Draft Submittal

SEQUOYAH JUNE 2004 EXAM
50-327 & 328/2004-301

JUNE 7 - 16, 2004

1. Operating Test Simulator Scenarios

Facility: Sequoyah **Scenario No.:** 1 **Op-Test No.:** 1

Examiners: _____ **Operators:** _____

_____ _____

_____ _____

Initial Conditions: 85% power (BOL), "A" MDAFW Pump is OOS, "A" SI Pump is OOS

Turnover: 10 gpd leakage in #3 S/G, Severe Thunderstorm Warning for Hamilton and Rhea Counties for the next 2 hours

Event No.	Malf. No.	Event Type*	Event Description
			Set up simulator to IC-.
Pre-insert	FW07B	C	"B" MDAFW Pump trips on start
Pre-insert	FW07C	C	TDAFW Pump trips
1	-	N (RO)	Increase power to 90% (1st event occurs after power increase started)
2	-	R (RO, BOP)	AOP-C.03 shutdown (from #6 below, Plant Management Directed)
3	CN01A	C (BOP)	Hotwell Pump Trip
4	NI07B	I (RO)	N-42 Fails High
5	RX24 0%	I (BOP)	PT 3-1 fails Lo
6	CV18C (80%)	C (RO)	#3 RCP #2 Seal Fails
7		M (All)	Loss of Heat Sink
			Terminate in E-1

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

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

Event Description: Increase Power to 90%

Time	Position	Applicant's Actions or Behavior
		The following steps are from GO-5
	US	IF LEFM indication is available, THEN CALCULATE calorimetric power: Calorimetric power = U2118 _____ = _____%.
	US/CRO	VERIFY that all NIS Power Range A channel drawers are within ± 2% of the calculated calorimetric power.
	US/CRO	Prior to increasing turbine load above 77%: ensure the following: LCV-6-106A and -106B are controlling properly and LCV-6-105A and -105B are closed.
	CRO	Turbine setter is adjusted to begin the power increase and placed in GO.
	All	Load increase is coordinated between the CRO and the OATC to maintain Tavg/Tref
		NOTE Control rods may be used along with dilution during reactor power increase to maintain AFD within the target control band.
	OATC/CRO	IF diluting the RCS to increase T_{AVG}, THEN CONTINUE dilution and increase turbine load to maintain T_{REF} with T_{AVG}.
	CRO	MONITOR the turbine load increasing and MAINTAIN valve position limit approximately 10% above the current governor control indication as turbine load is changed.
		NOTE When the turbine impulse pressure relay number is illuminated on Panel L-262, the relay is closed and Runback circuit is armed.
	CRO	WHEN greater than 77% Turbine Load, THEN VERIFY [PIS-47-13RLY1] light [1], 'Turbine Runback From Loss of 1 MFP' is illuminated on Panel L-262.
		NOTE Reactor power can be increased greater than 90% as long as adequate MFP suction is maintained.
	CRO	WHEN greater than 82% Turbine Load, THEN VERIFY the following relay lights are illuminated on Panel L-262: [a] [PIS-47-13RLY2], Turbine Runback From #3HDT. [2] [b] [PIS-47-13RLY 3], NPSH Protection VLV-6-106B closes on #3 HDT pump trip. [3]
	CRO	WHEN approximately 85 to 90% reactor power OR when determined by Unit SRO (if power raised above 90%), THEN ENSURE third condensate booster pump in service in accordance with 1, 2-SO-2/3-1. [C.2]

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

Event Description: Hotwell Pump Trip

Time	Position	Applicant's Actions or Behavior
		The following steps are from AOP-S.04
	US/CRO	DIAGNOSE the failure: Hotwell Pump Trip, Section 2.4
	CRO	ENSURE two hotwell pumps RUNNING.
	CRO	MONITOR Steam generator levels returning to program. [M-4]
	All	ENSURE the following conditions: Reactor power STABLE Turbine load STABLE
	CRO/OATC	DISPATCH operator to investigate cause of Hotwell Pump trip.
	CRO	MONITOR Feedwater pump inlet pressure greater than 320 psig. [M-3, PI-2-129]
	OATC	CHECK reactor power greater than 75% .
	All	INITIATE reactor power reduction to less than 75% at 1% per minute USING 0-GO-5, Normal Power Operation.
	US	NOTIFY maintenance to investigate and repair pump malfunction as necessary.
	US	GO TO appropriate plant procedure.
		Critical Task: Reduce power to < 75% prior to reaching reactor trip conditions on S/G water levels

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

Event Description: N-42 Fails high

Time	Position	Applicant's Actions or Behavior
		The Following steps are from AOP-I.01
	US	EVALUATE the following Tech Specs for applicability: 3.3.1.1 (3.3.1), Reactor Trip System Instrumentation 3.3.2.1 (3.3.2), Engineered Safety Feature Actuation System Instrumentation 3.3.3.5, Remote Shutdown Instrumentation 3.3.3.7, Accident Monitoring Instrumentation 3.9.2, Refueling Operations Instrumentation 4.2.4.2, QPTR with one PR Channel Inoperable
	US/OATC	DIAGNOSE the failure: Power Range Failure, Go to section 2.3
	OATC	PLACE rod control in MAN.
	OATC	STABILIZE reactor power at current level.
	US/OATC	PLACE following switches located on Detector Current Comparator drawer [M-13, N50] in position corresponding to failed Power Range Channel: Upper Section Lower Section Appropriate Rod Stop Bypass switch Appropriate Power Mismatch Bypass switch
	US/OATC	DEFEAT failed Power Range channel USING Comparator Channel Defeat switch: Comparator and Rate Drawer [M-13, N37]
	OATC	RESTORE T-avg to T-ref.
	OATC	ENSURE OPERABLE Power Range channel selected: Nuclear Power Recorder [M-4, NR-45] RCS Temp ΔT recorder - (green pen) [M-5, XS-68-2B]
	OATC	RETURN rod control to AUTO if desired.
	OATC	CHECK reactor power greater than 75%.
	US	NOTIFY Reactor Engineering to PERFORM 0-SI-NUC-000-011.0, Moveable Detector Determination of Quadrant Power Tilt Ratio.
	US	NOTIFY IM to remove failed power range channel from service USING appropriate Appendix: B
	US	GO TO appropriate plant procedure.
		Critical Task: Control rods are placed in manual prior to reaching the RIL Lo-Lo limit

Op-Test No.: 1 Scenario No.: 1 Event No.: 5 Page 1 of 1

Event Description: PT 3-1 Fails LO

Time	Position	Applicant's Actions or Behavior
		The Following step are from AOP-S.01
	US/CRO	DIAGNOSE the failure: Loss of Main Feedwater Pump Control, Section 2.2
	CRO	MAINTAIN feedwater pressure on program
	CRO	PLACE affected MFP speed controller(s) in MANUAL: PC-46-20, MFPT 1A(2A) & 1B(2B) Speed Control. SIC-46-20A, MFPT 1A(2A) Speed Controller SIC-46-20B, MFPT 1B(2B) Speed Controller
	CRO	CONTROL speed on affected MFP(s) to restore feedwater pressure to program
	CRO/OATC	MAINTAIN steam generator level(s) on program.
	US	INITIATE repairs on failed equipment.
	US	GO TO appropriate plant procedure.

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Event Description: #3 RCP #2 Seal Fails

Time	Position	Applicant's Actions or Behavior
		The following steps are from AOP-R.04
		CAUTION: Exceeding the following limitations requires trip of the affected RCP, unless RCP operation is required by FR-C.1, *Inadequate Core Cooling* [C.1]: RCP #1 Seal ΔP less than 220 psid RCP #1 Seal Temperature greater than 225°F RCP Lower Bearing Temperature greater than 225°F RCP Upper Motor Bearing Temperature greater than 200°F RCP Lower Motor Bearing Temperature greater than 200°F RCP Motor Voltage less than 5940V or greater than 7260V RCP Motor Amps greater than 608 amps RCP Vibration greater than 20 mils on any axis (x and/or y) [C.3]
		Examiner Note: Crew should verify that the above caution values are not exceeded
	US	EVALUATE the following Tech Specs for applicability: 3.2.5, DNB Parameters 3.4.1.1, Reactor Coolant Loops and Coolant Circulation - Startup and Power Operation 3.4.1.2, Reactor Coolant System - Hot Standby 3.4.1.3, Reactor Coolant System - Shutdown 3.4.6.2, RCS Operational Leakage
	US	EVALUATE EPIP-1, Emergency Plan Initiating Conditions Matrix.
	US/OATC	DIAGNOSE the failure: RCP #1 Seal Leakoff low flow (low flow Alarm), Section 2.3
		Section 2.3 Steps
	OATC	CHECK #1 seal leakoff flow greater than 0.8 gpm per pump: FR-62-23 [RCP 1 & 2] FR-62-49 [RCP 3 & 4] - NO GO TO Step 4.
		Continued on Next Page

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

Event Description: #3 RCP #2 Seal Fails

Time	Position	Applicant's Actions or Behavior
		Continued from previous page
	OATC	ENSURE RCP seal water supply flow between 6 gpm and 10 gpm per pump: FI-62-1A FI-62-14A FI-62-27A FI-62-40A
	US/CRO	CONTACT Engineering for recommendations WHILE continuing with this procedure.
	OATC	ENSURE VCT pressure between 17 psig and 45 psig [PI-62-122].
	OATC	CHECK RCP standpipe level alarms DARK [M-5B, A-2, B-2, C-2, D-2]. - NO
	OATC/CRO	MONITOR the following: a. RCDT parameters (0-L-2 AB, el. 669) • Level, LI-77-1 • Pressure, PI-77-2 • Temperature, TI-77-21 b. Cntmt Fl. & Eq. Sump Level rate of rise (ICS pt. U0969)
	OATC	VERIFY RCP #2 seal leakoff less than or equal to 0.5 gpm USING Appendix A, RCDT Level Rate-of-Change.
	OATC	VERIFY RCP lower bearing temperature and seal water temperature are stable and within limits (less than 225°F).
	OATC	MONITOR RCP #1 seal leakoff flow greater than 0.8 gpm: FR-62-23 [RCP 1 & 2] FR-62-49 [RCP 3 & 4] - NO
	All	INITIATE normal plant shutdown USING appropriate plant procedures AND STOP affected RCP within 8 hours.

