

Final Submittal

**SEQUOYAH RETAKE EXAM
50-327 & 50-328/2003-301**

FEBRUARY 27, 2003

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

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

Examiners: _____ Operators: _____

Initial Conditions: Plant is at 94% power following a trip after a refueling outage. 10 gpd leakage in #3 S/G.

Turnover: Maintain current plant power level and place excess letdown in service. A Severe Thunderstorm Warning is in effect for Hamilton and Rhea counties for the next 2 hours. There is general increased security due to validated threats in the US.

Event No.	Malf. No.	Event Type*	Event Description
			Set up simulator to IC- 9.
Preinsert			"B" Containment Spray Pump OOS
Preinsert			"B" MDAFW Pump OOS
Preinsert	RH01A	C	"A" RHR Pump Fails
Preinsert	RP16K 605A	C	Phase "A" fails to actuate
1	-	N (RO)	Place Excess Letdown in Service
2	RX18 100%	I (RO)	Tavg Channel fails High
3	FW05B	C (BOP)	"B" MFP trips
4	TH01A	M (All)	Large Break LOCA Loop 1

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (P)RA, (L)ow Power

Op-Test No.: _____ Scenario No.: 1 Event No.: 1 Page 1 of 1
 Event Description: Removing Letdown from Service/Place Excess Letdown in Service

Time	Position	Applicant's Actions or Behavior
		SO-62-1 Steps
	OATC	OBTAIN permission from Unit 1 SRO to remove letdown from service
	OATC	IF excess letdown is to be put in service, THEN PERFORM 1-SO-62-6, AND RETURN.
	OATC	ENSURE following letdown orifice valves CLOSED : [1-FCV-62-72], [1-FCV-62-73], [1-FCV-62-74]
	OATC	CLOSE following letdown isolation valves: 1-FCV-62-69, 1-FCV-62-70
		SO-62-6 Steps
	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.: _____ Scenario No.: 1 Event No.: 2 Page 1 of 1Event Description: Tavg Channel Fails High

Time	Position	Applicant's Actions or Behavior
		AOP-C.01 Steps
	US	EVALUATE the following Tech Specs for applicability
	US	EVALUATE EPIP-1, Emergency Plan Classification Matrix
	CREW	DIAGNOSE the failure: Continuous control bank movement , Section 2.2
	OATC	CHECK rod control: ENSURE rod control in MAN, CHECK rod motion STOPPED (YES)
	OATC	CHECK for instrumentation malfunction
	OATC	CHECK nuclear instrumentation OPERABLE
	OATC	CHECK RCS RTDs OPERABLE
	CRO	CHECK turbine impulse pressure channels OPERABLE
	OATC	CHECK T-ref OPERABLE, USING TR-68-2B
	OATC	CHECK Auct T-avg OPERABLE, USING TR-68-2B
	CRO	PLACE Steam Dumps in Steam Pressure Mode
	OATC	IF pressurizer level does not control in automatic, THEN CONTROL pressurizer level manually
	OATC	DETERMINE Program T-avg for current reactor power USING TI-28 Figure A.9
	US	NOTIFY MIG of T-avg failure
	OATC/CRO	RESTORE T-avg. to T-Ref: POSITION control rods, ADJUST turbine load, ADJUST RCS boron concentration
	OATC	CHECK for steam line or feedwater line break/leak: CHECK for rising reactor power with dropping T-avg (NO)
	OATC	CHECK for inadvertent boration flow: CHECK evidence of boration flow INDICATED (NO)
	OATC	CHECK for inadvertent dilution flow: CHECK evidence of dilution flow INDICATED (NO)
	OATC	CHECK for rod control system integrity, VERIFY T-avg. and T-Ref matched, PLACE control rods in AUTO (NO)
	US	NOTIFY Duty Operations Manager of the situation
	US	NOTIFY IM to determine and correct cause of rod control circuit failure

Op-Test No.: _____ Scenario No.: 1 Event No.: 3 Page 1 of 2Event Description: "B" MFP Trips

