

Facility:	Farley Nuclear Plant		Scenario No.:	1	Op-Test No.:	FA2014-301
Examiners:			Operators:			SRO
						RO
						BOP
<p>Initial Conditions: 4% power, UOP-1.2, v110, completed thru step 5.65. Ready to perform step 5.66. MOL, 1340 ppm Cb; 1B SGFP on service. Aux steam from U-2.</p> <p>Turnover:</p> <ul style="list-style-type: none"> 1B SGFP is on service, MFR bypass valves are on service. Current Risk Assessment is GREEN and projected to remain GREEN. A Train O/S, A Train protected. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia 						
SPLIT TRAIN ALIGNMENT						
Event No.	Malf. No.	Event Type*	Event Description			
1		R (RO) N (BOP)	Raise Power to 12% using control rods and steam dumps.			
2		N (BOP)	Start 1A CTMT Cooler in Fast			
3	Imf fk122-A	C (RO)	FK-122 Fails open in Auto (P – CT)			
4	imf mal-rmsip35 A / preset	I (BOP) TS (SRO)	R-35A Fails high, automatic actions do not occur T.S. 3.3.7 Cond A			
5	imf pt508	I (BOP)	PT-508 Fails high (P – CT)			
6	imf crcrp1_cc3	C (RO) TS (SRO)	1A RCP trips (P – CT) T.S. 3.4.4 Cond A			
7	Imf mal-mss1B / Preset	M (ALL) C (RO)	Steam break inside containment, MSIV's will not close, Automatic SI is blocked (CT-2)			
8	Preset / dmf crsh001_c_cc5	C (BOP)	1B CS pump does not auto start. (*CT-3) MOV 8820A does not open. (*CT-3) *1 CS spray pump required (Orange Path on Z until CS established) After ECP 2.1 entry and 27psig in containment MSIV's close.			
			Terminate on transition out of ECP-2.1 to EEP-2 or examiners discretion			

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

		PRESETS	
7		Fail auto SI signals, Manual SI works CMFmalf / csftyinj_cc1 / open CMFmalf / csftyinj_cc11 / open	*
4		3622, 3624 and 3626 will not close on hi rad Cmf mal / chvh3622_d_cc3 closed Cmf mal / chvh3624_d_cc3 closed Cmf mal / chvh3626_d_cc3 closed	*
7		1A MSIVs will not close on the auto or manual closure CMFmalf / crsh001a_cc5 / open CMFmalf / cmsh002a_d_cc5 / open CMFmalf / crsh001a_opos3 / open CMFmalf / cmsh002a_d_opos3 / open	*
7		1B MSIVs will not close on the auto or manual closure CMFmalf / crsh001b_cc5 / open CMFmalf / cmsh002b_d_cc5 / open CMFmalf / crsh001b_opos3 / open CMFmalf / cmsh002b_opos3 / open	*
7		1C MSIVs will not close on the auto or manual closure CMFmalf / crsh001c_cc5 / open CMFmalf / cmsh002c_d_cc5 / open CMFmalf / crsh001c_opos3 / open CMFmalf / cmsh002c_opos3 / open	*
8		1B CS pump does not auto start – will start from MCB CMFmalf / cbkp01b_d_cc5/ open	*
		MOV 8820A does not open on phase B– will open from MCB CMFmalf / cbk8820a_d_cc5 / open	*
		Triggers and Commands	

Initial Conditions: 4% power, UOP-1.2, v110, completed thru step 5.65, Ready to perform step 5.66. MOL, 1340 ppm Cb; 1B SGFP on service. Aux steam from U-2.

Turnover:

- 1B SGFP is on service, MFR bypass valves are on service.
- Current Risk Assessment is **GREEN** and projected to remain **GREEN**.
- **A** Train O/S, **A** Train protected.

Event 1 Commence Ramp up to 12% power.

Verifiable actions: RO uses rods to increase RCS temperature, adjusts Steam Dumps to increase Stm flow and Rx power. BOP adjusts MFW flow to the SGs (Bypass FRVs on service) and may adjust steam dumps instead of the RO.

Event 2 Start 1A CTMT Cooler in Fast.

Verifiable actions: BOP will stop the 1A CTMT cooler and then start the 1A CTMT Cooler in FAST (2 separate switches).

Event 3 FK-122 fails open in auto. (P – CT)

Verifiable actions: RO will take manual control of FK-122.

Event 4 R-35A Fails high, automatic actions do not occur.

Verifiable actions: BOP will manually isolate the three (3) dampers that failed to automatically isolate (HS on BOP). **TS 3.3.7 Function 3 Condition A.**

Event 5 PT-508 Fails high. (P – CT)

Verifiable Actions: BOP takes manual control of SGFP speed as SGFP speed will decrease as will SGWL.

Event 6 1A RCP trips. (P – CT)

Verifiable Actions: RO manually shuts 1A spray valve, PK-444C. BOP will maintain SGWL. **T.S. 3.4.4 Cond A.**

Event 7 A Steam Break inside CTMT will occur and MSIV's will not close. AUTO SI is blocked.

Verifiable Actions: RO manually initiate SI. (CT)

Event 8 1B CTMT Spray (CS) pump fails to auto start, MOV-8820A 1A CS discharge does not auto open.

Verifiable Actions: BOP start 1B CS pump OR open MOV-8820A. (CT) Orange path on FRP-Z.1 until CS flow is established.

At step 2 of ECP-2.1, 1A MSIV closes.

Terminate on transition from ECP-2.1 to EEP-2 or examiners discretion. Transition criteria to leave ECP-2.1 may or may not be met with in scenario design time.

UOP-1.2/ SOP/ARP/AOP-16/ARP/AOP-100/AOP-4/EEP-0/ESP-0.1/EEP-0/EEP-2/ECP-2.1/EEP-2.

CRITICAL TASK SHEET

- ___ 1. Manually actuate at least one train of SIS-actuated safeguards before any of the following: (CT-2)
- Transition to any E-2 series procedure or FRG.
- ___ 2. Manually actuate at least the minimum required complement of containment cooling equipment before an extreme (red path) challenge develops to the containment CSF. (CT-3)

**SCENARIO
OBJECTIVE/
OVERVIEW:**

Low power instrument and component failures with a Steam Break.

The team should be able to:

- ramp the plant from 4% to 12 % power,
- start a Containment cooler in FAST,
- respond to a component malfunction FCV-122,
- respond to an instrument malfunction of R-35A,
- respond to an instrument malfunction affecting SGFP speed,
- respond to a RCP trip,
- diagnose a steam break (MSIV's do not close) , manually SI (blocked), manually start Containment Spray,
- diagnose that all SGs are faulted and transition to ECP-2.1,
- 1C MSIV closes in ECP-2.1 and terminate when transition back to EEP-2 is performed or at examiner's discretion.

Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes
1.	Total malfunctions (5–8)	6
2.	Malfunctions after EOP entry (1–2)	2
3.	Abnormal events (2–4)	3
4.	Major transients (1–2)	1
5.	EOPs entered/requiring substantive actions (1–2)	1
6.	EOP contingencies requiring substantive actions (0–2)	1
7.	Critical tasks (2–3)	5

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Event Description: **Ramp up to 12% power**

Indications Available

Annunciators: NA

Increase Reactor power to 12% and get ready to roll the Main Turbine. When simulator is taken to run the crew is expected to increase Reactor power to 12% IAW UOP-1.2. At 8% the NRC will evaluate going to the next event. This evolution will take approx. 15 -20 minutes

Note to Examiner

When simulator is taken to run the crew is expected to increase Reactor power to 12% IAW UOP-1.2. At 8% the Lead Examiner may evaluate going to the next event. This evolution will take approx. 15 -20 minutes. Crew may choose to perform event 2 (Shift 1A CTMT Cooler to Fast Speed) prior to raising power.

UOP-1.2, Startup of Unit from Hot Standby to Minimum Load, v110.0

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(step 5.66) Begin to increase reactor power to greater than 12% with following controls.</p> <ul style="list-style-type: none"> Manual adjustment of control rods Steam dumps in Steam Pressure Control Mode <p>NOTE: SOP-2.3 instructions for associated dilution are on page 3</p>	<p>Manual adjustment of rods (not more than 3 steps at a time)</p> <p>Stm dump control – adjust PK-464 counterclockwise to release more steam, decrease Tavg, pull rods and increase power</p>
	RO	<p>(step 5.68) WHEN Nuclear at Power Permissive P-10 permissive status light is illuminated (2/4 power ranges greater than 10%), THEN perform the following: {CMT-0003695}</p> <p>(step 5.68.a) Block the intermediate range reactor trip and overpower rod stop.</p> <ul style="list-style-type: none"> Place INTERMEDIATE RANGE BLOCK TRN A to BLOCK. Place INTERMEDIATE RANGE BLOCK TRN B to BLOCK. <p>(step 5.68.b) On the Bypass and Permissive Panel verify the following:</p> <ul style="list-style-type: none"> The INTERM RANGE TRAIN A TRIP BLOCKED light illuminated. The INTERM RANGE TRAIN B TRIP BLOCKED light illuminated. <p>(step 5.68.c) Block the power range low setting reactor trip.</p> <ul style="list-style-type: none"> Place POWER RANGE BLOCK TRN A to BLOCK. Place POWER RANGE BLOCK TRN B to BLOCK. <p>(step 5.68.d) Verify the following on the Bypass and Permissive Panel:</p> <ul style="list-style-type: none"> The POWER RANGE LOW SETTING TRAIN A TRIP BLOCKED light illuminated. The POWER RANGE LOW SETTING TRAIN B TRIP BLOCKED light illuminated. 	

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Event Description: Ramp up to 12% power

**UOP-1.2, Startup of Unit from Hot Standby to Minimum Load, v110.0
(CONT)**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 5.68.e) Verify that Low Power Trip Block P-7 status light is not illuminated to ensure the unblocking of the following reactor trips. <ul style="list-style-type: none"> • Pressurizer Low Pressure • Pressurizer High Water Level • Loss of Flow-Two Loops 	
	RO	(step 5.68.f) Verify NR-45B is in the desired speed, i.e., 2 nd speed (2 min/div) <u>OR</u> normal speed. (10 min/div)	
	SRO	(step 5.68.g) <u>IF</u> not previously performed at Section 5 Reference 53, direct qualified OPS personnel to close disconnect switch 915 in accordance with FNP-0-SOP-36.8	Disconnect 915 is already closed.
When 8-12% power is reached or at the discretion of the Lead Examiner move to event.			

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Event Description: Ramp up to 12% power

SOP-2.3, CVCS RX Makeup Control System, Dilution, Appendix C, v60.1

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>2.0 Dilution</p> <p>2.1 IF necessary, THEN set the total batch integrator to the desired quantity.</p> <p>2.2 IF necessary, THEN adjust LTDN TO VCT FLOW LK 112 setpoint as desired.</p> <p>2.3 Position the MKUP MODE CONT SWITCH to STOP.</p> <p>2.4 Position the MKUP MODE SEL SWITCH to DIL or ALT DIL.</p> <p>2.5 IF using ALT DIL AND it is desired to bypass the VCT, THEN place the MKUP TO VCT valve Q1E21FCV114A in close.</p> <p>2.6 Position the MKUP MODE CONT SWITCH to START.</p> <p>2.7 Verify proper dilution operation by observing the following:</p> <ul style="list-style-type: none"> - IF using ALT DIL, MAKEUP TO CHG PUMP SUCTION HDR FCV113B opens. - FCV-114A opens, unless bypassing VCT. - RMW TO BLENDER Q1E21FCV114B opens. - Reactor makeup flow displayed on FI-168 MAKEUP FLOW TO CHG/VCT. <p>Verify the dilution automatically stops when the total flow batch integrator reaches setpoint:</p> <ul style="list-style-type: none"> - Reactor makeup flow returns to zero as displayed on FI-168 - MKUP TO VCT , FCV114A closes. - RMW TO BLENDER, FCV114B closes. - IF ALT DIL was used, THEN FCV-113B closes. <p>2.9 IF VCT was bypassed, THEN verify MKUP TO VCT valve Q1E21FCV114A (Q1E21V339) in AUTO.</p> <p>2.10 Position the MKUP MODE SEL SWITCH to AUTO.</p> <p>2.11 Position the MKUP MODE CONT SWITCH to START.</p> <p>2.12 IF LK 112 setpoint was adjusted per Step 2.2, THEN return setpoint to that required for current conditions.</p>	

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Event Description: Shift 1A CTMT Cooler to Fast Speed IAW SOP-12.1, step 4.7

Indications Available:

Annunciators:

- NONE

SOP-12.1, Containment Air Cooling System, v41.1

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 4.7.1.1) Stop 1A Containment cooler fan	
	BOP	(Step 4.7.1.2) Check CTMT CLR 1A DISCH 3186A closed light illuminated	
	BOP	(Step 4.7.1.3) Start 1A CTMT Cooler Fan is Fast Speed	
	BOP	(Step 4.7.1.2) Check CTMT CLR 1A DISCH 3186A open light illuminated	
Start the next event when the 1A CTMT cooler is running in fast speed or at discretion of the Lead Examiner			

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Event Description: FK-122, Charging Flow Controller, fails HI

Indications Available

Annunciators:	Recognize indications of FK-122 FAILING HI
- CHG HDR FLOW HI-LO (EA2)	- FT-122 will indicate pegged High
- REGEN HX LTDN FLOW DISCH TEMP HI (DE1) (possible if not discovered in a timely manner)	- VCT level will ↓
- RCP SEAL INJ FLOW LO (DD1)	- Przr level will ↑ slowly
	- LK-459F will ↓ slowly

Note to Examiner

Based upon the component malfunction AOP-100 is the expected entry procedure but AOP-16.0 may be entered if crew determines event is a CVCS malfunction.

AOP-100 actions begin on this page.

AOP-16.0 actions begin on page 5.

AOP-100, Instrumentation Malfunction, section 1.2, v13.0

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 1) Check pressurizer level is on or trending to program value	
	RO	(step 1 RNO) Take Manual control of FK-122, CHG FLOW controller and restore PZR level.	POTENTIAL CRITICAL TASK If > 10% power and operators fail to take manual control of FK-122, trip will occur on high PZR level.
	RO	(step 2) Check RCP Seal Injection flows 6-13 gpm □ Adjust as necessary using HIK 186, RCP SEAL INJECTION FLOW CONTROLLER	
	SRO	(step 3) Determine if a pressurizer level transmitter/indicator loop has failed None have failed	
	RO	(step 4) Check letdown in service - Letdown is in service - Proceed to step 6	
	SRO	(step 6) Refer to TS 3.3.1 and 3.3.3 (step 7) Notify the Shift Manager (step 8) When plant conditions permit then restore components to automatic control	Since there are no instrument failures TS 3.3.1 and 3.3.3 do not apply.

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Event Description: FK-122, Charging Flow Controller, fails HI

AOP-16, CVCS Malfunction, v20.0

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Determine a charging system malfunction is occurring and direct entry into AOP-16.	
	RO	(Step 1) Verify CHG flow adequate to cool letdown CHG FLOW - FI-122A LTDN HX OUTLET FLOW - FI-150 REGEN HX OUTLET TEMP - TI-140	Flow will be adequate
	BOP	(Step 2) Stop any load change in progress	
	SRO	(step 3) [CA]IF Charging line rupture occurs, THEN Go To ATTACHMENT 2	NO charging header rupture has occurred,
	RO	(Step 4) Monitor VCT level to ensure proper level is maintained	
	RO	(Step 5) Observe CHG HDR PRESS and MOTOR AMPS to ensure proper charging pump operation PI-121, CHG HDR PRESSURE, and ammeter for chg pump	NOTE: Actual amps will be lower than normal
	RO	(Step 6) Check charging pump – RUNNING	YES 1C chg pump
	RO	(Step 7) Check Charging flow FK-122, CHG FLOW CONTROLLER, controlling in AUTO with flow indicated FK- 122 is taken to manual control –RNO Adjust SEAL WTR INJECTION HIK-186, SEAL WATER INJECTION as required to maintain RCP seal injection flow 6-13 gpm.	NOTE: There will be flow indicated and FK-122 in AUTO - Seal inj flow will decrease due to FCV-122 going open. <u>POTENTIAL CRITICAL TASK</u> If > 10% power and operators fail to take manual control of FK-122, trip will occur on high PZR level.

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Event Description: FK-122, Charging Flow Controller, fails HI

AOP-16, CVCS Malfunction, v20.0 (CONT)

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 8) Check DE3 clear	YES
	RO	(Step 9) Determine Status of Normal Letdown: LTDN HX OUTLET FLOW, FI-150 - NO FLOW INDICATED	Since there is flow, go to RNO to go to step 19.
	SRO	(step 19) Determine charging status - CHG FLOW, FI-122A - ABNORMAL FLOW INDICATED.	NO – go to 19 RNO
	SRO	(step 19.1 RNO) THEN go to procedure and step in effect.	
	SRO	- Submit a Condition Report and notify the Work Week Coordinator (Maintenance ATL on backshifts) - Notify the Shift Manager	
Move to next event when FK-122 is in manual and PZR level is stable or at the discretion of the Lead Examiner.			

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Event Description: R-35A, Control Room Air Intake Radiation Monitor, fails HI

Indications Available

Annunciators:

- BOP PANELS ALARM (BE5) on MCB
- BOP/ R-35A HI ALARM (LD4)

Recognize indications of R-35A failing HIGH

- BOP/ R-35A HI ALARM (LD4)
- IPC R-35A indication

Note to Examiner

When R-35A fails high the only indication will be annunciators and IPC Data. Since R-35A is in the plant and normally on the BOP, (not in the simulator), a call to the extra operator will get a response.

Drawing D205012, HVAC & Filtration P&ID Control Room and Computer Room, is available to assist the crew if requested

ARP-3.1, BOP Panel Annunciator Panel L, v33.0

LD4

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Direct ARP entry for LD4	
	BOP	(step 1) Verify Computer Room AHU dampers closed. QSV47HV3622 COMPUTER RM HVAC RTN QSV47HV3624 CONT RM HVAC SUPP QSV47HV3626 COMPUTER RM HVAC SUPP BOP should close these 3 valves	NOTE: These three valves will fail to close automatically
	SRO/ BOP	(step 2) Call to have TSC HVAC aligned in the recirc mode	Calls Booth to have TSC ventilation aligned.
	SRO/ BOP	(step 3) Determine the validity of the high activity indication as follows: a. Verify that the instrument is aligned for normal operation and is functioning properly. b. Sample or survey the affected system or area as required.	Calls booth to verify that the instrument is aligned and functioning properly
	BOP	(step 4) Verify both control room doors closed	
	SRO	(step 6) Consult Technical Specifications 3.3.7 to determine the required alignment for the following: <ul style="list-style-type: none"> • Control Room Pressurization Units • Control Room Recirculation Units • Control Room Utility Exhaust Fan 	TS 3.3.7 on the next page

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Event Description: R-35A, Control Room Air Intake Radiation Monitor, fails HI

TECHNICAL SPECIFICATION 3.3.7, Control Room Emergency Filtration/Pressurization System (CREFS) Actuation Instrumentation

Table 3.3.7-1 (page 1 of 1)
CREFS Actuation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPPOINT
1. Manual Initiation	1,2,3,4, (a), (b)	2 trains	SR 3.3.7.6	NA
2. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	SR 3.3.7.3 SR 3.3.7.4 SR 3.3.7.5	NA
3. Control Room Radiation Control Room Air Intake (R-35A, B)	1,2,3,4 (a), (b)	1 2	SR 3.3.7.1 SR 3.3.7.2 SR 3.3.7.7	≤ 800 cpm
4. Containment Isolation - Phase A	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 3.a., for all initiation functions and requirements.			

(a) During CORE ALTERATIONS.

(b) During movement of irradiated fuel assemblies.

		CONDITION	REQUIRED ACTION	COMPLETION TIME	
		A. One or more Functions with one required channel or train inoperable.	A.1 Place one CREFS train in emergency recirculation mode.	7 days	
	SRO	<u>TS 3.3.7</u> Table 3.3.7-1 has two Functions that need to be addressed: #3 R-35A AND R-35B are <u>BOTH INOPERABLE</u> . R-35A is inoperable due to the failure, and R-35B is inoperable <u>as soon as</u> the flow path past the detector is isolated by closed dampers. A mandatory LCO would be initiated since one channel is required and neither channel is operable. The unit is in either mode 1 or 2 with no fuel movement in progress and only one rad monitor is required in this condition. This is condition A as shown above.			
	SRO	Submit a condition report on the failed instrument, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the condition report			
	SRO	Inform the SM of the failure and Tech Spec entry			
After Tech Spec analysis or at the discretion of the Lead Examiner move to next event.					

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Event Description: PT-508 Fails HI

Indications Available

Annunciators:	Recognize indications of PT-508 failure
- 1A,1B,OR 1C SG STM FLOW > FEED FLOW (JB1, JB2, JB3)	- SGFP speed ↓
- 1A,1B,OR 1C SG LVL DEV (JF1, JF2, JF3)	- FRVs opening
- TAVG/TREF DEV (HF3)	- SGWL NR ↓
	- Feed flows ↓ to zero

Note to Examiner

Afterwards, PT-508 will fail high and SGFP speed will decrease. The crew will enter AOP-100 and take manual control of the SGFP controller to increase speed and control SG water levels. If no action is taken the Reactor will trip at 28% SG NR levels

AOP-100, Instrumentation Malfunction, v13.0, Section 1.4

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Direct entry into AOP-100	
	BOP	(step 1) Immediate operator action Check that steam and feed flows matched on all SGs <ul style="list-style-type: none"> - Take manual control of SK-509A, SGFP MASTER CONTROLLER and increase SGFP speed (could also take control of INDIVIDUAL Controllers) - Possibly take manual control of all FRVs, FK-478, 488, 498, SG FW FLOW CONTROL VLVS 	NOTE: Feed flows will be decreasing and FRVs begin to open fully POTENTIAL CRITICAL TASK If operators fail to take manual control of the SGFP speed controller the Rx will trip on low SG level.
	SRO	(step 2) IF adverse trend in SG level exists, THEN establish trip criteria. If any are approached then Trip the reactor and go to EEP-0.	
	BOP	(step 3) Place the Main Turbine on HOLD	
	BOP	(step 4) Adjust SGFP speed back to within the normal operating range for the feed flow/steam flow ΔP required for the existing power level. <u>See table on next page for values</u>	NOTE: Approximate ΔP can be determined from the following MCB indications. [] SGFP DISCH PRESS PI4003 [] SG Pressure indications

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Event Description: PT-508 Fails HI

AOP-100, Instrumentation Malfunction, v13.0, Section 1.4

Time	Pos.	Expected Actions/Behavior	Comments
<ul style="list-style-type: none"> Unit 1 NO LOAD ΔP is 50 psid from 0-28.1%. PROGRAM ΔP is linear from 50-190 psid from 28.1% to 100%. TABLE 1 provides approximate ΔP values for varying power levels. 			
<u>% POWER</u>		<u>DP</u>	
30		54 psid	
40		73 psid	
50		93 psid	
60		112 psid	
	BOP	(step 5.0) Check Steam Dumps in Tavg Mode. - STM DUMP MODE SEL A-B TRN TAVG	
	RO	(step 6 and 8) - Call Shift Manager - Submit a condition report on the failed instrument, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the condition report	
At the discretion of the Lead Examiner move to next Event.			

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Event Description: 1A RCP Trip

Indications Available:

Annunciators:	Indications of 1A RCP Trip:
- 1A RCS Loop Flow LO or 1A RCP BRK Open (EF1)	- 1A RCP Amps decrease to zero
- 4160 VOLT BKR TRIPPED (MF4)	- FI-414, 415, 416, 1A RCS Loop flow ↓
- RCP UV SINGLE INPUT ALERT (EF4)	- TI-412D, Tavg 1A RCS Loop ↓
- Rx Coolant Loops DT Dev HI-LO (HF2)	

Note to Examiner

1A RCP will trip. Power is less than 30% so a reactor trip will not occur and is not required until RCS loop temperature decreases to less than 541°F.

AOP-4.0, Loss of Reactor Coolant Flow, v19.0

Time	Pos.	Expected Actions/Behavior	Comments
	RO	Announces receipt of MCB annunciators Reports trip of 1A RCP	
	SS	Directs RO and BOP Perform IOAs of AOP-4.0 Updates Team and Enters AOP-4.0	
	RO	(step 1) Closes Przr spray valves for 1A RCP • PK-444C	Immediate Operator Action
	BOP	(step 2) Maintain SG narrow range level stable at approximately 65% using: • FRV Bypasses	POTENTIAL CRITICAL TASK If operators fail to take manual control of SG water level < 82%. SGFP trip will occur and manual reactor trip will be required.
	RO	(step 3) Monitor Tavg for all three RCS loops ≥ 541°F. (TS 3.4.2) If the A Loop decreases below 541°F then trip the reactor.	[CA] Step Loop A Temp may fall below 541F and require a reactor trip and transition to EEP-0 (see page 13) If loop temperatures remain > 541F then initiation of next event will cause transition to EEP-0
	RO	(step 4) Maintain PRZR pressure 2200-2300 psig.	[CA] Step
	RO	(step 5) Check normal letdown - ESTABLISHED	
	RO	(step 6) Maintain PRZR level at approximately 22%.	

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Event Description: 1A RCP Trip

AOP-4.0, Loss of Reactor Coolant Flow, v19.0 (CONT)

Time	Pos.	Expected Actions/Behavior			Comments
	SRO	(step 7) Within six hours of the loss of RCS flow complete the following: IF the unit is in Mode 1 or 2, THEN place unit in Mode 3 using the following procedures: UOP-2.1, SHUTDOWN OF UNIT FROM MINIMUM LOAD TO HOT STANDBY			NOTE: Tech Spec 3.4.4, RCS Loops—MODES 1 and 2, Condition A requires the unit to be in mode 3 in 6 hours. This is procedurally driven.
TECHNICAL SPECIFICATION 3.4.4, RCS Loops—MODES 1 and 2					
		CONDITION	REQUIRED ACTION	COMPLETION TIME	Tech Spec will be evaluated after the scenario
		A. Requirements of LCO not met.	A.1 Be in MODE 3.	6 hours	
TECHNICAL SPECIFICATION 3.4.2, Minimum Temp for Critical OPS—MODES 1 and 2 with Keff > 1.0					
		CONDITION	REQUIRED ACTION	COMPLETION TIME	Tech Spec will be evaluated after the scenario This TS NOT APPLICABLE if Tavg is maintained > 541F
		A. Tavg in one or more RCS loops not within limit.	A.1 Be in MODE 3.	30 hours	
Move to the next event after the Reactor is tripped or at the discretion of the Lead Examiner					

Op Test No.: FA2014301 Scenario # 1 Event # 7 Page 14 of 41
 Event Description: **Steam Line Break Inside CTMT during ESP-0.1**

Indications Available

Annunciators:

- Various and numerous
- Fire Alarm (MH1)

Indications of STM Break in CTMT

- Pzr level ↓
- RCS pressure ↓
- Ctmr pressure ↑
- SG Pressure ↓

Note to Examiner

- AOP 4.0 may direct tripping the RX and entry to EEP-0. Since SI is not required, transition to ESP-0.1 is directed at step 4.
- EEP-0.0 re-entry will occur subsequent to the STM Break in CTMT and the associated SI
- On Step 3 of ESP-0.1, 1B SG will have a Stm Fault inside containment. MSIVs do not auto close so three SGs will be affected until MSIVs are closed. When the Steam Break occurs an Automatic SI will actuate if not already in.
- 1B CS pump will not auto start and the 1A CS pump discharge will not open and initiate event 8.
- Entry to FRP-Z.1 may be required. FRP-Z.1 actions are on page 21.

EEP-0, Reactor Trip or Safety Injection, v45

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	<p>Immediate Operator actions of EEP-0 (step 1) Check reactor trip. Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. Check rod bottom lights - LIT.</p> <p>(step 2) Check turbine - TRIPPED. TSLB2 14-1 thru 4 lit</p> <p>(step 3) Check power to 4160 V ESF busses. 4160 V ESF busses - AT LEAST ONE ENERGIZED</p> <p>A Train (F 4160V bus) power available lights lit OR B Train (G 4160V bus) power available lights lit</p> <p>Verify operating diesel generators are being supplied from at least one SW pump.</p>	Immediate Action steps

Op Test No.: FA2014301 Scenario # 1 Event # 7 Page 15 of 41

Event Description: Steam Line Break Inside CTMT during ESP-0.1

EEP-0, Reactor Trip or Safety Injection, v45 (CONT)

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	(step 4) Check SI Status. Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION <input type="checkbox"/> ACTUATED status light lit <input type="checkbox"/> MLB-1 1-1 lit <input type="checkbox"/> MLB-1 11-1 lit	IF SI is not actuated then ESP-0.1 Transition will occur. (next page) IF SI actuated EEP-0.0 will continue at step 5 (Page 17)

Op Test No.: FA2014301 Scenario # 1 Event # 7/8 Page 16 of 41
 Event Description: **Steam Line Break Inside CTMT During ESP-0.1**

ESP.0.1, Reactor Trip Response, version 34

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Directs actions in ESP-0.1 per RO/BOP Actions listed below	
	RO	(step 1) Check RCS temperature - Stable at or approaching 547°F - TAVG 1A(1B,1C) RCS LOOP <input type="checkbox"/> TI 412D <input type="checkbox"/> TI 422D STM DUMP <input type="checkbox"/> TI 432D	NOTE: this is a continuing action step RCS temperature will be decreasing due to the RCP trips and AFW flow
	BOP	(step 1.1.1 RNO) Verify steam dumps closed. STM DUMP INTERLOCK <input type="checkbox"/> A TRN in OFF RESET OR <input type="checkbox"/> B TRN in OFF RESET	
	BOP	(step 1.1.2 RNO) Verify atmospheric reliefs closed 1A(1B,1C) MS ATMOS REL VLV <input type="checkbox"/> PC 3371A <input type="checkbox"/> PC 3371B <input type="checkbox"/> PC 3371C	
	BOP	(step 1.1.3 RNO) Verify SGBD isolated	
	BOP	(step 1.1.4 RNO) IF cooldown continues, THEN control total AFW flow to stop RCS cooldown.	Adjusts pots for AFW flow to maintain > 395 gpm if SG NR levels are <31% using MCB placard
	BOP	(step 1.1.5) IF MSIVs are closed, THEN proceed to step 1.1.10	MSIV's are open

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Event Description: Steam Line Break Inside CTMT During ESP-0.1

ESP.0.1, Reactor Trip Response, version 34

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 1.1.6 RNO) Verify MSRs reset. REHEATER CONTROL SYSTEM □ CP 4054	
	BOP	(step 1.1.7) Verify Main Steam Drain Pots isolated □ MS DRN VLVS N1N11V904A/B/C/D handswitch to close.	
	BOP	(step 1.1.8 RNO) Direct personnel to perform the TB SO Actions Following A Reactor Trip and/or Safety Injection per FNP-0-SOP-0.0.	Calls booth to perform this step. Step
	BOP	(step 2) WHEN RCS average temperature less than 554°F, THEN verify feedwater status. - Verify FRVs closed (step 2.2) MDAFWP AUTO/DEFEAT □ 1A in DEFEAT □ 1B in DEFEAT (step 2.3) -Verify BOTH SGFPs tripped (step 2.4) -Verify total AFW flow to the SGs >395 gpm	NOTE: this is a continuing action step 1.1.2, Isolating Main steam drain pots is "if directed" and may not be directed.
	RO	(step 3) Verify ALL RX TRIP breakers OPEN	Steam line break will initiate after this step. Auto SI is blocked. <u>Critical task</u> Manually actuate at least one train of SI before transition to any E-1 series, E-2 series, E-3 series, or FRP. (page 22)

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Event Description: Steam Line Break Inside CTMT During ESP-0.1

EEP-0, Reactor Trip or Safety Injection, v45

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	<p>Immediate Operator actions of EEP-0 (step 1) Check reactor trip. Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. Check rod bottom lights - LIT.</p> <p>(step 2) Check turbine - TRIPPED. TSLB2 14-1 thru 4 lit</p> <p>(step 3) Check power to 4160 V ESF busses. 4160 V ESF busses - AT LEAST ONE ENERGIZED</p> <p>A Train (F 4160V bus) power available lights lit OR B Train (G 4160V bus) power available lights lit</p> <p>Verify operating diesel generators are being supplied from at least one SW pump.</p>	<p>Immediate Action steps of EEP-0</p> <p>NOTE: 3 DGs will be running when the SI is initiated manually. OATC will check SW header pressure, ctmt cooler flows and CCW Hx SW flows and SW pump lights.</p>
	RO/ BOP	<p>(step 4) Check SI Status. Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION <input type="checkbox"/> ACTUATED status light lit <input type="checkbox"/> MLB-1 1-1 lit <input type="checkbox"/> MLB-1 11-1 lit</p>	<p>IF SI is actuated then transition to ESP-0.1 will not occur and EEP-0.0 will continue on (Page 18)</p>
	SRO	<p>(step 5) Directs continuing into EEP-0. Directs the BOP to perform Attachment 2.</p>	<p>See Tab at end of scenario for Attachment 2 and 4 actions. (Page 25)</p>
	RO	<p>(step 6) Check containment pressure- HAS REMAINED LESS THAN 27 psig</p>	<p>NOTE: [CA] step</p>
	RO	<p>(step 6.1 RNO) Verify Phase B CTMT ISOL – ACTUATED <input type="checkbox"/> MLB-3 1-1 lit <input type="checkbox"/> MLB-3 6-1 lit</p>	

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Event Description: Steam Line Break Inside CTMT During ESP-0.1

EEP-0, Reactor Trip or Safety Injection, v45

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 6.2 RNO) Stop all RCPs. RCP <input type="checkbox"/> 1A <input type="checkbox"/> 1B <input type="checkbox"/> 1C	
	RO	(step 6.3 RNO) Verify PHASE B CTMT ISO alignment. (step 6.3.1) Check All MLB-3 lights lit. IF any MLB-3 light NOT lit, THEN verify PHASE B CTMT ISO using ATTACHMENT 5, PHASE B CONTAINMENT ISOLATION.	If 1B CS pump not started or MOV8820A not opened in FRP-Z.1 they will be opened using Attachment 5.
	RO	(step 6.4 RNO) Check containment spray	Should have CS flow by FRP-Z.1, E-0 Att 5 or SOP-0.8 actions. If not, may secure CS pumps.
	RO	(step 7) Announce "Unit 1 reactor trip and safety injection".	
	RO	(step 8) Check AFW status. Check secondary heat sink Available <ul style="list-style-type: none"> Check total AFW flow > 395 gpm <ul style="list-style-type: none"> <input type="checkbox"/> FI 3229A <input type="checkbox"/> FI 3229B <input type="checkbox"/> FI 3229C Total Flow FI 3229 OR <ul style="list-style-type: none"> Check any SG NR level > 31% {48%} WHEN all SG narrow range levels less than 31%{48%}, THEN maintain total AFW flow greater than 395 gpm. WHEN at least two SG narrow range levels greater than 28% AND TDAFWP NOT required, THEN stop TDAFWP. 	

Event Description: **Steam Line Break Inside CTMT During ESP-0.1**

[illegible]

Op Test No.: FA2014301 Scenario # 1 Event # 7/8 Page 21 of 41

Event Description: Steam Line Break Inside CTMT During ESP-0.1

EEP-0, Reactor Trip or Safety Injection, v45

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(step 10) Check pressurizer PORVs and spray valves. WHEN pressurizer pressure less than 2335 psig, THEN verify both PRZR PORVs closed. Verify both PRZR PORVs indicate CLOSED</p> <p>Check PRZR PORV temperature STABLE OR FALLING. <input type="checkbox"/> PORV Temp TI-463</p> <p>Check PRT parameters STABLE or FALLING. <input type="checkbox"/> PRT PRESS PI 472 <input type="checkbox"/> PRT LVL LI-470 <input type="checkbox"/> PRT TEMP TI-471</p> <p>WHEN pressurizer pressure less than 2260 psig, THEN verify normal pressurizer spray valves closed OR in the process of closing. 1A(1B) LOOP SPRAY VLV <input type="checkbox"/> PK 444C <input type="checkbox"/> PK 444D</p> <p>Check any PRZR PORV ISO - OPEN</p>	<p>[CA] step –</p> <p>[CA] step</p>
	RO	<p>(step 11) Check RCP criteria. Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE</p>	
	RO	<p>(step 12) Monitor charging pump miniflow criteria. Control charging pump miniflow valves based on RCS pressure. 1C(1A) LOOP RCS WR PRESS <input type="checkbox"/> PI 402A <input type="checkbox"/> PI 403A</p>	<p>NOTE: Based on RCS pressure, close miniflows < 1300 psig.</p>
Diagnostics			
The SRO will direct the parameters to be reviewed and will determine appropriate procedure to transition to.			
	SRO	<p>(step 13) Check SGs not faulted. <input type="checkbox"/> Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig.</p>	<p>The 1B Steam Generator Will be Faulted an MSIVs cannot be shut. Transition to FRP-Z.1 (Page 21) or EEP-2 (Page 23) should occur.</p>

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Event Description: Steam Line Break Inside CTMT During ESP-0.1

FRP-Z.1, Response to High CTMT Pressure, v15.0

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Direct transition to EEP-2 or FRP-Z.1	See EEP-2 (page 23) if FRP-Z.1 not entered
	RO	(step 1) Verify PHASE A CTMT ISO - ACTUATED. <input type="checkbox"/> MLB-2 1-1 lit <input type="checkbox"/> MLB-2 11-1 lit (step 2) Check all MLB-2 lights - LIT. - Verify containment ventilation isolation. - Verify all containment purge dampers - CLOSED. - Verify containment mini purge dampers - CLOSED. - Stop MINI PURGE SUPP/EXH FAN.	
	RO	(step 3) Check if containment spray is required. - Containment pressure - HAS RISEN TO GREATER THAN 27 psig. - Verify PHASE B CTMT ISO – ACTUATED - Verify containment spray pumps – RUNNING - Check containment spray flow in both trains - > 0 gpm. CS FLOW on FI 958A and FI 958B = 0	NOTE: [CA] step – <u>Critical task</u> Start the 1B CS pump (Step 3.3) OR Open MOV8020A (Step 3.4.3 RNO) before a Red Path challenge develops to the containment CSF
	BOP	Check all MLB-3 lights - LIT.	
	RO	Stop all RCPs.	

