Final Submittal

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

JUNE 7 - 16, 2004

1. As Given Simulator Scenario Operator Actions ES-D-2

Facility: Sequoyah Scenario No.: SB 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 stable for 48 hours IAW AOP-R.01, 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 (CRO)	Place Con DI Booster Pumps in Service
2	-	R (RO)	Increase power to 90%
3	RX05A	I (RO)	PZR Level Channel Fails High
4	RX26A 100%	I (BOP)	Steam Pressure Channel Fails High
5	CV01B	C (RO)	Running Charging Pump Trips
6	FW16A 100%	C (BOP)	FRV Fails Full Open
7	TH01A 0.1%	M (All)	ATWS, LOCA inserted after reactor tripped
			Terminate at FR-Z.1

* (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 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.
		Examiner Note: 2 Con DI pumps must be started simultaneously
	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.
		Feedback to crew: If AUO is dispatched to check pumps they are ready to start

Op-Test No.: 1 Scenario No.: SB 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.
		Feedback to Crew: If AUO is dispatched, Relay light is lit
	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]
		Feedback to Crew: If AUO is dispatched, Relay lights are lit
	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.: SB Event No.: 3 Page 1 of 1

Event Description: PZR Level Channel (68-339) Fails High 8:59 AM

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.: SB Event No.: 4 Page 1 of 1

Event Description: Steam Pressure Channel (1-2A) Fails High 8:59 AM

Time	Position	Applicant's Actions or Behavior
		Crew may enter AOP-I.06 first
		The following steps are from AOP-S.01
	CRO	RESTORE steam generator level(s) to program:
	CRO	PLACE affected level controller(s) in MANUAL: FIC-3-35A, S/G-1
	CRO	CONTROL feedwater flow on affected S/G(s) USING main feedwater regulating valve controller(s) to restore level to program.
	CRO	CHECK Steam Flow and Feed Flow Channels NORMAL. [M-4]
	CRO	TRANSFER associated Steam Flow or Feed Flow selector switch to alternate channel:
	CRO	MAINTAIN steam generator level(s) on program.
	CRO	VERIFY failure due to steam flow/feed flow instrument malfunction.
	CRO	PLACE main feedwater regulating valve(s) in AUTO.
	CRO	CHECK S/G pressure instruments NORMAL.
	US	GO TO AOP-I.06, Steam Generator Instrument Malfunction.
		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/OAT C	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.: SB Event No.: 5 Page 1 of 3

Event Description: Running Charging Pump (1B) Trips 8:59 AM

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) REESTABLISH charging and letdown in accordance with 1-SO-62-1, Chemical & Volume Control System.
		Feedback to crew: Overcurrent flag on the 1B CCP, smell of burnt insulation in the pump room
		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

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Event Description: Running Charging Pump (1B) 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

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Event Description: Running Charging Pump (1B) 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
	US	Applicable TS/TRM requirements 3.5.2 (YES), in LCO 3.0.3 3.1.2.4 (YES) 3.1.2.2 (NO)
		Critical task: Restore charging and letdown prior to VCT level reaching 93% and/or PZR level reaching 25% Critical task: Recognize entry into LCO 3.0.3
		Examiner Note: Will need to give time to evaluate TS to identify 3.0.3
	US	Contact Ops Supt inform 3.0.3 required S/D
	US	Contact MSS to inquire about status of 1A SI pump

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Event Description: FRV Fails Full Open 8:59 AM

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.

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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

Deleted: the RCS

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

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. Indications of LOCA, Ctmt temp, Ctmt moisture, EAM blue lights, Ctmt pressure
		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

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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 (YES) • 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

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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)
		Examiner Note: Crew should manually initiate SI prior to containment pressure reaching 1.54 psig
		Terminate the exercise at FR-Z.1 Transition

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 stable for 48 hours IAW AOP-R.01, 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- 16.
Preinsert	EG03A	C	1A EDG fails to auto start
Preinsert	RD09	C	Rods fail to move in Auto
Preinsert	MS04D	C	#4 S/G MSIV Fails to Close
Preinsert	CC09B	C	CCS Pump 1B-B Fails to Auto Start
Preinsert	TC04	C	Turbine Fails to Trip (Removed after operator manually trips turbine)
1	-	N (RO)	Swap Q-A/J-A ERCW pumps for inspection
2	-	R (~~RO~~ BOP)	Reduce Power to 95% for turbine valve testing
3	RX02A1	I (RO)	68-14A Cold leg RTD fails (ENSURE rods are in AUTO before inserting this failure)
4	SI04C	C (RO)	CLA Level Low (Put in during crew brief or after T.S. call)
5	ED08A	C (BOP)	Loss of 480V SD Board 1A1-A (Results in 1A-A pump tripping and 1B-B requiring manual start)
6	RX21	I (BOP)	PT 1-33 fails low
7	AN_OV_697 AN_OV_705		Seismic Alarms (Earthquake) (Outside AUO reports felt shaking at D/G Building)
8	MS02D	M (All)	#4 S/G Faulted Outside Containment

