MILLSTONE POWER STATION

SIMULATOR EXAM GUIDE APPROVAL SHEET

Exam Title: Large Break LOCA

Revision: 0

ID Number: 2K7 NRC-01

Submitted by:	D. Minnich Developer		1/11/07 Date
Validated by:	Martin Technical Reviewer		1/24/7 Date
Approved by:	Nutterman Training Supervisor		1/24/07 Date

SECTION 2

SIMULATOR EXAM GUIDE

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- Attributes Checklist
- Summary of Changes

SECTION 3

EXAM OVERVIEW

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1. The Session will begin with the plant at 100% power and at end of life. The "A" EDG is out of service for planned maintenance. The "C" TPCCW pump is out of service for an oil replacement. After taking the shift, a tube leak will occur in the "B" MSR. The crew will use OP 3317, *Reheat and Moisture Separator*, to identify the MSR leakage and determine required actions, which include a power reduction of 10% followed by taking the MSRs out of service. Plant Management will direct the crew to lower power using AOP 3575, Rapid Downpower, @ 1/2% per minute. During the downpower, controlling PZR Level transmitter, 3RCS-L459, will fail as is. The crew should respond by entering AOP 3571, *Response to an Instrument Failure*, to address the problem.

Once Tech Specs have been addressed, and bistables tripped, the SG steam flow channel, 3MSS*FT542, will fail low. Again, the crew should enter AOP 3571 "Instrument Failure Response" to address the failure.

Once actions as specified in AOP 3571 are complete, the Digital Rod Position Indication system will develop a Data B failure on rod M4. AOP 3552, *Malfunction of the Rod Drive System,* will be used by the crew to mitigate the event.

When AOP 3552 actions are complete, the crew will experience a Loss of 125 Volt DC Bus 4 and will respond using AOP 3563, *Loss of DC Bus Power.* There are no Main Board actions other than verifying system response. The US should evaluate and enter the appropriate Tech Spec. If attempted, power cannot be restored to the Battery Bus.

Once Tech Specs have been addressed, a leak (tube failure) of Reactor Plant Component Cooling Water (CCP) into the Upper Oil Reservoir of the "C" RCP will occur. CCP Surge Tank level, though slight, will discernibly decrease and, after a few minutes of leakage, an Oil Reservoir high level alarm will sound. The crew should take action per the ARP and AOP 3554, *RCP Trip or Stopping a RCP at Power* to attempt to reduce reactor power and take the affected RCP out of service. The crew will not have the time to downpower prior to exceeding RCP motor bearing temperature limits and should elect to trip the plant and the affected RCP. If the crew takes no action the affected RCP will seize and the reactor will trip.

At the time of the reactor trip a small break LOCA on loop 3 occurs (simulating a break in the area of the affected RCP). The crew will carry out the immediate actions of E-0, *Reactor Trip and Safety Injection,* determine that automatic safety injection (SI) actuation has failed, and manually initiate SI **[Critical Task]**. While in E-0, the crew should recognize that the AFW pumps did not start and take action to start the pumps **[Critical Task]**.

The crew should then transition to E-1, *Loss of Reactor or Secondary Coolant,* and stop the RHR pumps when procedurally directed. After the crew trips the RHR pumps, the LOCA will rapidly increase in severity forcing the restart of the RHR pumps. As the break size increases an "Orange" Path will be generated based on CTMT pressure. The crew should respond by transitioning to FR-Z.1, Response to high CTMT Pressure. CDA Train "A" & "B" will fail to

automatically or manually actuate. This will require the crew to manually manipulate individual components **[Critical Task]**. If the operator uses the pushbuttons to manually actuate CDA, the RHR pumps will not automatically start. The RHR pumps will need to be started using the hand switches on MB2. The RHR pumps will start and provide flow. Once FR-Z.1 is complete, the crew transitions back to E-1, the session can be terminated.

2. The US should classify the event as an ALERT – Charlie One based on failure of the RCS barrier.

3. Duration of Exam: 75 minutes

SECTION 4

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All Control Room Conduct, Operations and Communications shall be in accordance with Master Manual 14 and applicable DNAP/DNOS standards.

"Review the Simulator Operating Limits (design limits of plant) and the Simulator Modeling Limitations and Anomalous Response List prior to performing this exam scenario on the simulator. The evaluators should be aware if any of these limitations may be exceeded." (NSEM 6.06)

SECTION 4

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SIMULATOR PROBLEMS DURING EXAMS

It is the responsibility of the Instructors in the simulator to insure that training interruptions have a minimum negative impact on the Crew and the training we provide. Use your judgment on whether to stop the training and how the training should be commenced after the problem is corrected.

Be aware that at all times the Operators should treat the simulator as if it were the plant and you too should treat it as much like the plant as possible when they are in the simulator.

As soon as the Instructors are aware of a simulator problem that will adversely affect the training in progress (computer fault, etc.) the Instructor should:

1. Place the simulator in FREEZE if possible.

2. Announce to the Crew that there is a simulator problem.

3. Request that the Crew either standby (for minor trouble that can be handled quickly) or leave the simulator control room. (The Crew should leave the simulator for problems which involve major switch alignments).

4. Deal with the problem (reboot, close tripped breaker, call STSB, etc.)

5. After the Instructors believe the simulator is restored to service, the Crew should be told how training will continue. If it is possible and felt to be acceptable to the Instructors, training can begin where it left off with an update on plant parameters and each Crew member is prepared to restart. If training will not begin where it left off, the crew should be told how and where training will begin again.

6. Once the Crew has been told how and where training will begin, have the crew conduct a brief so that the Instructor can insure that the crew has all the necessary information to continue with the scenario.

7. Once all Crew members and Instructors are satisfied that they have the necessary information to continue the scenario, place the simulator in RUN and announce to the Crew that you have continued the training session.

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INITIAL SETUP INSTRUCTIONS

1. START the Sun Workstation.
   a. IF the Sun Workstation is running THEN go to SIM ACTIVE.
2. PLACE Recorder Power to ON.
3. VERIFY that the current approved training load is loaded.
4. REMOVE the step counter OVERRIDE and allow the counters to step out during the IC reset.
5. RESET to **IC XX (Based on IC 21)**
6. ADJUST the various pot settings to the valued specified by the chart in the simulator booth or Notepad for the selected IC. Pay particular attention to the Pzr spray valves and their setpoints.
7. PLACE Simulator to RUN.
8. If Necessary, RESET the Plant Calorimetric at the Instructor Station PPC by Pressing "SHIFT LEFT" and "F6" simultaneously.
9. ENSURE Simulator fidelity items cleared.
   a. CHECK the STEP COUNTERS at correct position for plant conditions.
   b. PLACE _7_ tiles under the DEMINS IN SERVICE lamacord label on MB6.
   c. PLACE the Main Turbine on the LOAD LIMITER and ENSURE Standby Load Set MATCHED if conditions require.
   d. PLACE the Westronic (5) and Gammametrics (2) recorders in active/run by depressing up or down arrow for each.
   e. For the RIL recorder: select printer to "ON" when command? appears select "Autojog".
   f. CLEAR **DCS** alarms on MB7 and BOP console.
   g. VERIFY annunciator, "COMPUTER FAILURE" (MB4C, 1-11), is NOT LIT.
10. As needed, RESET Computer Terminals to At Power displays if 100% power IC.
11. RESET Rad Monitor Screen to Status Grid.

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INITIAL SETUP INSTRUCTIONS

12. IF placing equipment OOS, THEN perform the necessary switch manipulations and hang appropriate tags, as required, listed under "Equipment OOS."
13. Ensure that the protected train and environmental placards are appropriately hung.

Equipment OOS: **"A" EDG (Yellow Tag on Start Switch, Output Breaker and Prelube pump)**
"C" TPCCW pump (Yellow Tag on control switch)

Insert applicable Crew Training Tape/CD into the DVD/VCR.

Verify the MONITOR Time Display the same as the digital time display on MB4. If not page/call the Unit Tech.

Initial Malfunctions/IOs/IDAs:

PLACE GREEN PLACARDS FOR ALL INTAKE PARAMETERS ON MB6

PLACE THE "B" TRAIN PROTECTED PLACARD ON MB4

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INITIAL SETUP INSTRUCTIONS

TYPE	Name	Sev.	Ramp	RSCU	Boul	Description
MALF	FW20A					"A" MDAFW pump fails to auto-start
MALF	FW20B					"B" MDAFW pump fails to auto-start
MALF	FW20C					TD AFW pump fails to auto-start
MALF	RP06A					Failure of CDA (train A) to auto actuate
MALF	RP06B					Failure of CDA (train B) to auto actuate
MALF	RP07A					"A" Train Safety Injection fails to auto-actuate.
MALF	RP07B					"B" Train Safety Injection fails to auto-actuate.
MALF	EG07A					EDG "A" Trip
MALF	TP02C					"C" TPCCW Pump fails to auto-start
MALF	MS05B	80%	240	1		Tube Leak 'B' MSR
MALF	RX10A	61.2%		2		3RCS*L459 fails as is
MALF	RX14G	0%		3		"D" SG steam flow fails low (3MSS-FT542)
MALF	RD1160			4		Rod position indication failure, Data B (rod M4)
MALF	ED09D			5		Loss of Battery Bus 4
MALF	RC14C	100%		6		RPCCW leak into upper oil reservoir of 'C' RCP
MALF	RC02C	0.15	60		BT1	Small break LOCA in CTMT (Loop 3 Hot Leg)
I/O (EG)	1A-3ENSACB-A GREEN	OFF	-	-	-	D/G A BKR CNTL
I/O (EG)	1A-3ENSACB-A-RED	OFF	-	-	-	D/G A BKR CNTL
I/O (EG)	1A-3ENSACB-A-AMBER	OFF	-	-	-	D/G A BKR CNTL
I/O (EG)	1-3EGO-P1A RED	OFF				D/G A Prelube Pump
I/O (EG)	1-3EGO-P1A GREEN	OFF				D/G A Prelube Pump

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I/O (RP)	**3ADS-CDA_PB1**	**OFF**	-	-	-	**CDA PBs fail to actuate CDA**
I/O (RP)	**3ADS-CDA_PB2**	**OFF**	-	-	-	
I/O (RP)	**3ADS-CDA_PB3**	**OFF**				
I/O (RP)	**3ADS-CDA_PB4**	**OFF**				
Ann O/R	**MB8A 2-11**	**ON**				**34C Loss of Control Power**

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INITIAL SETUP INSTRUCTIONS

Lead Examiner: **Refer to the "Briefing Script for the Operational Exam" and brief the crew. Go over the Plant/simulator differences, which follow.**

Booth Instructor: **Commence recording Simulator session**

Booth Instructor: Perform the crew turnover (Initial Conditions page at end of LP) with the SM . Have the SM brief his crew on plant conditions and any major equipment OOS.

PLANT/SIMULATOR DIFFERENCES:

- Rad Monitor Historical Data--Simulator Rad Monitor historical data not valid prior to the beginning of this exercise.
- If not using the speed dial option on the phone system, the operator must dial either #3333 or #3334 to reach the person/department they desire.
- The following PPC programs do not function on the simulator:
  - Samarium Follow
  - Xenon Follow
  - Sequence of Events
- Flow indications 3SIH-FI917 (charging ECCS flow), 3SIH-FI918 (A SI pump flow) and 3SIH-FI922 (B SI pump flow) will show flow at low flow rates.

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		EVENT 1: Tube leak in 'B' MSR.			
T = 1 minute after turnover	**RSCU 1**	(MS05B @ 80%) The first indication will be a slow reduction in unit output of about 7 MWe and an increase in power from 3411 to 3428 MWth. A computer point alarm on high reheat steam flow for 'B' MSR will come in. 3MSS-F38B will show significantly higher flow to the 'B' Reheater and 3MSS-P57B will show lower pressure (from 943 to 906 psig.) Hot reheat steam temperature will go down slightly (less superheat) and a Delta T will develop between the hot reheat steam leaving the two MSRs of around 5 degrees. The crew should take immediate actions to lower turbine load to lower thermal power to < 3411 MWth IAW OP 3204, *At Power Operation.*. Based on the computer point alarm on high reheat steam flow for 'B' MSR, the crew should verify symmetric operation of the MSRs, and check the MSR tube leakage displays on DCS. **The tube leak display for 'B' MSR will show**			

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		steam flow verses cross-around pressure greater than 5% above the baseline curve. OP 3317, *Reheat and Moisture Separator,* will direct a power reduction and taking the MSRs out of service. **OP 3317 Reheater and Moisture Separator, Section 4.14. (rev 014-06)**		**Identify MSR Tube Leaks**	Section 4.14
				Reheat steam flow during start of the reheaters is a function of many factors other than tube leaks. Reheat steam control valve position, reheat drain flow to the main condenser and the transitory nature at a start should be analyzed before a tube leak is conclusively identified.	4.14.1 NOTE
				The steam flow verses cross-around pressure plot being greater than 2.5% above the baseline curve on Attachments 3 through 8 is an indication of a tube leak.	4.14.1 NOTE
				Attachment 3 through 8 are for use during steady state operation. Limits on the graphs are expected to be exceeded during transients.	4.14.1 NOTE
		The BOP will be expected to call up the tube leak display on DCS for the "B"	BOP	PERFORM one of the following, as applicable:	4.14.1

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		MSR		• Refer To MSR Leak Detection" displays on the Foxboro Digital Control System and IDENTIFY MSR tube leaks. • PERFORM the following (computer): o Refer To Attachments 3 through 5 and COMPARE MSS-F38A steam flow with CRS-P24A cross-around pressure. • Refer To Attachments 6 through 8 and COMPARE MSS-F38B steam flow with CRS-P24B cross-around pressure.	
		The "B" MSR drain tank level will be normal.	BOP	MONITOR associated MSR drain tank level to ensure the Level Control System has not failed causing excessive steam flow through the high level dump to the condenser.	4.14.2
		The US should inform RE that steam flow verses cross-around pressure is greater than 5% above the baseline For "B" MSR.		IF the steam flow verses cross-around pressure plot is greater than 2.5% above the baseline curve on Attachments. 3 through 8, NOTIFY the Reactor Engineering Department.	4.14.3
		All turbine CIV valves are open. US should go to Section 4.11 to remove MSR reheaters from service.		IF the steam flow verses cross-around pressure plot is greater than 5% above the baseline curve on Attachments 3 through 8 AND all of the turbine CIV valves are open,	4.14.4

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Refer To Section 4.11 and REMOVE MSR reheaters from service.	
				INITIATE a CR.	4.14.5
		OP 3317 Reheater and Moisture Separator, Section 4.14. (rev 014-06)			
				Remove MSR Reheaters From Service At Turbine Load Greater Than 30% (360 MWe)	Step 4.11
				If manual control of reheater steam supply valves is taken at a location other than the Foxboro Digital Control System operator station, constant communications with the Control Room must be established.	Step 4.11.1 NOTE
				Turbine load is limited to approximately 90% (1080 MWe) without MSR reheaters in service due to Condensate System flowrate increase.	Step 4.11.1 NOTE
				With Reheat Steam isolated to the MSRs, Pimp is not an accurate reflection of Reactor Thermal Power. As a result, Tref is not accurate.	Step 4.11.1 NOTE
		US should recognize that a downpower is required to establish the plant conditions necessary to remove the reheaters from service. It is expected that the US inform the OMOC (OPS Manager on call) that a downpower is		IF at turbine load of 100% (1200 MWe), REDUCE turbine load by approximately 10% (120 MWe).	Step 4.11.1

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		required and that there is a significant tube leak in the "B" MSR.			
T = When crew discusses a downpower plan	**BOOTH**	**Call as OMOC and direct the US conduct a rapid downpower at 1% per minute in order to remove the Reheaters from service. Reduce power to 85%. Engineering reports that it is not desirable to attempt to achieve symmetrical operation of the MSRs during the downpower, given the tube leak.** The US will enter AOP 3575, *Rapid Downpower*			
T = When AOP 3575 entered	**RSCU 2 (RX10A)**	**This will fail 3RCS-L459 "as is" during the downpower**			
	Evaluator NOTE:	**Sometime during the downpower, the crew should notice a failed PZR level transmitter staying at the 100% program value. Page forward in the exam guide to AOP 3571 Actions when the crew responds to the failed transmitter** **AOP 3575 Actions (Rev 013-00)**			
				• A CONVEX requested emergency generation reduction as directed by C OP 200.8, "Response to ISO New England / Convex Emergencies and Alerts", Should	AOP 3575 Step 1 NOTE

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				be completed within 15 minutes of notification. • If a unit shutdown is required, the target power level should be between 20% and 25% reactor power. • If at any time ROD CONTROL BANKS LIMIT LO - LO (MB4C 4 - 9) annunciator is received, DO NOT go to AOP 3566, Immediate Boration. Immediately perform step 11.	
			CREW	**Determine Power Reduction Rate (%/min).**	AOP 3575 Step 1
			US	Check desired power reduction rate - EQUAL TO OR LESS THAN 5%/min.	AOP 3575 Step 1.a
			US	Check power reduction - CONVEX REQUESTED	AOP 3575 Step 1.b
			US	Proceed to Step 1.d.	AOP 3575 Step 1.b RNO
			CREW	Determine power reduction rate using Table.	AOP 3575 Step 1.d
		Evaluator NOTE: The crew has already been directed to use a power reduction rate of 1% per minute.			
			US	**Check Rod Control In AUTO.**	AOP 3575

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
					Step 2
			CREW	**Align EHC Panel**	AOP 3575 Step 3
			US	Check turbine OPERATING MODE - MANUAL	AOP 3575 Step 3.a
			US	Check LOAD LIMIT LIMITING light - LIT	AOP 3575 Step 3.b
			BOP	Intermittently Press DECREASE LOAD pushbutton until LOAD LIMIT LIMITING light - NOT LIT	AOP 3575 Step 3.c
			BOP	Rotate LOAD LIMIT SET adjust knob at least one full turn in raise direction	AOP 3575 Step 3.d
				Select DECREASE LOADING RATE to ON	AOP 3575 Step 3.e
		The US should direct the BOP to select 1% per minute.	BOP	Select LOAD RATE LIMIT % MIN to required power reduction rate (% min) determined in step 1.	AOP 3575 Step 3.f
				If at any time the power reduction rate or final desired power level must be changed, Return to step 1.	AOP 3575 Step 4 NOTE
			US/RO	**Verify Power Reduction Rate**	**AOP 3575 Step 4**
			RO	Check power reduction rate 5% MIN	AOP 3575 Step 4.a
				Perform the applicable action:	AOP 3575 Step 4.a

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
					RNO
				• IF power reduction rate is 3% min, THEN Proceed to step 5.	
		The US will proceed to step 6.		• IF power reduction rate is LESS THAN 3% min, THEN Proceed to NOTE prior step 6.	
			US	**Align RCS Makeup System For Boration**	AOP 3575 Step 6
				Check Rod Control – AVAILABLE FOR ROD INSERTION	AOP 3575 Step 6.a
		US / RO should determine a boric acid addition of 15% x 24(gal/%) = **360 gal.**	US/RO	Determine required boric acid addition by multiplying total power change (Δ%) by 24(gal/%) = _____gal.	AOP 3575 Step 6.b
			RO	Set the boric acid batch counter to the required gallons of boric acid determined in step 6.b.	AOP 3575 Step 6.c
			US	Check power reduction rate- 0.5%/min.	AOP 3575 Step 6.d
			RO	Adjust boric acid blend flow controller pot setting to the appropriate setpoint and Proceed to step 6.f.:	AOP 3575 Step 6.d RNO

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		The RO should set the boric acid blend flow controller pot to 7.5.		• rods available – 7.5 (30 gpm) • *no* rods available – 10.0 (40 gpm)	
			RO	Select BORATE on the reactor coolant makeup select switch.	AOP 3575 Step 6.f
			RO	Select START on the reactor coolant makeup start switch.	AOP 3575 Step 6.g
			RO	Verify boric acid flow - INDICATED	AOP 3575 Step 6.h
			RO	Energize all PZR heaters.	AOP 3575 Step 6.i
				Adjust Pzr Spray Valves to 50% setpoint	AOP 3575 Step 6.j
				• RCS-PK 455B • RCS-PK 455C	
				Adjust boric acid flow rate and total volume as necessary to maintain:	AOP 3575 Step 6.k
				• Rods above the Rod Insertion Limit • Tavg within ±5°F of Tref • AFD within COLR limits	
			RO	If a unit shutdown is being performed, the final MWe load should be approximately 230 MWe.	AOP 3575 Step 7 NOTE

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			US/BOP	**Initiate Load Reduction**	AOP 3575 Step 7
			BOP	Check turbine OPERATING MODE - MANUAL	AOP 3575 Step 7.a
			BOP	Check either of the following: • Rapid or gravity boration – IN PROGRESS OR • Turbine load reduction – REQUIRED TO STABILIZE PLANT	AOP 3575 Step 7.b
		The US should direct the RO to inform him when either Tavg, power or rod position changes as a result of the boration.	BOP	**WHEN** Any of the following change due to boration: • Tavg • Reactor power • Control Rod position **THEN** Proceed to step 7.d.	AOP 3575 Step 7.b RNO
		The US should direct the BOP to adjust LOAD SET to 1020 Mwe (about 85% power).	BOP	Utilizing DECREASE LOAD pushbutton, Adjust LOAD SET to desired final MWe	AOP 3575 Step 7.d
			BOP	Check power reduction - CONVEX REQUESTED.	AOP 3575 Step 7.e
			US	Inform CONVEX of load reduction rate	AOP 3575

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				(MWe/min) and final MWe level.	Step 7.e RNO
			BOP	Maintain initial MVAR loading during power reduction, unless directed otherwise.	AOP 3575 Step 7.f
			US/RO	Check boration - IN PROGRESS	AOP 3575 Step 7.g
				Verify Final Desired Turbine Load (MWe) – LESS THAN 75%	AOP 3575 Step 8
				Proceed to Step 10.	AOP 3575 Step 8 RNO
			BOP	The following step places one TD FW pump in manual while allowing the other TD FW pump to automatically unload during the downpower.	AOP 3575 Step 10 NOTE
			US/BOP	**Align One Feedwater Pump For Automatic Unloading**	AOP 3575 Step 10
		The US should recognize that 85% power, two feedwater pumps will be required.	BOP	Verify removing a feedwater pump from service during the downpower - DESIRED	AOP 3575 Step 10.a
				Proceed to step 11.	AOP 3575 Step 10.a RNO
			US/RO	**Verify Rod Position**	AOP 3575 Step 11
			RO	Check ROD CONTROL BANKS LIMIT LO -	AOP 3575

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				LO (MB4C 4 - 9) annunciator - LIT.	Step 11.a
			US/RO	Proceed to step 11.e and, IF at any time, the annunciator is received, THEN Perform steps 11.b, 11.c and 11.d.	AOP 3575 Step 11.a RNO
			RO	Check ROD CONTROL BANKS LIMIT LO (MB4C 3 - 9) annunciator - LIT	AOP 3575 Step 11.e
			US	Proceed to NOTE prior to step 12 and, IF the annunciator is received, THEN Perform step 11.f and 11.g.	AOP 3575 Step 11.e RNO
			US	**Restore From Rapid Boration.**	AOP 3575 Step 12
			RO	Check rapid OR gravity boration - IN PROGRESS.	AOP 3575 Step 12.a
			US	Proceed to Step 13.	AOP 3575 Step 12.a RNO
			US	**Reduce Steam Supply To The MSRs.**	AOP 3575 Step 13
			BOP	Check reheat steam flow controllers - IN AUTOMATIC.	AOP 3575 Step 13.a
		The US and BOP should recognize that perfect symmetrical operation of the MSR reheaters will not be possible because of the MSR tube leak.	BOP	Using the MSR Startup Pressure Display on the Foxboro DCS, Verify symmetrical operation of the MSR reheaters during power decrease.	AOP 3575 Step 13.b
			BOP	Using OP 3317, "Reheat and Moisture	AOP 3575

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Separator," Perform manual adjustment of moisture separator reheater steam flow control valves, as necessary.	Step 13.b RNO
			US	**Check If RCS Sample Is Required.**	AOP 3575 Step 14
			US	Verify change in Reactor Power - GREATER THAN 15% IN ONE HOUR	AOP 3575 Step 14.a
			US	Request Chemistry sample the RCS for iodine *(between 2 and 6 hours after the power change.)*	AOP 3575 Step 14.b
			US	Request Chemistry Department perform gaseous effluent samples and analysis *(between 24 and 72 hours after the power change)* for the following process monitors: • 3HVR-RE10B • 3HVR-RE19B	AOP 3575 Step 14.c
			US	**Verify Target Power Level - LESS THAN 50%.**	AOP 3575 Step 15
			US	Continue power reduction to the final desired target power level. <u>WHEN</u> Final power level is reached, <u>THEN</u> Proceed to Step 22.	AOP 3575 Step 15 RNO

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		Event 2: Failure of 3RCS-L459			
T= When identified by crew	**RX10A Sev= "as is"**	**This fails 3RCS-L459 "as is" during the downpower**			
		Annunciater "CHARG PP FLOW HI/LO" eventually comes in on low flow. The ARP will direct the crew to AOP 3571, if the cause is an instrument failure.			
		OP 3353.Mb3A 4-9 (rev 002-04)			
		CORRECTIVE ACTIONS			
			US	IF no charging pumps are operating, Go To AQP 3506, "Loss of All Charging Pumps."	MB3A step 1

		PZR level will not be on program.	RO	CHECK the following, (MB3):
				• 3CHS-FI 121A, charging flow (MB3), 55 to 100 gpm
				• 3CHS-FI 132, letdown flow (MB3), 75 to 120 gpm
				• Pressurizer level on program:
				  • 3RCS*LI 459, pressurizer bevel
				  • 3RCS*Li 460, pressurizer level
				  • 3RCS*LI 461, pressurizer level
					MB3A step 2

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		After the crew recognizes that the controlling channel of PZR level has failed, the US should go to AOP 3571.	US	IF alarm is due to instrument failure, Go To AOP 3571, "Instrument Failure Response."	MB3A step 3
			Crew	Enter AOP 3571 to address	3571 Entry Conditions
		AOP 3571 Actions (rev 009-01)			
		The RO should place the Master PZR level controller or 3CHS*FCV121 in manual.	RO	**Determine the Initiating Parameter and Place the affected controller in MANUAL**	AOP 3571 Step 1
				Stabilize the Plant Parameters	AOP 3571 Step 2
		The appropriate attachment for this failure is "C". The US should announce to the crew.		**Perform Corrective Actions Using Appropriate Attachment**	AOP 3571 Step 3
			RO	Defeat the failed channel input. • Pressurizer Level Select - Control - 3RCS-LS459D • Pressurizer Level Select - Record - 3RCS-LS459E	AOP 3571 Attachment C Step 1
		The US should give specific direction to the RO to restore PZR level to	RO	Restore PZR level to normal.	AOP 3571 Attachment

