassed status light energizes after 3 minutes.		Verify Feedwater Heater bypass valve closed PO places Steam Pressure controller with 0 % output PO adjusts setpoint for equivalent of 1005 psig PO places Steam Dump Controller in STM PRESS Mode and in AUTO PO ensures steam dump valves remain closed PO directs Turbine Plant Operator to re-arm AMSAC per OM 1.45.B.4AAE and 1.45.B.4.AAC.
Not necessary to actually trip B/S once US has identified TS or, at LE discretion, move on to next event			US Directs tripping bistables listed on Table 1 US refers to TS for P-13. TS 3.3.1 item 17F condition P – verify in required state W/I 1 hr (possible DNBR TS 3.4.1 condition A)

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #3	Annunciators:		RO takes manual control of Pressurizer Master Pressure Controller, adjusts to approx. 40% (NSA value)
Pressurizer Master Pressure Control Setpoint Fails Low	[A4-12], Pressurizer Control Low Pressure Deviation		
			RO reduces output of controller to close PORV, Spray.
IOR X07A090P (0 0) 0	Spray Valves open		
	PORV 455C opens		RO energizes pressurizer heaters as required
	PZR Heaters off		
			US refers to TS 3.4.1 for RCS pressure
Once US has referred to TS OR, at LE discretion, proceed to next event			

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT 4			
IMF AUX10A (0 0) **IMF INHINH33 (0 0) (PRE-LOAD)**	1WR-P-1A trips, 1WR-P-1B fails to auto start.		PO recognizes loss of WR-P-1A and reports to US. RO recognizes and reports WR-P-1B failure to auto start. RO manually starts WR-P-1B.
	1WR-P-1B manually started.		
	Alarms received: • A1-40, CC WTR HT EXCH River WTR PP Disch Line 'A' Press Low. • A1-48, CC WTR HT EXCH River WTR PP Disch Line 'B' Press Low. • A1-59, Intake Struct River WTR PP Disch Line 'A' Press Low. • A1-67, Intake Struct River WTR PP Disch Line 'B' Press Low. • A1-82, River Water PP Auto Start-Stop.		US refers to AOP 1.30.2 Loss of River Water/Intake Structure Crew verifies PI-RW-113A,B > 20 PSIG Crew checks Turbine Plant RW system status - SAT US directs WR-P-1C racked onto bus.
When directed to report the status of WR-P-1A, report that the motor windings are hot and smell of burnt insulation Report WR-P-1A breaker tripped on overcurrent **Align WR-P-1C:** **IRF EPS003 (0 0) 0** **IRF EPS005 (0 0) 1** Then report WR-P-1C is racked onto the AE bus			

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
NOTE: WR-P-1C **Must** be aligned to the AE bus before moving to the next event to support the loss of DF bus **WHEN WR-P-1C is aligned to AE bus** then proceed to the next event			
EVENT #5 RCS Leak **IMF RCS02A (0 0) 80** NOTE: Possible E-Plan classification of UE TAB 2.5 Unidentified Leakage or 2.6 Identified leakage since leakage is 80gpm	Annunciators: [A4-71], Radiation Monitor Hi [A4-72], Radiation Monitor Hi-Hi [A1-35], Cnmt Air Total Pressure Hi/Lo Channel 1 [A1-43], Cnmt Air Total Pressure Hi/Lo Channel 2 RM-204 in alarm RM-215A, B in alarm		US refers to AOP-1.6.7, Excessive Primary Plant Leakage Check if PZR level can be maintained RO controls charging flow as necessary to maintain PZR level on program US requests SM to evaluate EPP RO checks if VCT level can be maintained by normal makeup

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	[RM-1MS-102A, B, C], N-16 steam generator leak monitors normal		PO checks secondary plant radiation trends normal
	[RIS-SV100], Condenser Air Ejector Vent is normal		
	[RM-BD-101], High Capacity B/D monitor is normal		Crew may request STA perform leak rate calculation
	PRT pressure, level, and temperature are normal		RO checks PRT conditions consistent with pre-event values
	Slight rise in containment temperature may not be noticeable		RO checks Containment Temperature normal
	Aux Bldg radiation is normal		PO checks Aux Building radiation levels normal
	PZR level remains stable		RO isolates Charging and letdown to check for CVCS leakage
			RO restores Charging and Letdown
	Cnmt pressure is below 5.0 psig. Rise is very slight		RO checks Containment Pressure less than 5.0 psig and stable
The remaining actions are not necessary unless a T.S. determination must be made	[A3-96] is NOT alarming		RO checks annunciator [A3-96] NOT in alarm

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	All RCP Thermal Barrier flows are less than 50 GPM All RCP thermal barrier CCR isolation valves are open [RIS-CC100], CCR radiation monitor, is normal		Crew checks for leakage in CCR system US checks if plant should be shut down Crew performs RCS Water Inventory Balance
Once US has made TS 3.4.13 evaluation, OR at LE discretion, proceed with next event	Leak Rate approximately 80 GPM		US determines leak rate is not within limits of TS 3.4.13 US determines method of plant shutdown

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Event #6			
DBA LOCA			
IMF RCS02D (0 0)	DBA LOCA "A" Loop		Reactor Trip, SI, CIA, CIB/CNMT Spray actuate
PRE-LOAD ITEM:			
DF Buss and #2 EDG are tripped on differential on transfer to off site power. "B" Train **WILL NOT** be restored	Loss of "B" Train components		RO and PO commence immediate actions of E-0, US references E-0 to verify immediate actions.
Crew enters E-0, performs immediate operator actions.			Crew performs IMAs of E-0.
	Reactor trip and bypass breakers - OPEN Power range indication - LESS THAN 5% Neutron flux - DROPPING		RO verifies reactor tripped.
	Throttle Valves - ALL CLOSED OR Governor Valves - ALL CLOSED Main Generator Output Bkrs - OPEN Exciter Circuit Bkr - OPEN		PO verifies turbine tripped.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	AC Emergency Busses - AT LEAST ONE ENERGIZED		PO verifies power to AC Emergency Buses.
	DF Bus De-energized		PO reports DF Bus de-energized, #2 EDG tripped on differential
	Check SI - ACTUATED		RO checks SI status
Crew continues E-0	Manually actuate SI (both trains)		RO manually actuates SI both trains
	Alert Plant Personnel		RO/PO sound Standby Alarm, announce reactor trip and safety injection
	Check [1VS-F-4A(B)], Leak Coll Exhaust Fan - ONE RUNNING		PO checks Leak Collection Exhaust Fan status
When requested to align WR H_2 analyzers insert: **IMF XN02097 (0 0) 1** **IMF XN02105 (0 0) 1** and report actions to the control room	Start CNMT Hydrogen Analyzers Annun A2-97 energizes. Annun A2-105 energizes. H_2 analyzers in service.		Crew directs operator to perform 1OM-46.4.G to place WR H2 analyzers in service
	Charging Pumps – ONE RUNNING LHSI Pumps – NONE RUNNING BIT Flow – INDICATED		RO verifies SI System status

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
CRITICAL TASK – Manually Initiate LHSI Flow in at least one train	SI-P-1A Manually started		RO reports auto start failure of SI-P-1A and manually starts SI-P-1A
	RCPs Manually tripped due to loss of CCR on CIB		RO manually trips RCPs due to CIB/Loss of CCR
	Motor-driven AFW Pumps – FW-P-3A RUNNING Turbine-driven AFW Pump – RUNNING [TV-MS-105A, B] – OPEN Annunciator A7-7, "STM UNAVAILABLE TURB DRIVEN FEED PP FW-P-2" – NOT LIT AFW Throttle Vlvs – FULL OPEN Total AFW Flow – GREATER THAN 370 GPM		PO verifies AFW System status
Refer to PAGE 26 for details of Attachment 1-K	Perform Attachment 1-K in a timely manner		US directs performance of Attachment 1-K when time/manpower permit
	All of Train "B" components are de-energized due to loss of DF buss & #2 EDG		
Critical Task **Initiate Quench Spray Flow prior to completing Attachment 1-K**	QS-P-1A discharge valve MOV-QS-101A fails to auto open, requires manual operation to open.		RO/PO opens MOV-QS-101A, reports to US
	RCPs STOPPED – MONITOR Tcold		RO/PO check RCS Tavg stable at or trending to 547°F
	RCS temperature < 200F due to DBA LOCA		RO reports Tcold < 200F

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Check Recirc Spray Pumps – ANY RUNNING Check Recirc Spray Pumps – Train "A" pumps RUNNING (time delay) Check Recirc Spray Pumps – NOT CAVITATING		RO checks Recirc Spray Pump status
	PORVs – CLOSED Spray Valves – CLOSED Safety relief valves – CLOSED Check PRT conditions – CONSISTENT WITH EXPECTED VALUES Power to at least one block valve – AVAILABLE Block valves – AT LEAST ONE OPEN		RO verifies PZR isolated
	RCPs previously secured due to CIB/Loss of CCR flow		RO checks if RCPs should be stopped
	Pressures in all SGs – ANY DROPPING IN AN UNCONTROLLED MANNER OR ANY SG COMPLETELY DEPRESSURIZED		PO checks if any SGs are faulted. PO reports SGs are not faulted

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Check all SG levels – NONE RISING IN AN UNCONTROLLED MANNER Check Secondary Radiation – CONSISTENT WITH PRE-EVENT VALUES [RM-1BD-101] High capacity SGBD sample [RM-1SV-100] Condenser air ejector vent [RM-1SS-100] SGBD sample [RM-1MS-100A,B,C] Steam relief monitors [RM-1MS-101] FW-P-2 monitor		Crew checks if SG tubes are intact Crew reports SG tubes are intact
	Check the following consistent with pre-event: CNMT Radiation – NO, elevated CNMT Pressure – NO, elevated CNMT Sump Level – NO, elevated		Crew checks if RCS is intact Crew determines the RCS IS NOT intact
Crew transitions to E-1 STEP 1			US directs transition to E-1
NOTE: STA may report entry conditions for FR-P.1 exceeded, crew may enter FR-P.1 and then exit when LHSI flow is verified			US directs STA to monitor status trees.
	Control Room radiation monitor [RM-1RM-218A,B] – NOT IN HIGH ALARM CIB – HAS OCCURRED, CREVS actuated		Crew checks if CREVS should be actuated

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	RCPs previously secured due to CIB/Loss of CCR flow		RO checks if RCPs should be stopped
	Check Recirc Spray Pumps – ANY RUNNING Check Recirc Spray Pumps – "A" Train pumps RUNNING (time delay) Check Recirc Spray Pumps – NOT CAVITATING		RO checks Recirc Spray Pump status
	Pressures in all SGs – ANY DROPPING IN AN UNCONTROLLED MANNER OR ANY SG COMPLETELY DEPRESSURIZED		PO checks if any SGs are faulted. PO reports SGs are not faulted
	Narrow Range Levels – GREATER THAN 31% [50% ADVERSE CNMT]		PO checks intact SG levels PO controls feed flow to intact SGs to maintain NR level between 31% [50% ADVERSE CNMT] and 65%
	Station Inst Air HDR Press - > 100 PSIG		PO checks IA System status

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Check all SG levels – NONE RISING IN AN UNCONTROLLED MANNER Check Secondary Radiation – CONSISTENT WITH PRE-EVENT VALUES [RM-1BD-101] High capacity SGBD sample [RM-1SV-100] Condenser air ejector vent [RM-1SS-100] SGBD sample [RM-1MS-100A,B,C] Steam relief monitors [RM-1MS-101] FW-P-2 monitor		Crew checks if SG tubes are intact Crew reports SG tubes are intact
	Power to the Block Vlvs – AVAILABLE PORVs – CLOSED Block Vlvs – AT LEAST ONE OPEN		RO checks PRZR PORVs and Block Valves
	RCS Subcooling based on core exit TCs > 46F [54F ADVERSE CNMT] Secondary heat sink: Total feed flow to intact SGs – GREATER THAN 370 GPM OR Narrow range level in at least one intact SG – GREATER THAN 31% [50% ADVERSE CNMT]		RO/PO check if SI flow can be reduced RO/PO reports conditions DO NOT support SI flow reduction/termination
	RCS pressure – STABLE OR RISING PRZR level – GREATER THAN 17% [38% ADVERSE CNMT]		
			US directs crew to continue in E-1

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Any Quench spray or recirc spray pump – RUNNING		RO/PO check if CNMT Spray should be stopped
	CNMT pressure – LESS THAN 8 PSIG		RO reports CNMT pressure < 8 PSIG
	Reset CIB		RO resets CIB
	Check SGs – ANY FAULTED		PO checks for faulted SGs
			PO reports SGs are not faulted
	CNMT Pressure - > (-4) PSIG		RO checks CNMT pressure
			RO reports CNMT pressure > (-4) psig
	[1RW-99] RW flow to U2 blowdown vlv – CLOSED		Crew verifies 1RW-99 closed
	[1RW-200] RW flow from Recirc Spray HX throttled as required to maintain CNMT pressure between 8 PSIG and (-4) PSIG		US directs operator to throttle 1RW-200
	SI & CIA - RESET		RO resets SI and CIA

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	RCS Pressure - > 275 PSIG [400 PSIG ADVERSE CNMT] RCS Pressure – STABLE OR RISING LHSI Pumps – ANY RUNNING WITH SUCTION ALIGNED TO THE RWST		RO checks if LHSI Pmps should be stopped RO reports that LHSI pmps should not be stopped
	Check pressures in all SGs – STABLE OR RISING Check RCS Pressure – STABLE OR DROPPING		RO/PO check RCS and SG Pressures RO/PO report SG/RCS pressures as expected for DBA LOCA conditions US directs crew to continue with E-1 based on SG/RCS pressure response
	AE Emergency bus is energized from offsite DF bus is de-energized, #2 EDG not running		PO checks if EDGs should be stopped PO stops #1 EDG
	Attachment 1-F satisfactory for Train "A" components		US directs operators to perform Att 1-F and verify cold leg recirculation capability
Terminate scenario when crew determines Cold Leg Recirc Capability exists for Train "A" components			
After scenario, have the US determine the E-Plan classification			ALERT, TAB 1.2.3, RCS Leak Rate

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Attachment 1-K Verification of Automatic Actions	ALL TRAIN "B" Components are De-energized		
	#1 EDG – RUNNING #2 EDG – NOT RUNNING		Diesel Generators – BOTH RUNNING.
	> 100 psig		Check Station instrument Air Header Pressure – GREATER THAN 100 PSIG.
	Verify [MOV-1MS-100A, B] CLOSED. Reset reheater controller.		Ensure Reheat Steam Isolation.
	CIB - ACTUATED		CCR Pumps – NONE RUNNING.
	Transfer [NR-1NI-45] Nuclear Recorder to operable source and intermediate range displays.		Align Neutron Flux Monitoring For Shutdown.