* (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: Swap Q-A/J-A ERCW Pumps IAW SO-67-1

Time	Position	Applicant's Actions or Behavior
		The Following steps are from 0-SO-67-1
	CRO	INDICATE pump(s) to be started and stopped on table below (N/A any others): Q-A/J-A
	US	ENSURE Chemistry Section has stopped chemical injection to applicable ERCW pump bays.
	CRO	IF starting "B" train pump, THEN OPEN [0-FCV-67-152]. (N/A)
	CRO	PERFORM the following: START desired pump, AND VERIFY control switch returns to A-AUTO
	CRO	ENSURE pump amperes normal
	CRO	STOP desired pump, AND VERIFY control switch returns to A-AUTO
	CRO	REPEAT steps [a] - [c] until all desired pumps are swapped.
	CRO	RECORD ERCW flow below, AND ENSURE flow through any strainer does not exceed 22,000 gpm (N/A any not applicable):
	CRO	ENSURE diesel power selector switches are selected for operable pumps, running pump preferred
	US	NOTIFY the Chem Lab Supervisor, that IF chemical injection into the pump bays of running ERCW pumps is required, THEN it may be started
		Note: Have OATC perform the task

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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.: 2 Event No.: 3 Page 1 of 2

Event Description: Cold Leg RTD (68-14A) Fails High

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. (NO)
	US	GO TO appropriate plant procedure.
		Feedback to Crew: IM's will report in ~45 minutes
		AOP-C.01 actions on the next page

Op-Test No.: 1 Scenario No.: 2 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.
		Feedback to Crew: IM's are gathering materials and will be there in ~ 25 minutes

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

Event Description: Cold Leg Accumulator Low Level/Pressure

Time	Position	Applicant's Actions or Behavior
		The following steps are from SO-63-1, Section 8.1
	OATC	ENSURE Power Checklist 1-63-1.01 complete.
	OATC	ENSURE Valve Checklist 1-63-1.06 complete.
	OATC	ENSURE Valve Checklist 1-63-1.07 complete.
		ENSURE at least one SI Pump operable or available.
	OATC	ENSURE RWST boron concentration between 2500 and 2700 ppm per Radiochemical Laboratory results.
	OATC	ENSURE [1-FCV-63-84] SIS Test Line to HUT is CLOSED.
	OATC	OPEN the following valves: 1-FCV-63-71, 1-FCV-63-23
	OATC	IF 1B-B SI pump is to be used to add makeup water to Accumulators, THEN PERFORM the following: ENSURE the following valves are OPEN: 1-FCV-63-3, 1-FCV-63-175, 1-FCV-63-152, 1-FCV-63-153
	OATC	START 1B-B SI pump using [1-HS-63-15A].
	OATC	IF adding makeup water to Accumulator 3, THEN PERFORM the following: ENSURE the following valves are CLOSED: 1-FCV-63-115, 1-FCV-63-95, 1-FCV-63-70
	OATC	OPEN [1-FCV-63-77] No. 3 CL Accum Water Makeup to begin filling No. 3 Accumulator.
	OATC	WHEN No. 3 Accumulator increases to desired level, THEN CLOSE [1-FCV-63-77].
		CAUTION Do not fill any other accumulators until No. 3 accumulator pressure and level are within the operability limits of 624-668 psig and 7615-7955 gallons.
	OATC	VERIFY No. 3 accumulator pressure and level are within Tech Spec limits.
	OATC	VERIFY ACCUMULATOR 3 PRESSURE HI-LOW and ACCUMULATOR 3 LEVEL HI-LOW alarms are CLEAR. (1-XA-55-6D windows C-1 and C-2)
	OATC	CLOSE the following valves: 1-FCV-63-71, 1-FCV-63-23
	OATC	ENSURE SI pump has run for a minimum of 20 minutes.
	OATC	STOP running SI pump.
	OATC	IF Unit 1 is in Modes 1-3, THEN ENSURE SI Pump in A-AUTO (N/A pump not started): 1-HS-63-10A, 1-HS-63-15A
	OATC	IF SI Pump discharge piping depressurization NOT previously performed, THEN DEPRESSURIZE piping using 1-SO-63-5
		Feedback from Chemistry is that sample valves were not fully closed from previous sample, they are closed now