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		program for the present power level.			C Step 2
		Letdown should not have isolated.	RO	If necessary, using OP 3304A, "Charging and Letdown," Restore letdown.	AOP 3571 Attachment C Step 3
			RO	Place PZR level controller in automatic.	AOP 3571 Attachment C Step 4
			RO	Reset pressurizer heaters as necessary.	AOP 3571 Attachment C Step 5
			RO	When conditions have stabilized, Observe MB annunciators and parameters. Immediately report any unexpected or unexplained conditions to the SM.	AOP 3571 Attachment C Step 6
			US, I&C	Trip the associated Reactor Protection System bistable(s);	AOP 3571 Attachment C Step 7
			US	Place a check mark in the box above the appropriate channel that requires tripping on the last page of this Attachment.	AOP 3571 Attachment C Step 7a
		The US should identify the applicable T/S and T/R which are: **[Tech Specs]** 3.3.1, Functional Unit 11, Action 6 IF PZR level deviates from program level by + or – 6%, then also 3.4.3.1, Action b.	SM	Refer to Technical Specification 3.3.1, 3.3.3.5, and 3.3.3.6.	AOP 3571 Attachment C Step 7b

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		The RO should do a lamp check to ensure all bistable lights are functional.	RO	Check the existing bistable status to ensure a reactor trip will not occur when the failed channel is tripped.	AOP 3571 Attachment C Step 7c
				The following step will distinguish whether the failure is within SSPS or the Protection channel.	AOP 3571 Attachment C Step 7d NOTE
		NOTE: This is not the case. The channel has failed. The US should go to step 7.e.		If bistable status light(s) (MB4F) indicate that a single bistable input has tripped and channel indication is normal, PERFORM the following:	AOP 3571 Attachment C Step 7d
T=2 mins of request	**RXR106**	**"OPEN" Protection Set 1 Door**	I&C	Request the I&C Department trip the appropriate bistables using Attachment C and Attachment S.	AOP 3571 Attachment C Step 7e
	RXR25	**PZR High Level Trip B/S**	RO	Verify the appropriate bistable status lights are lit.	AOP 3571 Attachment C Step 7f
	RXR106	**"CLOSE" Protection Set 1 Door**			
			US	If indicator 3RCS*LI 459C is failed, Refer to TRM Table 7.4.1, Fire Related Safe Shutdown Components, "Reactor Coolant System."	AOP 3571 Attachment C Step 8
			US	Request I&C Department perform corrective maintenance on failed instrument.	AOP 3571 Attachment C Step 9

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		Event 3: "D" Steam Generator steam flow instrument fails low			
T = When AOP 3571 complete	**RSCU 3 (RX14G)**	**"D" Steam Generator steam flow instrument fails low (3MSS-FT542)**			
		AOP 3571 Actions (rev 009-01)			
		The BOP should place the "D" Feed Reg Valve controller and the Feedwater Pump Master Speed Controller in manual.	Crew	**Determine the initiating parameter and place the affected controller in MANUAL.**	AOP 3571 Step 1
			Crew	**Stabilize the plant parameters.**	AOP 3571 Step 2
		The appropriate attachment for this failure is "M". The US should announce to the crew.		**Perform Corrective Actions Using Appropriate Attachment**	AOP 3571 Step 3
			BOP	**If the failed steam flow channel is selected as the input to SG level control, Perform the following:**	AOP 3571 Attachment M Step 1
			BOP	Verify the affected SG feed regulating valve controller is in MANUAL.	AOP 3571 Attachment M Step 1.a
			BOP	Verify feedwater pump A and B master speed control (3FWS-SK509A) in MANUAL and Restore feed pump differential pressure to normal operating band (Program: 40 to 140 psid).	AOP 3571 Attachment M Step 1.b

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			BOP	Restore SG level to normal.	AOP 3571 Attachment M Step 1.c
			BOP	Defeat the failed channel input by selecting the alternate channel on the steam flow selector (also selects the alternate SG pressure instrument input to SGWLC).	AOP 3571 Attachment M Step 1.d
			BOP	When SG level is restored and feed/steam flow are matched, Perform the following: • Restore feed pump speed control to normal DP (Program: 40 to 140 psid) and Place the feed pump master speed controller in automatic. • Place the affected steam generator feed regulating valve controller in AUTO.	AOP 3571 Attachment M Step 1.e
			BOP/ RO	When conditions have stabilized, Observe MB annunciators and parameters. Immediately report any unexpected or unexplained conditions to the Shift Manager.	AOP 3571 Attachment M Step 2
		The calorimetric program automatically shifts to feed flow based at 88%power. This instrument failure should not cause a shift to an NI based output.	US/SM	• There are no Technical Specifications or bistables to be tripped associated with the steam flow instruments. • When the plant calorimetric is based on steam flow, the program will automatically shift to an NI based output if any steam flow channel is X-	AOP 3571 Attachment M Step 3 NOTE

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				tagged by the process computer.	
				If desired, using SP31002, "Plant Calorimetric," Select "FORCED FEED FLOW CALC" on the plant process computer.	AOP 3571 Attachment M Step 3
		The US should call I&C and report the instrument failure.	US/SM	**Request I&C Department perform corrective maintenance on failed instrument.**	AOP 3571 Attachment M Step 4
		Event 4: Data 'B' RPI Failure			
T = When AOP 3571 complete	**RSCU 4 (RD1160)**	Rod position indication failure, Data B (rod M4)			
		Annunciator "RPI NON URGENT FAILURE" will come in, and the 'general warning' light will flash for rod M4. The ARP will direct the crew to AOP 3552.			
		AOP 3552 Rev. 007-00 MALFUNCTION OF THE ROD DRIVE SYSTEM			
			CREW	**Stabilize Plant Conditions**	AOP 3552 Step 1
			RO	Place control rod bank SEL switch in MAN	AOP 3552 Step 1.a
			RO	Verify - NO RODS MOVING	AOP 3552 Step 1.b

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			CREW	Stop any power increase or decrease evolutions in progress.	AOP 3552 Step 1.c
			US	Check plant can be – MAINTAINED STABLE AT CURRENT POWER LEVEL	AOP 3552 Step 1.d
			US	Verify Tavg - Tref deviation - LESS THAN OR EQUAL TO 1.5°F	AOP 3552 Step 1.e
			US	Verify TURB LOAD REJECTION ARM C-7 (MB4D 6-6) annunciator - NOT LIT	AOP 3552 Step 1.f
				Maintain Tavg within 1.5°F of Tref using boration or dilution as necessary	AOP 3552 Step 1.g
				If, re-evaluation of plant conditions is desired, return to step 2.	AOP 3552 Step 2 NOTE
			US	**Check No Rod Dropped**	AOP 3552 Step 2
			US	Verify RPI URGENT FAILURE (MB4C 4-10) annunciator - NOT LIT	AOP 3552 Step 2.a
			RO	Check rod bottom lights - NONE LIT	AOP 3552 Step 2.b
				Check for Rod Control Failure	AOP 3552 Step 3
				Verify ROD CONTROL URGENT FAILURE (MB4C 4-8) annunciator – NOT LIT	
				Verify ROD CONTROL NON-URGENT FAILURE (MB4C 3-8) annunciator – NOT LIT	

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			US	**Check No Rod Position Indication Malfunction**	AOP 3552 Step 4
				Verify DRPI power available	AOP 3552 Step 4.a
				• Any DRPI display light - LIT	
				Verify status of following annunciators:	AOP 3552 Step 4.b
		NOTE: Annunciator IS LIT		• RPI NON URGENT FAILURE (MB4C 3-10) annunciator - NOT LIT	
				• RPI URGENT FAILURE (MB4C 4-10) annunciator - NOT LIT	
		NOTE: US should transition to the Attachment C at this step	US	Using Attachment C, Determine rod position indication malfunction.	AOP 3552 Step 4, RNO
				Verify status of DRPI display alarms:	AOP 3552 Step 4.c
				• URGENT ALARM - NOT FLASHING	
				• DATA A FAILURE - NOT FLASHING	
		NOTE: DATA **B** IS Flashing		• DATA B FAILURE - NOT FLASHING	
				• Rod GW - NONE FLASHING	
				• CENTRAL CONTROL FAILURE lights - NONE LIT	
			US	Using Attachment C, Determine rod position	AOP 3552

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				indication malfunction.	Step 4, RNO
		AOP 3552, ATTACHMENT C		**Check DRPI Power Supply**	AOP 3552 Att C **Step 1**
			RO	Verify DRPI display lights - NONE LIT	AOP 3552 Att C Step 1.a
			US	Proceed to Step 2.	AOP 3552 Att C Step 1.a, RNO
			RO	A DRPI URGENT ALARM indicates one of the following: • Error in both data A AND data B from detector/encoder cards. • Codes from data A and data B differ by GREATER THAN 1 bit • The binary sum of data A and data B data exceeds 38.	AOP 3552 Attachment C Step 2, Note
			RO	**Check For DRPI Urgent Alarm**	AOP 3552 Att C Step 2
				Verify DRPI display URGENT ALARM lights - FLASHING	AOP 3552 Att C

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					Step 2.a
			US	Proceed to NOTE prior to Step 3	AOP 3552 AttC Step 2.a, RNO
			US	• Loss of Data A will result in DRPI half-accuracy of +10 and -4 steps for affected rods.	AOP 3552 Att C Step 3, Note
			US	• Loss of Data B will result in DRPI half-accuracy of +4 and -10 steps for affected rods.	AOP 3552 Att C Step 3, Note
			US	**Check For DRPI Non-Urgent Alarm**	AOP 3552 Att C Step 3
			RO	Verify RPI NON URGENT FAILURE (MB4C 3-10) annunciator - LIT	AOP 3552 Att C Step 3.a
			RO	Verify DRPI Display DATA A FAILURE OR DATA B FAILURE lights - FLASHING	AOP 3552 Att C Step 3.b
	BOOTH	**NOTE**: When the board operator is sent to DRPI cabinet report, "ACCURACY MODE switch is in A+B position"	RO	Verify ACCURACY MODE selector switch (back of DRPI cabinet) - A + B POSITION	AOP 3552 Att C Step 3.c
		RO should identify the affected rod as rod M4 (CB D, group 2)	RO	Identify affected rod(s) as follows: • Flashing General Warning (GW) light	AOP 3552 Att C Step 3.d

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	Verify affected rod(s) indicates - WITHIN ± 12 STEPS OF ASSOCIATED GROUP STEP COUNTER DEMAND HEIGHT	AOP 3552 Att C Step 3.e
				Proceed to Step 3.h	AOP 3552 Att C Step 3.f
	BOOTH	**NOTE**: After notified as I&C inform the US that it is okay to return the rods to **Automatic**. Once the rods are in auto **then**... **Proceed** to Event 5		Notify I & C	AOP 3552 Att C Step 3.h
			US	A Central Control Card failure does not impair system operation since the three cards are redundant, handling both data A and data B.	AOP 3552 Att C Step 4, Note
			US	**Check For Central Control Card Failure**	AOP 3552 Att C Step 4
			RO	Verify DRPI display any CENTRAL CONTROL FAILURE 1 2 3 light - LIT	AOP 3552 Att C Step 4.a
			US	Proceed to NOTE prior to Step 5.	AOP 3552 Att C Step 4.a, RNO
			US	In "half accuracy" operation, the affected rod position will be indicated by every other LED	AOP 3552 Att C

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				as the rod is raised or lowered.	Step 5, Note
			US	**Perform Follow-up actions**	AOP 3552 Att C Step 5
		Event 5: Loss of Battery Bus 4			
T = Rods in AUTO or examiner's cue	**RSCU 5 (ED09D)**	Loss of Battery Bus 4			
		Battery 4 trouble and inverter 4 trouble annunciators alarm. The Battery 4 trouble ARP will direct the crew to AOP 3563.			
		AOP 3563, Loss of DC Bus Power, Rev. 007-03			
			BOP	**Check The Following DC Busses – ENERGIZED**	AOP 3563 step 1
				Bus 301A-1 (Battery Bus 1)	
				Bus 301B-1 (Battery Bus 2)	
				Bus 301C-1 (Battery Bus 5)	
				Bus 301D-1 (Battery Bus 6)	
				Check Bus 301A-2 (Battery Bus 3) -	AOP 3563 step 2

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				ENERGIZED	
				Check Bus 301B-2 (Battery Bus 4) – ENERGIZED	AOP 3563 step 3
				Use Attachment D.	AOP 3563 step 3 RNO
		VIAC-4 will still be energized from inverter 4	US	Verify VIAC-4 is energized from inverter 4 or the alternate power supply.	AOP 3563 Att.D step 1
		The US should contact Electrical Maintenance or the work week coordinator to initiate investigation and repair efforts.	US/BOP /PEO	Restore normal DC power alignment using OP 3345C, 125 Volt DC.	AOP 3563 Att.D step 2
T = 5 minutes from being dispatched	BOOTH	**Report as PEO that the 'Low DC Bus' alarm is in on Inverter 4.**			
		[Tech Specs] The following apply for a loss of DC bus 4: 3.8.2.1 Action b (24 hour action statement) 3.8.3.1 Actions b, c. (2 and 24 hour action statements respectively)	US	Refer to the following technical specifications for required actions: • 3.8.2.1 D.C. Sources Modes 1-4	AOP 3563 Att. D step 3

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• 3.8.2.2 D.C. Sources modes 5 and 6 • 3.8.3.1 Onsite Power Distribution Modes 1-4 • 3.8.3.2 Onsite Power Distribution Modes 5 and 6	
		NOTE: If called, Electrical Maintenance reports a bus fault on Battery Bus 4. More investigation is necessary.		**Continue With Normal Plant Evolutions Using Applicable Plant Procedures.**	AOP 3563 step 4
T= AOP 3563 complete	**RSCU 6** RC14C 100%	**EVENT 6**: RPCCW Leak into RCP C Upper Oil Reservoir			
		OP 3353.MB4B 4-6A Actions **(rev 004-05)**			
		NOTE: The reservoir high level alarm will sound after the malfunction has been in about 3 minutes.	RO	Check RCS-L477A, RCP C upper oil reservoir level computer point, to confirm alarm.	OP 3353.MB4 B Step 1
			CREW	MONITOR the following RCP C computer points: • RCS-T481A, RCP C upper thrust bearing temperature.	OP 3353.MB4 B Step 2

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• RCS-T481B, RCP C lower thrust bearing temperature. • RCS-T485A, RCP C upper thrust bearing temperature.	
			RO	IF at any time RCP B thrust bearing or radial bearing temperature computer point is greater than 195° F PERFORM the following:	OP 3353.MB4 B Step 3
				IF reactor power is greater than P-8 (37%), PERFORM the following:	OP 3353.MB4 B Step 3.1
				• TRIP reactor	OP 3353.MB4 B Step 3.1.1
				• STOP RCP C	OP 3353.MB4 B Step 3.1.2
				• Go To E-0	OP 3353.MB4 B Step 3.1.3
		The US should refer to AOP 3554, which will direct him to reduce power.	US	Refer to AOP 3554, "RCP Trip or Stopping an RCP at Power", and REMOVE RCP C from service.	OP 3353.MB4 B Step 3.2
			US	CHECK 3CCP-LI 20B, RPCCW surge tank level, for indication of RPCCW leakage.	OP 3353.MB4

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
					B Step 4
			US	The following step requires containment entry.	OP 3353.MB4 B ALARA Step 5
			CREW	IF directed by the SM/US CHECK for RPCCW to RCP C lube oil leak.	OP 3353.MB4 B Step 5
			US	Refer to Tech Specs and DETERMINE LCOs	OP 3353.MB4 B Step 6
		AOP 3554, Stopping an RCP at Power, Rev. 008-00	RO	**Check RCP Status - ALL PUMPS RUNNING**	AOP 3554 Step 1
			RO	**Check Reactor Power**	AOP 3554 Step 2
				Verify THREE LOOP PERMISSIVE P-8 annunciator (MB4D 3-3) - LIT.	AOP 3554 Step 2.a
		NOTE: The rate at which temperature is increasing should urge the crew to use the Rapid Downpower procedure. **However, the degrading oil reservoir condition will eventually either impel the Crew to manually trip the Reactor OR the RCP will seize and the Reactor will trip on RCP Low Speed. It is not expected that the**		Using one of the following, reduce power as required:	AOP 3554 Step 2.a RNO

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		crew will start the downpower.			
				• AOP 3575, "Rapid Downpower" • OP 3204, "At Power Operation"	
		At the time RCP C thrust bearing or radial bearing temperature reaches 195° F it is expected the US will direct the reactor be tripped and then "C" RCP.			
			RO	IF at any time RCP B thrust bearing or radial bearing temperature computer point is greater than 195° F PERFORM the following:	OP 3353.MB4 B Step 3
				IF reactor power is greater than P-8 (37%), PERFORM the following:	OP 3353.MB4 B Step 3.1
		NOTE: US should go to "Master Silence" before ordering reactor trip .	RO	TRIP reactor	OP 3353.MB4 B Step 3.1.1
			RO	STOP affected RCPs (RCP "D")	OP 3353.MB4 B Step 3.1.2

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			CREW	Go to E-0, Reactor Trip or Safety Injection.	OP 3353.MB4 B Step 3.1.3
		Event 7: **"C" Hot Leg break (Inside CTMT)** NOTE:			
T = Reactor Trip		**The small break LOCA will initiate upon the reactor trip. (MALF RC02C, 0.15% @ 60 sec ramp)**			
		E-0 (Rev. 22) STEPS	Crew		
				• Foldout page must be open	E-0, Step 1, NOTE
				• ADVERSE CTMT defined as GREATER THAN 180°F or GREATER THAN 10^5 R/hr in containment.	

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• The reactor can be interpreted as "tripped" when any two of three bulleted substeps of Step 1.* are satisfied.	
			RO	**Verify Reactor Trip** • Check reactor trip and bypass breakers - OPEN • Check rod bottom lights - LIT • Check neutron flux - DECREASING	E-0, Step 1
			RO	TRIP the reactor.	E-0, Step 1, RNO
				Verify Turbine Trip	E-0, Step 2
				Check all turbine stop valves - CLOSED	E-0, Step 2.a
			BOP	**Verify Power to AC Emergency Busses**	E-0, Step 3
			BOP	Check busses 34C and 34D - BOTH ENERGIZED	E-0, Step 3.a
			US	**Check If SI Is Actuated**	E-0, Step 4
			RO	Verify SAFETY INJECTION ACTUATION annunciator - (MB4D 1-6 or MB2B 5-9) - LIT	E-0, Step 4.a

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		Critical Task – Crew should identify that SI did not actuate and it is required. SI should be manually actuated.	US	Check if SI is required • CTMT pressure GREATER THAN 18 psia OR • PZR pressure LESS THAN 1890 psia OR • PZR level LESS THAN 9% OR • RCS subcooling LESS THAN 32°F OR • SG pressure LESS THAN 660 psig IF SI is required, THEN Initiate SI and Proceed to step 4.c.	E-0, Step 4.a, RNO [*]
				Check Reactor trip and bypass breakers - OPEN	E-0, Step 4.c

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Check Reactor trip and bypass breakers - OPEN	E-0, Step 4.c
			RO	**Verify Service Water Pumps - AT LEAST ONE PER TRAIN RUNNING**	E-0, Step 5
				START pump(s)	E-0, Step 5, RNO
			RO	**Verify Two RPCCW Pumps - ONE PER TRAIN RUNNING**	E-0, Step 6
			RO	**Verify ECCS Pumps Running** • Check SI pumps - RUNNING • Check RHR pumps - RUNNING • Check two charging pumps - RUNNING	E-0, Step 7
			BOP	**Verify AFW Pumps Running**	E-0, Step 8
				Check MD pumps - RUNNING	E-0, Step 8.a
		Critical Task – The BOP should identify that the AFW pumps failed to automatically start when required. The BOP should manually start both MDAFW pumps and the TDAFW pump.		START pump(s)	E-0, Step 8.a, RNO [*]

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Check turbine - driven pump - RUNNING, IF NECESSARY	E-0, Step 8.b
				OPEN steam supply valves.	E-0, Step 8.b, RNO [*]
				Check turbine - driven pump - RUNNING, IF NECESSARY	E-0, Step 8.b
			BOP	**Verify FW Isolation** • Check SG feed regulating valves - CLOSED • Check SG feed regulating bypass valves - CLOSED • Check FW isolation trip valves - CLOSED • Check TD FW pump - TRIPPED • Check MD FW pumps - STOPPED • Check SG blowdown isolation valves - CLOSED • Check SG blowdown sample isolation valves - CLOSED • Check SG chemical feed isolation valves - CLOSED	E-0, Step 9

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			BOP	**Check If Main Steam Lines Should Be Isolated**	E-0, Step 10
				Check Ctmt pressure GREATER THAN 18 psia	E-0, Step 10.a
				OR	
				Any SG pressure LESS THAN 660 psig	
				Proceed to Step 11	E-0, Step 10.a, RNO
				Verify MSIVs and MSIV bypass valves - CLOSED	E-0, Step 10.b
				Check ESF Group 3 lights - LIT.	E-0, Step 10.c
			RO	**Check if CDA Required**	E-0, Step 11
		CTMT pressure will ultimately reach the CDA setpoint. The crew should recognize that CDA did not actuate. Manual component alignment is required.		Check Ctmt pressure is GREATER THAN 23 psia	E-0, Step 11.a
				OR	
				Ctmt spray - INITIATED	
			US	Proceed to Step 12.	E-0, Step11,a, RNO

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			BOP	**Verify CAR Fans Operating In Emergency Mode**	E-0, Step 12
			BOP	Check CAR fan status: • CAR fans A and B - RUNNING • CAR fan C - STOPPED	E-0, Step 12.a
			BOP	START/STOP CAR fans as necessary.	E-0, Step 12.a, RNO
			RO	Verify RPCCW Ctmt supply and return header isolations - OPEN	E-0, Step 12.b
			RO	Verify Train A and B RPCCW supply and return to chill water valves - OPEN	E-0, Step 12.c
			RO	**Verify CIA**	E-0, Step 13
			RO	Check ESF Group 2 status columns 2 through 10 - LIT	E-0, Step 13.a
			RO	**Verify Proper ESF Status Panel Indication** • Verify ESF Group 1 lights - OFF • Verify ESF Group 2 lights - LIT	E-0, Step 14
			RO	**Determine If ADVERSE CTMT Conditions Exist** • Ctmt temperature GREATER THAN 180°F	E-0, Step 15

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				OR	
				• Ctmt radiation GREATER THAN 10^5 R/hr	
			RO	**Verify ECCS Flow**	E-0, Step 16
				Check charging pumps - FLOW INDICATED	E-0, Step 16.a
			RO	Check RCS pressure - GREATER THAN 1650 psia (1950 psia ADVERSE CTMT)	E-0, Step 16.b
			US	Proceed to Step 16.e	E-0, Step 16.b, RNO
				Check PORV block valves - OPEN	E-0, Step 16.c
				OPEN energized block valves.	E-0, Step 16.c RNO
		CREW should perform a short brief and come out of "Master Silence" at the completion of Step 16.		Proceed to step 17.	E-0, Step 16.d
				Check SI pumps - FLOW INDICATED	E-0, Step 16.e
				START pumps and Align valves.	E-0, Step 16.e RNO

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Check RCS pressure - LESS THAN 300 psia (500 psia ADVERSE CTMT)	E-0, Step 16.f
				Proceed to step 17.	E-0, Step 16.f RNO
			BOP	**Verify Adequate Heat Sink**	E-0, Step 17
				Check NR level in at least one SG - GREATER THAN 8% (42% ADVERSE CTMT)	E-0, Step 17.a
			US	Proceed to Step 17.d.	E-0, Step 17.a, RNO
			BOP	Verify Total AFW Flow - GREATER THAN 530 gpm	E-0, Step 17.d
			BOP	**Verify AFW Valve Alignment - PROPER EMERGENCY ALIGNMENT**	E-0, Step 18
			RO	**Verify ECCS Valve Alignment - PROPER EMERGENCY ALIGNMENT**	E-0, Step 19
			US	**Check Plant Status**	E-0, Step 20
BOOTH INST	NOTE	When asked, REPORT that "all SLCRS doors indicate closed."		Verify SLCRS doors - CLOSED	E-0, Step 20.a
			US	Request Security Close all SLCRS doors.	E-0, Step 20.a, RNO

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	Check CONTROL BUILDING ISOLATION annunciator (MB4D 3-6) - LIT	E-0, Step 20.b
			RO	Check if CBI is required	E-0, Step 20.b, RNO
			RO	• Ctmt pressure GREATER THAN 18 psia OR	
			RO	• Control Building radiation monitor in alarm OR • SI manually actuated	
			RO	IF CBI required, THEN Initiate CBI.	
			US	IF CBI is NOT required, THEN Proceed to Step 21.	
			RO	Verify ESF Group 2 CBI lights - LIT	E-0, Step 20.c

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	Align HVAC components as necessary for minimum safety function.	E-0, Step 20.c, RNO
			BOP	Verify control building purge supply fan and purge exhaust fan - NOT RUNNING	E-0, Step 20.d
			BOP	Verify control building air bank isolation valves - OPEN	E-0, Step 20.e
			BOP	STOP kitchen exhaust fan	E-0, Step 20.f
T+ 5 min of request	**BOOTH**	**Report the Control Building Pressure Boundary doors are closed & dogged or verified closed as directed.**	PEO	CLOSE and DOG the following Control Building pressure boundary doors. ▪ CB west 47'6" (C-47-1A) ▪ CB east 64' 6" (C-64-1B)	E-0, Step 20.g
				Verify the following Control Building pressure boundary doors - CLOSED ▪ CB west 47'6" (C-47-1) ▪ CB north 64'6" chiller room door (C-64-4) ▪ CB north 64'6" chiller room door (C-64-5) ▪ CB west 49'6" (C-49-1)	E-0, Step 20.h

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	**Check RCS Temperature**	E-0, Step 21
				Verify RCS cold leg WR temperature - BETWEEN 550°F AND 560°F.	E-0, Step 21.a

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			US	Perform the applicable action: • IF temperature is GREATER THAN 560°F, THEN Proceed to step 21.c. IF temperature is LESS THAN 550°F THEN Proceed to step 21.e.	E-0, Step 21.a, RNO
			BOP	Maintain total feed flow BETWEEN 530 and 600 gpm until NR level is GREATER THAN 8% (42% ADVERSE CTMT) in at least one SG	E-0, Step 21.e
			BOP	CLOSE SG atmospheric dump and dump bypass valves	E-0, Step 21.f
			BOP	Check the following valves - CLOSED • MSIVs • MSIV bypass valves	E-0, Step 21.g
			RO	**Check PZR Valves**	E-0, Step 22
				Verify PORVs - CLOSED	E-0, Step 22.a