Facility:	BVPS-1	Scenario No.:	2	Op Test No.:	NRC
Examiners:	_____	Candidates:	_____		CRS
	_____		_____		RO
	_____		_____		PO

Initial Conditions: MOL, 48% power, EQU Xe, CB "D" = 166, RCS Boron = 1121 PPM, (IC-212)
LHSI Pump B OOS. (PMP suction vlv MOV-SI-862B maintenance)
MDAFW B OOS (Pump Brng replacement)
PZR Spray Valve B in manual due to controller problems

Turnover: Reduce power to 40% due to high bushing temperature on the Main Transformer. Engineering is requesting immediate reduction, OPS Mngmt concurs, crew is to use reactivity placard, Rx engineering will provide detailed plan should further reductions be required.

Critical Tasks: Manually Trip the Reactor
Manual start of MDAFW Pump A
Establish Feed with Main Feed flow

Event No.	Malf. No.	Event Type*	Event Description
1		(R) RO (N) PO, US	Reduce Power
2		(I) PO, US (TS) US	SG steam pressure transmitter fails low
3		(TS) US	LHSI A Common Mode failure (TS 3.0.3)
4		(C) RO, US	Letdown Pressure Control Valve, PCV-CH-145, fails closed in AUTO, Manual control functions correctly
5		(C) RO, US	PZR Spray Valve A drifts open in auto
6		(M) ALL	Feed Pump Trip. Reactor Trip required. (Assumes 1 Feed Pump running prior to trip)
7		(C) RO	Auto reactor trip failure. Manual trip required
8		(C) PO	TDAFW Pump overspeed A MDAFW Pump fails to auto start. Manual start available
9		(C) PO	A MDAFW Pump trip. Feed restored using MFP in FR-H.1

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

Scenario Event Description

NRC Scenario 2

The crew will assume the shift at 48% power with directions to reduce power to take the unit off-line due to Main Transformer Bushing problems.

As power is being reduced, one SG steam pressure transmitter will fail requiring the BOP to place the affected FRV in manual and the Unit Supervisor to refer to Technical Specifications.

When the Unit Supervisor has reviewed Technical Specifications, a report of LHSI common mode failure involving MOV-SI-862A will require the US to determine that TS 3.0.3 applies.

When Technical Specifications have been addressed, the Letdown Pressure Control valve will fail closed, requiring the RO to take manual control to restore letdown flow.

When letdown is restored, a PZR Spray valve will drift open in automatic (due to PT-RC-444 drifts high), requiring manual control to close the valve.

When RCS Pressure control is restored, a Main Feedwater pump will trip. Reactor trip is required, but automatic trip is defeated. The reactor must be manually tripped

The TDAFW Pump will overspeed and be unavailable. A MDAFW Pump will fail to automatically start, but may be manually started. After A MDAFW pump is running, it will trip, requiring entry to FR-H.1.

The scenario may be terminated when the crew establishes Main Feedwater flow in FR-H.1.

EOP Flow path: E-0, ES-0.1, FR-H.1

INITIAL CONDITIONS:

- 48% Power, MOL, 1121 ppm boron, CB D = 166 steps
- LHSI B OOS
- MDAFW B OOS, Place placard stating FW-P-2 aligned to "B" Header
- PZR Spray Valve B Controller in manual

ADDITIONAL LINEUP CHANGES	STICKERS	VOND MARKINGS
MOV-SI-862B shut /de-energized	YCT	Fig 11-1, G3 MOV-SI-862B SHUT
SI-P-1B PTL	YCT	
FW-P-3B PTL	YCT	Fig 24-2, F5 WT-227 SHUT
PCV-RC-455B controller MANUAL/0%	YCT	Fig 24-2, E5 FW-41 SHUT
TV-DG-108B CLOSED	YCT	Fig 24-2, D7 FW-39 OPEN, FW-36 SHUT
EQUIPMENT STATUS	**DATE/TIME OOS**	**TECHNICAL SPECIFICATION(S)**
SI-P-1B/MOV-SI-862B	Yesterday 0100	3.5.2
FW-P-3B FW-P-2 aligned to "B" Header	Today 0600	3.7.5
PCV-RC-455B	Today 0700	N/A

SHIFT TURNOVER INFORMATION

1. Protected Train is Train "A"
2. High bushing temperature on Main Transformer requires power reduction to 40%
3. SI-P-1B OOS due to maintenance on MOV-SI-862B (pmp suction vlv). Pump WILL NOT be returned this shift

4. FW-P-3B OOS due to pump bearing replacement. FW-P-2 has been aligned to the "B" header. FW-P-3B isolated and WILL NOT be returned this shift
5. PCV-RC-455B in MANUAL and SHUT due to erratic operation in AUTO. PCV-RC-455A is controlling pressure in auto without problems. PCV-RC-455B can be used IN MANUAL ONLY, if required. I&C has been informed
6. Rx Engineering will provide detailed reactivity plans for power reductions less than 40% should they be required

SCENARIO SUPPORT MATERIAL REQUIRED

Reactivity plan placard for MOL

1OM-52.4.B Load Follow Procedure

Placard for FW-P-2 position stating FW-P-2 is aligned to "B" header

Place plaque on wall for Protected Train "A"

Ensure ESF Status Lights LIT for TRAIN "B" LHSI Pmp, HHSI Pmp and FW-P-3B

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #1 Reduce Power			Crew commences power reduction in accordance with approved reactivity plan.
	Power lowering.		US directs load decrease PO initiates Turbine Load decrease PO transfers the turbine control to the 1st Stage pressure feedback mode by depressing the 1ST STG IN pushbutton **AND** Verify the following: 1. The 1ST STG OUT lamp is OFF. 2. The 1ST STG IN lamp is ON. After transfer to the 1ST Stage pressure feedback mode, Set the desired terminal load on the SETTER. Set the desired rate on the LOAD RATE thumbwheel (5%/min. maximum).

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			As the turbine load reduces, maintain the valve position limiter approximately 5% above turbine load to prevent load excursions. Depress the GO pushbutton. RO initiates RCS boration as necessary to maintain Tavg - Tref Estimate the volume of boric acid to be added to the RCS using any of the following: a. 1OM-7.5, Figure 7.7, "Boron Addition", **AND** Table 1, "Nomograph Correction Factors". b. WAG tables. c. Reactor Engineer approved computer based methods. Estimate the rate of boron concentration change as a function of boric acid flow rate using 1OM-7.5, Figure 7-8, "Boron Addition Rate", **AND** Table 1, "Nomograph Correction Factors".

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Place the 1MU control switch to STOP for greater than 1 second to allow the blender to unarm. (BB-A)
			Place 43/MU control switch to BOR. (BB-A)
			Set [FCV-1CH-113A], Boric Acid to Blender FCV, to the desired boric acid flowrate. (BB-A)
			Set Boric Acid Integrator [YIC-1CH-113] for the desired quantity. (BB-A) a. Reset Boric Acid Integrator [YIC-1CH-113].
			Start the Reactor Makeup Control System by placing 1MU control switch to START. (BB-A)

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Verify boric acid to Blender flow on [FR-1CH-113], Boric Acid Flow. (VB-A)
			Operate the pressurizer spray as required to limit the difference between boron concentration in the pressurizer and that of the RCS to less than 50 ppm.
			Verify boration automatically stops when Boric Acid Integrator [YIC-1CH-113] reaches the setpoint. (BB-A)
			When boration is complete, perform the following: a. Place the 1MU control switch to STOP for greater than 1 second. b. Place 43/MU control switch to AUTO. (BB-A) c. Reset Boric Acid Integrator [YIC-1CH-113]. (BB-A) d. Adjust makeup controls for the new RCS boron concentration. e. Place the 1MU control switch to START.
Proceed with next event at Lead Examiners (LE) discretion			

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #2 SG B Steam Pressure Transmitter failure **IMF MSS16E (0 0) 0**	PT-MS-485 Fails low. [A7-49] Loop 2 Steam Line Press Low or Press Rate High [A7-50], Loop 2 Feedwater Flow Greater than Steam Flow [A7-53], Steam Generator 1B Level Deviation from Setpoint		
			US refers to 1OM-24.4.IF
	Feedwater flow decreases causing SG levels to decrease.		
			US determines that 1OM-24.4.IF Attachment 4 is to be implemented. PO determines which channel has failed by comparing with other steam flow indicators.
	SG level stabilizes.		PO places "B" SG FRV in manual and stabilizes steam generator level. PO selects redundant steam flow transmitter by placing FC-1FW-488 to FM-486 position.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			PO returns "B" FRV to auto when SG level is returned to normal range.
NOTE: It is not required to trip B/S, may proceed to next event at LE discretion			
If requested to trip bistables:			
IOR XS03C23 1	Protection CH III door 18 open		
IMF BST-RCS056 (0 0) 0	BS-488B tripped		
IMF BST-RCS157 (0 0) 0	BS-488C tripped		
DOR XS03C23	Protection CH III door 18 closed		
IOR XS03C23 1	Protection CH III door 35 open		
IMF BST-RCS092 (0 0) 0	BS-485A Tripped		
IMF BST-RCS102 (0 0) 0	BS-485B Tripped		
DOR XS03C23	Protection CH III door 35 closed		

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #3 Report of LHSI Common Mode Failure on LHSI Pump "A"	Report as Plant Engineering that while maintenance was working MOV-SI-862B, they found that MOV-SI-862B was assembled incorrectly and last week, they also assembled MOV-SI-862A incorrectly and it is now also inoperable. The "B" train can be recovered in approximately two hours.		US Refers to Technical Specifications US determines the unit is in LCO 3.0.3
Proceed to next event when US determines that TS 3.0.3 applies or at LE discretion			

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #4 Letdown Pressure Control Valve fails closed in auto			
IOR X06A087P (0 0) 1.0	PCV-1CH-145 fails closed, resulting in a loss of normal letdown.		
	[A3-107], NRHX Disch Press High.		RO notes indications and alarms. RO notifies US. Refers to ARP.
	Letdown Backpressure rising Letdown flow lowering		US may refer to AOP 1.7.1. Crew minimizes any power changes in progress RO reports zero flow indicated on 1CHS-FI150. RO takes manual control of PCV-1CH-145 and restores letdown flow to previous value. US contacts I&C to investigate failure of PCV-CH-145.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #6,7,8,9			
IMF FWM01A Feed Pump Trip – Reactor Trip. Auto reactor trip fails (Manual available); TDAFW Pump Overspeed. Train A MDAFW Pump Trip 30 seconds after start	Main Feed Pump trips		Crew acknowledges alarms Crew diagnoses Trip of Main Feed Pump
Other failures pre-loaded	[A7-53], Steam Generator 1B Level Deviation from Setpoint [A7-45], Steam Generator 1A Level Deviation from Setpoint [A7-61], Steam Generator 1C Level Deviation from Setpoint		US directs reactor trip when automatic reactor trip fails
CRITICAL TASK: **Manually Trip Reactor**			**RO manually trips reactor**
NOTE: May go undetected due to IMA to trip the reactor IAW AOP 1.24.1			
Crew enters E-0, performs *immediate operator actions.*			Crew performs IMAs of E-0.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Reactor trip and bypass breakers OPEN Power range indication LESS THAN 5% Neutron flux DROPPING		RO verifies reactor tripped.
	Throttle Valves ALL CLOSED OR Governor Valves ALL CLOSED Main Generator Output Bkrs OPEN Exciter Circuit Bkr OPEN		PO verifies turbine tripped.
	AC Emergency Busses AT LEAST ONE ENERGIZED		PO verifies power to AC Emergency Buses.
	Check SI ACTUATED		RO checks SI status
Crew transitions to ES-0.1	SI NOT ACTUATED, NOT REQUIRED		Crew transitions to ES-0.1