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Event Description: AOP-C.03 Shutdown

Time	Position	Applicant's Actions or Behavior
		The following steps are from AOP-C.03
	US	EVALUATE Tech Specs for applicability.
	US	EVALUATE EPIP-1, Emergency Plan Initiating Conditions Matrix.
	US/CRO	NOTIFY following personnel of emergency shutdown: Load Coordinator [C.1] Chemistry RADCON Plant Management
	ALL	MONITOR reactor/turbine trip NOT required USING Appendix A, Reactor and Turbine Trip Criteria.
	ALL	INITIATE load reduction at rate between 2% and 5% per minute.
	OATC	IF borating from BAT, THEN PERFORM the following: DETERMINE recommended boration flowrate and volume from table below. Rate and volume will be determined by the rate of shutdown INITIATE boration USING FCV- 62-138 to maintain control rods above low-low insertion limit.
		Caution: Turbine Load Reduction Rate greater than 3% per minute when borating from the RWST could result in violating Rod Insertion Limit. Note: Recommended boration volume from the RWST is approximately 500 gallons for each 20% of power reduction (~2000 gallons from 100% to 20%).
	OATC	ENERGIZE one set of backup heaters to reduce boron concentration differences between pressurizer and RCS.
	OATC	MONITOR automatic rod control maintaining T-avg/T-ref mismatch less than 5°F.
	CRO	STOP secondary plant equipment USING Appendix B, Secondary Plant Equipment.
		Examiner Note: Once the first secondary pump is removed from service the #3 Seal Failure will get worse requiring a reactor trip
	US	**CHECK** Reactor Shutdown required.
		Critical Task: Tavg/Tref deviation maintained </= 5degF

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Event Description: Reactor Trip/Loss of Heat Sink

Time	Position	Applicant's Actions or Behavior
		The following steps are from E-0
	OATC	VERIFY reactor TRIPPED: • Reactor trip breakers OPEN • Reactor trip bypass breakers OPEN or DISCONNECTED • Neutron flux DROPPING • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps.
	CRO	VERIFY turbine TRIPPED: • Turbine stop valves CLOSED.
	CRO	VERIFY shutdown boards ENERGIZED: VERIFY at least one train of shutdown boards ENERGIZED. VERIFY generator breakers OPEN 30 seconds after turbine trip.
	All	DETERMINE if SI actuated: Crew Should answer (NO) • ECCS pumps RUNNING. • Any SI alarm LIT [M-4D].
	All	DETERMINE if SI required: a. IF any of the following conditions exists: RCS pressure less than 1870 psig, OR Containment pressure greater than 1.54 psig, OR S/G pressure less than 600 psig, THEN, ACTUATE SI. b. IF SI is NOT required, THEN PERFORM the following: 1) MONITOR status trees. 2) GO TO ES-0.1, Reactor Trip Response.
	US	**Transition to ES-0.1**

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Event Description: Reactor Trip/Loss of Heat Sink

Time	Position	Applicant's Actions or Behavior
		The following steps are from ES-0.1
	US/CRO	MONITOR SI NOT actuated: SI ACTUATED permissive DARK [M-4A, D4]
	OATC	MONITOR RCS temperatures: • IF any RCP running, THEN CHECK T-avg stable at or trending to between 547F and 552F. OR • IF RCPs stopped, THEN CHECK T-cold stable at or trending to between 547F and 552F.
	OATC	MONITOR feedwater status: T-avg less than 550F. Should be (NO)
	OATC	CHECK if emergency boration is required: VERIFY all control rods fully inserted: • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps. MONITOR RCS temperature: • T-avg greater than 540F if any RCP running OR • T-cold greater than 540F if all RCPs stopped.
	US/CRO	ANNOUNCE reactor trip USING PA system.
	OATC	MONITOR pressurizer level control: CHECK pressurizer level greater than 17%. VERIFY charging IN SERVICE. VERIFY letdown IN SERVICE. CHECK pressurizer level trending to 25% (normal range 20% to 30%).
	OATC	MONITOR pressurizer pressure control: Pressurizer pressure greater than 1870 psig. Pressurizer pressure stable at or trending to 2235 psig (normal range 2210 psig to 2260 psig).
		Examiner Note: Depending on crew and STA pace, entry conditions for FR-H.1should be identified

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Event Description: Reactor Trip/Loss of Heat Sink

Time	Position	Applicant's Actions or Behavior
		The following steps are from FR-H.1
	US/CRO	DETERMINE procedure applicability: CHECK the following: Total feed flow less than 440 gpm due to operator action directed by another procedure. AND Total feed flow capability of greater than 440 gpm AVAILABLE. (NO)
	OATC	MONITOR RWST level greater than 27%.
	US/OATC	CHECK if secondary heat sink required: RCS pressure greater than any non-Faulted S/G pressure. RCS temperature greater than 350°F.
	OATC	MONITOR at least one CCP available.
	ALL	MONITOR heat removal capability: At least two S/G wide range levels greater than 20% [41% ADV]. Pressurizer pressure less than 2335 psig.
	CRO	MONITOR CST level greater than 5%.
	US	ATTEMPT to establish AFW flow to at least one S/G in the following order of priority-- Intact, Ruptured, Faulted:
	CRO	CHECK S/G blowdown isolation valves CLOSED. (NO)
	US/CRO	CHECK control room indications for cause of AFW failure: • CST level • AFW pump power supply • AFW Valve Alignment (NO)
	CRO	ESTABLISH MD AFW pump flow: ENSURE MD AFW pumps RUNNING. ENSURE AFW level control valves OPEN. ENSURE MD AFW recirculation valves FCV-3-400 and FCV-3-401 CLOSED. (NO)
		FR-H.1 Continued

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Event Description: Reactor Trip/Loss of Heat Sink

Time	Position	Applicant's Actions or Behavior
		FR-H.1 Continued
	CRO	ESTABLISH TD AFW pump flow: ENSURE turbine steam supply valves OPEN: • Either FCV-1-15 or FCV-1-16 • FCV-1-17 and FCV-1-18 • Trip and throttle valve, FCV-1-51. ENSURE AFW level control valves OPEN. RAISE TD AFW pump speed as necessary. (NO)
	US/CRO	CHECK total flow to S/Gs greater than 440 gpm. (NO)
	US	IF feed flow NOT verified, THEN GO TO Step 8.
	OATC	STOP all RCPs.
	CRO	MONITOR shutdown boards continuously energized.
	CRO	ATTEMPT to establish MFW flow to at least one S/G: CHECK at least one main feedwater pump available: • MSIV open • condenser vacuum established • containment pressure less than 1.54 psig • MFW pump available
	CRO	CHECK condensate system IN SERVICE: • Hotwell pumps • Condensate booster pumps
	ALL	CHECK SI signal previously actuated. (NO)
	CRO	CHECK FW isolation valves OPEN. (NO)
		FR-H.1 Continued

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Event Description: Reactor Trip/Loss of Heat Sink

Time	Position	Applicant's Actions or Behavior
		FR-H.1 Continued
	CRO	PERFORM the following: ENSURE MFW reg valve controllers in MANUAL and output ZERO. ENSURE MFW bypass reg valve controllers in MANUAL and output ZERO. CYCLE reactor trip breakers. RESET FW Isolation signal. [M-3] OPEN FW isolation valves for intact S/Gs.
	All	ESTABLISH MFW flow to at least one S/G USING EA-2-2, Establishing Secondary Heat Sink Using Main Feedwater or Condensate System. (NO)
		The following steps are from EA-2-2
	US	IF directed by FR-H.1 to establish main feedwater flow (MFP available), THEN PERFORM Section 4.3 to establish main feedwater flow to S/Gs.
	CRO	DISPATCH operator to PERFORM Appendix A, Part I to remove fuses to disable intermediate heater string isolation.
	CRO	ENSURE Condensate inlet and outlet valves for at least one LP heater string are OPEN. [M-3]
		CAUTION A condensate flowpath through the LP heaters must be established prior to starting a Condensate Booster Pump.
	CRO	ENSURE the following condensate pumps RUNNING: At least two Hotwell pumps At least one Condensate Booster Pump (with suction valve OPEN) At least one Injection water pump.
	CRO	ENSURE MFPT Recirc Valves in MANUAL and CLOSED: [FIC-3-70] MFPT A [FIC-3-84] MFPT B.
	CRO	ENSURE MFW reg controllers in MANUAL and output ZERO.
	CRO	ENSURE MFW bypass reg valve controllers in MANUAL and output ZERO.
		EA-2-2 Continued

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Event Description: Reactor Trip/Loss of Heat Sink

Time	Position	Applicant's Actions or Behavior
		EA-2-2 Continued
	CRO	IF a flowpath is NOT available through at least one intermediate heater string, THEN, NOTIFY personnel to PERFORM Appendix A Part II to establish a flow path.
	CRO	ENSURE Inlet and Outlet valves for at least one string of Intermediate and High pressure heaters OPEN: High Pressure Feedwater Heaters Intermediate Pressure Feedwater Heaters.
	CRO	IF starting MFW pump A, THEN PERFORM the following: ENSURE MFW pump A drain handswitch [HS-46-14] in OPEN position [M-3]. ENSURE the following valves OPEN: FCV-2-205 FCV-2-210 FCV-2-221 FCV-3-67
		Examiner Note: Crew my chose "B" MFP. Only difference in performance is valve numbers
	CRO	IF [VLV-1-611] MFW Pump A HP steam isolation valve CLOSED, THEN, DISPATCH operator to OPEN [VLV-1-611] [TB ele 706].
	CRO	RESET MFPT A USING [HS-46-9A].
	CRO	PLACE MFPT A [SIC-46-20A] in MANUAL with ZERO output.
	CRO	ENSURE MFPT A and B master speed controller [PC-46-20] in MANUAL with output at ZERO.
	All	DO NOT CONTINUE until suction flowpath established to MFP.
	CRO	ENSURE [FIC-3-70] MFPT A recirc valve in MANUAL and OPEN.
	CRO	PLACE MFPT A speed controller [SIC-46-20A] in AUTO.
	CRO	OPEN MFPT A stop valves by placing HP stop valve switch [HS-46-15A] to RAISE.
	CRO	RAISE MFPT A speed by placing governor valve positioner [HS-46-13A] to RAISE.
	CRO	WHEN MFPT speed controller controlling MFPT speed, THEN, HOLD MFPT governor valve positioner in RAISE, UNTIL position indicator red light LIT and green light DARK.
		EA-2-2 Continued

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

Event Description: Reactor Trip/Loss of Heat Sink

Time	Position	Applicant's Actions or Behavior
		EA-2-2 Continued
	CRO	ADJUST MFPT speed USING master controller [PC-46-20] UNTIL feedwater header pressure is approximately 80 psid greater than steam header pressure.
	All	IF RCS temperature is less than 550°F, THEN, GO TO Step 13. (below)
	US/CRO	IF RCS temperature is greater than 550°F AND Feedwater Isolation Valves are OPEN, THEN, PERFORM the following when feedwater is established: WHEN Tavg approaches 550°F, THEN, DEPRESS and HOLD both FWI reset pushbuttons [M-3]. WHEN T-avg is less than 550°F, THEN RELEASE FWI reset pushbuttons.
	CRO	(STEP 13) ADJUST MFW regulating bypass valve controller to establish required feed flow.
	CRO	MONITOR Hotwell level AND CONTROL as necessary.
	US	RETURN TO procedure and step in effect.
		FR-H.1 (step 11)
	US/CRO	DETERMINE if secondary heat sink restored: CHECK narrow range level in at least one S/G greater than 10% [25% ADV]. (NO)
	US/OATC	VERIFY adequate feed flow to at least one S/G by checking the following: Core exit T/Cs dropping WR level rising.
	All	IF adequate feed flow to at least one S/G verified, THEN, PERFORM the following: MAINTAIN flow to restore narrow range level greater than 10% [25% ADV]. RETURN TO procedure and step in effect.
		Terminate the exercise