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	Verify normal PZR spray valves - CLOSED	E-0, Step 22.b
			RO	Verify PZR safety valves - CLOSED	E-0, Step 22.c
			CREW	To prevent damage to the RCP seal(s), seal injection flow should be maintained to all RCPs.	E-0, Step 23, CAUTION
			RO	**Check If RCPs Should Be Stopped**	E-0, Step 23
				Verify RCPs - ANY RUNNING	E-0, Step 23.a
			RO	Verify RCS pressure - LESS THAN 1500 psia (1800 psia ADVERSE CTMT)	EOP 35 E-0, Step 23.b
			RO	Verify charging or SI pumps - AT LEAST ONE RUNNING	E-0, Step 23.c
		Critical Task – RCS pressure will eventually lower to < 1500 psia. Crew should identify this and trip all RCPs.	RO	STOP all RCPs	E-0, Step 23.d [*]
			BOP/RO	**Check If SG Secondary Boundaries Are Intact**	E-0, Step 24
				Check pressure in all SGs	E-0, Step 24.a

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				▪ NO SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER ▪ NO SG COMPLETELY DEPRESSURIZED	
			BOP	**Check If SG Tubes Are Intact**	E-0, Step 25
			RO	Sample all SGs for activity	E-0, Step 25.a
				1. RESET SG blowdown sample isolation 2. OPEN SG blowdown sample isolation valve(s) 3. Request Chemistry obtain activity samples using HP coverage	
	BOOTH	**Acknowledge the request to perform the S/G samples**. Ensure crew request activity samples with HP coverage			
			BOP	Check steam generator levels - NO SG LEVEL INCREASING IN AN UNCONTROLLED MANNER	E-0, Step 25.b
				Verify trend history and alarm status of radiation monitors • Main steam line - NORMAL • Condenser air ejector - NORMAL • SG blowdown - NORMAL	E-0, Step 25.c

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	**Check If RCS Is Intact**	E-0, Step 26
				▪ Verify Ctmt radiation using 3CMS*RE22 (pre-trip) - NORMAL	
				▪ Verify Ctmt radiation using radiation monitoring group histogram (CTMT) - NORMAL	
		CTMT pressure will not be normal.		▪ Verify Ctmt pressure - NORMAL	
				▪ Verify Ctmt recirculation sump level - NORMAL	
			US	Initiate monitoring of CSF Status Trees and Go to E-1, Loss of Reactor or Secondary Coolant.	E-0, Step 26 RNO
		E-1 (rev 021) Actions	RO	To prevent seal damage, seal injection flow should be maintained to all RCPs.	E-1, Step 1 CAUTION
	Note	The US should remind the operators to review their Foldout Page Books	US	Note: Foldout page must be open.	E-1, Step 1 NOTE
		RCP's should have been stopped in E-0	US	**Check If RCPs Should Be Stopped**	E-1, Step 1
			RO	Verify RCP's - ANY RUNNING	E-1 Step 1a

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			US	Proceed to step 2	E-1 Step 1a RNO
			US	**Check If SG Secondary Boundaries Are Intact**	E-1, Step 2
			BOP/	Check pressures in all SGs.	E-1, Step 2a
			RO	• NO SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER • NO SG COMPLETELY DEPRESSURIZED	
			US	**Check Intact SG Levels**	E-1, Step 3
			BOP	Verify NR level - GREATER THAN 8% (42% ADVERSE CTMT)	E-1, Step 3a
			BOP	Control feed flow to maintain NR level between 8% and 50% (42% and 50% ADVERSE CTMT)	E-1, Step 3b
			US	**Check Secondary Radiation**	E-1, Step 4

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	Sample all SGs for activity. 1) RESET SG blowdown sample isolation. 2) OPEN SG Blowdown sample isolation valve(s) 3) Request Chemistry obtain activity samples using HP coverage	E-1, Step 4.a
			RO	Verify trend history and alarm status of radiation monitors • Main steam line - NORMAL • Condenser air ejector - NORMAL • SG blowdown - NORMAL	E-1, Step 4.b
			CREW	If any PZR PORV opens because of high PZR pressure, step 5a should be repeated after pressure decreases to LESS THAN 2350 psia.	E-1, Step 5 CAUTION
			US	**Check PZR PORVs and Block Valves**	E-1, Step 5
			RO	Verify PORVs - CLOSED	E-1, Step 5a
			RO	Verify block valves - AT LEAST ONE OPEN	E-1, Step 5b

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			US	**Check If ECCS Flow Should Be Reduced**	E-1, Step 6
		Subcooling should be <32°F and/or PZR level < 16%.	RO	Verify RCS subcooling based on core exit TCs - GREATER THAN 32°F (115°F ADVERSE CTMT)	E-1, Step 6a
			BOP	Verify secondary heat sink ▪ Total feed flow to intact SGs - GREATER THAN 530 gpm OR ▪ Narrow range level in at least one intact SG - GREATER THAN 8% (42% ADVERSE CTMT)	E-1 Step 6b
			RO	Verify RCS pressure - STABLE OR INCREASING	E-1 Step 6c
			RO	Verify PZR level - GREATER THAN 16% (50% ADVERSE CTMT)	E-1 Step 6d
			US	Proceed to CAUTION prior to step 7.	E-1, Step 6, RNO
			US	To ensure adequate ECCS flow, do not stop any recirculation spray pumps used for core injection flow.	E-1, Step 7 CAUTION

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			US	The recirculation spray pumps are sequenced to automatically start 11 minutes after a CDA.	E-1, Step 7 NOTE
			RO	Check if containment spray should be stopped.	E-1, step 7
			RO	Verify quench spray pumps - RUNNING	E-1, Step 7a
			US	Proceed to CAUTION prior to step 8.	E-1, Step 7a, RNO
			CREW	• If offsite power is lost after SI reset, manual actions to restart safeguards equipment may be required.	E-1, Step 8 CAUTION
			CREW	• To provide adequate ECCS flow, RCS pressure should be monitored to ensure that the RHR pumps are manually restarted if pressure decreases to LESS THAN 300 psia (500 psia ADVERSE CTMT)	E-1, Step 8 CAUTION
			US	**Check If RHR Pumps Should Be Stopped**	E-1, Step 8
			US	Check RHR pumps - ANY RUNNING IN SI MODE	E-1, Step 8.a

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		Depending on the speed of the crew, RCS pressure may still be going down very slowly. If the crew elects NOT to stop RHR pumps based on this trend, this is satisfactory.	RO	Check RCS pressure 1) Verify pressure - GREATER THAN 300 psia (500 psia ADVERSE CTMT) 2) Verify pressure - STABLE OR INCREASING	E-1, Step 8.b
		Crew should reset SI	RO	RESET SI, if necessary	E-1, Step 8.c
		NOTE: This step will stop the RHR Pumps. If stopped, the pumps will need to be restarted when the LOCA becomes larger.	RO	STOP RHR pumps and Place in Auto	E-1, Step 8.d
			US	**Check RCS and SG Pressures**	E-1, Step 9
			BOP	• Check pressure in all SGs - INCREASING OR STABLE (consistent with plant cooldown)	
			RO	• Check RCS pressure - DECREASING OR STABLE	E-1, Step 9
				Do not reset CDA if the recirculation spray pumps are required and have NOT automatically started.	E-1, Step 10 CAUTION
			US	**Check If Diesel Generators Should Be Stopped**	E-1 Step 10

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			BOP	Verify AC emergency busses - BOTH ENERGIZED BY OFFSITE POWER	E-1 Step 10a
				Proceed to step 10.h.	E-1 Step 10b
				RESET SI and CDA, if required	E-1 Step 10h
			PEO	Perform the following to energize MCC32-3T	E-1 Step 10i
				Check Bus 34C -ENERGIZED	E-1 Step 10.i.1
		BOOTH INSTRUCTOR:		Using GA-1, Energize MCC 32-3T	E-1 Step 10.i.2
T = + 8 of request	**EDR18 "RESET"**	**Energize MCC1A3 (32-3T)**			
	EDR44 "RESET"	**Reset Batt/Inv 6 Trouble (~ 5 min after 3T reset)**			
				Check emergency diesel generators - BOTH RUNNING UNLOADED	E-1 Step 10.j
				STOP unloaded diesel generator(s)	E-1 Step 10k
				Locally perform the following for unloaded emergency diesel generators:	E-1 Step 10l
				▪ For EDG A, Place 3EGS*PNL1A control switch on MCC 32-1T-3H to START	

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				▪ For EDG B, Place 3EGS*PNL1B control switch on MCC 32-1U-3H to START	
			US	**Initiate Evaluation Of Plant Status**	E-1 Step 11
			US	Verify cold leg recirculation capability	E-1 Step 11a
			BOP	1) Power to recirculation spray pumps - AVAILABLE	
			RO	2) Using Attachment A, Verify power for cold leg recirculation valves - AVAILABLE	
T= step 11	**RC02C** **sev = 100%**	This will increase the severity of the SBLOCA to a point where ADVERSE CTMT will occur and if stopped, the RHR pumps will need to be restarted.			

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		The crew will need to recognize 3 items: **1- The rise in CTMT pressure will generate an orange path on CTMT, and require transition to FR-Z.1** **2- CDA has failed to actuate.** **3- If stopped, RHR pumps will need to be restarted.**			
	Note	FR-P.1 may come in first. If so the crew will perform FR-P.1 first as it has a higher priority	US	Go to FR-Z.1 and restart the RHR pumps	E-1, step 8 caution and OP3272
		FR-P.1 (rev 013-01) Steps	CREW	• If DWST level decreases to LESS THAN 80,000 gal, Shift AFW pump suction to the CST using GA-4. • If RWST level decreases to LESS THAN 520,000 gal, Go to ES-1.3, Transfer to Cold Leg Recirculation, to align the ECCS system.	FR-P.1 Step 1 CAUTION

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		RHR pumps may be started by the crew at this point.	RO	Check RCS Pressure - GREATER THAN 300 psia (500 psia ADVERSE CTMT)	FR-P.1, Step 1
			US	Perform the applicable action:	FR-P.1, Step 1, RNO
				• IF RHR pump flow is LESS THAN OR EQUAL TO 1000 gpm THEN Proceed to step 2.	
		RHR Pump flow should be > 1,000 gpm. The appropriate transition will be to FR-Z.1		• IF RHR pump flow is GREATER THAN 1000 gpm THEN Go to procedure and step in effect.	
		FR-Z.1 (rev 013-00) STEPS		**Check If CDA Required**	FR-Z.1, Step 1
		Yes, CTMT pressure will be greater than 23 psia.	RO	Check Ctmt pressure - GREATER THAN 23 psia	FR-Z.1, Step 1.a
		"CONTAINMENT DEPRESS ACTUATION" will NOT be lit.		Verify annunciator "CONTAINMENT DEPRESS ACTUATION' (MB2B 5-5) - LIT	FR-Z.1, Step 1.b
		The **RO** is expected to attempt to **manually initiate CDA** using the main board pushbuttons	RO	Initiate CDA.	FR-Z.1, Step 1.b RNO
			US/RO	**Verify CIA**	FR-Z.1, Step 2

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Check ESF Group 2 Status columns 2 Through 10- LIT	FR-Z.1, Step 2.a
		CDA will have failed to Auto Actuate. CIB relays operated on Hi-3 and realigned the RPCCW valves	US	**Verify CIB**	FR-Z.1, Step 3
			RO	Check RPCCW Ctmt supply and return header isolation valves - CLOSED	FR-Z.1, Step 3.a
			RO	CLOSE valves.	FR-Z.1, Step 3.a, RNO
			RO	Check RPCCW pumps - STOPPED	FR-Z.1, Step 3.b
		The RPCCW pumps will have to be manually stopped.	RO	STOP pumps.	FR-Z.1, Step 3.b, RNO
			RO	STOP all RCPs	FR-Z.1, Step 3.c
		N/A	US	If ECA-1.1, Loss of Emergency Coolant Recirculation, is in progress, Ctmt spray should be operated as directed in ECA-1.1.	FR-Z.1, Step 4 CAUTION
			US	**Verify Quench Spray System Operation**	FR-Z.1, Step 4

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	Check annunciator RWST EMPTY QSS PP OFF (69,331 gal) (MB2A 5-2) - NOT LIT	FR-Z.1, Step 4.a
			RO	Verify quench spray pumps - RUNNING	FR-Z.1, Step 4.b
		Critical Task – The RO must manually start the QSS pumps.	RO	START pumps.	FR-Z.1, Step4.b, RNO [*]
				Verify quench spray pump discharge valves - OPEN • 3QSS*MOV34A • 3QSS*MOV34B	FR-Z.1, Step 4.c
		Critical Task – The RO must manually open the quench spray pump discharge valves.	RO	OPEN valves.	FR-Z.1, Step 4.c, RNO [*]
		The BOP will have to manually stop Main Circulating Water Pumps.	BOP	**STOP All Main Circulating Water Pumps**	FR-Z.1, Step 5
				Check Containment Ventilation	FR-Z.1, Step 6

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		The BOP will have to manually stop the CAR and CRDM fans.	BOP	• Verify CAR fans - STOPPED	
			BOP	• Verify CRDM fans - STOPPED	
				Verify Recirculation Spray System Operation	**FR-Z.1, Step 7**
				Check recirculation spray pump suction isolation valves - OPEN • 3RSS*MOV23A • 3RSS*MOV23B • 3RSS*MOV23C • 3RSS*MOV23D	FR-Z.1, Step 7.a
				OPEN valves.	FR-Z.1, Step 7.a RNO
				Check annunciator CTMT RECIRC PUMP AUTO START SIGNAL (MB2B 1-8 lit) - LIT	FR-Z.1, Step 7.b

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Perform the applicable action: IF QSS flow is indicated, THEN Proceed to step 9 and, WHEN The annunciator actuates OR 11 minutes elapse since CDA initiation, THEN Return to step 7.c	FR-Z.1, Step 7.b, RNO
				Check recirculation spray pumps – ANY RUNNING	FR-Z.1, Step 7.c
				Proceed to step 7.e	FR-Z.1, Step 7.c, RNO
				Check Ctmt WR sump level (3RSS*LI22A, 3RSS*LI22B) - GREATER THAN 1.5 feet	FR-Z.1, Step 7.e
		The RO must manually start the RSS pumps.		START recirculation spray pumps	FR-Z.1, Step 7.f
				Verify recirculation spray pump spray header isolation valves – OPEN ON RUNNING PUMP (S) • For pump A – 3RSS*MOV20A • For pump B – 3RSS*MOV20B	FR-Z.1, Step 7.g

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• For pump C – 3RSS*MOV20C • For pump D – 3RSS*MOV20D	
				Check recirculation spray – FLOW INDICATED IN AT LEAST ONE TRAIN	FR-Z.1, Step 7.h
				IF running pump amps, flow, or discharge pressure oscillate THEN 1. RESET SI THEN LOP and CDA 2. STOP affected pump(s). 3. Go to ECA-1.1, Loss of Emergency Coolant Recirculation	FR-Z.1, Step 7.i
				Proceed to step 9.	FR-Z.1, Step 7.j
				Verify ESF Status Panel Group 4 Lights - LIT	FR-Z.1, Step 9
				Operate components as necessary for minimum safety function.	FR-Z.1, Step 9, RNO
				Verify Main Steam Line Isolation	FR-Z.1, Step 10
				• Check MISVs and MISV bypass valves - CLOSED • Check ESF Status Group 3 lights - LIT	

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Verify Main Feedwater Isolation	FR-Z.1, Step 11
				• Verify MD FW pumps - TRIPPED	
				• Verify TD FW pumps - TRIPPED	
				• Verify FW isolation trip valves - CLOSED	
				• Verify SG feed regulating valves - CLOSED	
				• Verify SG feed regulating bypass valves - CLOSED	
				• Verify SG chemical feed isolation valves - CLOSED	
				• At least one SG must be maintained available for RCS cooldown.	FR-Z.1, Step 12, CAUTION
				• If all SGs are faulted, at least 100 gpm feed flow should be maintained to each SG.	
				Check If Auxiliary Feedwater Flow Should Continue To All SGs	FR-Z.1, Step 12
				Check pressure in all SGs	FR-Z.1, Step 12.a
				• NO SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER	

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• NO SG COMPLETELY DEPRESSURIZED	
				Go to Procedure and Step In Effect	FR-Z.1, Step 13

The scenario may be terminated upon completion of FR-Z.1.

SECTION 4

Lesson Title: Large Break LOCA

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EVALUATION GUIDE

I. Crew FOLLOW-UP QUESTIONS

1. What is the Emergency Classification for this event?

   ALERT – Charlie One based on failure of the RCS barrier. (RCB4)

2. What plant condition(s) is(are) of greatest concern for (this event)?

   Reactor coolant release to the CTMT.

4. What actions did the crew take to directly mitigate (this event)?

   Carried out the actions of E-0 and E-1. Identified, the need for a Safety Injection and the restart of the RHR Pumps with CTMT Spray

5. Which safety function(s) were challenged or had the greatest potential for challenge? Describe why.

   CTMT Integrity as the CDA required a manual actuation

SECTION 4
EXAM GUIDE SUMMARY

Title: Large Break LOCA

ID Number: 2K7 NRC-01 Revision: 0

II. Critical Tasks

Note: Critical Tasks are not required for Progress Review Exams.

TASK DESCRIPTION	TASK #	K/A >/= 3.0	BASIS SELECTION
Establish 530 gpm AFW flow to the S/Gs before transition out of E-0 unless transition to FR-H.1. Then before step 3.	E-0--F	3.9/4.0 061 000 GEN 14	Failure to establish minimum required AFW flow, under the postulated plant conditions, results in "adverse consequences."
Trip all RCPs so that an Orange Path on Core Cooling based on core exit thermocouples (718°F) does not occur when forced circulation in the RCS stops (small break LOCA).	E-1 --C	3.6/3.6 009 EA1.09 4.2/4.3 009 EK3.23	Failure to trip the RCPs under the postulated plant conditions leads to core uncovery and to fuel cladding temperatures in excess of 2200°F, which is the limit specified in the ECCS acceptance criteria.
Manually actuate at least one train of SIS-actuated safeguards before completion of step 4 of E-0.	E-0--D	4.5/4.8 006 030 A2.01	Failure to manually actuate SI represents a "demonstrated in-ability by the crew to take an action or combination of actions that would prevent a challenge to plant safety."
Establish at least one Quench Spray train flow before completion of FR-Z.1 step 4.	E0-E	026 000 A1.01 3.9/4.2	Failure to establish at least one Quench Spray train flow under the postulated conditions constitutes a "demonstrated inability by the crew to recognize a failure/incorrect auto actuation of an ESF system or component."

Note: [*] Used to designate critical tasks. Should also be incorporated into column 3 or 4 of Instructor Guide.

SHIFT TURNOVER REPORT

DATE-TIME	PREPARED BY	SHIFT
today 0300	Unit Supervisor /"Night" Shift	1800-0600

PLANT STATUS:

Mode:	1		Rx Power:	100%
Megawatts:	Thermal:	3411 MWTH	PZR Pressure:	2250 psia
	Electric:	1205 MWe	RCS T-AVE:	587 degF
RCS Leakage:	Identified:	0.005 gpm	Boron/Burnup	43 ppm / 19,000 MWD/MTU
	Unidentified:	0.03 gpm	Days on line	485
Date/Time:	today 0015		Protected Train/Facility:	**B Purple**
PRA/SDR:	Green			
Intake:	Green			

Active Tracking Records and Action Statements

Equipment/Reason

LCO	Action	Date	Time in LCO	Action Requirement	Time Left
3.8.1.1	b.1, b.2, b.3, b.4, b.5	yesterday	18 hours	SR 4.8.1.1.1.a due in 3 hours	13 days
7.4.1	a.1, a.3	yesterday	18 hours		13 days

OD Compensatory Actions / Temp Logs

Open Date	Class Reason	Reason	Watch Position

Plant Systems APC

System	Notes
TPCCW	**"C" TPCCW pump is out of service for an oil replacement.**

Cross Unit System Status

Surveillances / Evolutions in Progress

Shift Orders

The "A" EDG is out of service for a planned 2 year overhaul maintenance outage. The "C" TPCCW pump is out of service for an oil replacement.

ATTACHMENT 2

VALIDATION CHECKLIST

Title: Large Break LOCA

ID Number: 2K7 NRC-01 Revision: 0

Verified By:
(Initials)

Initial Conditions:

The initial condition(s) contained in the guide are certified or have been developed from certified ICs.

Test Run:

The scenario contained in the guide has been test run in part or whole on the simulator. The simulator response is reasonable and as expected. If a simulator guide revision does not affect original Test Run, then enter N/A. ②

Simulator Operating Limits:

The simulator guide has been evaluated for operating limits and/or anomalous response by reviewing the Simulator Modeling and Anomalous Response List. ②

For Examination Scenario:

The Scenario Attributes Checklist is complete and attached. This is not required for Progress Review Exams.

Actions Complete (Signature) — Date: 1/24/07

Facility: Millstone 3 Scenario No.: 2K7 NRC-01 Op-Test No.: 2K7

Examiners: _____ Operators: _____

Initial Conditions: IC-21, 100% power, End of Life, Equilibrium Xe.

Turnover:
The plant is at 100% power and at end of life. The "A" Emergency Diesel Generator is out of service for major maintenance. The "C" TPCCW pump is out of service for oil replacement.

Event No.	Malf. No	Event Type*	Event Description
1	MS05B	C (BOP) N (SRO) R (RO) R (SRO) N (BOP)	Moisture Separator Reheater tube leak and subsequent procedurally required downpower. AOP 3575, *Rapid Downpower.*
2	RX10A	I (RO)	Controlling channel of PZR level fails 'as is' (3RCS*L459) in conjunction with downpower.
3	RX14G	I (BOP)	"D" Steam Generator steam flow instrument fails low (3MSS-FT542).
4	RD1160	C (RO)	Control rod position indication failure, Data B (rod M4).
5	ED09D		Loss of Battery Bus 4.
6	RC14C	C (RO)	RPCCW leak into upper oil reservoir of 'C' RCP.
7	RC02C RP07A/B FW20	M (ALL) C (RO) C (BOP)	Small break LOCA inside CTMT. Safety Injection fails to auto-actuate. AFW pumps fail to auto-start.
8	RC02C RP06A/B	C (RO)	Large break LOCA inside CTMT. CDA fails to auto-actuate.

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

Lesson Title: Large Break LOCA

ID Number: 2K7 NRC-01 Revision: 0

Assessor: Dave Minnich

QUALITATIVE ATTRIBUTES

___Y__1. The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the crew into expected events.

___Y__2. The scenario consists mostly of related events.

___Y__3. Each event description consists of:

- the point in the scenario when it is to be initiated
- the malfunctions(s) that are entered to initiate the event
- the symptoms/cues that will be visible to the crew
- the expected operator actions (by shift position)
- the event termination point (if applicable)

___Y__4. No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.

___Y__5. The events are valid with regard to physics and thermodynamics.

___Y__6. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.

_N/A__7. If time compression techniques are used, scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.

___Y__8. The simulator modeling is not altered.

___Y__9. The scenario has been validated. Pursuant to 10 CFR 55.46(d), any open simulator performance deficiencies or deviations from the referenced plant have been evaluated to ensure functional fidelity is maintained while running the planned scenario.

___Y__10. Every operator will be evaluated using at least one new or significantly modified scenario. All other scenarios have been altered IAW Section D.5 of ES-301.

___Y__11. All individual operator competencies can be evaluated, as verified using form ES-301-6.

___Y__12. Each operator will be significantly involved in the minimum number of transients and events specified on Form ES-301-5.

___Y__13. Level of difficulty is appropriate to support licensing decisions for each crew position.

Lesson Title: Large Break LOCA

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Note: Following criteria list scenario traits that are numerical (QUANTITATIVE) in nature.

01. Total Malfunctions (TM) – 5 to 8 required — Total 10

(1) MSR Tube Leak, (2) PZR Level Failure, (3) Steam Flow Failure, (4) DRPI Failure, (5) Loss of DC Bus Power (6) RCP Oil Reservoir Leak, (7) LOCA in CTMT, (8) ESF Auto Actuation Failure (SI), (9) AFW pumps fail to Auto Start, (10) ESF Auto Actuation Failure (CDA)

02. Malfunctions after EOP entry (EM's) – 1 to 2 required — Total 3

(1) ESF Auto Actuation Failure (SI), (2) AFW pumps fail to Auto Start, (3) ESF Auto Actuation Failure (CDA)

03. Abnormal Events (AE) – 2 to 4 required — Total 6

(1) Rapid Downpower (AOP 3575), (2) PZR Level Failure (AOP 3571), (3) Steam Flow Failure (AOP 3571), (4) DRPI Failure (AOP 3552), (5) Loss of DC Bus Power (AOP 3563), (6) RCP Oil Reservoir Leak

04. Major Transients (MT) – 1 to 2 required — Total 1

(1) LOCA inside CTMT

05. EOP's (EU) entered/requiring substantive actions -- 1 to 2 required — Total 2

(1) E-1, (2) FR-Z.1

06. EOP Contingencies requiring substantive actions [ECAs/FRs/] (EC) -- 0 to 2 required — Total 1

(1) FR-Z.1

07. Critical Tasks (CT) – 2 to 3 required — Total 4

E-0 – D Manually actuate at least one train of SI before completion of step 4 of E-0.

E-0 – F Establish 530 gpm of AFW flow before transitioning out of E-0.

E-0 – E Establish at least one train of QSS spray before completion of step 4 of FR-Z.1.

E-1--C Trip all RCP's before an Orange Path on core cooling.

08. Approximate Scenario Run Time: 60 to 90 min. — Total 90 min

09. EOP run time: — Total 45 min

10. Technical Specifications are exercised during the scenario. — (Y/N) Y

SUMMARY OF CHANGES

Change Description	Date of Change

MILLSTONE POWER STATION

SIMULATOR EXAM GUIDE APPROVAL SHEET

Exam Title: Four Faulted Steam Generators

Revision: 0

ID Number: 2K7 NRC-02

Submitted by:	D. Minnich Developer	1/11/07 Date
Validated by:	Martin Technical Reviewer	1/24/7 Date
Approved by:	Mathews Training Supervisor	1/24/07 Date

SECTION 2

SIMULATOR EXAM GUIDE

TABLE OF CONTENTS

SECTIONS LISTED IN ORDER

1. Cover Page

2. Table of Contents

3. Exercise/Exam Overview

4. Exam Guide

Attachments:

- Shift Turnover Report
- Validation Checklist
- Scenario Outline (ES-D-1)
- Attributes Checklist
- Summary of Changes

SECTION 3

EXAM OVERVIEW

Title: Four Faulted Steam Generators

ID Number: 2K7 NRC-02 Revision: 0

Exam Brief:

1. The Session will begin with the plant at 100% power and at end of life. The "A" EDG is out of service for planned maintenance. The "C" TPCCW pump is out of service for an oil replacement. Shortly after turnover is complete a Pressurizer Pressure Instrument will fail high. This failure will require the use of AOP 3571, *Instrument Failure Response*, to respond to the failure. The procedure should be completed up to and including addressing any required Technical Specifications.

After completion of AOP 3571, a feed flow instrument failure will occur on the "C" Steam Generator. Again, the crew should enter AOP 3571 "Instrument Failure Response" to address the failure.