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

Event Description: Loss of 480V Shutdown Board 1A1-A

Time	Position	Applicant's Actions or Behavior
		The following steps are from AOP-P.05
	OATC	ENSURE 1B-B CCS Pump SUPPLYING A Train. (Critical task)
	OATC	MONITOR REACTOR COOLANT PUMPS MOTOR THRUST BEARING TEMP HIGH alarm DARK [1-M-5B, E-3].
	OATC	DISPATCH operators with radios to Aux Bldg, 734' elev, Shutdown Board Room to DETERMINE cause of failure.
		EVALUATE starting additional CRDM cooling fans based on reactor cavity air temperature (T1014A) and RPI indications USING 0-SO-30-6.
	OATC	CHECK Aux Control Air pressure greater than 90 psig
	OATC	DISPATCH operators locally to CHECK control air pressure greater than 90 psig.
	OATC	ENSURE affected Battery Chargers ALIGNED to AVAILABLE source USING 0-SO-250-1, 0-SO-250-5, or 0-SO-250-6 as applicable:
		ENSURE following equipment STOPPED and LOCKED OUT: 1A-A Component Cooling Water Pump 1A-A Thermal Barrier Booster Pump A-A Main Control Room AHU
		CHECK CCS SFP Cooling ADEQUATE. ALIGNED to Unit 2 or 1B CCS Pmp in service to "A" Train CCS
		DISPATCH an operator to ENSURE SFP cooling in service USING 0-SO-78-1.
		REFER TO following Appendixes for additional equipment lost: Appendix B, 480V Shutdown Board 1A1-A Load List
		EVALUATE need to transfer Fire Protection Distribution Panel power supply to Alternate USING 0-SO-13-1, Fire Detection System.
		CHECK 1A1-A 480V Shutdown Board ready to be ENERGIZED.
		ENERGIZE 1A1-A 480V Shutdown Board from one of the following supplies: NORMAL, USING 1-SO-201-1, 480V Shutdown Boards
		EVALUATE restoration of 480V busses USING EA-201-2, Restoring 480V Busses.
		EVALUATE placing following equipment in A-AUTO: 1A-A Component Cooling Water Pump 1A-A Thermal Barrier Booster Pump A-A Main Control Room AHU
		TS 3.8.2.1
		Feedback to crew: A cleaning person in the vicinity of the board heard a noise and may have bumped the board

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

Event Description: Earthquake

Time	Position	Applicant's Actions or Behavior
		The following steps are from AR-M15B
	CRO	Feedback to crew: Outside AUO to report ground shaking at the D/G building DISPATCH Operator to check Seismic Monitor System Alarm Panel lights, 0-XA-52-86 in Aux Instrument Rm: • Loss of AC light is normally dark • DC Power light is normally lit • OBE (indicates ½ SSE exceeded) light is normally dark • Event light is normally dark
	CRO	IF alarm is due to EVENT or OBE lights illuminated, THEN • GO TO AOP-N.05, EARTHQUAKE. • REQUEST Instrument Maintenance to PERFORM SI-657, Retrieval of Earthquake Records Following A Seismic Event for evaluation within 4 hours of event. • CONTACT Duty Engineer to notify Civil Engineer of event.
	CRO	[1] IF alarm does NOT clear spontaneously, THEN GO TO AOP-N.05, Earthquake. [2] RETRIEVE report from Seismic Monitor System Printer at 0-R-113 for evaluating within 4 hours of event. [3] CONTACT Duty Engineer to notify Civil Engineer of event. [4] REFER to Technical Requirements Manual LCO's 3.3.3.3 and GOI-6 section T.
		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/OAT C	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.
		AOP-N.05 Continued

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

Event Description: Earthquake

Time	Position	Applicant's Actions or Behavior
		AOP-N.05 Continued
	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 areas Low Level Radwaste Storage Facility Old Steam Generator Storage Facility (OSGSF)
	ALL	MONITOR the main control boards and annunciators for any abnormal conditions.
	CRO/OAT C	PERFORM Appendix A, "CONTROL ROOM VERIFICATIONS".