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Event Description: Steam Line Break Inside CTMT During ESP-0.1

FRP-Z.1, Response to High CTMT Pressure, v15.0

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 4) Verify containment fan cooler alignment. Verify all available containment fan coolers - STARTED IN SLOW SPEED. CTMT CLR FAN SLOW SPEED <input type="checkbox"/> 1A <input type="checkbox"/> 1B - TRIPPED <input type="checkbox"/> 1C <input type="checkbox"/> 1D – DID NOT START Verify associated emergency service water outlet valves - OPEN. EMERG SW FROM 1A(1B,1C,1D) CTMT CLR <input type="checkbox"/> Q1P16MOV3024A <input type="checkbox"/> Q1P16MOV3024B <input type="checkbox"/> Q1P16MOV3024C <input type="checkbox"/> Q1P16MOV3024D	
	BOP	(step 5) Verify MSIV and bypass valves	MSIVs Will not close
	BOP	(step 6) Check if feed flow should be isolated to any SG. Check any SG pressure - FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig. Verify all faulted SG main feed stop valves - CLOSED.	
	SRO/ BOP	Evaluation - IF all SGs faulted THEN maintain 20 gpm AFW flow to each SG.	Reduces AFW to 20 gpm per SG
	SRO	Goes to procedure and step in effect	Most likely will be E-0

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Event Description: Steam Line Break Inside CTMT During ESP-0.1

EEP- 2.0, Faulted Steam Generator Isolation, v15.0

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 1) Verify all MSIV and bypass valves - CLOSED. Place handswitches for all MSIVs to the CLOSED position (6 total)	MSIV's will not close
	SRO	(step 2) Check if any SG not faulted. Check pressure in at least one SG - STABLE OR RISING.	Transitions to ECP-2.1 (next page)

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Event Description: Steam Line Break Inside CTMT During ESP-0.1

ECP-2.1, Uncontrolled Depressurization of All Steam Generators, v24.0

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	(Step 1) [CA] IF any SG pressure rises during performance of this procedure, THEN go to FNP-1-EEP-2, FAULTED STEAM GENERATOR ISOLATION.	NOTE: [CA] step
	BOP	<p>(Step 2) Check secondary pressure boundary isolated.</p> <p>2.1 Verify all main steam isolation and bypass valves CLOSED.</p> <p>1A(1B,1C) SG MSIV - TRIP</p> <p><input type="checkbox"/> Q1N11HV3369A</p> <p><input type="checkbox"/> Q1N11HV3369B</p> <p><input type="checkbox"/> Q1N11HV3369C</p> <p><input type="checkbox"/> Q1N11HV3370A</p> <p><input type="checkbox"/> Q1N11HV3370B</p> <p><input type="checkbox"/> Q1N11HV3370C</p> <p>1A(1B,1C) SG MSIV - BYPASS</p> <p><input type="checkbox"/> Q1N11HV3368A</p> <p><input type="checkbox"/> Q1N11HV3368B</p> <p><input type="checkbox"/> Q1N11HV3368C</p> <p><input type="checkbox"/> Q1N11HV3976A</p> <p><input type="checkbox"/> Q1N11HV3976B</p> <p><input type="checkbox"/> Q1N11HV3976C</p> <p>(Step 2.1 RNO) Place the associated test switch in the TEST position</p> <p>1A – 3369A/70A</p> <p>1B – 3369B/70B</p> <p>1C – 3369C/70C</p>	1A MSIV Closes

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Event Description: Steam Line Break Inside CTMT During ESP-0.1

ECP-2.1, Uncontrolled Depressurization of All Steam Generators, v24.0

Time	Pos.	Expected Actions/Behavior	Comments
		Verify all faulted SG atmospheric reliefs - MANUALLY CLOSED. 1A(1B,1C) MS ATMOS REL VLV <input type="checkbox"/> PC 3371A <input type="checkbox"/> PC 3371B <input type="checkbox"/> PC 3371C Verify all faulted SG main feed stop valves - CLOSED. MAIN FW TO 1A(1B,1C) SG STOP VLV <input type="checkbox"/> Q1N21MOV3232A <input type="checkbox"/> Q1N21MOV3232B <input type="checkbox"/> Q1N21MOV3232C Verify blowdown from all faulted SGs – ISOLATED. 1A(1B,1C) SGBD ISO <input type="checkbox"/> Q1G24HV7614A <input type="checkbox"/> Q1G24HV7614B <input type="checkbox"/> Q1G24HV7614C	
	SRO	Re-evaluates (Step 1) [CA] IF any SG pressure rises during performance of this procedure, THEN go to FNP-1-EEP-2, FAULTED STEAM GENERATOR ISOLATION.	Transitions to EEP-2
End Scenario after transition back into EEP-2 or at discretion of Lead Examiner			

Op Test No.: FA2014301 Scenario # 1 Event # 7 Page 27 of 41
 Event Description: **ATTACHMENT 2 of EEP-0**

EEP-0.0, Reactor Trip or Safety Injection, v45 Attachment 2			
Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 1) Verify one CHG PUMP in each train - STARTED. <input type="checkbox"/> A train (1A or 1B) amps > 0 <input type="checkbox"/> B train (1C or 1B) amps > 0	
	BOP	(Step 2) Verify RHR PUMPS - STARTED. RHR PUMP <input type="checkbox"/> 1A amps > 0 <input type="checkbox"/> 1B amps > 0	
	BOP	(Step 3) Verify Safety Injection Flow. (Step 3.1) Check HHSI flow - GREATER THAN 0 gpm. <input type="checkbox"/> FI 943	
	BOP	(Step 3.2) Check RCS pressure - LESS THAN 275 psig{435 psig}.	
	BOP	(step 3.3) Check LHSI flow – greater than 1.5×10^3 gpm <input type="checkbox"/> 1A RHR HDR FLOW FI-605A <input type="checkbox"/> 1B RHR HDR FLOW FI-605B	
	BOP	(Step 4) Verify each SW train - HAS TWO SW PUMPS STARTED. <input type="checkbox"/> A train (1A,1B or 1C) <input type="checkbox"/> B train (1D,1E or 1C)	

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Event Description: ATTACHMENT 2 of EEP-0

EEP-0.0, Reactor Trip or Safety Injection, v45
Attachment 2

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<p>(Step 5) Verify each train of CCW - STARTED. (Step 5.1) Verify one CCW PUMP in each train- STARTED.</p> <p>A train HX 1C or 1B CCW FLOW <input type="checkbox"/> FI 3043CA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW <input type="checkbox"/> FI 3043AA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm</p> <p>Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX <input type="checkbox"/> Q1P16FI3009AA > 0 gpm <input type="checkbox"/> Q1P16FI3009BA > 0 gpm <input type="checkbox"/> Q1P16FI3009CA > 0 gpm</p>	
		<p>(Step 5.3) Check instrument air available. Verify at least one air compressor started. AIR COMPRESSOR <input type="checkbox"/> 1A <input type="checkbox"/> 1B <input type="checkbox"/> 1C Check INST AIR PRESS PI 4004B greater than 85 psig.</p>	

Op Test No.: FA2014301 Scenario # 1 Event # 7 Page 29 of 41
 Event Description: **ATTACHMENT 2 of EEP-0**

**EEP-0.0, Reactor Trip or Safety Injection, v45
Attachment 2**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<p>(step 6) Verify containment ventilation isolation. Verify containment purge dampers - CLOSED. <input type="checkbox"/> 3197 <input type="checkbox"/> 3198D <input type="checkbox"/> 3198C <input type="checkbox"/> 3196 <input type="checkbox"/> 3198A <input type="checkbox"/> 3198B</p> <p>Verify containment mini purge dampers - CLOSED. CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D <input type="checkbox"/> 2866C <input type="checkbox"/> 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C <input type="checkbox"/> 2866D <input type="checkbox"/> 2867D</p> <p>Stop MINI PURGE SUPP/EXH FAN.</p>	Will place HS to STOP
	BOP	<p>(step 7) Verify containment fan cooler alignment. Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED.</p> <p><u>CTMT CLR FAN SLOW SPEED</u> A train <input type="checkbox"/> 1A <input type="checkbox"/> 1B B train <input type="checkbox"/> 1C <input type="checkbox"/> 1D Verify associated emergency service water outlet valves - OPEN. EMERG SW FROM 1A(1B,1C,1D) CTMT CLR <input type="checkbox"/> Q1P16MOV3024A <input type="checkbox"/> Q1P16MOV3024B <input type="checkbox"/> Q1P16MOV3024C <input type="checkbox"/> Q1P16MOV3024D</p>	

Event Description: **ATTACHMENT 2 of EEP-0**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 8) Verify AFW Pumps - STARTED. Verify both MDAFW Pumps - STARTED <input type="checkbox"/> 1A MDAFW Pump amps > 0 <input type="checkbox"/> 1B MDAFW Pump amps > 0 AND <input type="checkbox"/> FI-3229A indicates > 0 gpm <input type="checkbox"/> FI-3229B indicates > 0 gpm <input type="checkbox"/> FI-3229C indicates > 0 gpm	
		(Step 8.2) Check TDAFW Pump start required. <input type="checkbox"/> Condition <input type="checkbox"/> TSLB <input type="checkbox"/> Setpoint <input type="checkbox"/> Coincidence <input type="checkbox"/> RCP Bus TSLB2 1-1 <input type="checkbox"/> 2680 V 1/2 Detectors <u>Undervoltage</u> 1-2 1-3 <u>on 2/3 Busses</u> Low Low SG <u>TSLB4</u> 28% 2/3 Detectors Water Level 4-1,4-2,4-3 <u>on 2/3 SGs</u> In Any 5-1,5-2,5-3 2/3 SGs 6-1,6-2,6-3	
	BOP	(step 8.3) Verify TDAFWP started. <input type="checkbox"/> MLB-4 1-3 lit <input type="checkbox"/> MLB-4 2-3 lit <input type="checkbox"/> MLB-4 3-3 lit TDAFWP SPEED <input type="checkbox"/> SI 3411A > 3900 rpm TDAFWP SPEED CONT <input type="checkbox"/> SIC 3405 adjusted to 100% Verify TDAFW flow path to each SG. TDAFWP TO 1A(1B,1C) SG <input type="checkbox"/> Q1N23HV3228A in MOD <input type="checkbox"/> Q1N23HV3228B in MOD <input type="checkbox"/> Q1N23HV3228C in MOD TDAFWP TO 1A(1B,1C) SG FLOW CONT <input type="checkbox"/> HIC 3228AA open <input type="checkbox"/> HIC 3228BA open <input type="checkbox"/> HIC 3228CA open	

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Event Description: ATTACHMENT 2 of EEP-0

EEP-0.0, Reactor Trip or Safety Injection, v45
Attachment 2

Time	Pos.	Expected Actions/Behavior	Comments																
	BOP	<p>(step 9) Verify main feedwater status. Verify main feedwater flow control and bypass valves - CLOSED. 1A(1B,1C) SG FW FLOW <input type="checkbox"/> FCV 478 <input type="checkbox"/> FCV 488 <input type="checkbox"/> FCV 498</p> <p>Verify both SGFPs - TRIPPED.</p> <p>Verify SG blowdown - ISOLATED. 1A(1B,1C) SGBD ISO <input type="checkbox"/> Q1G24HV7614A closed <input type="checkbox"/> Q1G24HV7614B closed <input type="checkbox"/> Q1G24HV7614C closed</p> <p>9.4 Verify SG blowdown sample - ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE STEAM GEN ISO <input type="checkbox"/> MLB1 19-2 lit Q1P15HV3328 closed <input type="checkbox"/> MLB1 19-3 lit Q1P15HV3329 closed <input type="checkbox"/> MLB1 19-4 lit Q1P15HV3330 closed</p>																	
	BOP	<p>(Step 10) Check no MSL isolation actuation signal present.</p> <table border="1"> <thead> <tr> <th>Signal</th><th>Setpoint</th><th>coincidence</th><th>TSLB</th></tr> </thead> <tbody> <tr> <td>LO SG PRESS</td><td>< 585 psig</td><td>2/3</td><td>TSLB4 19-2,3,4</td></tr> <tr> <td>Hi stm flow and Lo-Lo Tavg</td><td>>40% and <543°F</td><td>1/2 on 2/3</td><td>TSLB4 16-3,4 17-3,4 18-3,4</td></tr> <tr> <td>HI-HI ctmt press</td><td>>16.2 psig</td><td>2/3</td><td>TSLB2 10-1,2,3</td></tr> </tbody> </table> <p>HI-HI ctmt press >16.2 psig 2/3 TSLB1 2-2,3,4</p>	Signal	Setpoint	coincidence	TSLB	LO SG PRESS	< 585 psig	2/3	TSLB4 19-2,3,4	Hi stm flow and Lo-Lo Tavg	>40% and <543°F	1/2 on 2/3	TSLB4 16-3,4 17-3,4 18-3,4	HI-HI ctmt press	>16.2 psig	2/3	TSLB2 10-1,2,3	
Signal	Setpoint	coincidence	TSLB																
LO SG PRESS	< 585 psig	2/3	TSLB4 19-2,3,4																
Hi stm flow and Lo-Lo Tavg	>40% and <543°F	1/2 on 2/3	TSLB4 16-3,4 17-3,4 18-3,4																
HI-HI ctmt press	>16.2 psig	2/3	TSLB2 10-1,2,3																
	BOP	<p>(Step 11) Verify PHASE A CTMT ISO. (Step 11.1) Verify PHASE A CTMT ISO - ACTUATED. <input type="checkbox"/> MLB-2 1-1 lit <input type="checkbox"/> MLB-2 11-1 lit</p> <p>11.2 Check all MLB-2 lights - LIT.</p>	<p>RNO Step 11.2 Verify PHASE A CTMT ISO alignment using ATTACH 3, PHASE A CTMT ISO</p>																

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Event Description: ATTACHMENT 2 of EEP-0

EEP-0.0, Reactor Trip or Safety Injection, v45 Attachment 2			
Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 12) Check all reactor trip and reactor trip bypass breakers – OPEN Reactor trip breaker A Reactor trip breaker B Reactor trip bypass breaker A Reactor trip bypass breaker B	
	BOP	(step 13) Trip CRDM MG set supply breakers. 1A(1B) MG SET SUPP BKR <input type="checkbox"/> N1C11E005A <input type="checkbox"/> N1C11E005B	
	BOP	(step 14) Secure secondary components. Stop both heater drain pumps. HDP <input type="checkbox"/> 1A <input type="checkbox"/> 1B Check any condensate pump started. IF started, THEN stop all but one condensate pump. <input type="checkbox"/> 1A <input type="checkbox"/> 1B If NO condensate pumps are started then place all HSs to STOP 14.3 IF condensate pump operating, THEN verify backup cooling aligned to condensate pumps per FNP-0-SOP-0.0, APPENDIX B, TB SO Actions Following A Reactor Trip Or Safety Injection.	Will call TBSO to accomplish this.
	BOP	(step 15) Verify both CRACS mode selector switches in the ON position. CRACS Mode Selector Switch <input type="checkbox"/> A TRAIN <input type="checkbox"/> B TRAIN Will call BOOTH to have this accomplished since this is not in the simulator	
	BOP	(step 16) WHEN at least 30 seconds have passed since turbine trip, THEN check main generator tripped. 230 KV BKR <input type="checkbox"/> 810 - OPEN <input type="checkbox"/> 914 - OPEN	

Op Test No.: FA2014301 Scenario # 1 Event # 7 Page 33 of 41Event Description: **ATTACHMENT 2 of EEP-0****EEP-0.0, Reactor Trip or Safety Injection, v45****Attachment 2**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 17) Verify two trains of ECCS equipment aligned. Perform ATTACHMENT 4, Two Train ECCS Alignment Verification.	
End of Attachment 2			

Op Test No.: FA2014301 Scenario # 1 Event # 7 Page 34 of 41

Event Description: ATTACHMENT 2 of EEP-0

EEP-0.0, Reactor Trip or Safety Injection, v45 Attachment 2			
Time	Pos.	Expected Actions/Behavior	Comments
		(Step 1) Verify both ECCS trains aligned. <input type="checkbox"/> Check DF01 closed <input type="checkbox"/> Verify DF02 closed <input type="checkbox"/> Check DG15 closed <input type="checkbox"/> Verify DG02 closed <input type="checkbox"/> Verify two trains of battery chargers – energized Amps > 0 (Step 1.6) Verify two trains of ESF equipment aligned. <input type="checkbox"/> Check all MLB-1 lights LIT Verify charging pump suction and discharge valves - OPEN. CHG PUMP DISCH HDR ISO <input type="checkbox"/> Q1E21MOV8132A <input type="checkbox"/> Q1E21MOV8132B <input type="checkbox"/> Q1E21MOV8133A <input type="checkbox"/> Q1E21MOV8133B CHG PUMP SUCTION HDR ISO <input type="checkbox"/> Q1E21MOV8130A <input type="checkbox"/> Q1E21MOV8130B <input type="checkbox"/> Q1E21MOV8131A <input type="checkbox"/> Q1E21MOV8131B	
		(Step 1.7) Verify all post accident containment air mixing system fans - STARTED. (BOP) POST ACCIDENT MIXING FAN <input type="checkbox"/> 1A <input type="checkbox"/> 1B <input type="checkbox"/> 1C <input type="checkbox"/> 1D RX CAV H2 DILUTION FAN <input type="checkbox"/> 1A <input type="checkbox"/> 1B (Step 1.8) WHEN power restored to any de-energized emergency bus, THEN verify alignment of associated equipment.	
	BOP	(Step 1.9) Verify SFP Cooling in service per SOP-54.0, Spent Fuel Pit Cooling And Purification System.	Call Radside SO
End of Attachment 4			

Event Description: **Attachment 5 of EEP-0**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 1) Check all the following MLB-3 indicating lights lit.	
	BOP	(Step 1 RNO) Verify associated component status.	Verifies component status based on below MLB indications. LIT = Proper status Re-position components as required to place in proper status
	BOP	(Step 2) Verify proper PRF system operation using FNP-1-SOP-60.0, PENETRATION ROOM FILTRATION SYSTEM.	Goes to SOP-60 (page 35 for A train in service and page 38 for B train in service)
	BOP	(Step 3) Notify control room of phase B Containment isolation status.	

End of Attachment 5

	1	2	3	4	5	6	7	8	9	10
1	CTMT ISO PHASE B	CS PMP 1A ON	3052 CLOSED	PENE RM EXH FAN 1A ON		CTMT ISO PHASE B	CS PMP 1B ON	3046 CLOSED	PENE RM EXH FAN 1B ON	
2	3611 CLOSED	CS RM CLR 1A ON	3045 CLOSED	PENE RM RECIRC FAN 1A ON		2228 CLOSED	CS RM CLR 1B ON	3184 CLOSED	PENE RM RECIRC FAN 1B ON	
3		8820A OPEN	3182 CLOSED	3361A OPEN			8820B OPEN		3361B OPEN	
4				3362A OPEN					3362B OPEN	

Op Test No.: FA2014301 Scenario # _____ Event # _____ Page 36 of 41

Event Description: **Attachment 5 of EEP-0**

SOP-60.0, Penetration Room Filtration, v35 A Train

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 4.3.1) IF both trains of PRF are started, THEN secure B train of PRF per section 4.6, Securing B Train of PRF Operation During a LOCA.	Goes to section 4.6
	BOP	(step 4.6.1) Verify the following dampers closed: <input type="checkbox"/> SFP to 1A PRF SUPPLY DAMPER Q1V48HV3538A <input type="checkbox"/> SFP to 1B PRF SUPPLY DAMPER Q1V48HV3538B	
	BOP	(step 4.6.2) Verify Phase B reset as indicated by MLB-3 lights 1.1 and 6.1 not lit.	
	BOP	(step 4.6.3) Place 1B PRF exhaust fan Q1E15M001B in automatic by placing the handswitch to STOP and release.	
	BOP	(step 4.6.4) Place 1B PRF recirculation fan Q1E15M002B in automatic by placing the handswitch to STOP and release.	
	BOP	(step 4.6.5) Place 1B PRF RECIRC FAN EXH DAMPER Q1E15HV3356B handswitch to AUTO.	
	BOP	(step 4.6.6) Close 1B PRF RECIRC FAN RECIRC DAMPER Q1E15MOV3361B	
	BOP	(step 4.6.7) Return 1B PRF RECIRC FAN RECIRC DAMPER Q1E15MOV3361B switch to AUTO.	
	BOP	(step 4.6.8) Close 1B PRF SUCTION DAMPER Q1E15MOV3362B	
	BOP	(step 4.6.9) Return 1B PRF SUCTION DAMPER Q1E15MOV3362B switch to AUTO.	Returns to step 4.3.2

Op Test No.: FA2014301 Scenario # _____ Event # _____ Page 37 of 41

Event Description: Attachment 5 of EEP-0

SOP-60.0, Penetration Room Filtration, v35 A Train

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 4.3.2) Verify closed SFP to 1A PRF SUPPLY DAMPER Q1V48HV3538A (BOP).	
	BOP	(step 4.3.3) Verify closed SFP to 1B PRF SUPPLY DAMPER Q1V48HV3538B (BOP).	
	BOP	(step 4.3.4) Verify Phase B reset as indicated by MLB-3, lights 1.1 and 6.1 not lit	
	BOP	(step 4.3.5) Verify open 1A PRF SUCTION DAMPER Q1E15MOV3362A.	
	BOP	(step 4.3.6) Verify 1A PRF recirculation fan Q1E15M002A started.	
	BOP	(step 4.3.7) Verify open 1A PRF RECIRC FAN EXH DAMPER Q1E15HV3356A.	
	BOP	(step 4.3.8) Verify 1A PRF exhaust fan Q1E15M001A started.	
	BOP	(step 4.3.9) Verify open 1A PRF EXH FAN DISCH DAMPER Q1E15HV3357A.	
	BOP	(step 4.4.10) IF required to maintain penetration room pressure at least - 0.5 IN WC as indicated by PENE RM TO ATMOS ΔP PDI 3367A and PDI 3367B, AND power to A train PRF is available, THEN place the A train of PRF in service as follows:	Evaluates ΔP - May or may not perform this step. If not then Returns to Attachment 5 of E-0
	BOP	(step 4.4.10.1) Verify open 1A PRF SUCT DAMPER Q1E15MOV3362A.	
	BOP	(step 4.4.10.2) Verify 1A PRF recirculation fan started.	

Op Test No.: FA2014301 Scenario # _____ Event # _____ Page 38 of 41

Event Description: Attachment 5 of EEP-0

**SOP-60.0, Penetration Room Filtration, v35
A Train**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 4.4.10.3) Verify open 1A PRF RECIRC FAN EXH DAMPER Q1E15MOV3356A.	
	BOP	(step 4.4.10.4) Verify 1A PRF exhaust fan started.	
	BOP	(step 4.4.10.5) Verify open 1A PRF EXH FAN DISCH DAMPER Q1E15HV3357A.	Returns to Attachment 5 of E-0.
End of Section			

Op Test No.: FA2014301 Scenario # _____ Event # _____ Page 39 of 41

Event Description: Attachment 5 of EEP-0

SOP-60.0, Penetration Room Filtration, v35 B Train

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 4.4.1) IF both trains of PRF are started, THEN secure A train of PRF per section 4.5, Securing A Train of PRF Operation During a LOCA.	Goes to section 4.5
	BOP	(step 4.5.1) Verify the following dampers closed: <input type="checkbox"/> SFP to 1A PRF SUPPLY DAMPER Q1V48HV3538A <input type="checkbox"/> SFP to 1B PRF SUPPLY DAMPER Q1V48HV3538B Q1E15MOV3361A switch to AUTO.	
	BOP	(step 4.5.2) Verify Phase B reset as indicated by MLB-3 lights 1.1 and 6.1 not lit.	
	BOP	(step 4.5.3) Place 1A PRF exhaust fan Q1E15M001A in automatic by placing the handswitch to STOP and release.	
	BOP	(step 4.5.4) Place 1A PRF recirculation fan Q1E15M002A in automatic by placing the handswitch to STOP and release.	
	BOP	(step 4.5.5) Place 1A PRF RECIRC FAN EXH DAMPER Q1E15HV3356A handswitch to AUTO.	
	BOP	(step 4.5.6) Close 1A PRF RECIRC FAN RECIRC DAMPER Q1E15MOV3361A	
	BOP	(step 4.5.7) Return 1A PRF RECIRC FAN RECIRC DAMPER	

Op Test No.: FA2014301 Scenario # _____ Event # _____ Page 40 of 41

Event Description: Attachment 5 of EEP-0

SOP-60.0, Penetration Room Filtration, v35 B Train

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 4.5.8) Close 1A PRF SUCTION DAMPER Q1E15MOV3362A	
	BOP	(step 4.5.9) Return 1A PRF SUCTION DAMPER Q1E15MOV3362A switch to AUTO.	Returns to step 4.4.2
	BOP	(step 4.4.2) Verify closed SFP to 1A PRF SUPPLY DAMPER Q1V48HV3538A (BOP).	
	BOP	(step 4.4.3) Verify closed SFP to 1B PRF SUPPLY DAMPER Q1V48HV3538B (BOP).	
	BOP	(step 4.4.4) Verify Phase B reset as indicated by MLB-3 lights 1.1 and 6.1 not lit.	
	BOP	(step 4.4.5) Verify open B PRF SUCTION DAMPER Q1E15MOV3362B.	
	BOP	(step 4.4.6) Verify 1B PRF recirculation fan started.	
	BOP	(step 4.4.7) Verify open 1B PRF RECIRC FAN EXH DAMPER Q1E15HV3356B.	
	BOP	(step 4.4.8) Verify 1B PRF exhaust fan started.	
	BOP	(step 4.4.9) Verify open 1B PRF EXH FAN DISCH DAMPER Q1E15HV3357B.	

Op Test No.: FA2014301 Scenario # _____ Event # _____ Page 41 of 41

Event Description: Attachment 5 of EEP-0

SOP-60.0, Penetration Room Filtration, v35 B Train

Time	Pos.	Expected Actions/Behavior	Comments
		(step 4.4.10) IF required to maintain penetration room pressure at least -0.5 IN WC as indicated by PENE RM TO ATMOS ΔP PDI 3367A and PDI 3367B, AND power to A train PRF is available, THEN place the A train of PRF in service as follows:	Evaluates ΔP - May or may not perform this step. If not then Returns to Attachment 5 of E-0.
	BOP	(step 4.4.10.1) Verify open 1A PRF SUCT DAMPER Q1E15MOV3362A.	
	BOP	(step 4.4.10.2) Verify 1A PRF recirculation fan started.	
	BOP	(step 4.4.10.3) Verify open 1A PRF RECIRC FAN EXH DAMPER Q1E15MOV3356A.	
	BOP	(step 4.4.10.4) Verify 1A PRF exhaust fan started.	
	BOP	(step 4.4.10.5) Verify open 1A PRF EXH FAN DISCH DAMPER Q1E15HV3357A.	Returns to Attachment 5 of E-0
End of Section			

Op-Test No.: FA2014301

Page 1 of 2

Brief

This simulator performance scenario is performed in the EVALUATION MODE. You should not direct questions to the evaluators. Otherwise, you should perform as if you were in the MCR.

Your ability to maintain a log is not being graded, but maintaining a rough log is recommended to help during briefs.

If you need to communicate with the Unit 2 operator, call Unit 2 at 2434 or page the Unit 2 Unit Operator.

Respond to what you see. If there is a problem with the simulation, the session will be terminated or adjusted as appropriate based on the specific problem.

Assign operating positions.

Ask for and answer questions.

[X] Unit 1 [] Unit 2

Shift:

Date

Off-going SS

Oncoming SS

[] N

[X] D

Today

Part I – To be reviewed by the oncoming Supervisor prior to assuming the shift.

Security Keys A, S, D, SW, X on key ring .SS

Unit 4% power, 1340 ppm Cb, MOL 10000 MWD/MTU
StatusTARGET ZERO
Every Day, Every Job Safely

STPs/Evolutions:

A Train On-Service – A Train
Protected

1.0 ____; 109.1 ____ No adj.; 63.7 ____; FSP-20,0 ____;

Status of Special Testing

All MODE 1 STP's are complete. Permission to proceed to MODE 1 has been granted.

General Information

- Shift Goal is to Raise power to 12% and prepare roll the Main Turbine to 1800 rpm
- Shift 1A CTMT Cooler to Fast Speed.
- Current Risk Assessment is GREEN and projected is GREEN
- Aux steam is being supplied from Unit 2
- 1B SGFP is on service with FRV Bypass valves in AUTO
- UOP-1.2 ver 110, is complete through Section 5.0, Step 65. Continue the startup starting at Section 5.0, Step 66.
- Unit 2 is at 100% power with no major issues.
- Disconnect 915 is closed.
-
-

Equipment Status

Maintain VCT gas pressure 25-30 psig

Reactivity Plan

Control rods and steam dumps, and 20 gallon dilutions as required.

Waste Management Status

#3 RHT – On Service

WGS – secured

LCO Status**Night Orders**

No New Night Orders

Part II Review Shift Complement

LCOs Reviewed SS (initials) reviewed as early in shift as possible

Part III:

STP-1.0

Operator Logs

Cond. Report

Autolog

ELDS & GEN

Keys

Reviewed/Signed

Reviewed

Queue

Reviewed

Spreadsheet

Turned

[X] Yes

[X] Yes

[X] Yes

[X] Yes

[X] Yes

[X] Yes

Reviewed

verified

Over

Unit One Reactivity Briefing Sheet

RCS Temp **549.0 °F**
 RX PWR **4.0 %**
 Current Xenon Concentration **2277 PCM**

Burnup **10000 MWD/MTU**
 As of (Date & Time) **10/2/2013 1:00**
 Calculated Burnup **10596 MWD/MTU**
 As Of **9/23/14 1133**

Assumes constant power since
 Last Power history update

RCS Boron **1340 PPM**
 BAT Concentration **7350 PPM**

Current Bank
 Delta Rod Position: **164 Steps**

Rod Worth Steps Out

One	6 PCM
Two	12 PCM
Five	30 PCM
Ten	64 PCM
Twenty	140 PCM
Fifty	410 PCM

Steps In

One	-6 PCM
Two	-12 PCM
Five	-29 PCM
Ten	-56 PCM
Twenty	-105 PCM
Fifty	-236 PCM

RCS Blended Flow Makeup Requirements

Acid to Borate 1 PPM (Gal.)	RMW to dilute 1 PPM (Gal.)	Required Acid flow Rate (GPM)	FK-113 Pot Setting
8.4 Gal.	37.1 Gal.	22.2 GPM	5.53
8.3 Gal.	37.1 Gal.	21.9 GPM	5.44

Values for Normal Auto M/U (Bat-100 ppm boron)
 Values based on Actual Bat Concentration

Current RCS Borations / Dilutions:

Borate	Dilute
0 Gal.	20 Gal.

