

Facility:	Farley Nuclear Plant	Scenario No.:	2	Op-Test No.:	FA2013-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
<p>Initial Conditions: 4% power, UOP-1.2, v103.1, completed thru step 5.62. Ready to perform step 5.63. MOL, 1350 ppm Cb; 1A SGFP on service. Aux steam from U-2.</p> <p>Turnover:</p> <ul style="list-style-type: none"> 1A 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. 					
SPLIT TRAIN ALIGNMENT					
Event No.	Malf. No.	Event Type*	Event Description		
1		R (RO)	Ramp up to 12% power.		
2	imf pk145-a	I (RO)	PK-145 fails high in automatic, letdown pressure controller failure causes PCV-145 to close.		
3	Imf SK509B-A	I (BOP)	1A SGFP controller failure. SGFP speed will decrease to 3200 rpm until control of SGFP is regained.		
4	Imf Ncvp01 c-b	C (RO) TS (SRO)	1C charging pump sheared shaft. T.S. 3.5.2 Condition A (mandatory until 1B charging pump swapped to opposite train) TRM 13.1.5 admin		
5		N (BOP)	Place letdown on service		
6	Imf cncpsw 1b_d_c o1 preset	C (BOP) TS (SRO)	1B SW pump trips on overcurrent. When the 1C SW pump is started, MOV-515 closes. AOP-7.0 will be entered to open MOV-515. T.S. 3.7.8 Condition A and 3.8.1 Condition B		
7	Mal- rcs4A / preset	M (ALL) C (RO)	1A SGTR 300 gpm ramped in over 5 minutes. Block auto SI. Initiate a SI manually (CT)		
8	preset	C (BOP) C (RO)	Block all AFW pumps from auto starting on SI signal 1A ARV FAILS OPEN during EEP-0 (CT)		
			Terminate in EEP-3.0 when RCS cooldown (CT) is complete.		

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

Event No.		Malfunction	* means in Bat file
9		Fail auto SI signals, Manual SI works CMFmalf / csftyinj_cc1 / open CMFmalf / csftyinj_cc11 / open	*
9		Prevent TDAFWP auto start CMFmalf / cMS3235B-cc1 / open CMFmalf / cms3235b_cc2 / open CMFmalf / cms3235a_cc1 / open CMFmalf / cms3235a_cc2 / open	*
9		Prevent MDAFWP auto start CMFmalf / Cafp01a_cr7 CMFmalf / Cafp01b_cr7	*
6		Indicate high flow condition in SW header imf af5 (2 5) failon 0	TRG 2
8		3371A ARV fails open 8 minutes after SI initiated imf pk3371A-A (1 480) 10 3	TRG 1
		Triggers and Commands	
8		CNH / 3371A-A Auto output failure high triggered on manual SI Trigger: jpplrtsi(1) > 0	*
3		Trigger 2: when 1c SW pump is started indicate high flow and mov-515 closure trgset 2 "nncpsw1c > 0" Trigger 3: Remove malfunction TRG 2 to allow reopening of MOV-515 trgset 3 "mncv515 == 0" trg 3 "dmf cncv515_cc7" Trigger 4: Close mov-515 on simulated high flow condition trgset 4 "xnmae06f" trg 4 " imf cncv515_cc7 closed" Trigger 5 turn off AF5 simulated flow spike trgset 5 "mncv515 < 0.98" trg 5 "imf af5 failoff"	*

Initial Conditions: 4% power, UOP-1.2, v103.1, completed thru step 5.62, Ready to perform step 5.63. MOL, 1350 ppm Cb; 1A SGFP on service. Aux steam from U-2.

Turnover:

- 1A 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, and adjusts MFW flow to the SGs (Bypass FRVs on service).

Event 2 PK-145, letdown pressure controller, fails high.

Verifiable actions: Take manual control of PK-145 and restore pressure or remove letdown from service.

Event 3 1A SGFP controller failure. SGFP speed will decrease to 3200 rpm until control of SGFP is regained.

Verifiable actions: Manual control of SGFP and Bypass FRVs to control SGWL.

Event 4 1C Charging pump shaft will shear. This will cause a loss of charging flow with the pump running. Letdown will be secured and restoration of letdown will be required. **TS 3.5.2 condition A and TRM 13.1.5 admin (mandatory while swapping the 1B Chg pump to B Train)**

Verifiable actions: Secure letdown, secure the running Chg pump and start one Chg pump.

Event 5 Place letdown back on service per AOP-16.0.