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
CRITICAL TASK	Check AFW Pumps – ANY RUNNING		PO verifies AFW status.
Manually Start AFW Pump	FW-P-3B OOS and P2 tripped. FW-P-3A manually started		**Manually starts FW-P-3A in ES-0.1**
	Alert Plant Personnel		Crew sounds Standby Alarm to alert plant personnel
	Check RCS Temperature – STABLE AT OR TRENDING TO 547F		RO checks RCS temperature trend
	If any RCP running, monitor Tavg		
	If no RCP running, monitor Tcold		
	FW-P-3A trips 30 seconds after start		PO notes/reports trip of FW-P-3A and that AFW flow is ZERO
			US directs entry to FR-H.1
	RCS Pressure is > SG pressure		Crew checks if Secondary Heat Sink is required
	RCS Hot Leg Temperature > 350F		
	WR level in at least 2 SGs is above 14%		Crew checks if RCS Bleed and Feed should be initiated
	PZR pressure is <2325 psig		
	PPDWST >27.5 feet		PO checks PPDWST level >27.5 feet
	No AFW pumps available		PO try to establish AFW flow to at least one SG

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	AFW Flow < 370 GPM		US direct establishing alternate AFW flow using the Dedicated AFW pump
			US/Crew continues with FR-H.1
	RCPs – Stopped		RO stop RCPs
CRITICAL TASK:	Condensate system – AVAILABLE		PO try to establish MFW flow to at least 1 SG
Establish MFW Flow to at least 1 SG	[HYV-1FW-100A,B,C] – OPEN		
	FW-P-1B - RUNNING		PO starts FW-P-1B
	SG Feed flow established		PO feeds SGs with BPFRVs
			US/Crew returns to Procedure/step in effect, returns to ES-0.1
Scenario may be terminated when MFW flow is established			
Classify Event at the end of the scenario			SAE Tab 2.2 – CSF RED PATH on HEAT SINK

Facility:	BVPS-1		Scenario No.:	3	Op Test No.: NRC
Examiners:			Candidates:		CRS
					RO
					PO

Initial Conditions: MOL, 67% Power, EQU Xe, CB "D" = 185, RCS Boron = 1037 PPM (IC 213)
LHSI Pump B OOS. (PMP suction vlv MOV-SI-862B maintenance)
MDAFW B OOS (Pump Brng replacement)
PZR Spray Valve B in manual due to controller problems

Turnover: Raise power to 100% at 10% per hour IAW 1OM-52.4.B Load Follow

Critical Tasks: Throttle AFW to limit RCS cooldown rate
Isolate the faulted SG

Event No.	Malf. No.	Event Type*	Event Description
1		(R) RO (N) PO, US	Raise Power
2		(I) RO, US (TS) US	PZR level transmitter fails low
3		(C) PO, US	SG B Feed Flow Transmitter fails LOW
4		(C) ALL (TS) US	Load Rejection approximately 20%
5		(TS) US	C/R Ventilation inoperability, air line downstream of SOV
6		(M) ALL	Turbine Trip. 1 PZR PORV opens and sticks open. (Can be isolated) Reactor Trip possibly required.
7		(C) RO	One Reactor Trip Breaker fails closed. (For later SI reset problem)
8		(C) PO	ADV on each SG sticks open on trip. When one ADV is closed, crew will go to E-2 and isolate SG

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

The crew will assume the shift with directions to raise power from 67% to 100% IAW 1OM-52.4.B Load Follow at 10%/Hr

When the power increase has been started, a PZR level transmitter will fail low. The crew will be required to control charging and letdown manually and switch to an operable PZR level channel. The US will refer to technical specifications.

When the plant is stable, a feed flow transmitter will fail on SG B. The crew will take manual control of the FRV on SG B to stabilize the plant.

When SG level is stable, a load rejection of approximately 20% will occur. The crew will stabilize the plant using control rods and steam dump, and the US will refer to technical specifications.

A report of Control Room Ventilation inoperability will require the US to determine TS actions

A turbine trip will occur. A PZR PORV will open and stick open. It may be isolated by the block valve, but reactor trip will occur or be required.

One reactor trip breaker will fail closed, requiring additional action for SI termination later in the event.

One ADV on each SG will stick open on the trip. When one ADV is closed in accordance with ECA-2.1, the crew may transition to E-2.

The scenario may be terminated when the crew completes E-2 and transitions to ES-1.1

EOP Flow Path: E-0, E-2, ECA-2.1, E-2, ES-1.1

INITIAL CONDITIONS:

- 67% Power, MOL, EQU Xe, 1037 ppm boron, CB D = 185 steps
- LHSI B OOS
- MDAFW B OOS, Place placard stating FW-P-2 aligned to "B" Header
- PZR Spray Valve B Controller in manual

ADDITIONAL LINEUP CHANGES	STICKERS	VOND MARKINGS
MOV-SI-862B shut /de-energized	YCT	Fig 11-1, G3 MOV-SI-862B SHUT
SI-P-1B PTL	YCT	
FW-P-3B PTL	YCT	Fig 24-2, F5 WT-227 SHUT
PCV-RC-455B controller MANUAL/0%	YCT	Fig 24-2, E5 FW-41 SHUT
TV-DG-108B CLOSED	YCT	Fig 24-2, D7 FW-39 OPEN, FW-36 SHUT
EQUIPMENT STATUS	**DATE/TIME OOS**	**TECHNICAL SPECIFICATION(S)**
SI-P-1B/MOV-SI-862B	Yesterday 0100	3.5.2
FW-P-3B FW-P-2 aligned to "B" Header	Today 0600	3.7.5
PCV-RC-455B	Today 0700	N/A

SHIFT TURNOVER INFORMATION

1. Protected Train is Train "A"
2. Raise Power to 100% at 10%/Hr IAW 1OM-52.4.B
3. SI-P-1B OOS due to maintenance on MOV-SI-862B (pmp suction vlv). Pump WILL NOT be returned this shift

4. FW-P-3B OOS due to pump bearing replacement. FW-P-2 has been aligned to the "B" header. FW-P-3B isolated and WILL NOT be returned this shift
5. PCV-RC-455B in MANUAL and SHUT due to erratic operation in AUTO. PCV-RC-455A is controlling pressure in auto without problems. PCV-RC-455B can be used IN MANUAL ONLY, if required. I&C has been informed

SCENARIO SUPPORT MATERIAL REQUIRED

Reactivity plan placard for MOL

Reactivity plan for power increase to 100% at 10%/Hr

1OM-52.4.B Load Follow Procedure

Placard for FW-P-2 position stating FW-P-2 is aligned to "B" header

Place plaque on wall for Protected Train "A"

Ensure ESF Status Lights LIT for TRAIN "B" LHSI Pmp, HHSI Pmp and FW-P-3B

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #1			
			US assumes control and directs Operators to increase reactor power to 100% IAW 1OM-52.4.B Part B
Raise power to 100%	*Turbine load and reactor power* increasing at 10/hr.		Crew reviews/agrees with reactivity plan. US approves for use. Crew begins power increase.
	[AM-MS-464B] set at 1005 psig		PO verifies steam dump controller setpoint
	VPL Light – OFF		
	The 1ST STG OUT light – OFF		PO transfers turbine control to 1st IN mode
	The 1ST STG IN light - ON		
	Power has remained above 50% since the last startup at the end of the refueling outage		US/Crew review procedure steps for initial power increase > 50% and determine steps shall be monitored as applicable for axial flux, QPTR
			Crew initiates load increase
	SETTER - *set to desired load*		PO sets the SETTER to desired load
	Load rate setting verified		PO sets the load rate thumbwheel to 1%/min

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	VPL adjusted during power increase as required		PO maintains VPL set approximately 5% above turbine load during power increase
	Turbine load increasing		PO depresses GO pushbutton, informs crew that turbine load is increasing
	Parameters maintained W/I limits: Axial Flux RIL Generator PF Exciter base at NULL (zero) Tavg equal to Tref (± 2F)		Crew monitors plant parameters and maintains W/I limits
Proceed with next event after 2% power increase OR at Lead Examiners (LE) discretion			Crew notifies chemistry to sample RCS as required for power changes > 15% in one hour

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

EVENT #2

When directed by Lead Evaluator:

Controlling Pressurizer Level Instrument Fails low

IMF PRS06A (0 0) 0	LT459 fails low.	RO recognizes problem with PRZR level channel, informs US.
	The following alarms actuate: [A3-58] CHARGING PUMP DISCH FLOW HIGH-LOW [A3-78] REACT COOL PP SEAL INJECTION FLOW LOW [A4-3] PRESSURIZER CONTROL LOW LEVEL [A4-4] PRESSURIZER CONTROL LOW LEVEL DEVIATION [A4-35] PRESSURIZER CONTROL HEATER GROUP AUTO TRIP	
	PRZR heaters off.	Crew refers to ARPs as necessary, then 1OM-6.4.IF Attachment 1.
	Letdown isolates	
		RO informs US that LT459 failed low.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
NOTE: It is not required to trip the B/S, may proceed to next event at LE discretion			US directs Operator to defeat LT459 control function with PRZR level selector switch. RO places [HSS-1LM-459], PRZR Level Channel Sel Switch, in POS 3 461 460
When directed to Trip Bistable:			RO places PRZR level channel recorder to controlling channel
IOR XS03A23 1	Protection Rack 1 Door 3 Open		RO informs US that Channels 460 and 461 are selected.
IMF BST-RCS035 (0 0) 0	BS-459A-1 tripped		
DOR XS03A23	Protection Rack 1 Door 3 Closed		Crew ensures adequate VCT makeup, proper PRZR heater operation, and proper charging flow control. Crew establishes letdown per 1OM-74.AF, Restoring Charging and Letdown
	Table 3.3.1-1, Function 9		US refers to Tech. Spec. 3.3.1, 3.3.4 and 3.3.3 (PAMS) RO informs the US that letdown has been reestablished.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Per Tech. Spec. requirements, Crew directs I&C to trip appropriate bistable within one hour.
EVENT 3			
IMF FWM014 (0 0) 0, selected feedwater flow transmitter fails low.	Feed flow transmitter FT-FW-487 (B SG) fails low. Annunciators: • A7-56, Loop 2 Steam-Feedwater Flow Mismatch. • A7-50, Loop 2 Feedwater Flow greater than Steam Flow. • A7-53, SG 1B Level Deviation from setpoint. SG feed flow, NR level rises.		PO notes problem with SG level control, takes manual control of SG level.
	FCV-FW-488 modulates closed in automatic.		Crew determines Feed Flow transmitter failed.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
NOTE: Level deviation dependent on time of establishing normal MFRV control to restore SG level.	SG level control in manual.		
			Crew refers to ARPs and 1OM-24.4.IF ATT 2.
			US directs PO to restore SG level to normal value.
			US directs I&C to investigate Feed Flow Transmitter failure.
			Crew implements 1OM-24.4.IF ATT 2.
	FT-FW-487 failed low		Crew identifies FT-FW-487 has failed low
	FCV-488 previously placed in MANUAL		PO maintains SG level via manual control of FCV-488
	Redundant feed flow channel selected		PO places FC-1FW-488 to the FM-486 position
	Redundant steam flow channel selected		PO places FC-1FW-488 to the FM-485 position
	FCV-FW-488 in auto		US directs PO to place FCV-FW-488 in auto when "B" SG level at program and stable

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
NOTE: It is not required to trip B/S, may proceed to next event at LE discretion			US contacts I&C to trip B/S
If desired to trip B/S:			
IOR XS03C23 1	Protection channel 3 rack 18 door open		
IMF BST-RCS056 (0 0) 0	BS-488B tripped		
IMF BST-RCS157 (0 0) 0	BS-488C tripped		
DOR XS03C23	Protection channel 3 rack 18 door closed		

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

EVENT #4

Valve Position Limiter failure

(Load Reject – VPL fails to 25%)

IMF TUR15 (0 0) 25

Crew acknowledges alarms, notifies US and investigates.

NOTE: Control Rods may be in manual at the start of the event due to the controlled power increase

Power decreasing.

Crew informs US of the loss of electrical load.

Tavg increasing.

Steam Dumps opening

US refers to AOP 1.35.2

Pressure increasing.

MW decreasing.

Control Rods inserting. Tavg dropping to Tref

RO places control rods in AUTO

Crew sounds standby alarm and announces Unit 1 load rejection.