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

Event Description: MS Break 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.: 2 Event No.: 8 Page 2 of 7

Event Description: MS Break 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].
	OATC	Status monitor panels: • 6C DARK, • 6D DARK, • 6E LIT OUTSIDE outlined area, • 6H DARK, • 6J LIT.
		E-0 Continued

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

Event Description: MS Break 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: May dispatch AUO's to do EA-1.1
	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.: 8 Page 4 of 7

Event Description: MS Break 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

Event Description: MS Break 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. (NO)
	US	Transitions to E-2
		Examiner Note: The scenario may be stopped here because of JPM-58
		The following steps are from E-2
	CRO	CHECK MSIVs and MSIV bypass valves CLOSED.
	CRO	CHECK ANY S/G secondary pressure boundary INTACT: Any S/G pressure controlled or rising.
	CRO	IDENTIFY Faulted S/G(s): CHECK S/G pressures: Any S/G pressure DROPPING in an uncontrolled manner OR Any S/G pressure less than 140 psig.
	CRO	ISOLATE Faulted S/G(s): ISOLATE MFW, ISOLATE AFW, CLOSE TD AFW pump steam supply from faulted S/G FCV-1-15 (S/G 1) or FCV-1-16 (S/G4). VERIFY atmospheric relief CLOSED. CHECK CST level greater than 5%.
	CRO	VERIFY secondary radiation NORMAL: NOTIFY Chem Lab to take S/G activity samples.
	CRO	CHECK following rad monitors, including available trends prior to isolation: Main steamline NORMAL Condenser exhaust NORMAL S/G blowdown recorder RR-90-120 NORMAL Post-Accident Area Radiation Monitor recorder RR-90-268B, points 3 (blue), 4 (violet), 5 (black) and 6 (brown) NORMAL. [M-31 (back of M-30)]
	ALL	CHECK SI termination criteria: RCS subcooling based on core exit T/Cs greater than 40°F. Secondary heat sink: •Narrow range level in at least one Intact S/G greater than 10% [25% ADV] OR •Total feed flow to Intact S/Gs greater than 440 gpm. RCS pressure stable or rising. Pressurizer level greater than 10% [20% ADV].
	US	GO TO ES-1.1, SI Termination.

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Event Description: MS Break Outside Containment

Time	Position	Applicant's Actions or Behavior
		The following steps are from ES-1.1
		RESET SI and CHECK the following AUTO SI BLOCKED permissive LIT. [M-4A, C4] SI ACTUATED permissive DARK. [M-4A, D4]
		MONITOR shutdown boards continuously energized.
		RESET Phase A and Phase B.
		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
		STOP all BUT one CCP and PLACE in A-AUTO.
		CHECK RCS pressure STABLE or RISING.
		ISOLATE CCPIT: CLOSE CCPIT inlet valves FCV-63-39 and FCV-63-40. CLOSE CCPIT outlet valves FCV-63-25 and FCV-63-26.
		ESTABLISH charging flow: CLOSE seal water flow control valve FCV-62-89. OPEN charging isolation valves FCV-62-90 and FCV-62-91. ENSURE normal or alternate charging isolation valve FCV-62-86 or FCV-62-85 OPEN. ESTABLISH desired charging flow USING seal water and charging flow control valves FCV-62-89 and FCV-62-93.
		CONTROL charging flow to maintain pressurizer level.
		DETERMINE if SI pumps should be stopped: CHECK RCS pressure and SI flow: RCS pressure STABLE or RISING RCS pressure greater than 1500 psig
		STOP SI pumps, and PLACE in A-AUTO.

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

Event Description: MS Break Outside Containment

Time	Position	Applicant's Actions or Behavior
		ES-1.1 Continued
		DETERMINE if RHR pumps should be stopped: CHECK any RHR pump RUNNING with suction aligned from RWST. STOP RHR pumps and PLACE in A-AUTO.
		MONITOR ECCS flow NOT required CHECK RCS subcooling based on core exit T/Cs greater than 40?F. CHECK Pressurizer level greater than 10% [20% ADV].
		MONITOR if containment spray should be stopped: CHECK any containment spray pump RUNNING. (NO)
		MONITOR if containment vacuum control should be returned to normal: CHECK containment pressure less than 1.0 psig. ENSURE containment vacuum relief isolation valves OPEN: [Panel 6K or M-9], FCV-30-46, FCV-30-47, FCV-30-48.
		MONITOR if letdown can be established CHECK pressurizer level greater than 20% [35% ADV]. ESTABLISH letdown USING EA-62-5, Establishing Normal Charging and Letdown.
		DETERMINE if steam dump to condenser available: CHECK condenser available: • C-9 CONDENSER INTERLOCK Permissive LIT [M-4A, E6]. • At least one Intact S/G MSIV OPEN. (NO) USE S/G atmospheric reliefs.
		MAINTAIN RCS T-hot STABLE: • OPERATE steam dumps or S/G atmospheric reliefs. • CONTROL AFW flow.
		Terminate the scenario