Event 6 1B Service Water pump trips on over current. When 1C service water pump is started, MOV-515 goes closed. **LCO 3.7.8 Condition A and 3.8.1 Condition B** (LOSF with ECCS failure above)

Verifiable Actions: start the SW pump and open MOV-515.

Event 7 1A SGTR 300 gpm ramped in over 5 minutes.

The AUTO SI is blocked. Verifiable actions: Initiate a manual SI **(CT)**

Event 8 No AFW pumps start. Verifiable actions: Start one AFW pump to prevent the intact SGs from losing SGWL and for cooldown inventory.

1A ARV fails open after the SI occurs. Verifiable actions: Isolate SG's (ARV closed and MSIV closed; and AFW, when started) **(CT)**

Terminate in EEP-3.0 when RCS cooldown **(CT)** is complete at step 6.6.

UOP-1.2/ ARP/ AOP-100/AOP-16/AOP-10/AOP-7/E-0/E-3

CRITICAL TASK SHEET

- ___ 1. Manually actuate at least one train of SIS-actuated safeguards before any of the following: (WOG CT E-0 - - D)
- Transition to any E-3 series procedure
- ___ 2. Isolate feed flow and steam from ruptured SG in EEP-3.0 before a transition to ECP-3.1 occurs. (WOG CT E-3 - - A)
- Close or isolate 1A ARV
 - Isolate AFW flow to the ruptured SG when >31%
 - At least one MSIV closed on 1A SG
- ___ 3. Establish/maintain an RCS temperature so that transition from E-3 does not occur because the RCS temperature is in either of the following conditions. (WOG CT E-3 - - B)
- Too high to maintain [minimum required subcooling]
 - Below [the RCS temperature that causes an extreme (red-path) or a severe (orange-path) challenge to the subcriticality and/or the integrity CSF]

**SCENARIO
OBJECTIVE/
OVERVIEW:**

Low power instrument and component failures with a SGTR.

The team should be able to:

- ramp the plant from 4% to 12 % power,
- respond to several instrument failures that affect the SW system,
- respond to a charging pump malfunction,
- respond to a SGFP controller failure and PK-145 malfunction,
- diagnose a SGTR,
- The crew will have to start AFW pumps when E-0 is entered, and discover and close a failed open ARV on the ruptured SG.
- Termination of the event will be when the crew completes the RCS cooldown.

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)	3
3.	Abnormal events (2–4)	4
4.	Major transients (1–2)	1
5.	EOPs entered/requiring substantive actions (1–2)	1
6.	EOP contingencies requiring substantive actions (0–2)	0
7.	Critical tasks (2–3)	3

Southern Nuclear J.M. Farley Nuclear Plant

Operations Training Simulator Exam Scenario

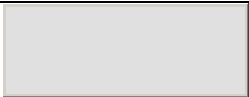

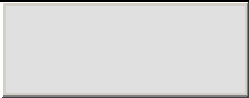
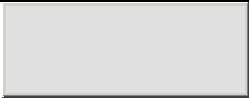
BOOTH INSTRUCTOR GUIDE

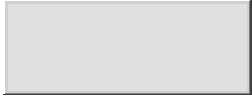

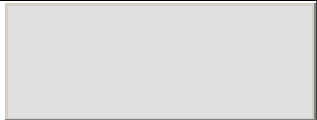
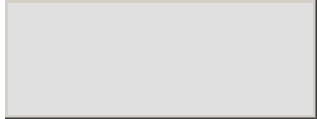
ILT-36 NRC EXAM SCENARIO #2

Validation time: 120 minutes Validated by McCaffery, Sorrell, Phillips The week of February 18, 2013			
TRN Supervisor Approval:	Gary Ohmstede	Date:	2/28/13
NRC Chief Examiner	SEE NUREG 1021 FORM ES-301-3		



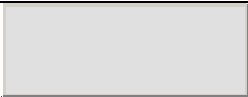
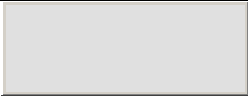
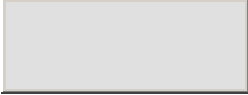

