Final Submittal

(Blue Paper)

1. Scenario Outline (ES-D-1) and Simulator Scenario Operator Actions (ES-D-2)

2. Final Operating Test Simulator Scenarios

   A. ES-D-1

   B. ES-D-2

FARLEY EXAM 2000-301

50-348, 50-364/2000-301
MAY 8 - 18, 2000

O: Farley ... 2000-301\ Final \ 26 operating tests

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Appendix D | Scenario Outline | Form ES-D-1

Facility: Farley Scenario No.: 1 Op-Test No.: A

Examiners: _____ Operators: _____

_____ _____

_____ _____

Objective: Evaluate applicant response to a ruptured S/G coincident with a faulted S/G.

Initial Conditions: (IC-8) 100%, BOL, Equil Xenon, B Train on service

Turnover: Diesel Gen 1-2A OOS for brush repair (OOS 1 hr, ETR 4 hrs)
1A MDAFWP OOS for bearing replacement (OOS 4 hr, ETR 12 hrs)
1A S/G has 10 gpd tube leakage – steady for 2 weeks
Thunderstorm warning in effect for southeast Alabama
Operations Manager expects plant to remain at 100% for rest of shift

Event No.	Malf. No.	Event Type*	Event Description
0	IC-8	-------	100% BOL, Equil. Xenon, B Train on service.
0	PANELS/EPB/DF-08-1/CMF	------	RACKOUT BREAKER; Rackout and tag 1-2A DG Unit 1 output.
0	PANELS/EPB/DF-08-2/CMF	------	RACKOUT BREAKER; Rackout and tag 1-2A DG Unit 2 output.
0	NA	------	1-2A DG Mode selector switch in Mode 3; Tag out 1-2A OOS
0	PANELS/MCB/1A MDAFW/CMF	-----	RACKOUT BREAKER; Rackout and tag 1A MDAFW Pump.
0	SYSTEMS/MECH/BOP/1A S/G	-----	Set tube leak = 10 gpd.
1	IMF/PRESS/TURBINE IMP PRESS/	I (RO)	Selected Turbine 1st Stage Pressure SET = 0; Ramp 0s. Xmtr Fails LOW
2	IMF/MISC INST/ 1A SGFP SPEED CONTROL/DRIVER	C (BOP)	S/G Feed Pump 1A Auto SIGNAL failed to 0 with a 0s Ramp.
3	IMF/PRESS/LTDN HX/ DRIVER	C (RO)	Letdown PCV (145) Fail I/P to 100% ON Auto Signal (PCV 145 fails closed).
4	SYSTEM/MECH/S/G B	N/R (ALL)	1B SG Tube Leak, SET= 144 gpd; Ramp 0s Requiring Controlled Shutdown.
5	IMF/PRESS/1A/1B/1C PROT IV (selected)	I (BOP)	Selected 1B SG Steam Pressure SET=1200; Ramp 0s
6	SYSTEM/MECH/BOP/B S/G	M (ALL)	SET 1B SG Tube Rupture= 300GPM; Ramp=300s.
6A	IMF/PRESS/3371B	C (ALL)	Fail Driver output Demand to 100% to fail 1B SG Atmospheric open (manual isolation valve stuck won't move).

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

Op-Test No.: A	Scenario No.: 1	Event No.: 1	Page 1 of 1
Event Description: Selected Turbine 1st Stage Pressure Xmtr Fails LOW			

Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications of 1st Stage Press failure - Rods stepping inward in Auto Annunciators: - TAVG/TREF DEV (HF3) - MS LINE HI STM FLOW ALERT (JB4)
	RO	Check loop temperatures and 1st stage pressures Determine 1st stage pressure instrument failure Shift rod control to Manual
	SRO	Refer to ARP and direct supplementary actions: Select other 1st stage press channel for control Match Tavg with Tref Refer to T.S. 3.3.1 for actions

Op-Test No.: A	Scenario No.: 1	Event No.: 2	Page 1 of 1
Event Description: SGFP 1A Speed Fails to 75%			

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize indications of SGFP 1A speed control failure - Deviations in SGFP speeds, disch press, flows Annunciators - TAVG/TREF DEV (HF3) possible - 1A/B/C SG LVL DEV (JF1/2/3) possible - 1A/1B/1C SG STM FLOW > FEED FLOW (JB1/2/3)
	BOP	Check SGFP speeds, disch press, flows Determine SGFP 1A speed control failure Shift SGFP 1A speed control to Manual; restore program FWRV ΔP If necessary, take manual control of FWRVs and restore SG levels to normal
	SRO	Refer to ARPs and direct supplementary actions

Op-Test No.: A	Scenario No.: 1	Event No.: 3	Page 1 of 1
Event Description: Letdown PCV (145) Fails Closed			

Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications of PCV-145 failing closed. - Increasing letdown pressure - Loss of letdown flow - Letdown relief valve opens Annunciators - LTDN HX OUTLET PRESS HI (DE4) - LTDN ORIF ISO VLV REL LINE TEMP HI (DE3) - PRT LVL HI-LO (HE4) possible - PRT PRESS HI (HE5) possible
	SRO	Ensure board operators take ARP actions. If necessary, direct use of Excess Letdown per SOP-2.7 or AOP-16.0 Loss of Letdown
	RO	Check proper orifice isolation valve selection. Place PK-145 controller in Manual and open valve to reduce pressure. If PK-145 cannot be operated in Manual, then - Close orifice isolation valves - Close charging flow valve - Place Excess Letdown in service per SRO direction
	BOP	Place turbine load on Hold until availability of letdown determined.
	SRO	Initiate investigation and repair.

Op-Test No.: A	Scenario No.: 1	Event No.: 4	Page 1 of 2
Event Description: Tube leak on B SG (144 gpd)			

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Recognize indications of a steam generator tube leak: - S/G Blowdown R-19/R-23 readings increasing. - Cond Air Ejector Exhaust R-15 readings increasing. - Main steam line rad monitor R-70B indication increasing. - Pressurizer level decreasing. - Charging flow increasing. - Mismatch between charging/letdown flows Annunciators: RMS HI RAD (FH1) SG TUBE LEAK ABOVE SETPT (FG1)
	SRO	Ensure board operators take actions required by ARPs. Direct Counting Room to immediately sample S/Gs to determine RCS leak rate. If R-15A (Low) alarming, notify on-call Operations Manager. Consult SOP-45.0, Radiation Monitoring System, for sampling S/Gs with R-19 in alarm. If R-15B/C (Med/Hi) alarms, implement EIP-9, Emergency Classifications and Actions Monitor Primary-to-Secondary Leakage to determine if rate increasing > 60 gpd/hr. Perform AOP-2.0, Steam Generator Tube Leakage, actions concurrent with ARPs. If confirmed primary-to-secondary leakage has increased > 60 gpd in 1 hour, be in Mode 3 within 1 hour or direct Rx trip
	RO/BOP	Check RMS console to determine channel(s) in alarm. If R-19 or R-23A/B alarming, insure automatic actions have occurred. (R-19: S/G blowdown sample valves closed.) (R-23A/B: Blowdown discharge valves FCV-1152 and/or RCV-023B closed.)
	SRO	Per AOP-2.0, direct SI actuation if: - Pzr level cannot be maintained at program level by increasing charging and decreasing letdown - VCT level cannot be maintained >20%. Continue directing actions of AOP-2.0 per attached pages.

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

Event Description: Power reduction to Minimum load.