Once feed control has been regained and "C" SG water level stable, RCS leak of about 20 gpm will occur from the reactor vessel flange inner O-ring. VCT level will decrease, CDTT level will increase and the annunciator for high flange leakoff temperature will alarm. The crew will enter the annunciator response procedure for *RX VESSEL FLG LEAKOFF TEMP HI,* to mitigate the event. Leakage will be in excess of the Tech Spec limit on Identified RCS leakage. The leak will be isolable.

After the crew has isolated the RCS leak, a narrow range Tc instrument will fail high. Rods will begin stepping in. The crew will utilize AOP 3571, *Instrument Failure Response* to mitigate the failure.

When AOP 3571 is complete, CONVEX will direct the crew to begin an "Emergency Load Reduction" decreasing unit electrical output by 300 MWe. The crew will use AOP 3575, Rapid Downpower to accomplish this down power. The emergency boration valve, 3CHS*MV8104, will fail to open and the RO will have to use the RNO steps to achieve boration flow.

Once the crew has completed the downpower, the electrical grid will become unstable resulting in a main generator trip. The reactor will fail to automatically trip **[Critical Task]**, resulting in SG pressures increasing. A steam break will occur upstream of the "A" MSIV inside the Main Steam Valve Building. Once the plant is tripped, the "A" & "B" MSIVs will fail to close and the "C" and "D" SG low set safety valves will stick open. Main Steamline Isolation (MSI) will fail to automatically actuate, necessitating the crew to manually initiate MSI **[Critical Task]**. Additionally, several RPCCW components will fail to respond as required to the safety injection signal and will have to be manually positioned by the crew. The crew should proceed through E-0 to E-2 to ECA-2.1. After progressing into the SI Termination steps of ECA-2.1, the "C" low set safety valve will close. The scenario will end when the crew identifies the safety valve closure and pressure increasing in the "C" SG, and discusses the transition to E-2, once SI termination is complete.

2. The SM/ US should classify this event as an ALERT based on failure of automatic reactor trip (EA1). The event is also classifiable at the ALERT level based on Unisolable Steam Line Break outside CTMT (BA2).

3. Duration of Exam: 75 minutes

SECTION 4

EXAM GUIDE

Title: Four Faulted Steam Generators

ID Number: 2K7 NRC-02 Revision: 0

All Control Room Conduct, Operations and Communications shall be in accordance with Master Manual 14 and applicable DNAP/DNOS standards.

"Review the Simulator Operating Limits (design limits of plant) and the Simulator Modeling Limitations and Anomalous Response List prior to performing this exam scenario on the simulator. The evaluators should be aware if any of these limitations may be exceeded." (NSEM 6.06)

SECTION 4

EXAM GUIDE

Title: Four Faulted Steam Generators

ID Number: 2K7 NRC-01 Revision: 0

SIMULATOR PROBLEMS DURING EXAMS

It is the responsibility of the Instructors in the simulator to insure that training interruptions have a minimum negative impact on the Crew and the training we provide. Use your judgment on whether to stop the training and how the training should be commenced after the problem is corrected.

Be aware that at all times the Operators should treat the simulator as if it were the plant and you too should treat it as much like the plant as possible when they are in the simulator.

As soon as the Instructors are aware of a simulator problem that will adversely affect the training in progress (computer fault, etc.) the Instructor should:

1. Place the simulator in FREEZE if possible.

2. Announce to the Crew that there is a simulator problem.

3. Request that the Crew either standby (for minor trouble that can be handled quickly) or leave the simulator control room. (The Crew should leave the simulator for problems which involve major switch alignments).

4. Deal with the problem (reboot, close tripped breaker, call STSB, etc.)

5. After the Instructors believe the simulator is restored to service, the Crew should be told how training will continue. If it is possible and felt to be acceptable to the Instructors, training can begin where it left off with an update on plant parameters and each Crew member is prepared to restart. If training will not begin where it left off, the crew should be told how and where training will begin again.

6. Once the Crew has been told how and where training will begin, have the crew conduct a brief so that the Instructor can insure that the crew has all the necessary information to continue with the scenario.

7. Once all Crew members and Instructors are satisfied that they have the necessary information to continue the scenario, place the simulator in RUN and announce to the Crew that you have continued the training session.

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INITIAL SETUP INSTRUCTIONS

1. START the Sun Workstation.
   a. IF the Sun Workstation is running THEN go to SIM ACTIVE.
2. PLACE Recorder Power to ON.
3. VERIFY that the current approved training load is loaded.
4. REMOVE the step counter OVERRIDE and allow the counters to step out during the IC reset.
5. RESET to **IC XX (Based on IC 21)**
6. ADJUST the various pot settings to the valued specified by the chart in the simulator booth or Notepad for the selected IC. Pay particular attention to the Pzr spray valves and their setpoints.
7. PLACE Simulator to RUN.
8. If Necessary, RESET the Plant Calorimetric at the Instructor Station PPC by Pressing "SHIFT LEFT" and "F6" simultaneously.
9. ENSURE Simulator fidelity items cleared.
   a. CHECK the STEP COUNTERS at correct position for plant conditions.
   b. PLACE _7_ tiles under the DEMINS IN SERVICE lamacord label on MB6.
   c. PLACE the Main Turbine on the LOAD LIMITER and ENSURE Standby Load Set MATCHED if conditions require.
   d. PLACE the Westronic (5) and Gammametrics (2) recorders in active/run by depressing up or down arrow for each.
   e. For the RIL recorder: select printer to "ON" when command? appears select "Autojog".
   f. CLEAR **DCS** alarms on MB7 and BOP console.
   g. VERIFY annunciator, "COMPUTER FAILURE" (MB4C, 1-11), is NOT LIT.
10. As needed, RESET Computer Terminals to At Power displays if 100% power IC.
11. RESET Rad Monitor Screen to Status Grid.
12. IF placing equipment OOS, THEN perform the necessary switch manipulations and hang appropriate tags, as required, listed under "Equipment OOS."

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INITIAL SETUP INSTRUCTIONS

13. Ensure that the protected train and environmental placards are appropriately hung.

Equipment OOS: **"A" EDG (Yellow Tag on Start Switch, Output Breaker and Prelube pump)**
"C" TPCCW pump (Yellow Tag on control switch)

Insert applicable Crew Training Tape/CD into the DVD/VCR.

Verify the MONITOR Time Display the same as the digital time display on MB4. If not page/call the Unit Tech.

Initial Malfunctions/IOs/IDAs:

PLACE GREEN PLACARDS FOR ALL INTAKE PARAMETERS ON MB6

PLACE THE "B" TRAIN PROTECTED PLACARD ON MB4

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INITIAL SETUP INSTRUCTIONS

TYPE	Name	Sev.	Ramp	RSCU	Boul	Description
MALF	RP10A					Automatic Reactor Trip Failure (train A)
MALF	RP10B					Automatic Reactor Trip Failure (train B)
MALF	RP08A					MSI fails to auto actuate (train A)
MALF	RP08B					MSI fails to auto actuate (train B)
MALF	RP11H					RPCCW components fail to position on an SI
MALF	MS12A					"A" MSIV sticks open
MALF	MS12B					"B" MSIV sticks open
MALF	RX09A	100	30 sec	1		RCS-PT455A fails high
MALF	RX13E	0		2		"C" Feed Flow Channel fails low
MALF	RC04A			3		Reactor Vessel Flange Leakoff
MALF	RC21	60%		3		Valve stem leakoff to the CDTT
MALF	RX04A	100%	-	4	-	RCS NR CL TE411B FAIL
MALF	ED10	75%	60	5		Degraded Grid Voltage
Remote	EDR01	+0.1		5		Grid Frequency shift
MALF	EG01			6		Main Generator Trip
MALF	MS02A	35	40		BT1	"A" SG Fault into the MSVB
MALF	MS07C	40			BT1	"C" Safety Valve sticks open
MALF	MS07D	35			BT1	"D" Safety Valve sticks open
I/O (CV)	3CHS*MV8104 - OPEN	FALSE				3CHS*MV8104, Emerg. Boration Vv will not open.
I/O (EG)	1A-3ENSACB-A GREEN	OFF	-	-	-	D/G A BKR CNTL
I/O (EG)	1A-3ENSACB-A-RED	OFF	-	-	-	D/G A BKR CNTL
I/O (EG)	1A-3ENSACB-A-AMBER	OFF	-	-	-	D/G A BKR CNTL
I/O (EG)	1-3EGO-P1A RED	OFF				D/G A Prelube Pump
I/O (EG)	1-3EGO-P1A GREEN	OFF				D/G A Prelube Pump
Ann O/R	MB8A 2-11	ON				34C Loss of Control Power

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INITIAL SETUP INSTRUCTIONS

Lead Examiner: **Refer to the "Briefing Script for the Operational Exam" and brief the crew. Go over the Plant/simulator differences, which follow.**

Booth Instructor: **Commence recording Simulator session**

Booth Instructor: Perform the crew turnover (Initial Conditions page at end of LP) with the SM . Have the SM brief his crew on plant conditions and any major equipment OOS.

PLANT/SIMULATOR DIFFERENCES:

- Rad Monitor Historical Data--Simulator Rad Monitor historical data not valid prior to the beginning of this exercise.
- If not using the speed dial option on the phone system, the operator must dial either #3333 or #3334 to reach the person/department they desire.
- The following PPC programs do not function on the simulator:
  - Samarium Follow
  - Xenon Follow
  - Sequence of Events
- Flow indications 3SIH-FI917 (charging ECCS flow), 3SIH-FI918 (A SI pump flow) and 3SIH-FI922 (B SI pump flow) will show flow at low flow rates.

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		Event 1: Failed Pzr Pressure Instrument P455A			
T+1 min of turnover	**RSCU=1 Activate**	**This will fail Pzr Pressure Instrument 455 high**	Crew	Diagnose instrument failure	
			US	Enter AOP 3571	AOP 3571 Entry Conditions
		AOP 3571 Actions (rev 009-01)			
			RO	Do not leave the rod selector switch in AUTO while diagnosing a related instrument failure unless the reason for rod movement is a turbine runback.	AOP 3571 Step 1, CAUTION
			CREW	If a reactor trip occurs, immediately go to E-0, Reactor Trip or Safety Injection.	AOP 3571 Step 1, NOTE
			RO	**Determine the Initiating Parameter and Place the affected controller in MANUAL**	AOP 3571 Step 1
		As a result of the failed instrument, PZR spray valves will open and actual PZR pressure will go down. The RO will take manual control of the Master PZR Pressure Controller and raise output to close the spray valves.	CREW	**Stabilize the Plant Parameters**	AOP 3571 Step 2
			US	It is desired that I&C personnel trip the bistables specified in this procedure. If,	AOP 3571 Step 3, NOTE

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				during off - hours, I&C personnel are not able to trip the necessary bistables within the time limitations required by the Technical Specifications, Operations Department personnel may trip the bistables using the guidance provided within this procedure.	
			US	**Perform Corrective Actions Using Appropriate Attachment**	AOP 3571 Step 3
				Instrument Failure	**Attachment**
				Pressurizer Pressure Channel Failure	B
			RO	**Defeat the failed channel input.**	AOP 3571 Attachment B Step 1
				Pressurizer Press Select - Control 3RCS-PS455F Pressurizer Press Select - Record 3RCS-PS455G OT/OP ΔT Record Select - RCS-TS411E	
			RO	**Restore RCS pressure to normal, then Place PZR pressure control in automatic.**	AOP 3571 Attachment B Step 2
			RO/ BOP	**When conditions have stabilized, Observe MB annunciators and**	AOP 3571 Attachment B

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				parameters. Immediately report any unexpected or unexplained conditions to the Shift Manager.	Step 3
			US	**Trip the associated Reactor Protection System bistable(s):**	AOP 3571 Attachment B Step 4
			US	Place a check mark in the box above the appropriate channel that requires tripping on pages 3 or 4 of this Attachment.	AOP 3571 Attachment B Step 4.a
		Tech Specs - Log into 3.3.1 Action 6 (FU #7,9 &10) and 3.3.2 Actions 20 and 21 (FU #1.d & 9.a).	SM /US	Refer to Technical Specification 3.3.1, 3.3.2, and 3.3.3.5.	AOP 3571 Attachment B Step 4.b
		TRM - Log into TRM 3.3.2.1, Action 27..A.		Refer to Technical Requirement 3.3.2.1	AOP 3571 Attachment B Step 4.c
		NOTE: If PZR pressure lowers to less than 2218 psia, the US should enter T/S 3.2.5 Action b. for DNB Parameters.	RO	Check the existing bistable status to ensure a reactor trip will not occur when the failed channel is tripped.	AOP 3571 Attachment B Step 4.d
				The following step will distinguish whether the failure is within SSPS or the Protection channel.	AOP 3571 Attachment B Step 4.e NOTE
		NOTE: This is not the case. The		If bistable status light(s) (MB2D or	AOP 3571

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		channel has failed. The US should go to step 4.f.		MB4F) indicate that a single bistable input has tripped and channel indication is normal, PERFORM the following:	Attachment B Step 4.e
T=2 mins of request	**RXR106**	**"OPEN" Protection Set 1 Door**	SM /US	Request the I&C Department trip the appropriate bistables using Attachment B and Attachment S.	AOP 3571 Attachment B Step 4.f
	RXR05	**"TRIP" OTΔT**	RO	Verify the appropriate bistable status lights are lit.	AOP 3571 Attachment B Step 4.g.
	RXR34	**"TRIP" C3**			
	RXR44	**"TRIP" Lo Pzr Press SI B/S**		If indicator 3RCS*PI 455B is failed, Refer to TRM Table 7.4.1, Fire Related Safe Shutdown Components, "Reactor Coolant System."	AOP 3571 Attachment B Step 5
	RXR40	**"TRIP" Hi Pzr Press Rx Trip B/S**			
	RXR48	**"TRIP" Lo Pzr Press Rx Trip B/S**	SM /US	Request I&C Department perform corrective maintenance on failed instrument.	AOP 3571 Attachment B Step 6
	RXR120	**"TRIP" P-11**			
	RPR40	**PORV Logic B/S**			
	RXR106	**"CLOSE" Protection Set 1 Door**			
		EVENT 2: Controlling channel of "C" Steam Generator feed flow fails low (3MSS-FT530)			
T= Crew has tripped bistables and addressed	**RSCU 2 (RX13E, 0%)**	**Activate RSCU 2. This will fail 3MSS-FT530 low.**			

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
TSs.					
		AOP 3571 Att L (Rev 009-01) Actions	Crew	Do not leave the rod selector switch in AUTO while diagnosing a related instrument failure unless the reason for rod movement is a turbine runback.	AOP 3571 Step 1 CAUTION
			Crew	If a reactor trip occurs, immediately go to E-0, Reactor Trip or Safety Injection.	AOP 3571 Step 1 NOTE
		When the feed flow channel fails low, first alarm will be SG (C) FLOW MISMATCH STM > FW, due to the "C" Feed Regulating Valve going closed. The BOP will take manual control of "C" FRV Controller and open the FRV.	BOP	**Determine the initiating parameter and place the affected controller in MANUAL.**	AOP 3571 step 1
			BOP	**Stabilize the plant parameters.**	AOP 3571 step 2
			US	**Perform Corrective Actions Using Appropriate Attachment**	AOP 3571 Step 3
				Instrument Failure	**Attachment**
				Feed Flow Channel Failure	L
			Crew	The following annunciators are symptoms of a failed feed flow instrument:	
				SG A (B) (C) (D) LEVEL DEVIATION	MB5B 4-1,3,5,7
				SG A (B) (C) (D) FLOW MISMATCH FW > STM	MB5B 5-1,3,5,7

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				SG A (B) (C) (D) FLOW MISMATCH STM > FW	MB5B 5-2,4,6,8
				If the failed feed flow channel is selected as the input to SG level control, Perform the following:	AOP 3571 Attachment L Step 1
			BOP	Verify the affected SG feed regulating valve controller is in MANUAL.	AOP 3571 Attachment L Step 1.a
			BOP	Restore SG level to normal.	AOP 3571 Attachment L Step 1.b
			BOP	Defeat the failed channel input by selecting the alternate channel on the feed flow selector.	AOP 3571 Attachment L Step 1.c
			BOP	When SG level is restored to normal and feed/steam flow are matched, Place the affected steam generator feed regulating valve controller in AUTO.	AOP 3571 Attachment L Step 1.d
			US	There are no Technical Specifications or bistables to be tripped associated with the feed flow instruments.	AOP 3571 Attachment L Step 2 NOTE
				When the plant calorimetric is based on feed flow, the program will automatically shift to an NI based output if any feed flow channel is X-tagged by the process computer.	AOP 3571 Attachment L Step 2 NOTE
			RO /BOP	**When conditions have stabilized,**	AOP 3571 Attachment L

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Observe MB annunciators and parameters. Immediately report any unexpected or unexplained conditions to the Shift Manager.	Step 2
			US / SM	**Request I&C Department perform corrective maintenance on failed instrument.**	AOP 3571 Attachment L Step 3
	EVENT 3: RCS leak. Reactor Flange Leakoff leakoff into the CDTT.				
T = AOP 3571 exited	**RSCU 3 (RC04A and RC21, 66%)**	**Flange leakoff to the CDTT increases to 20 gpm.**			
		Symptoms: VCT level will lower, CDTT level will increase. VCT pressure will lower slowly bringing in the VCT pressure low alarm. Charging flowrate will be slowly increasing and PZR level will be slowly lowering.			
		The crew will utilize the Annunciator Response Procedure, OP3353.MB4A-5-5, "RX VESSEL FLG LEAKOFF TEMP HI" **MB4A-5-5 (rev 002-12), "RX VESSEL FLG LEAKOFF TEMP HI"**		**CORRECTIVE ACTIONS**	

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		3DGS-TI 401 will show temperature in excess of 140 degrees.	RO	CONFIRM leakoff high temperature on 3DGS-TI 401, "RX FLANGE" "LEAK OFF TEMP" (MB4).	MB4A 5-5 Step 1
		CDTT level will be trending higher.	RO/BOP	MONITOR 3DGS-LI 33, "GASEOUS DRAINS" "CTMT DRAIN TK" "LVL", to determine leak rate (MB1).	MB4A 5-5 Step 2
		Leak Rate is around 20 gpm.	US	IF RCS IDENTIFIED LEAKAGE is greater than 10 gpm, PERFORM the following:	MB4A 5-5 Step 3
T = when called	**BOOTH**	**Inform the US that you will make notifications. You will put together a team to make a CTMT entry to align the outer O-ring. Expect CTMT entry in 1.5 hours.**	US	NOTIFY the OMOC (Duty Officer).	MB4A 5-5 Step 3.1
		TS 3.4.6.2 action b applies for identified leakage in excess of 10 gpm. 4 hour action statement.	US	Refer To Technical Specification 3.4.6.2 and DETERMINE Limiting Condition for Operation.	MB4A 5-5 Step 3.2
			US	Closing 3RCS*AV8032, Rx flange leakoff isolation, renders the Reactor Head Flange Leakoff System in capable of monitoring leakage per Surveillance Requirement 4.4.6.2.1.e.	MB4A 5-5 Step 4 NOTE
		Leakoff System is aligned to detect inner O-ring leakage.		IF Reactor Flange Leakoff System is aligned to detect inner O-ring leakage, ALIGN Leakoff System as follows:	MB4A 5-5 Step 4
T = 3RCS*AV8032	**REMOVE MALF**	**This will isolate the leakage.**	RO	CLOSE 3RCS*AV8032, "RX FLANGE LEAK OFF ISOL" (MB4).	MB4A 5-5

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
goes closed.	**RC21**				Step 4.1
		Steps 4.2 and 4.3 must be carried out **inside CTMT.**		CLOSE 3RCS*V104, reactor vessel flange inner O-ring leakoff.	MB4A 5-5
					Step 4.2
				OPEN 3RCS*V103, reactor vessel flange outer O-ring leakoff.	MB4A 5-5
					Step 4.3
				OPEN 3RCS*AV8032, "RX FLANGE LEAK OFF ISOL" (MB4).	MB4A 5-5
					Step 4.4
				VERIFY decreasing temperature on 3DGS-TI 401, "RX FLANGE" "LEAK OFF TEMP" (MB4).	MB4A 5-5
					Step 4.5
		Once the leak rate is determined and the Tech Spec entered, move on to the next event.			
		EVENT 4: Loop 2 Tavg fails high			
T = Leak isolated	**RSCU 4 (RX04A)**	**Loop 1 narrow range Tc, 3RCS*TE411B**			

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		Tave will fail high. Rods will drive in. Delta T for "A" Loop will go low.			
		AOP 3571 (Rev. 009-01) Actions	US	Transition to AOP 3571, Instrument Failure Response	
		The RO will place Rod Control in manual; PZR level control is already at 100% program. Steam Dumps not armed so no immediate impact	CREW	Determine the initiating parameter and place the effective controller in manual.	AOP 3571 Step 1
			CREW	Stabilize the plant parameters.	AOP 3571 Step 2
			US	**Perform Corrective Actions Using Appropriate Attachment**	AOP 3571 Step 3
				Instrument Failure	**Attachment**
				RCS NR Temperature Channel Failure	A
			RO	Defeat the failed channel input.	AOP 3571 Att.A Step 1
				Loop Temp Cutout - delta T	
				Loop Temp Cutout - Tavg	
				OT/OP delta T Record Select	
				Check the following annunciators NOT LIT:	AOP 3571 Att.A Step 2
				TREF/AUCT TAVE DEVIATION MB4C 6-5	
				TAVE HI MB4C 5-6	

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		No action may be required depending on when crew placed rods in manual.	RO	Restore T_{AVE} - T_{REF} error to within 1 °F and return rod control to automatic.	AOP 3571 Att.A Step 3
			RO	Monitor PZR level until stable. If PZR level controller is in manual, Restore pressurizer level to program level and Place PZR level controller in automatic.	AOP 3571 Att.A Step 4
		NA		If RCS loop 3 cold leg narrow range temperature channel computer point (RCS-T431E) is X-tagged, the plant calorimetric program will automatically shift to an NI based output.	AOP 3571 Att.A Step 5 Note
			CREW	When conditions have stabilized, Observe MB annunciators and parameters. Immediately report any unexpected or unexplained conditions to the Shift Manager.	AOP 3571 Att.A Step 5
			US	Trip the associated Reactor Protection System bistable(s):	AOP 3571 Att.A Step 6
			US	Place a check mark in the box above the appropriate channel that requires tripping on page 4 of the Attachment.	AOP 3571 Att.A Step 6a
		Table 3.3.1 – FU 7, 8 Action 6 applies **Table 3.3.2 – FU 5D Action 20 applies** **These are 6 hour requirements to trip bistables.**	US/ SM	Refer to Technical Specification 3.3.1 and 3.3.2.	AOP 3571 Att.A Step 6b

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		Once the crew has determined T.S. requirements go to Event 5. B/S will not be tripped due to time considerations and that evolution was exercised during the PZR Pressure channel failure.	RO	Check the existing bistable status to ensure a reactor trip will not occur when the failed channel is tripped.	AOP 3571 Att.A Step 6c
		EVENT 5: CONVEX directed Emergency Load Reduction. AOP 3575, *Rapid Downpower.* Emergency Boration valve fails to open.			
T = I&C called	**BOOTH**	**Call as CONVEX and request Millstone Unit 3 to perform an "Emergency Load Reduction" of 300 MwE in the next 15 minutes due to Grid Instabilities. Maintain current VAR loading.**			
			US	The US will enter AOP 3575, *Rapid Downpower*	
		AOP 3575 Actions (Rev. 013)		• A CONVEX requested emergency generation reduction as directed by C OP 200.8, "Response to ISO New England / Convex Emergencies and Alerts", Should be completed within 15 minutes of notification.	AOP 3575 Step 1 NOTE
				• If a unit shutdown is required, the target power level should be between 20% and 25% reactor power.	
				• If at any time ROD CONTROL BANKS LIMIT LO - LO (MB4C 4 - 9)	

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				annunciator is received, DO NOT go to AOP 3566, Immediate Boration. Immediately perform step 9.	
			CREW	**Determine Power Reduction Rate (%/min).**	AOP 3575 Step 1
			US	Check desired power reduction rate - EQUAL TO OR LESS THAN 5%/min.	AOP 3575 Step 1.a
			US	Check power reduction CONVEX REQUESTED	AOP 3575 Step 1.b
			CREW	Perform load reduction at 5%/min and Proceed to step 2	AOP 3575 Step 1.c
			US	**Check Rod Control In AUTO.**	AOP 3575 Step 2
			CREW	**Align EHC Panel**	AOP 3575 Step 3
			US	Check turbine OPERATING MODE - MANUAL	AOP 3575 Step 3.a
			US	Check LOAD LIMIT LIMITING light - LIT	AOP 3575 Step 3.b
			BOP	Intermittently Press DECREASE LOAD pushbutton until LOAD LIMIT LIMITING light - NOT LIT	AOP 3575 Step 3.c
			BOP	Rotate LOAD LIMIT SET adjust knob at least one full turn in raise direction	AOP 3575 Step 3.d
				Select DECREASE LOADING RATE to ON	AOP 3575 Step 3.e

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			BOP	Select LOAD RATE LIMIT % MIN to power reduction rate (% min) determined in step 1.	AOP 3575 Step 3.f
				If at any time the power reduction rate or final desired power level must be changed, Return to step 1.	AOP 3575 Step 4 NOTE
			US/RO	**Verify Power Reduction Rate**	AOP 3575 Step 4
			RO	Check power reduction rate 5% MIN	AOP 3575 Step 4.a
				Check power reduction - REQUIRED TO STABILIZE PLANT	AOP 3575 Step 4.b
				Proceed to Step 5	AOP 3575 Step 4.b RNO
				If SI actuation occurs during this procedure, Go to E-0, Reactor Trip or safety Injection, and restore from rapid boration lineup.	AOP 3575 Step 5 CAUTION
				Initiate Rapid Boration	AOP 3575 Step 5
				Verify RCS makeup system in - AUTO	AOP 3575 Step 5.a
				START one boric acid transfer pump	AOP 3575 Step 5.b
T = initial MALF	**I/O**	**EVENT 5:** Emergency Boration Valve Fails to Open		OPEN emergency boration valve (3CHS*MV8104).	AOP 3575 Step 5.c

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
	3CHS* MV8104, OPEN - FALSE				
			RO	Verify direct boric acid flow (3CHS-FI 183A) - INDICATED.	AOP 3575 Step 5.d
				Perform the following to initiate gravity boration:	AOP 3575 Step 5.d RNO
				1. Place the charging line flow control valve in MAN.	
				2. OPEN at least one gravity feed boration valve.	
				3. CLOSE at least one VCT outlet isolation valve.	
				4. Limit net charging flow to the RCS to LESS THAN 75 gpm (charging + seal injection - RCP seal return).	
				5. Adjust charging line flow control valve as required.	
				6. Proceed to step 5.f.	
				Record time boration started Time_____	AOP 3575 Step 5.f
				Energize all PZR heaters	AOP 3575 Step 5.g