Expected alarms:

[A4-46], Tavg Deviation from Tref

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	[A4-124], Rod Control Bank D Low Low *(Possible)*		May initiate Emergency Boration
	[A4-12], Pressurizer Control Low Pressure Deviation		
	[A4-52], Delta Flux Out of Target Band		
	EHC system normal except for valve position limiter.		PO verifies Normal EHC Operation.
	Valve position limiter failure; vibration and load satisfactory for condition.		Crew checks if governor valves have closed in sequence, checks turbine vibration recorders.
			Crew monitors for subsequent load reductions > 90 Mwe.
	Generator load > 270 MW and vacuum is greater than 27 inches HG.		Crew checks if turbine should be tripped, verifies load is greater than 270 MW and if vacuum is adequate.
	Generator output breakers closed. Generator volts, amps, and power factor satisfactory.		PO verifies if the main generator is on line.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Tavg being reduced to Tref value.		RO checks Tavg-Tref within 2°F.
			PO resets Steam Dump Controller
	Steam Dump valves closed		• Verifies steam dump valves closed • Places steam dump control mode to reset • Allows switch to spring return to Tave position
	Bistables are extinguished		• Verifies load rejection bistables NOT lit
			US notifies Wadsworth (FE) system control center and Duquesne light system control center
Crew may perform actions to recover GV control from the valve position limiter; 10M-26.4.AK is the appropriate procedure.			US directs I&C to investigate problem with governor valve.
			US checks for load reduction of> 15% and informs Chemistry, if necessary.
	TV-1CN-100 closed		Crew checks TV-1CN-100 closed.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Supervisory limits-normal.		Monitor Turbine Supervisory Limits
Continue with scenario when limiter problem is identified, Tavg-Tref is within 2°F, and TS actions have been identified OR at LE discretion			Crew should review Tech. Spec 3.2.3 to ensure compliance.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #5			
C/R Ventilation inoperability **IMF XN11018 (0 0) 1**	Annunciator: [A11-18], Control Room Temp Control Press Low		US declares control room ventilation inoperable
If requested to investigate, report that the intake damper air line downstream of SOV 112 is broken Report as investigating operator that the leak can be isolated by shutting VS-194-1 and VS-581			US determines TS 3.7.10 Condition "A" applies 7 days to repair
Proceed to next event at LE discretion			

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #6, 7, & 8			
Turbine Trip – Reactor Trip. One RTB Fails to open; One PZR PORV sticks open but may be isolated; Condenser Steam Dumps fail to operate,1 ADV on each SG fails open **IMF TUR01 (0 0)** Other failures preloaded			Crew diagnoses Turbine Trip – Reactor Trip
Crew enters E-0, performs immediate operator actions.			Crew performs IMAs of E-0.
	Reactor trip and bypass breakers – OPEN **"B" Trip breaker stuck CLOSED** Power range indication - LESS THAN 5% Neutron flux - DROPPING		RO verifies reactor tripped.
	Throttle Valves - ALL CLOSED OR Governor Valves - ALL CLOSED Main Generator Output Bkrs - OPEN Exciter Circuit Bkr - OPEN		PO verifies turbine tripped.
	AC Emergency Busses - AT LEAST ONE ENERGIZED		PO verifies power to AC Emergency Buses.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Check SI - ACTUATED		RO checks SI status
Crew continues E-0	Manually actuate SI (both trains)		RO manually actuates SI both trains
	Alert Plant Personnel		RO/PO sound Standby Alarm, announce reactor trip and safety injection
	Check [1VS-F-4A(B)], Leak Coll Exhaust Fan - ONE RUNNING		PO checks Leak Collection Exhaust Fan status
When requested to align WR H_2 analyzers insert: **IMF XN02097 (0 0) 1** **IMF XN02105 (0 0) 1** and report actions to the control room	Start CNMT Hydrogen Analyzers Annun A2-97 energizes. Annun A2-105 energizes. H_2 analyzers in service.		Crew directs operator to perform 1OM-46.4.G to place WR H2 analyzers in service
	Charging Pumps – TWO RUNNING LHSI Pumps – TWO RUNNING BIT Flow – INDICATED		RO verifies SI System status

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Motor-driven AFW Pumps – RUNNING Turbine-driven AFW Pump – RUNNING [TV-MS-105A, B] – OPEN Annunciator A7-7, "STM UNAVAILABLE TURB DRIVEN FEED PP FW-P-2" – NOT LIT AFW Throttle Vlvs – FULL OPEN Total AFW Flow – GREATER THAN 370 GPM		PO verifies AFW System status
	Perform Attachment 1-K in a timely manner		US directs performance of Attachment 1-K when time/manpower permit
NOTE: Attachment 1-K detail starts on page 32 of this scenario	ATTACHMENT 1-K DISCREPANCIES FW-P-3B on clearance SI-P-1B on clearance		
NOTE: If crew does not identify the stuck open SG Atmospheric relief valves in E-0, they will identify this in E-2	Tavg < 547°F and dropping rapidly. RCPs OPERATING – MONITOR Tavg RCPs STOPPED – MONITOR Tcold		RO/PO check RCS Tavg stable at or trending to 547°F, report Cold Leg temperatures dropping. Crew identifies atmospheric relief valves on each SG stuck open

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Check Recirc Spray Pumps – ANY RUNNING -- NO Check Recirc Spray Pumps – ALL RUNNING -- NO Check Recirc Spray Pumps – NOT CAVITATING		RO checks Recirc Spray Pump status
	PORVs – CLOSED **PCV-RC-455C FAILED TO RESEAT, ISOLATED BY BLOCK VALVE** Spray Valves – CLOSED Safety relief valves – CLOSED Check PRT conditions – CONSISTENT WITH EXPECTED VALUES Power to at least one block valve – AVAILABLE Block valves – AT LEAST ONE OPEN		RO verifies PZR isolated
	D/P between RCS pressure and highest SG pressure – LESS THAN 200 PSID [350 PSID ADVERSE CNMT] AND HHSI Flow – INDICATED		RO checks if RCPs should be stopped
	Stop all RCPs (possible)		RO stops RCPs if required
	Pressures in all SGs – ANY DROPPING IN AN UNCONTROLLED MANNER OR ANY SG COMPLETELY DEPRESSURIZED		PO checks if any SGs are faulted. PO reports indications of one or more faulted SGs

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Crew transitions to E-2 STEP 1			US directs transition to E-2 US directs STA to monitor status trees.
As U-2 operator, when requested, report proper CREVS actuation.	Check CREVS actuated: Control room air intake and exhaust dampers – CLOSED Request U2 operator to verify CREVS actuation Commence Control Room ventilation actions IAW ATT 4-E		PO verifies CREVS actuated, requests Unit 2 CREVS verification.
	Check All yellow SLI marks – LIT		Crew verifies steam line isolation.
	Check all SG pressures – ANY STABLE OR RISING		PO checks for any non-faulted SG. PO reports all SG pressures reducing in an uncontrolled manor US directs transition to ECA-2.1
Crew transitions to ECA-2.1.	All SGs pressures DROPPING.		PO checks all SGs pressure boundaries
	"A" MDAFW is running		PO checks motor-driven AFW Pumps – AT LEAST ONE RUNNING.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	MOV-MS-105 – CLOSED		Close [MOV-1MS-105], AFW TURB Steam Isolation Valve Check SG isolation
	Steamline Isolation has occurred – all indicating lights with YELLOW SLI mark – LIT.		• Steam Line isolation
	Feedwater isolation has occurred – all indicating lights with GREEN FWI mark – LIT.		• Feedwater isolation
	ADVs are open on each SG		• PO reports all SG atmospheric relief valves open
	PCV-MS-104 – CLOSED		• Residual Heat Release Valve
	[TV-1BD-100A, B, C], SG Bldn CNMT Isol Vlv CLOSED.		• SG B/D Ctmt isolation valves
			Attempt to close ADVs or dispatch an operator to manually close valves or isolation valves, one loop at a time Crew monitors shutdown margin during RCS cooldown.
			• US requests Chemistry obtain hourly RCS boron samples.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			When boron results are reported, US verifies RCS boron concentration is greater than the 200F boron concentration required by CB-27A, "Minimum Shutdown Boron Concentration Vs. Burnup, 1.77% ΔK/K".
CRITICAL TASK:	50 gpm feed flow to each SG.		**PO controls feed flow to minimize RCS Cooldown.**
Control AFW Flow to minimize RCS Cooldown	SG NR levels < 65%		PO controls feed flow to maintain < 65% level
	Checks RCS hot leg temperatures – STABLE OR DROPPING.		PO controls feed flow to maintain RCS hot leg temperatures stable
	PI-1IA-106 indicates > 100 psig.		PO checks station Instrument Air Header Pressure on [PI-1IA-106] – GREATER THAN 100 PSIG.
	D/P between RCS pressure and highest SG pressure – LESS THAN 200 PSID [350 PSID ADVERSE CNMT] AND HHSI Flow – INDICATED		RO checks if RCPs should be stopped. RO does not stop RCPs

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Power to [MOV-1RC-535, 536, 537} PRZR PORV Isol MOVs – AVAILABLE		RO checks PRZR PORVs and Block Valves.
	PRZR pressure – LESS THAN 2325 PSIG.		
	[PCV-1RC-456, 455D] PRZR PORVs – CLOSED.		RO reports PCV-RC-455C failed to reseat, and is now isolated by MOV-RC-535 Block Valve
	PRZR PORVs ISOL MOVs - AT LEAST ONE OPEN		
	Check all SG levels – NONE RISING IN AN UNCONTROLLED MANNER.		PO checks if SG tubes are intact PO reports SG tubes intact
	Check secondary radiation trend values on recorders is CONSISTENT WITH PRE-EVENT VALUES.		PO reports secondary radiation consistent with pre-event
	SI Train B will not reset. RTB B is closed		RO/PO reset SI, report status due to "B" trip breaker RO/PO reset CIA/CIB

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	LHSI Pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST		RO checks if LHSI Pumps should be stopped.
	RCS pressure is GREATER THAN 275 PSIG [400 PSIG ADVERSE CNMT].		
	Check RCS pressure – STABLE OR RISING		RO stops LHSI Pumps AND place in AUTO.
	CIB NOT actuated. Spray not running		RO/PO check if Containment Spray should be stopped
	RCS Hot Leg temps are >370F		RO/PO check if SI Accumulators should be isolated
Isolate 1 SG at a time on performance of step 14	RCS Subcooling based on CETCs > 46F [54F ADVERSE CNMT]		Check if SI flow should be reduced
	RCS Pressure stable or rising		
	PZR - >17% [38% ADVERSE CNMT]		

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
NOTE Obtain concurrence from LE prior to isolating any SGs When directed, isolate one SG by use of the following			
IRF MSS07 (0 0) 0	MS-23 CLOSED, PCV-MS-101A isolated		
IRF MSS08 (0 0) 0	MS-24 CLOSED, PCV-MS-101B isolated		
IRF MSS09 (0 0) 0	MS-25 CLOSED, PCV-MS-101C isolated		
IRF FWM34 (0 0) 0	MS-15 CLOSED, Stm Sup to FW-P-2		
IRF FWM35 (0 0) 0	MS-16 CLOSED, Stm Sup to FW-P-2		
IRF FWM36 (0 0) 0	MS-17 CLOSED, Stm Sup to FW-P-2		
Critical Task: Isolate at least one SG	SG press rising in 1 SG.		**PO report ADV on at least one SG isolated and its associated pressure rising** US determine that SI Termination sequence has begun, and will be completed through step 23 prior to transition to E-2 PO energize 4160 V and 480 V stub busses Verify Ctmt Instrument Air available
	Station Air > 100 psig TV-1IA-400 Open		

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Ctmt Air > 85 psig		
	CH-P-1B Charging stopped and in auto		RO stop all but 1 Charging Pump
	RCS pressure rising		RO check RCS Pressure stable or rising
	[MOV-SI-867A,B,C,D] – SHUT		Isolate the BIT
	[FCV-CH-122] – CLOSED		Establish normal Charging flow
	[MOV-CH-310] – OPEN		
	[MOV-CH-289] - OPEN		
	[FCV-CH-122] adjusted as required		Control Charging flow to maintain PZR level
	LHSI Pumps – ANY RUNNING WITH ITS SUCTION ALIGNED TO RWST		Check if LHSI pumps should be stopped
	SI-P-1A stopped and in auto		RO stops SI-P-1A and places in auto
	SI Auto Recirc Changeover - RESET		Reset SI Auto Recirc Changeover
	RCS Subcooling > 46F [54F ADVERSE CNMT]		Verify SI flow not required
	PZR Level >17% [38% ADVERSE CNMT]		
			SI Termination steps complete, US directs return to E-2

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Crew transitions to E-2 STEP 1			US directs transition to E-2
CRITICAL TASK was performed in ECA-2.1 – ISOLATE A FAULTED SG			US directs STA to monitor status trees.
As U-2 operator, when requested, report proper CREVS actuation.	Check CREVS actuated: Control room air intake and exhaust dampers – CLOSED		PO verifies CREVS actuated, requests Unit 2 CREVS verification.
	Request U2 operator to verify CREVS actuation		
	Commence Control Room ventilation actions IAW ATT 4-E		
	Check All yellow SLI marks – LIT		Crew verifies steam line isolation.
	Check all SG pressures – ANY STABLE OR RISING		PO checks for any non-faulted SG

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Check all SGs pressure – ANY SG PRESSURE DROPPING IN AN UNCONTROLLED MANER OR ANY SG COMPLETELY DEPRESSURIZED		PO identifies "B & C" SGs as faulted.
	"B & C" SG pressure dropping uncontrollably.		
	Check FWI – PREVIOUSLY VERIFIED		Crew isolates faulted (B & C) SGs
	HYV-1FW-100B,C closed		PO verifies "B & C" SG CNMT isolation vlv closed
	FCV-FW-488, 498 closed.		PO verifies "B & C" MFRV closed.
	FCV-FW-489, 499 closed.		PO verifies "B & C" BPFRV closed.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	MOV-FW-151A, B, C, D closed.		PO closes MOV-FW-151A, B, C, D.
IRF FWM35 (0 0) 0 IRF FWM36 (0 0) 0	MS-16 CLOSED MS-17 CLOSED.		Crew addresses the fact that TDAFW supply valve MS-16 is NSA open, it must be closed and MS-17 is NSA shut.
	PCV-MS-101A,B,C – OPEN. HCV-MS-104 closed.		RO/PO verify "B & C" S/G atmospheric dump valve and RHR valve closed. PO reports PCV-MS-101A,B,C are open
	Check [1WT-TK-10] PPDWST level - > 27.5.FEET		Crew checks PPDWST level > 27.5 feet

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Check all SG levels – NONE RISING IN AN UNCONTROLLED MANNER		Crew checks if SG tubes are intact.
			SG tubes are intact
	Check Secondary Radiation – CONSISTENT WITH PRE-EVENT VALUES		
	[RM-1BD-101] High capacity SGBD sample		
	[RM-1SV-100] Condenser air ejector vent		
	[RM-1SS-100] SGBD sample		
	[RM-1MS-100A,B,C] Steam relief monitors		
	[RM-1MS-101] FW-P-2 monitor		
			Check if SI flow can be reduced
	SI flow previously reduced/terminated in ECA-2.1		US directs transition to ES-1.1
TERMINATE scenario when crew transitions to ES-1.1			
Classify Event after terminating scenario			UE based on TAB 2.10

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

Attachment 1-K

Verification of Automatic Actions

Diesel Generators – BOTH RUNNING.