Time	Position	Applicant's Actions or Behavior
	SRO	Direct power reduction to minimum load (app.40 MW) @ 2 to 5 MW/min IAW UOP-3.1, POWER OPERATION Notify on-call Ops Mgr if ramp rate > 2 MW/min used (on-call Ops Mgr will limit ramp rate to < 5 MW/min for the first 20 min)
	RO	Commence boration as required - Determine existing boron concentration - Determine required increase in boron concentration - Determine the volume of boric acid required - Position the MKUP MODE CONT SWITCH to STOP - Position the MKUP MODE SEL SWITCH to BOR - Set the BA flow controller and batch integrator - Position the MKUP MODE CONT SWITCH to START - Verify proper operation by observing MKUP TO CHG PUMP SUCTION HDR (FCV-113B) opens BA flow on FR-113 at preselected rate Energize Pzr backup heaters to initiate Pzr spray Verify boration stops at correct amount Return makeup system to Auto operation Adjust boron to maintain AFD within target band
	BOP	Ramp power to minimum load (app.40 MW) - On the CONTROL SETPOINT page set the load target Move cursor to TARGET field Enter value using numeric keypad Depress SELECT key - If required, set RATE at 2-5 MW/min → - Depress GO pushbutton Maintain valve position limit 8-10% above demand
	SRO	Direct continuation of plant shutdown for going to Hot Standby.
	RO	Repeat borations as required.
	BOP	Continue downpower ramp. Coordinate securing of secondary components when no longer required.

Op-Test No.: A	Scenario No.: 1	Event No.: 5	Page 1 of 1
Event Description: "B" SG controlling steam pressure transmitter (485/6) fails high			

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize indications of steam flow channel failing high: - Increase in failed channel indication - Increase in actual feed flow - Increasing B SG level Annunciators: - 1B SG LVL DEV (JF2) - 1B SG STM FLOW >FEED FLOW (JB2) - 1A/1B/1C SG STM LINE HI DP ALERT (JE1/2/3)
	SRO	Ensure board operators take ARP actions
	BOP	Perform immediate actions of JF2 and JB2: - Verify actual level deviation and/or flow mismatch - Monitor SG levels, steam flows, feed flows - Take manual control of B SG feed flow and restore level to program - Determine cause of alarm
	SRO	Direct supplementary actions of ARP JF2 and JB2: - Notify I&C of failure - Select alternate steam flow xmtr - Return B SG level control to auto

82% trip

Op-Test No.: A Scenario No.: 1 Event No.: 6 Page 1 of 4

Event Description: SGTR on B SG with stuck open 1B SG Atmospheric

Time	Position	Applicant's Actions or Behavior
	CREW	Recognize B SG rupture: - Feedflow/steamflow mismatch for B SG - Increasing level in B SG - Air ejector, blowdown, and MSL rad mon alarms - Decreasing RCS pressure and Pzr level - Automatic Rx trip and SI (if not performed by operators)
	SRO	Enter EEP-0, Reactor Trip or Safety Injection
	RO/BOP	Perform immediate actions of EEP-0 without reference: - Check Rx tripped RTBs & associated bypass bkrs open NI power falling Rod bottom lights lit - Check turbine tripped - Verify at least one train of 4160 V ESF busses energized - Check SI actuated
	SRO	Direct subsequent actions of EEP-0 - Check HHSI flow > 0 gpm - Verify at least one RHR pump started - Verify ctmt vent isolation Ctmt purge dampers - closed Mini purge dampers - closed Stop mini purge supp/exh fan - Verify ctmt fan cooler alignment At least one ctmt fan started in slow Associated emer SW outlet vlv open - Verify at least one SW train has 2 SW pumps started - Verify at least one CCW pump started - Verify AFW flow to ea SG > 0 gpm - Verify MFW status Verify MFW flow control & bypass vlvs closed Verify both SG feed pumps tripped Verify SG blowdown isolated - Check no MSL iso signal present - Check that ctmt press has remained < 27 psig

Op-Test No.: A	Scenario No.: 1	Event No.: 6	Page 2 of 4
Event Description: SGTR on B SG with stuck open 1B SG Atmospheric			

Time	Position	Applicant's Actions or Behavior
		- Verify Phase A ctmt iso Verify Ph A ctmt iso actuated Check all MLB-2 lights lit - Announce "Unit 1 reactor trip and Safety Injection" - Verify all Rx trip and bypass bkrs open - Trip CRDM MG set supply breakers - Verify two trains of ECCS equipment aligned Both trains of SI actuated Bkrs DF01, DF02, DG15, & DG02 closed Two trains of battery chargers energized Two trains of ESF equip aligned All MLB-1 lights lit Two SW pumps running in both SW trains Chg pump suction and discharge vlvs open All post accident ctmt air mixing fans started - Check AFW status Total AFW flow > 395 gpm or any NR level >30% Control MDAFWP and TDAFWP flow for 30% to 60% NR level When two SG NR levels >25% and TDAFWP not required, stop TDAFWP - Secure secondary components Both heater drain pumps All but one cond pump Align backup cooling to cond pumps - Check RCS avg temp stable at or approaching 547 deg - If heatup is in progress attempt to dump steam to condenser - If heat up continues, dump steam to atmosphere - Direct counting room to perform CCP-645, Main Steam Abnormal Environmental Release. - Check Pzr pressure - Check RCP trip criteria; subcooling > 16 deg - Monitor chg pump miniflow criteria - Check SGs not faulted; no SG falling in uncontrolled manner or less than 50 psig **(DEPENDING ON WHEN FAILURE IS ENTERED, IT IS POSSIBLE TO GO TO EEP-2 HERE WHICH IS STEP 26)** - Check SGs not ruptured (Step 27) Secondary rad indication normal - NO No SG level rising in uncontrolled manner - NO

Op-Test No.: A Scenario No.: 1 Event No.: 6 Page 3 of 4

Event Description: SGTR on B SG with stuck open 1B SG Atmospheric

Time	Position	Applicant's Actions or Behavior
Critical	SRO	Direct transition to EEP-3, Steam Generator Tube Rupture Direct actions in EEP-3
	RO	Check RCP criteria; subcooled margin monitor > 16 deg subcooled in CETC mode
	BOP	Identify ruptured SG - B Isolate flow from ruptured SG Align atmos rel vlv and verify closed – NO Attempt to close Atmos Relief in Manual – CANNOT Direct System Oper to isolate 1B SG Atmos Relief locally Iso TDAFWP steam supply from 1B SG at HSD pnl Verify blowdown isolated Verify MS iso and bypass vlvs closed
Critical	SRO	Direct actions in EEP-3 until directed to transition to ECP-3.1, "SGTR With Loss of Reactor Coolant Subcooled Recovery Desired" Direct actions in ECP-3.1
	BOP/RO	Monitor RWST level > 12.5 feet
	RO	Reset SI; MLB-1 1-1 not lit & 11-1 not lit Reset Ph A ctmt iso; MLB-2 1-1 & 11-1 not lit Check Ph B ctmt iso reset; MLB-3 1-1 & 6-1 not lit
	BOP	Verify 4160V busses energized
	RO	Check containment spray not started Check LHSI status: - Establish CCW flow to RHR ht exchangers - If RCS pressure > 265 psig, stop any RHR pump without CCW flow to its HX
	BOP	Check ruptured SG level > 30%- NO Verify AFW flow to ruptured SG isolated- YES Check SGs not faulted Monitor CST level Check intact SG level, maintain 30-60% NR

Op-Test No.: A Scenario No.: 1 Event No.: 6 Page 4 of 4

Event Description: SGTR on B SG with stuck open 1B SG Atmospheric

Time	Position	Applicant's Actions or Behavior
	SRO	Perform evaluation of plant status Direct the performance of an RCS cooldown per step 13
	RO	When P-12 light lit, block low steam line pressure SI
Critical	SRO	Direct use of steam dump local manual overrides or atmospheric dumps for cooldown If dump to atmosphere, ensure counting room performs CCP-645
	BOP	Dump steam to condenser or atmosphere from intact SGs
	RO	Prepare RHR for service
	SRO	Check subcooled recovery allowed (RWST >25 ft, C SG NR level < 91%) Check subcooling > 16°F Continue actions of ECP-3.1 per attached pages until FREEZE
	SRO	Classify event per EIP-9.0 after FREEZE (Site Area Emerg if atmospheric relief vlv failed open)

Facility: Farley Scenario No.: 2 Op-Test No.: A

Examiners: _____ Operators: _____

Objective: Evaluate applicant response to a feed line break inside containment coincident with a loss of heat sink.