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	Adjust Pzr Spray Valves to 50% setpoint • RCS-PK 455B • RCS-PK 455C	AOP 3575 Step 5.h
				Check Rod Control – AVAILABLE FOR ROD INSERTED	AOP 3575 Step 5.i
				Using formula, Determine required boration time (If gravity borating, use net charging flow for BA flow rate):	AOP 3575 Step 5.j
		Boration Time = Total Power Change (Δ%) x 15 / BA Flow Rate = _____ min			
		Boration Time = (25% x 15) / 75 gpm = **5.0 min**	US	During power decrease, Modify boration time as necessary to maintain: • Rods above the Rod Insertion Limit • Tavg within ±° F of Tref • AFD within COLR limits	AOP 3575 Step 5.k
				Check turbine load decrease - IN PROGRESS OR COMPLETED.	AOP 3575 Step 5.l
			US	Proceed to NOTE prior to Step 7.	AOP 3575 Step 5.l RNO
			RO	If a unit shutdown is being performed, the final Mwe load should be approximately 230 Mwe.	AOP 3575 Step 7 NOTE

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			US/BOP	**Initiate Load Reduction.**	AOP 3575 Step 7
			BOP	Check turbine OPERATING MODE - MANUAL	AOP 3575 Step 7.a
			BOP	Check either of the following: • Rapid or gravity boration – IN PROGRESS OR • Turbine load reduction – REQUIRED TO STABILIZE PLANT	AOP 3575 Step 7.b
			BOP	Check LOAD RATE LIMIT % MIN set at - 3% OR 5%	AOP 3575 Step 7.c
		The BOP should adjust Load Set to 900 MWe.	BOP	Utilizing DECREASE LOAD pushbutton, Adjust LOAD SET to desired final Mwe	AOP 3575 Step 7.d
			BOP	Check power reduction - CONVEX REQUESTED.	AOP 3575 Step 7.e
			BOP	Maintain initial MVAR loading during power reduction, unless directed otherwise.	AOP 3575 Step 7.f
			US/RO	Check boration - IN PROGRESS	AOP 3575 Step 7.g
				Verify Final Desired Turbine Load (Mwe) – LESS THAN 75%	AOP 3575 Step 8

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Proceed to Step 10.	AOP 3575 Step 8 RNO
			BOP	The following step places one TD FW pump in manual while allowing the other TD FW pump to automatically unload during the downpower.	AOP 3575 Step10 NOTE
			US/BOP	**Align One Feedwater Pump For Automatic Unloading**	AOP 3575 Step 10
		The US should recognize that 75% power, two feedwater pumps will be required.	BOP	Verify removing a feedwater pump from service during the downpower - DESIRED	AOP 3575 Step 10.a
				Proceed to step 11.	AOP 3575 Step 10.a RNO
			US/RO	**Verify Rod Position**	AOP 3575 Step 11
			RO	Check ROD CONTROL BANKS LIMIT LO - LO (MB4C 4 - 9) annunciator - LIT.	AOP 3575 Step 11.a
			US/RO	Proceed to step 11.e and, IF at any time, the annunciator is received, THEN Perform steps 11.b, 11.c and 11.d.	AOP 3575 Step 11.a RNO
			RO	Check ROD CONTROL BANKS LIMIT LO (MB4C 3 - 9) annunciator - LIT	AOP 3575 Step 11.e
			US	Proceed to NOTE prior to step 12 and, IF the annunciator is received, THEN	AOP 3575 Step 11.e RNO

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Perform step 11.f and 11.g.	
			US	**Restore From Rapid Boration.**	AOP 3575 Step 12
			RO	Check rapid OR gravity boration - IN PROGRESS.	AOP 3575 Step 12.a
			US/RO	Check boration performed for the required time determined in Step 5.i and 5.j.	AOP 3575 Step 12.b
			RO	Check rapid boration – IN PROGRESS	AOP 3575 Step 12.c
				Perform the following:	AOP 3575 Step 12.c RNO
				1. OPEN both VCT outlet isolation valves. 2. CLOSE both gravity feed boration valves. 3. Proceed to step 12.f.	
			RO	Restore PZR level to program value and Place charging line flow control valve in AUTO.	AOP 3575 Step 12.f
			US	Using normal makeup, Adjust RCS boron concentration as necessary to maintain: • Rods above the Rod Insertion Limit	AOP 3575 Step 12.g

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• Tavg within ± 5°F of Tref • AFD within COLR limits	
			US	**Reduce Steam Supply To The MSRs.**	AOP 3575 Step 13
			BOP	Check reheat steam flow controllers - IN AUTOMATIC.	AOP 3575 Step 13.a
			BOP	Using the MSR Startup Pressure Display on the Foxboro DCS, Verify symmetrical operation of the MSR reheaters during power decrease.	AOP 3575 Step 13.b
			BOP	Using OP 3317, "Reheat and Moisture Separator," Perform manual adjustment of moisture separator reheater steam flow control valves, as necessary.	AOP 3575 Step 13.b RNO
			US	**Check If RCS Sample Is Required.**	AOP 3575 Step 14
			US	Verify change in Reactor Power - GREATER THAN 15% IN ONE HOUR	AOP 3575 Step 14.a
			US	Request Chemistry sample the RCS for iodine (*between 2 and 6 hours after the power change.)*	AOP 3575 Step 14.b
			US	Request Chemistry Department perform gaseous effluent samples and analysis (*between 24 and 72 hours after the power change)* for the following process monitors:	AOP 3575 Step 14.c

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• 3HVR-RE10B • 3HVR-RE19B	
			US	**Verify Target Power Level - LESS THAN 50%.**	AOP 3575 Step 15
			US	Continue power reduction to the final desired target power level. WHEN Final power level is reached, THEN Proceed to Step 22.	AOP 3575 Step 15 RNO

EVENT 6: Main Generator trip and automatic reactor trip failure

T = AOP 3571 and rapid downpower complete	**RSCU 5** **(ED10)** **(EDR01)**	**Degraded Grid Voltage** Grid voltage will increase to 372 KV over 60 seconds. Freq will increase to 60.1 hz.
T = 1 min after RSCU 5	**ED10** **EDR01**	**Modify to 58%, ramp 60 seconds.** **Modify to 0.0,** **THEN REMOVE ED10**
T = When	**RSCU 6**	**Generator Trip resulting in reactor**

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
the crew identifies degraded grid voltage		**trip and four faulted SGs.** Generator trip results in turbine trip. The reactor will fail to automatically trip. Secondary pressure rise will result in SG safety valves opening and "A" SG faulting. The "A" and "B" MSIVs will not close, and the "C" and "D" SGs will have a safety valve stick open.			
			BOP	The BOP should identify the Main Generator and Turbine trip	
			RO	The RO should identify the 'first out' and automatic reactor trip failure and initiate a manual reactor trip from main board 4.	OP 3272
			US	The US should enter E-0 and direct the crew to carry out the immediate actions of E-0.	E-0 Entry Conditions

EVENT 7: Four faulted SGs. MSI fails to automatically actuate. Several RPCCW components fail to respond to an SI signal.

NOTE: US should go to "Master Silence" before ordering reactor trip.

E-0 (Rev. 022-00) STEPS Crew

- Foldout page must be open — E-0, Step 1, NOTE

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• ADVERSE CTMT defined as GREATER THAN 180°F or GREATER THAN 10^5 R/hr in containment. • The reactor can be interpreted as "tripped" when any two of three bulleted substeps of Step 1.* are satisfied.	
			RO	**Verify Reactor Trip**	E-0, Step 1
				• Check reactor trip and bypass breakers - OPEN • Check rod bottom lights - LIT • Check neutron flux - DECREASING	
		Critical Task – The RO needs to initiate a manual reactor trip from main board 4. [*]	RO	TRIP the reactor.	E-0, Step 1, RNO **[*]**
				IF reactor will NOT trip, THEN	
				Verify Turbine Trip	E-0, Step 2
				Check all turbine stop valves - CLOSED	E-0, Step 2.a
			BOP	**Verify Power to AC Emergency Busses**	E-0, Step 3
			BOP	Check busses 34C and 34D -	E-0, Step 3.a

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				BOTH ENERGIZED	
				Try to energize the affected buss(es) from its associated EDG.	E-0, Step 3.a, RNO
			US	**Check If SI Is Actuated**	E-0, Step 4
			RO	Verify SAFETY INJECTION ACTUATION annunciator - (MB4D 1-6 or MB2B 5-9) - LIT	E-0, Step 4.a
				By observation of ESF Group 2 Status Panel lights, Verify both trains of SI - ACTUATED	E-0, Step 4.b
				By observation of ESF Group 2 Status Panel lights, Verify both trains of SI - ACTUATED	E-0, Step 4.b
				Check Reactor trip and bypass breakers - OPEN	E-0, Step 4.c
				Locally TRIP the reactor trip and bypass breakers.	E-0, Step 4.c RNO
			RO	**Verify Service Water Pumps - AT LEAST ONE PER TRAIN RUNNING**	E-0, Step 5
			RO	**Verify Two RPCCW Pumps - ONE PER TRAIN RUNNING**	E-0, Step 6
			RO	**Verify ECCS Pumps Running**	E-0, Step 7
				- Check SI pumps - RUNNING	
				- Check RHR pumps - RUNNING	

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				- Check two charging pumps - RUNNING	
			BOP	**Verify AFW Pumps Running**	E-0, Step 8
				Check MD pumps - RUNNING	E-0, Step 8.a
				Check turbine - driven pump - RUNNING, IF NECESSARY	E-0, Step 8.b
			BOP	**Verify FW Isolation**	E-0, Step 9
				• Check SG feed regulating valves - CLOSED	
				• Check SG feed regulating bypass valves - CLOSED	
				• Check FW isolation trip valves - CLOSED	
				• Check TD FW pump - TRIPPED	
				• Check MD FW pumps - STOPPED	
				• Check SG blowdown isolation valves - CLOSED	
				• Check SG blowdown sample isolation valves - CLOSED	
				• Check SG chemical feed isolation valves - CLOSED	
	BOOTH	Note: if the crew chooses to pull MSIV	BOP	**Check If Main Steam Lines Should Be**	E-0, Step 10

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		fuses early, the IOs are located on the page containing step 1 of E-2 in the exam plan.		**Isolated**	
				Check Ctmt pressure GREATER THAN 18 psia	E-0, Step 10.a
				OR	
		Yes		Any SG pressure LESS THAN 660 psig	
				Verify MSIVs and MSIV bypass valves - CLOSED	E-0, Step 10.b
		Critical Task – The BOP needs to initiate a manual MSI from main board 5. The BOP should go to close on the A and B MSIV. [*]	BOP	Initiate MSI.	E-0, Step 10.b, RNO [*]
			BOP	IF MSI will NOT actuate, THEN CLOSE the MSIVs and MSIV bypass valves.	
		All ESF Group 3 lights will be lit except for the A and B MSIV.		Check ESF Group 3 lights - LIT.	E-0, Step 10.c
			RO	**Check if CDA Required**	E-0, Step 11
				Check Ctmt pressure is GREATER THAN 23 psia	E-0, Step 11.a
				OR	
				Ctmt spray - INITIATED	

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			US	Proceed to Step 12.	E-0, Step11.a, RNO
			BOP	**Verify CAR Fans Operating In Emergency Mode**	E-0, Step 12
			BOP	Check CAR fan status: • CAR fans A and B - RUNNING • CAR fan C - STOPPED	E-0, Step 12.a
			BOP	START/STOP CAR fans as necessary.	E-0, Step 12.a, RNO
			RO	Verify RPCCW Ctmt supply and return header isolations - OPEN	E-0, Step 12.b
			RO	Verify Train A and B RPCCW supply and return to chill water valves - OPEN	E-0, Step 12.c
			RO	**Verify CIA**	E-0, Step 13
			RO	Check ESF Group 2 status columns 2 through 10 - LIT	E-0, Step 13.a
			RO	**Verify Proper ESF Status Panel Indication** • Verify ESF Group 1 lights - OFF • Verify ESF Group 2 lights - LIT	E-0, Step 14
		Several RPCCW components will need to be manually positioned as			

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		they failed to respond to the SI signal.			
		CTMT will not be ADVERSE	RO	**Determine If ADVERSE CTMT Conditions Exist** • Ctmt temperature GREATER THAN 180°F OR • Ctmt radiation GREATER THAN 10^5 R/hr	E-0, Step 15
			CREW	DO NOT use ADVERSE CTMT parameters.	E-0, Step 15, RNO
			RO	**Verify ECCS Flow**	E-0, Step 16
				Check charging pumps - FLOW INDICATED	E-0, Step 16.a
			RO	Check RCS pressure - GREATER THAN 1650 psia (1950 psia ADVERSE CTMT)	E-0, Step 16.b
			US	Proceed to Step 16.e	E-0, Step 16.b, RNO
		RCS has partially depressurized due to the faulted SGs. If pressure is greater than 1650 psia, the SI pump flow check is not necessary. The crew will check PORV block valves and proceed to step 17.		Check SI pumps - FLOW INDICATED	E-0, Step 16.e

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Check RCS pressure - LESS THAN 300 psia (500 psia ADVERSE CTMT)	E-0, Step 16.f
		CREW should perform a short brief and come out of "Master Silence" at the completion of Step 16.		Proceed to step 17.	E-0, Step 16.f RNO
			BOP	**Verify Adequate Heat Sink**	E-0, Step 17
				Check NR level in at least one SG - GREATER THAN 8% (42% ADVERSE CTMT)	E-0, Step 17.a
			US	Proceed to Step 17.d.	E-0, Step 17.a, RNO
		With 4 faulted SGs, crew should not isolate flow to all SGs, and also should wait for procedural guidance before throttling less than 530 gpm total AFW flow.	BOP	Verify Total AFW Flow - GREATER THAN 530 gpm	E-0, Step 17.d
			BOP	**Verify AFW Valve Alignment - PROPER EMERGENCY ALIGNMENT**	E-0, Step 18
			RO	**Verify ECCS Valve Alignment - PROPER EMERGENCY ALIGNMENT**	E-0, Step 19
			US	**Check Plant Status**	E-0, Step 20
T = When Requested	**BOOTH**	**When asked, REPORT, "all SLCRS doors indicate closed, except for several Main Steam Valve Building doors, which indicate open."**	SM/US	Verify SLCRS doors - CLOSED	E-0, Step 20.a

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	Check CONTROL BUILDING ISOLATION annunciator (MB4D 3-6) - LIT	E-0, Step 20.b
			RO	Verify ESF Group 2 CBI lights - LIT	E-0, Step 20.c
			BOP	Verify control building purge supply fan and purge exhaust fan - NOT RUNNING	E-0, Step 20.d
			BOP	Verify control building air bank isolation valves - OPEN (after 60 seconds)	E-0, Step 20.e
			BOP	STOP kitchen exhaust fan	E-0, Step 20.f
T = 10 min from request	**BOOTH**	**REPORT "All Control Building pressure boundary doors are Closed and Dogged as applicable."**	PEO	CLOSE and DOG the following Control Building pressure boundary doors. ▪ CB west 47'6" (C-47-1A) ▪ CB east 64' 6" (C-64-1B)	E-0, Step 20.g
				Verify the following Control Building pressure boundary doors - CLOSED ▪ CB west 47'6" (C-47-1) 2. CB north 64'6" chiller room door (C-64-4) 3. CB north 64'6" chiller room door (C-64-5) 4. CB west 49'6" (C-49-1)	E-0, Step 20.h
			RO	**Check RCS Temperature**	E-0, Step 21

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		NO, RCS temperature is cold due to faulted SGs.		Verify RCS cold leg WR temperature - BETWEEN 550°F AND 560°F.	E-0, Step 21.a
			US	Perform the applicable action:	E-0, Step 21.a, RNO
				▪ IF temperature is GREATER THAN 560°F, THEN Proceed to step 21.c.	
				IF temperature is LESS THAN 550°F THEN Proceed to step 21.e.	
			BOP	Maintain total feed flow BETWEEN 530 and 600 gpm until NR level is GREATER THAN 8% (42% ADVERSE CTMT) in at least one SG	E-0, Step 21.e
			BOP	CLOSE SG atmospheric dump and dump bypass valves	E-0, Step 21.f
			BOP	Check the following valves - CLOSED ▪ MSIVs ▪ MSIV bypass valves	E-0, Step 21.g
			US	Perform the following:	E-0, Step 21.g,

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
					RNO
			BOP	1. Place both condenser steam dump interlock selector switches to OFF.	
			BOP	2. IF unexpected cooldown continues, THEN CLOSE the MSIVs and MSIV bypass valves.	
			US	Proceed to Step 22	E-0, Step 21.b
			RO	**Check PZR Valves**	E-0, Step 22
				Verify PORVs - CLOSED	E-0, Step 22.a
			RO	Verify normal PZR spray valves - CLOSED	E-0, Step 22.b
			RO	Verify PZR safety valves - CLOSED	E-0, Step 22.c
			CREW	To prevent damage to the RCP seal(s), seal injection flow should be maintained to all RCPs.	E-0, Step 23, CAUTION
			RO	**Check If RCPs Should Be Stopped**	E-0, Step 23
				Verify RCPs - ANY RUNNING	E-0, Step 23.a
			US	Proceed to Step 24	E-0, Step 23.a, RNO

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			BOP/RO	**Check If SG Secondary Boundaries Are Intact**	E-0, Step 24
				Check pressure in all SGs	E-0, Step 24.a
		All 4 SGs are faulted. The crew should transition to E-2.		• NO SG PRESSURE DECREASING IN AN UNCONTROLLED MANNER • NO SG COMPLETELY DEPRESSURIZED	
			US	Initiate monitoring of CSF Status Trees and Go to E-2, Faulted Steam Generator Isolation.	E-0, Step 24.a RNO
		E-2 FAULTED STEAM GENERATOR ISOLATION Rev 010-00			
				• At least one SG must be maintained available for RCS cooldown. • Any faulted SG or secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown or sampling is required.	E-2 CAUTION
		NOTE: For E-2, step 1 RNO, the PEO should not be indiscriminately dispatched to do all of Attachment A. Some valves are in MSVB and some will isolate flow to the TDAFW Pump.		• If RWST level decreases to LESS THAN 520,000 gal, Go to ES-1.3, Transfer to Cold Leg Recirculation, to align the ECCS system.	

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		"A" and "B" MSIVs are open and will not close.	BOP US	**Check Main Steam Isolation And Bypass Valves - CLOSED**	E-2, Step 1
T = 2 min from being dispatched.	BOOTH	IOs to simulate PEO removing fuses as needed to de energize "A" and "B" MSIVs, which will remain open. If the crew elects to pull just one set then enter the Train A IOs only. **3MSS*CTV27A_TRA Green "Off"** **3MSS*CTV27A_TRA Red "Off"** **3MSS*CTV27A_TRB Green "Off"** **3MSS*CTV27A_TRB Red "Off"**	BOP	CLOSE valves. IF flow path(s) can NOT be isolated, THEN Using Attachment A for guidance, Locally Close valve(s).	E-2, Step 1 RNO
		3MSS*CTV27B_TRA Green "Off" **3MSS*CTV27B_TRA Red "Off"** **3MSS*CTV27B_TRB Green "Off"** **3MSS*CTV27B_TRB Red "Off"**	US	**Check At Least One SG Secondary Boundary Is Intact**	E-2, step 2
			RO/ BOP	Check pressures in all SGs - AT LEAST ONE STABLE OR INCREASING	E-2, step 2.a
		All 4 SGs are depressurizing. Crew should transition to ECA-2.1.	US	IF all SG pressures decreasing in an uncontrolled manner, THEN Go to ECA-2.1, Uncontrolled Depressurization of All Steam Generators.	E-2, Step 2.a RNO
		ECA-2.1, Uncontrolled Depressurization of All Steam Generators (Rev 014-03).			

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				▪ If any SG pressure increases at any time, except while performing SI termination in Steps 12 through 27, Go to E-2, Faulted Steam Generator Isolation. ▪ If, during the performance of the procedure, the capability to feed SGs at GREATER THAN 530 gpm is NOT available, Go to FR-H.1, Response to Loss of Secondary Heat Sink. ▪ If the TD AFW pump is required to maintain feed flow to any SG, a steam supply to the TD AFW pump must be maintained from at least one SG.	ECA 2.1 Step 1 CAUTION
			Crew	Foldout page must be open.	ECA 2.1 Step 1 NOTE
				Check Secondary Pressure Boundary	ECA 2.1 Step 1
			BOP	Verify MSIVs and MSIV bypass valves - CLOSED	ECA 2.1 Step 1.a
		Local actions of this step were initiated in E-2		Initiate MSI. IF MSI will NOT actuate, THEN	ECA 2.1 Step 1.a RNO

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				CLOSE the MSIVs and MSIV bypass valves IF MSIVs OR MSIV bypass valves will NOT close, THEN Using Attachment B, Pull the affected valve(s) fuse block.	
			BOP	Check SG isolation ▪ Verify SG feed regulating valves - CLOSED ▪ Verify SG feed regulating bypass valves - CLOSED ▪ Verify FW isolation trip valves - CLOSED ▪ Verify the SG atmospheric relief and bypass valves - CLOSED ▪ Verify SG blowdown isolation valves - CLOSED • Verify SG blowdown sample isolation valves - CLOSED • Verify SG chemical feed isolation valves - CLOSED • Using table, Verify main steam line	ECA 2.1 Step 1.b

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				drains upstream of MSIVs and TD AFW pump - CLOSED	

SG A	SG B	SGC	SGD
3DTM*AOV29A	3DTM*AOV29B	3DTM*AOV29C	3DTM*AOV29D
3DTM*AOV61A	3DTM*AOV61B	3DTM*AOV61C	3DTM*AOV61D
3DTM*AOV63A	3DTM*AOV63B		3DTM*AOV63D
3DTM*AOV64A	3DTM*AOV64B		3DTM*AOV64D

	BOP	Check MD AFW pumps - TWO RUNNING	ECA 2.1 Step 1.c
The US should direct the steam supply valves to TD AFW pump be closed since the MD AFW pumps are running.	US/BOP	Verify steam supply valves to TD AFW pump - CLOSED • 3MSS*MOV17A • 3MSS*MOV17B • 3MSS*MOV17D	ECA 2.1 Step 1.d
	BOP	CLOSE valves. IF valve(s) will NOT close, THEN Locally Close valve(s).	ECA 2.1 Step 1.d RNO
		To prevent inadvertent reactor criticality, the required shutdown margin must be maintained during RCS cooldown.	ECA 2.1 Step 2 NOTE
		Verify Shutdown Margin	ECA 2.1 Step

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
					2
			US	Request Chemistry sample the RCS for boron concentration	ECA 2.1 Step 2.a
				Check RCS sample results - AVAILABLE	ECA 2.1 Step 2.b
			US	Proceed to CAUTION prior to step 3 and, WHEN Sample results become available, THEN Perform step 2.c	ECA 2.1 Step 2.b RNO
				Using OP 3209B, "Shutdown Margin," Check shutdown margin.	ECA 2.1 Step 2.c
			US	A minimum feed flow of 100 gpm must be maintained to each SG with a NR level LESS THAN 8% (42% ADVERSE CTMT).	ECA 2.1 Step 3 CAUTION
				Control Feed Flow To Minimize RCS Cooldown.	ECA 2.1 Step 3
		No, cooldown rate will be greater than 80°F/hr.	RO	Check cooldown rate in RCS cold legs - LESS THAN 80°F/hr.	ECA 2.1 Step 3.a
		Critical Task - Control the AFW flowrate to at least 100 gpm per SG in order to minimize the RCS cooldown rate. **[*]**	BOP	Decrease AFW flow to 100 gpm to each SG and Proceed to Step 3c.	ECA 2.1 Step 3.a RNO **[*]**

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Check NR level in all SGs - LESS THAN 50%.	ECA 2.1 Step 3.b
				Control feed flow to maintain NR level LESS THAN 50% in all SGs.	ECA 2.1 Step 3.b RNO
		NOTE: this is a continuous action step to prevent the RCS from heating back up after the initial cooldown from the faulted SGs. This assists in maintaining the plant stable.	RO/BOP	Check RCS hot leg WR temperatures - STABLE OR DECREASING.	ECA 2.1 Step 3.c
				Control feed flow or Dump steam to stabilize RCS hot leg WR temperatures.	ECA 2.1 Step 3.c RNO
				• Seal injection flow should be maintained to all RCPs.	ECA 2.1 Step 4 NOTE
				• Step 4 for stopping RCPs is applicable until SI is terminated in step 20.	
				Check If RCPs Should Be Stopped.	ECA 2.1 Step 4
			RO	Check RCPs - ANY RUNNING	ECA 2.1 Step 4.a
			US	Proceed to CAUTION prior to step 5.	ECA 2.1 Step 4.a RNO
		As RCS pressurizes due to faulted SGs completing blowdown and SI injecting, PORV will start to cycle.		If any PZR PORV opens because of high PZR pressure, Step 5a must be repeated after pressure decreases to LESS THAN 2350 psia.	ECA 2.1 Step 5 CAUTION

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	**Check PZR PORVs And Block Valves**	ECA 2.1 Step 5
				Verify PORVs - CLOSED.	ECA 2.1 Step 5.a
				IF PZR pressure is LESS THAN 2350 psia,	ECA 2.1 Step 5.a RNO
				THEN	
				CLOSE PORVs.	
				IF any PORV can NOT be closed,	
				THEN	
				CLOSE its block valve.	
				Verify block valves - AT LEAST ONE OPEN.	ECA 2.1 Step 5.b
				Check Secondary Radiation.	ECA 2.1 Step 6
				Sample all SGs for activity	ECA 2.1 Step 6.a
			RO	1. RESET SG blowdown sample isolation	
			RO	2. OPEN SG blowdown sample isolation valves	
			US	3. Request Chemistry obtain activity samples using HP coverage	

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	Verify trend history and alarm status of radiation monitors • Main steam line - NORMAL • Condenser air ejector - NORMAL • SG blowdown - NORMAL	ECA 2.1 Step 6.b
			RO	**Check If RHR Pumps Should Be Stopped.**	ECA 2.1 Step 7
				Check RHR pumps - ANY RUNNING IN INJECTION MODE.	ECA 2.1 Step 7.a
				Check RCS pressure.	ECA 2.1 Step 7.b
				Pressure - GREATER THAN 300 psia (500 psia ADVERSE CTMT)	ECA 2.1 Step 7.b.1
				Pressure - STABLE OR INCREASING.	ECA 2.1 Step 7.b.2
				RESET ESF actuation signals ▪ SI ▪ CDA ▪ LOP ▪ CIA ▪ CIB	ECA 2.1 Step 7.c

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				STOP RHR pumps and Place in AUTO.	ECA 2.1 Step 7.d
				The recirculation spray pumps are sequenced to automatically start 11 *minutes after CDA actuation.*	ECA 2.1 Step 8 NOTE
			RO	**Check If Containment Spray Should Be Stopped.**	ECA 2.1 Step 8
				Verify quench spray pumps - RUNNING.	ECA 2.1 Step 8.a
				Proceed to Step 9.	ECA 2.1 Step 8.a RNO
			RO	**Check RWST Level - GREATER THAN 520,000 gal.**	ECA 2.1 Step 9
				Go to ES - 1.3, Transfer to Cold Leg Recirculation.	ECA 2.1 Step 9 RNO
			RO	**Check If Accumulators Should Be Isolated.**	ECA 2.1 Step 10
		RCS HL temperature should be < 380°F		Verify at least two RCS hot leg WR temperatures - LESS THAN 380°F.	ECA 2.1 Step 10.a
				Proceed to Step 11.	ECA 2.1 Step 10.a RNO