Reactivity Additions: **0.00** **4.08 PCM**
 Total Reactivity Addition: **4.08 PCM**
 Net RCS Temperature Effect: **1.01 °F**
 Net Rx Power Effect: **0.23 %**

Boron Worth **-8.34 PCM/PPM**
 Power Defect **70 PCM**
 MTC **-4.05 PCM/°F**

Boric Acid Required for Power reduction
 With no Control rod movement

DeltaPower	Power Defect (PCM)	Delta PPM	Acid Required (Gallons)
1.00%	18	2.07	17
2.00%	35	4.14	34
5.00%	N/A	N/A	N/A
10.00%	N/A	N/A	N/A
20.00%	N/A	N/A	N/A
25.00%	N/A	N/A	N/A
50.00%	N/A	N/A	N/A
75.00%	N/A	N/A	N/A
100.00%	N/A	N/A	N/A

a/o w/o
 RCS B-10 ratio **17.98** **16.6**
 BAT B-10 ratio **20.1** **18.6**
 NDR B-10 ratio **19.8** **18.3**

Valid For Unit One cycle 2

Core Physics Curves:

Curve 5 Rev 29
 Curve 27 Rev 28
 Curve 34 Rev 46
 Curve 57 Rev 35
 Curve 57A Rev 25

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Southern Nuclear J.M. Farley Nuclear Plant

Operations Training Simulator Exam Scenario

BOOTH INSTRUCTOR GUIDE

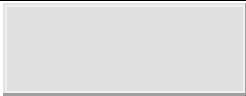



ILT-37 NRC EXAM SCENARIO #1

Validation time: 100 minutes Validated by: Sorrell, Newell, Smith			
TRN Supervisor Approval:	Billy Thornton	Date:	9/24/14
NRC Chief Examiner	SEE NUREG 1021 FORM ES-301-3		







Facility:	Farley Nuclear Plant		Scenario No.:	1	Op-Test No.:	FA2014-301
Examiners:	_____		Operators:	_____		SRO
	_____			_____		RO
	_____			_____		BOP
<p>Initial Conditions: 4% power, UOP-1.2, v110, completed thru step 5.65. Ready to perform step 5.66. MOL, 1340ppm Cb; 1BSGFP on service. Aux steam from U-2.</p> <p>Turnover:</p> <ul style="list-style-type: none"> 1B SGFP is on service, MFR bypass valves are on service. Current Risk Assessment is GREEN and projected to remain GREEN. A Train O/S, A Train protected. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia 						
SPLIT TRAIN ALIGNMENT						
Event No.	Malf. No.	Event Type*	Event Description			
1		R (RO) N (BOP)	Raise Power to 12% using control rods and steam dumps.			
2		N (BOP)	Start 1A CTMT Cooler in Fast			
3	Imf fk122-A	C (RO)	FK-122 Fails open in Auto(P – CT)			
4	imf mal- rmsip35 A / preset	I (BOP) TS (SRO)	R-35A Fails high, automatic actions do not occur T.S. 3.3.7 Cond A			
5	imf pt508	I (BOP)	PT-508 Fails high(P – CT)			
6	imf crrcp1 _cc3	C (RO) TS (SRO)	1A RCP trips(P – CT) T.S. 3.4.4 Cond A			
7	Imf mal- mss1B / Preset	M (ALL) C (RO)	Steam break inside containment, MSIV's will not close, Automatic SI is blocked (CT-2)			
8	Preset / dmf crsh001 c_cc5	C (BOP)	1B CS pump does not auto start. (*CT-3) MOV 8820A does not open. (*CT-3) *1 CS spray pump required (Orange Path on Z until CS established) After ECP 2.1 entry and 27psig in containment MSIV's close.			
			Terminate on transition out of ECP-2.1 to EEP-2 or examiners discretion			



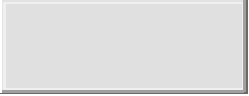

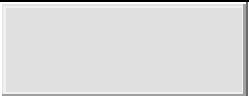
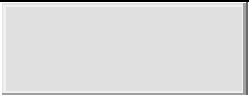
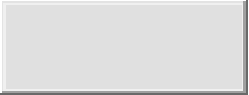
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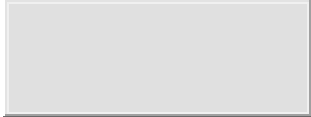
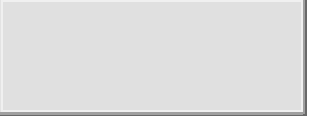
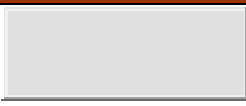


EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	Load in IC-211 and sim IC snap directory 1340 ppm Cb; 1BSGFP on service. Aux steam from U-2 Base IC is IC-33	
		RUN	 RUN simulator
0	0	Generic setup: bat generic_setup_HLT.txt	
0	0	Quick setup (all items with * are included): bat ILT37_1.txt	

PRESETS			
7		Fail auto SI signals, Manual SI works CMFmalf / csftyinj_cc1 / open CMFmalf / csftyinj_cc11 / open	*
4		3622, 3624 and 3626 will not close on hi rad Cmf mal / chvh3622_d_cc3 closed Cmf mal / chvh3624_d_cc3 closed Cmf mal / chvh3626_d_cc3 closed	*
7		1A MSIVs will not close on the auto or manual closure CMFmalf / crsh001a_cc5 / open CMFmalf / cmsh002a_d_cc5 / open CMFmalf / crsh001a_opos3 / open CMFmalf / cmsh002a_d_opos3 / open	*
7		1B MSIVs will not close on the auto or manual closure CMFmalf / crsh001b_cc5 / open CMFmalf / cmsh002b_d_cc5 / open CMFmalf / crsh001b_opos3 / open CMFmalf / cmsh002b_opos3 / open	*
7		1C MSIVs will not close on the auto or manual closure CMFmalf / crsh001c_cc5 / open CMFmalf / cmsh002c_d_cc5 / open CMFmalf / crsh001c_opos3 / open CMFmalf / cmsh002c_opos3 / open	*
8		1B CS pump does not auto start – will start from MCB CMFmalf / cbkp01b_d_cc5 / open	*
		MOV 8820A does not open on phase B– will open from MCB CMFmalf / cbk8820a_d_cc5 / open	*
Triggers and Commands			


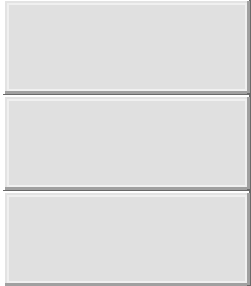
EXAM

<u>MCB setup</u>			
		DEH	Clear DEH alarms
		Select OPS GROUP on MCB monitor Acknowledge computer alarms	IPC
		IPC: IF FF5 is in alarm, update rods	Ensure FF5 clear or update rods on IPC
		Setup spreadsheet on OATC computer to resemble reactivity spreadsheet provided	<u>Set up computer</u>
		Clear Recorders Caeclearrecorders.cae	
		Remove R35A input to IPC (not modeled on simulator)	
		Provide a marked up copy of UOP-1.2 v109 completed thru Section 5.0, Step 65, ready to perform step 66.	<u>UOP-1.2 copy</u>
			 FREEZE simulator
		Perform Booth Operators Setup Checklist	
		Open Simview file to be used for plant parameter data collection: Simview / svDataCollection.uvl	
		If needed, adjust sim time back to 00:00:00 SIMVIEW / Sim_Clock.uvl Hours: clock(3) = 0 Minutes: clock(2) = 0 Seconds: clock(1) = 0	
		VERIFY MICROPHONES READY	Batteries installed
		TURNOVER SHEET AVAILABLE	

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
Prior to RUN	0		
		Start data collection for Simview file On DataCollection.uvl file press DATA for drop down and then COLLECT to start collecting data	
	0	Begin Exam	
		Verify Horns ON: hornflag <u>HORNS ON = TRUE</u>	
1	Start of exam	Commence Ramp up to 12% power.	
2	NRC CUE	Start 1A CTMT Cooler per SOP-12.1, Step 4.1	
3	NRC CUE	FK 122, Charging Flow Controller, Fails HI CNH / FK122-A / 0 / 2	
4	NRC CUE	R-35A, Control Room Air Intake Radiation Monitor Fails HI MAL / MAL-RMS35A / 1000000	
5	NRC CUE	PT-508 Fails HI XMT / PT508 / 1400 / 1	
6	NRC CUE	1A RCP Trip CMFmalf / cRCRCP1_cc3 / closed	
7	Step 3 of ESP-0.1	Steam Line Break Inside CTMT Malf / MAL-MSS1B / 0.5	

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
8	preset	1B CS Pump Does Not Start and MOV-8820A does not open	
8	NRC CUE	At Step 2 of ECP-2.1, the 1A MSIV (HV-3369A) will shut. dmf crsh001a_cc5	
8	NRC CUE	At Step 2 of ECP-2.1, the 1C MSIV (HV-3369C) will shut. dmf crsh001c_cc5	
		End of Exam HORNS OFF	
		FREEZE simulator	
		Stop data collection for Simview file svDataCollection.uvl	
		Export data to file with the name of exam2014sen1grpX.txt <i>NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate.</i> <i>NOTE: file will be saved in the OPENSIM directory.</i>	Ensure data file created.
		When Control board data no longer needed Then Clear recorders for exam security	

Local operator actions:

<u>EVENT NO.</u>	<u>TIME</u>	<u>ACTIONS</u>
1	NONE REQUIRED	
2	NONE REQUIRED	
3	NONE REQUIRED	
4	NONE REQUIRED	
5	NONE REQUIRED	
6	NONE REQUIRED	
7	IF REQUESTED	10 minutes after requested, SOP-0.0 actions for a Rx trip/Safety Injection 
7	IF REQUESTED	10 Minutes after requested, Isolate TDAFW to SG A, B, or C using the button below (step 5.3 of EEP-2.0) 
7	IF REQUESTED	5 Minutes after requested, perform step 2.5 of ECP.2.1 “On HSDP F” Place TDAFWP STM SUPP from 1C SG HV3235B in LOCAL Place TDAFWP STM SUPP from 1B SG HV3235A/26 in LOCAL “ON HSDP D” Place TDAFWP STM SUPP from 1C SG HV3235B to STOP and release. Place TDAFWP STM SUPP from 1B SG HV3235A/26 to STOP and release.

Communications sheet

<u>EVENT NO.</u>	<u>TIME</u>	<u>Communication:</u>
ALL	AS REQUIRED (Standard communications to inform supervision)	<u>SSS, SM and Dispatcher:</u> Repeat back failure, procedure entered, plant status, CR in the cue and that type of communications.
1	IF REQUESTED	“Disconnect 915 has already been closed” “FNP-1-STP-42.2 has been performed SAT within the last 30 days” “FNP-1-STP-151.5, Main Turbine Overspeed Test is not desired to be performed” “No maintenance has been performed on the main generator voltage regulator/exciter system” “I will check one cooler group (fans and pumps) operating on each main transformer”
2	IF REQUESTED	3 minutes after requested – “FK-122 is 100% open with no apparent damage”
3	NONE EXPECTED	
4	IF REQUESTED	3 minutes after requested - “TSC ventilation is aligned in recirculation mode” 1 minutes after requested – “R-35A is in high alarm.” “R-35A is pegged high with the RED high light LIT.” “R-35B is reading normal mid range scale” “I will verify both Control Room Doors are closed” 5 minutes after requested “HP survey of MCR area normal”
5	NONE EXPECTED	
6	NONE EXPECTED	5 minutes after requested “DA04 is tripped open with no apparent damage”
7/8	IF REQUESTED	10 minutes after requested “SOP-0.0 actions for a Rx trip/Safety Injection are complete” “I will verify SFP cooling in service per SOP-54.0” 10 minutes after requested “step 5.3 of EEP-2.0 is complete V017A is closed” 5 minutes after requested “step 2.5 of ECP-2.1 is complete”

Facility:	Farley Nuclear Plant	Scenario No.:	2	Op-Test No.:	FA2014-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
<p>Initial Conditions: 25% power, UOP-3.1, v119.0, at step 5.3. Ramping up. MOL, 1340 ppm Cb; 1B SGFP on service. Aux steam from U-2.</p> <p>Turnover:</p> <ul style="list-style-type: none"> Current Risk Assessment is GREEN and projected to remain GREEN. A Train O/S, A Train protected. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia 					
SPLIT TRAIN ALIGNMENT					
Event No.	Malf. No.	Event Type*	Event Description		
1		R (RO) N (BOP)	Place impulse loop in service and commence ramp to 100%		
2	loa-cfw001	C (BOP) TS (SRO)	CST Ruptured by crane TS 3.7.6 Cond A		
3	imf TK144-A 10 / preset	I (RO)	TK-144 fails high in Auto, TCV-143 fails to auto divert		
4	Imf lt459	I (RO) TS (SRO)	LT-459 fails low (P-CT) TS 3.3.1 Function 9 Cond M		
5	preset	N (BOP)	During letdown restoration LCV-459 will not open. Requires Excess letdown to be placed in service.		
6	Imf pt464	I (BOP)	PT-464 fails high (P-CT)		
7	Imf mal-eps1 / preset	M (ALL)	LOSP 1B DG trips after auto start and cannot be started 4 minutes after LOSP Unit 2 SI occurs 1C DG fails to align to unit 1 Loss of ALL AC		
8	preset	C (BOP)	TDAFW pump fails to auto start (CT-23)		
9	preset	C (RO)	Power restored by starting 2C DG (CT-24) Unit 2 has no B train service water At least one service water pumps must be manually started prior to the 2C DG tripping(CT-25)		
			Terminate when 2C diesel running with Service Water supplied		

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

PRESETS			
8		Prevent TDAFWP auto start CMFmalf / cms3235B-cc1 / open CMFmalf / cms3235b_cc2 / open CMFmalf / cms3235a_cc1 / open CMFmalf / cms3235a_cc2 / open	*
7		1B DG trips on AUTO start Malf / mal-eps4b / 30 sec delay / Trg 2	TRG 2
7		Unit 2 SI - 2B DG trips on loadshed CMFmalf / csftyinj_cc21 / closed / 240 sec delay / Trg 2 Malf / mal-eps4c / 245 sec delay / Trg 2	TRG 2
7		1C DG blocked from auto or manual closure CMFmalf / cbk1DH07_d_cc18 / open	*
9		Block D & E SW pumps from starting after 1B DG trips CMFmalf / cNCPsw1F_d_cc5 / 35 sec delay / open CMFmalf / cNCPsw1F_d_cc6 / 35 sec delay / open CMFmalf / cNCPsw1E_d_cc5 / 35 sec delay / open CMFmalf / cNCPsw1E_d_cc6 / 35 sec delay / open	TRG 2
3		Fails TCV-143 from diverting on high temperature. CMFmalf / ccvT143_d_cc1 / closed	*
Triggers and Commands			
5		Event Trigger 1 – monitors LCV-459 valve position, once closed will not reopen Trgset 1 “x13o133c” Trg 1 “imf rcv1459-m 0 2”	TRG 1
7		Event Trigger 2 – 1B DG start lamp. 1B DG will trip after it starts. Trgset 2 “xg1ba02”	TRG 2
7		Event Trigger 3 – 1C DG Trips when DF08-2 closes Trgset 3 “x4bo007o” Trg 3 “imf mal-dsg009”	TRG 3

Initial Conditions: 25% power, , UOP-3.1, v119.0, at step 5.3. Ramping up. MOL, 1340 ppm Cb; 1B SGFP on service. Aux steam from U-2.

Turnover:

- Current Risk Assessment is **GREEN** and projected to remain **GREEN**.
- **A** Train O/S, **A** Train protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia.

Event 1 Commence Ramp up to 100% power.

Verifiable actions: RO uses rods and boron to maintain Tavg/Tref. BOP will place impulse loop in service, insert ramp target and rate and commence ramp.

Event 2 CST ruptured by crane.

Verifiable actions: BOP aligns Service Water to Auxiliary Feed Pump suction. **TS 3.7.6 Condition A**

Event 3 TK-144 fails high in Auto, TCV-143 fails to auto divert

Verifiable Actions: RO take manual control of TK-144 and raise cooling flow to letdown and place TCV-143 in the VCT position.

Event 4 LT-459 fails low. **(P-CT)**

Verifiable Actions: Take manual control of charging to control PRZR level and deselect the failed channel. **TS 3.3.1 Condition M**

Event 5 During restoration of Letdown, LCV-459 fails to open.

Verifiable Actions: BOP place excess letdown on service.

Event 6 PT-464 fails high. **(P-CT)**

Verifiable actions: BOP takes manual control of SGFP speed as SGFP speed will increase as will SGWL.

Event 7 Loss of Offsite Power (LOSP). 1B DG trips after auto start and cannot be started. 4 minutes after the LOSP, a Unit 2 SI occurs and 1C DG fails to align to Unit1 causing a loss of all AC.

Event 8 TDAFWP fails to auto start.

Verifiable actions: BOP manually starts the TDAFWP **(CT)**.

Event 9 Power restored by starting 2C DG **(CT)**, Unit 2 has no Service Water (SW) and Unit 1 Service Water pumps do not auto start.

Verifiable actions: RO manually start SW pumps to support 2C DG. **(CT)**

Terminate when 2C DG is running with SW supplied.

UOP-3.1/ARP/SOP/ARP/AOP-16/AOP-100/SOP/AOP-100/EEP-0/ECP-0.0

CRITICAL TASK SHEET

- ___ 1. Energize at least one ac emergency bus [before placing safeguards equipment hand switches in the pull-to-lock position] (CT-24)
- ___ 2. Establish the minimum AFW flow rate to the SGs [before SG Dryout occurs] (CT-23)
- ___ 3. Manually start at least one SW pump such that the EDG does not fail because of damage caused by engine overheating. (CT-25)

**SCENARIO
OBJECTIVE/
OVERVIEW:**

Low power instrument and component failures with a loss of all AC.

The team should be able to:

- ramp up from 25% power,
- respond to a CST rupture and aligns AFW suction,
- respond to a letdown cooling valve malfunction ,
- respond to a PRZR level instrument malfunction,
- establish excess letdown as required when letdown cannot be restored,
- respond to a transmitter malfunction that affect SGFP speed,
- respond to a LOSP will become a complete loss of all AC,
- manually start the TDAFWP and SW pumps supplying the 2C DG,
- Terminate when power is restored on the 2C DG and SW pumps are running.

Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes
1.	Total malfunctions (5–8)	7
2.	Malfunctions after EOP entry (1–2)	2
3.	Abnormal events (2–4)	2
4.	Major transients (1–2)	1
5.	EOPs entered/requiring substantive actions (1–2)	0
6.	EOP contingencies requiring substantive actions (0–2)	1
7.	Critical tasks (2–3)	5

Op Test No.: FA2014301 Scenario # 2 Event # 1 Page 1 of 22

Event Description: Ramp up to 100% power

Indications Available

Annunciators: NA

Note to Examiner

The turnover sheet directs the crew to place the IMP PRESS LOOP in service per UOP-3.1 section 5.3. When simulator is taken to run the crew is expected to increase Reactor power to at least 30% IAW UOP-3.1. At 30% the NRC will evaluate going to the next event. This evolution will take approx. 15 -20 minutes

UOP-3.1, Startup of Unit from Hot Standby to Minimum Load, version 119, Section 5

Time	Pos.	Expected Actions/Behavior	Comments
	RO/BOP	Begin to increase reactor power to 100% with following controls. <ul style="list-style-type: none"> Manual adjustment of control rods and Boron Main Turbine with impulse pressure loop in service 	<u>Manual adjustment of rods</u> (not more than 3 steps at a time) <u>Turbine Control</u> – Place Impulse Loop in service and insert ramp target/rate and commence the ramp. <u>Dilutions</u> Dilutions should be performed per SOP-2.3 (see page 3 for dilution, page 4 for repetitive dilution)
	SRO	Monitor reactor power, main turbine ramp, and reactivity adjustments as reactor power rises.	
	BOP	(Step 3 and Following) (Step 3.a) Verify Turbine on HOLD. (Step 3.b) Check that the DEH computer point PIA, FIRST STAGE PRESSURE #1 has stable indication. (Step 3.c) On the FEEDBACK STATUS DISPLAY, move the cursor to IMP PRESS LOOP OUT. (Step 3.d) Depress the SELECT key. (Step 3.e) Verify IMP PRESS LOOP is highlighted in reverse video. (Step 3.f) Depress the START key (Step 3.g) Verify FEEDBACK STATUS indicates IMP PRESS LOOP IN.	(Step 2.b) On DEH check that the student : Depresses Point Data Entry Types PIA Depresses select button
	RO	(step 1) Begin raising turbine load to 50% power, using the appropriate DEH Controls	Ramp Rate should be limited to less than or equal to 2 MW/min per UOP-1.2 Section 2.1.

Op Test No.: FA2014301 Scenario # 2 Event # 1 Page 2 of 22

Event Description: Ramp up to 100% power

	BOP	<p>(step 4) As load increases to 30% power, perform the following:</p> <p>(step 4.a) Monitor SGFP suction Pressure</p> <p>(step 4.b) Verify proper SGFP speed control and maintain proper DP</p> <p>(step 4.c) Check that the IR HI LEVEL ROD STOP drawer lights are illuminated when reactor power exceeds 25%</p> <p>(step 4.d) Verify that the main turbine drain vales close at approximately 170 MW.</p> <p>(step 4.d.1) Check on the Secondary Valve Indication Panel for the following indication illuminated.</p> <p>TURB 518, 521, 524, 519, 522, 525, 520, 523, and 526 Closed</p> <p>(step 4.d.2) If any turbine drain valve indicate open perform the following:</p> <p>Place Turb DRN VLVS SEL Switch in MAN</p> <p>(step 4.e) Align FWH Extraction Line Drains and Startup vents per SOP-20.0 when turbine power exceeds 15-20%</p> <p>(step 4.f) Verify FWH condensate bypass valves fully closed.</p> <p>(step 4.g) When reactor power exceeds 30%, verify on the Bypass and Permissive panel that the Low Power Low Flow Trip Block P-8, permissive light NOT illuminated.</p>	
When 30% power is reached or at the discretion of the Lead Examiner move to next event.			

Op Test No.: FA2014301 Scenario # 2 Event # 1 Page 3 of 22

Event Description: Ramp up to 100% power

SOP-2.3, CVCS RX Makeup Control System, Dilution, Appendix C, v60.1

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>2.0 Dilution</p> <p>2.1 IF necessary, THEN set the total batch integrator to the desired quantity.</p> <p>2.2 IF necessary, THEN adjust LTDN TO VCT FLOW LK 112 setpoint as desired.</p> <p>2.3 Position the MKUP MODE CONT SWITCH to STOP.</p> <p>2.4 Position the MKUP MODE SEL SWITCH to DIL or ALT DIL.</p> <p>2.5 IF using ALT DIL AND it is desired to bypass the VCT, THEN place the MKUP TO VCT valve Q1E21FCV114A in close.</p> <p>2.6 Position the MKUP MODE CONT SWITCH to START.</p> <p>2.7 Verify proper dilution operation by observing the following:</p> <ul style="list-style-type: none"> - IF using ALT DIL, MAKEUP TO CHG PUMP SUCTION HDR FCV113B opens. - FCV-114A opens, unless bypassing VCT. - RMW TO BLENDER Q1E21FCV114B opens. - Reactor makeup flow displayed on FI-168 MAKEUP FLOW TO CHG/VCT. <p>Verify the dilution automatically stops when the total flow batch integrator reaches setpoint:</p> <ul style="list-style-type: none"> - Reactor makeup flow returns to zero as displayed on FI-168 - MKUP TO VCT , FCV114A closes. - RMW TO BLENDER, FCV114B closes. - IF ALT DIL was used, THEN FCV-113B closes. <p>2.9 IF VCT was bypassed, THEN verify MKUP TO VCT valve Q1E21FCV114A (Q1E21V339) in AUTO.</p> <p>2.10 Position the MKUP MODE SEL SWITCH to AUTO.</p> <p>2.11 Position the MKUP MODE CONT SWITCH to START.</p> <p>2.12 IF LK 112 setpoint was adjusted per Step 2.2, THEN return setpoint to that required for current conditions.</p>	

Op Test No.: FA2014301 Scenario # 2 Event # 1 Page 4 of 22Event Description: **Ramp up to 100% power**

	RO	<p>Repetitive Dilutions</p> <p>2.1 IF necessary, THEN set FIS-168 Total Flow Batch Integrator to the desired quantity.</p> <p>2.2 The Reactor Makeup Control system has been previously aligned for Dilution or Alternate Dilution.</p> <p>2.3 Position the MKUP MODE CONT SWITCH to START.</p> <p>2.4 Verify proper dilution operation by observing the following:</p> <p>-IF using ALT DIL, MAKEUP TO CHG PUMP SUCTION HDR FCV113B opens.</p> <p>MKUP TO VCT FCV114A opens, unless bypassing VCT.</p> <p>RMW TO BLENDER FCV114B opens.</p> <p>Reactor makeup flow is displayed on FI-168 MAKEUP FLOW TO CHG/VCT.</p> <p>2.5 Verify the dilution automatically stops when the total flow batch integrator reaches its setpoint by observing the following:</p> <p>Reactor makeup flow returns to zero as displayed on FI-168 MAKEUP FLOW TO CHG/VCT.</p> <p>MKUP TO VCT FCV114A closes or is closed if bypassing the VCT.</p> <p>RMW TO BLENDER FCV114B closes.</p> <p>IF ALT DIL was used, THEN MAKEUP TO CHG PUMP SUCTION HDR FCV113B closes.</p> <p>2.6 IF repetitive dilutions are no longer required THEN verify the system is aligned for Automatic makeup per Steps 2.8 through 2.11 of Appendix B.</p>	
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Op Test No.: FA2014301 Scenario # 2 Event # 2 Page 5 of 22

Event Description: CST rupture –base plate crack from bottom to top

Indications Available

Annunciators:

- CST LVL HI-LO (JE5)
- CST LVL LO-LO A TRN and B TRN (JD4 and JE4)

Recognize indications of CST LEVEL

Decreasing:

- LI-4005 B decreasing
- Computer alarms

Note to Examiner

CST level will decrease over a 5 min time frame to 14 feet. The first alarm comes in at 16 feet so if the crew does not notice the decreasing level, the first alarm will be at about the 4 minute mark. The DBSO will be sent out to look for the problem and then a report will be given about a crane accident. The CST level will continue to fall to 0 feet.

150,000 gallons = 12 feet CST Level

ARP-1.9, JE5, JD4, JE4, ver 49.0

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Direct ARP reference (JE5) and a call to the DBSO to look for problems.	
	BOP	(JE5 step 2) manually close CP-4055F HOTWELL FILL CONTROLLER, to avoid collapsing tank diaphragm.	
	BOP	(JE5 step 3) IF CST level is low, and SGBD is on service, THEN secure SGBD. (JE5 step 4) IF a system rupture is indicated, THEN notify appropriate personnel to locate and isolate the leaking piping.	Call Radside SO and have SGBD secured DBSO will provide report.
	BOP	(JE5 step 7) Direct DBSO to commence filling the tank (Unless report of rupture has come in)	
	SRO	(JE4.JD4 step 1) Monitor condensate storage tank level on LI-4005B, LI-4132A and LI-4132B to verify validity of alarm Direct BOP to monitor this issue	
	SRO	(JE4, JD4 step 2) <u>Make a decision to do the following:</u> IF Auxiliary Feedwater is required and Tank Level if < 5.3 feet, THEN shift Auxiliary Feed Pump Suctions to the Service Water System per SOP-22.0, AUXILIARY FEEDWATER SYSTEM.	See page 7 for SOP-22, version 71.0, section 4.10 actions

Op Test No.: FA2014301 Scenario # 2 Event # 2 Page 6 of 22

Event Description: CST rupture –base plate crack from bottom to top

ARP-1.9, JE5, JD4, JE4, ver 49.0.

Time	Pos.	Expected Actions/Behavior			Comments
	SRO	(JE4, JD4 step 9) Evaluate Tech Specs 3.7.6 condition A Verify by administrative means OPERABILITY of backup water supply w/i 4 hours and restore the CST to OPERABLE status w/l 7 days			
<i>TECHNICAL SPECIFICATION 3.7.6, Condensate Storage Tank (CST)</i> <i>The CST shall be OPERABLE. (≥ 150,000 GAL)</i>					
	SRO				
		CONDITION	REQUIRED ACTION	COMPLETION TIME	
		A. CST inoperable.	A.1 Verify by administrative means OPERABILITY of backup water supply. AND A.2 Restore CST to OPERABLE status.	4 hours AND Once per 12 hours thereafter 7 days	
	SRO	Submit a condition report on the failed component, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the condition report.			
	SRO	Inform the SM of the failure and Tech Spec entry			

Op Test No.: FA2014301 Scenario # 2 Event # 2 Page 7 of 22

Event Description: CST rupture –base plate crack from bottom to top

SOP-22.0, AUXILIARY FEEDWATER SYSTEM, version 71.0
section 4.10

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 4.10.1) Notify Shift Chemist that SW will be added to the SGs.	
	BOP	(step 4.10.2) Verify service water is in operation per SOP-24.0, SERVICE WATER SYSTEM maintaining proper SW pressure.	
	BOP	(step 4.10.3) Open MDAFWP SW SUPP: (BOP key operated switches) □ MOV3209A □ MOV3209B	BOP (2504-N) or Back panel handswitches
	BOP	(step 4.10.4) Open: (BOP) □ MDAFWP SW SUPP MOV3210A □ MDAFWP SW SUPP MOV3210B □ TDAFWP SW SUPP MOV3216.	BOP (2504-N) or Back panel handswitches
	BOP	(step 4.10.4.1) IF necessary to align TDAFWP suction from B Train service water, THEN perform the following:	This step is N/A
When SW is aligned to the AFW pumps and Tech Specs have been evaluated or at the discretion of the Lead Examiner move to next event.			

Op Test No.: FA2014301 Scenario # 2 Event # 3 Page 8 of 22

Event Description: **TK-144 fails HIGH and TCV-143 fails to AUTO Divert****Indications Available**

Annunciators:

- LTDN TO DEMIN DIVERTED-TEMP HI (DF1)

Recognize indications of TK-144 failing high

- TI-143 indicating off scale high (>200°F)
- TI-144 indicating off scale high (>200°F)
- Possible boration and RCS temperature decrease if prolonged

ARP-1.4, DF1, rev 54.2

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Direct entry into DF1 ARP	
	RO	(step 1) Verify Q1E21TCV143 has diverted letdown flow to VCT to bypass demins - TCV-143 white light LIT (VCT) on MCB (step 2) Monitor charging and letdown flows and temperatures. FI 122, FI 150, TI 140, TI 144 and 143 (step 3) Try to take manual control of TCV 144 (step 4) Adjust charging or letdown flow as required to reduce the letdown flow temperature.	Operator will have to place TCV-143 to the VCT position manually. NOTE: TCV-143 may not require transfer to VCT position if prompt operator action prevents high temperature condition. Operator will take manual control of TCV-144
	SRO	(step 5) When letdown temperature is returned to normal direct removing returning TCV-143 to DEMIN IAW SOP-2.1	This step may be directed but the next event should begin prior to execution.
When letdown temperature has returned to normal or at the discretion of the Lead Examiner then move to the next event			

Op Test No.: FA2014301 Scenario # 2 Event # 4 Page 9 of 22

Event Description: **LT-459, PZR LVL TRANSMITTER Fails LOW****Indications Available****Annunciators:**

- CHG HDR FLOW HI-LO (EA2)
- PZR LVL LO HTRS OF LTDN SEC (HA3)
- PRZR LVL DEV LO (HB2)
- PRZR HTR CONT TRBL (HD4)

Recognize indications of LT-459 failing low:

- FT-122, CHG FLOW ↑
- LT-112/115, VCT level ↓
- LT-459, 460, 461, Actual Przr level↑

Note to Examiner

Based upon the component malfunction AOP-100 is the expected entry procedure but AOP-16.0 may be entered if crew determines event is a CVCS malfunction. AOP-16.0 entry will be directed by step 5 of AOP-100 when normal letdown cannot be established due to failure of LCV-459.

AOP-100 actions begin on this page.

AOP-16.0 actions begin on page 7.

TS 3.3.1 is on page 8.

AOP-100, Instrumentation Malfunction, section 1.2, v13.0

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 1) Check pressurizer level is on or trending to program value	
	RO	(step 1 RNO) Take Manual control of FK-122, CHG FLOW controller, and lower the demand to 0 gpm.	
	RO	(step 2) Check RCP Seal Injection 6-13 gpm [] Adjust as necessary using HIK 186, RCP SEAL INJECTION FLOW CONTROLLER	
	SRO	(step 3) Determine if a pressurizer level transmitter/indicator loop has failed (step 3.1) Failed or erroneous reading on LI459, LI460 or LI461 (step 3.2) Select unaffected PZR level channel on LS-459Z (Step 3.3) Select unaffected channel on recorder control switch LS/459Y	NOTE: LT-459 has failed. Operators should select CH III/II (461/460) on LS-459Z and CH II or CH III on LS-459Y
	RO	(step 4) Check letdown in service <ul style="list-style-type: none"> - Verify Orifice Isolations closed - Place TK-144 on Service - Verify LCV-115A in Auto w/ VCT Lit - Verify TCV-143 in VCT w/ VCT Lit - Open HV-8157A/B, HV-8152, LCV-459, and LCV-460 	TK-144 has failed and should not be returned to service. TCV-143 may be delayed in order to re-establish letdown. Letdown will not be available since LCV-459 will fail to open
	SRO	(step 5) Check Letdown flow established	Since letdown flow is not established then crew will transition to AOP-16.0

Op Test No.: FA2014301 Scenario # 2 Event # 4 Page 10 of 22

Event Description: **LT-459, PZR LVL TRANSMITTER Fails LOW****AOP-16.0, CVCS Malfunction, v20.0**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 1) Verify CHG flow adequate to cool letdown CHG FLOW - FI-122A LTDN HX OUTLET FLOW - FI-150 REGEN HX OUTLET TEMP - TI-140	Already closed due to previous failure.
	BOP	(Step 2) Stop any load change in progress	
	RO	(Step 3) If charging line rupture occurs then goto attachment 2 (Step 4) Monitor VCT level (Step 5) Observe CHG HDR PRESS and MOTOR AMPS to ensure proper charging pump operation - PI-121 and ammeter for chg pump	
	RO	(Step 6) Check charging pump – RUNNING	
	RO	(Step 7) Check Charging flow FK-122, CHG FLOW controller, controlling in AUTO with flow indicated FK- 122, CHG FLOW controller, is taken to manual control –RNO Adjust SEAL WTR INJECTION HIK-186 as required to maintain RCP seal injection flow 6-13 gpm	NOTE: There will be no flow indicated and FK-122 should be maintained shut. <u>POTENTIAL CRITICAL TASK</u> If operators fail to take manual control of FK-122 there may be a Rx Trip based upon PZR high level.
	RO	(Step 8) Check DE3 clear (Step 9) Determine Status of Normal Letdown: - Manually close charging FK-122, CHG FLOW controller. - Minimize seal injection between 6-13 gpm - Direct Chemistry to shutdown the zinc addition system (ZAS) - If desired due to plant conditions then establish excess Letdown per SOP-2.7	Since normal letdown is not available AOP-16.0 will direct placing excess letdown on service.

Op Test No.: FA2014301 Scenario # 2 Event # 4 Page 11 of 22

Event Description: LT-459, PZR LVL TRANSMITTER Fails LOW

**TECHNICAL SPECIFICATION 3.3.1, Reactor Trip System
Instrumentation***Function 9. Pressurizer Water Level – High**Applicable MODES – MODE 1 above the P-7 (Low Power Rx Trip Block) interlock (10%)**Required Channels - 3*

SRO				
		CONDITION	REQUIRED ACTION	COMPLETION TIME
		M. One Channel Inoperable	M.1 Place Channel in Trip OR M.2 Reduce THERMAL POWER to < P-7.	72 hours 78 hours

When decision made to establish excess letdown move to next event.

Op Test No.: FA2014301 Scenario # 2 Event # 5 Page 12 of 22

Event Description: Place Excess Letdown in service

SOP-2.7, CVCS Excess Letdown, v12.0

Time	Pos.	Expected Actions/Behavior	Comments
CAUTION: Do not exceed 165° F excess letdown heat exchanger outlet temperature.			
Excess letdown flow will be limited to approximately 10-15 gpm.			
	BOP	(step 4.1.1/.2) Verify the RCDT system in operation per SOP-50.0, LIQUID WASTE PROCESSING SYSTEM	Will call Radside SO and check on status and notify the SO to expect an increase in RCDT level due to excess letdown being placed on service.
	BOP	(step 4.1.3/.4/.5) Verify the following valves open: <ul style="list-style-type: none"> - HV3095 - HV3443 - HV3067 (step 4.1.6) Verify HV-137 is closed (step 4.1.7/.8) Open HV 8153 and 8154	
		(step 4.1.9) Place excess letdown divert valve Q1E21HV8143 control switch in the RCDT position (step 4.1.10) Slowly throttle open the excess LTDN HX discharge valve Q1E21HCV137 to establish excess letdown flow not to exceed 165° F excess letdown heat exchanger outlet temperature	

Op Test No.: FA2014301 Scenario # 2 Event # 5 Page 13 of 22

Event Description: Place Excess Letdown in service

SOP-2.7, CVCS Excess Letdown, ver 12.0

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Should read the Caution in the procedure and speak to reactivity changes associated with placing excess letdown on service. Should decide and brief the crew on aligning excess letdown to the VCT/Charging pump suction and the expectations on this. This is not required to be done since it will take a significant amount of time to do this evolution.	CAUTION A small portion of excess letdown piping can not be flushed to the RCDT (calculated to be approx. one gallon) and there are uncertainties associated with achieving a complete flush. Therefore, the reactivity affects associated with directing excess letdown to the VCT/Charging pump suction must be considered and contingencies established for mitigating the consequences.
	SRO	Direct crew back to AOP -16.	
	SRO	AOP-16 (Step 9) Determine if normal letdown should be re-established: Check normal letdown malfunction(s) - CORRECTED	Normal letdown is still not available.
	RO	(step 10) Determine status of letdown flow: Check letdown flow - established	Excess letdown established
	SRO	(step 10.2) Go to procedure and step in effect	
When Excess letdown is in service or at the discretion of the Lead Examiner move to next event.			

Op Test No.: FA2014301 Scenario # 2 Event # 6 Page 14 of 22

Event Description: PT-464, Stm header pressure transmitter, fails HIGH

Indications Available

Annunciators:

- 1A SG LVL DEV (JF1)
- 1B SG LVL DEV (JF2)
- 1C SG LVL DEV (JF3)
- SGFP SUCT PRESS LO (KB4)

Indications of PT-464 failure:

- PI-464A increasing to 1200 psig
- Rx power increasing
- SGFP speed increasing

AOP-100, Instrument Malfunction, Section 1.4, v13.0

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Directs RO or BOP to address ARPs as time permits <ul style="list-style-type: none"> • 1A, 1B, & 1C SG LVL DEV 	
	SRO	Directs entry into AOP-100, section 1.4, and performance of immediate actions, then directs subsequent actions	
	BOP	(step 1) Maintain SG level at the referenced level of 65%. Take manual control of SGFP speed control SK-509A taken to manual and decreases speed	Step 1 is an Immediate Operator action NOTE: Step 1 is a continuing action step POTENTIAL CRITICAL TASK If operators fail to take manual control of SK-509A there may be a Rx Trip based upon SG high level that causes SGFP trip.
	SRO	(step 1.3) <u>IF</u> a loss of main feedwater has occurred, <u>THEN</u> perform the actions required by AOP-13.0, LOSS OF MAIN FEEDWATER.	
	SRO	(step 2) Set manual trip criteria on SG level (high and low trip setpoints are 82% & 28% respectively)	
	BOP	(step 3) <u>IF</u> a ramp is in progress, <u>THEN</u> place turbine on HOLD.	

Op Test No.: FA2014301 Scenario # 2 Event # 6 Page 15 of 22

Event Description: PT-464, Stm header pressure transmitter, fails HIGH

AOP-100, Instrument Malfunction, Section 1.4, v13.0

Time	Pos.	Expected Actions/Behavior	Comments																
	BOP	<p>(step 4) Adjust speed of SGFPs to maintain approximate DP for the existing power level</p> <p><u>Unit 1 NO LOAD ΔP is 54 psid for 30%.</u></p> <p>Approximate ΔP can be determined from the following MCB indications.</p> <ul style="list-style-type: none">SGFP DISCH PRESS PI-4003SG Pressure indications: <table><tr><td>S/G</td><td>CH II</td><td>CH III</td><td>CH IV</td></tr><tr><td>A S/G</td><td>PI-4 4</td><td>PI-475</td><td>PI-476</td></tr><tr><td>B S/G</td><td>PI-484</td><td>PI-485</td><td>PI-486</td></tr><tr><td>C S/G</td><td>PI-494</td><td>PI-495</td><td>PI-496</td></tr></table>	S/G	CH II	CH III	CH IV	A S/G	PI-4 4	PI-475	PI-476	B S/G	PI-484	PI-485	PI-486	C S/G	PI-494	PI-495	PI-496	
S/G	CH II	CH III	CH IV																
A S/G	PI-4 4	PI-475	PI-476																
B S/G	PI-484	PI-485	PI-486																
C S/G	PI-494	PI-495	PI-496																
<ul style="list-style-type: none">Unit 1 NO LOAD ΔP is 50 psid from 0-28.1%. PROGRAM ΔP is linear from 50-190 psid from 28.1% to 100%. TABLE 1 provides approximate ΔP values for varying power levels.																			
<u>% POWER</u>		<u>DP</u>																	
30		54 psid																	
40		73 psid																	
50		93 psid																	
60		112 psid																	
70		132 psid																	
80		151 psid																	
90		171 psid																	
	BOP	(step 5) Check Stm Dumps in the Tavg mode																	
	SRO	(step 6) Notifies Shift Manager																	
	SRO	(step 8) Submits a CR & Notifies the Work Week Coordinator																	
At the discretion of the Lead Examiner move to next event.																			