Initial Conditions: (IC-14) 70%, MOL, Xenon increasing, B train on service
Power increase in progress

Turnover: Diesel Gen 1-2A OOS for brush repair (OOS 1 hr, ETR 4 hrs)
1A MDAFWP OOS for bearing replacement (OOS 4 hr, ETR 12 hrs)
1A S/G has 10 gpd tube leakage – steady for 2 weeks
Thunderstorm warning in effect for southeast Alabama
Operations Manager directs a power increase at 2 MW/min

Event No.	Malf. No.	Event Type*	Event Description
0	IC-14	-----	70% MOL, Xenon building in, B train on service. Power increase in progress.
0	PANELS/EPB/DF-08-1/CMF	------	RACKOUT BREAKER; Rackout and tag 1-2A D/G Unit 1 output.
0	PANELS/EPB/DF-08-2/CMF	------	RACKOUT BREAKER; Rackout and tag 1-2A D/G Unit 2 output.
0	N/A	-----	1-2A D/G mode selector switch in Mode 3; Tag 1-2A OOS
0	PANEL/MCB/1A MDAFW	-----	RACKOUT BREAKER; Rackout and tag 1A MDAFW Pump.
0	SYSTEM/MECH/BOP/1A S/G	-----	Set tube leak =10 gpd.
0	SYSTEM/MECH/ESF/AUX FW	C	Select TDAFWP set to Trip on Start
0	PANEL/MCB/RX TRIP BRKR /CMF	C (ALL)	Fail Aand B reactor trip breakers closed ATWS
0	SYS/MECH/BOP/AUTO STOP OIL	C (BOP)	Select Turbine fails to trip automatically or manually
1	N/A	N/R	Increase Power to 100% at 2 MW/min
2	IMF/PRESS/PRZR	I(RO)	PT-444 Set=100%; Ramp 0s, :PRZR Pressure Xmtr PT-444 Fails HIGH
3	IMF/MISC/SGFP Speed Control	I(BOP)	PT-508 Set= 500; Ramp 30s Feedwater Header Pressure fails Xmtr LOW
4	IMF/FLOW/CHARG/AUTO SIG	C(RO)	Set output to 0 ; 5s Charging Flow Control Fails LOW in Auto
5	IMF/MISC/SGFP SPEED CONTROL/1A SFGP/DRIVER	C (BOP)	Fail out put driver for 1A SGFP to minimum. Pump rolls to minimum speed. Then Trip SGFP.
6	SYSTEM/MECH/BOP/1A S/G	M (ALL)	Set= .5E6; Ramp 600s 1A Feedline Break Inside Containment
6A	PANELS/EPB//DG15/5OG PANELS/EPB/1B D/G/	M (ALL)	50 G Loss of 4160v Bus 1G/Essential Engine Failure. (Loss of Secondary Heat Sink) (Insert at step 3.4 of EEP-2))

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

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

Event Description: Increase power to 100% as directed by Ops Manager.

Time	Position	Applicant's Actions or Behavior
	SRO	Direct ramp of power to 100% at 2 MW/min in accordance with UOP-3.1, Power Operations, Section 5.1.5
	RO	Initiate dilution: Determine existing RCS boron concentration Determine magnitude of required boron concentration decrease from core physics curves Determine volume of makeup water req'd from dilution nomograph If necessary, adjust LTDN TO VCT FLOW setpoint to prevent compressing the gas space Set reactor makeup water flow controller and batch integrator to the appropriate flow rate and quantity values Place the MAKEUP MODE CONT SWITCH to STOP Position the MKUP MODE SEL SWITHCH to DIL Position the MKUP MODE CONT SWITCH to START If running, stop 1B RMW PUMP Verify dilution by observing FCV114 opens and flow is indicated on FI-168 at selected rates Energize Pzr heaters to initiate spray for equalization of boron concentration
	BOP	Initiate ramp at directed rate (2 MW/min): Maintain valve position limit between 8 and 10% above valve position demand during ramp On the CONTROL SETPOINT page set the load target and load rate Inform other operator, then begin ramp by depressing the GO pushbutton If necessary, adjust Turbine Oil Temp Controller to maintain oil temp out of coolers at 110 to 120 deg. Verify Generator Hydrogen Temp Controller is maintaining cold gas temp below 46 deg Maintain load within the generator hydrogen pressure limits of the Calculated Capability Curve and the GENERATOR REACTIVE CAPABILITY display page

Op-Test No.: A	Scenario No.: 2	Event No.: 1	Page 2 of 2
Event Description: Increase power to 98%			

Time	Position	Applicant's Actions or Behavior
	RO	Maintain AFD in target band by varying dilution rate Verify dilution automatically stops when integrator reaches setpoint Return makeup system to Auto mode
	BOP	Stop ramp as necessary by depressing HOLD pushbutton

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

Event Description: Pzr pressure Xmtr PT-444 fails HIGH

Time	Position	Applicant's Actions or Behavior
	RO	Recognize failure of Pzr pressure Xmtr PT-444 - All przr heaters deenergized - Both spray valves open - PORV PCV-444B opens Annunciators: - PRZR PORV TEMP HI (HA5) - PRZR PRESS HI-LO (HC1) - PRZR HI-LO PRESS ALERT (HC2) - PRZR CONT PRESS OUTPUT HI (HD3) - REL VLV 444B/445A OPEN (HE1) - PRT TEMP HI (HE3)
	SRO	Ensure board operators take immediate actions per ARPs Direct subsequent actions per ARPs
	RO	Determine actual Pzr pressure Close PORV PCV-444B or Block Valve Take manual control of heaters and spray valves; close spray valves Monitor actual pressure against DNB LCO (2209 psig) Return actual pressure to the normal band
	SRO	Notify I&C to determine the cause and correct the fault Refer to LCOs 3.3.1, 3.3.2, and 3.4.1 for actions

Op-Test No.: A	Scenario No.: 2	Event No.: 3	Page 1 of 1
Event Description: Feedwater Header Pressure Xmtr PT-508 fails LOW			

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize indications of SGFP speed control failure - Increases in SGFP speeds, disch press, flows Annunciators - 1A/B/C SG LVL DEV (JF1/2/3) possible - 1A/1B/1C SG FEED FLOW > FEED FLOW (JG1/2/3)
	BOP	Check SGFP speeds, disch press, flows Determine SGFP speed control failure Shift SGFP speed control to Manual; restore program FWRV ΔP If necessary, take manual control of FWRVs and restore SG levels to normal
	SRO	Refer to ARPs and direct supplementary actions

82% trip

Op-Test No.: A	Scenario No.: 2	Event No.: 4	Page 1 of 1
Event Description: Charging Flow Control fails LOW in Auto			

Time	Position	Applicant's Actions or Behavior
	RO	Recognize failure of FCV-122 control Actual charging flow decreasing Pressurizer level decreases Letdown temperature increases Annunciators CHG HDR FLOW HI-LO (EA2) PZR LVL DEV LO (HB2) REGEN HX LTDN FLOW DISCH TEMP HI (DE1)
	SRO	Ensure board operators take ARP actions Assist RO in diagnosing FCV-122 failure
	RO	Check charging pump operation Check letdown flow normal Check FCV-122 operation Determine FCV-122 has failed Place FCV-122 in Manual and adjust to maintain pressurizer level
	BOP	Place turbine on HOLD
	SRO	Initiate investigation and repair