Lesson Title: Four Faulted Steam Generators

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
T= 5 min from being dispatched		Remote Actions (if temperature is - LESS THAN 380°F).		Using GA-7, Isolate SI accumulators	ECA 2.1 Step 10.b
		SIR15, RI **SIR16, RI** **SIR17, RI** **SIR18, RI**			
			RO	**Check If ECCS Flow Should Be Reduced.**	ECA 2.1 Step 11
				Verify RCS subcooling based on core exit TCs - GREATER THAN 32°F (115°F ADVERSE CTMT).	ECA 2.1 Step 11.a
				Verify RCS pressure - STABLE OR INCREASING.	ECA 2.1 Step 11.b
				Verify PZR level - GREATER THAN 16% (50% ADVERSE CTMT).	ECA 2.1 Step 11.c
				▪ If offsite power is lost after SI reset, manual actions to restart safeguards equipment may be required. ▪ DO NOT reset CDA if the recirculation spray pumps are required and have not automatically started.	ECA 2.1 Step 12 CAUTION

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				▪ If any SG pressure increases, Complete Steps 12 through 27, then Go to E-2, Faulted Steam Generator Isolation.	
			RO	**RESET ESF Actuation Signals** ▪ SI ▪ CDA ▪ LOP ▪ CIA ▪ CIB	ECA 2.1 Step 12
			BOP	**Restore Power To MCC 32-3T.**	ECA 2.1 Step 13
				Check emergency bus 34C - ENERGIZED	ECA 2.1 Step 13.a
		BOOTH INSTRUCTOR:	PEO	Using GA-1, Energize MCC 32-T	ECA 2.1 Step 13.b
T = + 8 of request	**EDR18 "RESET"** **EDR44 "RESET"**	**Energize MCC1A3 (32-3T)** **Reset Batt/Inv 6 Trouble (~ 5 min after 3T reset)**			
			RO	**Establish Instrument Air To Ctmt.**	ECA 2.1 Step 14
				Check instrument air compressors - AT LEAST ONE RUNNING.	ECA 2.1 Step 14.a

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				OPEN instrument air Ctmt isolation valves.	ECA 2.1 Step 14.b
			RO	**STOP All But One Charging Pump And Place In AUTO.**	ECA 2.1 Step 15
			RO	**Check RCS Pressure - STABLE OR INCREASING.**	ECA 2.1 Step 16
			RO	**Establish Normal Charging Flow Path.**	ECA 2.1 Step 17
				Fully Open charging line flow control valve.	ECA 2.1 Step 17.a
				Verify charging header loop isolation valves (3CHS*AV8146 or 3CHS*AV8147) - ONE OPEN.	ECA 2.1 Step 17.b
				Re-position valves to establish only one open.	ECA 2.1 Step 17.b RNO
				OPEN charging header isolation valves • 3CHS*MV8106 • 3CHS*MV8105	ECA 2.1 Step 17.c
				CLOSE the charging pump miniflow isolations to the RWST • 3CHS*MV8511A • 3CHS*MV8511B	ECA 2.1 Step 17.d

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				CLOSE the remaining charging pump cold leg injection valves	ECA 2.1 Step 17.e
				• 3SIH*MV8801A	
				• 3SIH*MV8801B	
				OPEN the charging pump recirculation isolation valves	ECA 2.1 Step 17.f
				• 3CHS*MV8111A	
				• 3CHS*MV8111B	
				• 3CHS*MV8111C	
				• 3CHS*MV8110	
			RO	**Verify PZR Level**	ECA 2.1 Step 18
				Check PZR level - STABLE OR INCREASING	ECA 2.1 Step 18.a
				Control charging flow to maintain PZR level.	ECA 2.1 Step 18.b
Step 19 commenced	**Remove MS07C**	**"C" Low Set SG Code Safety Valve closes.**	RO	**Check If SI Pumps Should Be Stopped.**	ECA 2.1 Step 19
		Per NOTE prior to step 1 of ECA-2.1, If any SG pressure increases at any time, except while performing SI termination in Steps 12 through 27, Go to E-2.		Check SI pumps - RUNNING.	ECA 2.1 Step 19.a

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Check RCS pressure ▪ Pressure - GREATER THAN 1650 psia (1950 psia ADVERSE CTMT). ▪ Pressure - STABLE OR INCREASING.	ECA 2.1 Step 19.b
				STOP SI pumps and Place in AUTO.	ECA 2.1 Step 19.c
				At the completion of step 20 stopping RCPs based on the conditions of step 4 is NOT required.	ECA 2.1 Step 20 NOTE
			RO	**STOP RHR Pumps and Place In AUTO.**	ECA 2.1 Step 20
			RO	**Verify ECCS Flow Not Required.**	ECA 2.1 Step 21
				Check RCS subcooling based on core exit TCs - GREATER THAN 32°F (115°F ADVERSE CTMT).	ECA 2.1 Step 21.a
				Check PZR level - GREATER THAN 16% (50% ADVERSE CTMT).	ECA 2.1 Step 21.b
			RO/BOP	**Check RCS Hot Leg WR Temperatures - STABLE OR DECREASING.**	ECA 2.1 Step 22

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			BOP	Control AFW flow OR Dump steam to stabilize RCS hot leg WR temperatures.	ECA 2.1 Step 22 RNO
			BOP	**Check NR Level In All SGs - LESS THAN 50%.**	ECA 2.1 Step 23
				Control AFW flow to maintain NR level LESS THAN 50% in all SGs.	ECA 2.1 Step 23 RNO
			RO	**Check If Letdown Can Be Established.**	ECA 2.1 Step 24
				Verify PZR level - GREATER THAN 25% (50% ADVERSE CTMT).	ECA 2.1 Step 24.a
				Verify Train A RPCCW pump RUNNING.	ECA 2.1 Step 24.b
				Using GA - 13, Establish normal letdown	ECA 2.1 Step 24.c
				Proceed to step 25.	ECA 2.1 Step 24.d
			RO	**Check RCS Makeup System.**	ECA 2.1 Step 25
				Adjust boric acid flow controller to pot setting 8.3.	ECA 2.1 Step 25.a
				Check RCS makeup - ALIGNED FOR AUTO	ECA 2.1 Step 25.b

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	**Align Charging Pump Suction to VCT.**	ECA 2.1 Step 26
				OPEN VCT to charging isolation valves. • 3CHS*LCV112B • 3CHS*LCV112C	ECA 2.1 Step 26.a
				CLOSE RWST to charging isolation valves. • 3CHS*LCV112D • 3CHS*LCV112E	ECA 2.1 Step 26.b
			RO	**Control PZR Pressure.**	ECA 2.1 Step 27
				Maintain pressure stable using PZR heaters and normal spray as necessary.	ECA 2.1 Step 27.a
				IF normal spray NOT available and letdown is in service, THEN Establish auxiliary spray: 1) Unlock and OPEN auxiliary spray valve (3RCS*AV8145).	ECA 2.1 Step 27.a RNO

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				2) CLOSE charging header loop isolation valves • 3CHS*AV8146 • 3CHS*AV8147 3) Throttle charging flow controller to adjust and maintain auxiliary spray flow. 4) IF at any time, REGEN HX LETDOWN TEMP HI (395°F) (MB3A 5-4) annunciator actuates, THEN OPEN one charging header loop isolation valve. IF auxiliary spray can NOT be established, THEN Use one PZR PORV.	

Terminate the scenario when crew identifies the "C" Low Set Code Safety closed and verbalizes their intention of transitioning to E-2 after the competion of step 27.

SECTION 4

Lesson Title: Four Faulted Steam Generators

ID Number: 2K7 NRC-02 Revision: 0

EVALUATION GUIDE

I. Crew FOLLOW-UP QUESTIONS

1. What is the Emergency Classification for this event?

ALERT – Charlie One based on failure of automatic reactor trip manual trip *successful.* (RCB4)
ALERT – Charlie One based on an unisolable steam break outside CTMT. (BA2)

2.

SECTION 4
EXAM GUIDE SUMMARY

Title: Four Faulted Steam Generators

ID Number: 2K7 NRC-02 Revision: 0

II. Critical Tasks

Note: Critical Tasks are not required for Progress Review Exams.

TASK DESCRIPTION	TASK #	K/A >/= 3.0	BASIS FOR SELECTION
Attempt to manually trip the reactor from the control room with either Main Board trip switch or by opening 32B and 32N supply breakers before completing step 1 of E-0.	E-0 -- A	029-EA1.08 4.5/4.5 029-EA1.12 4.1/4.0	(BASIS) Failure to manually trip the reactor causes a challenge to the subcriticality CSF beyond that irreparably introduced by the postulated conditions. Additionally, it constitutes an "incorrect performance that necessitates the crew taking compensating action which complicates the event mitigation strategy and demonstrates the inability by the crew to recognize a failure of the automatic actuation of the RPS."
Manually actuate Main Steamline isolation or close MSIVs before a severe (orange path) challenge develops to either the subcriticality or the integrity CSF or before transition to ECA-2.1, whichever happens first	E-0—P	E12-EA1.1 3.8/3.8 039-K4.05 3.7/3.7	Failure to close the MSIVs under the postulated plant conditions causes challenges to CSFs beyond those irreparably introduced by the postulated conditions. Such an omission constitutes a "demonstrated inability by the crew to recognize a failure of the auto actuation of an ESF system or component and to take an action that would prevent a challenge to plant safety."
Control the AFW flow rate to at least 100 gpm per SG in order to minimize the RCS cooldown rate before a severe (orange-path) challenge develops to the integrity CSF	ECA-2.1 -- A	E12.EA1.3 3.4/3.9	Failure to control the AFW flow rate to the SGs leads to an unnecessary and avoidable severe challenge to the integrity CSF and to the subcriticality and the containment CSFs beyond those irreparably introduced by the postulated plant conditions. Thus, failure constitutes "demonstrated inability by the crew to take an action or combination of actions that would prevent a challenge to plant safety."

Note: [*] Used to designate critical tasks. Should also be incorporated into column 3 or 4 of Instructor Guide.

SHIFT TURNOVER REPORT

DATE-TIME	PREPARED BY	SHIFT
today 0300	Unit Supervisor /"Night" Shift	1800-0600

PLANT STATUS:

Mode:	1		Rx Power:	100%
Megawatts:	Thermal:	3411 MWTH	PZR Pressure:	2250 psia
	Electric:	1205 MWe	RCS T-AVE:	587 degF
RCS Leakage:	Identified:	0.005 gpm	Boron/Burnup	43 ppm / 19,000 MWD/MTU
	Unidentified:	0.03 gpm	Days on line	485
Date/Time:	today 0015		Protected Train/Facility:	**B Purple**
PRA/SDR:	Green			
Intake:	Green			

Active Tracking Records and Action Statements

Equipment/Reason

LCO	Action	Date	Time in LCO	Action Requirement	Time Left
3.8.1.1	b.1, b.2, b.3, b.4, b.5	yesterday	18 hours	SR 4.8.1.1.1.a due in 3 hours	13 days
7.4.1	a.1, a.3	yesterday	18 hours		13 days

OD Compensatory Actions / Temp Logs

Open Date	Class Reason	Reason	Watch Position

Plant Systems APC

System	Notes
TPCCW	**"C" TPCCW pump is out of service for an oil replacement.**

Cross Unit System Status

Surveillances / Evolutions in Progress

Shift Orders

The "A" EDG is out of service for a planned 2 year overhaul maintenance outage. The "C" TPCCW pump is out of service for an oil replacement.

ATTACHMENT 2

VALIDATION CHECKLIST

Title: Four Faulted Steam Generators

ID Number: 2K7 NRC-02 Revision: 0

Verified By:
(Initials)

Initial Conditions:

The initial condition(s) contained in the guide are certified or have been developed from certified ICs.

Test Run:

The scenario contained in the guide has been test run in part or whole on the simulator. The simulator response is reasonable and as expected. If a simulator guide revision does not affect original Test Run, then enter N/A. ②

Simulator Operating Limits:

The simulator guide has been evaluated for operating limits and/or anomalous response by reviewing the Simulator Modeling and Anomalous Response List. ②

For Examination Scenario:

The Scenario Attributes Checklist is complete and attached. This is not required for Progress Review Exams.

Actions Complete (Signature) 1/24/07 Date

Facility: Millstone 3 Scenario No.: 2K7 NRC-02 Op-Test No.: 2K7

Examiners: Operators:

Initial Conditions: IC-21, 100% power, End of Life, Equilibrium Xe.

Turnover:
The plant is at 100% power and at end of life. The "A" Emergency Diesel Generator is out of service for routine maintenance. The "C" TPCCW pump is out of service for oil replacement.

Event No.	Malf. No	Event Type*	Event Description
1	RX09A	I (RO)	Controlling channel of PZR pressure fails high.
2	RX13E	I (BOP)	Controlling channel of "C" Steam Generator feed flow fails low (3MSS-FT530).
3	RC04A	C (RO)	RCS leak. Reactor Vessel Flange leakoff.
4	RX04A	I (RO)	Loop 1 Tavg fails high (loop 1 narrow range Tc, 3RCS*TE411B)
5	IO CHS-MV8104	R (RO) R (SRO) N (BOP) C (RO)	CONVEX directed Emergency Load Reduction. AOP 3575, *Rapid Downpower.* Emergency Boration valve fails to open.
6	EG01 RP10A/B	C (RO) C (BOP)	Main Generator trip and automatic reactor trip failure.
7	MS02A MS07C/D MS12A/B RP08 RP11H	M (ALL) C (BOP) C (RO)	Four faulted Steam Generators. Main Steam Isolation fails to automatically actuate. Several RPCCW components fail to respond to a Safety Injection signal.

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

Lesson Title: Four Faulted Steam Generators

ID Number: 2K7 NRC-02 Revision: 0

Assessor: Dave Minnich

QUALITATIVE ATTRIBUTES

___Y__1. The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the crew into expected events.

___Y__2. The scenario consists mostly of related events.

___Y__3. Each event description consists of:

- the point in the scenario when it is to be initiated
- the malfunctions(s) that are entered to initiate the event
- the symptoms/cues that will be visible to the crew
- the expected operator actions (by shift position)
- the event termination point (if applicable)

___Y__4. No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.

___Y__5. The events are valid with regard to physics and thermodynamics.

___Y__6. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.

_N/A__7. If time compression techniques are used, scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.

___Y__8. The simulator modeling is not altered.

___Y__9. The scenario has been validated. Pursuant to 10 CFR 55.46(d), any open simulator performance deficiencies or deviations from the referenced plant have been evaluated to ensure functional fidelity is maintained while running the planned scenario.

___Y__10. Every operator will be evaluated using at least one new or significantly modified scenario. All other scenarios have been altered IAW Section D.5 of ES-301.

___Y__11. All individual operator competencies can be evaluated, as verified using form ES-301-6.

___Y__12. Each operator will be significantly involved in the minimum number of transients and events specified on Form ES-301-5.

___Y__13. Level of difficulty is appropriate to support licensing decisions for each crew position.

Lesson Title: Four Faulted Steam Generators

ID Number: 2K7 NRC-02 Revision: 0

Note: Following criteria list scenario traits that are numerical (QUANTITATIVE) in nature.

01. Total Malfunctions (TM) – 5 to 8 required — Total 9

(1) PZR Pressure Failure, (2) SG Feed Flow Instrument Failure, (3) RCS Leak, (4) Tavg Channel Failure (5) Emergency Boration Valve Fails, (6) Automatic Reactor Trip Failure, (7) Four Faulted SGs, (8) MSI Auto Actuation Failure, (9) RPCCW Components Fail to Auto position on an SI

02. Malfunctions after EOP entry (EM's) – 1 to 2 required — Total 3

(1) Four Faulted SGs, (2) MSI Auto Actuation Failure, (3) RPCCW Components Fail to Auto position on an SI

03. Abnormal Events (AE) – 2 to 4 required — Total 5

(1) PZR Pressure Failure (AOP 3571), (2) SG Feed Flow Instrument Failure (AOP 3571), (3) RCS Leak (ARP MB4A), (4) Tavg Channel Failure (AOP 3571), (5) Rapid Downpower (AOP 3575)

04. Major Transients (MT) – 1 to 2 required — Total 1

(1) Four Faulted SGs

05. EOP's (EU) entered/requiring substantive actions -- 1 to 2 required — Total 2

(1) E-2, (2) ECA-2.1

06. EOP Contingencies requiring substantive actions [ECAs/FRs/] (EC) -- 0 to 2 required — Total 1

(1) ECA-2.1

07. Critical Tasks (CT) – 2 to 3 required — Total 3

E-0 – A Manually trip the reactor from the control room before completion of step 1 of E-0.

E-0 – P Manually actuate MSI or close the MSIVs before a severe challenge develops to the Subcriticality or Integrity CSFs.

ECA-2.1 – A Control the AFW flowrate to at least 100 gpm per SG in order to minimize the RCS cooldown rate.

08. Approximate Scenario Run Time: 60 to 90 min. — Total 90 min

09. EOP run time: — Total 45 min

10. Technical Specifications are exercised during the scenario. — (Y/N) Y

SUMMARY OF CHANGES

Change Description	Date of Change

MILLSTONE POWER STATION

SIMULATOR EXAM GUIDE APPROVAL SHEET

Exam Title: Loss of All AC Power

Revision: 0

ID Number: 2K7 NRC-03 (SPARE)

Submitted by:	D. Minnich Developer	1/11/07 Date
Validated by:	Martin Technical Reviewer	1/24/7 Date
Approved by:	Nutterman Training Supervisor	1/24/07 Date

SECTION 2

SIMULATOR EXAM GUIDE

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- Scenario Outline (ES-D-1)
- Attributes Checklist
- Summary of Changes

SECTION 3

EXAM OVERVIEW

Title: Loss of All AC Power

ID Number: 2K7 NRC-03 Revision: 0

1. The crew will take the shift with reactor power stable at the point of adding heat (reactor power 3%), following a reactor startup by the previous shift. This is the initial plant startup from a refueling outage. OP 3203, *Plant Startup* is in progress and complete up through step 4.2.7. The crew is to raise reactor power from 3% to 6 to 9% in accordance with step 4.2.8. The US should facilitate a brief of the evolution prior to taking the shift. The MP3 simulator briefing room may be used for this purpose.

During the power ascension, the "B" RPCCW pump will spuriously trip and will not restart. The crew will use AOP 3561, *Loss of RPCCW*, to verify alignment and start the "C" RPCCW pump on the B Train.

Once the reactor is in MODE 1 *(6 to 9%)* and the primary plant stable, a small leak will develop through pressurizer PORV, 3RCS*PCV455A. The crew should use ARP MB4A 3-5, *PZR RELIEF VALVE DIS TEMP HI,* to respond. Correct actions will include closing the "A" PORV Block valve to isolate the leaky PORV. This event will exercise the US in Tech Spec and TRM use.

Once the reactor is 6 to 9% and the primary plant stable, Power Range Nuclear Instrument (NI) Channel 43 Lower Detector will fail high and the appropriate annunciators will alarm. Rod control is in manual so no rod motion will occur, but the auctioneered high PRNI channel inputs to the control circuitry for the FRV Bypass valves. The FRV Bypass valve controllers should be placed in manual and the crew should respond using AOP 3571, *Instrument Failure Response*. Tech Specs will need to be addressed.

Once Tech Specs are addressed for the failed NI, "A" RCP #1 seal will slowly degrade. The crew should address the RCP seal degradation using the Main Board 4 Annunciator Response Procedure for *RCP HI RANGE LKG FLOW HI*. The procedure requirements will have the operator transition to AOP 3554, *RCP Trip or Removing a RCP from Service At Power*, to stop the affected RCP. The procedure will then direct the crew to commence a plant and reactor shutdown.

After the RCP is tripped and a downpower plan discussed, transmission grid instabilities will result in a loss of offsite power. The "B" EDG will not start due to it's inability to respond to signals from the Sequencer or MB8. Though the "A" EDG will initially start it will not load and will exhibit degraded frequency due to damaged governor linkage. The crew may conservatively decide to shutdown the EDG; if not the "A" EDG will trip at step 4 of E-0 and will not be able to be re-started. Also, at the time of the loss of power, an RCS leak will occur (A' RCP #1 seal catastrophically fails).

The crew should enter E-0, *Reactor Trip and Safety Injection,* and once the "A" EDG trips, transition to ECA 0.0, *Loss of All AC Power.* Prior to or at step 4 of ECA-0.0, the crew should diagnose that the TDAFW pump failed to auto-start and manually start the TDAFW **[Critical**

Task]. Plant assistance (a PEO/NLO, Maintenance, Engineering, etc.) should be dispatched to both EDGs to ascertain the reason for the start failures. The "B" EDG will be able to be started locally using ECA-0.0, Attachment E. The "B" EDG local start attempts will succeed when the crew is aligning the selected train busses for the Station Blackout Diesel. Service Water will need to be restored to the running EDG **[Critical Task]**. The crew should then Go To step 26 as per the note prior to step 6. Low pressurizer level will necessitate a transition to ECA 0.2, *Loss of All AC Power - Recovery with SI Required.* The session will end when the crew announces the transition to ECA-0.2.

2. The SM should classify the event as an **Site Area Emergency - Charlie Two,** Loss of Voltage on Buses 34C and 34D > 15 minutes (EAL PS1).

3. Duration of Exam: 120 minutes

SECTION 4

EXAM GUIDE

Title: Loss of All AC Power

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All Control Room Conduct, Operations and Communications shall be in accordance with Master Manual 14 and applicable DNAP/DNOS standards.

"Review the Simulator Operating Limits (design limits of plant) and the Simulator Modeling Limitations and Anomalous Response List prior to performing this exam scenario on the simulator. The evaluators should be aware if any of these limitations may be exceeded." (NSEM 6.06)

SECTION 4

EXAM GUIDE

Title: Loss of All AC Power

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SIMULATOR PROBLEMS DURING EXAMS

It is the responsibility of the Instructors in the simulator to insure that training interruptions have a minimum negative impact on the Crew and the training we provide. Use your judgment on whether to stop the training and how the training should be commenced after the problem is corrected.

Be aware that at all times the Operators should treat the simulator as if it were the plant and you too should treat it as much like the plant as possible when they are in the simulator.

As soon as the Instructors are aware of a simulator problem that will adversely affect the training in progress (computer fault, etc.) the Instructor should:

1. Place the simulator in FREEZE if possible.

2. Announce to the Crew that there is a simulator problem.

3. Request that the Crew either standby (for minor trouble that can be handled quickly) or leave the simulator control room. (The Crew should leave the simulator for problems which involve major switch alignments).

4. Deal with the problem (reboot, close tripped breaker, call STSB, etc.)

5. After the Instructors believe the simulator is restored to service, the Crew should be told how training will continue. If it is possible and felt to be acceptable to the Instructors, training can begin where it left off with an update on plant parameters and each Crew member is prepared to restart. If training will not begin where it left off, the crew should be told how and where training will begin again.

6. Once the Crew has been told how and where training will begin, have the crew conduct a brief so that the Instructor can insure that the crew has all the necessary information to continue with the scenario.

7. Once all Crew members and Instructors are satisfied that they have the necessary information to continue the scenario, place the simulator in RUN and announce to the Crew that you have continued the training session.

Lesson Title: Four Faulted Steam generators

ID Number: 2K7 NRC-02 Revision: 0

INITIAL SETUP INSTRUCTIONS

1. START the Sun Workstation.
   a. IF the Sun Workstation is running THEN go to SIM ACTIVE.
2. PLACE Recorder Power to ON.
3. VERIFY that the current approved training load is loaded.
4. REMOVE the step counter OVERRIDE and allow the counters to step out during the IC reset.
5. RESET to **IC XX (Based on IC 07)**
6. ADJUST the various pot settings to the valued specified by the chart in the simulator booth or Notepad for the selected IC. Pay particular attention to the Pzr spray valves and their setpoints.
7. PLACE Simulator to RUN.
8. If Necessary, RESET the Plant Calorimetric at the Instructor Station PPC by Pressing "SHIFT LEFT" and "F6" simultaneously.
9. ENSURE Simulator fidelity items cleared.
   a. CHECK the STEP COUNTERS at correct position for plant conditions.
   b. PLACE _**4**_ tiles under the DEMINS IN SERVICE lamacord label on MB6.
   c. PLACE the Main Turbine on the LOAD LIMITER and ENSURE Standby Load Set MATCHED if conditions require.
   d. PLACE the Westronic (5) and Gammametrics (2) recorders in active/run by depressing up or down arrow for each.
   e. For the RIL recorder: select printer to "ON" when command? appears select "Autojog".
   f. CLEAR **DCS** alarms on MB7 and BOP console.
   g. VERIFY annunciator, "COMPUTER FAILURE" (MB4C, 1-11), is NOT LIT.
10. As needed, RESET Computer Terminals to At Power displays if 100% power IC.
11. RESET Rad Monitor Screen to Status Grid.

Lesson Title: Four Faulted Steam generators

ID Number: 2K7 NRC-02 Revision: 0

INITIAL SETUP INSTRUCTIONS

12. IF placing equipment OOS, THEN perform the necessary switch manipulations and hang appropriate tags, as required, listed under "Equipment OOS."
13. Ensure that the protected train and environmental placards are appropriately hung.

Equipment OOS: **NONE**

Insert applicable Crew Training Tape/CD into the DVD/VCR.

Verify the MONITOR Time Display the same as the digital time display on MB4. If not page/call the Unit Tech.

Initial Malfunctions/IOs/IDAs:

PLACE GREEN PLACARDS FOR ALL INTAKE PARAMETERS ON MB6

PLACE THE "B" TRAIN PROTECTED PLACARD ON MB4

ENSURE THE BORIC ACID POT SETTING IS ABOUT 5.9

Lesson Title: Four Faulted Steam generators

ID Number: 2K7 NRC-02 Revision: 0

INITIAL SETUP INSTRUCTIONS

TYPE	Name	Sev.	Ramp	RSCU	Boul	Description
MALF	EG06B					B EDG Fails to Start
MALF	EG08A		30		1	EDG "A" Load Limiter Failure
MALF	FW20C					TD AFW pump Fails to automatically start
MALF	CC01B			1		"B" RPCCW pump trip.
MALF	RC07A	1%		2		"A" PZR PORV Leak.
MALF	NI09C	100%		3		PRNI Channel 43 lower det fails high
MALF	CV13A	6.5%		4		"A" RCP #1 seal degrades
MALF	ED10	75%	60	5		Degraded Grid Voltage
Remote	EDR01	+0.1		5		Grid Frequency Degradation
MALF	ED01			6		Loss of Offsite Power

Lesson Title: Four Faulted Steam generators

ID Number: 2K7 NRC-02 Revision: 0

INITIAL SETUP INSTRUCTIONS

Lead Examiner: **Refer to the "Briefing Script for the Operational Exam" and brief the crew. Go over the Plant/simulator differences, which follow.**

Booth Instructor: **Commence recording Simulator session**

Booth Instructor: Perform the crew turnover (Initial Conditions page at end of LP) with the SM . Have the SM brief his crew on plant conditions and any major equipment OOS.