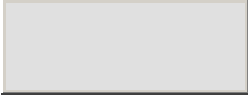
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Examiners:		Operators:		SRO	
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SPLIT TRAIN ALIGNMENT					
Event No.	Malf. No.	Event Type*	Event Description		
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2	imf pk145-a	I (RO)	PK-145 fails high in automatic, letdown pressure controller failure causes PCV-145 to close.		
3	Imf SK509B -A	I (BOP)	1A SGFP controller failure. SGFP speed will decrease to 3200 rpm until control of SGFP is regained.		
4	Imf Ncvp0 1c-b	C (RO) TS (SRO)	1C charging pump sheared shaft. T.S. 3.5.2 Condition A (mandatory until 1B charging pump swapped to opposite train) TRM 13.1.5 admin		
5		N (BOP)	Place letdown on service		
6	Imf cncps w1b_d _co1 preset	C (BOP) TS (SRO)	1B SW pump trips on overcurrent. When the 1C SW pump is started, MOV-515 closes. AOP-7.0 will be entered to open MOV-515. T.S. 3.7.8 Condition A and 3.8.1 Condition B		
7	Mal- rcs4A / preset	M (ALL) C (RO)	1A SGTR 300 gpm ramped in over 5 minutes. Block auto SI. Initiate a SI manually (CT)		
8	preset	C (BOP) C (RO)	Block all AFW pumps from auto starting on SI signal 1A ARV FAILS OPEN during EEP-0 (CT)		
			Terminate in EEP-3.0 when RCS cooldown (CT) is complete.		

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

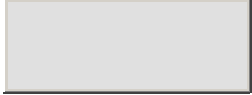

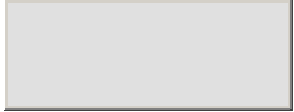

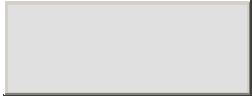
EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	Load in IC-212 and sim IC snap directory 1350 ppm Cb; 1A SGFP on service. Aux steam from U-2 Base IC is IC-33	
		RUN	 RUN simulator
0	0	Generic setup: bat 36exam/generic_setup_HLT.txt	
		Quick setup is in IC-212	
0	0	Quick setup (all items with * are included): bat 36exam/2013nrcexam_2.txt	
		PRESETS	
9		Fail auto SI signals, Manual SI works CMFmalf / csftyinj_cc1 / open CMFmalf / csftyinj_cc11 / open	*
9		Prevent TDAFWP auto start CMFmalf / cMS3235B-cc1 / open CMFmalf / cms3235b_cc2 / open CMFmalf / cms3235a_cc1 / open CMFmalf / cms3235a_cc2 / open	*
9		Prevent MDAFWP auto start CMFmalf / Cafp01a_d_cr7 CMFmalf / Cafp01b_d_cr7	*
6		Indicate high flow condition in SW header imf af5 (2 5) failon 0	TRG 2
8		3371A ARV fails open 8 minutes after SI initiated imf pk3371A-A (1 480) 10 3	TRG 1
		Triggers and Commands	
8		CNH / 3371A-A Auto output failure high triggered on manual SI Trigger: jpplrtsi(1) > 0	*
3		Trigger 2: when 1c SW pump is started indicate high flow and mov-515 closure trgset 2 "nncpsw1c > 0" Trigger 3: Remove malfunction TRG 2 to allow reopening of MOV-515 trgset 3 "mncv515 == 0" trg 3 "dmf cncv515_cc7" Trigger 4: Close mov-515 on simulated high flow condition trgset 4 "xnmae06f" trg 4 " imf cncv515_cc7 closed" Trigger 5 turn off AF5 simulated flow spike trgset 5 "mncv515 < 0.98" trg 5 "imf af5 failoff"	*

MCB setup			
		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-1.2 v103.1 completed thru step 5.62, Ready to perform step 5.63.	<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 / sv DataCollection.uvl	 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	 sv sim_clock.uvl
		VERIFY MICROPHONES READY	Batteries installed
		TURNOVER SHEET AVAILABLE	

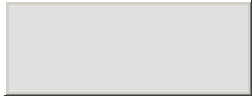
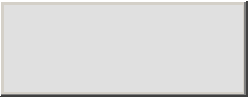
EXAM

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	 RUN simulator
		Verify Horns ON: hornflag  <u>HORNS ON = TRUE</u>	 Turn Horns ON/OFF ann horn
1	Start of exam	Commence Ramp up to 12% power.	
2	NRC CUE	PK-145 fails high in automatic, letdown pressure controller failure causes PCV-145 to close. imf pk145-a 10 30	
3	NRC CUE	1A SGFP controller failure. SGFP speed will decrease to 3200 rpm until control of SGFP is regained. Imf SK509B-A 0 20	
4	NRC CUE	1C charging pump sheared shaft. Imf Ncvp01c-b	
5		Place letdown on service	
6	NRC CUE	1B SW pump trips on overcurrent. Imf cncpsw1b_d_co1 When the 1C SW pump is started, MOV-515 closes. AOP-7.0 will be entered to open MOV-515.	