Op-Test No.: A	Scenario No.: 2	Event No.: 5	Page 1 of 1
Event Description: Steam Generator Feedwater pump 1A speed fails low and then trips			

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize loss of SGFP A speed: - Decrease in A SGFP speed - Decreasing main feed flow - Decreasing SG levels Annunciators: - 1A OR 1B SGFP TRIPPED (KC3) - 1A, 1B, and/or 1C SG LVL DEV (JF1, 2, 3) - 1A SGFP MISC ALARM (KB1)
	SRO	Direct rapid rampdown to < 515 MW → AOP 13.0 FCV close If SG levels not maintained > 25%, direct Rx trip (should not approach them) Direct actions per AOP-13.0, Loss of Main Feedwater and AOP-17.0, Rapid load reduction.
	BOP	Check SG level indications and determine actual water level Monitor SG levels, steam flows and feedwater flows Identify loss of A SGFP and take manual control of B SGFP speed control to increase speed to maximum if required. Reduce turbine load to < 515 MW Restore SG levels to program
	RO	Reduce Rx power to match decreased turbine load
	SRO	Notify Maintenance to determine cause of A SGFP trip

trip if 18%

Op-Test No.: A	Scenario No.: 2	Event No.: 6	Page 1 of 4
Event Description: "A" Feedline break inside ctmt with loss of 4160V Bus 1G causing loss of secondary heat sink			

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize feed flow problem Loss of Main feed flow Decreasing SG levels Annunciators: - 1A, 1B, and/or 1C STM FLOW > FEED FLOW (JB1, 2, 3) - 1A, 1B, and/or 1C SG LO LVL (JA1, 2, 3) - 1A, 1B, and/or 1C SG LVL DEV (JF1, 2, 3)
_____ Critical	SRO	Direct Rx trip and transition to EEP-0
	SRO	Enter EEP-0, Reactor Trip or Safety Injection
	RO/BOP	Perform immediate actions of EEP-0 without reference: - Check RTBs & associated bypass bkrs open - NO - Check Rx tripped (NIs, Rod Bottom lights) - NO - Check turbine tripped - NO - Verify at least one train of 4160 V ESF busses energized - Check SI actuated - NO
_____ Critical	SRO	Direct transition to FRP-S.1 when receive report that reactor has not tripped

Op-Test No.: A	Scenario No.: 2	Event No.: 6	Page 2 of 4

Event Description: "A" Feedline break inside ctmt with loss of 4160V Bus 1G causing loss of secondary heat sink

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Perform immediate actions of FRP-S.1 without reference: - Verify reactor tripped - NO Trip CRDM MG set supply breakers E5A, E5B - Check turbine tripped - NO Attempt manual trip for 5 sec Close GVs by depressing TURBINE MANUAL, GV CLOSE, FAST ACTION
	SRO	Direct subsequent actions of FRP-S.1, Nuclear Power Generator/ATWT - Verify all available AFW pumps started - YES - Check if emergency boration required - NO - If reactor shutdown now verified and steam flow to main turbine stopped, direct return to EEP-0
Critical	SRO	Direct return to EEP-0 Check SI actuated – YES

Op-Test No.: A	Scenario No.: 2	Event No.: 6	Page 3 of 4

Event Description: "A" Feedline break inside ctmt with loss of 4160V Bus 1G causing loss of secondary heat sink

Time	Position	Applicant's Actions or Behavior
	SRO	Direct actions of EEP-0. - Check reactor trip RTBs and BYP brkrs open, NI power falling, rod bottom lights lit - Check turbine tripped - Verify at least one train of ESF busses energized - Check SI actuated
	SRO	- Check HHSI flow > 0 gpm - Verify at least one RHR pump started - Verify ctmt vent isolation Ctmt purge dampers - closed Mini purge dampers - closed Stop mini purge supp/exh fan - Verify ctmt fan cooler alignment At least one ctmt fan started in slow Associated emer SW outlet vlv open - Verify at least one SW train has 2 SW pumps started - Verify at least one CCW pump started - Verify AFW flow to ea SG > 0 gpm – YES (1B MDAFW pump running) - Verify MFW status Verify MFW flow control & bypass vlvs closed Verify both SG feed pumps tripped Verify SG blowdown isolated - Check no MSL iso signal present - Check that ctmt press has remained < 27 psig

Op-Test No.: A Scenario No.: 2 Event No.: 6 Page 4 of 4

Event Description: "A" Feedline break inside ctmt with loss of 4160V Bus 1G causing loss of secondary heat sink

Time	Position	Applicant's Actions or Behavior
	SRO	- Verify Phase A ctmt iso Verify Ph A ctmt iso actuated Check all MLB-2 lights lit - YES - Announce "Unit 1 reactor trip and Safety Injection" - Verify all Rx trip and bypass bkrs open - Trip CRDM MG set supply breakers - Verify two trains of ECCS equipment aligned Both trains of SI actuated – YES Bkrs DF01, DF02, DG15, & DG02 closed – YES Two trains of battery chargers energized -YES Two trains of ESF equip aligned All MLB-1 lights lit - YES Two SW pumps running in both SW trains Chg pump suction and discharge vlvs open All post accident ctmt air mixing fans started - Check AFW status Total AFW flow > 395 gpm or any NR level >30% Control MDAFWP and TDAFWP flow for 30% to 60% NR level - Secure secondary components Both heater drain pumps All but one cond pump Align backup cooling to cond pumps - Check RCS avg temp stable at or approaching 547 deg - Check Pzr pressure - Check RCP trip criteria; subcooling > 16 deg - Monitor chg pump miniflow criteria - Check SGs not faulted; no SG press falling uncontrolled or < 50 psig - NO
Critical	SRO	Direct transition to EEP-2, Faulted Steam Generator Isolation Direct actions in EEP-2 per attached pages until transition to FRP-H.1 required. (Cue: Loss of 4160v Bus 1G)
Critical		When AFW flow > 395 gpm cannot be obtained, direct transition to FRP-H.1 Direct actions in FRP-H.1 per attached pages until FREEZE.
	SRO	Classify event per EIP-9.0 after FREEZE [Alert based on Equipment Failure (ATWT)] No continued power generation. Could be Site Area based on loss of functions for achieving HSTBY.

Facility: Farley Scenario No.: 2 Op-Test No.: B

Examiners: _____ Operators: _____

Objective: Evaluate applicant response to a SBLOCA coincident with a loss of all AC power.

Initial Conditions: (IC-21) 55%, MOL, Increasing Xenon, A Train on service
Power increase in progress

Turnover: 1B Diesel Generator OOS-voltage regulator problem. (OOS 1 hr; ETR 4 hr)
1B MDAFWP-burned cable (OOS 4 hrs; ETR 24 hrs)
1B Steam Generator has 15 gpd tube leak – unchanged for last week
Tornado/high winds watch set in southern Alabama
Operations Manager directs a power increase at 2 MW/min to 75% power.