Facility: Sequoyah **Scenario No.:** 2 **Op-Test No.:** 1

Examiners: _____ **Operators:** _____

Initial Conditions: 100% power (BOL), "A" MDAFW Pump is OOS, "A" SI Pump is OOS

Turnover: 10 gpd leakage in #3 S/G, Severe Thunderstorm Warning for Hamilton and Rhea Counties for the next 2 hours

Event No.	Malf. No.	Event Type*	Event Description
			Set up simulator to IC-__.
Pre-insert	RP16K 608B	C	Train "B" SI Failure
Pre-insert	TC04	C	Main Turbine Fails to Trip
1	-	N (RO)	Reduce power to 80% (at 10%/HR)
2	-	R (RO, BOP)	Runback (from MFP trip below)
3	RX07A	I (RO)	PZR pressure channel fails high
4	FW05A	C (BOP)	Main Feed Pump Trips
5	CV16 100%	C (RO)	Letdown relief valve fails during runback
6	RX11B	I (BOP)	PT 1-73 fails high
7	TH13B 10%	M (All)	#2 S/G tube leak at 100 gpm
			Terminate at RCS depressurization

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

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

Event Description: Reduce Power to 80%

Time	Position	Applicant's Actions or Behavior
		The following steps are from GO-5
	US	REVIEW of Precautions and Limitations section 3.0 has been completed.
	US	NOTIFY RADCON of impending load reduction.
	US/CRO	NOTIFY CON DI operators of load reduction and to remove beds as needed.
	US	NOTIFY Load Dispatcher of impending load reduction.
	All	INITIATE a load reduction.
	All	MONITOR turbine load decreasing.
	OATC/CRO	MONITOR the following during the load reduction: T_{AVG} following T_{REF} program. All RPIs, group step counters for rod insertion limits and inoperable rods or rod misalignment, Loop ΔT, and NIS for correct power distribution and quadrant power tilts. Core AFD within $\pm$ 5% control band around the power level dependent target value. Valve position limit approximately 10% above the current governor control indication as turbine load is changed.
	US	CONTACT Reactor Engineering if AFD remains outside the AFD target band for approximately 30 min or more, as to why and when the AFD might be returned to the target band.
	CRO	WHEN reactor power is approximately 85 to 90%, THEN, PERFORM the following: IF three condensate demineralizer booster pumps are in service, THEN EVALUATE removing one (1) condensate demineralizer booster pump in accordance with 1,2-SO-2/3-1. IF two condensate demineralizer booster pumps are in service, THEN EVALUATE removing both condensate demineralizer booster pumps in accordance with 1,2-SO-2/3-1. STOP one (1) condensate booster pump in accordance with 1,2-SO-2/3-1.

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

Event Description: Pressurizer Pressure Channel Fails high

Time	Position	Applicant's Actions or Behavior
		The following steps are from AOP-I.04
	US	EVALUATE the following Tech Specs for applicability: 3.2.5, DNB Parameters 3.3.1.1 (3.3.1), Reactor Trip System Instrumentation 3.3.2.1 (3.3.2), Engineered Safety Feature Actuation System Instrumentation 3.3.3.5 Remote Shutdown Instrumentation 3.3.3.7, Accident Monitoring Instrumentation 3.4.3.2, RCS Relief Valves - Operating
	US	EVALUATE EPIP-1, Emergency Plan Classification Matrix.
	US/OATC	DIAGNOSE the failure: Pressurizer Pressure Instrument OR Controller Malfunction, 2.1
	OATC	MONITOR pressurizer pressure stable or trending to desired pressure. (NO)
	OATC	RESTORE pressurizer pressure USING manual control of the following: PZR Spray controllers PIC-68-340D (Loop 1) AND/OR PIC-68-340B (Loop 2) OR PIC-68-340A OR Pressurizer Heaters
	OATC	CHECK PI-68-340A indicates NORMAL. (NO)
	US/OATC	PERFORM the following: ENSURE LOOP TAVG ΔT REC/SEL selector switch XS-68-2B in LOOP 2, 3, or 4. ENSURE PRESS CONTROL SELECTOR switch XS-68-340D in PT-68-334 & 323. ENSURE PRESS REC CHANNEL SELECTOR XS-68-340B in PT-68-334, PT-68-323, or PT-68-322.
	OATC	WHEN malfunction has been identified AND isolated OR corrected, THEN CHECK PZR PRESS and PZR SPRAY controllers in AUTO.
	OATC	PERFORM the following: ENSURE Master Pzr Pressure Controller PIC–68–340A Output Percent Meter is less than 40%. ENSURE PZR PRESS. controller, PZR SPRAY controller, and PZR HTRS in AUTO.
	US	NOTIFY IM to remove failed pressurizer pressure channel from service USING appropriate Appendix: P-68-340 (P-455), Appendix A
		Critical Task: Pressurizer pressure controlled prior to reaching trip setpoint

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

Event Description: Main Feed Pump Trips

Time	Position	Applicant's Actions or Behavior
		The following step are from AOP-S.01
	US/CRO	DIAGNOSE the failure:
	US	Loss of One Main Feedwater Pump Above 76% Turbine Load (Unit 1 Only), Section 2.3
	All	VERIFY turbine runback to less than 72% load (~880 Mwe).
	OATC	VERIFY control rods inserting automatically to match T-avg and T-ref.
	CRO	ENSURE running main feedwater pump FULLY LOADED: Speed controller output at maximum. [M-3, SIC-46-20A or SIC-46-20B]
	CRO	ENSURE AFW pumps started: MDAFW Pumps RUNNING. [M-4] TDAFW Pump RUNNING. [M-3] TDAFW Pump LCVs OPEN. [M-3] MDAFW Pump recirculation valves CLOSED: [M-4] FCV-3-400, FCV-3-401
	CRO	ENSURE affected Main Feedwater Pump Turbine Condenser isolation valves CLOSED: Condenser A, FCV-2-205, Condensate Inlet, FCV-2-210, Condensate Outlet
	CRO/OATC	ENSURE the following steam generator blowdown valves CLOSED [M-4]: FCV-1-7 FCV-1-14 FCV-1-25 FCV-1-32
	CRO	RESTORE steam generator levels to program level.
	CRO	IF necessary to prevent S/G overfill, THEN CLOSE Turbine Driven Auxiliary Feedwater Pump LCVs: [M-3] LCV-3-174 LCV-3-173 LCV-3-172 LCV-3-175
		AOP-S.01 Continued

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

Event Description: Main Feed Pump Trips

Time	Position	Applicant's Actions or Behavior
		AOP-S.01 Continued
	All	ENSURE unit STABILIZED.
	CRO/OATC	DISPATCH operator to investigate cause of main feedwater pump trip.
	CRO	RESET Steam Dump Load Rejection Signal: PLACE HS-1-103A and 103B, Steam Dump Control, in OFF. PLACE HS-1-103D, Steam Dump Control, in RESET and VERIFY spring return to TAVG. VERIFY C-7, LOSS OF LOAD INTERLOCK alarm, DARK. [M-4A, 5E] ENSURE Steam Dump demand is ZERO. PLACE HS-1-103A and 103B, Steam Dump Control, in ON.
	CRO	RESTORE turbine control USING 0-GO-5 Appendix B, Turbine Runback Restoration.
	US/CRO	EVALUATE need to reduce number of running condensate pumps: EVALUATE stopping one condensate booster pump USING 1-SO-2/3-1. EVALUATE stopping cond demin booster pumps USING 1-SO-2/3-1.
		NOTE: To ensure unit is within capacity of one MFWP, power should be reduced below 60% (if all cond booster pumps and heater drain tank pumps in service) or 55% (if two cond booster pumps in service).
	All	INITIATE turbine load reduction to reduce steam flow below capacity of one MFWP USING 0-GO-5, Normal Power Operation.
	US/CRO	WHEN turbine load has been reduced to below capacity of one MFWP, THEN RESTORE the following systems to NORMAL: Auxiliary Feedwater USING 1-SO-3-2. Steam Generator Blowdown USING 1-SO-15-1.
	US	INITIATE repairs on failed equipment.
	US	GO TO appropriate plant procedure.
		Critical Task: Turbine load reduced to prevent reaching reactor trip setpoints on S/G levels

Op-Test No.: 1 Scenario No.: 2 Event No.: 5 Page 1 of 1

Event Description: Letdown Relief Valve Fails During Runback

Time	Position	Applicant's Actions or Behavior
		The following steps are from AR-M6-C-C-4
	OATC	MONITOR letdown pressure on [1-PI-62-81]
	OATC	MONITOR low press letdown relief tailpipe temp on [1-TI-62-75].
	OATC	MONITOR VCT and PRT levels.
	US/OATC	IF PRT level increasing, THEN ASSUME [1-62-662] is leaking through.
	OATC	IF US concurs, THEN ATTEMPT to reduce letdown pressure to allow closing of [1-62-662].
	US/OATC	IF pressure swings fail to seat [1-62-662] , THEN EVALUATE switching to Excess Letdown to allow 62-662 to cool off, in accordance with 1-SO-62-6, *Excess Letdown*.
	US/OATC	DETERMINE amount of leakage.
		Examiner Note: If the crew enters AOP-R.05, the procedure will eventually get them to the same point
		The following steps are from 0-SO-62-6
	OATC	ENSURE [1-FCV-62-93] is in MANUAL and OPERATE as needed to regulate charging flow to keep pressurizer level on program
	US	NOTIFY RADCON that Excess Letdown is being placed in service.
	CRO	ENSURE [1-FCV-70-143] CCS water to the excess letdown heat exchanger is OPEN
	CRO	ENSURE [1-FCV-70-85] Excess Letdown Heat Exchanger CCS flow control valve is OPEN.
	CRO	ENSURE [1-FI-70-84] is indicating greater than 230 gpm.
	OATC	ENSURE Excess Letdown 3-way divert valve [1-FCV-62-59] is in NORMAL
	OATC	OPEN [1-FCV-62-54] Cold Leg Loop #3 Excess Letdown isolation valve
	OATC	OPEN [1-FCV-62-55] Excess Letdown containment isolation valve.
	OATC	OPEN [1-FCV-62-56] slowly to increase excess letdown flow to desired amount, not to exceed 240°F heat exchanger outlet temperature, as indicated on 1-TI-62-58.
	US	NOTIFY RADCON that Excess Letdown has been placed in service.