PLANT/SIMULATOR DIFFERENCES:

- Rad Monitor Historical Data--Simulator Rad Monitor historical data not valid prior to the beginning of this exercise.
- If not using the speed dial option on the phone system, the operator must dial either #3333 or #3334 to reach the person/department they desire.
- The following PPC programs do not function on the simulator:
  - Samarium Follow
  - Xenon Follow
  - Sequence of Events
- Flow indications 3SIH-FI917 (charging ECCS flow), 3SIH-FI918 (A SI pump flow) and 3SIH-FI922 (B SI pump flow) will show flow at low flow rates.

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard

EVENT 1: Power ascension from 3% to 8% power using OP 3203.

OP 3203, *Plant Startup* is in progress and complete up through step 4.2.7. The crew is to raise reactor power from 3% to 6 to 9% in accordance with step 4.2.8. The US should facilitate a brief of the evolution prior to taking the shift.

OP 3303, Plant Startup (rev 018-05)

The reactivity plan specifies control rods be used to raise reactor power.	US	INCREASE reactor power to between 6% and 9% by one of the following:	OP 3203 Step 4.2.8
	RO	• WITHDRAW control rods at a rate *not* greater than approximately 2 steps/minute • DILUTE RCS boron concentration at a rate *not* greater than approximately 10 to 15 pcm/minute.	
		PERFORM the following:	OP 3203 Step 4.2.9
		a. LOG MODE change to MODE 1, POWER OPERATION.	
		b. NOTIFY ISO-New England of the MODE change.	
		WHEN desired, Refer To OP 3331A,	OP 3203

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				"Auxiliary Boiler, Steam and Condensate," and SHIFT auxiliary steam from auxiliary boiler (A or B) to main steam while continuing with this procedure.	Step 4.2.10
				PERFORM one of the following: • IF power increase desired, Go to Section 4.3 • IF reactor shutdown desired, Go to OP 3206, "Plant Shutdown".	OP 3203 Step 4.2.11
	EVENT 1 (cont'd): Running RPCCW pump trip, alignment and start of the standby RPCCW pump.				
T= MODE 1	**RSCU 1** CC01B	B RPCCW Pump Trips			
			US	The US should recognize the entry conditions for AOP 3561 are met and announce entry.	
		AOP 3561 Actions (rev 009-00)		The Foldout Page must be open.	AOP 3561 Step 1, NOTE
			RO	**Verify RPCCW System Alignment.**	AOP 3561 Step 1
		Yes the "A" RPCCW pump is running.	RO	Check RPCCW pumps - AT LEAST ONE RUNNING	AOP 3561 Step 1.a
			RO	Check RPCCW pumps - ONLY ONE RUNNING.	AOP 3561 Step 1.b

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		Yes, the "C" RPCCW pump is aligned to the affected train.	RO	Check the standby RPCCW pump - ALIGNED TO THE AFFECTED TRAIN	AOP 3561 Step 1.c
			RO	START the standby RPCCW pump	AOP 3561 Step 1.d
		Yes, 3SWP*MOV50B will be open.	RO	Verify RPCCW heat exchanger SW inlet isolation valves (3SWP*MOV50A or 3SWP*MOV50B) to the affected Train - OPEN	AOP 3561 Step 1.e
T = When directed	**REMOTE** SWR06 to 'CLOSE' SWR07 to 'OPEN'	**SWR07** (for 3SWP*V38) and **SWR06** (for 3SWP*V66). This will align service water from the "B" RPCCW HX to the "C" RPCCW HX.	RO	Using OP 3330A, "Reactor Plant Component Cooling Water," Shift from the affected RPCCW pump and heat exchanger to the standby RPCCW pump and heat exchanger.	AOP 3561 Step 1.f
		Yes, the "C" CDS chiller auto tripped and then auto started once RPCCW flow was reestablished.	RO	Check the CDS chiller on affected train - AUTO STARTED	AOP 3561 Step 1.g
			RO	Check RPCCW containment supply and return header isolation valves - OPEN	AOP 3561 Step 1.h
			RO	Check RPCCW containment header cross-connect valves - CLOSED 3CCP*AOV179A 3CCP*AOV179B 3CCP*AOV180A 3CCP*AOV180B	AOP 3561 Step 1.I

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	**Check Service Water to RPCCW Heat Exchangers**	AOP 3561 Step 2
				Verify RPCCW heat exchanger SW inlet isolation valves (3SWP*MOV50A and 3SWP*MOV50B) - OPEN.	AOP 3561 Step 2.a
		Yes, service water flow to each operating RPCCW heat exchangers will be > 6200 gpm.	RO	Verify service water flow to each operating RPCCW heat exchangers - GREATER THAN 6200 gpm	AOP 3561 Step 2.b
				Check IF RPCCW System Is Intact	AOP 3561 Step 3
		RPCCW SURGE TANK LEVEL LOW annunciator will not be lit.	RO	Verify RPCCW SURGE TANK LEVEL LOW annunciator (MB1C 2-7B) - NOT LIT	AOP 3561 Step 3.a
			RO	CLOSE surge tank fill valves: • RPCCW (3CCP-LV20) • SI Cooling (3CCP-LV61) • Chill Water (3CCP-LV74) • Charging Pump Cooling (3CCP-LV91)	AOP 3561 Step 3.b
		RPCCW surge tank level should be stable.	RO	Verify RPCCW surge tank level - STABLE OR INCREASING	AOP 3561 Step 3.c
			RO	Place surge tank fill valves in AUTO: • RPCCW (3CCP-LV20)	AOP 3561 Step 3.d

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• SI Cooling (3CCP-LV61) • Chill Water (3CCP-LV74) • Charging Pump Cooling (3CCP-LV91)	
			Crew	**Allow Plant Conditions To Stabilize**	AOP 3561 Step 4
				Determine Additional Actions	AOP 3561 Step 5
			US	Using the following determine any additional required actions	AOP 3561 Step 5.a
		T/S 3.7.3 applies until the "C" RPCCW pump and Heat Exchanger are placed in service, including service water alignment. 72 hour action statement		• Technical Specification 3.7.3, "Reactor Plant Component Cooling System"	
		T/R 7.4.1. actions a.1 and a.3 apply. 14 and 30 day action statements respectively.		• 3TRM-7.4.1, "Fire Related Safe Shutdown Components"	
			RO/BOP	**Verify MB Annunciators And Parameters - AS EXPECTED**	AOP 3561 Step 6
			US	**Continue With Normal Plant Evolutions Using Applicable Plant Procedures**	AOP 3561 Step 7

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		EVENT 2: Small leak develops through PZR PORV, 3RCS*PCV455A			
T = power stable between 6 and 9%	**RSCU 2 (RC07A, 1%)**	**"A" PORV Leak**			
		The crew will utilize the Annunciator Response Procedure, OP3353.MB4A-3-5, PZR Relief Valve Dis Temp Hi. **MB4A-3-5 (rev 002-12), PZR Relief Valve Dis Temp Hi**		**CORRECTIVE ACTIONS**	
		"PORV OPEN" (MB4B 4-9) will not be lit.	RO	IF "PORV OPEN" (MB4B 4-9) is lit, Go to OP 3353.MB4B 4-9, "PORV OPEN."	OP 3353 MB4A 3-5, Step 1
		PRESSURIZER PRESSURE HI" (MB4A 3-4) will not be lit.	RO	IF "PRESSURIZER PRESSURE HI" (MB4A 3-4) is lit, Go To MB4A 3-4, "PRESSURIZER PRESSURE HI"	OP 3353 MB4A 3-5, Step 2
		3RCS-TI 463 will confirm the alarm.	RO	CONFIRM high PORV outlet temperature on 3RCS-TI 463, "PORV" " OUTLET TEMPS" (MB4)	OP 3353 MB4A 3-5, Step 3
				IF 3RCS*PCV455A or 3RCS*PCV456, PORV, (MB4), is not fully closed, CLOSE PORVs.	OP 3353 MB4A 3-5, Step 4

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				IF 3RCS*PCV455A or 3RCS*PCV456, PORV, (MB4), fail to close, CLOSE associated PORV block (MB4):	OP 3353 MB4A 3-5, Step 5

PORV	PORV BLOCK
3RCS*PCV455A	3RCS*MV8000A
3RCS*PCV456	3RCS*MV8000B

		This will be the case.	US	IF pressurizer pressure is not high AND both pressurizer power relief valves are closed, PERFORM the following to determine leaking PORV:	OP 3353 MB4A 3-5, Step 6
		Give US/SM the Data logger readout. The readout is at the end of exam. It will show 3RCS*PCV455A is leaking.	Crew	MONITOR PORV outlet temperatures on data logger.	OP 3353 MB4A 3-5, Step 6.1
			US	IF data logger indicates 3RCS*PCV455A, PORV, is leaking, TEST 3RCS*PCV455A, PORV, as follows:	OP 3353 MB4A 3-5, Step 6.2
			RO	CLOSE 3RCS*MV8000A, PORV block (MB4).	OP 3353 MB4A 3-5, Step 6.2.1
			RO	MONITOR 3RCS-TI 463, "PORV" " OUTLET TEMPS" (MB4).	OP 3353 MB4A 3-5, Step 6.2.2
			US	IF 3RCS*TI 463, "PORV" " OUTLET TEMPS" (MB4), decreases, Refer To the following Technical Specifications and DETERMINE Limiting Condition for Operation:	OP 3353 MB4A 3-5, Step 6.2.3

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		Enter T/S 3.4.4 action a. 1 hour action statement to close the associated block valve with power maintained.		• T/S 3.4.4, "Relief Valves"	
		NA		• T/S 3.4.6.2, "Operational Leakage" • T/S 3.4.9.3, "Overpressure protection Systems"	
		NA		• TRM 3.4.11, "Reactor Coolant System Vents"	
			US/RO	IF 3RCS-TI 463, "PORV" " OUTLET TEMPS" (MB4), remains high, Refer To OP 3301G, "Pressurizer Pressure Control," and OPEN 3RCS*MV8000A, "PORV BLOCK" (MB4).	OP 3353 MB4A 3-5, Step 6.2.4
		After determining that the "A" PORV is leaking, the crew should maintain the "A" Block valve closed.			
		Event 3: Power Range Nuclear Instrument (NI) Channel 43 Lower Detector fails high.			
T= ARP is complete	**RSCU 3** (NI09C, 100%)	**PRNI 43 lower Fails High**	US	The US should recognize the entry conditions for AOP 3571 are met and announce entry.	3571 Entry Conditions

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		AOP 3571 Actions (rev 009-01)			
		The BOP should place all SG level Control Bypass Valve controllers in manual and stabilize steam generator level.	RO	**Determine the Initiating Parameter and Place the affected controller in MANUAL**	AOP 3571 Step 1
				Stabilize the Plant Parameters	AOP 3571 Step 2
		The appropriate attachment for this failure is "D". The US should announce to the crew.		**Perform Corrective Actions Using Appropriate Attachment**	AOP 3571 Step 3
				Instrument Failure	**Attachment**
				Power Range Nuclear Instrument Channel Failure	D
			US	**Power Range Nuclear Instrument Channel Failure**	
				Failure of two or more channels of PR instrumentation may prevent P-10 from resetting when power is reduced below 10%. If P-10 fails to reset, the following automatic reactor trip signals are lost: 1. SR HIGH FLUX TRIP (10^5 CPS) 2. IR HIGH FLUX TRIP (25%) 3. PR HIGH FLUX LOW STPT TRIP (25%) • The reactor operator must remain alert to any power increases which	AOP 3571 Attachment D Step 1 CAUTION

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				would necessitate a manual reactor trip. • The Gamma Metrics Nuclear Instrumentation System shall be used during the reactor shutdown in lieu of the source range channels.	
			RO	**Defeat the failed channel input.**	AOP 3571 Attachment D Step 1
				At the detector current comparator drawer, Turn the following switches to the failed channel: Rod Stop Bypass Upper Section Lower Section Power Mismatch Bypass.	AOP 3571 Attachment D Step 1a
				At the comparator and rate drawer, Turn the following switch to the failed channel: Comparator Channel Defeat.	AOP 3571 Attachment D Step 1b
		There should be no error, since rod control was in manual	RO	**Restore T_{AVE} - T_{REF} error to within 1°F and Place rod control in automatic.**	AOP 3571 Attachment D Step 2
				If the plant calorimetric source is NI's, the failure of one NI channel will disable the calorimetric program.	AOP 3571 Attachment D Step 3 NOTE
			CREW	**When conditions have stabilized, observe MB board annunciators and**	AOP 3571 Attachment

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				parameters and immediately report any unexpected or unexplained conditions to the Shift Manager.	D Step 3
			US	**Trip the associated Reactor Protection System bistable(s):**	AOP 3571 Attachment D Step 4
				Place a check mark in the box above the appropriate channel that requires tripping on the last page of this Attachment.	AOP 3571 Attachment D Step 4a
		[Tech Specs] LCO 3.3.1 (FU2) 6 hour action statement to trip bistables.		Refer to Technical Specification 3.3.1.	AOP 3571 Attachment D Step 4b
				Check the existing bistable status to ensure a reactor trip will not occur when the failed channel is tripped.	AOP 3571 Attachment D Step 4c
				The following step will distinguish whether the failure is within SSPS or the Protection channel.	AOP 3571 Attachment D Step 4.d NOTE
		This is not the case. The channel has failed. The US should proceed to step 4.e.		If bistable status light(s) (MB4F or MB4G) indicate that a single bistable input has tripped and channel indication is normal, PERFORM the following:	AOP 3571 Attachment D Step 4.d
	REMOTE	NOTE: When requested act as I&C		Request the I&C Department trip the	AOP 3571

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
	See column 3	Technician and remove control power fuses and trip bistables. **REMOTES** **RXR107 Door Open** **RXR35 OTDT 421C** **RXR06 OTDT 421D** **RXR107 Door Closed**		appropriate bistables using Attachment D and Attachment S.	Attachment D Step 4e
				Verify the appropriate bistable status lights are lit.	AOP 3571 Attachment D Step 4f
		NOTE: If at any time during the performance of this procedure, if asked, as Reactor Engineering or Unit Management, advice that **NI power** should be used to determine reactor power.	US	**Within one hour, Determine by observation of the associated permissive annunciator window (s) that the following interlocks are in their required state for the existing plant condition (Tech, Spec. 3.3.1, Action 8):** • Rx or turbine not at power P-7 (MB4D 5-3) • Three loop permissive P-8 (MB4D 3-3) • NIS power range P-9 permissive (MB4D 6-1) • Reactor at power P-10 (MB4D 4-3).	AOP 3571 Attachment D Step 5

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• The following step for removing the failed PR channel from Program 3R5 restores OPERABILITY to the AFD Monitor Alarm and must be completed within 1 hour or SURVEILLANCE REQUIREMENT 4.2.1.1.1.b must be performed.	AOP 3571 Attachment D Step 6 NOTE
				• The following step for removing the failed PR channel from Program 3R5 does NOT restore OPERABILITY to the QPTR Alarm Monitor; therefore, TABLE 3.3-1, ACTION 2.c and SURVEILLANCE REQUIREMENTS 4.2.4.1.b and 4.2.4.2 are in effect.	
			US / CREW	**Perform the following to remove the affected power range input to the AFD and QPTR monitor alarm (Program 3R5):**	AOP 3571 Attachment D Step 6
				On the plant process computer, Select the NSSS menu, page 2.	AOP 3571 Attachment D Step 6a
				At the NSSS menu, Select "Tilting Factors" (F9).	AOP 3571 Attachment D Step 6b
				Press the key (F5 through F8) that corresponds to the channel to be removed.	AOP 3571 Attachment D Step 6c
				Refer to the following Technical Specifications and Perform any required actions:	AOP 3571 Attachment D Step 7

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• Surveillance Requirement 4.2.1.1.1.b • TABLE 3.3-1, ACTION 2.c • Surveillance Requirement 4.2.4.1.b	
			US	• Surveillance Requirement 4.2.4.2	
			US	**Request I&C Department perform corrective maintenance on failed instrument.**	AOP 3571 Attachment D Step 8
		EVENT 4: "A" RCP #1 seal degradation			
T= Bistables tripped and T.S. Addressed	**ACTIVATE** **RSCU=4** **CV13A @ 6.5%**	**6.5% should correlate to a leak of ~5.8 gpm. If needed slowly adjust the leakage to ~5.8 gpm to bring in the annunciator.**	Crew	Diagnose a problem with the #2 RCP #1 Seal and enter ARP MB3B 2-10	Entry conditions
		CORRECTIVE ACTIONS	RO	CHECK the following to confirm alarm and determine affected RCP: • 3CHS-FR158 and 3CHS-FR160, high range RCP No. 1 seal leakoff flow recorders (MB3) • CHS-F161*, RCP A No. 1 seal leakoff flow computer point • CHS-F160*, RCP B No. 1 seal leakoff flow computer point • CHS-F159*, RCP C No. 1 seal leakoff flow computer point	MB3B 2-10 step 1

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• CHS-F158*, RCP D No. 1 seal leakoff flow computer point	
			RO	DISPLAY "RCP Status" NSSS, picture 15.	MB3B 2-10 step 2
			US	Verify leakage flow high indication by observing the following indications: • Seal injection flow • Affected RCO #1 seal inlet temperatures • VCT level • Charging header flow • Pressurizer level • 3CHS-FR 158 and 3CHS-FR 160, high range RCP No. 1 seal leakoff flow recorders (MB3) • 3CHS-PI 124, excess L/D Hx outlet pressure	MB3B 2-10 step 3
		The first time through the table Step 8 is applicable. The leak will progress to a point to where step 7 then step 6 will apply.		Using Table 1, EVALUATE plant conditions for the affected RCP, and Go To indicated Step.	MB3B 2-10 step 4

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard

RCP No. 1 Seal Leakoff	RCP No. 2 Seal Leakoff Hi Alarm	No. 1 Seal Inlet Temperatures	Reactor Power	Go To Step
≥ 8 gpm	[redacted]	[redacted]	> P-8 (37%) < P-8 (37%)	5. 6.
≥ 7 gpm	Lit	[redacted]	> P-8 (37%) < P-8 (37%)	5. 6.
> 6 gpm	[redacted]	Increasing or >230°F	> P-8 (37%) < P-8 (37%)	5. 6.
	[redacted]	Stable	[redacted]	7.
≤ 6 gpm	Lit	Increasing or >230°F Stable	> P-8 (37%) < P-8 (37%)	5. 6. 7.
≤ 6 gpm	[redacted]	[redacted]	[redacted]	8.

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			CREW	PERFORM the following:	MB3B 2-10 step 8
			SS/ US	NOTIFY OMOC (Duty Officer) of alarm condition.	MB3B 2-10 step 8.1
			US	IF "VCT TEMP HI" (MB3A 5-10) is lit, refer to OP 3353.MB3A 5-10, "VCT TEMP HI."	MB3B 2-10 step 8.2
			SS/ US	REQUEST Engineering Department evaluate continued pump operation.	MB3B 2-10 step 8.3
			US	IF, at any time, affected RCP no. 1 seal parameters degrade, IMPLEMENT steps as specified in Table 1.	MB3B 2-10 step 8.4
			US	IF total seal return flow from all four RCPs exceeds 16 gpm, Refer To 3TRM-7.4.I, "Fire Related Safe Shutdown Components," and PERFORM required ACTIONS.	MB3B 2-10 step 9
Step 9 complete	**CV13A @ 8%**	**8% should correlate to a leak of ~6-7 gpm. If needed slowly adjust the leakage to 6.5 gpm to align the leakage with the need to perform step 7**			
			CREW	PERFORM the following to removed affected RCP from service within 8 hours:	MB3B 2-10 step 7
			CREW	IF reactor power is greater than 25%, Refer to OP 3204, "At Power Operation," and COMMENCE an orderly plant shutdown	MB3B 2-10 step 7.1

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				while continuing with this step.	
		Once the crew makes a decision to commence a shutdown, Make the leak worse to the point that the crew will need to implement step 6 and remove the RCP from service immediately.	CREW	IF reactor power is less than or equal to 25%, refer to OP 3206, "Plant Shutdown," and COMMENCE an orderly plant shutdown while continuing with this step.	MB3B 2-10 step 7.2
			CREW	IF, at any time, RCP No. 1 seal parameters degrade, IMPLEMENT steps as specified in Table 1.	MB3B 2-10 step 7.3
			CREW	WHEN in MODE 3, refer to OP 3301D, "Reactor Coolant Pump Operation", and STOP the affected reactor coolant pump.	MB3B 2-10 step 7.4
T= Decision to shutdown made	**CV13A @ 20% on a 30 sec ramp**	**20% should correlate to a leak of ~10gpm. If needed slowly adjust the leakage to >10 gpm to align the leakage with the need to perform step 6**			
			US	Go to AOP 3554, "RCP Trip or Stopping an RCP at Power," and INITIATE actions to perform an immediate RCP shutdown.	MB3B 2-10 step 6
		AOP 3554 ACTIONS (rev 008-00)	**RO**	**Check RCP Status - ALL PUMPS RUNNING**	AOP 3554 Step 1
			US	**Check Reactor Power**	AOP 3554

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
					Step 2
			RO	Verify THREE LOOP PERMISSIVE P-8 annunciator (MB4D 3-3) - LIT.	AOP 3554 Step 2.a
			CREW	If stopping the RCP due to No. 1 seal failure, steps 3 through 5 should be completed as quickly as possible in order to isolate the affected pump No. 1 seal within the recommended 5 minutes.	AOP 3554 Step 3 NOTE
				While removing the RCP from service, it is desirable to maintain feedwater flow to the affected steam generator, to ensure that the reactor does not trip on low-low steam generator level from the shrink that will occur. Approximately 0.5 MPPH excess flow is sufficient. Feedwater flow to the affected steam generator should be stopped once shrink has stopped.	AOP 3554 Step 3 NOTE
			BOP	**Feed Affected Loop SG NR Level to Between 65% and 70%**	AOP 3554 Step 3
			RO	**Defeat Affected Loops Temperature Input**	AOP 3554 Step 4
		Loop 1		Place loop temperature cutout switch for ΔT to the affected loop and pull out.	AOP 3554 Step 4.a
		Loop 1		Place loop temperature cutout switch for Tavg to the affected loop and pull out.	AOP 3554 Step 4.b
		Loop 2, 3, 4		Place OT/OP ΔT recorder select switch to an *unaffected* loop.	AOP 3554 Step 4.c
			US	**Remove Affected RCP From Service**	AOP 3554

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
					Step 5
			RO	Check RCP status - ALL PUMPS RUNNING.	AOP 3554 Step 5.a
			US	Check the following conditions:	AOP 3554 Step 5.b
			BOP	• Affected SG NR level - GREATER THAN 65%.	
			RO	• THREE LOOP PERMISSIVE P-8 annunciator (MB4D 3-3) - LIT	
		May apply	US	Return to step 2.	AOP 3554 Step 5.b RNO
			RO	STOP affected RCP.	AOP 3554 Step 5.c
				Verify affected S/G level- STABLE	AOP 3554 Step 5.d
				Stop feeding the affected S/G	AOP 3554 Step 5.e
			RO	Check RCP 1 and 2 - BOTH RUNNING.	AOP 3554 Step 5.f
		"B" Spray to manual and close	RO	Place affected PZR Spray Controller in manual and CLOSE spray valve.	AOP 3554 Step 5.f RNO
			US	**Check if RCP Seal Leakoff should be isolated**	AOP 3554 Step 6
		yes	US	Verify RCP – STOPPED AS A RESULT OF	AOP 3554

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				SEAL FAILURE REQUIRING *IMMEDIATE* SHUTDOWN	Step 6.a
			RO	Verify the affected RCP has been tripped - AT LEAST 3 minutes	AOP 3554 Step 6.b
		Will need to return and perform.	US	Proceed to step 7 and, WHEN The RCP has been tripped at least 3 minutes, THEN Perform step 6.c.	AOP 3554 Step 6.b, RNO
			RO	CLOSE the affected RCP No. 1 seal leakoff isolation valve	AOP 3554 Step 6.c
			RO	Verify affected RCP RPCCW thermal barrier isolation valve - OPEN	AOP 3554 Step 6.d
			BOP	**Shift affected SG to Main Feed Bypass Flow**	AOP 3554 Step 7
		The "A" SG feed regulating valve will already be closed.	BOP	Close affected SG feed regulating valve.	AOP 3554 Step 7.a
		3FWS-MOV35A will already be closed.	BOP	CLOSE affected SG FW control isolation valve 3FWS-MOV35A 3FWS-MOV35B 3FWS-MOV35C 3FWS-MOV35D	AOP 3554 Step 7.b
			BOP	Using the SG feed regulating bypass valve, Maintain the affected SG level between 45% and 55%.	AOP 3554 Step 7.c
			US	**Perform Follow-up Actions.**	AOP 3554 Step 8

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		The crew should not trip bistables as this will cause a reactor trip. (An OTΔT bistable was already tripped for the PRNI failure) Crew must diagnose this. If they do not diagnose this then trip the following bistables as directed:	US	Using AOP 3571, Instrument Failure Response, Attachment A, step 6, Trip the associated temperature bistables for the affected loop	AOP 3554 Step 8.a
T+ 1 min of request	**RXR107**	**Protection set 2 door**	RO	Verify MB annunciators and parameters – AS EXPECTED	AOP 3554 Step 8.b
	RXR115	**"TRIP" LoLo Tave (P-12)**		Immediately Report any unexplained or unexpected conditions to the Shift Manager.	AOP 3554 Step 8.b RNO
	RXR111	**"TRIP" Lo Tave**			
	RXR02	**"TRIP" OPΔT**		Perform the following to be in HOT STANDBY (MODE 3) within 6 hours	AOP 3554 Step 8.c
	RXR31	**"TRIP" C-4**		1. Check reactor power - GREATER THAN 25%.	
This B/S will trip the plant	**RXR31**	**"TRIP" OTΔT**		Continue plant shutdown using OP 3206, Plant Shutdown.	AOP 3554 Step 8.c.1 RNO
	RXR107	***"CLOSE" Protection Set 2 Door***			

EVENT 5: Loss of offsite power, "B" Emergency Diesel Generator (EDG) fails to start.