Event No.	Malf. No.	Event Type*	Event Description
0	IC-21	-------	55% MOL, Xenon building in, A Train on service.
0	PANELS/EPB/DG08-1/CMF	------	RACKOUT BREAKER Rackout and tag 1B D/G output.
0	N/A	------	1B mode selector switch in Mode 3, Tag out 1B D/G OOS.
0	PANELS/MCB/1B MDAFW/CMF	------	RACKOUT BREAKER Rackout and tag 1B MDAFW pump.
0	SYS/MECH/BOP/1B S/G	-----	Set tube leak = 15 gpd.
0	PANEL/EPB/DF08-1CMF	C	Fail auto close contact. Breaker fails to close automatically. BF contact.
1	NA	N/R (ALL)	Increase Power at 2 MW/min
2	IMF/PRESS/ "C" S/G PROTECTION	I(BOP)	Select 200 psig ; 10s - Fail Selected Steam Pressure Xmtr Fails LOW
3	IMF/PRESS/ PRZR PRESS CONTROL	I(RO)	Select PT-444 Set = 2500 psig; 0s ramp. PRZR Pressure Xmtr PT-444 Fails HIGH
4	SYS/ESF/CCW TO RCPA	C(RO)	Select 1A RCP Thermal Barrier Leak. (Prevent surge tank valve from closing).
5	SYS/MECH/SGFP TURBINES/1B	C(BOP)	Trip the 1B SGFWP.
6	SYS/MECH/RCS/RCP A/	C(ALL)	Select 1A RCP #1 Seal Failure. 5.5% Fail ON DA5
6A	SYS/MECH/RCS/RCP A SYS/MECH/RCS/A LOOP	M(ALL)	Select 1A RCP #2 and 3 Seal Failures **[Insert When RCP Tripped]** Select small pipe break set = 300 gpm.
6B	SYS/ELEC/SWITCHYARD	M(ALL)	Select Loss of all Off-site Power set =1; 3s **(Insert at step 6 of EEP-0) (loss of all AC)**

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

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

Event Description: Increase power to 100%

Time	Position	Applicant's Actions or Behavior
	SRO	Direct ramp of power to 100% at 2 MW/min in accordance with UOP-3.1, Power Operations, Section 5.1.5
	RO	Initiate dilution: Determine existing RCS boron concentration Determine magnitude of required boron concentration decrease from core physics curves Determine volume of makeup water req'd from dilution nomograph If necessary, adjust LTDN TO VCT FLOW setpoint to prevent compressing the gas space Set reactor makeup water flow controller and batch integrator to the appropriate flow rate and quantity values Place the MAKEUP MODE CONT SWITCH to STOP Position the MKUP MODE SEL SWITCH to DIL Position the MKUP MODE CONT SWITCH to START If running, stop 1B RMW PUMP Verify dilution by observing FCV114 opens and flow is indicated on FI-168 at selected rates Energize Pzr heaters to initiate spray for equalization of boron concentration
	BOP	Initiate ramp at directed rate (2 MW/min): Maintain valve position limit between 8 and 10% above valve position demand during ramp On the CONTROL SETPOINT page set the load target and load rate Inform other operator, then begin ramp by depressing the GO pushbutton If necessary, adjust Turbine Oil Temp Controller to maintain oil temp out of coolers at 110 to 120 deg. Verify Generator Hydrogen Temp Controller is maintaining cold gas temp below 46 deg Maintain load within the generator hydrogen pressure limits of the Calculated Capability Curve and the GENERATOR REACTIVE CAPABILITY display page

Op-Test No.: B	Scenario No.: 2	Event No.: 1	Page 2 of 2
Event Description: Increase power to 98%			

Time	Position	Applicant's Actions or Behavior
	RO	Maintain AFD in target band by varying dilution rate Verify dilution automatically stops when integrator reaches setpoint Return makeup system to Auto mode
	BOP	Stop ramp as necessary by depressing HOLD pushbutton

Op-Test No.: B	Scenario No.: 2	Event No.: 2	Page 1 of 1
Event Description: "C" SG controlling steam pressure transmitter (495/6) fails low			

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize indications of steam pressure channel failing low: - Decrease in failed channel indication - Decrease in actual feed flow - Decreasing C SG level Annunciators: - 1C SG LVL DEV (JF3) - MS LINE PRESS LO ALERT (JA4) - 1C SG STM LINE HI DP ALERT (JE3) - 1C SG FEED FLOW > STM FLOW (JG3)
	SRO	Ensure board operators take ARP actions
	BOP	Perform immediate actions of JF3: - Verify actual level deviation and/or flow mismatch - Monitor SG levels, steam flows, feed flows - Take manual control of C SG feed flow and restore level to program - Determine cause of alarm
	SRO	Direct supplementary actions of ARP JF3: - Notify I&C of failure - Select alternate steam flow xmtr - Return SG level control to auto

Op-Test No.: B	Scenario No.: 2	Event No.: 3	Page 1 of 1
Event Description: Pzr pressure Xmtr PT-444 fails HIGH			

Time	Position	Applicant's Actions or Behavior
	RO	Recognize failure of Pzr pressure Xmtr PT-444 - All przr heaters deenergized - Both spray valves open - PORV PCV-444B opens Annunciators: PRZR PORV TEMP HI (HA5) PRZR PRESS HI-LO (HC1) PRZR HI-LO PRESS ALERT (HC2) PRZR CONT PRESS OUTPUT HI (HD3)
	SRO	Ensure board operators take immediate actions per ARPs Direct subsequent actions per ARPs
	RO	Determine actual Pzr pressure Close PORV PCV-444B or Block Valve Take manual control of heaters and spray valves; close spray valves Monitor actual pressure against DNB LCO (2209 psig) Return actual pressure to the normal band
	SRO	Notify I&C to determine the cause and correct the fault Refer to LCOs 3.3.1, 3.3.2, and 3.4.1 for actions

Op-Test No.: B	Scenario No.: 2	Event No.: 4	Page 1 of 1
Event Description: 1A RCP Thermal Barrier Leak			

Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications of 1A RCP thermal barrier leak Increasing level in on-service CCW train surge tank Increasing reading on CCW rad monitor Check AOV-3045 (CCW return from thermal barriers) closed. Annunciators: - CCW SRG TK LVL A TRN HI-LO (AA4) - RMS HI-RAD (FH1) - RCP THRM BARR CCW FLOW HI (DD2) - RCP SEAL INJ FLOW LO (DD1) - SEAL WTR INJ FLTR HI DP (DC4) - BOP PANELS ALARM (BE5) - BOP N- NB3 RCP THRM BARR ISO HV-3045 AIR PRESS LO - BOP N- LB3 RCP THRM BARR ISO HV-3184 AIR PRESS LO Close R-17A & B Surge Tank Vent Isolation valves
	SRO	Ensure board operators perform ARP actions If CCW rad monitor alarms, ensure CCW surge tank vent shuts Check adequate seal injection flow rates

Op-Test No.: B	Scenario No.: 2	Event No.: 5	Page 1 of 1
Event Description: Steam Generator Feedwater pump B trips			

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize loss of SGFP B: - Increase in A SGFP speed - Decreasing main feed flow - Decreasing SG levels Annunciators: - 1A OR 1B SGFP TRIPPED (KC3) - 1A, 1B, and/or 1C STM FLOW > FEED FLOW (JB1, 2, 3) - 1A, 1B, and/or 1C SG LO LVL (JA1, 2, 3) possible - 1A, 1B, and/or 1C SG LVL DEV (JF1, 2, 3) - 1B SGFP MISC ALARM (KB2)
	SRO	Direct rapid rampdown to < 515 MW If SG levels not maintained > 25%, direct Rx trip Direct actions per AOP-13.0, Loss of Main Feedwater
	BOP	Check SG level indications and determine actual water level Monitor SG levels, steam flows and feedwater flows Identify loss of B SGFP and take manual control of A SGFP speed control to increase speed to maximum if required. Reduce turbine load to < 515 MW Restore SG levels to program
	RO	Reduce Rx power to match decreased turbine load
	SRO	Notify Maintenance to determine cause of B SGFP trip

Op-Test No.: B	Scenario No.: 2	Event No.: 6	Page 1 of 6
Event Description: Failure of number 1 seal on RCP 1A followed by failure of other 1A RCP seals causing LOCA			