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
7	NRC CUE	1A SGTR 300 gpm ramped in over 5 minutes. Imf Mal-rs4A 300 600	
8		All AFW pumps will not auto start on SI signal 1A ARV FAILS OPEN	TRG 1
		Terminate in EEP-3.0 when RCS cooldown is complete.  SG overfill variable (SG full when > 0.995)	
		End of Exam	 HORNS OFF
			 FREEZE simulator
		Stop data collection for Simview file sv DataCollection.uvl	
		Export data to file with the name of exam2013sen2grpX.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	IF REQUESTED	Alignment of 1C to auto-start for 1E SW pump will not take place during this exam.
	IF REQUESTED	Report alarms from TURB BLDG MISC alarm panel from panel view and clear alarms with button below.
		Clear TURB BLDG MISC alarm 
		imf kf2 failoff
		Report alarms from SGBD PROC PNL TRBL alarm panel from panel view and clear alarms with button below.
		Clear SGBD PROC PNL TRBL alarm JB5 
		imf jb5 failoff
7	NONE REQUIRED	
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.
1	IF REQUESTED	<u>SSS-plant,</u> Have EM or OPS prepare to close Disconnect 915 per UOP-1.2, step 5.60.7.
2/3	NONE EXPECTED	
4	WHEN REQUESTED	<u>Radside SO:</u> Called to check 1C charging pump, After 3 minutes report the following. <ul style="list-style-type: none"> • the 1C charging pump motor is running • Lube oil temperatures have decreased. • There is no discharge pressure on the local discharge pressure gage. • Making a grinding noise and pump is NOT rotating.
5	NONE EXPECTED	
6	WHEN REQUESTED	<u>SSS / OUTSIDE:</u> "1E SW pump breaker DL-04 has an overcurrent flag. I do not see any obvious problems with pump or motor. Oil levels look good." "1C SW pump appears to be operating normally" <u>TBSO:</u> The 1A TB chiller tripped alarm is in. <u>SSS:</u> "I will coordinate with the Outside SO to align 1C SW pump to auto start for 1B SW pump." (SOP-24.0D checklist)
7	WHEN REQUESTED	<u>SM:</u> "I will make the classifications and notifications." <u>SM / SSS:</u> "I will get an extra operator to secure the running DGs" <u>ANY CALL TO SHIFT CHEMIST:</u> Acknowledge to requirement for sampling.
8	NONE EXPECTED	

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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, and adjusts MFW flow to the SGs (Bypass FRVs on service).

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Verifiable actions: Take manual control of PK-145 and restore pressure or remove letdown from service.

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Verifiable actions: Secure letdown, secure the running Chg pump and start one Chg pump.

Event 5 Place letdown back on service per AOP-16.0.

Event 6 1B Service Water pump trips on over current. When 1C service water pump is started, MOV-515 goes closed. **LCO 3.7.8 Condition A and 3.8.1 Condition B** (LOSF with ECCS failure above)

Verifiable Actions: start the SW pump and open MOV-515.

Event 7 1A SGTR 300 gpm ramped in over 5 minutes.

The AUTO SI is blocked. Verifiable actions: Initiate a manual SI **(CT)**

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Terminate in EEP-3.0 when RCS cooldown **(CT)** is complete at step 6.6.

UOP-1.2/ ARP/ AOP-100/AOP-16/AOP-10/AOP-7/E-0/E-3

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 - Isolate AFW flow to the ruptured SG when >31%
 - At least one MSIV closed on 1A SG
- ___ 3. Establish/maintain an RCS temperature so that transition from E-3 does not occur because the RCS temperature is in either of the following conditions. (WOG CT E-3 - - B)
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SCENARIO
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Low power instrument and component failures with a SGTR.

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- The crew will have to start AFW pumps when E-0 is entered, and discover and close a failed open ARV on the ruptured SG.
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Event Description: Ramp up to 12% power

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

Indications Available:

Annunciators: NA

Time	Pos.	Expected Actions/Behavior	Comments
UOP-1.2, Startup of Unit from Hot Standby to Minimum Load, version 103.1			
	RO	(step 5.63)Begin to increase reactor power to greater than 12% with following controls. <ul style="list-style-type: none"> Manual adjustment of control rods Steam dumps in Steam Pressure Control Mode 	<u>Manual adjustment of rods</u> (not more than 3 steps at a time) <u>Stm dump control</u> – adjust PK-464 counterclockwise to release more steam, decrease Tavg, pull rods and increase power
	SRO	Monitor reactor power and Steam Dump adjustments as reactor power rises	Examiner NOTE: Diluting is not procedurally <u>required or expected</u> at step 5.63 of UOP-1.2 and as such would not be a part of the reactivity plan
	BOP	Will be reviewing UOP-1.2 and getting ready to roll the main turbine.	