Time	Position	Applicant's Actions or Behavior
		AR-M3B (A2) Steps
	CRO	IF unit > 80% load, THEN , VERIFY all auxiliary feedwater pumps start
	US	IF unit > 80% load and one MFP trips, THEN, GO TO AOP-S.01, <i>Loss of Normal Feedwater</i>
		AOP-S.01 Steps
	CRO	VERIFY turbine runback to less than 73% 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 the following for Auxiliary Feedwater Pumps
	CRO	MDAFW Pumps RUNNING [M-4]:
	CRO	TDADF Pump RUNNING [M-3].
	CRO	TDADF Pump LCVs OPEN [M-3].
	CRO	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 B
	CRO	ENSURE the steam generator blowdown valves CLOSED [M-4]:
	CRO	RESTORE steam generator levels to program level
	US	EVALUATE placing additional condensate pumps IN SERVICE as necessary (N/A)
	CRO	ENSURE unit STABILIZED
	US	DISPATCH an operator to investigate cause of main feedwater pump trip, places 1-HS46-27A & 30A in PTL
	CRO	CLOSE Turbine Driven Auxiliary Feedwater Pump LCVs as required [M-3]:
	CRO	RESET Steam Dump Load Rejection Signal: (May decide not to do this step, since in Stm. Press. Mode)
	CRO	PLACE HS-1-103A and 103B, Steam Dump Control, in OFF.
	CRO	PLACE HS-1-103D, Steam Dump Control, in RESET and VERIFY spring return to TAVG.
	CRO	VERIFY C-7, LOSS OF LOAD INTERLOCK alarm, DARK [M-4A, 5E]

Op-Test No.: _____ Scenario No.: 1 Event No.: 3 Page 2 of 2Event Description : "B" MFP Trips

Time	Position	Applicant's Actions or Behavior
		AOP-S.01 Steps Continued
	CRO	ENSURE Steam Dump demand is zero (Will have to place in Steam Press Mode due to previous failure)
	CRO	PLACE HS-1-103A and 103B, Steam Dump Control, in ON.
	CRO	RESTORE following systems to NORMAL
	CRO	Auxiliary Feedwater USING 1,2-SO-3-2
	CRO	Steam Generator Blowdown USING 1,2-SO-15-1
	CRO	Checks Turb Vlv position limit light dark (NO), reset IAW 0-GO-5
		SO-3-2 Steps
	CRO	ENSURE all automatic AFW start signals clear
	CRO	IF shutdown of A-A AFW pump is required, THEN
	CRO	PLACE [1-HS-3-118A] to STOP
	CRO	ENSURE [1-FCV-3-400] recirc isolation valve is CLOSED
	CRO	IF shutdown of B-B AFW pump is required, THEN
	CRO	PLACE [1-HS-3-128A] to STOP
	CRO	ENSURE [1-FCV-3-401] recirc isolation valve is CLOSED
	CRO	IF the AFW system is to be put in standby, THEN
	CRO	PLACE the system in standby readiness per Section 5.1 and Appendix A of this Instruction

Op-Test No.: _____ Scenario No.: 1 Event No.: 4 Page 1 of 5Event Description : Large Break LOCA Loop 1

Time	Position	Applicant's Actions or Behavior
		E-0 Actions
	OATC	VERIFY reactor TRIPPED
	CRO	VERIFY turbine TRIPPED
	CRO	VERIFY shutdown boards ENERGIZED
	CRO/OATC	DETERMINE if SI actuated (Yes)
	CRO	VERIFY CCS pumps RUNNING
	CRO	CHECK ERCW system operation, VERIFY at least four ERCW pumps RUNNING, VERIFY D/G ERCW supply valves OPEN
	CRO/OATC	VERIFY ECCS pumps RUNNING
	OATC	VERIFY CCP flow through CCPIT
	OATC	• CHECK RCS pressure less than 1500 psig (YES)
	OATC	VERIFY ESF systems ALIGNED, Phase A ACTUATED, Containment Ventilation Isolation ACTUATED, Status monitor panels, Train A status panel 6K, Train B status panel 6L
	OATC	MONITOR containment spray NOT required (NO)
	OATC	ENSURE containment spray INITIATED
	OATC	Containment spray pumps RUNNING
	OATC	Containment spray header isolation valves FCV-72-39 and FCV-72-2 OPEN
	OATC	Containment spray recirculation valves to RWST FCV-72-34 and FCV-72-13 CLOSED
	OATC	Containment spray header flow greater than 4750 gpm per train
	OATC	Panel 6E LIT
	OATC	ENSURE Phase B valves CLOSED, Panel 6K PHASE B GREEN, Panel 6L PHASE B GREEN
	OATC	STOP RCPs
	OATC	MONITOR containment air return fans
	OATC	WHEN 10 minutes have elapsed, THEN ENSURE containment air return fans are running