Op Test No.: FA2014301 Scenario # 2 Event # 7 Page 16 of 22

Event Description: **Loss of All AC**

Indications Available

Annunciators:	Recognize indications of Loss of ALL AC power
- Many and various	- RCPs tripped
- EPB power indication lights not LIT	- Components not running

Note to Examiner

Event will begin with an LOSP and entry into EEP-0 (This page). 1B DG will trip after auto start and A Train DGs will be lost after an SI on the opposite unit (the SI on U-2 will occur 4 minutes after the LOSP). A Loss of All AC will result and ECP-0.0 entry will be required (Page 14)

Events 8 and 9 are incorporated into the response to a loss of all AC power and will occur as the crew progresses through ECP-0.0. Operators may take early actions to start the TDAFWP any time after completion of immediate operator actions.

Event 8 – TDAFWP failure to auto start (Page 15)

Event 9 – Restoration of power with the 2C DG (Page 16)

EEP-0, Reactor Trip or Safety Injection, v45

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	<p>Immediate Operator actions of EEP-0 (step 1) Check reactor trip. Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. Check rod bottom lights - LIT.</p> <p>(step 2) Check turbine - TRIPPED. TSLB2 14-1 thru 4 lit</p> <p>(step 3) Check power to 4160 V ESF busses. 4160 V ESF busses - AT LEAST ONE ENERGIZED</p> <p>A Train (F 4160V bus) power available lights lit OR B Train (G 4160V bus) power available lights lit Verify operating diesel generators are being supplied from at least one SW pump</p>	Immediate Action steps of EEP-0

Op Test No.: FA2014301 Scenario # 2 Event # 7 Page 17 of 22

Event Description: **Loss of All AC**

EEP-0, Reactor Trip or Safety Injection, rev 45

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	<p>(step 4) Check SI Status.</p> <p>(step 4.1) Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION</p> <p><input type="checkbox"/> ACTUATED status light lit</p> <p><input type="checkbox"/> MLB-1 1-1 lit</p> <p><input type="checkbox"/> MLB-1 11-1 lit</p> <p>(step 4.2) Verify both trains of SI- ACTUATED.</p> <p><input type="checkbox"/> MLB-1 1-1 lit AND <input type="checkbox"/> MLB-1 11-1 lit</p>	<p>Transition to ESP-0.1 may occur but entry to ECP-0.0, Loss of All AC will occur near the transition out of EEP-0.0 (a U-2 SI will occur 4 minutes after the LOSP and this will cause 1-2A DG to swap to U-2 and 1C DG to trip. U-1 will have no power. U-2 Reactor Trip and SI will be announced by the Booth Operator 2 minutes after the U-2 SI.).</p>

Op Test No.: FA2014301 Scenario # 2 Event # 7 Page 18 of 22

Event Description: **Loss of All AC**

ECP-0.0, Loss of ALL AC Power, version 26

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Recognize Loss of all AC and direct IOAs of ECP-0.0.	
	RO/ BOP	<p>(step 1) Check reactor tripped.</p> <p><input type="checkbox"/> Check reactor trip and reactor trip bypass breakers - OPEN.</p> <p><input type="checkbox"/> Nuclear power – FALLING</p> <p>(step 1.1 RNO) Manually trip reactor.</p> <p>(step 1.2) IF reactor can NOT be tripped, THEN trip both MG set supply breakers.</p> <p><input type="checkbox"/> N1C11E005A</p> <p><input type="checkbox"/> N1C11E005B</p> <p>(step 2) Check turbine tripped.</p> <p><input type="checkbox"/> TSLB2 14-1 lit</p> <p><input type="checkbox"/> TSLB2 14-2 lit</p> <p><input type="checkbox"/> TSLB2 14-3 lit</p> <p><input type="checkbox"/> TSLB2 14-4 lit</p>	<p>Immediate Operator actions of ECP-0 are steps 1 and 2</p> <p>No power</p> <p>YES</p>

Event Description: **Loss of All AC**

ECP-0.0, Loss of ALL AC Power, version 26

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(step 3) Verify RCS isolated. (step 3.1) Verify normal letdown isolated.</p> <p>3.1.1 Verify all letdown line orifice isolation valves - CLOSED. LTDN ORIF ISO 45 GPM <input type="checkbox"/> Q1E21HV8149A</p> <p>LTDN ORIF ISO 60 GPM <input type="checkbox"/> Q1E21HV8149B <input type="checkbox"/> Q1E21HV8149C</p> <p>OR</p> <p>3.1.2 Verify letdown line isolation valves - CLOSED. LTD LINE ISO <input type="checkbox"/> Q1E21LCV459 <input type="checkbox"/> Q1E21LCV460</p> <p>(step 3.2) WHEN RCS pressure less than 2335 psig, THEN verify both PRZR PORVs closed. (step 3.3) Verify excess letdown line - ISOLATED. EXC LTDN ISO VLV <input type="checkbox"/> Q1E21HV8153 closed <input type="checkbox"/> Q1E21HV8154 closed</p> <p>(step 3.4) Verify all reactor vessel head vent valves - CLOSED. RX VESSEL HEAD VENT OUTER ISO <input type="checkbox"/> Q1B13SV2213A <input type="checkbox"/> Q1B13SV2213B</p> <p>RX VESSEL HEAD VENT INNER ISO <input type="checkbox"/> Q1B13SV2214A <input type="checkbox"/> Q1B13SV2214B</p>	
The next event will occur when operators take action to restore AFW flow			

Op Test No.: FA2014301 Scenario # 2 Event # 8 Page 20 of 22

Event Description: TDAFWP Fails to Auto Start

ECP-0.0, Loss of ALL AC Power, version 26			
Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(step 4) Verify total AFW flow GREATER THAN 395 gpm. AFW TOTAL FLOW <input type="checkbox"/> FI 3229</p> <p>RNO (step 4) Verify TDAFWP running. TDAFWP STM SUPP FROM 1B(1C) SG <input type="checkbox"/> MLB-4 1-3 lit <input type="checkbox"/> MLB-4 2-3 lit <input type="checkbox"/> MLB-4 3-3 lit TDAFWP SPEED <input type="checkbox"/> SI 3411A > 3900 rpm</p> <p>TDAFWP SPEED CONT <input type="checkbox"/> SIC 3405 adjusted to 100%</p> <p>Place TDAFWP STM SUPP FROM 1B SG HV3235A/26 AND TDAFWP STM SUPP FROM 1C SG to the START position</p>	<p><u>CRITICAL TASK</u> Establish > 395 gpm AFW flow before SG dryout occurs.</p>
The next event will begin when operators reach step 5 of ECP-0.0			

Event Description: **Restoration of AC Power with the 2C DG****ECP-0.0, Loss of ALL AC Power, version 26**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 5) [CA] Restore power to any emergency bus. (step 5.1) Verify supply breakers for major loads on emergency 4160 V busses - OPEN. <input type="checkbox"/> BKR DF01 (1A S/U XFMR TO 1F 4160 V BUS) <input type="checkbox"/> BKR DF15 (1B S/U XFMR TO 1F 4160 V BUS) <input type="checkbox"/> BKR DF-13-1 (1F 4160 V BUS TIE TO 1H 4160 V BUS) <input type="checkbox"/> BKR DG01 (1A S/U XFMR TO 1G 4160 V BUS) <input type="checkbox"/> BKR DG15 (1B S/U XFMR TO 1G 4160 V BUS)	On EPB
	BOP/ RO	<input type="checkbox"/> 1C CCW PUMP BKR DF-04-1 <input type="checkbox"/> 1B CCW PUMP BKR DF-05-1 <input type="checkbox"/> 1B CCW PUMP BKR DG-05-1 <input type="checkbox"/> 1A CCW PUMP BKR DG-04-1 <input type="checkbox"/> 1A SW PUMP BKR DK-03-1 <input type="checkbox"/> 1B SW PUMP BKR DK-04-1 <input type="checkbox"/> 1C SW PUMP BKR DK-05-1 <input type="checkbox"/> 1C SW PUMP BKR DL-05-1 <input type="checkbox"/> 1D SW PUMP BKR DL-03-1 <input type="checkbox"/> 1E SW PUMP BKR DL-04-1 <input type="checkbox"/> #4 RW PUMP BKR DJ-03-1 <input type="checkbox"/> #5 RW PUMP BKR DJ-04-1 <input type="checkbox"/> #8 RW PUMP BKR DH-03-1 <input type="checkbox"/> #9 RW PUMP BKR DH-04-1 <input type="checkbox"/> #10 RW PUMP BKR DH-05-1 <input type="checkbox"/> 1B CRDM CLG FAN BKR ED-11-1 <input type="checkbox"/> 1A CRDM CLG FAN BKR EE-13-1 <input type="checkbox"/> 1A CS PUMP BKR DF-11-1 <input type="checkbox"/> 1B CS PUMP BKR DG-11-1 <input type="checkbox"/> 1A RHR PUMP BKR DF-09-1 <input type="checkbox"/> 1B RHR PUMP BKR DG-09-1 <input type="checkbox"/> 1A CHG PUMP BKR DF-06-1 <input type="checkbox"/> 1B CHG PUMP A TRN BKR DF-07-1 <input type="checkbox"/> 1B CHG PUMP B TRN BKR DG-07-1 <input type="checkbox"/> 1C CHG PUMP BKR DG-06-1 <input type="checkbox"/> 1A MDAFWP BKR DF-10-1 <input type="checkbox"/> 1B MDAFWP BKR DG-10-1	Load shed list continued from above Components on MCB and may be verified by RO

Event Description: Restoration of AC Power with the 2C DG

ECP-0.0, Loss of ALL AC Power, version 26			
Time	Pos.	Expected Actions/Behavior	Comments
	BOP	Check 1-2A, 1C or 1B diesel generator running for Unit 1. Perform 2C DG SBO start: <ul style="list-style-type: none"> ○ MSS in MODE 1 ○ USS in UNIT 1 ○ When load shed has been completed then depress START PB 2C DG will start 	NO CRITICAL TASK Energize at least on AC emergency bus before removing DC control power from ESF equipment breakers.
		<ul style="list-style-type: none"> ○ Check Unit 1 2C DG output breaker DJ06 closes. 	YES
		<ul style="list-style-type: none"> ○ Verify breaker DG13 closed. (1G 4160 V bus tie to 1J 4160 V BUS) 	YES
		<ul style="list-style-type: none"> ○ Verify breaker DG02 closed. (1G 4160 V bus tie to 1L 4160 V bus) 	YES
		<ul style="list-style-type: none"> ○ IF 1G 4160V bus energized, THEN proceed to step 5.7 	YES
	BOP	Verify adequate SW flow. <ul style="list-style-type: none"> ○ Verify two SW PUMPS in energized train - RUNNING. <ul style="list-style-type: none"> □ A Train (1A, 1B or 1C) □ B Train (1D, 1E or 1C) ○ IF A train energized, THEN verify SW TO/FROM DG BLDG - A HDR Q1P16V519/537 open. ○ IF B train energized, THEN verify SW TO/FROM DG BLDG - B HDR Q1P16V518/536 open. 	CRITICAL TASK Start at least one SW pump prior to the 2C DG tripping. Start 1D and/or 1E SW pump(s) YES YES
	BOP	Check no running diesel generator lube oil temperature annunciator in alarm. (155 ft, DG BLDG local control panel)	Will call DB SO to check 2C DG
	SRO	IF 1F OR 1G 4160 V bus energized THEN go to procedure and step in effect and implement function restoration procedures as necessary.	
End the scenario when power is restored with the 2C DG or at the discretion of the Lead examiner			

Op-Test No.: FA2014301

Page 1 of 2

Brief

This simulator performance scenario is performed in the EVALUATION MODE. You should not direct questions to the evaluators. Otherwise, you should perform as if you were in the MCR.

Your ability to maintain a log is not being graded, but maintaining a rough log is recommended to help during briefs.

If you need to communicate with the Unit 2 operator, call Unit 2 at 2434 or page the Unit 2 Unit Operator.

Respond to what you see. If there is a problem with the simulation, the session will be terminated or adjusted as appropriate based on the specific problem.

Assign operating positions.

Ask for and answer questions.

Appendix D

Turnover sheet

Form ES-D-3

[X] Unit 1 [] Unit 2

Shift:

Date

Off-going SS	Oncoming SS	[] N [X] D	Today
--------------	-------------	---------------	-------

Part I – To be reviewed by the oncoming Supervisor prior to assuming the shift.

Security Keys A, S, D, SW, X on key ring .SS

Unit 25% power, 1303 ppm Cb, MOL 10000 MWD/MTU
Status

TARGET ZERO

Every Day, Every Job Safely

STPs/Evolutions:

A Train On-Service – A Train
Protected

1.0 ____; 109.1 ____ No adj.; 63.7 ____; FSP-20,0 ____;

Status of Special Testing

General Information

- Shift Goal is to place impulse loop in service and raise power to 100%
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia
- Current Risk Assessment is GREEN and projected is GREEN
- Aux steam is being supplied from Unit 2
- 1B SGFP is on service with FRV are in MAN and FRV Bypass valves are in AUTO
- UOP-3.1, V119.0 in progress at step 5.3, Ramping up
- Unit 2 is at 100% power with no major issues.
-
-
-
-

Equipment Status

	Maintain VCT gas pressure 25-30 psig

Reactivity Plan

Waste Management Status

100 gallon dilutions every 15 minutes	#3 RHT – On Service
	WGS – secured

LCO Status

Night Orders

No New Night Orders

Part II

Review Shift Complement

LCOs Reviewed SS (initials) reviewed as early in shift as possible

Part III:

STP-1.0	Operator Logs	Cond. Report	Autolog	ELDS & GEN	Keys
Reviewed/Signed	Reviewed	Queue	Reviewed	Spreadsheet	Turned
		Reviewed		verified	Over
[X] Yes	[X] Yes	[X] Yes	[X] Yes	[X] Yes	[X] Yes

Unit One Reactivity Briefing Sheet

RCS Temp **552.0 °F**
 RX PWR **25.0 %**
 Current Xenon Concentration **3812 PCM**

Burnup **10000 MWD/MTU**
 As of (Date & Time) **10/2/2013 1:00**
 Calculated Burnup **13723 MWD/MTU**
 As Of **9/23/14 1144**

Assumes constant power since
 Last Power history update

RCS Boron **1303 PPM**
 BAT Concentration **7436 PPM**

Current Bank
 Delta Rod Position: **168 Steps**

Rod Worth Steps Out

One	6 PCM
Two	13 PCM
Five	33 PCM
Ten	69 PCM
Twenty	151 PCM
Fifty	410 PCM

Steps In

One	-6 PCM
Two	-12 PCM
Five	-30 PCM
Ten	-58 PCM
Twenty	-110 PCM
Fifty	-243 PCM

RCS Blended Flow Makeup Requirements

Acid to Borate 1 PPM (Gal.)	RMW to dilute 1 PPM (Gal.)	Required Acid flow Rate (GPM)	FK-113 Pot Setting
8.2 Gal.	38.1 Gal.	21.3 GPM	5.31
8.1 Gal.	38.1 Gal.	21.0 GPM	5.23

Values for Normal Auto M/U (Bat-100 ppm boron)
 Values based on Actual Bat Concentration

Current RCS Borations / Dilutions:

Borate	Dilute
0 Gal.	100 Gal.

Reactivity Additions: **0.00 19.70 PCM**
 Total Reactivity Addition: **19.70 PCM**
 Net RCS Temperature Effect: **3.88 °F**
 Net Rx Power Effect: **0.96 %**

Boron Worth **-8.30 PCM/PPM**
 Power Defect **515 PCM**
 MTC **-5.07 PCM/°F**

Boric Acid Required for Power reduction
 With no Control rod movement

DeltaPower	Power Defect (PCM)	Delta PPM	Acid Required (Gallons)
1.00%	21	2.44	20
2.00%	41	4.89	40
5.00%	103	12.22	99
10.00%	206	24.45	198
20.00%	412	48.89	398
25.00%	515	61.12	498
50.00%	N/A	N/A	N/A
75.00%	N/A	N/A	N/A
100.00%	N/A	N/A	N/A

a/o w/o
 RCS B-10 ratio **17.98 16.6**
 BAT B-10 ratio **20.1 18.6**
 NDR B-10 ratio **19.8 18.3**

Valid For Unit One cycle 2

26

Core Physics Curves:

Curve 5 Rev 29
 Curve 27 Rev 28
 Curve 34 Rev 46
 Curve 57 Rev 35
 Curve 57A Rev 25

Southern Nuclear J.M. Farley Nuclear Plant

Operations Training Simulator Exam Scenario

BOOTH INSTRUCTOR GUIDE

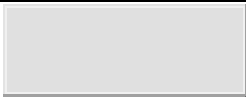


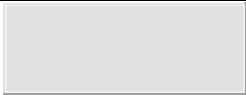
ILT-37 NRC EXAM SCENARIO #2

Validation time: 100 Minutes Validated by: Sorrell, Newell, Smith			
TRN Supervisor Approval:	Billy Thornton	Date:	9/24/14
NRC Chief Examiner	SEE NUREG 1021 FORM ES-301-3		



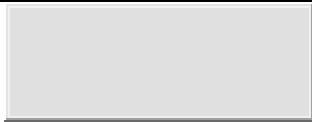



Facility:	Farley Nuclear Plant	Scenario No.:	2	Op-Test No.:	FA2014-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
<p>Initial Conditions: 25% power, UOP-3.1, v119.0, at step 5.3. Ramping up. MOL, 1303 ppm Cb; 1B SGFP on service. Aux steam from U-2.</p> <p>Turnover:</p> <ul style="list-style-type: none"> Current Risk Assessment is GREEN and projected to remain GREEN. A Train O/S, A Train protected. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia 					
SPLIT TRAIN ALIGNMENT					
Event No.	Malf. No.	Event Type*	Event Description		
1		R (RO) N (BOP)	Place impulse loop in service and commence ramp to 100%		
2	loa-cfw001	C (BOP) TS (SRO)	CST Ruptured by crane TS 3.7.6 Cond A		
3	imf TK144-A 10 / preset	I (RO)	TK-144 fails high in Auto, TCV-143 fails to auto divert		
4	Imf lt459	I (RO) TS (SRO)	LT-459 fails low (P-CT) TS 3.3.1 Function 9 Cond M		
5	preset	N (BOP)	During letdown restoration LCV-459 will not open. Requires Excess letdown to be placed in service.		
6	Imf pt464	I (BOP)	PT-464 fails high (P-CT)		
7	Imf mal-eps1 / preset	M (ALL)	LOSP 1B DG trips after auto start and cannot be started 4 minutes after LOSP Unit 2 SI occurs 1C DG trips Loss of ALL AC		
8	preset	C (BOP)	TDAFW pump fails to auto start (CT-23)		
9	preset	C (RO)	Power restored by starting 2C DG (CT- 24) Unit 2 has no B train service water At least one service water pumps must be manually started prior to the 2C DG tripping (CT-25)		
			Terminate when 2C diesel running with Service Water supplied		


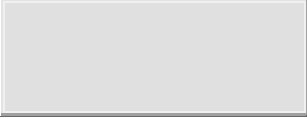





(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

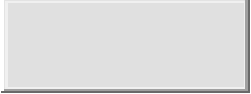


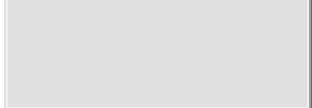
EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	Load in IC-212 and sim IC snap directory 1303 ppm Cb; 1B SGFP on service. Aux steam from U-2 Base IC is IC-37	
		RUN	
0	0	Generic setup: bat generic_setup_HLT.txt	
0	0	Quick setup (all items with * are included): bat ILT37_2.txt	
PRESETS			
8		Prevent TDAFWP auto start CMFmalf / cms3235B-cc1 / open CMFmalf / cms3235b_cc2 / open CMFmalf / cms3235a_cc1 / open CMFmalf / cms3235a_cc2 / open	*
7		1B DG trips on AUTO start Malf / mal-eps4b / 30 sec delay / Trg 2	TRG 2 *
7		Unit 2 SI - 2B DG trips on loadshed CMFmalf / csftyinj_cc21 / closed / 240 sec delay / Trg 2 Malf / mal-eps4c / 240 sec delay / Trg 2	TRG 2 *
7		1C DG blocked from auto or manual closure CMFmalf / cbk1DH07_d_cc18 / open	*
9		Block D & E SW pumps from starting after 1B DG trips CMFmalf / cNCPsw1F_d_cc5 / 35 sec delay / open CMFmalf / cNCPsw1F_d_cc6 / 35 sec delay / open CMFmalf / cNCPsw1E_d_cc5 / 35 sec delay / open CMFmalf / cNCPsw1E_d_cc6 / 35 sec delay / open	TRG 2 *
3		Fails TCV-143 from diverting on high temperature. CMFmalf / ccvT143_d_cc1 / closed	*
Triggers and Commands			
5		Event Trigger 1 – monitors LCV-459 valve position, once closed will not reopen Trgset 1 “x13o133c” Trg 1 “imf rcv1459-m 0 2”	TRG 1 *
7		Event Trigger 2 – 1B DG start lamp. 1B DG will trip after it starts. Trgset 2 “xg1ba02”	TRG 2 *
7		Event Trigger 3 – 1C DG Trips when DF08-2 closes Trgset 3 “x4bo007o” Trg 3 “imf mal-dsg009”	TRG 3 *

EXAM



<u>MCB setup</u>			
		DEH	Clear DEH alarms
		DEH	Ensure Impulse loop is NOT IN SERVICE
		Select OPS GROUP on MCB monitor Acknowledge computer alarms	IPC
		IPC: IF FF5 is in alarm, update rods	Ensure FF5 clear or update rods on IPC
		Setup spreadsheet on OATC computer to resemble reactivity spreadsheet provided	<u>Set up computer</u>
		Clear Recorders Cae clearrecorders.cae	
		Provide a marked up copy of UOP-3.1, v117.0 completed thru step 5.3, Ready to perform step 5.4.	<u>UOP-3.1 copy</u>
		FREEZE simulator	
		Perform Booth Operators Setup Checklist	
		Open Simview file to be used for plant parameter data collection: Simview / sv DataCollection.uvl	
		If needed, adjust sim time back to 00:00:00 SIMVIEW / Sim_Clock.uvl Hours: clock(3) = 0 Minutes: clock(2) = 0 Seconds: clock(1) = 0	

EXAM


		VERIFY MICROPHONES READY	Batteries installed
		TURNOVER SHEET AVAILABLE	
EVENT#	TIME	EVENT DESCRIPTION	COMMAND
Prior to RUN	0		
		Start data collection for Simview file On DataCollection.uvl file press DATA for drop down and then COLLECT to start collecting data	
	0	Begin Exam	
		Verify Horns ON: hornflag <u>HORNS ON = TRUE</u>	
			
1	Start of exam	Commence Ramp up to 100% power.	
2	NRC CUE	CST Ruptured by crane Remote / N21 / LOA-CFW001 / 0 / 600	
3	NRC CUE	TK-144 fails high in auto, TCV-143 fails to auto divert CNH / TK144-A / 10 / 1	
4	NRC CUE	LT-459 fails low XMT / LT459 / 0 / 1	
5	preset	During letdown restoration LCV-459 will not open. Requires Excess letdown to be placed on service.	
6	NRC CUE	PT-464 fails high XMT / PT464 / 1200 / 45	

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
7	NRC CUE	LOSP, 1B DG Trips after auto start and cannot be started. 4 minutes after LOSP U2 SI occurs. 1C DG fails to align to Unit 1. Loss of All AC Malf / MAL-EPS1 / 1 / 1	
8	Preset	TDAFW pump fails to auto start	
9	Preset	Power restored by starting the 2C DG and manual restoration of SW	
		End of Exam	
		HORNS OFF	
		FREEZE simulator	
		Stop data collection for Simview file sv DataCollection.uvl	
		Export data to file with the name of exam2014sen2grpX.txt NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate. NOTE: file will be saved in the OPENSIM directory.	Ensure data file created.
		When Control board data no longer needed Then Clear recorders for exam security	


Local operator actions:

<u>EVENT NO.</u>	<u>TIME</u>	<u>ACTIONS</u>
1	NONE REQUIRED	
2	IF REQUESTED	Place RCDT on recirc Three (3) Minutes after requested 
3	NONE REQUIRED	
4	NONE REQUIRED	
5	NONE REQUIRED	
6	NONE REQUIRED	
7	When REQUIRED	Announce Unit 2 Reactor Trip and Safety Injection 2 Minutes after Unit-Two Safety Injection. 
8	NONE REQUIRED	

Communications sheet

<u>EVENT NO.</u>	<u>TIME</u>	<u>Communication:</u>
ALL	AS REQUIRED (Standard communications to inform supervision)	<u>SSS, SM and Dispatcher:</u> Repeat back failure, procedure entered, plant status, CR in the cue and that type of communications. If recommendation/direction requested then tell crew to "Use their own judgment"
1	NONE EXPECTED	 <u>ROVER:</u> Called to Monitor 1A CNDS Pump Amps <ul style="list-style-type: none"> • "Report 1A Condensate Pump AMPS 3 (THREE) minutes after request"
		<u>Turbine SO:</u> Called to perform step 4.1.5 of SOP-20.0 <ul style="list-style-type: none"> • "I will perform step 4.1.5 of SOP-20.0"
2	WHEN REQUESTED	<u>Diesel BLDG SO:</u> Called to check CST due to level dropping rapidly. After 1 minute report the following: <ul style="list-style-type: none"> • A Crane moving a large load has ruptured the CST at ground level. <u>SM:</u> Called to Evaluate EALs <ul style="list-style-type: none"> • I will evaluate EALs <u>RAD SIDE SO:</u> Called to Secure SGBD per SOP-16.1. After 5 minutes report the following: <ul style="list-style-type: none"> • "SGBD is secured." • Acknowledge SGBD Process Panel Alarms as required
3	NONE EXPECTED	
4	NONE EXPECTED	

Communications sheet

<u>EVENT NO.</u>	<u>TIME</u>	<u>Communication:</u>
5	NONE EXPECTED	<u>Chemistry:</u> Called to secure Zinc Addition System <ul style="list-style-type: none"> • I will secure the Zinc Addition System <u>Rad Side SO:</u> Called to place RCDT on Recirc: After 3 minutes report the following: <ul style="list-style-type: none"> • The RCDT is on Recirc. After 5 minutes of flush to the RCDT report: "300 gallons have been flushed to the RWST during the flush"
6	NONE EXPECTED	
7	WHEN REQUESTED	<u>Diesel BLDG SO:</u> Called to check 1B DG. After 5 minutes report the following: <ul style="list-style-type: none"> • 1B DG is not running. • Local annunciator window 35 ESSENTIAL GENERATOR PROTECTION GEN DIFF is in alarm. • Local annunciator window 43 EMRGENCY ENGINE SHUTDOWN is in alarm. • No other problems are apparent with 1B DG. Called to check the status of the 1C DG. After 1 minute report: <ul style="list-style-type: none"> • 1C DG has tripped Called to check 2C DG Lube oil alarm status. After 1 minute report the following: <ul style="list-style-type: none"> • 2C DG lube oil alarm is clear
7		<i>2 Minutes after Unit 2 SI:</i> <i>Walk into control room and announce "Unit 2 Rx Trip and Safety Injection, Unit 2 Rx Trip and Safety Injection"</i> 

Facility:	Farley Nuclear Plant	Scenario No.:	4	Op-Test No.:	FA2014-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
<p><u>Initial Conditions:</u> 85% power, UOP-3.1, v119.0, at step 5.20. Ramping up. MOL, 900 ppm Cb Turnover:</p> <ul style="list-style-type: none"> Current Risk Assessment is GREEN and projected to remain GREEN. A Train O/S, B Train protected. 1A MDAFW pump tagged out for bearing replacement. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia. 					
SPLIT TRAIN ALIGNMENT					
Event No.	Malf. No.	Event Type*	Event Description		
1	Imf cp4055 K-A	I (BOP)	CP-4055K, H2 temperature controller fails low in auto		
2	Imf mal-tur4f	R (RO) N (BOP)	Turbine Vibration requires ramp down		
3	Imf lt475 Imf mal-mss1	I (BOP) TS (SRO)	LT-475 fails high (P-CT) TS 3.3.1. Cond E 5 minutes later when cabinet is inspected (IC person), MSS fails on A SGWLC when rack cab door is opened		
4	Imf pt444 / preset	C (RO) TS (SRO)	PT-444 fails high; PORV-444B leaks by the seat – requires block valve closure (P-CT) TS 3.4.11 Cond A, TS 3.4.1 Cond A		
5	Imf mal-rcs3	C (RO)	Reactor Vessel Inner O-Ring leakage increases to 1 GPM		
6	Imf mal-tur4f	M (ALL)	Turbine Vibrations requires RX trip		
7	preset	C (RO)	Reactor will not trip FRP-S.1 entry (CT-52) Manual Turbine Trip is required Rods fail to move in AUTO after turbine trip		
8	preset	M (ALL) C (BOP)	Two minutes after Turbine is tripped 500GPM steam space break in the Pressurizer 3318A/B Containment Isolations fail to auto close and must be closed at BOP (CT-11)		
			Terminate in EEP-1 after decision not to terminate SI at step 7.5		

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

		PRESETS	
7		1a crdm set fails to trip: CMFmalf / c52MGA_cr3	*
7		RTBs fail to open CMFmalf / cBKRXTRP_cc21 / closed CMFmalf / cbkrxtrp_cc22 closed	*
0		Tag 1A MDAFW pump irf cafp01a_d_cd1 open	*
3		Fail 1A SG MSS Card when Prot CH II cabinet open Imf mal-mss1 (3 20)	TRG 3
4		PORV 444B sticks at 10% after being demanded closed: imf rrc444b-m (1 0) 10 1	TRG 1
7		Blocks rods from moving in Auto Imf mal-crf2 (2 0) 1	TRG 2
8		Steam Space Break in the Pressurizer Imf mal-prs1 (2 120) 500 300	TRG 2
8		Block 3318 valves auto isolation CMFmalf / ccb3318A_d_cc5 / open CMFmalf / ccb3318B_d_cc5 / open	*
		Triggers and Commands	
4		Event Trigger 1 – monitors PORV444B HS closed position trgset 1 “x30i115c”	TRG 1
7/8		Event Trigger 2 – monitors for turbine trip Trgset 2 “x30O144g”	TRG 2
3		Event Trigger 3 – monitors bistable light for Protection CH II cabinet door open	TRG 3

Initial Conditions: 85% power, UOP-3.1, v119.0 at step 5.20 ramping up. MOL, 900 ppm Cb.

Turnover:

- Current Risk Assessment is GREEN and projected to remain GREEN.
- A Train O/S, A Train protected.
- 1A MDAFW pump tagged out for bearing replacement.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia.

Event 1 CP-4055K, H2 temperature controller fails low.

Verifiable actions: BOP takes manual control of CP-4055K and raise demand to increase cooling flow.

Event 2 Turbine vibrations require the unit to be ramped down.

Verifiable actions: RO uses rods and boron to maintain Tavg/Tref. BOP will insert ramp rate and target.

Event 3 LT-475 fails high along with the 1A SG Median Selector Card failure. Causes the 1A FRV to close. (P-CT)

Verifiable actions: BOP takes manual control of 1A FRV and restores SGWL.

Event 4 PT-444 fails high. PORV-444B leaks by the seat after being shut. (P-CT)

Verifiable actions: Take manual control of spray valves, and PORV's and shut them, MOV8000B must be shut due to leaking PORV.

Event 5 Reactor Vessel Inner O-Ring leakage increases to 1 GPM.

Verifiable Actions: RO evaluates leakoff temperature closes Rx vessel flange leakoff valve.

Event 6 Turbine vibrations increase requiring a Rx trip.

Event 7 Reactor will not trip (CT). Rods fail to move in AUTO after turbine trip.

Verifiable Actions: RO drives rods in manual inserting negative reactivity

Event 8 Two minutes after Turbine is tripped 500 GPM steam space break in the Pressurizer. MOV-3318A/B will not shut on Phase "A" Isolation.(CT)

Verifiable Actions: BOP closes one of the MOV-3318 valves completing isolation.

Terminate in EEP-1 after decision not to terminate SI at step 7.5.

UOP-3.1/ AOP-100/ARP/SOP/UOP-3.1/AOP-100/AOP-100/ARP/EEP-0/FRP-S.1/
EEP-0/EEP-1

CRITICAL TASK SHEET

- ___ 1. Insert negative reactivity into the core by at least one of the following methods prior to dispatching operators to locally trip the reactor and/or the turbine:
- De-energize the control rod drive MG sets
 - Insert control rods
 - Establish emergency boration flow to the RCS (CT-52)
- ___ 2. Close containment isolation valves such that at least one valve is closed on each critical Phase A penetration before the end of the scenario. (CT-11)

**SCENARIO
OBJECTIVE/
OVERVIEW:**

Component failures, ramp down, ATWT and PZR steam space break.

The team should be able to:

- respond to H2 controller malfunction,
- turbine vibrations require a ramp down,
- respond to a SGWL ,malfunction and control SGWL,
- respond to a pressure transmitter failure and stop RCS pressure reduction.
- respond to a Rx vessel O-ring leak,
- turbine vibrations rise requiring a Rx trip,
- Rx fails to trip and FRP-S.1 is entered,
- Diagnose and respond to a Pressurizer steam space break

Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes
1.	Total malfunctions (5–8)	9
2.	Malfunctions after EOP entry (1–2)	2
3.	Abnormal events (2–4)	3
4.	Major transients (1–2)	2
5.	EOPs entered/requiring substantive actions (1–2)	1
6.	EOP contingencies requiring substantive actions (0–2)	1
7.	Critical tasks (2–3)	4

Op Test No.: FA2014301 Scenario # 4 Event # 1 Page 1 of 36

Event Description: Hydrogen Temperature controller CP-4055K fails LOW

Indications Available

Annunciators: H2 TEMP HIGH (LJ3) DEH TRBL (LB1)	TI-4067, HYDROGEN TEMP, increasing DEH screen alarm comes in
---	---

ARP-1.11, MCB Annunciator Panel L, v51**LJ3**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 1) Check H2 TEMP controller (CP-4055K on MCB) to insure proper setpoint.	
	BOP	(step 2) Verify validity of alarm from computer point indication. NOTE: The MCB indication (TI4067) comes from DEH computer point G1CGAVG, which is an average of points HCOU21R and HCOU22R. Historically, there has been a 5-7°C difference between the MCB indication and the point feeding the alarm, such that the alarm may be in with a MCB indication of 42-43°C.	
	SRO	(step 4) Enter AOP-100, section 1.9	AOP-100 Actions on next page

Op Test No.: FA2014301 Scenario # 4 Event # 1 Page 2 of 36

Event Description: Hydrogen Temperature controller CP-4055K fails LOW

AOP-100, Instrumentation Malfunction, v13.0**Section 1.9**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 1) Check main generator hydrogen temperature controller functioning properly in AUTO. [] HYDROGEN TEMP, CP-4055K	IOA step
	SRO	(step 1 RNO) Maintain main generator hydrogen temp < 46°C using manual control of hydrogen temperature controller. (step 2) If hydrogen temperature cannot be maintained < 46C then Trip the Rx if reactor power is > 35% or Trip the turbine if Rx power is < 35%. (step 3) If main generator hydrogen temperature is high due to a condition other than SW flow, then reduce turbine load as necessary to control hydrogen temperature < 46°C	Take manual control of HYDROGEN TEMP, CP-4055K and open valve.
	SRO	(step 4) Notify the Shift Manager.	
	SRO	(step 5) Direct appropriate personnel to determine and correct the cause of the high hydrogen temperature alarm.	
	SRO	Write a CR and call dispatcher to plan work order	
When Hydrogen temperature is under manual control or at the discretion of the Lead Examiner move to next event.			