Check Station instrument Air Header Pressure – GREATER THAN 100 PSIG.

Ensure Reheat Steam Isolation.

a. Verify [MOV-1MS-100A, B] CLOSED.

b. Reset reheater controller.

Verify CCR Pumps – TWO RUNNING.

Align Neutron Flux Monitoring For Shutdown.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			a. Transfer [NR-1NI-45] Nuclear Recorder to operable source and intermediate range displays.
			Verify River Water System in Service.
			a. RPRW Pumps – TWO RUNNING.
			b. Check CCR Heat EX RW pressure – GREATER THAN 20 PSIG.
			Check If Main Steamline Isolation Required.
			a. Check the following: • CNMT pressure – GREATER THAN 7 PSIG OR

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			• Steamline pressure – LESS THAN 500 PSIG OR • Steamline pressure high rate of change – ANY ANNUNCIATOR LIT - Annunciator A7-41 - Annunciator A7-49 - Annunciator A7-57 b. Verify steamline isolation • YELLOW SLI marks – LIT Check CIB and CNMT S[ray Status • Containment pressure – HAS REMAINED LESS THAN 11 PSIG Verify ESF Equipment Status

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	EXCEPTIONS: SI-P-1B – on clearance FW-P-3B – on clearance		a. Verify SI status by checking all RED SIS marks – LIT b. Verify CIA by checking all ORANGE CIA marks – LIT c. Verify FWI by checking all GREEN FWI marks – LIT Verify Power to Both AC Emergency Busses Upon Completion, Report Any Discrepancies to SM/US

Facility:	BVPS-1	Scenario No.:	4	Op Test No.:	NRC
Examiners:	_____	Candidates:	_____		CRS
	_____		_____		RO
	_____		_____		PO

Initial Conditions: MOL, 4% Power, EQU Xe, CB "D" = 109, RCS Boron = 1426 PPM

Turnover: Raise Power to 100% following a forced outage to repair a Main Steam Safety valve

Critical Tasks: Isolate Ruptured SG

Depressurize RCS to equalize pressure with ruptured SG

Event No.	Malf. No.	Event Type*	Event Description
1		(R) RO (N) PO, US	Raise Power
2		(I) PO, US (TS) US	Intermediate Range Channel N-35 Failure
3		(C) RO, US (TS) US	PORV 455D Leakage, isolation required
4		(I) ALL	PT-MS-464 drifts high. Manual control of steam dump position required. Manual rod control for Tavg
5		(C) RO, US (TS) US	RCP High Vibration eventually requires RCP trip
6		(M) ALL	Multiple dropped rods. Reactor trip required
7		(C) ALL	Multiple stuck rods. RCS boration required
8		(M) ALL	SGTR
9		(C) RO	PZR Spray Valve failure. Depressurization using PORV required

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

Scenario Event Description

NRC Scenario 4

The crew will assume the shift at 4% power with instructions to raise power to 100% at 12%/hr.

When the power increase is commenced, Intermediate Range channel N-35 will fail. The US will determine applicable Tech Spec actions and the PO will take action to remove the channel from service.

Subsequent to the IR failure, Pressurizer PORV 455D will begin leaking. The crew will take action to isolate it and the US will determine appropriate Tech Spec action.

When Tech Specs have been addressed, PT-MS-464 will drift high, causing the steam dumps to open and an RCS cooldown. The crew will take action to control steam dumps manually.

When steam dumps are in manual control, an RCP will show signs of increased seal leak off flow and high vibration. US/Crew must evaluate whether continued pump operation is allowed.

Upon determination that pump operation may continue, multiple rods will drop, requiring a manual reactor trip. When the reactor is tripped, several rods will be stuck out, requiring subsequent RCS boration. At some point during performance of ES-0.1, a steam generator tube rupture will develop requiring a Safety Injection and return to E-0

When the crew attempts to depressurize the RCS using spray in E-3, the spray valves will not function, requiring use of a PZR PORV to depressurize the RCS.

The scenario is terminated when the crew completes the RCS depressurization in accordance with E-3.

EOP Flow Path: E-0, ES-0.1, E-0, E-3

INITIAL CONDITIONS:

- 4% Power, EQU Xe, 1426 ppm boron
- Control Bank D at 109 steps

ADDITIONAL LINEUP CHANGES	STICKERS	VOND MARKINGS
TV-DG-108B CLOSED	YCT	
FCV-FW-150A/B	YCT	
AS-29 – CLOSED		Fig 27-1, C3
AS-235 – OPEN		Fig 27-1, C7
MS-42 - OPEN		Fig 26-3, A1
EQUIPMENT STATUS	**DATE/TIME OOS**	**TECHNICAL SPECIFICATION(S)**

SHIFT TURNOVER INFORMATION

1. Train "A" is protected Train
2. Raise Power to 100% at 12%/hr following repairs to a main steam safety valve
3. Aux Steam is supplied from Unit 2, Gland Steam supplied from Aux Steam

SCENARIO SUPPORT MATERIAL REQUIRED

Reactivity placard for MOL

Reactivity Plan for 12%/Hr load increase

1OM-52.4.A step IV.A.6

Place plaque on wall for Train "A" as protected train

Place plaque on wall for Aux Steam Cross Connected to U2

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #1 Raise Power			
			Crew commences power increase in accordance with reactivity plan.
	Power at 4%		
			US references OM-52.4.A to continue power increase.
NOTE: Event 2 may be initiated at Lead Examiners (LE) discretion, BUT, it MUST be initiated prior to blocking the IR trip above P-10 (ie before exceeding 10% power)			
			Estimate the volume of makeup water to be added to the RCS using any of the following: a. 1OM-7.5, Figure 7-9, "Boron Dilution", **AND** Table 7-1, "Nomograph Correction Factors". b. WAG tables. c. Reactor Engineering approved computer based methods.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Estimate the rate of boron concentration change as a function of dilution water flow using 1OM-7.5, Figure 7-10, "Boron Dilution Rate", **AND** Table 7-1, "Nomograph Correction Factors".
			Place the 1MU switch in STOP for greater than 1 second to allow the blender to unarm.
			Place 43/MU control switch to DIL **OR** ALT DIL (BB-A) as directed by the SM/US.
			Set [AM-1CH-114], Blender Total Flow Set Point, to the desired flow rate.
			Set Blender Output Integrator [YIC-1CH-168A] to the desired quantity. (BB-A) a. Reset Blender Output Integrator [YIC-1CH-168A].

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Log the flow totalizer indication, **AND** add to it the number of gallons set into the batch integrator.
			Start the Reactor Makeup Control system by placing 1MU control switch to START. (BB-A)
			Operate pressurizer heaters to initiate automatic spray operation as required so that the difference in boron concentration between the RCS and pressurizer is < 50 ppm.
			Verify dilution automatically stops when Blender Output Integrator [YIC-1CH-168A] reaches the setpoint. (BB-A).
			When dilution is complete, perform the following: a. Place 1MU control switch in STOP for greater than 1 second. (BB-A) b. Place the 43/MU control switch to AUTO. (BB-A)

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			c. Reset Blender Output Integrator [YIC-1CH-168A]. (BB-A) d. Place the 1MU switch to START. e. If in Mode 4, 5 or 6, Record the time the dilution was completed in the Daily Journal. f. Adjust makeup controls for the new RCS boron concentration.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #2 Intermediate Range Channel Failure Before Crew has raised reactor power to greater than 10% and IR trips have been blocked: **IMF NIS02A (0 0) 1E-11** NI-35 FAILURE	[A4-85] NIS Source Range CH I Detector Voltage Trouble		RO acknowledges ANN's and performs a channel check to identify NI-35 as the failed channel. RO insures N-35 NOT selected on NR-45 recorder RO reports diagnosis to US. US refers to AOP 1.2.1B, Intermediate Range Channel Malfunction. Verifies Unit is above P-6 and below P-10 and goes to step 5
	Single Channel (N-35) INOPERABLE		US determines only one channel inoperable, refers to TS 3.3.1, Table 3.3.1-1 Function 4 Reduce power to < p-6 OR Raise Thermal power to> P-10
	N-35 level trip bypassed		US directs RO/PO to LEVEL TRIP switch for N-35 to the BYPASS position

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			US informs I&C of failed N-35 IR instrument
			US directs the Crew to continue with unit startup IAW OM 52.4.A
			RO withdraws rods to raise reactor power to 15 – 18%.
			RO/PO maintain reactor power, T_{avg}, and SG level in preparation for unit synchronization.
Proceed with next event at LE discretion			

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

EVENT #3

PORV Leakage, isolation required

IMF PRS03B (0 0) 5 60

PCV-455D leakage

Alarms received:

- [A4-25 - 28], PRESSURIZER POWER RELIEFSAFETY VALVE LINE DISCHARGE TEMP HIGH.

PCV-455D tailpipe temperature is rising

PORV Block Valve closed.

RO notes indications and alarms, informs US.

US refers to ARP's and AOP 1.6.7

Crew identifies PORV 455D is leaking.

US directs PORV Block Valve closed.

(may consider de-energizing)

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			RO closes PORV Block valve.
Proceed with next event at LE discretion			US determines TS actions • TS 3.4.11 Condition "A" applies
EVENT #4 PT-MS-464 drifts high. Manual control of steam dump position required			
IMF MSS11 (0 0) 1400 300	PT-MS-464 indication slowly rising Annunciator: [A4-46], Tave-Tref Deviation [A4-4], Pressurizer Control Low Level Deviation [A7-45,53,61], Steam Generators A,B,C Level Deviation From Setpoint [A7-2], Condenser Hotwell Level High Low		RO determines that Tave is decreasing RO determines that reactor power is rising PO determines that Condenser Steam Dumps are opening US directs PO to take manual control of Steam Dumps and stop the cooldown

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			PO takes manual control of steam dumps and adjusts as necessary to stop the cooldown
			PO operates steam dumps in manual to control Tavg at previous value
			US contacts I&C to investigate
Proceed with next event when plant has been stabilized OR at LE discretion			
EVENT #5	Annunciator:		RO determines that RCP "A" vibration is increasing
RCP "A" Increasing #1 seal leak off and increasing vibration			
IMF RCS05A (0 0) 1 300	"A" RCP #1 seal L/O slowly increases		
IMF RCS10A (0 0) 10	"A" RCP High Vibration		
	Annunciator: [A3-126] Reactor Cool Pump Vibration High		CREW refers to alarm response
			US directs operator to check RCP vibration monitor (behind VB B)

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			US enters AOP 1.6.8 "Abnormal RCP Operation as directed by ARP
			US refers to AOP step 2.d for high vibration
			Crew verifies Shaft vibration < 20 mills, Frame vibration < 5 mills
	Shaft vibration = 10 mills Frame vibration = 3 mills		Operator reports high vibration on "A" RCP – 10 mills shaft, 3 mills frame
			Crew verifies Shaft vibration < 15 mills, Frame vibration < 3 mills
			US directs STA to monitor vibration for any increase
	RCP Vibration steady		US directs crew to trip the reactor and perform IMAs of E-0 IF Shaft vibration increasing at > 1.0 mill/hr OR Frame vibration increasing at > 0.2 mills/hr
			US directs RO to trip "A" RCP upon completion of IMAs