Op-Test No.: _____ Scenario No.: 1 Event No.: 4 Page 2 of 5Event Description : Large Break LOCA Loop 1

Time	Position	Applicant's Actions or Behavior
	OATC	CHECK if main steam lines should be isolated (YES), VERIFY MSIVs and MSIV bypass valves CLOSED
	CRO	VERIFY MFW Isolation
	CRO	VERIFY AFW pumps RUNNING, MDAPW, TDAFW
	CRO	CHECK AFW valve alignment
	CRO	DETERMINE if secondary heat sink available (Yes)
	OATC	MONITOR RCS temperatures
	OATC	IF any RCP running, THEN CHECK T-avg stable at or trending to between 547°F and 552°F (NO)
	OATC/CRO	IF temperature less than 547°F and dropping, THEN PERFORM the following; ENSURE steam dumps and atmospheric reliefs CLOSED (NO)
	CRO	IF cooldown continues, THEN, PERFORM the following; CONTROL total feed flow USING EA-3-8, Manual Control of AFW Flow, MAINTAIN total feed flow greater than 440 gpm UNTIL narrow range level greater than 10% [25% ADV] in at least one S/G
	US/CRO	IF cooldown continues, THEN, CLOSE MSIVs and MSIV bypass valves
	CRO	DISPATCH personnel to perform EA-0-1, Equipment Checks Following ESF Actuation
	OATC	CHECK pressurizer PORVs, safeties, and spray valves
	EXAMINER NOTE	* Depending on crew speed, the crew may go back to step 7c when RCS pressure goes below 1500 psig
	OATC	MONITOR RCP trip criteria; At least one CCP OR SI pump RUNNING AND RCS pressure less than 1250 psig (NO*)
		A phase B signal should be generated during this portion of the procedure
	OATC	STOP RCPs
	CRO	CHECK if S/G secondary pressure boundaries are INTACT: All S/G pressures controlled or rising, All S/G pressures greater than 140 psig (YES)
	CRO	CHECK if S/G tubes are INTACT (YES)
	OATC	CHECK if RCS is INTACT: Containment pressure NORMAL (NO)
	US	PERFORM the following: MONITOR status trees, GO TO E-1, Loss of Reactor or Secondary Coolant
	EXAMINER NOTE	STA Should Identify a Transition to FR-P.1 is required

Op-Test No.: _____		Scenario No.: <u>1</u>	Event No.: <u>4</u>	Page <u>3</u> of <u>5</u>
Event Description : <u>Large Break LOCA Loop 1</u>				
Time	Position	Applicant's Actions or Behavior		
		FR-P.1 Steps		
	OATC	MONITOR RWST level greater than 27%.		
	CRO	MONITOR CST level greater than 10%.		
	OATC	CHECK RCS pressure greater than 180 psig (NO)		
	OATC	IF at least one RHR pump flow greater than 1500 gpm, THEN RETURN TO procedure and step in effect (E-1)		
	EXAMINER NOTE	STA Should Identify a Transition to FR-Z.1 is required (May transition to ES-1.3)		
		FR-Z.1 Steps		
	OATC	MONITOR RWST level greater than 27%.		
	OATC	VERIFY containment ventilation dampers CLOSED, Panel 6K CNTMT VENT GREEN, Panel 6L CNTMT VENT GREEN		
	OATC	VERIFY Phase A valves CLOSED, Panel 6K PHASE A GREEN, Panel 6L PHASE A GREEN (Action should be taken to close valves that failed to actuate)		
	OATC	VERIFY Phase B valves CLOSED, Panel 6K PHASE B GREEN, Panel 6L PHASE B GREEN		
	OATC	VERIFY containment spray operation		
	OATC	STOP RCPs		
	OATC	CHECK procedure applicability for containment spray operation, RHR sump recirculation capability AVAILABLE		
	OATC	VERIFY containment spray pumps RUNNING		
	OATC	MONITOR RWST level greater than 8%.		
	OATC	VERIFY containment spray suction ALIGNED to RWST		
	OATC	VERIFY containment spray discharge alignment		
	OATC	VERIFY EGTS operation, VERIFY EGTS fans RUNNING, VERIFY EGTS operation NORMAL		
	OATC	MONITOR containment air return fans, WHEN 10 minutes have elapsed, THEN VERIFY containment air return fans RUNNING		
	OATC	VERIFY MSIVs and MSIV bypass valves CLOSED		
	OATC	DETERMINE if any S/G Intact, CHECK at least one S/G pressure, Controlled or rising, and Greater than 140 psig		
	CRO	DETERMINE if any S/G Faulted (NO)		