Op Test No.: FA2014301 Scenario # 4 Event # 2 Page 3 of 36

Event Description: HI Main Turbine Vibrations on #6 Bearing and Turbine Ramp

Indications Available

Annunciators: - MAIN TURB GEN VIB ALARM (KD4)	Recognize indications of High Vibrations: - Vibration Display Monitor will show high out of spec readings on #6 Bearing - DEH Turbine bearing page will show high readings - IPC Main Turbine page will show high readings
--	---

Note to examiner:

Turbine vibrations will reach the alarm level about 5 minutes after the event is inserted.

ARP 1.10, MCB Annunciator Panel K, v72
KD4

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Direct actions of KD4	
	BOP	KD4 (step 1) Check indications on BN TURB VIB MCR DISPLAY to determine the cause of the alarm Or On DEH Or On IPC	
	SRO	(step 2) IF shaft vibration exceeds 7 mils, THEN investigation is necessary if vibration is continuous.	
	BOP	(step 3) IF shaft vibration for #9 bearing is > 7 mils, THEN go to Step 11. (step 4) IF shaft vibration is > 7 mils but less than 14 mils, THEN reduce turbine speed or load to reduce vibration.	Shaft vibrations will be >7 mils on #6 Bearing. SRO should direct Turbine Ramp down at less than or equal to 5 MW/min
At the discretion of the Lead Examiner then go to the next event.			

Op Test No.: FA2014301 Scenario # 4 Event # 3 Page 4 of 36

Event Description: **LT-475, 1A SG NR LVL, fails high with concurrent 1A SG Median Selector Card Failure****Indications Available****Annunciators:**

- 1A SG HI-HI LVL ALERT (JD1)
- 1A SG LVL DEV (JF1)

Additional Annunciators w/ MSS failure:

- 1A SG STM FLOW > FEED FLOW (JB1)
- PROC CAB PWR FAILURE (EC1)

Indications of LT-475 failure

- LI-475 Indicates top of scale

Indications of 1A SG Median Selector Failure

- TSLB 1, 5-2 CAB 6 Power Failure Light Lit
- FK-478 Demand lowers
- LI-474 and 476 lowers
- 1A FRV Closes

Note to examiner

The initial failure of LT-475 will not affect the SGWL control system due to the operation of the Median Selector Switch. A subsequent MSS failure due to action within the control cabinet will initiate a response by the control system.

AOP-100, Section 1.6 actions for failure of LT-475 alone are on page 5.

AOP-100, Section 1.6 actions for failure of LT-475 and MSS are on page 6.

ARP-1.9, MAIN CONTROL BOARD ANNUNCIATOR PANEL J, v49
JD1

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	May direct RO or BOP to address ARP if instrument failure is not initially diagnosed. <ul style="list-style-type: none"> - 1A SG HI-HI LVL ALERT (JD1) - (Step 1) Check 1A SGWL - (Step 2) If turbine trip and feedwater isolation occur THEN <ul style="list-style-type: none"> o If > P-9 then Trip Reactor and enter EEP-0 o If < P-9 then refer to AOP-13 - (Step 3) If and instrument failure has occurred, THEN go to AOP-100 	SRO May direct entry to AOP-100 without referencing JD1 IF SRO directs entry into JD1 then transition to AOP-100 should occur at step 3 of the ARP AOP-100 Actions are on the next page.

Op Test No.: FA2014301 Scenario # 4 Event # 3 Page 5 of 36

Event Description: **LT-475, 1A SG NR LVL, fails high with concurrent 1A SG Median Selector Card Failure****AOP-100, Instrumentation Malfunction, v13.0****Section 1.6 (LT-475 failure)**

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Directs entry into AOP-100, section 1.6, and performance of immediate actions, then directs subsequent actions	
	BOP	(step 1) Maintain SG level at the referenced level of 65%. Take manual control of SGFP speed control SK-509B taken to manual This controller will shift to manual IF required, THEN, take manual control of SGFP speed control as necessary to restore SG level to 65% 1.1 SGFP master controller SK-509 IF required, THEN take manual control of the affected feedwater regulating valves. [] 1A SG FW FLOW FK-478 [] 1B SG FW FLOW FK-488 [] 1C SG FW FLOW FK-498	Due to the proper operation of the MSS these actions will not be taken.
	SRO	(step 1.3) IF a loss of main feedwater has occurred, THEN perform the actions required by AOP-13.0, LOSS OF MAIN FEEDWATER.	
	SRO	(step 2) Set manual trip criteria on SG level is adverse trend exists (high and low trip setpoints are 82% & 28% respectively)	
	BOP	(step 3) IF a ramp is in progress, THEN place turbine on HOLD.	
	BOP	(step 4) Determine affected SG and failed SG Level indicator.	
	BOP	(step 5) Refer to TS 3.3.1 and 3.3.2	See page 7 for TS information
	SRO	(step 6) Notify Shift Manager (step 7) Restore components to automatic when plant conditions permit. (step 8) Initiate Condition Report	

Op Test No.: FA2014301 Scenario # 4 Event # 3 Page 6 of 36

Event Description: LT-475, 1A SG NR LVL, fails high with concurrent 1A SG Median Selector Card Failure

AOP-100, Instrumentation Malfunction, v13.0 Section 1.6 (LT-475 failure w/ MSS failure)			
Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Directs entry into AOP-100, section 1.6, and performance of immediate actions, then directs subsequent actions	
	BOP	<p>(step 1) Maintain SG level at the referenced level of 65%. Take manual control of SGFP speed control SK-509B taken to manual This controller will shift to manual</p> <p>IF required, THEN, take manual control of SGFP speed control as necessary to restore SG level to 65% 1.1 SGFP master controller SK-509</p> <p>IF required, THEN take manual control of the affected feedwater regulating valves. [] 1A SG FW FLOW FK-478 [] 1B SG FW FLOW FK-488 [] 1C SG FW FLOW FK-498</p>	<p>Step 1 Is An Immediate Operator Action</p> <p>NOTE: Step 1 Is A Continuing Action Step</p> <p>Operators Should Take Manual Control Of FK-478 To Maintain 1A SGWL Approximately 65%.</p> <p>POTENTIAL CRITICAL TASK If SGWL is improperly controlled a Rx Trip may occur.</p>
	SRO	(step 1.3) IF a loss of main feedwater has occurred, THEN perform the actions required by AOP-13.0, LOSS OF MAIN FEEDWATER.	
	SRO	(step 2) Set manual trip criteria on SG level is adverse trend exists (high and low trip setpoints are 82% & 28% respectively)	
	BOP	(step 3) IF a ramp is in progress, THEN place turbine on HOLD.	
	BOP	(step 4) Determine affected SG and failed SG Level indicator.	
	BOP	(step 5) Refer to TS 3.3.1 and 3.3.2	See next page
	SRO	<p>(step 6) Notify Shift Manager</p> <p>(step 7) Restore components to automatic when plant conditions permit.</p> <p>(step 8) Initiate Condition Report</p>	

Op Test No.: FA2014301 Scenario # 4 Event # 3 Page 7 of 36

Event Description: **LT-475, 1A SG NR LVL, fails high with concurrent 1A SG Median Selector Card Failure****TECHNICAL SPECIFICATION 3.3.1, Reactor Trip System Instrumentation**

Table 3.3.1-1 Reactor Trip System Instrumentation
Function 14 – SG Water Level – Low Low
Applicable in Modes 1 and 2
required channels 3 per stm line CONDITION E

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
	E. One channel inoperable.	<p>-----NOTE----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. -----</p> <p>E.1 Place channel in trip. OR E.2 Be in MODE 3.</p>	<p>72 hrs</p> <p>78 hrs</p>	

TECHNICAL SPECIFICATION 3.3.2, Engineered Safety Feature Actuation System Instrumentation

Table 3.3.2-1 Engineered Safety Feature Actuation System Instrumentation
Function 5.b – SG Water Level – High High (P-14)
Applicable in MODES 1 and 2, Required channels - 3 per SG, CONDITION I
Function 6.b – SG Water Level – LOW LOW
Applicable in MODES 1-3, Required Channels – 3 per SG, CONDITION D

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
	I. One channel inoperable.	<p>-----NOTE----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. -----</p> <p>I.1 Place channel in trip. OR I.2 Be in MODE 3.</p>	<p>72 hrs</p> <p>78 hrs</p>	
	CONDITION	REQUIRED ACTION	COMPLETION TIME	
	D. One channel inoperable.	<p>-----NOTE----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. -----</p> <p>D.1 Place channel in trip. OR D.2.1 Be in MODE 3. AND D.2.2 Be in MODE 4.</p>	<p>72 hrs</p> <p>78 hrs</p> <p>84 hrs</p>	

Begin next event when AOP-100 is complete or at the discretion of the lead examiner

Op Test No.: FA2014301 Scenario # 4 Event # 4 Page 8 of 36

Event Description: PT-444, PZR Press Control Channel, Fails HI

Indications Available

Annunciators: <ul style="list-style-type: none"> - PRZR PORV TEMP HI (HA5) - PRZR SAFETY VLV TEMP HI (HA4) - REL VLV 444B/445A OPEN (HE1) - PRZR PRESS RELVLV 445A OR BU HTRS ON (HD1) - PRZR PRESS HI-LO (HC1) 	Recognize indications of PT-444 failing HIGH: <ul style="list-style-type: none"> • PK-444A demand ↓ • PORV 444B open - PI's 455;456;457, RCS Press ↓ - Pressurizer B/U heaters energizing - TI-463 PORV Tailpiece temps ↑ • TI-465; TI-467; TI-469 Code Safety Tailpiece temps ↑
PT-444, PRZR Press control channel, fails HIGH. The PORV closes in manual, PZR pressure control will be in manual.	

AOP-100, Instrumentation Malfunction, v13.0 section 1.1

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Direct entry into AOP-100	
	RO	(step 1) Take manual control of the following equipment as necessary: <ul style="list-style-type: none"> - PORV 444B, PRZR PORV. - ALL Pzr heaters - PK-444C & D, 1A& 1B LOOP SPRAY VLV - PK-444A, PRZR PRESS reference Controller 	Steps 1 and 2 are IOAs POTENTIAL CRITICAL TASK If RCS pressure is improperly controlled a RX Trip may occur.
		(step 2) * IF pressurizer pressure is decreasing due to a mechanically stuck open spray valve PCV444C or PCV444D	*Spray valves verified functioning properly (closed) No actions required
	RO	(step 3) If the PORV is open then close the PORV when RCS pressure is < 2310 psig.	PORV 444B will close with the handswitch but the PORV will leak by.
	RO	(step 4) IF an alarm was caused by a CONTROL instrument (PT-444/445) OR component failure, THEN perform the following as required to restore RCS pressure to desired value. <ul style="list-style-type: none"> - Take manual control of PORV's, Block valves, Pressurizer heaters and spray. 	

Op Test No.: FA2014301 Scenario # 4 Event # 4 Page 9 of 36

Event Description: PT-444, PZR Press Control Channel, Fails HI

AOP-100, Instrumentation Malfunction, v10.1
section 1.1 (CONT)

Time	Pos.	Expected Actions/Behavior		Comments
	SRO	(step 5) Determine NO protection instrument failure occurred.		
	RO	(step 6) References required Technical Specifications : 3.4.1 for DNBR limits RCS pressure < 2209 psig CONDITION A		
TECHNICAL SPECIFICATION 3.4.1, RCS Pressure, Temperature, and Flow DNB Limits				
RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified in the COLR. The minimum RCS total flow rate shall be ≥ 263,400 GPM when using the precision heat balance method, ≥ 264,200 GPM when using the elbow tap method, and ≥ the limit specified in the COLR				
	SRO	CONDITION	REQUIRED ACTION	COMPLETION TIME
		A. One or more RCS DNB parameters not within limits.	A.1 Restore RCS DNB parameter(s) to within limit.	2 hours
TECHNICAL SPECIFICATION 3.4.11, Pressurizer Power Operated Relief Valves (PORVs)				
Each PORV and associated block valve shall be OPERABLE				
Applicable in Modes 1, 2, and 3.				
		CONDITION	REQUIRED ACTION	COMPLETION TIME
		A. One or more PORVs inoperable and capable of being manually cycled.	A.1 Close and maintain power to the associated block valve.	1 hour

Op Test No.: FA2014301 Scenario # 4 Event # 4 Page 10 of 36

Event Description: PT-444, PZR Press Control Channel, Fails HI

AOP-100, Instrumentation Malfunction, v10.1
section 1.1 (CONT)

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	(step 7) Notify the Shift Manager	
	SRO	(step 9) Submit a condition report on the failed component, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the condition report.	
	SRO	(step 10) IF the pressurizer PORVs operated, THEN perform the following: <ul style="list-style-type: none"> Refer to SOP-1.2, Reactor Coolant Pressure Relief System, for cooldown of the PRT Refer to SOP-0.0, General Instructions To Operations Personnel, for reporting requirements. 	
After Shift Manager Notification or at the discretion of the Lead Examiner move to next event			

Op Test No.: FA2014301 Scenario # 4 Event # 5 Page 11 of 36

Event Description: Reactor Vessel O-Ring Leakage

Indications Available

Annunciators:

- RX VESSEL FLANGE LKOF TEMP HI (HH5)

Indications of an RCS leak:

- TI-401, RX VESSEL LEAKOFF Rising
- FI-122A Slowly Rising

Reactor Vessel Inner O-Ring leakage increases to 1 GPM.

**ARP-1.8, MAIN CONTROL BOARD ANNUNCIATOR PANEL H, v35.6
HH5**

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Directs performance of ARP <ul style="list-style-type: none"> • HH5, RX VESSEL FLANGE LKOF TEMP HI 	
	RO	(step 1) Determine the actual reactor vessel flange leakoff temperature as indicated by TI-401, on the MCB.	
	RO	(step 2) Compare the indicated flange leakoff temperature with containment temperature to verify flange leakage	
	RO	(step 3) IF Reactor Vessel flange leakage is indicated, THEN close RX VESSEL LKOF ISO HV-8032	RO should evaluate that flange leakage exists and close HV-8032
	SRO	(step 4) Refer to Technical Specifications 3.4.13 for LCO requirements on operational leakage.	No LCO required, only 1 gpm of identified leakage.

Once HV-8032 has been shut and TS condition determined or at the discretion of the Lead Examiner then move to next event.

Op Test No.: FA2014301 Scenario # 4 Event # 6 Page 12 of 36

Event Description: High Main Turbine Vibrations on #6 Bearing prompting Reactor Trip

Note to examiner

Vibrations will increase rapidly on the Main Turbine. ARP KD4 will direct the crew to trip the Reactor. The Rx will fail to trip and initiate the next event (FRP-S.1 Entry).

Indications Available

Annunciators:	Recognize indications of High Vibrations:
- MAIN TURB GEN VIB ALARM (KD4)	- Vibration Display Monitor will show in RED high out of spec readings
	- DEH Turbine bearing page will show high readings
	- IPC Main Turbine page will show high readings

ARP 1.10, MCB Annunciator Panel K, v72
KD4

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Direct actions of KD4	
	BOP	KD4 (step 1) Check indications on BN TURB VIB MCR DISPLAY to determine the cause of the alarm Or On DEH Or On IPC	
	SRO	(step 2) IF shaft vibration exceeds 7 mils, THEN investigation is necessary if vibration is continuous.	
	BOP	(step 3) IF shaft vibration for #9 bearing is > 7 mils, THEN go to Step 11. (step 4) IF shaft vibration is > 7 mils but less than 14 mils, THEN reduce turbine speed or load to reduce vibration.	
	SRO	(step 5) IF shaft vibration exceeds 14 mils, OR thrust bearing wear exceeds 40 mils THEN perform the following: IF Reactor Power is > 35%, THEN Trip the Reactor and refer to EEP-0, Reactor Trip or Safety Injection.	Shaft vibrations will be 15-17 mils on #6 bearing. SRO should direct tripping the Reactor and take actions of EEP-0 (next page)
Reactor will fail to trip and initiate the next event			

Op Test No.: FA2014301 Scenario # 4 Event # 7 Page 13 of 36
 Event Description: **FRP-S.1 Entry**

Indications Available

Annunciators: - Various and many	Recognize indications of ATWT event - RTBs still closed - Nis indicate full power - Conditions warrant a reactor trip and one is not received
When the crew tries to trip the reactor, the reactor trip breakers will not open and one of the CRDM MG set breakers will not open.	

Enter EEP-0, Reactor Trip or Safety Injection, v45

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Reactor trip Direct the reactor trip and enter EEP-0.	
	RO/ BOP	Immediate Operator actions of EEP-0 (step 1) Check reactor trip. Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. check rod bottom lights - LIT.	RNO 1.1 Manually trip reactor. 1.2 IF reactor can NOT be tripped, THEN trip both MG set supply breakers. • N1C11E005A • N1C11E005B 1.3 IF reactor will NOT trip, THEN go to FNP-1-FRP-S.1 SRO Should direct entry into FRP-S.1 (Actions on next Page.

Op Test No.: FA2014301 Scenario # 4 Event # 7 Page 14 of 36
 Event Description: **FRP-S.1 Entry**

FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION ATWT, v27.0			
Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 1) IF reactor still NOT tripped, THEN perform the following: <ul style="list-style-type: none"> Insert control rods in manual control. OR <ul style="list-style-type: none"> Verify rods insert in AUTO at greater than 48 steps per minute. 	Steps 1 and 2 are Immediate Operator Actions <u>Critical task</u> Insert negative reactivity into the core by inserting control rods or establishing emergency boration flow prior to dispatching operators to open Rx Trip breakers
	BOP	(step 2) Check Main Turbine tripped RNO step 2.1 – Place main turbine emergency trip switch to TRIP for at least 5 seconds.	Note: A PZR Steam Space LOCA (Event 8) will begin to ramp in ~ 2 minute after the turbine is tripped.

Note to examiner

Any time beyond this point crew may elect to take Early Action for Step 7 and direct an SO to locally open the RTB's.

Op Test No.: FA2014301 Scenario # 4 Event # 7 Page 15 of 36

Event Description: FRP-S.1 Entry

**FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION ATWT, v27.0
CONT**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 3) Verify AFW pumps running <ul style="list-style-type: none">Both MDAFWPs amps > 0TDAFWP speed > 3900 rpm	
	RO	(step 4) Initiate Emergency Boration of the RCS. <ul style="list-style-type: none">Verify at least one CHG PUMP - RUNNING.Start a BAT pumpOpen MOV 8104Establish normal letdown flow – 8149A and either 8149B or C openEstablish normal charging flow > 40 gpmVerify adequate emergency boration flow of > 30 gpm on FI-110Check RCS pressure less than 2335 psig	

Op Test No.: FA2014301 Scenario # 4 Event # 7 Page 16 of 36

Event Description: FRP-S.1 Entry

FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION ATWT, v27.0 CONT

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 5) Verify containment ventilation isolation. Verify containment purge dampers - CLOSED. <ul style="list-style-type: none"> • 3197 • 3198D • 3198C • 3196 • 3198A • 3198B Verify containment mini purge dampers - CLOSED. CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D <ul style="list-style-type: none"> • 2866C • 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C <ul style="list-style-type: none"> • 2866D • 2867D Stop MINI PURGE SUPP/EXH FAN.	

Op Test No.: FA2014301 Scenario # 4 Event # 7 Page 17 of 36

Event Description: FRP-S.1 Entry

**FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION ATWT, v27.0
CONT**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 6) Check SI actuated – 6.1 BYP & PERMISSIVE SAFETY INJECTION <ul style="list-style-type: none"> • ACTUATED status light lit • MLB-1 1-1 lit • MLB-1 11-1 lit (IF SI has actuated) 6.2 Initiate ATTACHMENT 1, AUTOMATIC SAFETY INJECTION VERIFICATION.	Go to page 24 for ATT 1 actions.
	RO	(step 7) Check ALL RTBs open Check Main Turbine tripped	RNO Dispatch an operator to locally trip the reactor trip and bypass breakers.

Note to Examiner

Transition to EEP-0 will be made when requirements of step 8 are met. EEP-0 actions are incorporated into event 8 (see next page)

	RO	(step 8) Check if reactor still critical. If power range indication is GREATER THAN OR EQUAL TO 5%. OR Check any intermediate range startup rate - POSITIVE.	NOTE: [CA] step RNO Go to procedure and step in effect.
Move to the next event when the actions of FRP-S.1 are complete.			

Op Test No.: FA2014301 Scenario # 4 Event # 8 Page 18 of 36
 Event Description: **Pressurizer Steam Space LOCA**

Indications Available:

Annunciators:	Indications of SB LOCA
- Containment Rad monitors in alarm	- RCS Pressure Decreasing
- PRZR LO Press Rx Trip SI (GB4)	- SI Actuation
- RMS HI RAD (FF1)	- Containment Pressure Increasing
	- Numerous CTMT Rad Monitors alarming

3318A/B Containment Isolations fail to auto close and must be closed at BOP.

EEP-0, Reactor Trip or Safety Injection, v45.0

Time	Pos.	Expected Actions/Behavior	Comments
	ALL	<p>Immediate Operator actions of EEP-0</p> <p>Check reactor trip. Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. check rod bottom lights - LIT.</p> <p>Check turbine - TRIPPED. TSLB2 14-1 thru 4 lit</p>	Immediate Action steps of EEP-0
		<p>Check power to 4160 V ESF busses. 4160 V ESF busses - AT LEAST ONE ENERGIZED</p> <p>A Train (F 4160V bus) power available lights lit OR B Train (G 4160V bus) power available lights lit Verify operating diesel generators are being supplied from at least one SW pump.</p>	NOTE: 3 DGs will be running since an SI has occurred.
		<p>Check SI Status. Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION <input type="checkbox"/> ACTUATED status light lit <input type="checkbox"/> MLB-1 1-1 lit <input type="checkbox"/> MLB-1 11-1 lit</p>	

Op Test No.: FA2014301 Scenario # 4 Event # 8 Page 19 of 36
 Event Description: **Pressurizer Steam Space LOCA**

EEP-0, Reactor Trip or Safety Injection, v45.0 CONT

Time	Pos.	Expected Actions/Behavior	Comments
	SRO, RO, OR BOP	Announces EEP-0 Fold out Page items in effect, directs/takes actions required <ul style="list-style-type: none"> Subcooling <16°F [45], stop all RCPs RCS Press < 1300 psig, close chg mini-flows Ctmt pressure > 4 psig, use adverse numbers 	
	SRO	(step 5) Directs continuing into EEP-0 at step 5. Directs the BOP to perform Attachment 2.	See Tab at end of scenario for Attachment 2 and 4 actions. Page 32
	RO	(step 6) Check containment pressure- HAS REMAINED LESS THAN 27 psig	Ctmt pressure will be pre-event
	RO	(step 7) Announce "Unit 1 reactor trip and safety injection".	
	RO	(step 8) Check AFW status. Check secondary heat sink Available <ul style="list-style-type: none"> Check total AFW flow > 395 gpm <ul style="list-style-type: none"> FI 3229A FI 3229B FI 3229C Total Flow FI 3229 OR Check any SG NR level > 31% {48%} WHEN all SG narrow range levels less than 31%{48%}, THEN maintain total AFW flow greater than 395 gpm. WHEN at least two SG narrow range levels greater than 28% AND TDAFWP NOT required, THEN stop TDAFWP.	

Op Test No.: FA2014301 Scenario # 4 Event # 8 Page 20 of 36
 Event Description: **Pressurizer Steam Space LOCA**

EEP-0, Reactor Trip or Safety Injection, v45.0 CONT

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 8.4) WHEN SG narrow range level greater than 31%{48%}, THEN maintain SG narrow range level 31%-65%{48%-65%}. <ul style="list-style-type: none"> Control MDAFWP flow. MDAFWP FCV 3227 RESET <ul style="list-style-type: none"> <input type="checkbox"/> A TRN reset <input type="checkbox"/> B TRN reset MDAFWP TO 1A/1B/1C SG B TRN <ul style="list-style-type: none"> <input type="checkbox"/> FCV 3227 in MOD Control TDAFWP flow. TDAFWP FCV 3228 <ul style="list-style-type: none"> <input type="checkbox"/> RESET reset TDAFWP SPEED CONT <ul style="list-style-type: none"> <input type="checkbox"/> SIC 3405 adjusted 	NOTE: [CA] step –
	RO	(step 9) Check RCS temperature. IF any RCP running, THEN check RCS average temperature - STABLE AT OR APPROACHING 547°F. TAVG 1A(1B,1C) RCS LOOP <ul style="list-style-type: none"> <input type="checkbox"/> TI 412D <input type="checkbox"/> TI 422D <input type="checkbox"/> TI 432D 	

Op Test No.: FA2014301 Scenario # 4 Event # 8 Page 21 of 36

Event Description: Pressurizer Steam Space LOCA

EEP-0, Reactor Trip or Safety Injection, v45.0 CONT

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(step 9 RNO) IF RCS temperature less than 547°F and falling, THEN perform the following.</p> <p>(step 9.1.1) Verify steam dumps closed. STM DUMP INTERLOCK <input type="checkbox"/> A TRN in OFF RESET <input type="checkbox"/> B TRN in OFF RESET</p> <p>(step 9.1.2) Verify atmospheric reliefs closed on MCB <input type="checkbox"/> Demand at 0 and minimum red light LIT</p> <p>(step 9.1.3) Control total AFW flow to minimize RCS cooldown, AFW FLOW TO 1A(1B,1C) SG <input type="checkbox"/> FI 3229A <input type="checkbox"/> FI 3229B <input type="checkbox"/> FI 3229C AFW TOTAL FLOW <input type="checkbox"/> FI 3229</p> <p>IF MSIVs are closed THEN proceed to step 9.1.8</p> <p>IF MSIVs are open, THEN isolate steam loads in the turbine building while continuing with RNO step 9.1.5.</p>	<p>NOTE: RNO column is not expected to be used for this scenario</p> <p>NOTE: Will call TBSO to accomplish this task</p>

Op Test No.: FA2014301 Scenario # 4 Event # 8 Page 22 of 36
 Event Description: **Pressurizer Steam Space LOCA**

EEP-0, Reactor Trip or Safety Injection, v45.0 CONT

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(step 10) Check pressurizer PORVs and spray valves. WHEN pressurizer pressure less than 2335 psig, THEN verify both PRZR PORVs closed. Verify both PRZR PORVs indicate CLOSED</p> <p>Check PRZR PORV temperature STABLE OR FALLING. <input type="checkbox"/> PORV Temp TI-463</p> <p>Check PRT parameters STABLE or FALLING. <input type="checkbox"/> PRT PRESS PI 472 <input type="checkbox"/> PRT LVL LI-470 <input type="checkbox"/> PRT TEMP TI-471</p> <p>WHEN pressurizer pressure less than 2260 psig, THEN verify normal pressurizer spray valves closed OR in the process of closing. 1A(1B) LOOP SPRAY VLV <input type="checkbox"/> PK 444C <input type="checkbox"/> PK 444D</p> <p>Check any PRZR PORV ISO - OPEN</p>	<p>NOTE: [CA] step –</p> <p>NOTE: [CA] step –</p>
	RO	<p>(step 11) Check RCP criteria. Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE</p>	<p>Examiner note: This is a foldout page item, verify applicants trip RCPs</p>
	RO	<p>(step 12) Monitor charging pump miniflow criteria. Control charging pump miniflow valves based on RCS pressure. 1C(1A) LOOP RCS WR PRESS <input type="checkbox"/> PI 402A <input type="checkbox"/> PI 403A</p>	<p>Examiner note: This is a foldout page item, verify applicants close miniflow isolation valves</p>

Op Test No.: FA2014301 Scenario # 4 Event # 8 Page 23 of 36

Event Description: Pressurizer Steam Space LOCA

EEP-0, Reactor Trip or Safety Injection, v45.0 CONT

Time	Pos.	Expected Actions/Behavior	Comments
Diagnostics			
The SRO will direct the parameters to be reviewed and will determine appropriate procedure to transition to.			
	SRO	(step 13) Check SGs not faulted. □ Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig.	
		(step 14) Check SGs not ruptured - Check secondary radiation indication NORMAL. - No SG rising in an uncontrolled manner	
	SRO	(step 15) Check RCS intact - Check containment radiation – NORMAL - Check CTMT pressure < 3 psig - Check ECCS sump level <0.4 feet	SRO should transition to EEP-1.0. See next page.

Op Test No.: FA2014301 Scenario # 4 Event # 8 Page 24 of 36
 Event Description: **Pressurizer Steam Space LOCA**

EEP-1.0, Loss of Reactor or Secondary Coolant, v31.0

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 1) Checks RCP stopped due to insufficient subcooling (SCMM<16{45}°F)	
	BOP	(step 2) Check SGs not faulted - no press falling uncontrolled - none less than 50 psig	
	BOP	(step 3) Checks intact SG levels Verifies any intact SG NR level > 31{48%} Controls MDAFW & TDAFW flows as necessary to maintain levels 31-65%{48%-65%} Stops TDAFW pump WHEN at least 2 SGs >28%	
	BOP	(step 4) Check SGs not ruptured - Check secondary radiation indication - NORMAL.	
		(step 5) Checks PORVs - Iso valves open with power - PORVs closed with no leakage - no evidence of leak by via downstream temps & PRT parameters	
	SRO	(step 6) directs step 6 be performed - Close recirc disconnects - Establish 1A & 1B post LOCA H2 analyzer on service per ATT 2 - Plot H2 on Fig 1 - Check and control H2 concentration in Cmt	1 hour from start of event requirements - not available to perform in simulator-SRO calls for SSS or an extra to perform
	SRO RO	(step 7) Checks for SI termination criteria and continues on without terminating SI due to inadequate RCS pressure & Pzr level	SI termination criteria may be met but transition to ESP-1.1 is incorrect due to existence of known LOCA.
End scenario when SI Termination decision has been made or at the discretion of the Lead Examiner			

Op Test No.: FA2014301 Scenario # 4 Event # 7 Page 25 of 36
 Event Description: **FRP-S.1 ATTACHMENT 1**

Attachment 1 of FRP-S.1			
AUTOMATIC SAFETY INJECTION VERIFICATION			
Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<p>(step 1) Check power to 4160 V ESF busses. 4160 V ESF busses - AT LEAST ONE ENERGIZED</p> <p>A Train (F & K) power available lights lit OR B Train (G & L) power available lights lit Verify operating diesel generators are being supplied from at least one SW pump.</p>	
		<p>(step 2) Check SI Status. Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION <input type="checkbox"/> ACTUATED status light lit <input type="checkbox"/> MLB-1 1-1 lit <input type="checkbox"/> MLB-1 11-1 lit</p>	
	BOP	<p>(step 3) Verify MFW status Verify main FRVs and bypass valves - valves CLOSED. 1A(1B,1C) SG STOP VLVFW FLOW</p> <ul style="list-style-type: none"> • FCV 478 • FCV 488 • FCV 498 <p>Verify both SGFPs - TRIPPED.</p> <p>Verify SGBD isolated - HV 7614A, B C – closed</p> <p>Verify SGBD sample valves closed by MLB-4 6-4, 7-4 and 8-4 LIT</p>	
	BOP	<p>(step 4) Verify Phase A actuated – MLB-2 1-1 and 11-1 Lit All MLB-2 lights LIT</p>	
	BOP	<p>(step 5) Verify one CHG PUMP in each train - STARTED.</p> <ul style="list-style-type: none"> • A train (1A or 1B) amps > 0 • B train (1C or 1B) amps > 0 	

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Event Description: FRP-S.1 ATTACHMENT 1

Attachment 1 of FRP-S.1 (CONT)			
AUTOMATIC SAFETY INJECTION VERIFICATION			
Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 6) Verify RHR PUMPs - STARTED. <ul style="list-style-type: none"> RHR PUMP 1A and 1B amps > 0 	
	BOP	(step 7) Verify each train of CCW - STARTED. Verify one CCW PUMP in each train- STARTED. A train HX 1C or 1B CCW FLOW <ul style="list-style-type: none"> FI 3043CA > 0 gpm OR <ul style="list-style-type: none"> FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW <ul style="list-style-type: none"> FI 3043AA > 0 gpm OR <ul style="list-style-type: none"> FI 3043BA > 0 gpm Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX <ul style="list-style-type: none"> Q1P16FI3009AA > 0 gpm Q1P16FI3009BA > 0 gpm Q1P16FI3009CA > 0 gpm (step 8) Verify each SW train - HAS TWO SW PUMPs STARTED. <ul style="list-style-type: none"> A train (1A,1B or 1C) B train (1D,1E or 1C) 	
	BOP	(step 9) Verify containment fan cooler alignment. Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED. CTMT CLR FAN SLOW SPEED A train <ul style="list-style-type: none"> 1A 1B B train <ul style="list-style-type: none"> 1C 1D Verify associated emergency service water outlet valves - OPEN. EMERG SW FROM 1A(1B,1C,1D) CTMT CLR <ul style="list-style-type: none"> Q1P16MOV3024A Q1P16MOV3024B Q1P16MOV3024C Q1P16MOV3024D 	

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Event Description: FRP-S.1 ATTACHMENT 1

Attachment 1 of FRP-S.1																											
AUTOMATIC SAFETY INJECTION VERIFICATION																											
Time	Pos.	Expected Actions/Behavior	Comments																								
	BOP	(Step 10) Check no MSL isolation actuation signal present. <table> <tr> <th>Signal</th><th>Setpoint</th><th>coincidence</th><th>TSLB</th></tr> <tr> <td>LO SG PRESS</td><td>< 585 psig</td><td>2/3</td><td>TSLB4 19-2,3,4</td></tr> <tr> <td>Hi stm flow</td><td>>40%</td><td>1/2 on 2/3</td><td>TSLB4 16-3,4</td></tr> <tr> <td>and</td><td>and</td><td></td><td>17-3,4 18-3,4</td></tr> <tr> <td>Lo-Lo Tavg</td><td><543°F</td><td>2/3</td><td>TSLB2 10-1,2,3</td></tr> <tr> <td>HI-HI ctmt press</td><td>>16.2 psig</td><td>2/3</td><td>TSLB1 2-2,3,4</td></tr> </table> If a MSLI signal is present then close ALL MSIVs	Signal	Setpoint	coincidence	TSLB	LO SG PRESS	< 585 psig	2/3	TSLB4 19-2,3,4	Hi stm flow	>40%	1/2 on 2/3	TSLB4 16-3,4	and	and		17-3,4 18-3,4	Lo-Lo Tavg	<543°F	2/3	TSLB2 10-1,2,3	HI-HI ctmt press	>16.2 psig	2/3	TSLB1 2-2,3,4	
Signal	Setpoint	coincidence	TSLB																								
LO SG PRESS	< 585 psig	2/3	TSLB4 19-2,3,4																								
Hi stm flow	>40%	1/2 on 2/3	TSLB4 16-3,4																								
and	and		17-3,4 18-3,4																								
Lo-Lo Tavg	<543°F	2/3	TSLB2 10-1,2,3																								
HI-HI ctmt press	>16.2 psig	2/3	TSLB1 2-2,3,4																								
	BOP	(step 11) Check containment pressure - HAS REMAINED LESS THAN 27 psig.																									
End of attachment 1 of FRP-S.1																											

Op Test No.: FA2014301 Scenario # 4 Event # 7 Page 28 of 36
 Event Description: **Attachments 2 and 4 of EEP-0.0**

EEP-0.0, Reactor Trip or Safety Injection, v45 Attachment 2			
Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 1) Verify one CHG PUMP in each train - STARTED. <input type="checkbox"/> A train (1A or 1B) amps > 0 <input type="checkbox"/> B train (1C or 1B) amps > 0	
	BOP	(Step 2) Verify RHR PUMPS - STARTED. RHR PUMP <input type="checkbox"/> 1A amps > 0 <input type="checkbox"/> 1B amps > 0	
	BOP	(Step 3) Verify Safety Injection Flow. (Step 3.1) Check HHSI flow - GREATER THAN 0 gpm. <input type="checkbox"/> FI 943	
	BOP	(Step 3.2) Check RCS pressure - LESS THAN 275 psig{435 psig}.	
	BOP	(step 3.3) Check LHSI flow – greater than 1.5×10^3 gpm <input type="checkbox"/> 1A RHR HDR FLOW FI-605A <input type="checkbox"/> 1B RHR HDR FLOW FI-605B	
	BOP	(Step 4) Verify each SW train - HAS TWO SW PUMPS STARTED. <input type="checkbox"/> A train (1A,1B or 1C) <input type="checkbox"/> B train (1D,1E or 1C)	

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Event Description: Attachments 2 and 4 of EEP-0.0