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

Event Description: PT 1-73 Fails high

Time	Position	Applicant's Actions or Behavior
		The following steps are from AOP-I.08
	CRO	CHECK PI-1-73 indicates normal.
	OATC	PERFORM the following: PLACE rods in MAN.
	ALL	STABILIZE reactor power.
	CRO	EVALUATE placing Main Reg Valves in MAN to maintain SG level on program.
	CRO	PLACE steam dumps in STEAM PRESSURE mode.
	OATC	DETERMINE Program T-avg for current reactor power USING TI-28 Figure A.9 or ICS (NSSS / BOP, Program Reactor Average Temperature).
	OATC	RESTORE T-avg to program.
	US	NOTIFY IM to remove P-1-73 from service USING Appendix B, Removing Turbine Impulse Pressure Instrument Loop P-1-73 (P-505) from Service.
	CRO	CHECK PI-1-72 indicates normal.
	US	EVALUATE the following Tech Specs for applicability: 3.3.1.1 (3.3.1), Reactor Trip System Instrumentation
	US	GO TO appropriate plant procedure.
		Critical Task: Rods placed in manual prior to reaching RIL Lo-Lo limit or plant trip

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Page 1 of 9

Event Description: Steam Generator Tube Leak/Reactor Trip

Time	Position	Applicant's Actions or Behavior
		The following steps are from E-0
	OATC	VERIFY reactor TRIPPED: • Reactor trip breakers OPEN • Reactor trip bypass breakers OPEN or DISCONNECTED • Neutron flux DROPPING • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps.
	CRO	VERIFY turbine TRIPPED: • Turbine stop valves CLOSED.
	CRO	VERIFY shutdown boards ENERGIZED: VERIFY at least one train of shutdown boards ENERGIZED. VERIFY generator breakers OPEN 30 seconds after turbine trip.
	All	DETERMINE if SI actuated: Crew Should answer (NO) • ECCS pumps RUNNING. • Any SI alarm LIT [M-4D].
	CRO	VERIFY CCS pumps RUNNING: • Pump 1A-A (2A-A) • Pump 1B-B (2B-B) • Pump C-S.
	CRO	CHECK ERCW system operation: VERIFY at least four ERCW pumps RUNNING. VERIFY D/G ERCW supply valves OPEN.
		E-0 Continued

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Page 2 of 9

Event Description: Steam Generator Tube Leak/Reactor Trip

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	OATC	MONITOR ECCS operation
	OATC	VERIFY ECCS pumps RUNNING: • CCPs • RHR pumps • SI pumps
	OATC	VERIFY CCP flow through CCPIT.
	OATC	CHECK RCS pressure less than 1500 psig.
	OATC	VERIFY SI pump flow.
	OATC	CHECK RCS pressure less than 300 psig. (NO)
	OATC	VERIFY ESF systems ALIGNED:
	OATC	Phase A ACTUATED: • CONTAINMENT ISOLATION PHASE A TRAIN A alarm LIT [M-6C, B5]. • CONTAINMENT ISOLATION PHASE A TRAIN B alarm LIT [M-6C, B6].
	OATC	Containment Ventilation Isolation ACTUATED: • CONTAINMENT VENTILATION ISOLATION TRAIN A alarm LIT [M-6C, C5]. • CONTAINMENT VENTILATION ISOLATION TRAIN B alarm LIT [M-6C, C6].
		E-0 Continued

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Page 3 of 9

Event Description: Steam Generator Tube Leak/Reactor Trip

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	OATC	Train A status panel 6K: CNTMT VENT GREEN PHASE A GREEN
	OATC	Train B status panel 6L: CNTMT VENT GREEN PHASE A GREEN
	OATC	MONITOR containment spray NOT required: Phase B NOT ACTUATED AND Containment pressure less than 2.81 psig.
	CRO	CHECK if main steam lines should be isolated:
	ALL	CHECK if any of the following conditions have occurred: Any S/G pressure less than 600 psig AND STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive DARK [M-4A, A4] OR Phase B actuation OR Any S/G pressure drop at a rate greater than 100 psi in a 50-second period AND STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive LIT [M-4A, A4].
	CRO	VERIFY MSIVs and MSIV bypass valves CLOSED.
	CRO	VERIFY MFW isolation: MFW pumps TRIPPED MFW regulating valves CLOSED MFW regulating bypass valve controller outputs ZERO MFW isolation valves CLOSED MFW flow ZERO.
	CRO	VERIFY AFW pumps RUNNING: MD AFW pumps TD AFW pump.
		E-0 Continued

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Page 4 of 9

Event Description: Steam Generator Tube Leak/Reactor Trip

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	CRO	CHECK AFW valve alignment: VERIFY MD AFW LCVs in AUTO. VERIFY TD AFW LCVs OPEN. VERIFY MD AFW pump recirculation valves FCV-3-400 and FCV-3-401 CLOSED.
	CRO	DETERMINE if secondary heat sink available: CHECK total AFW flow greater than 440 gpm. CHECK narrow range level greater than 10% [25% ADV] in at least one S/G. CONTROL feed flow to maintain narrow range level between 10% [25% ADV] and 50% in all S/Gs.
	OATC	MONITOR RCS temperatures: • IF any RCP running, THEN CHECK T-avg stable at or trending to between 547F and 552F. OR • IF RCPs stopped, THEN CHECK T-cold stable at or trending to between 547F and 552F.
	US/CRO	DISPATCH personnel to perform EA-0-1, Equipment Checks Following ESF Actuation.
	OATC	CHECK pressurizer PORVs, safeties, and spray valves: Pressurizer PORVs CLOSED. Pressurizer safety valves CLOSED. Normal spray valves CLOSED. Power to at least one block valve AVAILABLE. At least one block valve OPEN.
	OATC	CHECK RCP trip criteria: CHECK the following: • At least one CCP OR SI pump RUNNING AND • RCS pressure less than 1250 psig. STOP RCPs.
		E-0 Continued

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Page 5 of 9

Event Description: Steam Generator Tube Leak/Reactor Trip

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	CRO	CHECK S/G secondary pressure boundaries INTACT: • All S/G pressures CONTROLLED or RISING • All S/G pressures greater than 140 psig.
	CRO	CHECK S/G tubes INTACT: CHECK all S/G narrow range levels CONTROLLED or DROPPING. CHECK following rad monitors, including available trends prior to isolation: • Main steam line NORMAL. • Condenser exhaust recorder RR-90-119 NORMAL. • S/G blowdown recorder RR-90-120 NORMAL. • Post-Accident Main Steam Line Radiation recorder RR-90-268B, points 3 (blue), 4 (violet), 5 (black), and 6 (brown) NORMAL [M-31 (back of M-30)] (NO)
	US/STA	PERFORM the following: MONITOR status trees. IF any S/G has level rising in an uncontrolled manner OR has abnormal radiation, THEN GO TO E-3, Steam Generator Tube Rupture.
		The following steps are from E-3
	OATC	MONITOR RCP trip criteria: CHECK the following: • At least one CCP OR SI pump RUNNING. AND • RCS pressure less than 1250 psig
	OATC	STOP RCPs.
	CRO	BYPASS condensate DI.
		E-3 Continued

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Page 6 of 9

Event Description: Steam Generator Tube Leak/Reactor Trip

Time	Position	Applicant's Actions or Behavior
		E-3 Continued
	CRO	MONITOR indications of Ruptured S/G(s): IDENTIFY Ruptured S/G(s) as indicated by any of the following: • Unexpected rise in any S/G narrow range level. OR • High radiation from any S/G sample. OR • RADCON survey of main steam lines and S/G blowdown lines. OR • High radiation on any main steamline radiation monitor.
	CRO	ISOLATE flow from Ruptured S/G(s): ADJUST Ruptured S/G(s) atmospheric relief controller setpoint to 87% in AUTO. (1040 psig) CHECK Ruptured S/G(s) atmospheric relief hand switch in P-AUTO and valve(s) CLOSED. CLOSE TD AFW pump steam supply from Ruptured S/G FCV-1-15 (S/G #1) or FCV-1-16 (S/G #4). VERIFY Ruptured S/G(s) blowdown isolation valves CLOSED. CLOSE Ruptured S/G(s) MSIV and MSIV bypass valve.
	CRO	MONITOR Ruptured S/G(s) level: CHECK narrow range level greater than 10% [25% ADV]. WHEN ruptured S/G level is greater than 10% [25% ADV], THEN STOP feed flow to ruptured S/G.
	CRO	VERIFY Ruptured S/G ISOLATED from Intact S/G(s): CHECK either of the following conditions SATISFIED: • Ruptured S/G MSIVs and MSIV bypass valves CLOSED OR • MSIV(s) and MSIV bypass valve(s) CLOSED on Intact S/G(s) to be used for RCS cooldown. CHECK TDAFW pump steam supply from ruptured S/G ISOLATED.
	CRO	CHECK Ruptured S/G pressure greater than 425 psig.
		E-3 Continued

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Page 7 of 9

Event Description: Steam Generator Tube Leak/Reactor Trip

Time	Position	Applicant's Actions or Behavior
		E-3 Continued
	OATC	CHECK at least one RCP RUNNING.
	CRO	INITIATE RCS cooldown: DETERMINE target core exit T/C temperature based on Ruptured S/G pressure: Value will depend on pressure at the time
	OATC	WHEN RCS pressure less than 1960 psig, THEN PERFORM the following: • BLOCK low steamline pressure SI. • CHECK STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive LIT. [M-4A, A4]
	CRO	DUMP steam to condenser from intact S/G(s) at maximum achievable rate: 1) ENSURE steam dumps in steam pressure mode. 2) ADJUST steam dump demand to FULLY OPEN three cooldown valves. 3) WHEN T-avg is less than 540°F, THEN BYPASS steam dump interlock.
	CRO	WHEN core exit T/Cs less than target temperature determined in Substep 9.a, THEN PERFORM the following: 1) STOP RCS cooldown. 2) MAINTAIN core exit T/Cs less than target temperature.
	CRO	MAINTAIN intact S/G narrow range levels: Greater than 10% [25% ADV] Between 20% [25% ADV] and 50%.
	OATC	MONITOR pressurizer PORVs and block valves: Power to block valves AVAILABLE Pressurizer PORVs CLOSED At least one block valve OPEN.
	OATC	RESET SI and CHECK the following: • AUTO S.I. BLOCKED permissive LIT [M-4A, C4] • S.I. ACTUATED permissive DARK [M-4A, D4].
		E-3 Continued

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Page 8 of 9

Event Description: Steam Generator Tube Leak/Reactor Trip

Time	Position	Applicant's Actions or Behavior
		E-3 Continued
	CRO	MONITOR AC busses energized from start busses.
	OATC	RESET Phase A and Phase B.
	OATC	CHECK control air established to containment: [Panel 6K and 6L] • 1-FCV-32-80 (2-FCV-32-81) Train A essential air OPEN • 1-FCV-32-102 (2-FCV-32-103) Train B essential air OPEN • 1-FCV-32-110 (2-FCV-32-111) non-essential air OPEN.
	OATC	DETERMINE if RHR pumps should be stopped: CHECK RHR pump suction aligned from RWST. CHECK RCS pressure greater than 300 psig. STOP RHR pumps and PLACE in A-AUTO. MONITOR RCS pressure greater than 300 psig.
	CRO/OATC	CHECK if RCS cooldown should be stopped: CHECK core exit T/Cs less than target temperature determined in Substep 9.a. STOP RCS cooldown. MAINTAIN core exit T/Cs less than target temperature.
	CRO	CHECK Ruptured S/G(s) pressure STABLE or RISING.
	OATC	CHECK RCS subcooling based on core exit T/Cs greater than 60°F.
	OATC	DEPRESSURIZE RCS to minimize break flow and to refill pressurizer: CHECK normal pressurizer spray AVAILABLE. INITIATE maximum available pressurizer spray. CHECK depressurization rate ADEQUATE. (NO)
	OATC	DEPRESSURIZE RCS USING one pressurizer PORV to minimize break flow and to refill pressurizer: CHECK at least one pressurizer PORV AVAILABLE
		E-3 Continued