Time	Position	Applicant's Actions or Behavior
	RO	Recognize failure of #1 seal: - Increase in seal leakoff flow to > 6 gpm - #1 seal leakoff high temp - lower radial bearing water temp increasing Annunciator - RCP #1 SEAL LKOF FLOW HI (DC2)
Critical	SRO	Direct actions per ARP for DC2 Direct Rx trip if: (any one) a. #1 seal leakoff flow > 8 gpm or combo of #1/#2 seal leakoff flows > 8 gpm b. 1A RCP #2 SEAL LKOF FLOW HI annunciator (DA5) alarms with #1 seal leakoff flow > 7.25 gpm c. Lower pump bearing or seal water outlet temps increasing
	RO	- Manually trip the reactor as directed by SRO - Secure 1A RCP within 5 minutes - When 1A RCP has come to a complete stop, iso seal leakoff (HV-8141A)
	SRO	Direct initiation of EEP-0, Reactor Trip or Safety Injection
	RO/BOP	Perform immediate actions of EEP-0 without reference: - Check Rx tripped RTBs & associated bypass bkrs open NI power falling Rod bottom lights lit - Check turbine tripped - Verify at least one train of 4160 V ESF busses energized - Check SI actuated - NO (Depending on timing, SI may actuate, obviating transition to ESP-0.1)
	SRO	Direct transition to ESP-0.1 Direct actions in ESP-0.1

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

Event Description: Failure of number 1 seal on RCP 1A followed by failure of other 1A RCP seals causing LOCA

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Perform actions of ESP-0.1 as directed Check RCS T-cold stable at or approaching 547°F Check emergency boration not required - All control rods fully inserted. - RCS T-avg >525°F Verify all RTB and bypass breakers open Announce "Unit 1 reactor trip"
	CREW	Recognize and report Safety Injection due to lowering RCS pressure - Decreasing RCS pressure - BYP & PERMISSIVE SAFETY INJECTION ACTUATED light lit
Critical	SRO	Direct return to EEP-0
	RO/BOP	Repeat immediate actions of EEP-0 without reference - Check reactor trip RTBs and BYP brkrs open, NI power falling, rod bottom lights lit - Check turbine tripped - Verify one train of ESF busses energized - Check SI actuation
	CREW	Recognize failure of all seals on RCP 1A - Zero D/P on seals - Reduced seal return flow - RCS pressure decrease - Pzr level decreasing
	RO	Manually initiate SI if auto actuation has not occurred
	SRO	Direct subsequent actions of EEP-0 - Check HHSI flow > 0 gpm - Verify at least one RHR pump started - Verify ctmt vent isolation Ctmt purge dampers - closed Mini purge dampers - closed Stop mini purge supp/exh fan

Op-Test No.: B	Scenario No.: 2	Event No.: 6	Page 3 of 6

Event Description: Failure of number 1 seal on RCP 1A followed by failure of other 1A RCP seals causing LOCA

Time	Position	Applicant's Actions or Behavior
	CREW	Recognize Loss of Offsite Power - Breaker indications on MCB - Verify at least one train of 4160 V ESF busses energized - NO, Inform SRO
Critical	SRO	Direct transition to ECP-0.0 when receive report that neither train of ESF busses energized.
	RO/BOP	Perform immediate actions of ECP-0.0 without reference: - Check reactor tripped RTBs and bypass bkrs open Nuclear power falling - Check turbine tripped
	SRO	Direct subsequent actions of ECP-0.0 - Verify RCS isolated PORVs closed when RCS press < 2310 psig Normal and excess letdown isolated - Verify total AFW flow > 395 gpm - Restore power to any emergency bus Open supply bkrs to major loads on ESF busses Check 1-2A, 1C or 1B EDG running Only 1-2A EDG running, and its output breaker has NOT closed Verify 1-2A EDG output frequency and voltage Check 1-2A EDG output breaker closed - NO Direct closure of 1-2A EDG output breaker DF08 per RNO
Critical	BOP	Perform closure of 1-2A EDG output breaker DF08 per RNO (Team may start SBO Diesel for B train Power) - Place mode selector switch in Mode 2 - Place SYNCH SWITCH in MAN - Close DF08 breaker Verify adequate SW flow Verify two SW pumps in A Train running Verify SW TO/FROM DG BLDG-A HDR (519/537) open Check 1-2A EDG lube oil temperature alarm clear. Direct a return to procedure and step in effect-(EEP-0)

Op-Test No.: B Scenario No.: 2 Event No.: 6 Page 4 of 6

Event Description: Failure of number 1 seal on RCP 1A followed by failure of other 1A RCP seals causing LOCA

Time	Position	Applicant's Actions or Behavior
	SRO	- Verify ctmt fan cooler alignment At least one ctmt fan started in slow Associated emer svc water outlet vlv open - Verify at least one SW train has 2 SW pumps started - Verify at least one CCW pump started - Verify AFW flow to ea SG > 0 gpm - Verify MFW status Verify MFW flow control & bypass vlvs closed Verify both SG feed pps tripped Verify SG blowdown isolated - Check no MSL iso signal present - Check that ctmt press has remained < 27 psig - Verify Phase A ctmt iso Verify Ph A ctmt iso actuated Check all MLB-2 lights lit - Announce "Unit 1 reactor trip and Safety Injection" - Verify all Rx trip and bypass bkrs open - Trip CRDM MG set supply breakers - Verify two trains of ECCS equipment aligned Both trains of SI actuated Bkrs DF01, DF02, DG15, & DG02 closed Two trains of battery chargers energized Two trains of ESF equip aligned All MLB-1 lights lit Two SW pumps running in both SW trains Chg pump suction and discharge vlvs open All post accident ctmt air mixing fans started - Check AFW status Total AFW flow > 395 gpm or any NR level >30% Control MDAFWP and TDAFWP flow for 30% to 60% NR level When two SG NR levels >25% and TDAFWP not required, stop TDAFWP - Secure secondary components Both heater drain pumps All but one cond pump Align backup cooling to cond pumps - Check RCS avg temp stable at or approaching 547 deg - - Direct actions per RNO 22.2 to stop heatup (If required).

Op-Test No.: B Scenario No.: 2 Event No.: 6 Page 5 of 6

Event Description: Failure of number 1 seal on RCP 1A followed by failure of other 1A RCP seals causing LOCA

Time	Position	Applicant's Actions or Behavior
	SRO	- Continue directing subsequent actions of EEP-0 - Check Pzr pressure - Check RCP trip criteria; subcooling > 16 deg - Monitor chg pump miniflow criteria - Check SGs not faulted; no SG falling in uncontrolled manner or less than 50 psig
	SRO	- Check SGs not ruptured Secondary rad indication normal No SG level rising in uncontrolled manner - Check RCS intact - NO Check containment radiation normal Check containment pressure < 3 psig Check containment ECCS sump < 0.4 ft Recognize that even if above requirements met, RCS not intact due to "A" RCP seal failure
Critical	SRO	Direct transition to EEP-1, Loss of Reactor or Secondary Coolant Direct actions in EEP-1
	RO	Check RCP trip criteria - > 16% subcooled on subcooled margin monitor
	BOP	Check SGs not faulted - no SG pressure falling uncontrolled Monitor CST level Check intact SG levels Control AFW flow to get SG NR levels >30% {50%} Check secondary rad indications
	RO	Check Pzr PORVs- power avail to iso vlvs, at least one iso vlv open, both PORVs closed
	SRO	Direct that the following be performed within one hour of start of event: Close recirc vlv disconnects Establish 1A and 1B post LOCA ctmt H2 analyzers Plot H2 concentration If H2 concentration <4%, place both recombiners in svc

Op-Test No.: B	Scenario No.: 2	Event No.: 6	Page 6 of 6
Event Description: Failure of number 1 seal on RCP 1A followed by failure of other 1A RCP seals causing LOCA			

Time	Position	Applicant's Actions or Behavior
	SRO	Check SI termination criteria: Subcooling > 16 {45} deg in CETC mode Secondary heat sink available RCS pressure stable or rising - NO Pzr level > 7% {50%} Continue directing actions of EEP-1 per attached pages until FREEZE
	SRO	Classify event per EIP-9.0 after FREEZE [Alert based on RCS fault >50 gpm or Electrical Fault – LOSP with loss of emergency busses < 15 min]

Facility: Farley Scenario No.: 3 Op-Test No.: A

Examiners: _____ Operators: _____

_____ _____

_____ _____

Objective: Evaluate applicants response to a steam space break.