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	"A" RCP #1 Seal L/O elevated but not in alarm		RO reports slight increase in "A" RCP #1 seal L/O
Proceed with next event when AOP has been addressed OR at LE discretion			Crew monitors "A" RCP seal L/O
EVENT #6, & 7			RO determines more than 1 rod dropped
Dropped Rods; Stuck Rods **IMF CRF01B (2 0)** **IMF CFR04AB (2 5) 1** **IMF CFR04AJ (2 10) 1** **IMF CFR04BI (2 12) 1** **IMF CFR04BT (2 16) 1**	1B Rod Drive MG Set Trips [A4-107], Rod Control MG Set 1B Trip FOUR Control Rods drop to fully inserted position on individual time delays [A4-126], Rod Bottom/Rod Drop [A4-105], Rod Control Urgent Alarm		RO informs crew of loss of Rod Drive MG Set RO informs crew of multiple dropped rods
			US directs RO to trip the reactor
Crew enters E-0, performs immediate operator actions.			Crew performs IMAs of E-0.
	Reactor trip and bypass breakers OPEN Power range indication LESS THAN 5% Neutron flux DROPPING		RO verifies reactor tripped.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Throttle Valves ALL CLOSED OR Governor Valves ALL CLOSED Main Generator Output Bkrs OPEN Exciter Circuit Bkr OPEN		PO verifies turbine tripped.
	AC Emergency Busses AT LEAST ONE ENERGIZED		PO verifies power to AC Emergency Buses.
	Check SI ACTUATED		RO checks SI status
	SI NOT ACTUATED, NOT REQUIRED		RO reports **SI NOT Required**
Crew transitions to ES-0.1			Crew transitions to ES-0.1
	Check AFW Pumps – ANY RUNNING		PO checks AFW system status
	NO AFW pumps running		PO reports NO AFW pumps running
	FW-P-3A,B Manually started		PO Starts Motor Driven AFW Pumps
	Alert Plant Personnel		RO/PO sounds Standby Alarm announces Unit 1 Reactor Trip
	RCPs OPERATING – MONITOR Tavg		RO/PO check RCS Tavg stable at or trending to 547°F
			RO/PO report Tavg responding as expected

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	MSIVs – AT LEAST ONE OPEN Condenser – AVAILABLE Steam Dumps set to maintain steam pressure for no load operation and placed in "Steam Pressure Mode" and automatic operation		Crew Maintains RCS Temperature PO sets condenser steam dumps for post trip operation PO adjusts steam dump settings as necessary to maintain approximately 547F
	Station Inst. Air Pressure > 100 psig		PO checks Station Instrument Air system status
	RCS Tavg < 554F Main FRVs – CLOSED FW-P-3A,B RUNNING FW-P-2 RUNNING (possible) All BPFRVs – CLOSED		RO/PO check Feedwater status PO closes BPFRVs
	One MFP (FW-P-1A) – OPERATING		PO stops all but one MFP
	Total AFW Flow > 370 gpm		PO verifies total AFW flow > 370 gpm
PRE-LOAD ITEM	**FOUR Control Rods NOT FULLY INSERTED**		RO verifies all Control Rods fully inserted RO reports four Control Rods remain at 228 steps US directs RO to begin Emergency Boration

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
NOTE: When Emergency Boration Flow Initiated, OR at LE discretion, proceed with next event	CH-P-1A – RUNNING MOV-CH-350 – OPEN In service BA Transfer Pump placed in FAST Speed Emergence Boration Flow indicates > 30 gpm Charging Flow indicates > 75 gpm Emergency Boration continues until SDM verified SAT		RO Emergency Borates RO opens MOV-CH-350 RO places CH-P-2A to Fast Speed RO verifies FI-CH-150 indicates > 30 gpm RO adjusts FCV-CH 122 for > 75 gpm Emergency Boration continues until 1OST-49.2 completed satisfactorily
EVENT # 8 SG 1A SGTR **IMF RCS03A (0 0) 600**	[A4-71], Radiation Monitoring High PZR level decreasing RCS pressure decreasing		Crew diagnose possible SGTR US directs MANUAL SI and return to E-0
Crew enters E-0, performs immediate operator actions.			Crew performs IMAs of E-0.
	Reactor trip and bypass breakers - OPEN Power range indication - LESS THAN 5% Neutron flux - DROPPING		RO verifies reactor tripped.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Throttle Valves - ALL CLOSED OR Governor Valves - ALL CLOSED Main Generator Output Bkrs - OPEN Exciter Circuit Bkr - OPEN		PO verifies turbine tripped.
	AC Emergency Busses - AT LEAST ONE ENERGIZED		PO verifies power to AC Emergency Buses.
	Check SI - ACTUATED		RO checks SI status
Crew continues E-0	Manually actuate SI (both trains)		RO manually actuates SI both trains
	Alert Plant Personnel		RO/PO sound Standby Alarm, announce reactor trip and safety injection
	Check [1VS-F-4A(B)], Leak Coll Exhaust Fan - ONE RUNNING		PO checks Leak Collection Exhaust Fan status
When requested to align WR H_2 analyzers insert: **IMF XN02097 (0 0) 1** **IMF XN02105 (0 0) 1** and report actions to the control room	Start CNMT Hydrogen Analyzers Annun A2-97 energizes. Annun A2-105 energizes. H_2 analyzers in service.		Crew directs operator to perform 1OM-46.4.G to place WR H2 analyzers in service
	Charging Pumps – TWO RUNNING LHSI Pumps – TWO RUNNING BIT Flow – INDICATED		RO verifies SI System status

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Motor-driven AFW Pumps – RUNNING Turbine-driven AFW Pump – RUNNING [TV-MS-105A, B] – OPEN Annunciator A7-7, "STM UNAVAILABLE TURB DRIVEN FEED PP FW-P-2" – NOT LIT AFW Throttle Vlvs – FULL OPEN Total AFW Flow – GREATER THAN 370 GPM		PO verifies AFW System status
	Perform Attachment 1-K in a timely manner		US directs performance of Attachment 1-K when time/manpower permit
Attachment 1-K detailed on page 26 of this scenario			
	RCPs OPERATING – MONITOR Tavg		RO/PO check RCS Tavg stable at or trending to 547°F
	CIB not actuated, not required		RO checks Recirc Spray Pump status
	PORVs – CLOSED Spray Valves – CLOSED Safety relief valves – CLOSED Check PRT conditions – CONSISTENT WITH EXPECTED VALUES Power to at least one block valve – AVAILABLE Block valves – AT LEAST ONE OPEN		RO verifies PZR isolated

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	D/P between RCS pressure and highest SG pressure – LESS THAN 200 PSID [350 PSID ADVERSE CNMT] AND HHSI Flow – INDICATED		RO checks if RCPs should be stopped
			RO does not stop RCPs
	Pressures in all SGs – ANY DROPPING IN AN UNCONTROLLED MANNER OR ANY SG COMPLETELY DEPRESSURIZED		PO checks if any SGs are faulted.
			PO reports SGs are NOT FAULTED
	Check all SG levels – NON RISING IN AN UNCONTROLLED MANNER		Crew checks if SG tubes are intact
	Check Secondary Radiation – CONSISTENT WITH PRE-EVENT VALUES [RM-1BD-101] High capacity SGBD sample [RM-1SV-100] Condenser air ejector vent [RM-1SS-100] SGBD sample [RM-1MS-100A,B,C] Steam relief monitors [RM-1MS-101] FW-P-2 monitor		**CREW REPORTS INDICATION OF SGTR ON "A" SG**
Crew transitions to E-3 STEP 1			US directs transition to E-3
			US directs STA to monitor status trees.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	CREVS not actuated.		PO checks if CREVS should be activate.
	CR radiation not in high alarm.		
	CIB has not occurred.		Crew commences control room ventilation action per attachment 4-F
	D/P between RCS pressure and highest SG pressure – LESS THAN 200 PSID [350 PSID ADVERSE CNMT] AND HHSI Flow – INDICATED		RO checks if RCPs should be stopped
			RO does not stop RCPs
	"A" SG ruptured.		US identifies "A" SG as the ruptured SG.
	Unexpected rise in level.		
	Rad survey results.		
Critical Task **Crew isolates feed flow into and steam flow from the ruptured SG**	PCV-MS-101A – CLOSED HCV-MS-104 – CLOSED		US directs crew to isolate flow from the ruptured SG
	"A" and "B" MDAFW running Steam Supply Valve from "A" SG open		Close [MOV-1MS-105], AFW Turbine Steam Isolation Valve

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
IRF FWM34 (0 0) 0	MS-15 – CLOSED		Dispatch operator to locally close steam supply from ruptured SG
IRF FWM36 (0 0) 100	MS-17 – OPEN		Verify Steam Supply from intact SGs
			If necessary, restart TDAFW
	[TV-1MS-111A] closed		Close SG "A" pre-nrtrn Drain Isol valves
	[TV-1MS-101A] [MOV-1MS-101A] [NRV-1MS-101A]		Close ruptured Main Steam trip, bypass, and non-return valves
	"A" SG level > 31% [50% ADVERSE CNMT]		PO checks ruptured SG level.
	MOV-FW-151E,F - CLOSED		Crew isolates feed flow to "A" SG.
			Check FWI previously verified
	"A" SG pressure > 380 psig.		PO checks ruptured SG pressure > 380 psig.
	Station Instrument Air header >100 psig		PO checks Station Instrument Air Header pressure >100 psig
NOTE: Target temperature based on "A" SG Pressure at this time	1000-1099 psig = 507F 900-999 psig = 495F		US determines target cooldown temperature.
	Condenser steam dumps available.		PO verifies condenser available and initiates cooldown at maximum rate, (or uses SG atmospherics).

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	RCS pressure < 1950 psig.		RO blocks steamline SI when RCS pressure is below 1950 psig.
	Tavg approaches 541 F		PO defeats Tavg interlock during cooldown
	Total AFW flow >370 GPM or SG level between 25% [50% adverse cnmt] and 65%		PO checks intact SG levels, controls AFW flow to intact SGs
	PORVs closed (not leaking) PCV-RC-455D previously isolated At least one Block Valve open		RO checks PORVs, Block Valves, and Safety Valves
	SI reset, CIA and CIB reset		RO resets SI, CIA, and CIB
	Station Instrument Air header >100 psig [TV-IA-400], - OPEN CNMT Inst Air HDR Pressure - > 85 psig		PO verifies CNMT Inst Air available
	LHSI Pumps – ANY RUNNING WITH SUCTION ALIGNED TO THE RWST RCS Pressure - > 275 PSIG [400 PSIG ADVERSE CNMT]		RO checks if LHSI Pmps should be stopped
	LHSI Pmps stopped and in auto		RO stops LHSI Pmps and places them in auto

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Average of 5 highest CETCs < target temperature		US directs PO to Stop cooldown and maintain temperature < target temperature
			PO stops cooldown and sets condenser steam dumps to maintain < target temperature in automatic mode
	"A" SG Pressure stable/rising		PO checks "A" SG pressure stable or rising
	Subcooling >66F		RO checks RCS subcooling >66F
PCV-RC-455A,B Failed Closed (Pre-load)	RCPs available		RO attempts to depressurize RCS using normal spray • Spray Valves failed closed
CRITICAL TASK **Depressurize RCS using PORV prior to overfill of ruptured SG**			US directs use of 1 PZR PORV to depressurize
	Only ONE PORV – OPEN		RO opens 1 PZR PORV and closes when criteria is met
	RCS Pressure - RISING		RO checks RCS pressure rising

Attachment 1–K

Verification of Automatic Actions

Diesel Generators – BOTH RUNNING.

Check Station instrument Air Header Pressure – GREATER THAN 100 PSIG.

Ensure Reheat Steam Isolation.

a. Verify [MOV-1MS-100A, B] CLOSED.

b. Reset reheater controller.

Verify CCR Pumps – TWO RUNNING.

Align Neutron Flux Monitoring For Shutdown.

a. Transfer [NR-1NI-45] Nuclear Recorder to operable source and intermediate range displays.

Verify River Water System in Service.

a. RPRW Pumps – TWO RUNNING.

b. Check CCR Heat EX RW pressure – GREATER THAN 20 PSIG.

Check If Main Steamline Isolation Required.

a. Check the following:

- CNMT pressure – GREATER THAN 3 PSIG

OR

- Steamline pressure – LESS THAN 500 PSIG

OR

- Steamline pressure high rate of change – ANY ANNUNCIATOR LIT
  - Annunciator A7-41
  - Annunciator A7-49
  - Annunciator A7-57

b. Verify steamline isolation

- YELLOW SLI marks – LIT

Check CIB and CNMT S[ray Status

- Containment pressure – HAS REMAINED LESS THAN 8 PSIG

Verify ESF Equipment Status

a. Verify SI status by checking all RED SIS marks – LIT

b. Verify CIA by checking all ORANGE CIA marks – LIT

c. Verify FWI by checking all GREEN FWI marks – LIT

Verify Power to Both AC Emergency Busses

Upon Completion, Report Any Discrepancies to SM/US

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

Attachment 1–K

Verification of Automatic Actions

Diesel Generators – BOTH RUNNING.