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Page 9 of 9

Event Description: Steam Generator Tube Leak/Reactor Trip

Time	Position	Applicant's Actions or Behavior
		E-3 Continued
	OATC	OPEN one pressurizer PORV UNTIL any of the following conditions SATISFIED: Both of the following: 1) RCS pressure less than Ruptured S/G(s) pressure AND 2) Pressurizer level greater than 10% [20% ADV]. OR Pressurizer level greater than 65%. OR RCS subcooling based on core exit T/Cs less than 40F.
	OATC	CLOSE pressurizer PORV.
	OATC	CLOSE spray valve(s): Normal spray valves Auxiliary spray valves.
	OATC	CHECK RCS pressure RISING.
		Terminate The Exercise

Facility: Sequoyah **Scenario No.:** 3 **Op-Test No.:** 1

Examiners: _____ **Operators:** _____

Initial Conditions: 75% power (BOL), "A" MDAFW Pump is OOS, "A" SI Pump is OOS

Turnover: 10 gpd leakage in #3 S/G. Severe Thunderstorm Warning for Hamilton and Rhea Counties for the next 2 hours

Event No.	Malf. No.	Event Type*	Event Description
			Set up simulator to IC-14.
Pre-insert	RH01A	C	"A" RHR Pump Fails to start
Pre-insert	FW09B	C	"B" MDAFW Pump fails to start
Pre-insert	IOR ZDIHS 6767A	C	1B EDG ERCW VLV Fails to Open
Pre-insert	RP01C	C	Reactor Trip Breakers Fail to Open
1	-	N (All)	Place Con DI Pumps in Service
2	-	R (All)	Increase power to 90% expeditiously
3	RX05A	I (RO)	PZR Level Channel Fails High
4	CV01A	C (RO)	Running Charging Pump Trips
5	RX26A 100%	I (BOP)	Steam Pressure Channel Fails High
6	FW16A 100%	C (BOP)	FRV Fails Full Open
7		M (All)	ATWS, LOCA inserted after reactor tripped
			Terminate at E-1

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

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

Event Description: Place Con DI Pumps In Service

Time	Position	Applicant's Actions or Behavior
		The following steps are from 1-SO-2/3-1
	CRO	ENSURE the sufficient number of HWP(s) IN SERVICE.
	CRO	ENSURE CDBP oil levels sufficient
	CRO	VERIFY CDBP Area Cooler (1A Turbine Bldg Area Space Cooler) is IN SERVICE per Section 5.13.5.
	CRO	IF placing 1A Cond Demin Booster Pump IN SERVICE, THEN OPEN [1-FCV-2-290], 1A CDBP Suction Isol using [1-HS-2-290A]. VENT by OPENING 1A CDBP sensing line to [1-PI-2-296] THEN CLOSE the sensing line when pump is vented. PLACE [1-HS-2-292A], 1A CDBP Handswitch in the START position and verify 1A CDBP STARTS. VERIFY [1-FR-2-35], Condensate Flow is stable.
	CRO	IF placing 1B Cond Demin Booster Pump IN SERVICE, THEN OPEN [1-FCV-2-285], 1B CDBP Suction Isol using [1-HS-2-285A]. VENT by OPENING 1B CDBP sensing line to [1-PI-2-294] THEN CLOSE the sensing line when pump is vented. PLACE [1-HS-2-287A], 1B CDBP Handswitch in the START position and verify 1B CDBP STARTS. VERIFY [1-FR-2-35], Condensate Flow is stable.
	CRO	IF placing 1C Cond Demin Booster Pump IN SERVICE, THEN OPEN [1-FCV-2-280], 1C CDBP Suction Isol using [1-HS-2-280A]. VENT by OPENING 1C CDBP sensing line to [1-PI-2-284] THEN CLOSE the sensing line when pump is vented. PLACE [1-HS-2-282A], 1C CDBP Handswitch in the START position and verify 1C CDBP STARTS. VERIFY [1-FR-2-35], Condensate Flow is stable.

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

Event Description: Increasing power to 90% expeditiously

Time	Position	Applicant's Actions or Behavior
		The following steps are from GO-5
	CRO	PRIOR to increasing turbine load above 77%: ENSURE the following: LCV-6-106A and -106B are controlling properly. LCV-6-105A and -105B are CLOSED
	US	RECORD power ascension ramp rate from TI-40. _____
	All	CONTINUE the power ascension to 90% reactor power.
	OATC	IF diluting the RCS to increase T_{AVG}, THEN CONTINUE dilution and increase turbine load to maintain T_{REF} with T_{AVG}.
	CRO	MONITOR the turbine load increasing and MAINTAIN valve position limit approximately 10% above the current governor control indication as turbine load is changed.
	CRO	WHEN greater than 77% Turbine Load, THEN VERIFY [PIS-47-13RLY1] light [1], 'Turbine Runback From Loss of 1 MFP' is illuminated on Panel L-262.
	CRO	WHEN greater than 82% Turbine Load, THEN VERIFY the following relay lights are illuminated on Panel L-262: [PIS-47-13RLY2], Turbine Runback From #3HDT. [2] [PIS-47-13RLY 3], NPSH Protection VLV-6-106B closes on #3 HDT pump trip. [3]
	US/CRO	WHEN approximately 85 to 90% reactor power OR when determined by Unit SRO (if power raised above 90%), THEN ENSURE third condensate booster pump in service in accordance with 1,2-SO-2/3-1. [C.2]

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

Event Description: PZR Level Channel Fails High

Time	Position	Applicant's Actions or Behavior
		The following steps are from AOP-I.04
	US	EVALUATE the following Tech Specs for applicability: 3.2.5, DNB Parameters 3.3.1.1 (3.3.1), Reactor Trip System Instrumentation 3.3.2.1 (3.3.2), Engineered Safety Feature Actuation System Instrumentation 3.3.3.5 Remote Shutdown Instrumentation 3.3.3.7, Accident Monitoring Instrumentation 3.4.3.2, RCS Relief Valves - Operating
	US	EVALUATE EPIP-1, Emergency Plan Classification Matrix.
	US/OATC	DIAGNOSE the failure: Pressurizer Pressure Instrument OR Controller Malfunction, 2.1
	OATC	CHECK LI-68-339 indicates NORMAL. (NO)
	OATC	PERFORM the following: ENSURE LEVEL CONTROL CHANNEL SELECTOR switch XS-68-339E in LT-68-335 & 320. ENSURE LEVEL REC CHANNEL SELECTOR switch XS-68-339B in LT-68-320 or LT-68-335.
	OATC	CHECK letdown IN SERVICE.
	OATC	ENSURE pressurizer heaters restored to service.
	US/CRO	NOTIFY IM to remove failed pressurizer level channel from service USING appropriate Appendix: E L-68-339 (L-459)
	US	GO TO appropriate plant procedure.

Op-Test No.: 1 Scenario No.: 3 Event No.: 4 Page 1 of 3

Event Description: Running Charging Pumps Trips

Time	Position	Applicant's Actions or Behavior
		The following steps are from 1-AR-M6-C-D3
	OATC	CHECK charging line flow on [1-FI-62-93A].
	OATC	IF Charging flow is fluctuating along with CCP discharge pressure and/or motor amps indicating gas intrusion in pump casing/piping THEN (NO)
	OATC	IF abnormal charging flow is caused by pressurizer level channel failure, THEN (NO)
	OATC	IF Charging flow is High, THEN (NO)
	OATC	IF charging flow is Low, THEN PERFORM the following: IF PZR level is above program level, THEN (NO) IF CCP tripped or failed, THEN PERFORM the following: 1. IF Thermal Barrier flow is present, THEN A. VERIFY 1-LCV-62-132 and -133 OPEN and VCT level > 8% OR 1-LCV-62-135 AND/OR 1-LCV-62-136 OPEN. B. ANNOUNCE pump start over PA AND START the standby CCP and check for proper operation. 2. IF thermal barrier flow is NOT present or is lost after pump trip, THEN (NO) 3. REESTABLISH charging and letdown in accordance with 1-SO-62-1, *Chemical & Volume Control System.*
		The following steps are from 1-SO-62-1
	OATC	ENSURE following valves are CLOSED: 1-FCV-62-73, Letdown Orifice Isol 1-FCV-62-72, Letdown Orifice Isol 1-FCV-62-74, Letdown Orifice Isol 1-FCV-62-84, Auxiliary Spray 1-FCV-62-86, Normal Charging 1-FCV-62-85, Alternate Charging
		1-SO-62-1 Continued

Op-Test No.: 1 Scenario No.: 3 Event No.: 4 Page 2 of 3

Event Description: Running Charging Pumps Trips

Time	Position	Applicant's Actions or Behavior
		1-SO-62-1 Continued
	OATC	ENSURE following valves are OPEN: 1-FCV-62-90, Charging Isol 1-FCV-62-91, Charging Isol 1-FCV-62-77, Letdown Isol 1-FCV-62-69, Letdown Isol 1-FCV-62-70, Letdown Isol
	OATC	IF CCP is not running, THEN PERFORM the following: (N/A)
	OATC	OPEN one of the following charging isolation valves (N/A the other): [1-FCV-62-86] Normal Charging. [1-FCV-62-85] Alternate Charging.
	OATC	ADJUST [1-HIC-62-93A] and [1-HIC-62-89A] to establish 6-11 gpm per RCP.
	OATC	ENSURE following seal water return valves are OPEN.1-FCV-62-61, 1-FCV-62-63
	OATC	PLACE [1-HIC-62-78] in MANUAL, AND OPEN [1-TCV-70-192] to ~50%.
	OATC	PLACE [1-HIC-62-81A] in MANUAL, AND ADJUST [1-PCV-62-81] to 50-60% OPEN (40-50% output).
	OATC	OPEN one or more of the Letdown Orifice Isolation Valves: (N/A one(s) not used) 1-FCV-62-72, Letdown Orifice Isol 1-FCV-62-73, Letdown Orifice Isol 1-FCV-62-74, Letdown Orifice Isol
	OATC	ADJUST [1-HIC-62-81A] to obtain desired letdown pressure as indicated on [1-PI-62-81].
	OATC	PLACE [1-HIC-62-81A] in AUTO.
	OATC	ADJUST [1-HIC-62-78A] to obtain desired letdown temperature, as indicated on [1-TI-62-78].
	OATC	PLACE [1-HIC-62-78A] in AUTO.
	OATC	IF necessary to stabilize letdown temperature due to oscillations in CCS flow, THEN PERFORM following to gain control of CCS flow through letdown heat exchanger (N/A)
	OATC	IF Mixed Bed Hi Temperature Bypass valve [1-TCV-62-79], auto bypasses DI on high temperature, THEN (N/A)
		1-SO-62-1 Continued

Op-Test No.: 1 Scenario No.: 3 Event No.: 4 Page 3 of 3

Event Description: Running Charging Pumps Trips

Time	Position	Applicant's Actions or Behavior
		1-SO-62-1 Continued
	OATC	ADJUST charging and letdown as needed to maintain RCP seal injection flow and desired PZR level.
	OATC	IF PZR level is on program and auto operation is desired, THEN PLACE [1-HIC-62-93A] in AUTO.
	CRO	PERFORM Independent Verification for following valve(s) that were OPENED: (N/A one(s) not used). 1-FCV-62-90, Charging Isol 1-FCV-62-91, Charging Isol 1-FCV-62-77, Letdown Isol 1-FCV-62-69, Letdown Isol 1-FCV-62-70, Letdown Isol 1-FCV-62-72, Letdown Orifice Isol 1-FCV-62-73, Letdown Orifice Isol 1-FCV-62-74, Letdown Orifice Isol
		Critical task: Restore charging and letdown prior to VCT level reaching 93% and/or PZR level reaching 25%