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Facility: Sequoyah Scenario No.: SB 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 stable for 48 hours IAW AOP-R.01, 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 (CRO)	Place Con DI Booster Pumps in Service
2	-	R (RO)	Increase power to 90%
3	RX05A	I (RO)	PZR Level Channel Fails High
4	RX26A 100%	I (BOP)	Steam Pressure Channel Fails High
5	CV01B	C (RO)	Running Charging Pump Trips
6	FW16A 100%	C (BOP)	FRV Fails Full Open
7	TH01A 0.1%	M (All)	ATWS, LOCA inserted after reactor tripped
			Terminate at FR-Z.1

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

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Op-Test No.: 1 Scenario No.: SB 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.
		Examiner Note: 2 Con DI pumps must be started simultaneously
	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.
		Feedback to crew: If AUO is dispatched to check pumps they are ready to start

Op-Test No.: 1 Scenario No.: SB 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.
		Feedback to Crew: If AUO is dispatched, Relay light is lit
	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]
		Feedback to Crew: If AUO is dispatched, Relay lights are lit
	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.: SB Event No.: 3 Page 1 of 1

Event Description: PZR Level Channel (68-339) Fails High 10:18 AM

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.: SB Event No.: 4 Page 1 of 1

Event Description: Steam Pressure Channel (1-2A) Fails High 10:18 AM

Time	Position	Applicant's Actions or Behavior
		Crew may enter AOP-I.06 first
		The following steps are from AOP-S.01
	CRO	RESTORE steam generator level(s) to program:
	CRO	PLACE affected level controller(s) in MANUAL: FIC-3-35A, S/G-1
	CRO	CONTROL feedwater flow on affected S/G(s) USING main feedwater regulating valve controller(s) to restore level to program.
	CRO	CHECK Steam Flow and Feed Flow Channels NORMAL. [M-4]
	CRO	TRANSFER associated Steam Flow or Feed Flow selector switch to alternate channel:
	CRO	MAINTAIN steam generator level(s) on program.
	CRO	VERIFY failure due to steam flow/feed flow instrument malfunction.
	CRO	PLACE main feedwater regulating valve(s) in AUTO.
	CRO	CHECK S/G pressure instruments NORMAL.
	US	GO TO AOP-I.06, Steam Generator Instrument Malfunction.
		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/OAT C	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.: SB Event No.: 5 Page 1 of 3

Event Description: Running Charging Pump (1B) Trips 10:18 AM

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) REESTABLISH charging and letdown in accordance with 1-SO-62-1, Chemical & Volume Control System.
		Feedback to crew: Overcurrent flag on the 1B CCP, smell of burnt insulation in the pump room
		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.: SB Event No.: 5 Page 2 of 3

Event Description: Running Charging Pump (1B) 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.: SB Event No.: 5 Page 3 of 3

Event Description: Running Charging Pump (1B) 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
	US	Applicable TS/TRM requirements 3.5.2 (YES), in LCO 3.0.3 3.1.2.4 (YES) 3.1.2.2 (NO)
		Critical task: Restore charging and letdown prior to VCT level reaching 93% and/or PZR level reaching 25% Critical task: Recognize entry into LCO 3.0.3
		Examiner Note: Will need to give time to evaluate TS to identify 3.0.3
	US	Contact Ops Supt inform 3.0.3 required S/D
	US	Contact MSS to inquire about status of 1A SI pump

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

Event Description: FRV Fails Full Open 10:18 AM

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.: SB Event No.: 7 Page 1 of 4

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

Deleted: the RCS

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

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. Indications of LOCA, Ctmt temp, Ctmt moisture, EAM blue lights, Ctmt pressure
		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.: SB Event No.: 7 Page 3 of 4

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 (YES) • 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.: SB Event No.: 7 Page 4 of 4

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)
		Examiner Note: Crew should manually initiate SI prior to containment pressure reaching 1.54 psig
		Terminate the exercise at FR-Z.1 Transition