Check Station instrument Air Header Pressure – GREATER THAN 100 PSIG.

Ensure Reheat Steam Isolation.

a. Verify [MOV-1MS-100A, B] CLOSED.

b. Reset reheater controller.

Verify CCR Pumps – TWO RUNNING.

Align Neutron Flux Monitoring For Shutdown.

a. Transfer [NR-1NI-45] Nuclear Recorder to operable source and intermediate range displays.

Verify River Water System in Service.

a. RPRW Pumps – TWO RUNNING.

b. Check CCR Heat EX RW pressure – GREATER THAN 20 PSIG.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Check If Main Steamline Isolation Required. a. Check the following: • CNMT pressure – GREATER THAN 3 PSIG OR • Steamline pressure – LESS THAN 500 PSIG OR • Steamline pressure high rate of change – ANY ANNUNCIATOR LIT - Annunciator A7-41 - Annunciator A7-49 - Annunciator A7-57 b. Verify steamline isolation • YELLOW SLI marks – LIT Check CIB and CNMT S[ray Status

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			• Containment pressure – HAS REMAINED LESS THAN 8 PSIG Verify ESF Equipment Status a. Verify SI status by checking all RED SIS marks – LIT b. Verify CIA by checking all ORANGE CIA marks – LIT c. Verify FWI by checking all GREEN FWI marks – LIT Verify Power to Both AC Emergency Busses Upon Completion, Report Any Discrepancies to SM/US

Facility:	BVPS-1	Scenario No.:	5	Op Test No.:	NRC
Examiners:	_____	Candidates:	_____		CRS
	_____		_____		RO
	_____		_____		PO

Initial Conditions: MOL, 25% Power, EQU Xe, CB "D" = 120, RCS Boron = 1127 PPM (IC 215)
LHSI Pump B OOS. (PMP suction vlv MOV-SI-862B maintenance)
MDAFW B OOS (Pump Brng replacement)
PZR Spray Valve B in manual due to controller problems

Turnover: Maintain current conditions for continuing maintenance on "A" MFRV FCV-FW-478

Critical Tasks: Manually energize AE bus from #1 EDG
Establish 1 train of HHSI flow
Establish Containment Isolation

Event No.	Malf. No.	Event Type*	Event Description
1		(N) PO, US	Maintain current plant conditions
2		(C) RO, US (TS) US	RCP Thermal Barrier Heat Exchanger leak
3		(I) RO, US	Letdown Temperature Control Valve failure. Letdown diversion
4		(C) PO, US	CCR Pump Trips. Backup must be manually started.
5		(C) ALL (TS) US	CCR leak – Isolable
6		(M) ALL	SBLOCA
7		(C) ALL	EDG A will not auto start. Manual start available
8		(C) RO	Containment Isolation Phase A fails to automatically actuate. Manual actuation required

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

Scenario Event Description

NRC Scenario 5

The crew will assume the shift with instructions to maintain current plant conditions at 25% power for FCV-FW-478 maintenance.

Shortly after taking the shift, an RCP thermal barrier heat exchanger tube leak will develop, requiring action to isolate. US will address TS.

After the isolation of the thermal barrier leak and the plant is stable, the letdown temperature control valve will fail, causing letdown to divert. The crew will realign letdown to the demineralizers.

When plant conditions have been restored, the running CCR Pump trips. The backup pump will not auto start, requiring manual start of the backup pump. Once the backup pump is running, a leak will develop in the CCR system, requiring use of the AOP to isolate. US will address TS.

Following isolation of the CCR leak, a SBLOC will occur, Off-Site Power is lost, and #1 EDG will not automatically start, #2 EDG will trip during S/U and will not be returned. The crew will enter ECA-0.0, the #1 EDG will be started and the PO will be required to manually energize the bus from the EDG.

When ECA-0.0 is exited, HHSI Pump A will fail to automatically start, but may be started manually. Automatic isolation of Containment Isolation Phase A fails. CIA must be manually actuated.

This scenario may be terminated when crew transitions to ES-1.2.

EOP Flow Path: E-0, (ECA-0.0), E-0, E-1, ES-1.2

INITIAL CONDITIONS:

- 25% Power, EQU Xe, MOL, 1127 ppm boron, CB D = 120 steps
- LHSI B OOS
- MDAFW B OOS, Place placard stating FW-P-2 aligned to "B" Header
- PZR Spray Valve B Controller in manual

ADDITIONAL LINEUP CHANGES	STICKERS	VOND MARKINGS
MOV-SI-862B shut /de-energized	YCT	Fig 11-1, G3 MOV-SI-862B SHUT
SI-P-1B PTL	YCT	
FW-P-3B PTL	YCT	Fig 24-2, F5 WT-227 SHUT
PCV-RC-455B controller MANUAL/0%	YCT	Fig 24-2, E5 FW-41 SHUT
TV-DG-108B CLOSED	YCT	Fig 24-2, D7 FW-39 OPEN, FW-36 SHUT
MOV-FW-154A	YCT	
FCV-FW-150A/B	YCT	
EQUIPMENT STATUS	**DATE/TIME OOS**	**TECHNICAL SPECIFICATION(S)**
SI-P-1B/MOV-SI-862B	Yesterday 0100	3.5.2
FW-P-3B FW-P-2 aligned to "B" Header	Today 0600	3.7.5
PCV-RC-455B	Today 0700	N/A

SHIFT TURNOVER INFORMATION

1. Protected Train is Train "A"
2. Maintain current plant conditions at 25% power for maintenance on FCV-FW-478
3. SI-P-1B OOS due to maintenance on MOV-SI-862B (pmp suction vlv). Pump WILL NOT be returned this shift
4. FW-P-3B OOS due to pump bearing replacement. FW-P-2 has been aligned to the "B" header. FW-P-3B isolated and WILL NOT be returned this shift
5. PCV-RC-455B in MANUAL and SHUT due to erratic operation in AUTO. PCV-RC-455A is controlling pressure in auto without problems. PCV-RC-455B can be used IN MANUAL ONLY, if required. I&C has been informed
6. Rx Engineering will provide detailed reactivity plans for power increase when required

SCENARIO SUPPORT MATERIAL REQUIRED

Reactivity plan placard for MOL

1OM-52.4.A

Placard for FW-P-2 position stating FW-P-2 is aligned to "B" header

Place plaque on wall for Protected Train "A"

Ensure ESF Status Lights LIT for TRAIN "B" LHSI Pmp, HHSI Pmp and FW-P-3B

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #1			
Maintain current plant conditions			Crew maintains stable plant conditions at 25% power
EVENT #2			
RC-P-1A thermal barrier HX leak TV-CC-107A fails to close automatically, can be closed manually (pre-load) **IMF CCW2A (0 0) 20 60**	Alarms: A3-73 - REACT COOL PP THERMAL BARRIER COOL WATER DISCH FLOW HIGH A4-71 - RADIATION MONITORING HIGH		Crew responds to alarms. US references ARPs. Crew monitors RIS-CC-100 for activity increase. US directs Chemistry to sample CCW.
NOTE: US may address this after TV-CC-107A is closed			TS 3.4.13 Condition "A", reduce W/I 4 hrs. applies while TV-CC-107A is open
	Thermal Barrier Outlet Isolation is open. TV-1CC-107A, failed open.		RO checks Thermal Barrier Outlet Isolation, reports NOT closed. RO closes TV-CC-107A, isolates leak
			Crew monitors surge tank level.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Crew may refer to AOPs 1.6.8 and 1.15.1 for abnormal RCP and CCR system ops as a backup to the ARPs
	RIS-CC100, CCW Monitor alarms. Shows rising activity.		US enters 10M-6.4AM.
			Crew monitors PRZR level and pressure.
			RO compares charging and letdown flow rates.
			US notifies Unit Operations Manager.
			US directs STA to perform an RCS Water Inventory Balance IAW 1OST-6.2.
			US evaluates continued plant operation.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Event #3 **Letdown Temperature control valve fails shut and cannot be opened manually** **IOR X06A086P (0 0) 1**	A3-91 - NON-REGEN HEAT EXCHANGER DISCH TEMP HIGH		RO responds to alarm Crew diagnoses failure of letdown TCV and letdown diversion Crew implements ARP A3-91
	TI-CH-143 > 134F		RO verifies NRHX outlet temp high
	TCV-CH-143 – diverted to VCT		RO verifies correct position (to VCT) for TCV-CH-143
	TCV-CH-201 - CLOSED		RO verifies TCV-CH-201, Rad Monitor Trip Isolation valve closed
	TI-CH-140 is approximately 285F		RO verifies regenerative HX L/D temperature on TI-CH-140 is approximately 285F
	TI-CC-100 < 100F		RO/PO verifies TI-CC-100 < 100F RO attempts to open TCV-CH-144 in manual
	TCV-CH-144 cannot be controlled in manual		RO reports TCV-CH-144 does not respond
	TV-CH-200A, 45 gpm isolation vlv in service		RO closes TV-CH-200B, 60 gpm L/D isolation vlv

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			US directs RO to secure normal letdown and charging
	TV-CH-200 A,B,C – CLOSED		RO secures normal L/D and charging
	FCV-CH-122 – CLOSED		
	MOV-CH-289 – CLOSED		
	HCV-CH-186 adjusted as required to maintain seal injection flow		RO maintains seal injection flow
			US directs crew to place Excess L/D in service IAW 1OM-7.4.H
NOTE – It is not required to wait until Excess L/D is inservice, may proceed at LE discretion			

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #4			
CCR Pump Trips. Backup must be manually started. **IMF CCW3A (0 0)**	Running CCR Pumps trips Annunciators: [A6-33], Primary Comp Cool Pump Auto Start-Stop [A6-35], Pri Comp Cool Pump Disch Press Low [A6-38], PRI COMP COOL WTR HEAT EXCHANGER 8" DISCH LINE FLOW LOW [A6-46], PRI COMP COOL WTR HEAT EXCHANGER 14" DISCH LINE FLOW LOW		PO determine CC-P-1A tripped
	Standby CCR Pump manually started.		PO manually starts CC-P-1B US directs placing CC-P-1C on the AE Bus
May require prompting to ensure CC-P-1C is racked on AE Bus.			Crew places CC-P-1C on AE Bus

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
When directed to place 1C pump on AE bus, perform the following			US refers to TS 3.7.7 Condition "A", restore W/I 72 hrs.
IRF EPS007 (0 0) 0	CC-P-1A racked off AE bus		
IRF EPS009 (0 0) 1	CC-P-1C racked onto AE bus		
Then report actions to control room			
Do not continue to next event until action is taken			
EVENT #5			
CCR leak - Isolable			CREW – Identify/report leak in CCR system.
IMF CCW6 (0 0) 200	Decreasing CCR Surge Tank level		
			Check CCR system status.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Alarms Received: • [A11-21], Aux Bldg Well Sump Level High • [A11-22], Aux Bldg North Sump Level High • [A11-30], Aux Bldg South Sump Level High		US refers to AOP-1.15.1
	LCV-CC-100A – Stroking open in auto		RO/PO verify LCV-CC-100A responding correctly in auto
	1BR-545 NSA open		Crew verifies proper alignment for auto makeup to CCR surge tank
			Crew attempts to locate and isolate the leak
			US dispatches operator to check Aux Building for CCR leaks
	[BR-TK-6A] PG Water storage tank – Level Above Low Level Alarm		Crew verifies adequate makeup water source available
After appropriate delay, REPORT as auxiliary operator that CC-P-1A has a large leak on its discharge flex coupling and that the leak can be isolated by closing CC-1 and CC-7			Crew receives report on leak location

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
When directed to isolate CC-P-1A,			Us directs isolation of CC-P-1A
IMF CCW6 (0 0) 0 120 200	Leak rate decreasing		
THEN, WHE LEAK IS 0			RO/PO report CCR Surge tank level recovering
DMF CCW6	Leak isolated		
Proceed to next event at LE discretion			

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #6, 7 & 8 SBLOCA; Loss of off-site power; Failure of CIA to actuate; Failure of #1EDG to auto start, Trip of #2 EDG during S/U (loss of DF bus)			
IMF RCS02A (0 0) 600	Annunciators: [A4-4], Pressurizer Control Low Level Deviation [A4-72], Radiation Monitor High [A3-58], Charging Pump Discharge Flow High-Low [A1-49], Containment Sump Level High		
	RCS pressure and PZR level dropping rapidly		US orders reactor trip and entry to E-0, Reactor Trip or Safety Injection
Crew enters E-0, performs immediate operator actions.			Crew performs IMAs of E-0.
	Reactor trip and bypass breakers - OPEN Power range indication - LESS THAN 5% Neutron flux - DROPPING		RO verifies reactor tripped.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Throttle Valves - ALL CLOSED OR Governor Valves - ALL CLOSED Main Generator Output Bkrs - OPEN Exciter Circuit Bkr - OPEN		PO verifies turbine tripped.
Loss of offsite power, both EDGs fail	AC Emergency Busses - AT LEAST ONE ENERGIZED		PO verifies power to AC Emergency Buses.
	AE/DF buses De-Energized		PO reports AE/DF buses are de-energized
			US directs PO to perform the following to both EDGs in an attempt to restore at least on Emergency bus:
			Depress both stop pushbuttons Select Exercise Start EDG
	#2 EDG WILL NOT START #1 EDG starts #1 EDG at 900 RPM #1 EDG Field WILL NOT Flash		Verify 900 RPM Flash EDG Field
			PO reports #1 EDG Field WILL NOT Flash
			US directs personnel to #1 EDG and investigate/locally flash EDG field
Transition to ECA-0.0			US directs crew transition to ECA-0.0