Op-Test No.: 1 Scenario No.: 3 Event No.: 5 Page 1 of 1

Event Description: Steam Pressure Channel Fails High

Time	Position	Applicant's Actions or Behavior
		The following steps are from AOP-I.06
	US	EVALUATE the following Tech Specs for applicability: 3.3.1.1 (3.3.1), Reactor Trip System Instrumentation 3.3.2.1 (3.3.2), Engineered Safety Feature Actuation System Instrumentation 3.3.3.5, Remote Shutdown Instrumentation 3.3.3.7, Accident Monitoring Instrumentation
	US/CRO	DIAGNOSE the failure: S/G (steamline) pressure instrument malfunction, Section 2.1
	CRO	VERIFY unaffected steam flow channel SELECTED: (NO) S/G-1, XS-1-3D
	CRO	PERFORM the following: PLACE affected level controller(s) in MANUAL: FIC-3-35A, S/G 1
	CRO	MATCH steam flow and feedwater flow on affected S/G USING main feedwater regulating valve controller(s).
	CRO/OATC	TRANSFER associated Steam Flow selector switch to alternate channel:
	US	NOTIFY IM to remove failed S/G pressure instrument from service USING appropriate Appendix: A
	US	GO TO appropriate plant procedure.
		Critical Task: Restore S/G level to the program band prior to reaching reactor trip setpoints

Op-Test No.: 1 Scenario No.: 3 Event No.: 6 Page 1 of 1

Event Description: FRV Fails Full Open

Time	Position	Applicant's Actions or Behavior
		The following steps are from AOP-S.01
	CRO	DIAGNOSE the failure: IF... Loss of Normal Feedwater Control, Section 2.1
	CRO	RESTORE steam generator level(s) to program: PLACE affected level controller(s) in MANUAL: FIC-3-35A, S/G-1 CONTROL feedwater flow on affected S/G(s) USING main feedwater regulating valve controller(s) to restore level to program.
	ALL	IF loss of steam generator level is imminent, THEN TRIP the reactor and GO TO E-0, Reactor Trip or Safety Injection.
		The following steps are from E-0
	OATC	VERIFY reactor TRIPPED: (NO) • Reactor trip breakers OPEN • Reactor trip bypass breakers OPEN or DISCONNECTED • Neutron flux DROPPING • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps.
	ALL	TRIP reactor. IF reactor CANNOT be tripped, THEN PERFORM the following: a. MONITOR status trees. b. GO TO FR-S.1, Nuclear Power Generation/ATWS.

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Page 1 of 8

Event Description: ATWS - LOCA

Time	Position	Applicant's Actions or Behavior
		The following steps are from FR-S.1
	OATC	VERIFY reactor TRIPPED: (NO) • Reactor trip breakers OPEN • Reactor trip bypass breakers OPEN or DISCONNECTED • Neutron flux DROPPING • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps.
	OATC	TRIP reactor.
	OATC	IF reactor trip breakers will NOT open, THEN INSERT control rods at maximum rate.
	CRO	VERIFY turbine TRIPPED: ALL turbine stop valves CLOSED.
	CRO	CHECK AFW System operation: MD AFW pumps RUNNING TD AFW pump RUNNING as necessary. MD AFW LCVs in AUTO. TD AFW LCVs OPEN. MD AFW pump recirculation valves FCV-3-400 and FCV-3-401 CLOSED.
	OATC/CRO	INITIATE emergency boration of RCS: ENSURE at least one CCP RUNNING. EMERGENCY BORATE RCS USING EA-68-4, Emergency Boration VERIFY charging flow path established. CHECK pressurizer pressure less than 2335 psig.
	OATC/CRO	VERIFY Containment Purge isolated: VERIFY containment purge and vent dampers (System 30) CLOSED. [Panel 6K and 6L]
		FR-S.1 Continued

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Page 2 of 8

Event Description: ATWS - LOCA

Time	Position	Applicant's Actions or Behavior
		FR-S.1 Continued
	OATC/CRO	MONITOR SI NOT actuated: S.I. ACTUATED permissive DARK [M-4A, D4]. CHECK reactor and turbine trip status: Reactor TRIPPED. Turbine TRIPPED.
	ALL	MONITOR reactor subcritical: Power range channels less than 5%. Intermediate range SUR NEGATIVE. GO TO Note prior to Step 19.
	OATC	MONITOR boration termination criteria: NOTIFY Chem Lab to sample RCS boron concentration. CHECK shutdown margin ADEQUATE. WHEN emergency boration is no longer needed, THEN STOP emergency boration USING EA-68-4, Emergency Boration. RETURN TO procedure and step in effect.
		Examiner Note: LOCA will be inserted after the reactor is tripped
		Critical Task: Insert negative reactivity into the core by any one of the following before completing step 4 of FR-S.1, De-energize rod drive mg sets, insert control rods, establish emergency boration flow
		The following steps are from E-0
	OATC	VERIFY reactor TRIPPED: • Reactor trip breakers OPEN • Reactor trip bypass breakers OPEN or DISCONNECTED • Neutron flux DROPPING • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps.
	CRO	VERIFY turbine TRIPPED: • Turbine stop valves CLOSED.
		E-0 Continued

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Page 3 of 8

Event Description: ATWS - LOCA

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	CRO	VERIFY shutdown boards ENERGIZED: VERIFY at least one train of shutdown boards ENERGIZED. VERIFY generator breakers OPEN 30 seconds after turbine trip.
	All	DETERMINE if SI actuated: Crew Should answer (NO) • ECCS pumps RUNNING. • Any SI alarm LIT [M-4D].
	CRO	**VERIFY** CCS pumps RUNNING: • Pump 1A-A (2A-A) • Pump 1B-B (2B-B) • Pump C-S.
	CRO	**CHECK** ERCW system operation: **VERIFY** at least four ERCW pumps RUNNING. **VERIFY** D/G ERCW supply valves OPEN.
	OATC	**MONITOR** ECCS operation
	OATC	**VERIFY** ECCS pumps RUNNING: • CCPs • RHR pumps • SI pumps
	OATC	**VERIFY** CCP flow through CCPIT.
	OATC	**CHECK** RCS pressure less than 1500 psig.
	OATC	**VERIFY** SI pump flow.
	OATC	**CHECK** RCS pressure less than 300 psig. (NO)
	OATC	**VERIFY** ESF systems ALIGNED:
		E-0 Continued

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Page 4 of 8

Event Description: ATWS - LOCA

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	OATC	Phase A ACTUATED: • CONTAINMENT ISOLATION PHASE A TRAIN A alarm LIT [M-6C, B5]. • CONTAINMENT ISOLATION PHASE A TRAIN B alarm LIT [M-6C, B6].
	OATC	Containment Ventilation Isolation ACTUATED: • CONTAINMENT VENTILATION ISOLATION TRAIN A alarm LIT [M-6C, C5]. • CONTAINMENT VENTILATION ISOLATION TRAIN B alarm LIT [M-6C, C6].
	OATC	Train A status panel 6K: CNTMT VENT GREEN PHASE A GREEN
	OATC	Train B status panel 6L: CNTMT VENT GREEN PHASE A GREEN
	OATC	MONITOR containment spray NOT required: Phase B NOT ACTUATED AND Containment pressure less than 2.81 psig.(NO)
		E-0 Continued

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Page 5 of 8

Event Description: ATWS - LOCA

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	OATC	PERFORM the following: ENSURE containment spray INITIATED: Containment spray pumps RUNNING. Containment spray header isolation valves FCV-72-39 and FCV-72-2 OPEN. Containment spray recirculation valves to RWST FCV-72-34 and FCV-72-13 CLOSED. Containment spray header flow greater than 4750 gpm per train. Panel 6E LIT. ENSURE Phase B valves CLOSED: • Panel 6K PHASE B GREEN. • Panel 6L PHASE B GREEN. STOP RCPs. MONITOR containment air return fans: RECORD present time. _____ WHEN 10 minutes have elapsed, THEN ENSURE containment air return fans are running.
	CRO	CHECK if main steam lines should be isolated:
	ALL	CHECK if any of the following conditions have occurred: Any S/G pressure less than 600 psig AND STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive DARK [M-4A, A4] OR Phase B actuation OR Any S/G pressure drop at a rate greater than 100 psi in a 50-second period AND STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive LIT [M-4A, A4].
	CRO	VERIFY MSIVs and MSIV bypass valves CLOSED.
		E-0 Continued

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Page 6 of 8

Event Description: ATWS - LOCA

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	CRO	VERIFY MFW Isolation: MFW pumps TRIPPED MFW regulating valves CLOSED MFW regulating bypass valve controller outputs ZERO MFW isolation valves CLOSED MFW flow ZERO.
	CRO	VERIFY AFW pumps RUNNING: MD AFW pumps TD AFW pump.
	CRO	CHECK AFW valve alignment: VERIFY MD AFW LCVs in AUTO. VERIFY TD AFW LCVs OPEN. VERIFY MD AFW pump recirculation valves FCV-3-400 and FCV-3-401 CLOSED.
	CRO	DETERMINE if secondary heat sink available: CHECK total AFW flow greater than 440 gpm. CHECK narrow range level greater than 10% [25% ADV] in at least one S/G. CONTROL feed flow to maintain narrow range level between 10% [25% ADV] and 50% in all S/Gs.
	OATC	MONITOR RCS temperatures: • IF any RCP running, THEN CHECK T-avg stable at or trending to between 547F and 552F. OR • IF RCPs stopped, THEN CHECK T-cold stable at or trending to between 547F and 552F.
	US/CRO	DISPATCH personnel to perform EA-0-1, Equipment Checks Following ESF Actuation.
		E-0 Continued

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Page 7 of 8

Event Description: ATWS - LOCA

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	OATC	CHECK pressurizer PORVs, safeties, and spray valves: Pressurizer PORVs CLOSED. Pressurizer safety valves CLOSED. Normal spray valves CLOSED. Power to at least one block valve AVAILABLE. At least one block valve OPEN.
	OATC	CHECK RCP trip criteria: CHECK the following: • At least one CCP OR SI pump RUNNING AND • RCS pressure less than 1250 psig. (YES) STOP RCPs.
	CRO	CHECK S/G secondary pressure boundaries INTACT: • All S/G pressures CONTROLLED or RISING • All S/G pressures greater than 140 psig.
	CRO	CHECK S/G tubes INTACT: CHECK all S/G narrow range levels CONTROLLED or DROPPING. CHECK following rad monitors, including available trends prior to isolation: • Main steam line NORMAL. • Condenser exhaust recorder RR-90-119 NORMAL. • S/G blowdown recorder RR-90-120 NORMAL. • Post-Accident Main Steam Line Radiation recorder RR-90-268B, points 3 (blue), 4 (violet), 5 (black), and 6 (brown) NORMAL [M-31 (back of M-30)]
		E-0 Continued

Op-Test No.: ___ Scenario No.: ____ Event No.: _____ Page 8 of 8

Event Description:

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	US/OATC	CHECK if RCS is INTACT: (NO) • Containment pressure NORMAL • Containment sump level NORMAL • TS-30-31 LOWER COMPT TEMP HIGH alarm DARK [M-5C, B1] • Upper containment high range rad monitors RM-90-271 and RM-90-272 NORMAL [M-30] • Lower containment high range rad monitors RM-90-273 and RM-90-274 NORMAL [M-30] • Containment rad recorders RR-90-112 and RR-90-106 NORMAL [M-12] (prior to isolation).
	US/STA	PERFORM the following: a. MONITOR status trees. b. GO TO E-1, Loss of Reactor or Secondary Coolant.
		Terminate the exercise

Facility: Sequoyah **Scenario No.:** SB **Op-Test No.:** 1

Examiners: _____ **Operators:** _____

Initial Conditions: 100% power (BOL), "A" MDAFW Pump is OOS, "A" SI Pump is OOS

Turnover: 10 gpd leakage in #3 S/G, Severe Thunderstorm Warning for Hamilton and Rhea Counties for the next 2 hours, work must be performed on PCV-62-81 controller.