Op Test No.: FA2013301 Scenario # 2 Event # 1 Page 2 of 44

Event Description: Ramp up to 12% power

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(step 5.65) 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>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>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>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>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. 	
	RO	<p>(step 5.65.5) Verify that Low Power Trip Block P-7 status light is not illuminated to ensure the unblocking of the following reactor trips.</p> <ul style="list-style-type: none"> Pressurizer Low Pressure Pressurizer High Water Level Loss of Flow-Two Loops 	
	RO	<p>(step 5.65.6) Verify NR-45B is in the desired speed, i.e., 2nd speed (2 min/div) <u>OR</u> normal speed. (10 min/div)</p>	

Op Test No.: FA2013301 Scenario # 2 Event # 1 Page 3 of 44Event Description: **Ramp up to 12% power**

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	(step 5.65.7) <u>IF</u> not previously performed at Step 5.51, direct qualified OPS personnel to close disconnect switch 915 in accordance with FNP-0-SOP-36.8	
When 8-12% power is reached and at the discretion of the Lead Examiner move to event.			

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Event Description: **PK-145 fails high in automatic, letdown pressure controller failure causes PCV-145 to close**

This controller will fail high slowly. The Letdown relief valve may open and DE3 will come into alarm. If the RO or BOP takes manual control per DE4 and reduces pressure, then letdown will not be secured. Once DE3 comes into alarm, DE3 will direct AOP-16 entered if letdown was lost.

Indications Available:

Annunciators:

- LTDN ORIF ISO VLV REL LINE TEMP HI (DE3)
- LTDN HX OUTLET PRESS HI (DE4)

Comment: The Letdown relief valve lifts to the PRT.

Recognize indications of PK-145 failing:

- Letdown HX outlet pressure (PI-145) increases to 600 psig
- Letdown flow (FI-150) decreases to zero
- Letdown orifice isolation relief line to PRT temperature (TI-141) ↑
- LI-112/115, VCT level, ↓

Time	Pos.	Expected Actions/Behavior	Comments
ARP-1.4, MCB ANNUNCIATOR PANEL D, DE4 version 53.0			
	SRO	Direct entry into DE4.	
	RO	(step 1) Monitor LTDN HX Outlet Flow (FI-150) and LTDN HX Outlet Press (PI-145).	
	RO	(step 2) Ensure proper orifice isolation valve selection.	
	RO	(step 3) <u>IF</u> the high pressure is due to LP LTDN PRESS PK-145 malfunction, <u>THEN</u> place valve controller in manual and attempt to reduce the pressure.	PK-145 placed in manual and controlled manually. (May have been done earlier using Skill of the craft)
	RO	(step 4) IF pressure can NOT be controlled manually with LP LTDN PK-145, THEN close LTDN ORIF ISO 45 (60) GPM Q1E21HV8149A, B, and C.	
	RO	(step 5) IF a ramp is in progress, THEN place turbine load on HOLD.	
	SRO	(step 6) Go to AOP-16.0, CVCS MALFUNCTION to address the loss of letdown flow.	(see next page if AOP-16 is entered)

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Event Description: **PK-145 fails high in automatic, letdown pressure controller failure causes PCV-145 to close****ARP-1.4, MCB ANNUNCIATOR PANEL D, DE3
version 53.0**

	SRO	Direct entry into DE3	If required
	RO	(step 1) Monitor the LTDN ORIF ISO REL line to PRT Temperature (TI-141) and LTDN HX Outlet Press (PI-145).	
	RO	(step 2) If the high temperature is due to LP LTDN press PK-145 malfunctions, THEN place valve controller in manual and adjust as required.	
	RO	IF temperature continues to rise rapidly indicating a lifted relief valve, THEN close LTDN ORIF ISO 45 (60) GPM Q1E21HV8149A, B AND C.	
	RO	(step 4) IF a ramp is in progress, THEN place turbine load on HOLD. (step 5) Direct AOP-16.0, CVCS MALFUNCTION to address the loss of letdown flow, if required.	
Entry into DE3 may or may not require letdown to be isolated			
If letdown is secured then AOP-16 guidance is below:			
AOP-16, CVCS Malfunction, ver 18.0			
	RO	(Step 1) Verify charging flow adequate to cool letdown. RNO – close all LTDN ORIF ISO's □ Q1E21HV8149A □ Q1E21HV8149B □ Q1E21HV8149C	Letdown flow may be secured
	RO	(Step 2) Stop any load change in progress	
	RO	(Step 3) Monitor VCT level to ensure proper level is maintained	