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Reactor trip and bypass breakers - OPEN Power range indication - LESS THAN 5% Neutron flux - DROPPING		RO verifies reactor tripped.
	Yellow SLI valves - CLOSED		RO/PO perform manual MSLI and closed all Yellow SLI valves
	Alert Plant Personnel		RO/PO sound Standby Alarm, announce reactor trip and Loss of Emergency Power
	PZR PORVs – CLOSED TV-CH-200A,B,C – CLOSED All RCPs Stopped		RO verifies RCS isolated
	TV-MS-105A,B – OPEN MOV-MS-105 – OPEN A7-7 – NOT LIT MOV-FW-151A – F – OPEN Total AFW Flow > 370 GPM		PO verifies adequate AFW flow
	Main Generator Output Bkrs – OPEN Exciter Circuit Bkr - OPEN		PO verifies Generator Trip
When directed to locally flash #1 EDG field: **DOR X12I068C** **IOR X12I068C (0 0) 1** **DOR X12I068C**	#1 EDG at 900 RPM		PO attempts to restore power to AE bus
	#1 EDG Field Flashed, normal EDG voltage indicated		PO reports field flashed, normal voltage indicated

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			US directs PO to close #1 EDG output breaker
CRITICAL TASK: Energize AE bus from #1 EDG	AE Bus re-energized Loads sequence onto #1 EDG		PO closes #1 EDG breaker, power restored to AE bus
NOTE: Pre-load item will prevent CH-P-1A from automatically staring on the EDG sequencer and/or SI signal. This will **support a critical task** to establish 1 train of HHSI flow later in the scenario			US directs crew to transition to procedure & set in effect
			Crew transitions to E-0 step 3
	AC Emergency Busses - AT LEAST ONE ENERGIZED		PO verifies power to AC Emergency Buses.
	AE bus – ENERGIZED from #1 EDG		PO reports AE bus energized from #1 EDG
	Check SI - ACTUATED		RO checks SI status
	PZR pressure reducing		
			US directs manual actuation of SI if not already actuated
Crew continues E-0	Manually actuate SI (both trains)		RO manually actuates SI both trains

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Alert Plant Personnel		RO/PO sound Standby Alarm, announce reactor trip and safety injection
	Check [1VS-F-4A(B)], Leak Coll Exhaust Fan - ONE RUNNING		PO checks Leak Collection Exhaust Fan status
When requested to align WR H_2 analyzers insert: **IMF XN02097 (0 0) 1** **IMF XN02105 (0 0) 1** and report actions to the control room	Start CNMT Hydrogen Analyzers Annun A2-97 energizes. Annun A2-105 energizes. H_2 analyzers in service.		Crew directs operator to perform 1OM-46.4.G to place WR H2 analyzers in service
CRITICAL TASK: Establish 1 train of HHSI flow	Charging Pumps – **NONE** RUNNING CH-P-1A manually started LHSI Pumps – TWO RUNNING BIT Flow – INDICATED		RO verifies SI System status RO reports CH-P-1A not running, manually starts CH-P-1A
	Motor-driven AFW Pumps – FW-P-3A RUNNING Turbine-driven AFW Pump – RUNNING [TV-MS-105A, B] – OPEN Annunciator A7-7, "STM UNAVAILABLE TURB DRIVEN FEED PP FW-P-2" – NOT LIT AFW Throttle Vlvs – FULL OPEN Total AFW Flow – GREATER THAN 370 GPM		PO verifies AFW System status

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Attachment 1-K detailed beginning on page 25 of this scenario	Perform Attachment 1-K in a timely manner **NOTE: ALL "B" TRAIN COMPONENTS ARE DE-ENERGIZED DUE TO LOSS OF DF BUS**		US directs performance of Attachment 1-K when time/manpower permit
Note: Pre-load item is a failure of CIA to automatically actuate to support a critical task	CIA failed to actuate automatically CIA manually actuated		Operator performing Attachment 1-K manually actuates CIA when auto failure discovered and reports to US at appropriate time
	RCPs STOPPED – MONITOR Tcold		RO/PO check RCS Tavg stable at or trending to 547°F
	Check Recirc Spray Pumps – ANY RUNNING - NO Check Recirc Spray Pumps – ALL RUNNING - NO Check Recirc Spray Pumps – NOT CAVITATING		RO checks Recirc Spray Pump status
	PORVs – CLOSED Spray Valves – CLOSED Safety relief valves – CLOSED Check PRT conditions – CONSISTENT WITH EXPECTED VALUES Power to at least one block valve – AVAILABLE Block valves – AT LEAST ONE OPEN		RO verifies PZR isolated

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	RCPs not running due to loss of power		RO checks if RCPs should be stopped
	Pressures in all SGs – ANY DROPPING IN AN UNCONTROLLED MANNER OR ANY SG COMPLETELY DEPRESSURIZED		PO checks if any SGs are faulted. PO reports SGs NOT faulted
	Check all SG levels – NONE RISING IN AN UNCONTROLLED MANNER Check Secondary Radiation – CONSISTENT WITH PRE-EVENT VALUES [RM-1BD-101] High capacity SGBD sample [RM-1SV-100] Condenser air ejector vent [RM-1SS-100] SGBD sample [RM-1MS-100A,B,C] Steam relief monitors [RM-1MS-101] FW-P-2 monitor		Crew checks if SG tubes are intact Crew reports SG tubes are intact
	Check the following consistent with pre-event: CNMT Radiation CNMT Pressure CNMT Sump Level		Crew checks if RCS is intact CREW REPORTS RCS NOT INTACT
Crew transitions to E-1 STEP 1			US directs transition to E-1 US directs STA to monitor status trees.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	NOTE: Reminder that ALL TRAIN "B" Components are de-energized due to loss of DF bus		
	Control Room radiation monitor [RM-1RM-218A,B] – NOT IN HIGH ALARM		Crew checks if CREVS should be actuated
	CIB – HAS NOT OCCURRED		
	RCPs de-energized		RO checks if RCPs should be stopped
	Check Recirc Spray Pumps – ANY RUNNING Check Recirc Spray Pumps – ALL RUNNING Check Recirc Spray Pumps – NOT CAVITATING		RO checks Recirc Spray Pump status
	Pressures in all SGs – ANY DROPPING IN AN UNCONTROLLED MANNER OR ANY SG COMPLETELY DEPRESSURIZED		PO checks if any SGs are faulted. PO reports SGs NOT faulted
	Narrow Range Levels – GREATER THAN 31% [50% ADVERSE CNMT]		PO checks intact SG levels

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
When directed to locally close the "B" Train AFW Throttle valves, perform the following **RAMP RFWH151A ASIS 0.0 60** **RAMP RFWH151C ASIS 0.0 60** **RAMP RFWH151E ASIS 0.0 60**			PO controls feed flow to intact SGs to maintain NR level between 31% [50% ADVERSE CNMT] and 65%
Then report valves are shut	Station Inst Air HDR Press - > 100 PSIG		PO checks IA System status
	Check all SG levels – NON RISING IN AN UNCONTROLLED MANNER Check Secondary Radiation – CONSISTENT WITH PRE-EVENT VALUES [RM-1BD-101] High capacity SGBD sample [RM-1SV-100] Condenser air ejector vent [RM-1SS-100] SGBD sample [RM-1MS-100A,B,C] Steam relief monitors [RM-1MS-101] FW-P-2 monitor		Crew checks if SG tubes are intact Crew reports SG tubes ARE INTACT
	Power to the Block Vlvs – AVAILABLE PORVs – CLOSED Block Vlvs – AT LEAST ONE OPEN		RO checks PRZR PORVs and Block Valves

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	RCS Subcooling based on core exit TCs > 46F [54F ADVERSE CNMT] Secondary heat sink: Total feed flow to intact SGs – GREATER THAN 370 GPM OR Narrow range level in at least one intact SG – GREATER THAN 31% [50% ADVERSE CNMT]		RO/PO check if SI flow can be reduced Crew determines that SI flow **CANNOT** be reduced at this time Crew continues in E-1
	RCS pressure – STABLE OR RISING PRZR level – GREATER THAN 17% [38% ADVERSE CNMT]		
	CIB not actuated not required Quench spray or recirc spray pump – NOT RUNNING		RO/PO check if CNMT Spray should be stopped
	SI & CIA - RESET		RO resets SI and CIA
	RCS Pressure - > 275 PSIG [400 PSIG ADVERSE CNMT] RCS Pressure – REDUCING SLOWLY "A" LHSI Pump – RUNNING WITH SUCTION ALIGNED TO THE RWST "A" LHSI Pmp remains in operation		RO checks if LHSI Pmps should be stopped RO does not stop "A" LHSI Pmp
	Check pressures in all SGs – STABLE OR RISING Check RCS Pressure – STABLE OR DROPPING		RO/PO check RCS and SG Pressures

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Verify AC emergency busses energized from offsite AE bus energized from #1 EDG DF bus de-energized		PO checks if EDGs should be stopped PO does not stop #1 EDG
	Train "A" Cold Leg Recirc components available		US directs operators to perform Att 1-F and verify cold leg recirculation capability
	Check Aux building and Safeguards radiation – CONSISTENT WITH PRE-EVENT: [RM-1VS-102A,B] Aux Bldg Exh Sys A & B Gas [RM-1RM-209] Aux Bldg Bot Flr North [RM-1RM-210] Aux Bldg 3rd Flr [RM-1RM-211] Aux Bldg Bot Flr South [RM-1RM-212] Sample Room [RM-1VS-107A,B] Elevated Release Part and Gas [RM-1VS-110] CNMT/SLCRS Exhaust Monitor SPING 4		Crew tries to identify and isolate the leakage, refers to ATT 3-B

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	[RM-1VS-112] CNMT/SLCRS Exhaust Monitor SA 9/10		
			SM consults with TSC Staff to determine whether samples can be obtained
	Sample: CNMT atmosphere for radioactivity and hydrogen CNMT sump for pH and boron RCS liquid		US directs Chemistry and HP to obtain pertinent samples
IRF AUX042 (0 0) 100 **IRF AUX044 (0 0) 100** **IRF AUX204 (0 0) 0**	AUX Stm transferred to U2 Turbine plant secured IAW ATT 2		US directs crew to perform additional actions as required to aid in plant recovery
	RCS Pressure - > 275 PSIG [400 PSIG ADVERSE CNMT]		RO checks if cooldown and depressurization is required
			IF REQUIRED GO TO ES-1.2 STEP 1
			US directs crew to transition to ES-1.2 Post LOCA Cooldown and Depressurization
Terminate scenario upon transition to ES-1.2			
Classify Event at completion of scenario			SAE Tab 3.1 Loss of AC Power

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

Attachment 1-K

Verification of Automatic Actions

ALL TRAIN 'B' COMPONENTS DE-ENERGIZED DUE TO LOSS OF DF BUS

CRITICAL TASK: Start EDG #1 to allow for Train A HHSI

#1 EDG did NOT start.

Diesel Generators – BOTH RUNNING.

- **PO must manually start No. 1 EDG**

Check Station instrument Air Header Pressure – GREATER THAN 100 PSIG.

Ensure Reheat Steam Isolation.

a. Verify [MOV-1MS-100A, B] CLOSED.

b. Reset reheater controller.

Verify CCR Pumps – TWO RUNNING.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE

Align Neutron Flux Monitoring For Shutdown.

a. Transfer [NR-1NI-45] Nuclear Recorder to operable source and intermediate range displays.

Verify River Water System in Service.

a. RPRW Pumps – TWO RUNNING.

b. Check CCR Heat EX RW pressure – GREATER THAN 20 PSIG.

Check If Main Steamline Isolation Required.

a. Check the following:

- CNMT pressure – GREATER THAN 7 PSIG

OR

- Steamline pressure – LESS THAN 500 PSIG

OR

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			• Steamline pressure high rate of change – ANY ANNUNCIATOR LIT - Annunciator A7-41 - Annunciator A7-49 - Annunciator A7-57
			b. Verify steamline isolation • YELLOW SLI marks – LIT
			Check CIB and CNMT Spray Status • Containment pressure – HAS REMAINED LESS THAN 11 PSIG
	TRAIN 'B' COMPONENTS DE-ENERGIZED		Verify ESF Equipment Status
			a. Verify SI status by checking all RED SIS marks – LIT

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
CRITICAL TASK: Manually initiate CIA			**b. Verify CIA by checking all ORANGE CIA marks – LIT** **Must manually initiate CIA** c. Verify FWI by checking all GREEN FWI marks – LIT
	DF BUS DE-ENERGIZED		Verify Power to Both AC Emergency Busses Upon Completion, Report Any Discrepancies to SM/US