EEP-0.0, Reactor Trip or Safety Injection, v45 Attachment 2			
Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<p>(Step 5) Verify each train of CCW - STARTED.</p> <p>(Step 5.1) Verify one CCW PUMP in each train- STARTED.</p> <p>A train HX 1C or 1B CCW FLOW <input type="checkbox"/> FI 3043CA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW <input type="checkbox"/> FI 3043AA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm</p> <p>Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX <input type="checkbox"/> Q1P16FI3009AA > 0 gpm <input type="checkbox"/> Q1P16FI3009BA > 0 gpm <input type="checkbox"/> Q1P16FI3009CA > 0 gpm</p>	
		<p>(Step 5.3) Check instrument air available. Verify at least one air compressor started.</p> <p>AIR COMPRESSOR <input type="checkbox"/> 1A <input type="checkbox"/> 1B <input type="checkbox"/> 1C</p> <p>Check INST AIR PRESS PI 4004B greater than 85 psig.</p>	

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Event Description: Attachments 2 and 4 of EEP-0.0

EEP-0.0, Reactor Trip or Safety Injection, v45 Attachment 2			
Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<p>(step 6) Verify containment ventilation isolation. Verify containment purge dampers - CLOSED. □ 3197 □ 3198D □ 3198C □ 3196 □ 3198A □ 3198B</p> <p>Verify containment mini purge dampers - CLOSED. CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D □ 2866C □ 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C □ 2866D □ 2867D</p> <p>Stop MINI PURGE SUPP/EXH FAN.</p>	Mini Purge will not be running
	BOP	<p>(step 7) Verify containment fan cooler alignment. Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED.</p> <p><u>CTMT CLR FAN SLOW SPEED</u> A train □ 1A □ 1B B train □ 1C □ 1D Verify associated emergency service water outlet valves - OPEN. EMERG SW FROM 1A(1B,1C,1D) CTMT CLR □ Q1P16MOV3024A □ Q1P16MOV3024B □ Q1P16MOV3024C □ Q1P16MOV3024D</p>	

Op Test No.: FA2014301 Scenario # 4 Event # 7 Page 31 of 36

Event Description: Attachments 2 and 4 of EEP-0.0

EEP-0.0, Reactor Trip or Safety Injection, v45			
Attachment 2			
Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 8) Verify AFW Pumps - STARTED. Verify both MDAFW Pumps - STARTED <input type="checkbox"/> 1A MDAFW Pump amps > 0 <input type="checkbox"/> 1B MDAFW Pump amps > 0 AND <input type="checkbox"/> FI-3229A indicates > 0 gpm <input type="checkbox"/> FI-3229B indicates > 0 gpm <input type="checkbox"/> FI-3229C indicates > 0 gpm	
		(Step 8.2) Check TDAFW Pump start required. <input type="checkbox"/> Condition <input type="checkbox"/> TSLB <input type="checkbox"/> Setpoint <input type="checkbox"/> Coincidence <input type="checkbox"/> RCP Bus TSLB2 1-1 <input type="checkbox"/> 2680 V 1/2 Detectors Undervoltage 1-2 1-3 on 2/3 Busses Low Low SG TSLB4 28% 2/3 Detectors Water Level 4-1,4-2,4-3 on 2/3 SGs In Any 5-1,5-2,5-3 2/3 SGs 6-1,6-2,6-3	
	BOP	(step 8.3) Verify TDAFWP started. <input type="checkbox"/> MLB-4 1-3 lit <input type="checkbox"/> MLB-4 2-3 lit <input type="checkbox"/> MLB-4 3-3 lit TDAFWP SPEED <input type="checkbox"/> SI 3411A > 3900 rpm TDAFWP SPEED CONT <input type="checkbox"/> SIC 3405 adjusted to 100% Verify TDAFW flow path to each SG. TDAFWP TO 1A(1B,1C) SG <input type="checkbox"/> Q1N23HV3228A in MOD <input type="checkbox"/> Q1N23HV3228B in MOD <input type="checkbox"/> Q1N23HV3228C in MOD TDAFWP TO 1A(1B,1C) SG FLOW CONT <input type="checkbox"/> HIC 3228AA open <input type="checkbox"/> HIC 3228BA open <input type="checkbox"/> HIC 3228CA open	

Op Test No.: FA2014301 Scenario # 4 Event # 7 Page 32 of 36
 Event Description: **Attachments 2 and 4 of EEP-0.0**

EEP-0.0, Reactor Trip or Safety Injection, v45 Attachment 2																							
Time	Pos.	Expected Actions/Behavior	Comments																				
	BOP	<p>(step 9) Verify main feedwater status. Verify main feedwater flow control and bypass valves - CLOSED. 1A(1B,1C) SG FW FLOW <input type="checkbox"/> FCV 478 <input type="checkbox"/> FCV 488 <input type="checkbox"/> FCV 498</p> <p>Verify both SGFPs - TRIPPED.</p> <p>Verify SG blowdown - ISOLATED. 1A(1B,1C) SGBD ISO <input type="checkbox"/> Q1G24HV7614A closed <input type="checkbox"/> Q1G24HV7614B closed <input type="checkbox"/> Q1G24HV7614C closed</p> <p>9.4 Verify SG blowdown sample - ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE STEAM GEN ISO <input type="checkbox"/> MLB1 19-2 lit Q1P15HV3328 closed <input type="checkbox"/> MLB1 19-3 lit Q1P15HV3329 closed <input type="checkbox"/> MLB1 19-4 lit Q1P15HV3330 closed</p>																					
	BOP	<p>(Step 10) Check no MSL isolation actuation signal present.</p> <table> <tr> <th>Signal</th><th>Setpoint</th><th>coincidence</th><th>TSLB</th></tr> <tr> <td>LO SG PRESS</td><td>< 585 psig</td><td>2/3</td><td>TSLB4 19-2,3,4</td></tr> <tr> <td>Hi stm flow and Lo-Lo Tavg</td><td>>40% and <543°F</td><td>1/2 on 2/3</td><td>TSLB4 16-3,4 17-3,4 18-3,4</td></tr> <tr> <td></td><td></td><td>2/3</td><td>TSLB2 10-1,2,3</td></tr> <tr> <td>HI-HI ctmt press</td><td>>16.2 psig</td><td>2/3</td><td>TSLB1 2-2,3,4</td></tr> </table>	Signal	Setpoint	coincidence	TSLB	LO SG PRESS	< 585 psig	2/3	TSLB4 19-2,3,4	Hi stm flow and Lo-Lo Tavg	>40% and <543°F	1/2 on 2/3	TSLB4 16-3,4 17-3,4 18-3,4			2/3	TSLB2 10-1,2,3	HI-HI ctmt press	>16.2 psig	2/3	TSLB1 2-2,3,4	
Signal	Setpoint	coincidence	TSLB																				
LO SG PRESS	< 585 psig	2/3	TSLB4 19-2,3,4																				
Hi stm flow and Lo-Lo Tavg	>40% and <543°F	1/2 on 2/3	TSLB4 16-3,4 17-3,4 18-3,4																				
		2/3	TSLB2 10-1,2,3																				
HI-HI ctmt press	>16.2 psig	2/3	TSLB1 2-2,3,4																				
	BOP	<p>(Step 11) Verify PHASE A CTMT ISO. (Step 11.1) Verify PHASE A CTMT ISO - ACTUATED. <input type="checkbox"/> MLB-2 1-1 lit <input type="checkbox"/> MLB-2 11-1 lit</p> <p>11.2 Check all MLB-2 lights - LIT.</p>	HV 3318 A and B lights will not be lit. Attachment 3 performance is required																				

Op Test No.: FA2014301 Scenario # 4 Event # 7 Page 33 of 36
 Event Description: **Attachments 2 and 4 of EEP-0.0**

EEP-0.0, Reactor Trip or Safety Injection, v45 Attachment 2			
Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 12) Check all reactor trip and reactor trip bypass breakers – OPEN Reactor trip breaker A Reactor trip breaker B Reactor trip bypass breaker A Reactor trip bypass breaker B	
	BOP	(step 13) Trip CRDM MG set supply breakers. 1A(1B) MG SET SUPP BKR <input type="checkbox"/> N1C11E005A <input type="checkbox"/> N1C11E005B	
	BOP	(step 14) Secure secondary components. Stop both heater drain pumps. HDP <input type="checkbox"/> 1A <input type="checkbox"/> 1B Check any condensate pump started. IF started, THEN stop all but one condensate pump. <input type="checkbox"/> 1A <input type="checkbox"/> 1B If NO condensate pumps are started then place all HSs to STOP 14.3 IF condensate pump operating, THEN verify backup cooling aligned to condensate pumps per FNP-0-SOP-0.0, APPENDIX B, TB SO Actions Following A Reactor Trip Or Safety Injection.	Will call TBSO to accomplish this.
	BOP	(step 15) Verify both CRACS mode selector switches in the ON position. CRACS Mode Selector Switch <input type="checkbox"/> A TRAIN <input type="checkbox"/> B TRAIN Will call BOOTH to have this accomplished since this is not in the simulator	

Op Test No.: FA2014301 Scenario # 4 Event # 7 Page 34 of 36

Event Description: Attachments 2 and 4 of EEP-0.0

EEP-0.0, Reactor Trip or Safety Injection, v45 Attachment 2			
Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 16) WHEN at least 30 seconds have passed since turbine trip, THEN check main generator tripped. 230 KV BKR <input type="checkbox"/> 810 - OPEN <input type="checkbox"/> 914 - OPEN	
	BOP	(step 17) Verify two trains of ECCS equipment aligned. Perform ATTACHMENT 4, Two Train ECCS Alignment Verification.	
End of Attachment 2			

Op Test No.: FA2014301 Scenario # 4 Event # 7 Page 35 of 36

Event Description: Attachments 2 and 4 of EEP-0.0

EEP-0.0, Reactor Trip or Safety Injection, v45

Attachment 3

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 1) Check all the following MLB-2 indicating lights lit.	<p>If light not lit then verify associated component status. Circled components below must be manually closed</p> <p>CRITICAL TASK Close MOV-3318 A or B before the end of the scenario.</p>

	1	2	3	4	5	6	7	8	9	10
1	CTMT ISO PHASE A	3657 CLOSED	3198A CLOSED	3772A CLOSED	8112 CLOSED	LCV1003 CLOSED	7126 CLOSED	CONT RM FILT FAN 1A ON	CONT RM PRZN FAN 1A ON	3622 CLOSED
2	3234A CLOSED	3660 CLOSED	3198D CLOSED	3772B CLOSED	8149A CLOSED	3377 CLOSED	3103 CLOSED	3104 CLOSED	3649A CLOSED	3624 CLOSED
3	P16V515 CLOSED	3318B CLOSED	2866C CLOSED	3772C CLOSED	8149B CLOSED	3380 CLOSED	8033 CLOSED	3765 CLOSED	3649B CLOSED	3626 CLOSED
4	P16V517 CLOSED	3999A CLOSED	2867C CLOSED	3443 CLOSED	8149C CLOSED	8871 CLOSED	8028 CLOSED	3766 CLOSED	3649C CLOSED	3628 CLOSED

	11	12	13	14	15	16	17	18	19	20
1	CTMT ISO PHASE A	3658 CLOSED	3198B CLOSED	3196 CLOSED	8100 CLOSED	7136 CLOSED	3331 CLOSED		CONT RM FILT FAN 1B ON	CONT RM PRZN FAN 1B ON
2	3234B CLOSED		3198C CLOSED	3197 CLOSED	8152 CLOSED	3376 CLOSED	3332 CLOSED		3623 CLOSED	3627 CLOSED
3	P16V514 CLOSED	3318A CLOSED	2866D CLOSED	3067 CLOSED	8880 CLOSED	7150 CLOSED	3333 CLOSED		3625 CLOSED	3629 CLOSED
4	P16V516 CLOSED	3999B CLOSED	2867D CLOSED	3095 CLOSED	8860 CLOSED	8861 CLOSED	3334 CLOSED		8047 CLOSED	3659 CLOSED

End of Attachment 3

Op Test No.: FA2014301 Scenario # 4 Event # 7 Page 36 of 36
 Event Description: **Attachments 2 and 4 of EEP-0.0**

EEP-0.0, Reactor Trip or Safety Injection, v45 Attachment 4			
Time	Pos.	Expected Actions/Behavior	Comments
		(Step 1) Verify both ECCS trains aligned. <input type="checkbox"/> Check DF01 closed <input type="checkbox"/> Verify DF02 closed <input type="checkbox"/> Check DG15 closed <input type="checkbox"/> Verify DG02 closed <input type="checkbox"/> Verify two trains of battery chargers – energized Amps > 0 (Step 1.6) Verify two trains of ESF equipment aligned. <input type="checkbox"/> Check all MLB-1 lights LIT Verify charging pump suction and discharge valves - OPEN. CHG PUMP DISCH HDR ISO <input type="checkbox"/> Q1E21MOV8132A <input type="checkbox"/> Q1E21MOV8132B <input type="checkbox"/> Q1E21MOV8133A <input type="checkbox"/> Q1E21MOV8133B CHG PUMP SUCTION HDR ISO <input type="checkbox"/> Q1E21MOV8130A <input type="checkbox"/> Q1E21MOV8130B <input type="checkbox"/> Q1E21MOV8131A <input type="checkbox"/> Q1E21MOV8131B	
		(Step 1.7) Verify all post accident containment air mixing system fans - STARTED. (BOP) POST ACCIDENT MIXING FAN <input type="checkbox"/> 1A <input type="checkbox"/> 1B <input type="checkbox"/> 1C <input type="checkbox"/> 1D RX CAV H2 DILUTION FAN <input type="checkbox"/> 1A <input type="checkbox"/> 1B (Step 1.8) WHEN power restored to any de-energized emergency bus, THEN verify alignment of associated equipment.	
	BOP	(Step 1.9) Verify SFP Cooling in service per SOP-54.0, Spent Fuel Pit Cooling And Purification System.	Call Radside SO
End of Attachment 4			

Op-Test No.: FA2014301

Page 1 of 2

Brief

This simulator performance scenario is performed in the EVALUATION MODE. You should not direct questions to the evaluators. Otherwise, you should perform as if you were in the MCR.

Your ability to maintain a log is not being graded, but maintaining a rough log is recommended to help during briefs.

If you need to communicate with the Unit 2 operator, call Unit 2 at 2434 or page the Unit 2 Unit Operator.

Respond to what you see. If there is a problem with the simulation, the session will be terminated or adjusted as appropriate based on the specific problem.

Assign operating positions.

Ask for and answer questions.

[X] Unit 1 [] Unit 2

Shift:

Date

Off-going SS	Oncoming SS	[] N [X] D	Today
--------------	-------------	---------------	-------

Part I – To be reviewed by the oncoming Supervisor prior to assuming the shift.

Security Keys A, S, D, SW, X on key ring . SS

Unit 85% power, 899 ppm Cb, MOL 10000 MWD/MTU
Status

TARGET ZERO

Every Day, Every Job Safely

STPs/Evolutions:

A Train On-Service – B Train
Protected

1.0 ____; 109.1 ____ No adj.; 63.7 ____; FSP-20,0 ____;

Status of Special Testing

General Information

- Shift Goal is to continue raising power to 100%
- 1A MDAFW Pump is tagged out for bearing replacement
- Thunderstorm warnings in effect for Southeast Alabama and Western Georgia
- Current Risk Assessment is **GREEN** and projected is **GREEN**
- UOP-3.1 is complete through step 5.19
- Unit 2 is at 100% power with no major issues.
- I & C Personnel are performing visual inspections in 7300 protection and control cabinets.
-
-

Equipment Status

	Maintain VCT gas pressure 25-32 psig

Reactivity Plan

100 gallon dilutions every ten minutes

Waste Management Status

#3 RHT – On Service

WGS – secured

LCO Status

3.7.5 Condition B (1A MDAFW Pump)

Night Orders

No New Night Orders

Part II

Review Shift Complement

LCOs Reviewed SS (initials) reviewed as early in shift as possible

Part III:

STP-1.0

Operator Logs

Cond. Report

Autolog

ELDS & GEN

Keys

Reviewed/Signed

Reviewed

Queue

Reviewed

Spreadsheet

Turned

[X] Yes

[X] Yes

[X] Yes

[X] Yes

[X] Yes

[X] Yes

verified

Over

Unit One Reactivity Briefing Sheet

RCS Temp **567.0 °F**
 RX PWR **85.0 %**
 Current Xenon Concentration **2277 PCM**

Burnup **10000 MWD/MTU**
 As of (Date & Time) **10/2/2013 1:00**
 Calculated Burnup **22658 MWD/MTU**
 As Of **9/23/14 1156**

Assumes constant power since
 Last Power history update

RCS Boron **899 PPM**
 BAT Concentration **7436 PPM**

Current Bank
 Delta Rod Position: **206 Steps**

Rod Worth Steps Out

One	16 PCM
Two	33 PCM
Five	78 PCM
Ten	145 PCM
Twenty	214 PCM
Fifty	*

Steps In

One	-16 PCM
Two	-32 PCM
Five	-82 PCM
Ten	-164 PCM
Twenty	-313 PCM
Fifty	-634 PCM

RCS Blended Flow Makeup Requirements

Acid to Borate 1 PPM (Gal.)	RMW to dilute 1 PPM (Gal.)	Required Acid flow Rate (GPM)	FK-113 Pot Setting
7.7 Gal.	55.2 Gal.	14.7 GPM	3.64
7.6 Gal.	55.2 Gal.	14.5 GPM	3.60

Values for Normal Auto M/U (Bat-100 ppm boron)
 Values based on Actual Bat Concentration

Current RCS Borations / Dilutions:

Borate	Dilute
0 Gal.	100 Gal.

Reactivity Additions: **0.00 14.34 PCM**
 Total Reactivity Addition: **14.34 PCM**
 Net RCS Temperature Effect: **0.81 °F**
 Net Rx Power Effect: **0.57 %**

Boron Worth **-8.75 PCM/PPM**
 Power Defect **2,148 PCM**
 MTC **-17.73 PCM/°F**

Boric Acid Required for Power reduction
 With no Control rod movement

DeltaPower	Power Defect (PCM)	Delta PPM	Acid Required (Gallons)
1.00%	23	2.62	20
2.00%	47	5.25	40
5.00%	117	13.11	100
10.00%	233	26.23	200
20.00%	466	52.45	400
25.00%	583	65.56	501
50.00%	1,215	136.77	1050
75.00%	1,881	211.73	1636
100.00%	N/A	N/A	N/A

a/o w/o
 RCS B-10 ratio **17.98 16.6**
 BAT B-10 ratio **20.1 18.6**
 NDR B-10 ratio **19.8 18.3**

Valid For Unit One cycle 2

26

Core Physics Curves:

Curve 5 Rev 29
 Curve 27 Rev 28
 Curve 34 Rev 46
 Curve 57 Rev 35
 Curve 57A Rev 25

Southern Nuclear J.M. Farley Nuclear Plant

Operations Training Simulator Exam Scenario

BOOTH INSTRUCTOR GUIDE



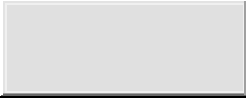

ILT-37 NRC EXAM SCENARIO #4

Validation time: 85 minutes Validated by: Sorrell, Newell, Smith			
TRN Supervisor Approval:	Billy Thornton	Date:	9/24/14
NRC Chief Examiner	SEE NUREG 1021 FORM ES-301-3		








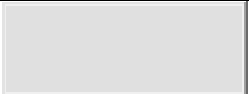



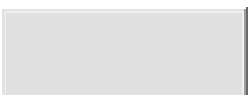


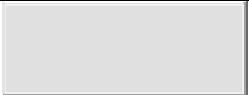
Facility:	Farley Nuclear Plant	Scenario No.:	4	Op-Test No.:	FA2014-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
<p><u>Initial Conditions:</u> 85% power, UOP-3.1, v119.0, at step 5.20. Ramping up. MOL, 900 ppm Cb Turnover:</p> <ul style="list-style-type: none"> Current Risk Assessment is GREEN and projected to remain GREEN. A Train O/S, B Train protected. 1A MDAFW pump tagged out for bearing replacement. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia. 					
SPLIT TRAIN ALIGNMENT					
Event No.	Malf. No.	Event Type*	Event Description		
1	Imf cp4055 K-A	I (BOP)	CP-4055K, H2 temperature controller fails low in auto		
2	Imf mal-tur4f	R (RO) N (BOP)	Turbine Vibration requires ramp down		
3	Imf lt475 Imf mal-mss1	I (BOP) TS (SRO)	LT-475 fails high (P-CT) TS 3.3.1. Cond E, 3.3.2 Cond D, I 5 minutes later when cabinet is inspected (IC person), MSS fails on A SGWLC when rack cab door is opened		
4	Imf pt444 / preset	C (RO) TS (SRO)	PT-444 fails high; PORV-444B leaks by the seat – requires block valve closure (P-CT) TS 3.4.11 Cond A		
5	Imf mal-rcs3	C (RO)	Reactor Vessel Inner O-Ring leakage increases to 1 GPM		
6	Imf mal-tur4f	M (ALL)	Turbine Vibrations requires RX trip		
7	preset	C (RO)	Reactor will not trip FRP-S.1 entry (CT-52) Manual Turbine Trip is required Rods fail to move in AUTO after turbine trip		
8	preset	M (ALL) C (BOP)	Two minutes after Reactor is tripped 500GPM steam space break in the Pressurizer 3318A/B Containment Isolations fail to auto close and must be closed at BOP (CT-11)		
			Terminate in EEP-1 after decision not to terminate SI at step 7.5		

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

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	Load in IC-214 and sim IC snap directory 900 ppm Cb Base IC is IC-58	
		RUN	
0	0	Generic setup: bat generic_setup_HLT.txt	
0	0	Quick setup (all items with * are included): bat ILT37_4.txt	
PRESETS			
7		1a crdm set fails to trip: CMFmalf / c52MGA_cr3	*
7		RTBs fail to open CMFmalf / cbkrxtrp_cc21 / closed CMFmalf / cbkrxtrp_cc22 closed	*
0		Tag 1A MDAFW pump irf cafp01a_d_cd1 open	*
3		Fail 1A SG MSS Card when Prot CH II cabinet open Imf mal-mss1 (3 20)	TRG 3
4		PORV 444B sticks at 10% after being demanded closed: imf rrc444b-m (1 0) 10 1	TRG 1
7		Blocks rods from moving in Auto Imf mal-crf2 (2 0) 1	TRG 2
8		Steam Space Break in the Pressurizer Imf mal-prs1 (2 120) 500 300	TRG 2
8		Block 3318 valves auto isolation CMFmalf / ccb3318A_d_cc5 / open CMFmalf / ccb3318B_d_cc5 / open	*
Triggers and Commands			
4		Event Trigger 1 – monitors PORV444B HS closed position trgset 1 “x30i115c”	TRG 1
7/8		Event Trigger 2 – monitors for turbine trip Trgset 2 “x30O144g”	TRG 2
3		Event Trigger 3 – monitors bistable light for Protection CH II cabinet door open	TRG 3


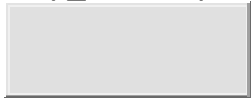

EXAM**MCB setup**

	Place Unit 1 Bypass and inoperable panel lights to the up position (Auxiliary Feed water System)	Unit 1 A-Train
	Place HOLD Tag on 1A MDAFW pump H/S	1 HOLD TAG
	DEH	Clear DEH alarms
	Select OPS GROUP on MCB monitor Acknowledge computer alarms	IPC
	IPC: IF FF5 is in alarm, update rods	Ensure FF5 clear or update rods on IPC
	Setup spreadsheet on OATC computer to resemble reactivity spreadsheet provided	<u>Set up computer</u>
	Clear Recorders Cae clearrecorders.cae	
	Provide a marked up copy of UOP-3.1, v116.0 completed thru step 5.19, Ready to perform step 5.20.	<u>UOP-3.1 copy</u>
	Place Simulator in Freeze	
	Perform Booth Operators Setup Checklist	
	Open Simview file to be used for plant parameter data collection: Simview / sv DataCollection.uvl	
	If needed, adjust sim time back to 00:00:00 SIMVIEW / Sim_Clock.uvl Hours: clock(3) = 0 Minutes: clock(2) = 0 Seconds: clock(1) = 0	
	VERIFY MICROPHONES READY	Batteries installed
	TURNOVER SHEET AVAILABLE	

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
Prior to RUN			
		Start data collection for Simview file On DataCollection.uvl file press DATA for drop down and then COLLECT to start collecting data	
		Begin Exam	
		Verify Horns ON: hornflag <u>HORNS ON = TRUE</u>	
1	Start of exam	CP-4055K, H2 temperature controller fails low in auto CNH / CP4055K-A / 0 / 1	
2	NRC CUE	Turbine Vibration requires ramp down Malf / MAL-TUR4F / 9 / 600	
3	NRC CUE NRC CUE	LT-475 fails high XMT / LT475 / 100 / 1 MSS Fails when SGWLC rack door opened STL / S1B07 / 1	 
4	NRC CUE	PT-444 fails high; PORV-444B leaks by the seat – requires block valve closure XMT / PT444 / 2500 / 1	
5	NRC CUE	Reactor Vessel Inner O-Ring leakage increases to 1 GPM Malf / MAL-RCS3 / 1 / 1	
6	NRC CUE	Turbine Vibrations requires RX trip Malf / MAL-TUR4F / 17 / 300	
7	NRC CUE	Reactor will not trip FRP-S.1 entry (CT-52) Rods fail to move in AUTO after turbine trip	
8	Preset	Two minutes after Turbine is tripped 500GPM steam	

		space break in the Pressurizer 3318A/B Containment Isolations fail to auto close and must be closed at BOP (CT-11)	
		Terminate in EEP-1 after decision not to terminate SI at step 7.5	
		End of Exam HORNS OFF	
		FREEZE simulator	
		Stop data collection for Simview file sv DataCollection.uvl	
		Export data to file with the name of exam2014sen4grpX.txt <i>NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate.</i> <i>NOTE: file will be saved in the OPENSIM directory.</i>	Ensure data file created.
		When Control board data no longer needed Then Clear recorders for exam security	

Local operator actions:

<u>EVENT NO.</u>	<u>TIME</u>	<u>ACTIONS</u>
1	NONE REQUIRED	
2	NONE REQUIRED	
3	NONE REQUIRED	
4	NONE REQUIRED	
5	NONE REQUIRED	
6	NONE REQUIRED	
7	WHEN REQUESTED	Locally Open Rx Trip Breakers 3(THREE) MINUTES AFTER REQUEST using the buttons below.  CMFmalf / cbkrxtrp_cc21 / open  CMFmalf / cbkrxtrp_cc22 / open
8	IF REQUESTED	Close ECCS Disconnects (step 6 EEP-1.0) 5(FIVE) MINUTES AFTER REQUEST using the button below  CAE eccs_disc_delayed.cae

Communications sheet

<u>EVENT NO.</u>	<u>TIME</u>	<u>Communication:</u>
ALL	AS REQUIRED (Standard communications to inform supervision)	<u>SSS, SM and Dispatcher:</u> Repeat back failure, procedure entered, plant status, CR in the cue and that type of communications.
1	NONE EXPECTED	
2	When Requested	<u>Turbine Bldg SO:</u> Called to walkdown the turbine: "There are abnormal vibrations on the turbine deck. No other abnormal conditions are apparent" If #6 Bearing temperature is requested: "The #6 Bearing temperature is:" Report temperature on the Main turbine screen for the #6 Bearing
3	When Requested	If asked about I&C maintenance: "I will investigate"
4	NONE EXPECTED	
5	When Requested	<u>Radside SO:</u> Called to Check RCDT parameters for any change. After 2 minutes report the following: <ul style="list-style-type: none"> There has been no change in RCDT level or pressure.
6	NONE EXPECTED	
7	When Requested	<u>ROVER:</u> Called to locally open RX Trip Breakers, After 3 minutes report the following: <ul style="list-style-type: none"> I have locally opened Unit one Reactor Trip breakers
8	When Requested	<u>SM:</u> "I will make the classifications and notifications."
		<u>SM / SSS:</u> "I will get someone to perform step 6 of EEP-1."
		<u>ANY CALL TO SHIFT CHEMIST:</u> Acknowledge to requirement for sampling.

Communications sheet

<u>EVENT NO.</u>	<u>TIME</u>	<u>Communication:</u>

Facility:	Farley Nuclear Plant	Scenario No.:	5	Op-Test No.:	FA2014-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
Initial Conditions: 95% power, AOP-2 step 16.1. MOL, 894 ppm Cb;					
Turnover:					
<ul style="list-style-type: none"> Current Risk Assessment is GREEN and projected to remain GREEN. A Train O/S, B Train protected. 1A MDAFW pump tagged out for bearing replacement. 7gpd tube leak. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia. Maintain current power level for SG Tube Leakage evaluation 					
SPLIT TRAIN ALIGNMENT					
Event No.	Malf. No.	Event Type*	Event Description		
1		N (BOP)	Adjust R-70 setpoint		
2	Imf pt476	I (BOP) TS (SRO)	PT-476 fails low (P-CT) TS 3.3.2 Cond D		
3	Imf pk444a-a	C (RO)	PK-444A fails low. (P-CT)		
4	Imf sgs508 7a_cc3	C BOP	Main Generator Seal oil pressure decreases due to air side seal oil pump trip and regulator malfunction – automatic actions are blocked		
5	Irf loa-rds001	R (RO) TS (SRO)	Tube leak increases to 160GPD, ramp unit offline TS 3.4.13 Cond B		
6	Preset	C (RO)	Selected BAT pump will not Auto start during Auto makeup or borations		
7	Imf pk444c-m	M (ALL) C (BOP)	“A” loop spray valve drifts open in manual control Reactor is tripped due to stuck open spray valve Main Turbine will not trip automatically or manually. GV closure is required (CT-13) 1B MDAFW will not auto start and cannot be started After start TDAFW pump speed slows to idle speed		
8			Restore feed water in FRP H.1 (CT-43)		
			Terminate on exit of FRP H.1		

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

		PRESETS	
0		Tag 1A MDAFW pump irf cafp01a_d_cd1 open	*
0		Insert Initial Tube Leak in A SG lrf loa-rds001 7 5	*
4		Prevents selected BAT pump from working in AUTO lmf ccvp005a_cc2 open	*
5		Simulates back up seal oil regulator malfunction Set ctga26 = 117.0	*
5		Prevents Air Side DC seal oil pump auto start lmf cgs5085_cc10 open	*
7		Prevents auto closure of all MSIV's imf crsh001a_cc5 open imf cmsh002a_d_cc5 open imf crsh001b_cc5 open imf cmsh002b_d_cc5 open imf crsh001c_cc5 open imf cmsh002c_d_cc5 open	*
7		Prevent AUTO trip of main turbine MALF / T / MAL-TUR2	*
7		Prevent MANUAL trip of main turbine MALF / T / MAL-TUR24	*
7		Prevent start of B MDAFW Pump lmf cafp01b_d_cc18 open	*
		Triggers and Commands	
7		Trigger 1 monitors for TDAFW Pump Start Trgset 1 "x21o135o" Trg 1 "imf sic3405-o 4 20"	TRG 1

Initial Conditions: 95% power, AOP-2 step 16.1. MOL, 894 ppm Cb

Turnover:

- Current Risk Assessment is **GREEN** and projected to remain **GREEN**.
- **A** Train O/S, **B** Train protected.
- 1A MDAFW pump tagged out for bearing replacement.
- 7 gpd tube leak
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia.

<u>Event 1</u>	Adjust R-70 setpoint. Verifiable Actions: BOP operates various R-70 controls to change setpoint.
<u>Event 2</u>	PT-476 fails low. (P-CT) Verifiable Actions: BOP takes manual control of SGFP speed as it slows down and 1A FRV closes and then opens. TS 3.3.2 Cond D.
<u>Event 3</u>	PK-444A fails low. (P-CT) Verifiable Actions: Close both PORVs and spray valves.
<u>Event 4</u>	Seal oil pressure decreases due to air side seal oil pump trip and regulator malfunction, automatic actions are blocked. Verifiable Actions: BOP starts DC air side oil pump and Seal oil backup pump.
<u>Event 5</u>	SGTL increases to 160 gpd. Ramp off line. Verifiable Actions: RO uses rods/boron to control Tavg/Tref. TS 3.4.13 Cond B.
<u>Event 6</u>	Selected BAT pump will not Auto start during Auto makeup or borations. Verifiable Actions: RO will start BAT pump as required for boration/dilution and auto makeup. May use SOP to switch to the other BAT pump.
<u>Event 7</u>	Reactor is tripped due to a spray valve drifting open in manual. Main Turbine will not trip automatically or manually. GV closure is required. 1B MDAFW will not auto start and cannot be started. After start TDAFW pump speed slows to idle speed. Verifiable Actions: Main Turbine GV closure is required. (CT-13)
<u>Event 8</u>	Restore feedwater in FRP-H.1. Verifiable Actions: Restore feed using SGFP or Condensate Pump. (CT-43)
	Terminate on exit from FRP-H.1. SOP/AOP-100/AOP-2/UOP-3.1/SOP/ARP/AOP-100/EEP-0/FRP-H.1/EEP-0

CRITICAL TASK SHEET

- ___ 1. Manually trip the main turbine before a severe (ORANGE path) challenge develops to either the subcriticality or the integrity CSF or before transition to ECA-2.1, whichever happens first. (CT-13).
- ___ 2. Establish feedwater flow into at least one SG before RCS bleed and feed is required. (CT-43).

**SCENARIO
OBJECTIVE/
OVERVIEW:**

Power operation with instrument and component failures with a loss of Heat Sink.
The team should be able to:

- Adjust R-70 setpoint,
- respond to a steam pressure transmitter failure,
- respond to a Pressurizer pressure controller failure requires manual valve operation,
- respond to a reduction in seal oil pressure requiring manual start of the backup pumps,
- respond to increase in SGTL requiring ramp,
- operate BAT pump during boration/dilution/auto makeup,
- respond to a spray valve drifting open in manual that requires a Rx trip,
- manually close turbine governor valves when required,
- respond to a loss of feedwater requiring entry into FRP-H.1.
- terminate at exit of FRP-H.1

Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes
1.	Total malfunctions (5–8)	7
2.	Malfunctions after EOP entry (1–2)	2
3.	Abnormal events (2–4)	3
4.	Major transients (1–2)	1
5.	EOPs entered/requiring substantive actions (1–2)	0
6.	EOP contingencies requiring substantive actions (0–2)	1
7.	Critical tasks (2–3)	4

Op Test No.: FA2014301 Scenario # 5 Event # 1 Page 1 of 40

Event Description: R-70 Setpoint Adjustment

Indications Available

Annunciators: SG TUBE LEAK ABOVE SETPT (FG1)	R-70 reading 7.0 GPD
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AOP-2.0, Steam Generator Tube Leakage, v35.0

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 16.1) Monitor R-70 and R-15 radiation monitors leak rate once every 15 minutes	[CA] Step
	BOP	(step 16.2) Clear the FG1 alarm by raising the affected SG R-70 channel alert setpoint to a value above the current baseline value, but not over 30 gpd per SOP-69.0.	

SOP-69.0, N-16 Primary to Secondary Leak Detection System, v6.0
Section 4.3 – Changing Alarm Setpoints

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 1) Press CODE key	
	BOP	(step 2) Enter 1111	If operator enters the wrong value pressing the VAL key and returning to step 1 will allow the correct value to be entered.
	BOP	(step 3) Press VAL key	
	BOP	(step 4) Press ALRT Key	
	BOP	(step 5) Check existing setpoint displayed	
	BOP	(step 6) Press MOD key	
	BOP	(step 7) Enter desired setpoint using numeric keys	Value entered will be in scientific notation and should not exceed 30 GPD
	BOP	(step 8) When desire setpoint is displayed press the VAL key	MCB Alarm FG1 will also clear if step 7 is done correctly.

Op Test No.: FA2014301 Scenario # 5 Event # 1 Page 2 of 40

Event Description: R-70 Setpoint Adjustment

SOP-69.0, N-16 Primary to Secondary Leak Detection System, v6.0
Section 4.3 – Changing Alarm Setpoints (CONT)

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 9) Press MEAS key to return to measurement mode	
	BOP	(step10) Check display indicates 'AV' and leak rate	
	BOP	(step 11) Press ALRT key	
	BOP	(step 12) Check setpoint was changed to correct, desired value	
	BOP	(step 13) Press MEAS key to return to measurement mode	
	BOP	(step 14) Place a status tag stating new setpoint on channel modified	Operator may direct SSS to prepare a status tag.
When status tag preparation has been directed or at the discretion of the Lead Examiner move to the next event.			