Initial Conditions: (IC-32) 100%, MOL, Equil Xenon, B Train on Service

Turnover: Diesel Gen 1-2A OOS for Brush Repair (OOS 1hr, ETR 4 hrs)
1A MDAFWP OOS for Bearing Replacement (OOS 4 hr, ETR 12 hrs)
1A S/G has 10 gpd Tube Leakage – Steady for 2 weeks
Thunderstorm Warning in Effect for Southeast Alabama
Operations Manager Directions are for the Plant to Remain at 100% for Rest of Shift

Event No.	Malf. No.	Event Type*	Event Description
0	IC-32	-------	100% MOL, Equil. Xenon, B Train on service.
0	PANEL/EPB/DF08-1/CMF	------	RACKOUT BREAKER; Rackout and Tag 1-2A D/G unit 1 output.
0	PANEL/EPB/DF08-2/CMF	------	RACKOUT BREAKER; Rackout and Tag 1-2A D/G unit 2 output.
0	N/A	------	1-2A D/G Mode selector switch in mode 3, tag 1-2A OOS.
0	PANEL/MCB/1AMDAFW/CMF	------	RACKOUT BREAKER; Rackout and Tag 1A MDAFW Pump.
0	SYS/MECH/BOP/1A S/G	------	Set tube leak =10 gpd.
0	PANEL/MCB/1A CCW/CMF	C	FAIL OPEN SI Contacts for B Train CCW. Pump Fails to Start
0	SYS/MECH/ESF/AFW/	C	Select TDAFWP set to Trip on Start. **(LINK to alarm)**
0	PANEL/MCB/1C COND PUMP/CMF	C	Fail Auto start contacts (63Ia,52b,52b) open on STBY condensate pump.
0	PANEL/MCB/1B COND PUMP/CMF	C	Degrade head 5% (this is to get final pressure below 275 psig)
1	IMF/PRZR LEVEL CONTROL/ LT-459	I(RO)	Set = 0; 10s ramp. Selected PRZR Level Xmtr Fails LOW
2	SYS/MECH/BOP/HTR DRN TK/ V915A	C (BOP)	Heater Drain Tank 1A Dump Valve V915A Fails OPEN
3	IMF/FLOW/1A S/G FEED FLOW	I(BOP)	Set Selected xmtr to 0 ;ramp 10s; 1A SG FF Xmtr Fails LOW
4	N/A	N/R	Secondary Chem Parameter > Level 3 – Controlled Shutdown
5	IMF/MISC/SPEED CONTROL RODS	C(RO)	Select Rods Fail to Move in Auto.
6	IMF/PRESS/PRZR PRESS CONTROL/ PCV 444-C/OUTPUT DEMAND	M (ALL)	Set output demand to 100; Ramp 0s. PRZR Spray Valve PCV-444C Fails OPEN
6A	SYS/MECH/RCS/PRZR	M (ALL)	Select PRZR Steam Space Leak Set = 600 gpm; Ramp 300s. (Insert 60 seconds after plant tripped for event 6)

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

Op-Test No.: A	Scenario No.: 3	Event No.: 1	Page 1 of 1
Event Description: Controlling Pzr level transmitter fails low			

Time	Position	Applicant's Actions or Behavior
	RO	Recognize failure of Pzr level transmitter LT-459 - Letdown isolation valve closes - Pzr heaters deenergize - Charging flow increases - Actual Pzr level increases Annunciators: PRZR LVL LO B/U HTRS OFF LTDN SEC (HA3) CHG HDR FLOW HI-LO (EA2) PRZR LVL DEV LO (HB2)
	SRO	Ensure board operators take immediate actions per ARPs Direct subsequent actions per ARPs
	RO	Determine actual Pzr level deviation Ensure automatic actions have occurred Take manual control of charging flow and reduce flow to zero Adjust RCP seal injection flow as required Shift to alternate Pzr level transmitter LT-461 Reestablish charging and letdown flow per SOP-2.1, CVCS Startup & Operation, Section 4.4 Ensure Pressurizer Htrs are energized. Return level to the program band
	SRO	Notify I&C to determine the cause and correct the fault Refer to Tech Specs 3.3.1 and determine required actions

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

Event Description: Heater Drain Tank 1A Dump Valve Fails Open
(and subsequent trip of HDT pump and low SGFP suction pressure)

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize failure of HDT 1A dump valve - Reduced SGFP suction pressure, FW flow - Decreasing SG levels Annunciators - 1A or 1B HDP TRIPPED (LA1) - SGFP SUCT PRESS LO (KB4) - TAVG/TREF DEV (HF3) possible - 1A/B/C SG LVL DEV (JF1/2/3) possible
	SRO	Ensure board operators take immediate actions per ARPs. Direct subsequent actions per ARPs .
	BOP	Observe SGFP suction pressure. If low then refer to KB4. If SGFP pressure continues to drop, then start Stby Conds pump prior to reaching 275 psig. Send TB SO to check HDT dump valve (v915A) closed to attempt to determine problem and close HDT 1A dump valve if necessary. Take manual control of FWRVs as necessary to restore SG levels.(as required) Restart HDT pump and stop Stby Conds pump ASAP.
	RO	Carefully monitor Tave, Rx power, Pressurizer level and pressure and S/G levels due to effects of the colder feedwater.

Op-Test No.: A	Scenario No.: 3	Event No.: 3	Page 1 of 1
Event Description: "A" SG controlling FW flow transmitter (476) fails low			

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize indications of "A" SG feed flow channel failing low: - Reduction in feed flow indication followed by increase in actual feed flow - Increasing A SG level Annunciators: - 1A SG LVL DEV (JF1) - 1A SG STM FLOW >FEED FLOW (JB1)
	SRO	Ensure board operators take ARP actions
	BOP	Perform immediate actions of JF1 and JB1: - Verify actual level deviation - Monitor SG levels, steam flows, feed flows - Take manual control of A SG feed flow and restore level to program
	SRO	Direct supplementary actions of ARP JF1 and JB1: - Notify I&C to investigate failure and determine cause - Select alternate FW flow transmitter - Return SG level control to auto

Op-Test No.: A	Scenario No.: 3	Event No.: 4	Page 1 of 1
Event Description: Secondary Chemistry Parameter exceeds Action Level 3 Criterion			

Time	Position	Applicant's Actions or Behavior
	SRO	Receive report from Chemistry that Chloride in SG's B & C exceeds the Action Level 3 criterion Direct implementation of AOP-25.0, "Abnormal Primary or Secondary Chemistry" Direct rapid load reduction per AOP-17.0 Verify CNDS EMER DUMP NIN21V904 closed
	RO/BOP	Coordinate rapid load reduction per AOP-17.0
	BOP	Reduce turbine load at desired rate in OPERATOR AUTO
	RO	Maintain TAVG within ±5°F of TREF using rods in Auto or borating approximately 1 gal per MW reduction Maintain ΔI within limits of COLR