T = AOP 3554 complete	**RSCU 5**	**Degraded Grid Voltage**
	(ED10)	Grid voltage will increase to 372 KV over 60 seconds. Freq will increase to 60.1 hz.
	(EDR01)	
T = 1 min after	**ED10**	**Modify to 25%, ramp 60 seconds.**

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
RSCU 5	EDR01	**Modify to –0.2** Will cause grid voltage to decrease to 328 KV and freq to lower to 59.8 hz.			
T = 1 min after modification	RSCU 6 (ED01)	**Loss of Offsite Power**			
	CV13A	**Increase the severity of CV13A to 100% to simulate the catastrophic failure of the seal package associated with 'A' RCP.**			
		NOTE: US should go to "Master Silence" before ordering reactor trip.	RO		
		E-0 (Rev. 22) STEPS	Crew		
				• Foldout page must be open	E-0, Step 1, NOTE
				• ADVERSE CTMT defined as GREATER THAN 180°F or GREATER THAN 10^5 R/hr in containment.	
				• The reactor can be interpreted as "tripped" when any two of three bulleted substeps of Step 1.* are	

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				satisfied.	
			RO	**Verify Reactor Trip**	E-0, Step 1
				• Check reactor trip and bypass breakers - OPEN	
		Rod bottom lights are out due to loss of power.		• Check rod bottom lights - LIT	
		The crew still meets two of three		• Check neutron flux - DECREASING	
				Verify Turbine Trip	E-0, Step 2
				Check all turbine stop valves - CLOSED	E-0, Step 2.a
			BOP	**Verify Power to AC Emergency Busses**	E-0, Step 3
		The BOP should attempt a manual start of the "B" EDG from MB8. The "B" EDG will not start.	BOP	Check busses 34C and 34D - BOTH ENERGIZED	E-0, Step 3.a
		The "A" EDG will be exhibiting exhibit degraded frequency and speed. The US may decide to emergency shutdown the EDG.		Try to energize the affected buss(es) from its associated EDG.	E-0, Step 3.a, RNO
			US	IF power can NOT be restored to at least one AC emergency bus, THEN Go to ECA-0.0, Loss of All AC Power, Step 3. (Observe NOTE prior to step 1).	
T= Step 4 of E-0 if crew	**MALF EG07A**	**NOTE**: Crew may have tripped EDG due to abnormal operations	US	**Check If SI Is Actuated**	E-0, Step 4

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
has not tripped "A" EDG					
			RO	Verify SAFETY INJECTION ACTUATION annunciator - (MB4D 1-6 or MB2B 5-9) - LIT	EOP 35 E-0, Step 4.a
			US	Check if SI is required	E-0, Step 4, RNO
		ECA-0.0 Rev 020-01 Actions			
				CSF Status Trees should be monitored for information only. Functional Response procedures shall NOT be implemented while in this procedure.	ECA-0.0 Step 1 NOTE
			RO	**Check If RCS Is Isolated**	ECA-0.0 Step 3
				Verify PZR PORVs - CLOSED	ECA-0.0 Step 3.a
				CLOSE letdown orifice isolation valves.	ECA-0.0 Step 3.b
				Verify excess letdown and reactor head vent isolation valves - CLOSED	ECA-0.0 Step 3.c
			BOP	**Verify AFW Flow To All Intact SGs - GREATER THAN 530 gpm**	ECA-0.0 Step 4
				Perform the following:	ECA-0.0 Step 4.a. RNO
				Verify TD AFW pump running.	

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		CRTICAL TASK – The BOP will start the TD AFW pump by opening the steam supply valves [*]	BOP	IF the TD AFW pump is NOT running, THEN	[*]
				1) Using Attachment J locally Reset the turbine trip valve as necessary.	
			BOP	2) OPEN steam supply valves.	
			BOP	Verify the TD AFW flow control valves are open. IF the valves are NOT open, THEN OPEN the TD AFW pump flow control valves.	ECA-0.0 Step 4.b. RNO
				If power is NOT restored to Bus 34C within 30 minutes, Inverter 6 de-energizes and the process computer will be unavailable. Use GA-12 as required to determine core cooling parameters.	ECA-0.0 Step 5 CAUTION
				Try To Restore Power To Any AC Emergency Bus	ECA-0.0 Step 5
	NOTE>>	**If called, as ISO NE/CONVEX report that the there has been a partial blackout of most northeast grid regions. Time to restoration unknown.**	BOP	START at least one EDG (MB8)	ECA-0.0 Step 5.a
				Proceed to step 5.e	ECA-0.0 Step 5.a

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
					RNO
			BOP	Check offsite power - AVAILABLE	ECA-0.0 Step 5.e
			US	Proceed to CAUTION prior to step 6 and, IF offsite power becomes available, THEN Using GA-3, Energize the AC emergency bus through the RSST or the NSST.	ECA-0.0 Step 5.e RNO
				• Maintain one service water pump available to automatically load on its AC emergency bus to provide emergency diesel generator cooling.	ECA-0.0 Step 6 CAUTION
				• If a SI signal is actuated during this procedure, it must be reset to permit manual loading of equipment on an AC emergency bus.	
				• Spurious fire alarms may occur in areas where the temperatures exceed 120°F due to a loss of ventilation. The locking out of CO_2 protected areas which have spurious fire alarms is recommended.	
				• When power is restored to any AC emergency bus from offsite or an emergency diesel generator, recovery actions should continue starting with Step 26.	ECA-0.0 Step 6 NOTE

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• ADVERSE CTMT is defined as Ctmt temperature GREATER THAN 180°F or Ctmt radiation level GREATER THAN 10^{5R}/hr.	
				Block Automatic Loading Of AC Emergency Busses	ECA-0.0 Step 6
				RESET the following if necessary	ECA-0.0 Step 6.a
			RO	• SI	
			BOP	• Aux FW Train A for Lo-Lo SG Level	
			BOP	• Aux FW Train B for Lo-Lo SG Level	
				Place Following Control Switches In PULL-TO-LOCK	ECA-0.0 Step 6.b
			RO	• Charging pumps	
T=Service Water Pump in PTL	**SW01B or SW01D**	**For the Service Water Pump left in condition to Auto Start [not in PTL] INSERT THE APPLICABLE TRIP. The goal is to have the RO need to manually start the pump that is <u>currently</u> in PTL.**		• One service water pump per train (follow pumps preferred)	
				• RPCCW pumps	
				• Quench spray pumps	
				• Recirculation spray pumps	
				• SI pumps	

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				• RHR pumps	
			BOP	• MD AFW pumps	
				• CAR fans	
				• Control Building HVAC chillers	
				• CRDM cooling fans	
				• Auxiliary Building filter exhaust fans	
				• SLCRS fans	
				Place CHG & CCW PP area supply fans in OFF	ECA-0.0 Step 6.c
				Locally Attempt To Restore AC Power	ECA-0.0 Step 7
			BOP	Verify emergency diesel generators – AT LEAST ONE RUNNING	ECA-0.0 Step 7.a
				Perform the following:	ECA-0.0 Step 7.a RNO
			US/PEO	Using Attachment E, Locally Start both EDGs.	
			US	Proceed to step 8 and,	
				IF an EDG starts, **THEN**	
				Perform steps 7.b and 7 c.	

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			BOP	Check emergency bus 34C or 34D – AUTOMATICALLY ENERGIZED	ECA-0.0 Step 7.b
			US	Proceed to step 26.	ECA-0.0 Step 7.c
			US/PEO	**Isolate RCP Seals**	ECA-0.0 Step 8
				a. Locally Close the following valves:	
T=7 minutes from dispatching PEO		**CVR 94 to CLOSE'**		1) RCP seal water return Ctmt outer isolation valve (3CHS*MV8100)	
				2) All RCP seal supply isolation valves:	
		CVR 90 to CLOSE'		3CHS*MV8109A	
		CVR 91 to CLOSE'		3CHS*MV8109B	
		CVR 92 to CLOSE'		3CHS*MV8109C	
		CVR 93 to CLOSE'		3CHS*MV8109D	
				3) RPCCW Ctmt return outer isolation valves:	
		CCR 47 to CLOSE'		3CCP*MOV49A	
		CCR 48 to CLOSE'		3CCP*MOV49B	
			PEO	**Open Instrument Rack Room Cabinet Doors Using Attachment B.**	ECA-0.0 Step 9

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
		The US may decide to align the SBO to either Train "A" or "B".		The SBO diesel may be aligned to either bus pair 34A and 34C or 34B and 34D. The preferred bus pair is 34A and 34C.	ECA-0.0 Step 10 NOTE
				Energize Any AC Emergency Bus From The SBO Diesel	ECA-0.0 Step 10
			BOP	OPEN all SBO bus tie breakers:	ECA-0.0 Step 10.a
				For Bus 34A : 34A 1-2	
				For Bus 34B : 34B 1-2	
			US	For Bus 34E: A505 (Unit 2)	
T = 5 minutes from being dispatched	**EDR33 to "ON"**	Operates SBO Synch Check	US/PEO	Using Attachment G locally Start SBO diesel.	ECA-0.0 Step 10.b
T = 7 minutes from being dispatched	**EGR08 to "START"**	Starts SBO Diesel	US/PEO	Locally Align the selected AC bus pair using one of the following attachments:	ECA-0.0 Step 10.c
				For Busses 34A and 34C: Attachment H	
				For Busses 34B and 34D: Attachment I	
T = When directed	**EDR32 to "CLOSE"**	Closes SBO Output Breaker	BOP	OPEN the following breakers:	ECA-0.0 Step 10.d
				EDG supply breaker for selected emergency	ECA-0.0

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				AC bus	Step 10.d.1
				For Bus 34C: DGA*34C-2	
				For Bus 34D: DGB*34D-2	
				NSST feeder breaker for selected non-emergency AC bus	ECA-0.0 Step 10.d.2
				For Bus 34A: NSSA-34A-2	
				For Bus 34B: NSSA-34B-2	
				Close SBO diesel output breaker as follows:	ECA-0.0 Step 10.e
			US	1. Verify local start of SBO diesel (*Using Attachment G*) - COMPLETED	
				1) Proceed to NOTE prior to step 11 and,	ECA-0.0 Step 10.e RNO
				WHEN	
				Attachment G completed,	
				THEN	
				Continue with step 10.e thru 10.q.	
			PEO	1. Locally Close SBO diesel output breaker	

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			BOP	OPEN the following load center supply breakers for the selected non-emergency AC bus:	ECA-0.0 Step 10.f
				For Bus 34A:	
			32A	32A-2 AND 32A-XFMR-2	
			32B	32B-2 AND 32B-XFMR-2	
			32C	32C-2 AND 32C-XFMR-2	
			32D	32D-2 AND 32D-XFMR-2	
			32E	32E-2 AND 32E-XFMR-2	
			32F	32F-2 AND 32F-XFMR-2	
			32G	32G-2 AND 32G-XFMR-2	
				For Bus 34B:	
			32H	32H-2 AND 32H-XFMR-2	
			32J	32J-2 AND 32J-XFMR-2	
			32K	32K-2 AND 32K-XFMR-2	
			32L	32L-2 AND 32L-XFMR-2	
			32M	32M-2 AND 32M-XFMR-2	
			32N	32N-2 AND 32N-XFMR-2	
			32P	32P-2 AND 32P-XFMR-2	
			32Q	32Q-2 AND 32Q-XFMR-2	

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Align the selected non-emergency AC bus	ECA-0.0 Step 10.g
T = 5 minutes from SBO being started	**EGR08 to "STOP"**	Stops SBO Diesel	BOP	1. Place the following switches in Pull-TO-LOCK	
T = 1 minute from SBO being stopped		**Report as the PEO at the SBO that the SBO tripped on "Generator Ground Fault". "Engine Shutdown" is also in.**		• Screen wash pump	
				• Circulating water pumps	
				• TPCCW pump(s)	
			BOP	2. Place the following switches to STOP:	
				• CDS chiller(s)	
				• Heater drain pump(s)	
				• MSR drain pump	
			US	Verify local alignment of selected busses (*Using Attachment H or I*) - COMPLETED	ECA-0.0 Step 10.h
T = +5 min of being dispatched	**EGR07**	**Clear EDG B Local Panel Trouble**	US	Proceed to NOTE prior to step 11 and, WHEN Attachment H or I completed, THEN Continue with step 10.h through 10.q.	ECA-0.0 Step 10h RNO

Lesson Title: Loss of All AC Power

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
T = +9 min of being dispatched	**EGR011**	**EDG B Local Control**		Place the remaining service water pump on the selected emergency bus in PULL-TO-LOCK.	ECA-0.0 Step 10.i
T = +11 min of being dispatched	**EGR14**	**EDG "B" Output Breaker to LOCAL Control**		Reset the undervoltage block for the selected emergency bus	ECA-0.0 Step 10.j
	REMOVE EG06B	**Remove Malfunction EG06B (allows auto start of EDG)**			
		Call as PEO. Inform SM/US that local start of the "B" EDG is completed and the EDG output breaker automatically closed in on the emergency bus. No apparent reason the B EDG would not start automatically.			
		NOTE: Once the 'B' EDG is started and closed in to bus 34D, the US should proceed to step 26.		1. Verify annunciator For Bus 34C: BUS 34C UNDERVOLTAGE (MB8A 3-12) - NOT LIT For Bus 34D: BUS 34D UNDERVOLTAGE (MB8C 3-2) - NOT LIT 2. Press undervoltage block BYPASS pushbutton (MB8R)	
				RESET LOP (MB2) for the selected train	ECA-0.0 Step 10.k
				CLOSE SBO bus tie breaker (MB8) for	ECA-0.0

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				selected non-emergency AC bus	Step 10.l
				For Bus 34A: 34A1-2	
				For Bus 34B: 34B1-2	
				Place the synchronizing selector to ON for the selected emergency and non-emergency busses	ECA-0.0 Step 10.m
				For Bus 34A and 34C: SYNC SEL 34A-34C Tie	
				For Bus 34B and 34D: SYNC SEL 34D-34B Tie	
				CLOSE the bus tie breaker between the selected emergency and non-emergency busses	ECA-0.0 Step 10.n
				For 34A and 34C: 34C*1T-2	
				For 34B and 34D: 34D*1T-2	
				Place the synchronizing selector to OFF for the selected AC bus pair	ECA-0.0 Step 10.o
				For Bus 34A and 34C: SYNC SEL 34A-34C Tie	
				For Bus 34B and 34D: SYNC SEL 34D-34B Tie	
				Check any AC emergency bus - ENERGIZED	ECA-0.0 Step 10.p

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			US	Proceed to NOTE prior to step 11.	ECA-0.0 Step 10.p RNO
				Go to ECA - 0.3, Loss of All AC Power - Recovery With The SBO Diesel	ECA-0.0 Step 10.q
		The Note prior to Step 6 directs continuing recovery actions at Step 26 when power is restored to any A/C emergency bus.			
				Stabilize SG Pressures.	ECA-0.0 Step 26
		SG pressures may not need to be stabilized in that the depressurization has not been started.	BOP	Adjust the following: • SG atmospheric dump valves **OR** • SG atmospheric dump bypass valves.	ECA-0.0 Step 26.a
				Verify Service Water System Operation For Each Energized Emergency Bus.	ECA-0.0 Step 27
			RO	RESET LOP, if required.	ECA-0.0 Step 27.a
			RO	Check diesel generator heat exchanger SW outlet isolation valves - OPEN. • 3SWP*AOV39A • 3SWP*AOV39B	ECA-0.0 Step 27.b

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
			RO	Check service water pumps - ONE PER TRAIN RUNNING.	ECA-0.0 Step 27.c
		CRITICAL TASK - [*]	RO	START one pump per train.	ECA-0.0 Step 27.c RNO **[*]**
			RO	Place service water pumps in PULL-TO-LOCK to AUTO.	ECA-0.0 Step 27.d
			RO	Check service water pump discharge valves - OPEN FOR RUNNING PUMPS For pump A (3SWP*MOV102A) For pump B (3SWP*MOV102B) For pump C (3SWP*MOV102C) For pump D (3SWP*MOV102D)	ECA-0.0 Step 27.e
T = 5 minutes from being dispatched	**SWR25 to "0"**	Closes 3SWP*MOV71A	RO	Check TPCCW heat exchanger SW supply isolation valves - CLOSED. • 3SWP*MOV71A • 3SWP*MOV71B	ECA-0.0 Step 27.f
			PEO	CLOSE valves.	ECA-0.0 Step 27.f RNO
				When placing loads on an energized emergency bus, DO NOT exceed the capacity of the power source.	ECA-0.0 Step 28 CAUTION

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Perform the Following For Each Energized AC Emergency Bus:	ECA-0.0 Step 28
			BOP	Verify the following equipment is energized: • 480 volt emergency busses • Battery chargers	ECA-0.0 Step 28.a
			US/PEO	Energize previously de-energized DC loads (Attachment A).	ECA-0.0 Step 28.b
				Perform the following to energize MCC 32-3T:	ECA-0.0 Step 28.c
			BOP	1. Verify Bus 34C - ENERGIZED	
			US	Proceed to step 28.d and, WHEN Power is restored to bus 34C, THEN Perform step 28.c	ECA-0.0 Step 28.c.1 RNO
				Verify communications console - ENERGIZED.	ECA-0.0 Step 28.d
				If RCP seal cooling was previously isolated, further cooling of the RCP seals will be performed by RCS natural circulation cooldown as directed in subsequent procedures.	ECA-0.0 Step 29 NOTE

Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard
				Select Recovery Procedure.	ECA-0.0 Step 29
			RO	Check RCS subcooling based on core exit TCs - GREATER THAN 32°F (115°F ADVERSE CTMT)	ECA-0.0 Step 29.a
				Go to ECA - 0.2, Loss of All AC Power Recovery With SI Required.	ECA-0.0 Step 29.a RNO
		PZR level will be less than 16%.	RO	Check PZR level - GREATER THAN 16% (50% ADVERSE CTMT).	ECA-0.0 Step 29.b
			US	Go to ECA - 0.2, Loss of All AC Power Recovery With SI Required.	ECA-0.0 Step 29.b RNO
				Check SI equipment NOT actuated • Verify SI pumps - STOPPED • Verify RHR pumps - NOT RUNNING IN SI MODE • Verify charging pump cold leg injection valves - CLOSED	ECA-0.0 Step 29.c
		The US should announce the transition to ECA-0.2.		Go to ECA-0.2, Loss of All AC Power Recovery With SI Required.	ECA-0.0 Step 29.c RNO

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Time	IDA/Malf	Instructor Information/Activity	Task Assign	Expected Action	Standard

Terminate the scenario once the US has announced the transition to ECA-0.2.

SECTION 4

Lesson Title: Loss of All AC Power

ID Number: 2K7 NRC-03 Revision: 0

EVALUATION GUIDE

I. Crew FOLLOW-UP QUESTIONS

1. What is the Emergency Classification for this event?

   Site Area Emergency - Charlie Two, Loss of Voltage on Buses 34C and 34D > 15 minutes (EAL PS1).

2.

SECTION 4
EXAM GUIDE SUMMARY

Title: Loss of All AC Power

ID Number: 2K7 NRC-03 Revision: 0

II. Critical Tasks

Note: Critical Tasks are not required for Progress Review Exams.

TASK DESCRIPTION	TASK #	K/A >/= 3.0	BASIS SELECTION
Establish 530 gpm AFW flow to the S/Gs prior to the completion of step 4 of ECA-0.0	ECA-0.0--B	061-000 A2.02 3.2/3.6	Failure to establish the minimum required AFW flow rate, under the postulated plant conditions, results in "adverse consequence(s) or a significant degradation in the mitigative capability of the plant."
Isolate RCP Seal Injection before a Charging Pump starts or is started	ECA-0.0--H	003-000 A4.01 3.3/3.2	Failure to isolate RCP seal injection before starting a charging pump, under the postulated plant conditions, can result in unnecessary and avoidable degradation of the RCS fission-product barrier, specifically at the point of the RCP seals, especially if RCPs are subsequently started.
Manually start the SW pump and verify SW flowpath before completing step 27 of ECA-0.0 such that the EDG does not fail because of damage caused by engine overheating.	ECA-0.0 -- F	076-A2.01 3.5/3.7	Failure to restore SW flow means that the EDG is running without SW cooling which leads engine overheating. Failure to perform the critical task constitutes "mis-operation or incorrect crew performance that leads to degraded emergency power capacity."

Note: [*] Used to designate critical tasks. Should also be incorporated into column 3 or 4 of Instructor Guide.

SHIFT TURNOVER REPORT

DATE-TIME	PREPARED BY	SHIFT
today 0300	Unit Supervisor /"Night" Shift	1800-0600

PLANT STATUS:

Mode:	1		Rx Power:	3%
Megawatts:	Thermal:	3411 MWTH	PZR Pressure:	2250 psia
	Electric:	0 MWe	RCS T-AVE:	557 degF
RCS Leakage:	Identified:	0.005 gpm	Boron/Burnup	2032 ppm / 0 MWD/MTU
	Unidentified:	0.03 gpm	Days on line	485
Date/Time:	today 0015		Protected Train/Facility:	**B Purple**
PRA/SDR:	Green			
Intake:	Green			

Active Tracking Records and Action Statements

Equipment/Reason

LCO	Action	Date	Time in LCO	Action Requirement	Time Left

OD Compensatory Actions / Temp Logs

Open Date	Class Reason	Reason	Watch Position

Plant Systems APC

System	Notes

Cross Unit System Status

Surveillances / Evolutions in Progress

Shift Orders

Reactor power stable at the point of adding heat (reactor power 3%), following a reactor startup by the previous shift. This is the initial plant startup from a refueling outage. OP 3203, *Plant Startup* is in progress and complete up through step 4.2.7. The crew is to raise reactor power from 3% to 6 to 9% in accordance with step 4.2.8.

ATTACHMENT 2

VALIDATION CHECKLIST

Title: Loss of All AC Power

ID Number: 2K7 NRC-03 Revision: 0

Verified By:
(Initials)

Initial Conditions:

The initial condition(s) contained in the guide are certified or have been developed from certified ICs.

Test Run:

The scenario contained in the guide has been test run in part or whole on the simulator. The simulator response is reasonable and as expected. If a simulator guide revision does not affect original Test Run, then enter N/A. ②

Simulator Operating Limits:

The simulator guide has been evaluated for operating limits and/or anomalous response by reviewing the Simulator Modeling and Anomalous Response List. ②

For Examination Scenario:

The Scenario Attributes Checklist is complete and attached. This is not required for Progress Review Exams.

Actions Complete (Signature) 1/24/07 Date

Facility: Millstone 3 Scenario No.: 2K7 NRC-03 (spare) Op-Test No.: 2K7

Examiners: _____ Operators: _____

Initial Conditions: IC-07 (modified), 3% power, Beginning of Life, No Xe.

Turnover:
The crew will take the shift with reactor power stable at the point of adding heat (reactor power 3%), following a reactor startup by the previous shift. This is the initial plant startup from a refueling outage. OP 3203, *Plant Startup* is in progress.

Event No.	Malf. No	Event Type*	Event Description
1	CC01B	R (RO) R (SRO) N (BOP) C (RO)	Power ascension from 3% to 8% power using OP 3203, *Plant Startup.* Running RPCCW pump trip. Alignment and start of the standby RPCCW pump.
2	RC07A	C (RO)	Small leak develops through pressurizer PORV, 3RCS*PCV455A.
3	NI09C	I (BOP)	Power Range Nuclear Instrument (NI) Channel 43 Lower Detector fails high requiring FRV Bypass valve controllers to be placed in manual.
4	CV13A	C (RO) N (BOP)	"A" RCP #1 seal degradation resulting in high RCP seal leakoff. RCP is tripped using AOP 3554, *RCP Trip or Removing a RCP from Service At Power.*
5	ED01 EG06B	M (ALL)	Loss of offsite power, "B" Emergency Diesel Generator (EDG) fails to automatically or manually start from the control room.
6	EG08A EG07A FW20C	C (BOP) C (RO)	"A" EDG trips resulting in a loss of all AC power. TDAFW pump fails to auto-start. "B" EDG is started locally. "B" service water pumps fail to auto-start after "B" EDG is successfully started locally.

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

Lesson Title: Loss of All AC Power

ID Number: 2K7 NRC-03 Revision: 0

Assessor: Dave Minnich

QUALITATIVE ATTRIBUTES

___Y__1. The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the crew into expected events.

___Y__2. The scenario consists mostly of related events.

___Y__3. Each event description consists of:

- the point in the scenario when it is to be initiated
- the malfunctions(s) that are entered to initiate the event
- the symptoms/cues that will be visible to the crew
- the expected operator actions (by shift position)
- the event termination point (if applicable)

___Y__4. No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.

___Y__5. The events are valid with regard to physics and thermodynamics.

___Y__6. Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.

_N/A__7. If time compression techniques are used, scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.

___Y__8. The simulator modeling is not altered.

___Y__9. The scenario has been validated. Pursuant to 10 CFR 55.46(d), any open simulator performance deficiencies or deviations from the referenced plant have been evaluated to ensure functional fidelity is maintained while running the planned scenario.

___Y__10. Every operator will be evaluated using at least one new or significantly modified scenario. All other scenarios have been altered IAW Section D.5 of ES-301.

___Y__11. All individual operator competencies can be evaluated, as verified using form ES-301-6.

___Y__12. Each operator will be significantly involved in the minimum number of transients and events specified on Form ES-301-5.

___Y__13. Level of difficulty is appropriate to support licensing decisions for each crew position.

Lesson Title: Loss of All AC Power

ID Number: 2K7 NRC-03 Revision: 0, Change 2

Note: Following criteria list scenario traits that are numerical (QUANTITATIVE) in nature.

01. Total Malfunctions (TM) – 5 to 8 required — Total 8

(1) RPCCW Pump Trip, (2) PORV Leak, (3) PRNI Channel Failure, (4) RCP Seal Failure, (5) Loss of Offsite Power, (6) TDAFW Pump Fails to Auto Start, (7) EDG Faults, (8) Service Water Pump Failure

02. Malfunctions after EOP entry (EM's) – 1 to 2 required — Total 3

(1) TDAFW Pump Fails to Auto Start, (2) EDG Faults, (3) Service Water Pump Failure

03. Abnormal Events (AE) – 2 to 4 required — Total 4

(1) RPCCW Pump Trip (AOP 3561), (2) PORV Leak (ARP MB4A), (3) PRNI Channel Failure (AOP 3571), (4) RCP Seal Failure/RCP Trip (AOP 3554)

04. Major Transients (MT) – 1 to 2 required — Total 1

(1) Loss of All AC Power

05. EOP's (EU) entered/requiring substantive actions -- 1 to 2 required — Total 1

(1) ECA-0.0

06. EOP Contingencies requiring substantive actions [ECAs/FRs/] (EC) -- 0 to 2 required — Total 1

(1) ECA-0.0

07. Critical Tasks (CT) – 2 to 3 required — Total 3

ECA-0.0 –B Establish 530 gpm AFW flow to the SGs prior to completion of step 4 of ECA-0.0

ECA-0.0 –H Isolate RCP seal injection before a charging pump starts or is started.

ECA-0.0 –F Manually start the service water pump and verify a flowpath before completing step 27 of ECA-0.0.

08. Approximate Scenario Run Time: 60 to 90 min. — Total 90 min

09. EOP run time: — Total 45 min

10. Technical Specifications are exercised during the scenario. — (Y/N) Y

SUMMARY OF CHANGES

Change Description	Date of Change