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Event Description: **PK-145 fails high in automatic, letdown pressure controller failure causes PCV-145 to close**

	RO	(Step 4) [CA] Observe CHG HDR PRESS and MOTOR AMPS to ensure proper charging pump operation. □ PI-121 □ AMMETER FOR RUNNING CHG PUMP	
	RO	(Step 5) Check charging pump – RUNNING	
	RO	(Step 6) Check Charging flow FK-122 controlling in AUTO with flow indicate	
	RO	(Step 7) Check DE3 clear	May or may not be clear
	RO	(Step 8) Determine Status of Normal Letdown: Check normal CVCS letdown - AFFECTED BY MALFUNCTION - LTDN HX OUTLET FLOW, FI-150, NO FLOW INDICATED (Step 8.2) Minimize RCS makeup: Manually close charging flow control: CHG FLOW □ FK-122 (Step 8.2.2) Minimize seal injection between 6-13 gpm (Step 8.2.3) Direct Chemistry to shutdown the zinc addition system (ZAS) (Step 8.3) Dispatch personnel to investigate cause of the Letdown malfunction	Letdown will have been removed from service so it will be placed in service. (If letdown is still in service procedure directs you to step [18.1 IF charging is normal, THEN go to procedure and step in effect.])
	RO	(Step 9) Determine if normal letdown should be re-established: Check normal letdown malfunction(s) - CORRECTED	Yes PCV-145 is in manual control

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Event Description: **PK-145 fails high in automatic, letdown pressure controller failure causes PCV-145 to close**

	RO	<u>Restore letdown with the following steps:</u> (Step 9.2) Verify all letdown orifice isolation valves - CLOSED LTDN ORIF ISO 45 GPM <input type="checkbox"/> Q1E21HV8149A LTDN ORIF ISO 60 GPM <input type="checkbox"/> Q1E21HV8149B <input type="checkbox"/> Q1E21HV8149C (Step 9.3) Place LTDN HX OUTLET TEMP TK 144 on service: <input type="checkbox"/> Place controller in AUTO <input type="checkbox"/> Set to maintain temperature 90 to 115°F	
	RO	(Step 9.5) Verify VCT HI LVL DIVERT VLV LCV-115A alignment: <input type="checkbox"/> Position indicator VCT light - LIT <input type="checkbox"/> Handswitch in - AUTO	
	RO	(Step 9.4) Verify LTDN HI TEMP DIVERT VLV Q1E21TCV143: <input type="checkbox"/> DEMIN light - LIT <input type="checkbox"/> Handswitch in - AUTO (Step 9.5) Verify LTDN HI TEMP DIVERT VLV Q1E21TCV143: <input type="checkbox"/> Handswitch in - VCT <input type="checkbox"/> VCT light - LIT <input type="checkbox"/> DEMIN light - NOT LIT (Step 9.6) IF necessary, THEN OPEN both LTDN LINE PENE RM ISO's from the PRIP. <input type="checkbox"/> Q1E21HV8175A <input type="checkbox"/> Q1E21HV8175B	
	RO	(Step 9.7) Verify LTDN LINE CTMT ISO Q1E21HV8152 - OPEN	
	RO	(Step 9.8) Verify LTDN LINE ISO valves - OPEN <input type="checkbox"/> Q1E21LCV459 <input type="checkbox"/> Q1E21LCV460	
	RO	(Step 9.9) Place LP LTDN PRESS PK 145 on service: <input type="checkbox"/> Place controller in MANUAL <input type="checkbox"/> Adjust demand signal to 50% or less	

Op Test No.: FA2013301 Scenario # 2 Event # 2 Page 8 of 44Event Description: **PK-145 fails high in automatic, letdown pressure controller failure causes PCV-145 to close**