Event No.	Malf. No.	Event Type*	Event Description
			Set up simulator to IC- 16.
Preinsert	EG03A	C	1A EDG fails to auto start
Preinsert	RD09	C	Rods fail to move in Auto
Preinsert	RHR10B 100%	C	RHR Check Valve Leakage Failure
Preinsert	TC04	C	Turbine Fails to Trip
1	-	N (RO)	Place Excess Letdown in Service
2	-	R (RO, BOP)	Reduce Power to 95% for turbine valve testing
3	RX02A1	I (RO)	68-14A Cold leg RTD fails
4	RC05 25%	C (RO)	68-334 PZR Relief valve fails partially open
5	RX21	I (BOP)	PT 1-33 fails low
6	AN_OV_ 697 AN_OV_ 705	C (BOP)	Seismic Alarms (Earthquake)
7	RHR08B 25%	M (All)	LOCA Outside Containment

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

Op-Test No.: 1 Scenario No.: SB Event No.: 1 Page 1 of 1

Event Description: Place Excess Letdown in Service

Time	Position	Applicant's Actions or Behavior
		The Following steps are from 1-SO-62-6
	OATC	ENSURE [1-FCV-62-93] is in MANUAL and OPERATE as needed to regulate charging flow to keep pressurizer level on program.
	OATC	NOTIFY RADCON that Excess Letdown is being placed in service.
	CRO	ENSURE [1-FCV-70-143] CCS water to the excess letdown heat exchanger is OPEN.
	CRO	ENSURE [1-FCV-70-85] Excess Letdown Heat Exchanger CCS flow control valve is OPEN.
	CRO	ENSURE [1-FI-70-84] is indicating greater than 230 gpm.
	OATC	ENSURE Excess Letdown 3-way divert valve [1-FCV-62-59] is in NORMAL
	OATC	IF less than 100 psig in RCS and [1-FCV-62-63] is CLOSED and excess letdown will be aligned for NORMAL operation, THEN 1-FCV-62-53, RCP's Seal Bypass 1-FCV-62-9, No. 1 Seal Return 1-FCV-62-22, No. 2 Seal Return 1-FCV-62-35, No. 3 Seal Return 1-FCV-62-48, No. 4 Seal Return
	OATC	ENSURE [1-FCV-62-63] is OPEN
	OATC	OPEN [1-FCV-62-54] Cold Leg Loop #3 Excess Letdown isolation valve.
	OATC	OPEN [1-FCV-62-55] Excess Letdown containment isolation valve.
	OATC	OPEN [1-FCV-62-56] slowly to increase excess letdown flow to desired amount, not to exceed 240°F heat exchanger outlet temperature, as indicated on 1-TI-62-58.
	US	NOTIFY RADCON that Excess Letdown has been placed in service.

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

Event Description: Reduce Power to 95% for Turbine Valve Testing

Time	Position	Applicant's Actions or Behavior
		The following steps are from GO-5
	US	REVIEW of Precautions and Limitations section 3.0 has been completed
	US/CRO	NOTIFY RADCON of impending load reduction.
	CRO	NOTIFY CON DI operators of load reduction and to remove beds as needed
	US	NOTIFY Load Dispatcher of impending load reduction
	ALL	INITIATE a load reduction
		NOTE 4 The following general approach should be used during power reduction: (a) borate RCS to reduce RCS T_{AVG} within limits of T_{REF}, (b) reduce turbine load to match T_{REF} with T_{AVG} (c) periodically take rod control to MANUAL from AUTO and insert the bank to move AFD near the target value, (d) return rod control to AUTO when not using the bank to control AFD, and (e) repeat the above as necessary to accomplish the load change.
	US/CRO	MONITOR turbine load decreasing
	OATC	MONITOR the following during the load reduction: [a] T_{AVG} following T_{REF} program. [b] All RPIs, group step counters for rod insertion limits and inoperable rods or rod misalignment, Loop ΔT, and NIS for correct power distribution and quadrant power tilts. [c] Core AFD within ± 5% control band around the power level dependent target value. NOTE Valve position limit and governor control meter are displayed on EHC Display panel 1, 2-XX-047-2000 (M-2). [d] Valve position limit approximately 10% above the current governor control indication as turbine load is changed.
	US	**CONTACT** Reactor Engineering if AFD remains outside the AFD target band for approximately 30 min or more, as to why and when the AFD might be returned to the target band.

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

Event Description: Cold Leg RTD Fails

Time	Position	Applicant's Actions or Behavior
		The following steps are from AOP-I.02
	US	EVALUATE the following Tech Specs for applicability: 3.3.1.1 (3.3.1), Reactor Trip System Instrumentation 3.3.2.1 (3.3.2), Engineered Safety Feature Actuation System Instrumentation
	US/OATC	STABILIZE reactor power USING manual rod control. (Note: rods fail to move in AUTO)
	OATC	CHECK loop 1 temperature channel OPERABLE. (NO)
	OATC	PERFORM the following: PULL-TO-DEFEAT TAVG CHANNEL DEFEAT switch to LOOP 1 PULL-TO-DEFEAT ΔT CHANNEL DEFEAT switch to LOOP 1 PLACE LOOP TAVG ΔT REC/SEL switch in LOOP 2, 3, or 4 GO TO Step 7.
	US/CRO	NOTIFY IM to remove failed TAVG ΔT instrument loop from service USING appropriate Appendix: A
	OATC	RESTORE rod control to AUTO.
	US	GO TO appropriate plant procedure.
		Critical Task: Rods are left in Manual because of Rod control malfunction prior to exiting the AOP
		AOP-C.01 actions on the next page

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

Event Description: Cold Leg RTD Fails

Time	Position	Applicant's Actions or Behavior
		The following steps are from AOP-C.01
	US	EVALUATE the following Tech Specs for applicability: 3.1.1.1, Shutdown Margin - $T_{avg.}$ greater than 200°F 3.1.3.1, Movable Control Assemblies, Group Height 3.1.3.2, Position Indication Systems - Operating 3.1.3.5, Shutdown Rod Insertion Limit 3.1.3.6, Control Rod Insertion Limits 3.2, Power Distribution Limits (entire section)
	US/OATC	DIAGNOSE the failure: Failure of control bank to move in AUTO, Section 2.1
	OATC	ENSURE rod control in MAN.
	OATC	POSITION control rods to minimize $T_{avg.}$ - $T_{ref.}$ deviation.
	OATC	MONITOR following parameters to ensure core power distribution is within normal limits: Power range NIS $T_{avg.}$ and ΔT channels Incore T/Cs Delta flux (ΔI)
	OATC	CHECK ROD CONTROL SYSTEM URGENT FAILURE alarm LIT [M-4B, A6]. (NO)
	OATC	CHECK IRS INTERMED RANGE HI FLUX LVL ROD WITHDRAWAL STOP alarm LIT [M-4B, B2].
	US/CRO	NOTIFY MIG to initiate repairs on rod control and GO TO Step 19.
	ALL	RESTORE plant to stable conditions
	US	CHECK rod control repairs COMPLETE. (NO)
	US	WHEN rod control repairs COMPLETE, THEN RESTORE rod control to AUTO.
	US	GO TO appropriate plant procedure.

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

Event Description: PZR Relief Valve Fails Partially Open

Time	Position	Applicant's Actions or Behavior
		The following steps are from M5-A-E-2
	OATC	IF PZR pressure is less than 2315 psig (PORV reset) THEN ENSURE both power relief valves closed.
	OATC	CHECK temperature on PORV discharge line to determine which valve is leaking (M-4). [TI-68-331 (PORVs); TI-68-330 (SV-68-563); TI-68-329 (SV-68-564); TI-68-328 (SV-68-565)]
	OATC	CHECK 1-XX-68-363A "PZR PORV ACCOUSTIC MONITORS (M-4) to determine which PORV or safety valve is leaking
		Examiner Note: Operator should close associated PORV Block valve based on prudent operator actions
	OATC	IF leaking valve cannot be identified above, THEN OBTAIN SRO permission to determine which PORV is leaking by manipulating the respective block valves.
	OATC	MONITOR pressurizer relief tank pressure, temperature and level
	US	IF SRO deems necessary, THEN PERFORM 0-SI-OPS-068-137.0, RCS Water Inventory
		IF in MODE 4 or MODE 5 and a LOCA is identified, THEN GO TO AOP-R.02, Shutdown LOCA (MODE 4, or 5).
		IF a small RCS leak is indicated, THEN GO TO AOP-R.05, RCS Leak and Leak Source Identification
	US	EVALUATE Technical Specifications (3.4.2, 3.4.3, & 3.4.6.2).
		Critical Task: PZR PORV/Block valve is closed prior to RCS pressure reaching the reactor trip setpoint

Op-Test No.: 1 Scenario No.: SB Event No.: 5 Page 1 of 1

Event Description: PT 1-33 Fails Low

Time	Position	Applicant's Actions or Behavior
		The following steps are from AOP-S.01
	US/CRO	DIAGNOSE the failure: IF... Loss of Main Feedwater Pump Control, Section 2.2
	CRO	MAINTAIN feedwater pressure on program: PLACE affected MFP speed controller(s) in MANUAL: PC-46-20, MFPT 1A(2A) & 1B(2B) Speed Control. SIC-46-20A, MFPT 1A(2A) Speed Controller SIC-46-20B, MFPT 1B(2B) Speed Controller CONTROL speed on affected MFP(s) to restore feedwater pressure to program
	CRO	MAINTAIN steam generator level(s) on program.
	US/OATC	INITIATE repairs on failed equipment.
	US	GO TO appropriate plant procedure.
		Critical Task: Restore S/G levels to program band prior to reaching reactor trip setpoints

Op-Test No.: 1 Scenario No.: SB Event No.: 6 Page 1 of 1

Event Description: Earthquake

Time	Position	Applicant's Actions or Behavior
		The following steps are from AOP-N.05
	US	EVALUATE the following Technical Requirements (TRM) for applicability: 3.3.3.3, Seismic Instrumentation
	US	EVALUATE EPIP-1, Emergency Plan Classification Matrix.
	US/CRO	NOTIFY Duty Engineer to contact Civil Engineering and inform them of the Seismic Event.
	US	CONTACT National Earthquake Information Center (1-303-273-8500 (M-F daytime), or 8516 (off hours), or Duty Eng. pager @ home 8427, or 8428).
	ALL	DIAGNOSE event. IF...Seismic alarm received (XA-55-15B Widows D-1 and / or E-2 lit) AND with Earthquake "felt" or confirmed by National Earthquake Information Center. Section 2.2
	CRO/OATC	DISPATCH an operator to Unit 1 Auxiliary Instrument Room to perform the following: [C.1] CHECK 0-R-113, • Kinemetrics Condor Sys Seismic Alarm Panel (0-XA-52-86) AND • Recorder (0-XR-52-75) Panel for alarms and indications AND NOTIFY the control room of findings. RETRIEVE Seismic event printout from 0-R-113, Kinemetrics Condor Sys Seismic Printer Panel (0-PLOT-52-91) and deliver printout to SM.
	US	NOTIFY IM to perform SI-657, Retrieval of Earthquake records Following a Seismic Event.
	US	NOTIFY RAD CON to monitor radiological conditions in the following: plant area Low Level Radwaste Storage Facility Old Steam Generator Storage Facility (OSGSF)
	ALL	MONITOR the main control boards and annunciators for any abnormal conditions.
	CRO/OATC	PERFORM Appendix A, "CONTROL ROOM VERIFICATIONS".