Op Test No.: FA2014301 Scenario # 5 Event # 2 Page 3 of 40

Event Description: PT-476, CH IV, 1A SG Steam Pressure Transmitter, fails LOW

Indications Available:

Annunciators:

- 1A SG LVL DEV (JF1)
- 1A SG STM LINE HI DP ALERT (JE1)
- 1A SG FEED FLOW > STM FLOW (JG1)

Recognize indications of PT-476 failing:

- 1A SG water level decreasing
- 1A FRV going full closed

AOP-100, Instrumentation Malfunction, version 13**Section 1.5**

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Direct AOP-100 entry and IOAs taken.	
	BOP	(step 1) Maintain SG Level at the reference level of 65%. IF required take manual control of: <ul style="list-style-type: none"> - SGFP Master Controller SK-509A - 1A Feed Reg Valve FK-478 	Immediate Operator Action [CA] POTENTIAL CRITICAL TASK Improper SGWL control may cause a RX Trip.
	SRO	(step 2) If adverse trend in SG level exists then establish trip criteria	
	BOP	(step 3) Place ramp on HOLD	
	BOP	(step 4) Determine the instrument failure	
	BOP	(step 4.3) Select out the controlling channel by placing the following handswitches to the appropriate channel III <u>OR</u> IV position as required: A SG STM FLOW SEL SW - FS/478Z A SG FW FLOW SEL SW - FS/478Y	
	SRO	(step 5) Refer to Tech Specs 3.3.2 Function 1, e(2) cond D; Place channel in trip in 72 hours or be in mode 3 in 78 hours and mode 4 in 84 hours. Steam Flow INDICATION failing low based on PT-476 failing is NOT a TS action since the STEAM FLOW protection channel is NOT density compensated (i.e. not affected by the Pressure Transmitter failure).	See TS 3.3.2 on the next page

Op Test No.: FA2014301 Scenario # 5 Event # 2 Page 4 of 40

Event Description: PT-476, CH IV, 1A SG Steam Pressure Transmitter, fails LOW

AOP-100, Instrumentation Malfunction, version 13

Section 1.5 (CONT)

TECHNICAL SPECIFICATION 3.3.2, ESFAS Instrumentation

The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE

*Table 3.3.2-1 ESFAS Instrumentation
Function 1, e(2) – High Differential Pressure Between Steam Lines*

*Applicable in Modes 1, 2 and 3
required channels 3 per stm line CONDITION D*

		CONDITION	REQUIRED ACTION	COMPLETION TIME	
		D. One channel inoperable.	D.1 -----NOTE----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----- Place channel in trip. OR D.2.1 Be in MODE 3. AND D.2.2 Be in MODE 4.	72 hrs 78 hrs 84 hrs	
Time	Pos.	Expected Actions/Behavior			Comments
	SRO	(step 6) Notify the Shift Manager			
	SRO	(step 7) WHEN plant conditions permit, THEN return systems to automatic control.			
	SRO	(step 8) Submit a condition report on the failed component, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the condition report.			
Move to next event when SM notification complete and CR report directed or at the discretion of the lead examiner					

Op Test No.: FA2014301 Scenario # 5 Event # 6 Page 5 of 40
 Event Description: **PK-444A, Pressurizer Pressure Controller, fails LOW**

Indications Available:

Annunciators:	Recognize indications of PK-444A failing LOW
- PRZR PRESS HI-LO (HC1)	• PK-444A controller reading 0% output
- PRZR HI-LO PRESS ALERT (HC2)	• BOTH Spray valves open
- PRZR PRESS REL VLV 445A OR B/U	• PORV-444B open
HTRS ON (HD1)	• RCS pressure falling

AOP-100, Instrumentation Malfunction, v13, section 1.1

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Directs AOP-100 section 1.1 immediate actions to be performed	
	RO	(step 1) Take manual control to raise RCS pressure: <ul style="list-style-type: none"> • PORVs PCV444B • Sprays PK-444C & D • Heaters 1A, 1B, 1C, 1D, 1E • PK-444A PRZR PRESS REFERENCE controller 	Immediate Operator Action POTENTIAL CRITICAL TASK If RCS pressure is not controlled correctly a RX Trip could occur.
	RO	(step 2) IF pressurizer pressure is decreasing due to a mechanically stuck open spray valve PCV444C or PCV444D, THEN perform the following: <ul style="list-style-type: none"> • IF the reactor trip breakers are closed, THEN trip the reactor prior to pressure reaching 2100 PSIG. • WHEN the reactor is tripped, THEN go to EEP-0, REACTOR TRIP OR SAFETY INJECTION. 	Immediate Operator Action Both Spray valves will shut and a reactor trip will not be required
Start the next event after operators have verified immediate operator actions and RCS Pressure is stable > 2200 psig or at the discretion of the Lead Examiner			

Op Test No.: FA2014301 Scenario # 5 Event # 5 Page 6 of 40

Event Description: **Air Side Seal Oil Pump trip and Seal Oil Pressure Regulator Fails LOW**

Indications Available

Annunciators: SEAL OIL PRESSURE LO (LF5) AIR SIDE SEAL OIL PUMP OFF (LF4)	MCB Indication: Air Side Seal Oil Pump Amber Trip Light Lit
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Note to Examiner:

Operators may choose to respond using LF5 or LF4.

LF5 actions start on this page.

LF4 actions start on page 7.

ARP-1.11, Main Control Board Annunciator Panel L, v51.0

LF5

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 1) Notify appropriate plant personnel	
	BOP	(step 2) Verify the DC AIR SIDE EMERGENCY SEAL OIL PUMP is running	Operator should start this pump since it failed to auto start.
	BOP	(step 3) Start the SEAL OIL BACKUP PUMP	Operator should start pump.
	BOP	(step 4) If the DC Air Side Emergency Seal Oil Pump is supplying the seal oil pressure (and the attached Oil Pump is not available), Then start the Seal Oil Backup Pump and reduce hydrogen pressure to 45 psig or less by the following: (step 4.1) Reduce Generator Loading with appropriate UOPs and SOPs (step 4.2) When ready to reduce hydrogen pressure then reduce the pressure with SOP-27.0.	Attached oil pump is supplying sufficient pressure through the backup regulator.
	BOP	(step 5) Actions Required if the Seal Oil Backup Pump cannot be started - Reduce Generator Loading - Reduce Generator Pressure to 2 PSIG	Seal Oil Backup Pump will start and the actions of this step will not be required
	BOP	(step 6) Correct the cause of the alarm	
	BOP	(step 7) Return the Hydrogen Seal Oil System to normal	
	BOP	(step 8) Return Hydrogen Pressure to normal	
At the discretion of the Lead Examiner move to the next event.			

Op Test No.: FA2014301 Scenario # 5 Event # 5 Page 7 of 40

Event Description: Air Side Seal Oil Pump trip and Seal Oil Pressure Regulator Fails LOW

ARP-1.11, Main Control Board Annunciator Panel L, v51.0
LF4

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 1) Verify Seal oil is being supplied by either the turbine backup regulator or the DC air side emergency seal oil pump	Operator will start DC air side emergency seal oil pump.
	BOP	(step 2) Determine the cause of the alarm	
	BOP	(step 3) If the DC Air Side Emergency Seal Oil Pump is supplying the seal oil pressure (and the attached Oil Pump is not available), Then start the Seal Oil Backup Pump and reduce hydrogen pressure to 45 psig or less by the following: <ul style="list-style-type: none"> - Reduce generator load with applicable UOPs and SOPs - When ready to reduce hydrogen pressure then reduce generator pressure IAW SOP-27.0, Generator Gas and Monitoring System. 	The Seal Oil Backup Pump should be started
	BOP	(step 4) Actions Required if the Seal Oil Backup Pump cannot be started <ul style="list-style-type: none"> - Reduce Generator Loading - Reduce Generator Pressure to 2 PSIG 	Seal Oil Backup Pump will start and the actions of this step will not be required
	BOP	(step 5) If necessary to reduce hydrogen pressure then refer to SOP-27.0	
	BOP	(step 6) Correct the cause of the alarm	
	BOP	(step 7) Return the Hydrogen Seal Oil System to normal	
	BOP	(step 8) Return Hydrogen Pressure to normal	
At the discretion of the Lead Examiner move to the next event.			

Op Test No.: FA2014301 Scenario # 5 Event # 3 Page 8 of 40
 Event Description: **SG Tube leak increases to 160 GPD**

Indications Available

Annunciators:	Recognize indications of SG TUBE LEAK
- SG TUBE LEAK ABOVE SETPT (FG1)	<ul style="list-style-type: none"> R-15 Levels rising R-70A READING 160 GPD

ARP-1.6, Main Control Board Annunciator Panel F, v72.1 FG1

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Direct FG1 actions	
	BOP	(step 1) Check N1D11RISH0070A, B, & C to determine the magnitude of the leak and the generator indicating leakage.	
	BOP	(step 3) Notify chemistry of the alarm condition (step 4) Take appropriate measures to return any OOS SG RMS equipment (step 5) Perform qualitative confirmation for the existence of a SG tube leak by checking two independent rad monitors.	
	SRO	(step 6) IF this annunciator will not clear due to actual SG tube leakage OR an increase in existing tube leak is indicated, THEN go to FNP-1-AOP-2.0, STEAM GENERATOR TUBE LEAKAGE.	AOP-2.0 actions on page 9.
	SRO	(step 7) Refer to Technical Specifications section 3.4.13 for limiting conditions for operation.	T.S. Listed on page 12.

Op Test No.: FA2014301 Scenario # 5 Event # 3 Page 9 of 40
 Event Description: **SG Tube leak increases to 160 GPD**

Note to Examiner:

If operators exited AOP-2.0 at the end of event 1 then they should enter the procedure at step 1.
 If operators remained in AOP-2.0 at the end of event 1 then they may enter this procedure at step 1 or continue from step 7.

AOP-2.0, Steam Generator Tube Leakage Ver. 35

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 1) Maintain pressurizer level stable at normal programmed value by: - Control charging - Reduce letdown close HV-8149 A, B, C	NOTE: [CA] step FK-122 adjusted as required close one or more orifice isol. valves
	RO	(step 1.3) Determine leak rate, if possible (use STP-9.0, RCS leakage) (RNO step 1.3) Determine leak rate based on flow balance _____(charging flow) + _____(seal injection flow) - _____(letdown flow) - _____(#1 seal leakoff flow) = _____(RCS leak rate)	
	RO	(step 2) Maintain VCT level greater than 20%. by: Verify RMW system in AUTO <u>OR</u> Manually control makeup as required by using SOP-2.3, CVCS Rx makeup system	NOTE: [CA] step RNO is to trip the Rx and actuate an SI
	BOP	(step 3) Check Unit in Mode 1 or Mode 2.	
	SRO	(step 4) Check reactor power conditions: - Check NO power ascension in progress - Check NO power reduction in progress - Check reactor power greater than 20%	

Op Test No.: FA2014301 Scenario # 5 Event # 3 Page 10 of 40
 Event Description: **SG Tube leak increases to 160 GPD**

AOP-2.0, Steam Generator Tube Leakage Ver. 35 (CONT)

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 5) Monitor primary to secondary leakage Check R-70s or R-15 for increasing count rate Begin trending R-70A, SG TUBE LEAK, and R-15, SJAE EXH, using the plant computer and Data sheet 1.	NOTE: [CA] step Chemistry will acknowledge CCP-31 app C
	BOP	(step 6) Call TBSO to place SJAE filtration on service.	
	SRO	(step 7) Direct chemistry to perform grab samples and leak rate determinations. CCP-201 Table 55 (step 8) Notify SM of leak rate (step 9) Continue to monitor R-70's, R-15 or CHM/HP leak rate input for primary to secondary leak rate and rate of change using Data sheet 1.	NOTE: [CA] step NOTE: [CA] step
	SRO	(Step 10) Monitor the Continuous Radiation Monitoring System operation. [] R-15 – OPERABLE OR [] R-70's - OPERABLE	NOTE: [CA] step
		(step 11) Evaluate Table to determine appropriate response: - ACTION LEVEL 3 Condition 1 ≥160 GPD	AOP-2.0 will direct the crew to ramp to 50% power within 1 hour. This will require entry into AOP-17.1, Rapid Power Reduction (See Page 13)

Op Test No.: FA2014301 Scenario # 5 Event # 3 Page 11 of 40
 Event Description: **SG Tube leak increases to 160 GPD**

AOP-2.0, Steam Generator Tube Leakage Ver. 35 (CONT)

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 12.1) Check any two of the following rad monitors trending in the same direction: - R-70s/R-15 OR - R-70s/R-23A(B) OR - R-15/R-23A(B) trending in the same direction with the same order of magnitude	
	SRO RO BOP	(step 12.2) Reduce power to less than or equal to 50% within 1 hour (step 12.3) MODE 3 within 3 hours	Begin ramping offline as directed by the SM
	SRO	(step 12.4) Identify the correct leaking SG Using R-70s, R-60s and level rise in any SG	1A SG has a 160 gpm tube leak
	BOP	(step 12.6) Have Chemistry convert R-15 readings to gpd within 15 minutes.	
	SRO	(step 12.7) Call SM to evaluate emergency classifications per NMP-EP-110 and EIP 8.0	
	SRO	(step 17) Direct Chemistry to monitor the turbine building sump for activity	Step 12.8 directs operators to step 17
	SRO	(step 18) Refer to FNP-0-AOP-2.1; Contingency Plan For Minimizing And Controlling Contaminated Secondary Condensate.	
	BOP	(step 19) Verify affected SG(s) identified. Check any SG level - RISING IN AN UNEXPLAINED MANNER. OR Check any SG radiation indication – HIGH R-70 A, B, C and R-60 A, B, C	

Op Test No.: FA2014301 Scenario # 5 Event # 3 Page 12 of 40
 Event Description: **SG Tube leak increases to 160 GPD**

AOP-2.0, Steam Generator Tube Leakage Ver. 35 (CONT)

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 20) Verify affected SG(s) atmospheric relief valve-ALIGNED - 3371A 8.25 and in AUTO	
	BOP	(Step 21) Check affected SG atmospheric relief valve 3371A – CLOSED	
		(Step 22) if TDAFWP is running or required then direct the counting room to perform CCP-645 (STEP 23) Check 1B or 1C SG(s) - AFFECTED.	TDAFWP not running or required Not affected
	BOP	(Step 24) Verify SGBD isolated from the 1A SG- 7614A closed (Step 25) Check AS supplied from Unit 2	 It is aligned from Unit 2

TECHNICAL SPECIFICATION 3.4.13, RCS Operational LEAKAGE

RCS operational LEAKAGE shall be limited to:

d. 150 gallons per day primary to secondary LEAKAGE through any one SG.

CONDITION	REQUIRED ACTION	COMPLETION TIME	
B. Required Action and associated Completion Time of Condition A not met. OR Pressure boundary LEAKAGE exists. OR Primary to secondary LEAKAGE not within limit.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours	

The next event (BATP fails to start in Auto) will occur when crew attempts boration.

Op Test No.: FA2014301 Scenario # 5 Event # 3 Page 13 of 40
 Event Description: **SG Tube leak increases to 160 GPD**

AOP-17.1, Rapid Turbine Power Reduction, v5.0

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	(step 1) Perform a rapid ramp briefing (step 1.1) Perform attachment 1 as time permits to aid the operating crew during rapid load reduction (step 1.2) Contact Reactor Engineering as soon as practical for fast ramp recovery recommendation. (step 1.3) If power reduction will result in greater than 15% Rx power change within 1 hour. Then notify Shift Radiochemist of the change to plant load and to sample RCS per STP-746 (SR 3.4.16.2)	Attachment 1 is on page 31
	BOP	(step 2) Reduce turbine load at desired rate in OPERATOR AUTO	
	RO	(step 3) Maintain Tavg within 5F of Tref (step 3.1) If AUTO rod control desired for rapid load reduction, THEN verify control rods in AUTO (step 3.2) If required then initiate a manual boration. (step 3.3) Maintain Delta I within limits of the COLR (step 3.4) If load rejection is great enough. Check proper operation of the Steam Dumps.	Control rods should not be withdrawn with Tavg/Tref mismatch greater than 3F. When temp mismatch is 3F or less then rods can be withdrawn for a maximum of 3 step per withdrawal. A boration of 1Gallon per MW rejected will limit control rod insertion and assist in maintaining Delta I.
	BOP	(step 4) Control RCS/Secondary parameters (step 4.1) Check SG Narrow range levels trending to or maintained at ~65% (step 4.2) Check PZR level trending to or maintained on program. (step 4.3) Check PZR pressure maintained approximately 2235psig	

Op Test No.: FA2014301 Scenario # 5 Event # 3 Page 14 of 40Event Description: **SG Tube leak increases to 160 GPD**

	RO	(step 5) Check parameters within limits for continued operation <ul style="list-style-type: none"> - PZR Level > 15% - PZR Press > 2100 psig - SGNR Level 35%-75% - Tavg 541F-580F - FE2 Clear - Delta I w/in limits of COLR 	
	RO	(step 6) When power reduction completed then restore Tavg to the programmed values (step 7) Check Loss of Load Interlock C-7A not illuminated (step 8) check plant stable. (step 9) Check that power reduction was < 15% in an hour. If greater than 15% within 1 hour then notify Shift Radiochemist to sample RCS per STP-746. (step 10) Refer to SOP-72.0 for DEH Console Operations (Step 11) Go to procedure and step in effect.	
The next event (BATP fails to start in Auto) will occur when crew attempts boration.			

Op Test No.: FA2014301 Scenario # 5 Event # 4 Page 15 of 40
 Event Description: **BATP fails to start in AUTO**

Indications Available

Annunciators:	Recognize BATP fails to auto start during
- BA FLOW DEV HI-LO (DK2)	- Auto Makeup
	- Boration

Note to Examiner:

Failure may become apparent during Boration required for ramp down or during auto makeup. If auto makeup fails to occur operators may respond using DK2 response procedure.
 Operators may choose to swap the on service BATP due to the failure.
 Operator actions for boration are in SOP-2.3 Appendix B (This page)
 Operator actions for Auto makeup are in SOP-2.3 Figure 7 (Page 16)
 Operator actions for DK2 (Page 17)
 Operator actions for BATP swap are in SOP-2.3 section 4.6 (Page 18)

SOP-2.3, CVCS Reactor Makeup Control System, v60.1 Appendix B (BORATION)

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 1.1) If necessary set the boric acid integrator to the desired quantity	
	RO	(step 1.2) If necessary adjust LTDN to VCT FLOW LK 112 setpoint as desired	
	RO	(step 1.3) Position MKUP MODE CONT switch to STOP (step 1.4) Position the MKUP MODE SEL SWITCH to BOR (step 1.5) Position the MKUP MODE CONT SWITCH to START	
	RO	(step 1.6) Verify proper boration operation by observing the following: - On service boric acid pump started - FCV-113B opens - FCV-113A opens - FI-113 displays boric acid flow	The on service boric acid pump will fail to start in auto. The operator should manually start the 1A or 1B BATP per SOP-0.8.
When makeup is restored or at the discretion of the Lead Examiner move to the next event			

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Event Description: BATP fails to start in AUTO

SOP-2.3, CVCS Reactor Makeup Control System, v60.1 Figure 7 (Auto Makeup)

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 1) Verify FI-113 boric acid flow agrees with the Reactivity Briefing Sheet or the demand on the pot for FK-113 to prevent a boric acid deviation alarm	FI-113 will indicate zero flow Operator may initiate flow by starting the 1A or 1B BATP
	RO	(step 2) For a Boric Acid Deviation Alarm refer to DK2 (step 3) Verify FI-168 indicates approximately 120 gpm (step 4) If desired to manually secure the makeup at any time during the makeup, place the MKUP MODE CONT SWITCH to STOP (step 5) Monitor VCT level, Tavg, SUR, and Control Rod motion to verify proper reactivity changes. (step 6) Following makeup if 1B RMW pump is running and not required then secure the 1B RMW pump (Step 7) Refer to SOP-2.3 when time permits	
When makeup is restored or at the discretion of the Lead Examiner move to the next event			

Op Test No.: FA2014301 Scenario # 5 Event # 4 Page 17 of 40

Event Description: BATP fails to start in AUTO

**ARP-1.4, Main Control Board Annunciator Panel D, v54.2
DK2**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 1) Take manual control of makeup in accordance with SOP-2.3 and monitor VCT Tank Level OR perform step 2 (step 2) If the cause of the alarm is known and the makeup system is in automatic control then it is permissible to open FCV-114A and FCV-113B to complete the desired makeup	Actions for VCT high level not required
	RO	(step 3) Determine the cause of the alarm (step 4) Notify appropriate personnel (step 5) Return the makeup system to automatic as soon as possible	
When makeup is restored or at the discretion of the Lead Examiner move to the next event			

Op Test No.: FA2014301 Scenario # 5 Event # 4 Page 18 of 40
 Event Description: **BATP fails to start in AUTO**

**SOP-2.3, CVCS Reactor Makeup Control System, v60.1
 Section 4.6 (Align for Auto Make Up)**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 4.6.1) Determine the RCS Boron Concentration by sample or estimation	
	RO	(step 4.6.2) Verify the following - Verify FK-113 is in manual and potentiometer set for RCS boron concentration - (STEP 4.6.2.1/2) IV FK-113 (step 4.6.3) FK-168 controller in Auto	
	RO	(step 4.6.4) Position MKUP MODE CONT SWITCH to STOP (step 4.6.5) Verify FCV-113B closed in Auto (step 4.6.6) Verify FCV-113A closed in Auto (step 4.6.7) Verify FCV-114A closed in Auto (step 4.6.8) Verify FCV-114B closed in Auto	
	RO	(step 4.6.9) Verify 1A and 1B BATP secure with the on service BATP handswitch in AUTO	Since the 1A BATP failed to start in auto the 1B BATP should be placed on service and aligned to automatic
	RO	(step 4.6.10) Verify 1A or 1B RMW pump is supplying the makeup system (step 4.6.11/12) Secure running RMW pumps that are not required by placing hand switch in stop and back to auto	
	RO	(step 4.6.13) Place MKUP MODE SEL switch to AUTO (step 4.6.14) Position the MKUP MODE CONT SWITCH to START	
When makeup is restored or at the discretion of the Lead Examiner move to the next event			

Op Test No.: FA2014301 Scenario # 5 Event # 7 Page 19 of 40

Event Description: 1A Spray Valve Drifts Open

Indications Available:

Annunciators:

- PRZR PRESS HI-LO (HC1)
- PRZR HI-LO PRESS ALERT (HC2)
- PRZR PRESS REL VLV 445A OR B/U HTRS ON (HD1)

Recognize indications of A spray valve drifting open in manual

- PK-444C at 100% demand
- 1A Spray valve open
- RCS pressure falling

Note to Examiner

Operators should trip the plant due to a stuck open spray valve. The turbine will require a manual trip. This series of events may result in an automatic Safety Injection.

Procedural guidance will direct operators to transition to FRP-H.1, Response to Loss of Secondary Heat Sink. The transition to FRP-H.1 will initiate the next event.

AOP-100, Instrumentation Malfunction, v13, section 1.1

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Directs AOP-100 section 1.1 immediate actions to be performed	
	RO	(step 1) Take manual control to raise RCS pressure: <ul style="list-style-type: none"> • PORVs PCV444B • Sprays PK-444C & D • Heaters 1A, 1B, 1C, 1D, 1E • PK-444A PRZR PRESS REFERENCE controller 	Immediate Operator Action
	RO	(step 2) IF pressurizer pressure is decreasing due to a mechanically stuck open spray valve PCV444C or PCV444D, THEN perform the following: <ul style="list-style-type: none"> • IF the reactor trip breakers are closed, THEN trip the reactor prior to pressure reaching 2100 PSIG. • WHEN the reactor is tripped, THEN go to EEP-0, REACTOR TRIP OR SAFETY INJECTION. 	Immediate Operator Action 1A Spray Valve will not close. Operators should trip the RX prior to reaching 2100 PSIG (EEP-0 Actions on next page)
	BOP	WHEN the reactor is tripped, THEN verify 1A and 1B RCPs secured.	BOP will verify the reactor is tripped and then secure 1A and 1B RCPs

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Event Description: 1A Spray Valve Drifts Open

EEP-0, Reactor Trip or Safety Injection, v45			
Time	Pos.	Expected Actions/Behavior	Comments
	SRO	Reactor trip Direct the reactor trip and enter EEP-0.	
	RO/ BOP	Immediate Operator actions of EEP-0 (step 1) Check reactor trip. (step 2) Check Turbine Trip (step 2 RNO) Perform the following (step 2.1 RNO) Place emergency trip switch to trip for at least 5 seconds (step 2.2 RNO) If turbine cannot be tripped then reduce GV position demand to zero -TURBINE MANUAL depressed - GV CLOSE depressed - FAST ACTION depressed (step 3) Verify power to 4160V ESF Busses	CRITICAL TASK Manually Trip the Turbine before an Orange path challenge develops to the subcriticality or integrity CSF or before transition to ECP-2.1
	RO/ BOP	(step 4) Check SI Status. (step 4.1) Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION <input type="checkbox"/> ACTUATED status light lit <input type="checkbox"/> MLB-1 1-1 lit <input type="checkbox"/> MLB-1 11-1 lit (step 4.1 RNO) Check SI Required (step 4.1.1 RNO) If any SI setpoint is reached then SI is required. (step 4.1.2 RNO) If SI is required then actuate SI (step 4.1.3 RNO) If SI is not required then go to ESP-0.1 Reactor Trip Response	If SI is actuated then the operators should continue with EEP-0.0. If SI is not actuated the operators should transition out of EEP-0 and recognize entry conditions for FRP-H.1 (Next Event, Page 22)
	SRO	(step 5) Directs the BOP to perform Attachment 2 of EEP-0.	Attachment 2 and 4 actions are on Page 31
	RO	(step 6) Check containment pressure- HAS REMAINED LESS THAN 27 psig (checked on IPC or PI950, 951, 952, 953,CNMT PRESSURE)	[CA] step
	RO	(step 7) Announce "Unit 1 reactor trip and safety injection".	

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Event Description: 1A Spray Valve Drifts Open

Enter EEP-0, Reactor Trip or Safety Injection, v45 (CONT)

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 8) Check AFW status. Check secondary heat sink Available <ul style="list-style-type: none"> ○ Check total AFW flow > 395 gpm □ FI 3229A □ FI 3229B □ FI 3229C ○ Total Flow FI 3229 OR Check any SG NR level > 31% {48%} (step 8 RNO) <ul style="list-style-type: none"> • Verify all available AFW pumps are started • Verify total AFW flow is greater than 395 gpm • If AFW flow < 395 gpm and All SG narrow range levels less than or equal to 31% then go to FRP-H.1 	The operators should recognize FRP-H.1 entry conditions and transition to FRP-H.1 (See Page 22).
Transition to FRP-H.1 will initiate the next event			

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Event Description: FRP-H.1 with SGFP or Condensate Pump Recovery

FRP-H.1 , Response to Loss of Secondary Heat Sink, v27

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	(step 1) Check secondary heat sink - REQUIRED. <ul style="list-style-type: none"> Check RCS pressure > any non-faulted SG pressure on PT-402/403 Check RCS hot leg temperatures > 350°F on TR 413 	
	SRO	(step 2) Directs monitoring of bleed and feed criteria <ul style="list-style-type: none"> Check at least two SG wide range levels GREATER THAN 12% {31%}. Check pressurizer pressure < 2335 psig 	
	SRO	(step 3) Direct I&C to defeat feedwater isolation signal by installing jumpers per ATTACHMENT 1.	NOTE: Calls I&C
	BOP	(step 4) Check CST level > 5.3 feet and call for makeup to CST as required	
	BOP	(step 5) Try to establish AFW flow to at least one SG. (step 5.1) Verifies blowdown isolated from all SGs 1A(1B,1C) SGBD ISO <ul style="list-style-type: none"> Q1G24HV7614A closed Q1G24HV7614B closed Q1G24HV7614C closed (step 5.2) Verifies SG blowdown sample valves isolated <ul style="list-style-type: none"> MLB4 6-4 lit MLB4 7-4 lit MLB4 8-4 lit (step 5.3) Recognizes AFW pumps not available and attempt to start from HSP. AFW pumps will not start from any location.	NOTE: [CA] Step

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Event Description: FRP-H.1 with SGFP or Condensate Pump Recovery

FRP-H.1 , Response to Loss of Secondary Heat Sink, v27 (CONT)			
Time	Pos.	Expected Actions/Behavior	Comments
		(step 5.4) Verify at least one flow path to at least one SG ALIGNED Checks OPEN MDAFP to 1A/B/C SG (where x = respective SG A, B or C) - HV3227x MDAFW TO SG MOD - HIC3227xA MDAFW FCVs adjusted - HV3228x TDAFW to SG MOD - HIC3228xA TDAFW FCVs adjusted - MOV-3350x AFW STOP vlv OPEN - MOV3764x MDAFW to SG OPEN	
		(step 5.5) [CA] Check total AFW flow to SGs greater than 395 gpm. WHEN any feed flow established AND at least one SG narrow range level greater than 31%{48%} THEN go to procedure and step in effect	Continue efforts to establish AFW flow.
	RO	(step 6) Stops all RCPs	
	SRO	(step 7) Try to establish main feedwater flow to intact SGs with one SGFP. (step 7.1) Verify at least one CNDS Pump Started with backup (step 7.1.1) Verify backup cooling aligned to condensate pumps per SOP-21.0 (step 7.2) Check intact SGs main steam line isolation valves – OPEN (step 7.3) Check all intact SG pressure greater than 540 psig (step 7.4) Check Condenser Available (step 7.5) Verify EH pump running (step 7.6) Verify SGFP lube oil available (step 7.7) Verify all Main Feed and Bypasses closed (step 7.8) If SI not actuated then reset FW Isolation. (step 7.9) Check FWI signal defeated per attachment 1 (step 7.10) Verify Phase A CTMT ISO Reset	IF MSIVs are closed SGFPs will not be available and operators should restore flow to SGs with condensate pumps. (STEP 9)

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Event Description: FRP-H.1 with SGFP or Condensate Pump Recovery

	RO	<p>(step 7.11) Verify SW TO TURB BLDG ISO open or throttled. V515, V516, V517, V514, V540, V542, V543, V541</p> <p>(step 7.12) Verify SGFP speed control manually adjusted to 0%</p> <p>(step 7.13) Latch SGFP turbine</p> <p>(step 7.14) Open SGFP Low Press Stop Valve</p> <p>(step 7.15) Open SGFP High Press Stop Valve</p> <p>(step 7.16) Raise SGFP to minimum speed Increase speed depressed until Boiler control light illuminated.</p> <p>(step 7.17) Open SGFP discharge valve -V503A or V503B</p> <p>(step 7.18) Verify all intact SGs main feedwater stop valves open. -MOV 3232A, MOV-3232B, MOV-3232C</p> <p>(step 7.19) Place SGFP speed controller in AUTO. -SK-509B, SK-509C</p> <p>(step 7.20) Adjust master speed controller to raise feedwater discharge header pressure to 50 psi greater than steam header pressure using PI 464A and PI 508.</p> <p>(step 7.21) Control Feedwater regulating bypass valves to supply main feedwater to intact SGs</p> <p>(step 7.22) When P-12 light lit then: Block Low Steam Line Pressure SI Verify Blocked indication on BYP and Permissive panel</p> <p>(step 8) Check S/G Levels</p> <p>(step 8.1) Verify feed flow to at least one SG</p> <p>(8.1 RNO) go to step 9</p> <p>(step 8.2) check at least 1 SG greater than 31% {48%}.</p> <p>(step 9) Try to establish condensate flow to intact SGs.</p> <p>9.1 IF SI has NOT actuated since reactor trip, THEN reset FW ISO. RNO 9.1 Verify SI RESET.</p> <p><input type="checkbox"/> MLB-1 1-1 not lit</p> <p><input type="checkbox"/> MLB-1 11-1 not lit</p>	<p><u>Critical Task</u> Establish feedwater flow to at least one S/G before RCS feed and bleed is required.</p> <p>IF restoration of SG feed with a SGFP is unsuccessful or impossible then Step 8.1 RNO directs the crew to step 9 for Condensate pump recovery.</p>
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Event Description: FRP-H.1 with SGFP or Condensate Pump Recovery

FRP-H.1 , Response to Loss of Secondary Heat Sink, v27 (CONT)			
Time	Pos.	Expected Actions/Behavior	Comments
NOTE: Step 9.8, Pressurizer pressure reduction, should be performed in conjunction with steps 9.2 through 9.7.			
	BOP	(step 9.2) Check feedwater isolation signal to intact SGs main feedwater regulating bypass valves defeated per ATTACHMENT 1.	
	BOP	(step 9.3) Verify all main feedwater flow control and bypass valves - CLOSED IN MANUAL. 1A(1B,1C) SG FW FLOW <ul style="list-style-type: none"> • FK 478 • FK 488 • FK 498 1A(1B,1C) SG FW BYP FLOW <ul style="list-style-type: none"> • FK 479 • FK 489 • FK 499 	
	BOP	(step 9.4) Verify backup cooling aligned to condensate pumps per FNP-1-SOP-21.0.	
	BOP	(step 9.5) Locally open SGFP BYP N1N21V509. (155 ft, TURB BLDG) (step 9.6) Locally isolate SGFP miniflow valves. (155 ft, TURB BLDG) SGFP 1A(1B) RECIRC FCV INLET ISO <ul style="list-style-type: none"> • N1N21V502A closed • N1N21V502B closed 	

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Event Description: FRP-H.1 with SGFP or Condensate Pump Recovery

FRP-H.1 , Response to Loss of Secondary Heat Sink, v27 (CONT)			
Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 9.7) Perform the following. 9.7.1 Dispatch personnel to 1V 600 V MCC. 9.7.2 Place handswitch for main feedwater stop valves to intact SGs to OPEN and hold in that position. <ul style="list-style-type: none"> 1A(1B,1C) SG STOP VLV Q1N21MOV 3232A 3232B 3232C 9.7.3 WHEN main feedwater stop valves to intact SGs open, THEN direct personnel to open associated breakers. <ul style="list-style-type: none"> FV-K2 FV-K3 FV-L2 	
	BOP	(step 9.7.4) WHEN associated breaker open, THEN allow main feedwater stop valve handswitch to spring return.	
	RO	(step 9.8) Reduce PRZR pressure to less than 1950 psig. 9.8.1 Check either condition for using auxiliary spray satisfied. <ul style="list-style-type: none"> Normal letdown in service. OR <ul style="list-style-type: none"> No PRZR PORV available. 	RNO 9.8.1 Perform the following. If normal letdown secured and THEN open only one PRZR PORV to reduce PRZR pressure to less than 1950 psig. AND Proceed to step 9.9.
	RO	(step 9.8.2) Manually open both normal pressurizer spray valves. 1A(1B) LOOP SPRAY VLV <ul style="list-style-type: none"> PK 444C PK 444D 	

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Event Description: FRP-H.1 with SGFP or Condensate Pump Recovery

FRP-H.1 , Response to Loss of Secondary Heat Sink, v27 (CONT)			
Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 9.8.3) Open auxiliary spray valve. RCS PRZR AUX SPRAY <ul style="list-style-type: none"> Q1E21HV8145 open 	
	RO	(step 9.8.4) Verify flow path aligned CHG FLOW <ul style="list-style-type: none"> FK 122 manually open CHG PUMPS TO REGENERATIVE HX <ul style="list-style-type: none"> Q1E21MOV8107 open Q1E21MOV8108 open RCS NORMAL CHG LINE <ul style="list-style-type: none"> Q1E21HV8146 closed RCS ALT CHG LINE <ul style="list-style-type: none"> Q1E21HV8147 closed 	
	RO	(step 9.8.5) Operate the following valves as required to reduce PRZR pressure to less than 1950 psig. CHG FLOW <ul style="list-style-type: none"> FK 122 manually open 1A(1B) LOOP SPRAY VLV <ul style="list-style-type: none"> PK 444C manually open/closed PK 444D manually open/closed RCS PRZR AUX SPRAY <ul style="list-style-type: none"> Q1E21HV8145 open/closed RCS NORMAL CHG LINE <ul style="list-style-type: none"> Q1E21HV8146 open/closed RCS ALT CHG LINE <ul style="list-style-type: none"> Q1E21HV8147 open/closed 	
	RO	(step 9.9) Maintain PRZR pressure at 1900-1950 psig.	