	RO	<p>(Step 9.10) Initiate minimum charging flow:</p> <p>(Step 9.10.1) Verify CHG FLOW FK 122 in - MAN</p> <p>(Step 9.10.2) Establish minimum charging flow based on orifices to be placed on service:</p> <p><input type="checkbox"/> 1 Orifice - 18 gpm</p> <p>OR</p> <p><input type="checkbox"/> 2 Orifices - 40 gpm</p> <p>(Step 9.11) Establish approximately 60 gpm letdown flow by OPENING:</p> <p><input type="checkbox"/> Q1E21HV8149B</p> <p>OR</p> <p><input type="checkbox"/> Q1E21HV8149C</p>	
	RO	<p>(Step 9.12) IF desired, THEN place the second orifice on service by OPENING:</p> <p><input type="checkbox"/> Q1E21HV8149A</p>	
	RO	<p>(Step 9.13) Initiate actions to restore letdown flow to the demins per FNP-1-SOP-2.1, CHEMICAL AND VOLUME CONTROL SYSTEM PLANT STARTUP AND OPERATION</p>	
	RO	<p>(Step 9.14) [CA] IF all backup heaters energized due to pressurizer level deviation, THEN verify two sets of backup heaters in ON prior to level deviation clearing.</p> <p>(Step 9.15) Adjust LP LTDN PRESS PK 145 to maintain desired letdown pressure - BETWEEN 260-450 PSIG</p>	

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Event Description: **PK-145 fails high in automatic, letdown pressure controller failure causes PCV-145 to close**

	RO	(Step 9.15.1) Set controller between 4.3 and 7.5 (Step 9.15.2) Check letdown flow – STABLE (Step 9.15.3) Place PK 145 in AUTO (Step 9.15.4) Control Letdown pressure as desired (Step 9.16) Control LTDN HX OUTLET TEMP, TK 144 to maintain LTDN temp 90 to 115°F. <input type="checkbox"/> TI-116 VCT TEMP <input type="checkbox"/> TI-143 DIVERT LTDN HX TEMP <input type="checkbox"/> TI-144 CCW LTDN HX TEMP (Step 9.17) Refer to SOP-2.1, CVCS system PLANT STARTUP AND OPERATION, for further guidance on Letdown system control	NOTE: Cannot complete step 9.15.3, will reintroduce failure
	RO	(step 10) Determine status of letdown flow: Check letdown flow - established	
	RO	(step 10.2) 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	
When PK-145 is in manual control with letdown in service and at the discretion of the Lead Examiner move to the next event.			

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Event Description: 1A SGFP controller failure LOW, speed will decrease to 3200 rpm.

The bypass FRVs open up as the 1A SGFP speed decreases to 3200 rpm. Due to the slow reaction time of the bypass valves if the operator does not take manual control of the SGFP, ALL SGWLs will decrease and a reactor trip will occur at 28%. Also if a long time is taken to increase SGFP speed, the FRV bypass valves will be full open and when the SGFP speed is raised a high flow will result which will cause a transient on the system.

Indications Available:

Annunciators:

- 1A, 1B, 1C SG LVL DEV (JF1, JF2, JF3)

Recognize indications of 1A SGFP controller failing:

- ALL FRV bypasses go open
- 1A SGFP will slow down
- ALL SG levels ↓
- Rx Power ↓
- RCS temp will ↓

Time	Pos.	Expected Actions/Behavior	Comments
AOP-100, Instrumentation Malfunction, ver 12, section 1.4 (AOP-13, ver 30, can be entered as well but it takes longer to take action.)			
	Team	Check that steam and feed flows matched on all SGs	
	BOP	<p>(step 1) Take manual control of SGFP speed by: Place SK 509A or 509B, 1A/B SGFP SPEED CONT, in Manual and raise demand as necessary.</p> <p>Take manual control of all FRV bypass valves</p> <ul style="list-style-type: none"> • 1A SG BYPASS FLOW FK-479 • 1B SG BYPASS FLOW FK-489 • 1C SG BYPASS FLOW FK-499 <p><u>IF</u> a loss of main feedwater occurs, <u>THEN</u> perform the actions required by AOP-13.0, LOSS OF MAIN FEEDWATER</p>	<p>NOTE: Step 1 is an Immediate Operator Action and a continuing action step</p> <p>Bypass valves will need to be closed to prevent a large cooldown on the RCS.</p>
	SRO	<p>(step 2) If adverse trends in the SG level exists then establish trip criteria</p> <p>If an automatic action is required or set points is approached: Trip the reactor and go to EEP-0</p>	NOTE: if the SGFP trips at 82% level then the reactor would be tripped at this point.
	BOP	(step 3) There will not be a ramp in progress since the main turbine is not on line.	

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Event Description: 1A SGFP controller failure LOW, speed will decrease to 3200 rpm.