Op-Test No.: 1 Scenario No.: SB Event No.: 7 Page 1 of 8

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior
		The following steps are from E-0
	OATC	VERIFY reactor TRIPPED: • Reactor trip breakers OPEN • Reactor trip bypass breakers OPEN or DISCONNECTED • Neutron flux DROPPING • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps.
	CRO	VERIFY turbine TRIPPED: • Turbine stop valves CLOSED.
	CRO	VERIFY shutdown boards ENERGIZED: VERIFY at least one train of shutdown boards ENERGIZED. VERIFY generator breakers OPEN 30 seconds after turbine trip.
	ALL	DETERMINE if SI actuated: Crew Should answer (NO) • ECCS pumps RUNNING. • Any SI alarm LIT [M-4D].
	CRO	VERIFY CCS pumps RUNNING: • Pump 1A-A (2A-A) • Pump 1B-B (2B-B) • Pump C-S.
	CRO	CHECK ERCW system operation: VERIFY at least four ERCW pumps RUNNING. VERIFY D/G ERCW supply valves OPEN.
		E-0 Continued

Op-Test No.: 1 Scenario No.: SB Event No.: 7 Page 2 of 8

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	OATC	MONITOR ECCS operation
	OATC	VERIFY ECCS pumps RUNNING: • CCPs • RHR pumps • SI pumps
	OATC	VERIFY CCP flow through CCPIT.
	OATC	CHECK RCS pressure less than 1500 psig.
	OATC	VERIFY SI pump flow.
	OATC	CHECK RCS pressure less than 300 psig. (NO)
	OATC	VERIFY ESF systems ALIGNED:
	OATC	Phase A ACTUATED: • CONTAINMENT ISOLATION PHASE A TRAIN A alarm LIT [M-6C, B5]. • CONTAINMENT ISOLATION PHASE A TRAIN B alarm LIT [M-6C, B6].
	OATC	Containment Ventilation Isolation ACTUATED: • CONTAINMENT VENTILATION ISOLATION TRAIN A alarm LIT [M-6C, C5]. • CONTAINMENT VENTILATION ISOLATION TRAIN B alarm LIT [M-6C, C6].
		E-0 Continued

Op-Test No.: 1 Scenario No.: SB Event No.: 7 Page 3 of 8

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	OATC	Train A status panel 6K: CNTMT VENT GREEN PHASE A GREEN
	OATC	Train B status panel 6L: CNTMT VENT GREEN PHASE A GREEN
	OATC	MONITOR containment spray NOT required: Phase B NOT ACTUATED AND Containment pressure less than 2.81 psig.
	CRO	CHECK if main steam lines should be isolated:
	ALL	CHECK if any of the following conditions have occurred: Any S/G pressure less than 600 psig AND STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive DARK [M-4A, A4] OR Phase B actuation OR Any S/G pressure drop at a rate greater than 100 psi in a 50-second period AND STEAMLINE PRESS ISOL/SI BLOCK RATE ISOL ENABLE permissive LIT [M-4A, A4].
	CRO	VERIFY MSIVs and MSIV bypass valves CLOSED.
	CRO	VERIFY MFW Isolation: MFW pumps TRIPPED MFW regulating valves CLOSED MFW regulating bypass valve controller outputs ZERO MFW isolation valves CLOSED MFW flow ZERO.
	CRO	VERIFY AFW pumps RUNNING: MD AFW pumps TD AFW pump.
		E-0 Continued

Op-Test No.: 1 Scenario No.: SB Event No.: 7 Page 4 of 8

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	CRO	CHECK AFW valve alignment: VERIFY MD AFW LCVs in AUTO. VERIFY TD AFW LCVs OPEN. VERIFY MD AFW pump recirculation valves FCV-3-400 and FCV-3-401 CLOSED.
	CRO	DETERMINE if secondary heat sink available: CHECK total AFW flow greater than 440 gpm. CHECK narrow range level greater than 10% [25% ADV] in at least one S/G. CONTROL feed flow to maintain narrow range level between 10% [25% ADV] and 50% in all S/Gs.
	OATC	MONITOR RCS temperatures: • IF any RCP running, THEN CHECK T-avg stable at or trending to between 547F and 552F. OR • IF RCPs stopped, THEN CHECK T-cold stable at or trending to between 547F and 552F.
	US/CRO	DISPATCH personnel to perform EA-0-1, Equipment Checks Following ESF Actuation.
	OATC	CHECK pressurizer PORVs, safeties, and spray valves: Pressurizer PORVs CLOSED. Pressurizer safety valves CLOSED. Normal spray valves CLOSED. Power to at least one block valve AVAILABLE. At least one block valve OPEN.
	OATC	CHECK RCP trip criteria: CHECK the following: • At least one CCP OR SI pump RUNNING AND • RCS pressure less than 1250 psig. STOP RCPs.
		E-0 Continued

Op-Test No.: 1 Scenario No.: SB Event No.: 7 Page 5 of 8

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	CRO	CHECK S/G secondary pressure boundaries INTACT: • All S/G pressures CONTROLLED or RISING • All S/G pressures greater than 140 psig.
	CRO	CHECK S/G tubes INTACT: CHECK all S/G narrow range levels CONTROLLED or DROPPING. CHECK following rad monitors, including available trends prior to isolation: • Main steam line NORMAL. • Condenser exhaust recorder RR-90-119 NORMAL. • S/G blowdown recorder RR-90-120 NORMAL. • Post-Accident Main Steam Line Radiation recorder RR-90-268B, points 3 (blue), 4 (violet), 5 (black), and 6 (brown) NORMAL [M-31 (back of M-30)] (NO)
	US/OATC	CHECK if RCS is INTACT: • Containment pressure NORMAL • Containment sump level NORMAL • TS-30-31 LOWER COMPT TEMP HIGH alarm DARK [M-5C, B1] • Upper containment high range rad monitors RM-90-271 and RM-90-272 NORMAL [M-30] • Lower containment high range rad monitors RM-90-273 and RM-90-274 NORMAL [M-30] • Containment rad recorders RR-90-112 and RR-90-106 NORMAL [M-12] (prior to isolation).
		E-0 Continued

Op-Test No.: 1 Scenario No.: SB Event No.: 7 Page 6 of 8

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	OATC	DETERMINE if ECCS flow should be reduced: CHECK RCS subcooling based on core exit T/Cs greater than 40□F. CHECK secondary heat sink: • Narrow range level in at least one S/G greater than 10%. OR • Total feed flow to S/Gs greater than 440 gpm. CHECK RCS pressure STABLE or RISING. (NO)
	STA	MONITOR status trees.
	CRO	MAINTAIN S/G narrow range levels: Greater than 10%. Between 10% and 50%.
	OATC	RESET SI and CHECK the following: • AUTO S.I. BLOCKED permissive LIT [M-4A, C4] • S.I. ACTUATED permissive DARK [M-4A, D4].
	CRO	MONITOR shutdown boards continuously energized.
	OATC	RESET Phase A and Phase B.
	OATC	CHECK control air established to containment: [Panel 6K and 6L] • 1-FCV-32-80 (2-FCV-32-81) Train A essential air OPEN • 1-FCV-32-102 (2-FCV-32-103) Train B essential air OPEN • 1-FCV-32-110 (2-FCV-32-111) non-essential air OPEN.
		E-0 Continued

Op-Test No.: 1 Scenario No.: SB Event No.: 7 Page 7 of 8

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior
		E-0 Continued
	CRO	VERIFY secondary radiation NORMAL: CHECK following rad monitors, including available trends prior to isolation: • Main steamline NORMAL • Condenser exhaust recorder RR-90-119 NORMAL • S/G blowdown recorder RR-90-120, NORMAL • Post-Accident Main Steam Line Radiation recorder RR-90-268B, points 3 (blue), 4 (violet), 5 (black), and 6 (brown) NORMAL. [M-31 (back of M-30)]
	ALL	NOTIFY Chem Lab to take S/G activity samples.
	ALL	NOTIFY RADCON to survey main steam lines and S/G blowdown.
	CRO	CHECK Auxiliary Building radiation NORMAL: (NO) Area rad monitor recorders RR-90-1A and RR-90-1B NORMAL. Vent monitor recorder 0-RR-90-101 NORMAL (prior to isolation).
	US	IF LOCA outside containment indicated by any of the following: • Loss of RCS inventory AND containment indications NORMAL, OR • RHR pipe break indicated by XI-74-43 or XI-74-45 LIT [M-6], OR • AUX BLDG HIGH ENERGY LINE BREAK alarm LIT [M-6D, E1], THEN GO TO ECA-1.2, LOCA Outside Containment.

Op-Test No.: 1 Scenario No.: SB Event No.: 7 Page 8 of 8

Event Description: LOCA Outside Containment

Time	Position	Applicant's Actions or Behavior
		The following steps are from ECA-1.2
	OATC	VERIFY proper valve alignment:
	OATC	VERIFY RHR suction from RCS FCV-74-1 and FCV-74-2 CLOSED.
	OATC	VERIFY RHR hot leg injection FCV-63-172 CLOSED.
	OATC	VERIFY Normal letdown isolation valves FCV-62-69 and FCV-62-70 CLOSED.
	OATC	VERIFY Excess letdown isolation valves FCV-62-54 and FCV-62-55 CLOSED.
	OATC/CRO	CHECK RCS pressure RISING. (NO)
	OATC	ATTEMPT to isolate break from RCS USING FCV-63-93:
	OATC	CLOSE RHR Train A cold leg injection valve FCV-63-93.
	OATC	CHECK RCS pressure RISING. (YES)
	US	ATTEMPT to identify and isolate break: DISPATCH Operations and Radcon personnel to attempt to identify break location.
		Terminate the exercise when RCS pressure is rising