Op-Test No.: _____ Scenario No.: 1 Event No.: 4 Page 4 of 5Event Description : Large Break LOCA Loop 1

Time	Position	Applicant's Actions or Behavior
		FR-Z.1 steps continued
	OATC	MONITOR if RHR spray should be placed in service (NO)
	OATC	MONITOR if containment spray should be stopped
	OATC	CHECK any containment spray pump RUNNING
	OATC	CHECK containment pressure less than 2.0 psid
	OATC	RESET Containment Spray
	OATC	STOP containment spray pumps and PLACE in A-AUTO
	OATC	CLOSE containment spray discharge valves FCV-72-2 and FCV-72-39.
	OATC	MONITOR if containment vacuum control should be returned to normal, CHECK containment pressure less than 1.5 psid
	OATC	VERIFY containment vacuum relief isolation valves OPEN, FCV-30-46 OPEN, FCV-30-47 OPEN, FCV-30-48 OPEN
		E-1 Steps
	OATC	MONITOR RCP trip criteria; At least one CCP OR SI pump RUNNING AND RCS pressure less than 1250 psig
	CRO	CHECK if S/G secondary pressure boundaries are INTACT : All S/G pressures controlled or rising, All S/G pressures greater than 140 psig (YES)
	CRO	MAINTAIN Intact S/G narrow range levels: > 25%, Between 25 - 50%
	CRO	VERIFY secondary radiation NORMAL : CHECK the following radiation monitors, including available trends prior to isolation: Main steamline NORMAL , Condenser exhaust NORMAL , S/G blowdown recorder RR-90-120, pen #1 and pen #2 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)]
	US	NOTIFY chem lab to take S/G activity samples every 60 minutes
	US	NOTIFY RADCON to survey main steamlines and S/G blowdown
	OATC	MONITOR pressurizer PORVs and block valves: Power to block valves AVAILABLE , Pressurizer PORVs CLOSED , At least one block valve OPEN
	CRO	ENSURE Reactor Building auxiliary floor and equipment drain sump pumps (pocket sump pumps) STOPPED

Op-Test No.: _____ Scenario No.: 1 Event No.: 1 Page 5 of 5Event Description : Large Break LOCA Loop 1

Time	Position	Applicant's Actions or Behavior
		E-1 Steps
	OATC	MONITOR SI termination criteria
	OATC	RCS subcooling based on core exit T/Cs greater than 40°F
	CRO	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
	OATC	RCS pressure stable or rising (NO)
	OATC	MONITOR if containment spray should be stopped
	OATC	CHECK any containment spray pump running.
	OATC	CHECK containment pressure less than 2.0 psid.
	OATC	RESET containment spray.
	OATC	STOP containment spray pumps and PLACE in A-AUTO.
	OATC	CLOSE containment spray discharge valves FCV-72-2 and FCV-72-39.
	OATC	MONITOR if containment vacuum control should be returned to normal
	OATC	CHECK containment pressure less than 1.5 psid.
	OATC	VERIFY containment vacuum relief isolation valves OPEN: FCV-30-46, FCV-30-47, FCV-30-48
		TERMINATE THE EXERCISE AT TRANSITION TO ES-1.3