Op-Test No.: A	Scenario No.: 3	Event No.: 5	Page 1 of 1
Event Description: Rods fail to move in Automatic			

Time	Position	Applicant's Actions or Behavior
	RO	Recognize failure of Automatic rod control – THIS MAY NOT OCCUR DUE TO AOP-17 STEP 12 THAT ALLOWS A RAMP IN MANUAL RODS* - Swings in Tavg caused by feed oscillations - Swings in pressurizer level Annunciators: TAVG/TREF DEV (HF3) RX COOLANT LOOPS TAVG DEV HI-LO (HF1)
	SRO	Ensure board operators take immediate actions of ARPs. Refer to AOP-19.0, Malfunction of Rod Control System
	RO	Verify actual temperature deviation Shift rod control to Manual Restore Tavg to programmed value
	SRO	Initiate investigation and repair of rod problem Consult Ops Mgr to evaluate continued plant ops

*NEED CONTINGENCY PLAN- If team selects manual rod control prior to the ramp, then insert IMF/MISC/SPEED CONTROl/ RODS. Select manual rods continue to move when used. This will also cause an AOP-19.0 entry and force the team to select AUTO rod control (The malfunction for AUTO rod movement will be cleared)

Op-Test No.: A	Scenario No.: 3	Event No.: 6	Page 1 of 1
Event Description: Pzr spray valve PCV-444C fails open			

Time	Position	Applicant's Actions or Behavior
	RO	Recognize failure of PCV-444C and spray lights OFF Decreasing RCS pressure All przr heaters energized Annunciators: PRZR PRESS REL VLV 445A OR B/U HTRS ON (HD1) PRZR PRESS HI-LO (HC1) PRZR HI-LO PRESS ALERT (HC2) PRZR PRESS SI PORV BLOCK P-11 (HD2)
Critical	SRO	Direct actions per ARP Direct reactor trip before pressure reaches 2000 psig Direct tripping RCP 1A after Rx tripped
	RO	Determine actual Pzr pressure Ensure automatic action has occurred Take manual control of spray valve PCV-444C and attempt to close Perform Rx trip when directed by SRO Trip RCP 1A
	SRO	Direct initiation of EEP-0

Op-Test No.: A	Scenario No.: 3	Event No.: 6A	Page 1 of 4
Event Description: PRZR Steam Space leak (LOCA) with loss of B Train CCW Pump and TDAFWP			

Time	Position	Applicant's Actions or Behavior
	SRO	Direct initiation of EEP-0, Reactor Trip or Safety Injection
	RO/BOP	Perform immediate actions of EEP-0 without reference: - Check Rx tripped RTBs & associated bypass breakers open NI power falling Rod bottom lights lit - Check turbine tripped - Verify at least one train of 4160 V ESF busses energized - Check SI actuated - NO (Depending on timing, SI may actuate, obviating transition to ESP-0.1)
	SRO	Direct transition to ESP-0.1, Reactor Trip Response Direct actions in ESP-0.1
	RO/BOP	Perform actions of ESP-0.1 as directed Check RCS T-cold stable at or approaching 547°F Check emergency boration not required: All control rods fully inserted; RCS Tavg >525°F Verify all RTBs and bypass breakers open Announce "Unit 1 reactor trip"
	CREW	Recognize and report Safety Injection due to lowering RCS pressure - Decreasing RCS pressure - BYP & PERMISSIVE SAFETY INJECTION ACTUATED light lit
Critical	SRO	Direct return to EEP-0
	RO/BOP	Repeat immediate actions of EEP-0 without reference - Check reactor trip RTBs and BYP breakers open, NI power falling, rod bottom lights lit - Check turbine tripped - Verify one train of ESF busses energized - Check SI actuation

Op-Test No.: A Scenario No.: 3 Event No.: 6A Page 2 of 4

Event Description: PRZR Steam Space leak (LOCA) with loss of B Train CCW Pump and TDAFWP

Time	Position	Applicant's Actions or Behavior
	SRO	Direct subsequent actions of EEP-0 - Check HHSI flow > 0 gpm - Verify at least one RHR pump started - YES - Verify ctmt vent isolation Ctmt purge dampers - closed Mini purge dampers - closed Stop mini purge supp/exh fan - Verify ctmt fan cooler alignment At least one ctmt fan started in slow Associated emer SW outlet vlv open - Verify at least one SW train has 2 SW pumps started - Verify at least one CCW pump started (Train A only) may have or at this point start a B Train CCW pump - Verify AFW flow to ea SG > 0 gpm - Verify MFW status Verify MFW flow control & bypass vlvs closed Verify both SG feed pumps tripped Verify SG blowdown isolated - Check no MSL iso signal present - Check that ctmt press has remained < 27 psig - Verify Phase A ctmt iso Verify Ph A ctmt iso actuated Check all MLB-2 lights lit - Announce "Unit 1 reactor trip and Safety Injection" - Verify all Rx trip and bypass breakers open - Trip CRDM MG set supply breakers - Verify two trains of ECCS equipment aligned Both trains of SI actuated Bkrs DF01, DF02, DG15, & DG02 closed Two trains of battery chargers energized Two trains of ESF equip aligned All MLB-1 lights lit - NO Verify SI alignment using Attachment 4- including a B Train CCW pump (if not already started) Two SW pumps running in both SW trains Chg pump suction and discharge vlvs open All post accident ctmt air mixing fans started - Check AFW status Total AFW flow > 395 gpm or any NR level >30% Control MDAFWP and TDAFWP flow for 30% to 60% NR level When two SG NR levels >25% and TDAFWP not required, stop TDAFWP

Op-Test No.: A Scenario No.: 3 Event No.: 6A Page 3 of 4

Event Description: PRZR Steam Space leak (LOCA) with loss of B Train CCW Pump and TDAFWP

Time	Position	Applicant's Actions or Behavior
	SRO	- Secure secondary components Both heater drain pumps All but one cond pump Align backup cooling to cond pumps - Check RCS avg temp stable at or approaching 547 deg - Check Pzr pressure - Check RCP trip criteria; subcooling > 16 deg - NO Stop all RCPs - Monitor chg pump miniflow criteria - Check SGs not faulted; no SG falling in uncontrolled manner or less than 50 psig
	SRO	- Check SGs not ruptured Secondary rad indication normal No SG level rising in uncontrolled manner - Check RCS intact - NO Check containment radiation normal Check containment pressure < 3 psig Check containment ECCS sump < 0.4 ft
Critical	SRO	Direct transition to EEP-1, Loss of Reactor or Secondary Coolant Direct actions in EEP-1
	RO	Check RCP trip criteria - all tripped
	BOP	Check SGs not faulted - no SG pressure falling uncontrolled Monitor CST level Check intact SG levels Control AFW flow to get SG NR levels >30% {50%} Check secondary rad indications
	RO	Check Pzr PORVs- power avail to iso vlvs, at least one iso vlv open, both PORVs closed
	SRO	Direct that the following be performed within one hour of start of event: Close recirc vlv disconnects Establish 1A and 1B post LOCA ctmt H2 analyzers Plot H2 concentration If H2 concentration <4%, place both recombiners in service

Op-Test No.: A	Scenario No.: 3	Event No.: 6A	Page 4 of 4
Event Description: PRZR Steam Space leak (LOCA) with loss of B Train CCW Pump and TDAFWP			

Time	Position	Applicant's Actions or Behavior
	SRO	Check SI termination criteria: Subcooling > 16 {45} deg in CETC mode - YES Secondary heat sink available - YES RCS pressure stable or rising - NO Pzr level > 7% {50%} - YES Continue directing actions of EEP-1 per attached pages until FREEZE
	SRO	Classify event per EIP-9.0 after FREEZE [Alert based on RCS fault >50 gpm]