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Event Description: FRP-H.1 with SGFP or Condensate Pump Recovery

FRP-H.1 , Response to Loss of Secondary Heat Sink, v27 (CONT)			
Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 9.9.1) IF using auxiliary spray, THEN operate the following valves as required to control PRZR pressure. CHG FLOW <ul style="list-style-type: none"> FK 122 manually open 1A(1B) LOOP SPRAY VLV <ul style="list-style-type: none"> PK 444C manually open/closed PK 444D manually open/closed RCS PRZR AUX SPRAY <ul style="list-style-type: none"> Q1E21HV8145 open/closed RCS NORMAL CHG LINE <ul style="list-style-type: none"> Q1E21HV8146 open/closed RCS ALT CHG LINE <ul style="list-style-type: none"> Q1E21HV8147 open/closed 	RNO 9.9.1 IF using a PRZR PORV, THEN open only one PRZR PORV to control PRZR pressure.
	RO	(step 9.10) WHEN pressurizer pressure less than 2000 psig, THEN perform the following. 9.10.1 Block low pressurizer pressure SI. PRZR PRESS SI BLOCK - RESET <ul style="list-style-type: none"> A TRN to BLOCK B TRN to BLOCK 9.10.2 Verify blocked indication. BYP & PERMISSIVE PRZR. SAFETY INJECTION	
		(step 9.11) WHEN P-12 light lit (543F), THEN perform the following. 9.11.1 Block low steam line pressure SI. STM LINE PRESS SI BLOCK - RESET <ul style="list-style-type: none"> A TRN to BLOCK B TRN to BLOCK 9.11.2 Verify blocked indication. BYP & PERMISSIVE STM LINE ISOL. SAFETY INJ. <ul style="list-style-type: none"> TRAIN A BLOCKED light lit TRAIN B BLOCKED light lit 9.11.3 Bypass the steam dump interlock. STM DUMP INTERLOCK <ul style="list-style-type: none"> A TRN to BYP INTLK B TRN to BYP INTLK 	

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Event Description: FRP-H.1 with SGFP or Condensate Pump Recovery

FRP-H.1 , Response to Loss of Secondary Heat Sink, v27 (CONT)			
Time	Pos.	Expected Actions/Behavior	Comments
		(step 9.12) IF condenser available, THEN dump steam to condenser from intact SGs at maximum attainable rate.	RNO 9.12 Dump steam to atmosphere. 9.12.1 Direct counting room to perform FNP-0-CCP-645, MAIN STEAM ABNORMAL ENVIRONMENTAL RELEASE. RNO 9.12.2 IF normal air available, THEN control atmospheric relief valves to dump steam from at least one intact SG at maximum attainable rate. 1A(1B,1C) MS ATMOS REL VLV <input type="checkbox"/> PC 3371A adjusted <input type="checkbox"/> PC 3371B adjusted <input type="checkbox"/> PC 3371C adjusted
		(step 9.13) WHEN SG(s) pressure reduced to less than 540 psig, THEN stop pressure reduction.	
		(step 9.14) Maintain SG(s) pressure - STABLE AT EXISTING VALUE.	
		(step 9.15) Verify at least one CNDS PUMP - STARTED.	
		(step 9.16) Check SGFP BYP N1N21V509 - OPEN. (155 ft, TURB BLDG)	
		(step 9.17) Initially open feedwater regulating bypass valves just off the closed seat to initiate flow and minimize any water hammer. FW BYP FLOW FK <ul style="list-style-type: none"> • 479 adjusted • 489 adjusted • 499 adjusted 	

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Event Description: **FRP-H.1 with SGFP or Condensate Pump Recovery**

FRP-H.1 , Response to Loss of Secondary Heat Sink, v27 (CONT)			
Time	Pos.	Expected Actions/Behavior	Comments
		(step 9.18) Control feedwater regulating bypass valves to supply main feedwater to at least one intact SG.	
		(step 10) Check SG levels. 10.1 Verify feed flow to at least one SG. <ul style="list-style-type: none"> • Check SG wide range level - RISING. OR Check core exit T/C temperature - FALLING.	
		(step 10.2) Check at least one SG narrow range level - GREATER THAN 31%{48%}.	10.2 Continue feeding SGs to restore at least one SG narrow range level greater than 31%{48%}.
Terminate scenario when FRP-H.1 is exited or at the discretion of the Lead Examiner.			

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Event Description: **Attachment 1 of AOP-17.1**

AOP-17.1, Rapid Turbine Power Reduction Attachment 1			
Time	Pos.	Expected Actions/Behavior	Comments
	SRO	<p>(Step 1) Address any OFF Normal conditions that could adversely effect stable plant operation during the load reduction.</p> <p>(step 2) Contact appropriate authority of load reduction.</p> <ul style="list-style-type: none"> • ACC • SYSTAT <p>(step 3) Prior to going below 65% power, verify the HP steam supply valve is open to the SGFP which is to remain in operation.</p> <ul style="list-style-type: none"> • V501A • V501B 	
	BOP	<p>(step 4) <u>WHEN</u> power level is reduced to approximately 60% or less, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> • Remove a main Teed pump from operation per FNP-1 -SOP-21 .0, CONDENSATE <u>AND</u> FEEDWATER SYSTEM. • <u>WHEN</u> SW TO CW CANAL LCV Q1P16V560 is no longer able to maintain normal canal level , <u>THEN</u> transfer Circulating Water make up control valve Q1P16V560 to REMOTE MANUAL per FNP-1 -SOP-26.0, CIRCULATING WATER SYSTEM. • <u>WHEN</u> Q1P16V560 Circ Water make up control valve i s in REMOTE MANUAL and adjusted to minimum, <u>THEN</u> it may be necessary to control canal level manually using N1P16V748. 	

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Event Description: Attachment 1 of AOP-17.1

	BOP	<p>(step 5) WHEN reactor power is reduced below 35%, <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> • Place the control switches for the SGFP mini flows to the open position. • Stop all but one condensate pump. • if desired, <u>THEN</u> secure one circulating water pump per FNP-1 -SOP- 26.0, CIRCULATING WATER SYSTEM. • If required, <u>THEN</u> at the local control station/panel, cooling tower fans may be stopped as necessary. • Reference FNP-1 -ARP-1 .10 ann KK2 and monitor condenser pressure. An automatic turbine trip occurs at 4.351 psia.(8.9 in Hga) • Check that the permissive light for LO TURB IMPULSE PRESS AMSAC TRIP BLOCKED illuminates. • Verify that the turbine trip reactor trip is blocked as indicated by the P9 bistable status lights are not being illuminated. (TSLB3 lights 9.1 through 9.4; 3/4 coincidence required) 	
	BOP	<p>(step 6) WHEN reactor power is reduced below 30%, <u>THEN</u> verify that the single loop loss of flow reactor trip is blocked as indicated by the Low Power Low Flow Trip Block permissive status light being illuminated.</p>	
	BOP	<p>(step 7) As power level approaches 20%, perform the following:</p> <ul style="list-style-type: none"> • Monitor steam generator level, TAVG, pressurizer level and pressure. • Verify proper operation of automatic control systems. • Verify automatic Turbine Drain valve opening below approximately 170 MW. 	
	BOP	<p>(step 8) Ensure 1A, 18 and 1C 4160V busses aligned to the startup transformers per FNP-1-SOP-36.2, 4160 V AC ELECTRICAL DISTRIBUTION SYSTEM</p>	

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Event Description: **Attachment 1 of AOP-17.1**

	BOP	(step 9) If the main generator is tied to the grid, <u>THEN</u> perform the following: <ul style="list-style-type: none">• Notify ACC the generator is ready for unloading.• <u>WHEN</u> ACC gives permission to remove the generator from the grid, <u>THEN</u> begin ramping generator load down to approximately 40 MW per FNP-1-SOP-28.1, TURBINE GENERATOR OPERATION.	
	RO	Prior to reducing reactor power below 13%, check the status of the intermediate range trip bistable lights TSLB 3 2.1(2.2).	

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Event Description: 1A Spray Valve Drifts Open

EEP-0.0, Reactor Trip or Safety Injection, v45 Attachment 2			
Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(Step 1) Verify one CHG PUMP in each train - STARTED. <input type="checkbox"/> A train (1A or 1B) amps > 0 <input type="checkbox"/> B train (1C or 1B) amps > 0	
	BOP	(Step 2) Verify RHR PUMPS - STARTED. RHR PUMP <input type="checkbox"/> 1A amps > 0 <input type="checkbox"/> 1B amps > 0	
	BOP	(Step 3) Verify Safety Injection Flow. (Step 3.1) Check HHSI flow - GREATER THAN 0 gpm. <input type="checkbox"/> FI 943	
	BOP	(Step 3.2) Check RCS pressure - LESS THAN 275 psig{435 psig}.	
	BOP	(step 3.3) Check LHSI flow – greater than 1.5×10^3 gpm <input type="checkbox"/> 1A RHR HDR FLOW FI-605A <input type="checkbox"/> 1B RHR HDR FLOW FI-605B	
	BOP	(Step 4) Verify each SW train - HAS TWO SW PUMPS STARTED. <input type="checkbox"/> A train (1A,1B or 1C) <input type="checkbox"/> B train (1D,1E or 1C)	
	BOP	(Step 5) Verify each train of CCW - STARTED. (Step 5.1) Verify one CCW PUMP in each train-STARTED. A train HX 1C or 1B CCW FLOW <input type="checkbox"/> FI 3043CA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW <input type="checkbox"/> FI 3043AA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX <input type="checkbox"/> Q1P16FI3009AA > 0 gpm <input type="checkbox"/> Q1P16FI3009BA > 0 gpm <input type="checkbox"/> Q1P16FI3009CA > 0 gpm	

Op Test No.: FA2014301 Scenario # 5 Event # 8 Page 35 of 40

Event Description: 1A Spray Valve Drifts Open

EEP-0.0, Reactor Trip or Safety Injection, v45
Attachment 2

Time	Pos.	Expected Actions/Behavior	Comments
		(Step 5.3) Check instrument air available. Verify at least one air compressor started. AIR COMPRESSOR <input type="checkbox"/> 1A <input type="checkbox"/> 1B <input type="checkbox"/> 1C Check INST AIR PRESS PI 4004B greater than 85 psig.	
	BOP	(step 6) Verify containment ventilation isolation. Verify containment purge dampers - CLOSED. <input type="checkbox"/> 3197 <input type="checkbox"/> 3198D <input type="checkbox"/> 3198C <input type="checkbox"/> 3196 <input type="checkbox"/> 3198A <input type="checkbox"/> 3198B Verify containment mini purge dampers - CLOSED. CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D <input type="checkbox"/> 2866C <input type="checkbox"/> 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C <input type="checkbox"/> 2866D <input type="checkbox"/> 2867D Stop MINI PURGE SUPP/EXH FAN.	

Op Test No.: FA2014301 Scenario # 5 Event # 8 Page 36 of 40

Event Description: 1A Spray Valve Drifts Open

EEP-0.0, Reactor Trip or Safety Injection, v45 Attachment 2																											
Time	Pos.	Expected Actions/Behavior	Comments																								
	BOP	<p>(step 7) Verify containment fan cooler alignment. Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED.</p> <p><u>CTMT CLR FAN SLOW SPEED</u> A train <input type="checkbox"/> 1A <input type="checkbox"/> 1B B train <input type="checkbox"/> 1C <input type="checkbox"/> 1D Verify associated emergency service water outlet valves - OPEN. EMERG SW FROM 1A(1B,1C,1D) CTMT CLR <input type="checkbox"/> Q1P16MOV3024A <input type="checkbox"/> Q1P16MOV3024B <input type="checkbox"/> Q1P16MOV3024C <input type="checkbox"/> Q1P16MOV3024D</p>																									
	BOP	<p>(step 8) Verify AFW Pumps - STARTED. Verify both MDAFW Pumps - STARTED <input type="checkbox"/> 1A MDAFW Pump amps > 0 <input type="checkbox"/> 1B MDAFW Pump amps > 0 AND <input type="checkbox"/> FI-3229A indicates > 0 gpm <input type="checkbox"/> FI-3229B indicates > 0 gpm <input type="checkbox"/> FI-3229C indicates > 0 gpm</p>																									
		<p>(Step 8.2) Check TDAFW Pump start required.</p> <table> <tr> <th>Condition</th><th>TSLB</th><th>Setpoint</th><th>Coincidence</th></tr> <tr> <td>RCP Bus Undervoltage</td><td>TSLB2 1-1</td><td>2680 V</td><td>1/2 Detectors on 2/3 Busses</td></tr> <tr> <td>Low Low SG Water Level</td><td>TSLB4</td><td>28%</td><td>2/3 Detectors on 2/3 SGs</td></tr> <tr> <td>In Any</td><td>4-1,4-2,4-3</td><td></td><td></td></tr> <tr> <td>2/3 SGs</td><td>5-1,5-2,5-3</td><td></td><td></td></tr> <tr> <td></td><td>6-1,6-2,6-3</td><td></td><td></td></tr> </table>	Condition	TSLB	Setpoint	Coincidence	RCP Bus Undervoltage	TSLB2 1-1	2680 V	1/2 Detectors on 2/3 Busses	Low Low SG Water Level	TSLB4	28%	2/3 Detectors on 2/3 SGs	In Any	4-1,4-2,4-3			2/3 SGs	5-1,5-2,5-3				6-1,6-2,6-3			
Condition	TSLB	Setpoint	Coincidence																								
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Op Test No.: FA2014301 Scenario # 5 Event # 8 Page 37 of 40

Event Description: 1A Spray Valve Drifts Open

EEP-0.0, Reactor Trip or Safety Injection, v45
Attachment 2

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 8.3) Verify TDAFWP started. <input type="checkbox"/> MLB-4 1-3 lit <input type="checkbox"/> MLB-4 2-3 lit <input type="checkbox"/> MLB-4 3-3 lit TDAFWP SPEED <input type="checkbox"/> SI 3411A > 3900 rpm TDAFWP SPEED CONT <input type="checkbox"/> SIC 3405 adjusted to 100% Verify TDAFW flow path to each SG. TDAFWP TO 1A(1B,1C) SG <input type="checkbox"/> Q1N23HV3228A in MOD <input type="checkbox"/> Q1N23HV3228B in MOD <input type="checkbox"/> Q1N23HV3228C in MOD TDAFWP TO 1A(1B,1C) SG FLOW CONT <input type="checkbox"/> HIC 3228AA open <input type="checkbox"/> HIC 3228BA open <input type="checkbox"/> HIC 3228CA open	
	BOP	(step 9) Verify main feedwater status. Verify main feedwater flow control and bypass valves - CLOSED. 1A(1B,1C) SG FW FLOW <input type="checkbox"/> FCV 478 <input type="checkbox"/> FCV 488 <input type="checkbox"/> FCV 498 Verify both SGFPs - TRIPPED. Verify SG blowdown - ISOLATED. 1A(1B,1C) SGBD ISO <input type="checkbox"/> Q1G24HV7614A closed <input type="checkbox"/> Q1G24HV7614B closed <input type="checkbox"/> Q1G24HV7614C closed 9.4 Verify SG blowdown sample - ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE STEAM GEN ISO <input type="checkbox"/> MLB1 19-2 lit Q1P15HV3328 closed <input type="checkbox"/> MLB1 19-3 lit Q1P15HV3329 closed <input type="checkbox"/> MLB1 19-4 lit Q1P15HV3330 closed	

Op Test No.: FA2014301 Scenario # 5 Event # 8 Page 38 of 40
 Event Description: **1A Spray Valve Drifts Open**

EEP-0.0, Reactor Trip or Safety Injection, v45 Attachment 2																							
Time	Pos.	Expected Actions/Behavior	Comments																				
	BOP	(Step 10) Check no MSL isolation actuation signal present. <table> <tr> <td>Signal</td><td>Setpoint</td><td>coincidence</td><td>TSLB</td></tr> <tr> <td>LO SG PRESS</td><td>< 585 psig</td><td>2/3</td><td>TSLB4 19-2,3,4</td></tr> <tr> <td>Hi stm flow</td><td>>40%</td><td>1/2 on 2/3</td><td>TSLB4 16-3,4</td></tr> <tr> <td>and</td><td>and</td><td></td><td>17-3,4 18-3,4</td></tr> <tr> <td>Lo-Lo Tavg</td><td><543°F</td><td>2/3</td><td>TSLB2 10-1,2,3</td></tr> </table> HI-HI ctmt press >16.2 psig 2/3 TSLB1 2-2,3,4	Signal	Setpoint	coincidence	TSLB	LO SG PRESS	< 585 psig	2/3	TSLB4 19-2,3,4	Hi stm flow	>40%	1/2 on 2/3	TSLB4 16-3,4	and	and		17-3,4 18-3,4	Lo-Lo Tavg	<543°F	2/3	TSLB2 10-1,2,3	
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and	and		17-3,4 18-3,4																				
Lo-Lo Tavg	<543°F	2/3	TSLB2 10-1,2,3																				
	BOP	(Step 11) Verify PHASE A CTMT ISO. (Step 11.1) Verify PHASE A CTMT ISO - ACTUATED. <input type="checkbox"/> MLB-2 1-1 lit <input type="checkbox"/> MLB-2 11-1 lit 11.2 Check all MLB-2 lights - LIT.	RNO Step 11.2 Verify PHASE A CTMT ISO alignment using ATTACH 3, PHASE A CTMT ISO																				
	BOP	(step 12) Check all reactor trip and reactor trip bypass breakers – OPEN Reactor trip breaker A Reactor trip breaker B Reactor trip bypass breaker A Reactor trip bypass breaker B																					
	BOP	(step 13) Trip CRDM MG set supply breakers. 1A(1B) MG SET SUPP BKR <input type="checkbox"/> N1C11E005A <input type="checkbox"/> N1C11E005B																					
	BOP	(step 14) Secure secondary components. Stop both heater drain pumps. HDP <input type="checkbox"/> 1A <input type="checkbox"/> 1B Check any condensate pump started. IF started, THEN stop all but one condensate pump. <input type="checkbox"/> 1A <input type="checkbox"/> 1B If NO condensate pumps are started then place all HSs to STOP (step 14.3) IF condensate pump operating, THEN verify backup cooling aligned to condensate pumps per FNP-0-SOP-0.0, APPENDIX B, TB SO Actions Following A Reactor Trip Or Safety Injection.	Will call TBSO to accomplish this.																				

Op Test No.: FA2014301 Scenario # 5 Event # 8 Page 39 of 40Event Description: **1A Spray Valve Drifts Open**

**EEP-0.0, Reactor Trip or Safety Injection, v45
Attachment 2**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 15) Verify both CRACS mode selector switches in the ON position. CRACS Mode Selector Switch <input type="checkbox"/> A TRAIN <input type="checkbox"/> B TRAIN Will call BOOTH to have this accomplished since this is not in the simulator	
	BOP	(step 16) WHEN at least 30 seconds have passed since turbine trip, THEN check main generator tripped. 230 KV BKR <input type="checkbox"/> 810 - OPEN <input type="checkbox"/> 914 - OPEN	
	BOP	(step 17) Verify two trains of ECCS equipment aligned. Perform ATTACHMENT 4, Two Train ECCS Alignment Verification. (See Next Page)	
End of Attachment 2			

Op Test No.: FA2014301 Scenario # 5 Event # 8 Page 40 of 40

Event Description: 1A Spray Valve Drifts Open

EEP-0.0, Reactor Trip or Safety Injection, v45
Attachment 4

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<p>(Step 1) Verify two trains of ECCS equipment aligned.</p> <p><input type="checkbox"/> Check DF01 closed</p> <p><input type="checkbox"/> Verify DF02 closed</p> <p><input type="checkbox"/> Check DG15 closed</p> <p><input type="checkbox"/> Verify DG02 closed</p> <p><input type="checkbox"/> Verify two trains of battery chargers – energized Amps > 0</p> <p>(Step 1.6) Verify two trains of ESF equipment aligned.</p> <p><input type="checkbox"/> Check all MLB-1 lights LIT</p> <p>Verify charging pump suction and discharge valves - OPEN.</p> <p>CHG PUMP DISCH HDR ISO</p> <p><input type="checkbox"/> Q1E21MOV8132A</p> <p><input type="checkbox"/> Q1E21MOV8132B</p> <p><input type="checkbox"/> Q1E21MOV8133A</p> <p><input type="checkbox"/> Q1E21MOV8133B</p> <p>CHG PUMP SUCTION HDR ISO</p> <p><input type="checkbox"/> Q1E21MOV8130A</p> <p><input type="checkbox"/> Q1E21MOV8130B</p> <p><input type="checkbox"/> Q1E21MOV8131A</p> <p><input type="checkbox"/> Q1E21MOV8131B</p>	
	BOP	<p>(Step 1.7) Verify all post accident containment air mixing system fans - STARTED. (BOP)</p> <p>POST ACCIDENT MIXING FAN</p> <p><input type="checkbox"/> 1A <input type="checkbox"/> 1B <input type="checkbox"/> 1C <input type="checkbox"/> 1D</p> <p>RX CAV H2 DILUTION FAN</p> <p><input type="checkbox"/> 1A <input type="checkbox"/> 1B</p> <p>(Step 1.8) WHEN power restored to any de-energized emergency bus, THEN verify alignment of associated equipment.</p>	
	BOP	(Step 1.9) Verify SFP Cooling in service per SOP-54.0, Spent Fuel Pit Cooling And Purification System.	Call Radside SO
End of Attachment 4			

Op-Test No.: FA2014301

Page 1 of 2

Brief

This simulator performance scenario is performed in the EVALUATION MODE. You should not direct questions to the evaluators. Otherwise, you should perform as if you were in the MCR.

Your ability to maintain a log is not being graded, but maintaining a rough log is recommended to help during briefs.

If you need to communicate with the Unit 2 operator, call Unit 2 at 2434 or page the Unit 2 Unit Operator.

Respond to what you see. If there is a problem with the simulation, the session will be terminated or adjusted as appropriate based on the specific problem.

Assign operating positions.

Ask for and answer questions.

[X] Unit 1 [] Unit 2

Shift:

Date

Off-going SS	Oncoming SS	[] N [X] D	Today
--------------	-------------	---------------	-------

Part I – To be reviewed by the oncoming Supervisor prior to assuming the shift.

Security Keys A, S, D, SW, X on key ring . SS

Unit 95% power, 894 ppm Cb, MOL 10000 MWD/MTU
Status

TARGET ZERO

Every Day, Every Job Safely

STPs/Evolutions:

A Train On-Service – B Train
Protected

1.0 ____; 109.1 ____ No adj.; 63.7 ____; FSP-20,0 ____;

Status of Special Testing

General Information

- Shift is responding to a 7 gpd SG Tube Leak. AOP-2.0 in progress at step 16.1
- 1A MDAFW Pump is tagged out for bearing replacement
- Thunderstorm warnings in effect for Southeast Alabama and Western Georgia
- Current Risk Assessment is **GREEN** and projected is **GREEN**
- Unit 2 is at 100% power with no major issues.
- Maintain current power level for SG Tube Leakage Evaluation
-
-
-

Equipment Status

	Maintain VCT gas pressure 25-30 psig

Reactivity Plan

Waste Management Status

50 gallon dilutions every ten minutes	#3 RHT – On Service
	WGS – secured

LCO Status

3.7.5 Condition B (1A MDAFW Pump)	

Night Orders

No New Night Orders

Part II Review Shift Complement
 LCOs Reviewed SS (initials) reviewed as early in shift as possible

Part III:	STP-1.0 Reviewed/Signed [X] Yes	Operator Logs Reviewed [X] Yes	Cond. Report Queue Reviewed [X] Yes	Autolog Reviewed [X] Yes	ELDS & GEN Spreadsheet verified [X] Yes	Keys Turned Over [X] Yes
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Unit One Reactivity Briefing Sheet

RCS Temp **570.0 °F**
 RX PWR **95.0 %**
 Current Xenon Concentration **2277 PCM**

Burnup **10000 MWD/MTU**
 As of (Date & Time) **10/2/2013 1:00**
 Calculated Burnup **24148 MWD/MTU**
 As Of **9/23/14 1205**

Assumes constant power since
 Last Power history update

RCS Boron **894 PPM**
 BAT Concentration **7436 PPM**

Current Bank
 Delta Rod Position: **216 Steps**

Rod Worth Steps Out

One	10 PCM
Two	20 PCM
Five	45 PCM
Ten	69 PCM
Twenty	*
Fifty	*

Steps In

One	-13 PCM
Two	-26 PCM
Five	-67 PCM
Ten	-145 PCM
Twenty	-309 PCM
Fifty	-691 PCM

RCS Blended Flow Makeup Requirements

Acid to Borate 1 PPM (Gal.)	RMW to dilute 1 PPM (Gal.)	Required Acid flow Rate (GPM)	FK-113 Pot Setting
7.7 Gal.	55.5 Gal.	14.6 GPM	3.64
7.6 Gal.	55.5 Gal.	14.4 GPM	3.60

Values for Normal Auto M/U (Bat-100 ppm boron)
 Values based on Actual Bat Concentration

Current RCS Borations / Dilutions:

Borate	Dilute
0 Gal.	50 Gal.

Reactivity Additions: **0.00** **7.07 PCM**
 Total Reactivity Addition: **7.07 PCM**
 Net RCS Temperature Effect: **0.37 °F**
 Net Rx Power Effect: **0.28 %**

Boron Worth **-8.67 PCM/PPM**
 Power Defect **2,381 PCM**
 MTC **-18.86 PCM/°F**

Boric Acid Required for Power reduction
 With no Control rod movement

DeltaPower	Power Defect (PCM)	Delta PPM	Acid Required (Gallons)
1.00%	23	2.65	20
2.00%	47	5.29	40
5.00%	117	13.23	101
10.00%	233	26.47	201
20.00%	466	52.94	404
25.00%	583	66.17	505
50.00%	1,182	134.24	1030
75.00%	1,848	209.90	1620
100.00%	N/A	N/A	N/A

a/o w/o
 RCS B-10 ratio **17.98** **16.6**
 BAT B-10 ratio **20.1** **18.6**
 NDR B-10 ratio **19.8** **18.3**

Valid For Unit One cycle 2.

Core Physics Curves:

Curve 5 Rev 29
 Curve 27 Rev 28
 Curve 34 Rev 46
 Curve 57 Rev 35
 Curve 57A Rev 25

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Southern Nuclear J.M. Farley Nuclear Plant

Operations Training Simulator Exam Scenario

BOOTH INSTRUCTOR GUIDE





ILT-37 NRC EXAM SCENARIO #5

Validation time: 90 minutes Validated by: Sorrell, Smith, Jackson			
TRN Supervisor Approval:	Billy Thornton	Date:	9/24/14
NRC Chief Examiner	SEE NUREG 1021 FORM ES-301-3		

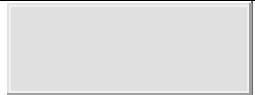

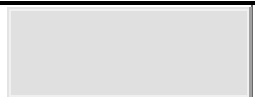
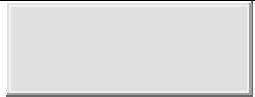










Facility:	Farley Nuclear Plant	Scenario No.:	5	Op-Test No.:	FA2014-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
Initial Conditions: 95% power, AOP-2 step 16.1. MOL, 894 ppm Cb;					
Turnover:					
<ul style="list-style-type: none"> Current Risk Assessment is GREEN and projected to remain GREEN. A Train O/S, B Train protected. 1A MDAFW pump tagged out for bearing replacement. 7 gpd tube leak. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia. Maintain current power level for SG Tube Leakage evaluation 					
SPLIT TRAIN ALIGNMENT					
Event No.	Malf. No.	Event Type*	Event Description		
1		N (BOP)	Adjust R-70 setpoint		
2	Imf pt476	I (BOP) TS (SRO)	PT-476 fails low (P-CT) TS 3.3.2 Cond D		
3	Imf pk444a-a	C (RO)	PK-444A fails low. (P-CT)		
4	Imf sgs508 7a_cc3	C BOP	Main Generator Seal oil pressure decreases due to air side seal oil pump trip and regulator malfunction – automatic actions are blocked		
5	Irf loa-rds001	R (RO) TS (SRO)	Tube leak increases to 160GPD, ramp unit offline TS 3.4.13 Cond B		
6	Preset	C (RO)	Selected BAT pump will not Auto start during Auto makeup or borations		
7	Imf pk444c-m	M (ALL) C (BOP)	“A” loop spray valve drifts open in manual control Reactor is tripped due to stuck open spray valve Main Turbine will not trip automatically or manually. GV closure is required (CT-13) 1B MDAFW will not auto start and cannot be started After start TDAFW pump speed slows to idle speed		
8			Restore feed water in FRP H.1 (CT-43)		
			Terminate on exit of FRP H.1		



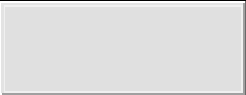
(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	Load in IC-215 and sim IC snap directory 894 ppm Cb Base IC is IC-59	
		RUN	
0	0	Generic setup: bat generic_setup_HLT.txt	
0	0	Quick setup (all items with * are included): bat ILT37_5.txt	
PRESETS			
0		Tag 1A MDAFW pump irf cafp01a_d_cc1 open	*
0		Insert Initial Tube Leak in A SG lrf loa-rds001 7 5	*
4		Prevents selected BAT pump from working in AUTO lmf ccvp005a_cc2 open	*
5		Simulates back up seal oil regulator malfunction Set ctga26 = 117.0	*
5		Prevents Air Side DC seal oil pump auto start lmf cgs5085_cc10 open	*
7		Prevents auto closure of all MSIV's imf crsh001a_cc5 open imf cmsh002a_d_cc5 open imf crsh001b_cc5 open imf cmsh002b_d_cc5 open imf crsh001c_cc5 open imf cmsh002c_d_cc5 open	*
7		Prevent AUTO trip of main turbine MALF / T / MAL-TUR2	*
7		Prevent MANUAL trip of main turbine MALF / T / MAL-TUR24	*
7		Prevent start of B MDAFW Pump lmf cafp01b_d_cc18 open	*
Triggers and Commands			
7		Trigger 1 monitors for TDAFW Pump Start Trgset 1 "x21o135o" Trg 1 "imf sic3405-o 4 20"	TRG 1

EXAM**MCB setup**

	Place Unit 1 Bypass and inoperable panel lights to the up position (Auxiliary Feed water System)	Unit 1 A-Train
	Place HOLD Tag on 1A MDAFW pump H/S	1 HOLD TAG
	DEH	Clear DEH alarms
	Select OPS GROUP on MCB monitor Acknowledge computer alarms	IPC
	IPC: IF FF5 is in alarm, update rods	Ensure FF5 clear or update rods on IPC
	Setup spreadsheet on OATC computer to resemble reactivity spreadsheet provided	<u>Set up computer</u>
	Clear Recorders Cae clearrecorders.cae	
	Provide a marked up copy of AOP-2.0 completed through step 16.1 ready to perform step 16.2	<u>AOP-2.0 copy</u>
	Place Simulator in Freeze	
	Perform Booth Operators Setup Checklist	
	Open Simview file to be used for plant parameter data collection: Simview / sv DataCollection.uvl	
	If needed, adjust sim time back to 00:00:00 SIMVIEW / Sim_Clock.uvl Hours: clock(3) = 0 Minutes: clock(2) = 0 Seconds: clock(1) = 0	
	VERIFY MICROPHONES READY	Batteries installed
	TURNOVER SHEET AVAILABLE	

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
Prior to RUN			
		Start data collection for Simview file On DataCollection.uvl file press DATA for drop down and then COLLECT to start collecting data	
		Begin Exam RUN simulator	
		Verify Horns ON: hornflag <u>HORNS ON = TRUE</u> 	
1	Start of exam	Adjust R-70 Setpoint	
2	NRC CUE	PT-476 Fails LOW XMT / PT476 / 0 / 1	
3	NRC CUE	PK-444A fails LOW CNH / PK444A-D / 10 / 1	
4	NRC CUE	Air Side Seal Oil Pump Trips CMFmalf / sGS5087A_cc3 / closed	
5	NRC CUE	Tube Leak increases to 160 GPD Remote / LOA-RDS001 / 160 / 300	
6	NRC CUE	Selected BAT Pump will not AUTO Start during makeup or borations	Pre-set
7	NRC CUE	"A" loop spray valve drifts open in manual control CNH / PK444C-M / 10 / 30 Reactor is tripped due to stuck open spray valve	

		Main Turbine will not trip automatically or manually. GV closure is required (CT-13) 1B MDAFW will not auto start and cannot be started After start TDAFW pump speed slows to idle speed	
8	Preset	Restore feed water in FRP H.1 (CT-43)	
		Terminate on Exit of FRP-H.1	
		End of Exam HORNS OFF	
		FREEZE simulator	
		Stop data collection for Simview file sv DataCollection.uvl	
		Export data to file with the name of exam2014sen5grpX.txt NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate. NOTE: file will be saved in the OPENSIM directory.	Ensure data file created.
		When Control board data no longer needed Then Clear recorders for exam security	


Local operator actions:

<u>EVENT NO.</u>	<u>TIME</u>	<u>ACTIONS</u>
1	NONE REQUIRED	
2	NONE REQUIRED	
3	NONE REQUIRED	
4	NONE REQUIRED	
5	NONE REQUIRED	
6	NONE REQUIRED	
7	NONE REQUIRED	
8	NONE REQUIRED	Install Jumpers

Communications sheet

<u>EVENT NO.</u>	<u>TIME</u>	<u>Communication:</u>
ALL	AS REQUIRED (Standard communications to inform supervision)	<u>SSS, SM and Dispatcher:</u> Repeat back failure, procedure entered, plant status, CR in the cue and that type of communications.
1	WHEN REQUESTED	<u>SSS, SM:</u> Called to request a status tag for R-70A. <ul style="list-style-type: none"> I will create a status tag for R-70A <u>Chemistry:</u> Called to request samples <ul style="list-style-type: none"> Repeat back any request for sampling
2	NONE EXPECTED	<u>SM:</u> Called to request permission to return FRVs and SGFP speed control to AUTO. <ul style="list-style-type: none"> You have permission to return FRVs and SGFP speed control to AUTO.
3	NONE EXPECTED	
5	WHEN REQUESTED	<u>CHEMISTRY:</u> Called to perform sampling: Repeat back any request for sampling <ul style="list-style-type: none"> I will determine leak rate using CCP-31 I will perform grab samples and leak rate determination per CCP-201 and CCP-31 I will perform STP-746 <u>Rad Side SO:</u> Called to complete securing SGBD per SOP-16.1. After 5 minutes report the following <ul style="list-style-type: none"> SGBD is secured.

Communications sheet

<u>EVENT NO.</u>	<u>TIME</u>	<u>Communication:</u>
4	IF REQUESTED	<p><u>Turbine SO:</u></p> <p>Called to check air side seal oil pump and seal oil system: After 3 Minutes report the following</p> <ul style="list-style-type: none"> • IF AIR SIDE DC SOP NOT RUNNING REPORT: <ul style="list-style-type: none"> ○ Air side SOP has burnt acrid odor. ○ Air side seal oil DP is reading 0 psid. ○ It appears the backup seal oil regulator is partially open. • IF AIR SIDE DC SOP IS RUNNING REPORT: <ul style="list-style-type: none"> ○ Air side SOP has burnt acrid odor ○ Air side seal oil DP is reading 12 psid. <p> TRUE = RUNNING, FALSE = NOT RUNNING</p>
6	NONE EXPECTED	
7	If Requested	<p><u>Rover:</u></p> <p>Called to check on the 1B MDAFWP and TDAFWP: After 3 minutes report the following:</p> <ul style="list-style-type: none"> • 1B MDAFWP's supply breaker is tripped • TDAFWP operation appears normal but is running at reduced speed. <p>IF Directed to attempt to start the 1B MDAFWP and/or TDAFWP from the HSDP then after 3 min:</p> <ul style="list-style-type: none"> • Go to HSDP and place 1B MDAFW in local (this should result in annunciator alarm). • Report that the 1B MDAFWP and TDAFWP failed to start from the HSDP.

Communications sheet

<u>EVENT NO.</u>	<u>TIME</u>	<u>Communication:</u>
8	IF REQUESTED	<p><u>SSS, SM:</u> Called to have jumpers installed per attachment 1 of FRP-H.1. I will contact I & C for Jumper installation per attachment 1. After 5 minutes report the following:</p> <ul style="list-style-type: none"> Jumpers have been installed per attachment 1 of FRP-H.1. <p>Called to have Make-up aligned to CST.</p> <ul style="list-style-type: none"> I will verify Make-up aligned to the CST <p>Called to look at running TDAFW pump locally</p> <ul style="list-style-type: none"> I will look at the procedures and make preparations for running the TDAFW pump locally. <p>Called to perform step 5.3 RNO of FRP-H.1 After 5 minutes PERFORM STEP 5.3 RNO on Simulator for the 1B MDAFW pump and Report:</p> <ul style="list-style-type: none"> I have attempted to perform step 5.3 RNO of FRP-H.1 and the 1B MDAFW pump will not Start. <p><u>ROVER:</u> Called to Investigate 1B MDAFW & TDAFW Pumps. After 5 minutes report the following:</p> <ul style="list-style-type: none"> 1B MDAFW pump breaker appears fine and the closing spring is charged. 1B MDAFW pump appears normal TDAFW pump appears normal except it is only running at 2000 RPM. <p><u>Turbine SO:</u> Called to align back-up cooling to the CNDS Pumps. After 5 minutes report the following.</p> <ul style="list-style-type: none"> Back-up cooling has been aligned to the CNDS Pumps.