	BOP	(step 4) Adjust speed back to within the normal operating range for the feed flow/steam flow ΔP required for the existing power level. Since the main turbine is off line, the SGFP speed should be adjusted back to 50 psid.	Determine the instrument failure. The alarm is due to the failure of the controller for 1A SGFP. Check Steam flow and Feed flow indicators.
	BOP	(step 5) Check Steam Dumps in the Tavg mode	NOTE: steam dumps are in STM PRESS mode. RNO control stm dumps in auto or manual as required
	SRO	(step 6) Notify the Shift Manager	
	SRO	(Step 8) Submit a condition report for the failed instrument, and notify the Notify the Work Week Coordinator	
At the discretion of the Lead Examiner move to Event			

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Event Description: 1C charging pump sheared shaft / Restore Letdown

1C Charging pump will experience a shaft shear. Due to the alignment of charging, this pump will be secured and a pump in the other train will be started.

Indications Available:**Annunciators:**

- CHG HDR FLOW HI-LO (EA2)
- RCP SEAL INJ FLOW LO (DD1)
- LTDN ORIF ISO VLV REL LINE TEMP HI (DE3)

Recognize indications of sheared shaft

- FI-122A decreasing to 0 gpm
- 1C Chg pump amps decrease to 52 amps
- SI flow decreases to 0 gpm on all 3 RCPs
- VCT level will ↓
- Przr level will ↓ slowly
- FK-122 demand will go to approx. 0
- LK-459F will ↑ slowly

Time	Pos.	Expected Actions/Behavior	Comments
AOP-16, CVCS Malfunction, ver 18.0			
		EA2 will direct the crew to AOP-16.0	
	SRO	Determine a charging system malfunction is occurring and direct entry into AOP-16.	
	RO	<ul style="list-style-type: none"> - Monitor VCT level - Observe CHG HDR PRESS and MOTOR AMPS to ensure proper charging pump operation - PI-121 and ammeter for chg pump - Actual amps will be lower than normal 	
	RO	(Step 1) Verify charging flow adequate to cool letdown. CHG FLOW <input type="checkbox"/> FI-122A LTDN HX OUTLET FLOW <input type="checkbox"/> FI-150 REGEN HX OUTLET TEMP <input type="checkbox"/> TI-140	RNO – close all LTDN ORIF ISO's <input type="checkbox"/> Q1E21HV8149A <input type="checkbox"/> Q1E21HV8149B <input type="checkbox"/> Q1E21HV8149C
	RO	(Step 2) Stop any load change in progress	
	RO	(Step 3) Monitor VCT level to ensure proper level is maintained	

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Event Description: 1C charging pump sheared shaft / Restore Letdown

	RO	(Step 4) [CA] Observe CHG HDR PRESS and MOTOR AMPS to ensure proper charging pump operation. <input type="checkbox"/> PI-121 <input type="checkbox"/> AMMETER FOR RUNNING CHG PUMP	Amps will be lower than normal
	RO	(Step 5) Check charging pump – RUNNING	YES but since the shaft is sheared the answer is NO
		RNO for step 5	
	RO	(step 5) RNO Start an available charging pump as follows: (step 5.1) Check VCT level and pressure adequate. (step 5.2) Verify charging suction flowpath aligned: VCT OUTLET ISO valves <input type="checkbox"/> Q1E21LCV115C - OPEN <input type="checkbox"/> Q1E21LCV115E – OPEN OR RWST TO CHG PUMP valves <input type="checkbox"/> Q1E21LCV115B - OPEN <input type="checkbox"/> Q1E21LCV115D – OPEN (step 5.3) Check auxiliary oil pump running for charging pump to be started as indicated by white light illuminated on MCB.	NOTE: 1C charging pump may be stopped at any time but will not be procedurally directed to be secured.
	RO	(step 5.4) Check open miniflow isolation for charging pump to be started: <ul style="list-style-type: none"> 1A CHG PUMP MINIFLOW ISO, Q1E21MOV8109A 1B CHG PUMP MINIFLOW ISO, Q1E21MOV8109B (step 5.5) Verify CHG PUMP MINIFLOW ISO, Q1E21MOV8106, is open.	

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Event Description: 1C charging pump sheared shaft / Restore Letdown

	RO	(step 5.6) Verify the following are closed: □ CHG FLOW FK 122 □ SEAL WTR INJECTION HIK 186 (step 5.7) Verify a CCW pump is running in same train aligned to supply charging pump to be started.	
	RO	(step 5.8) Start selected charging pump. (step 5.9) Observe CHG HDR PRESS indicator PI 121 and motor ammeter to check proper pump operation. (step 5.10) WHEN charging pump comes up to speed, THEN check auxiliary oil pump stops as indicated by white light NOT being illuminated on MCB.	
	RO	(step 5.11) Adjust SEAL WTR INJECTION HIK 186 to maintain 6-13 gpm seal injection flow to each RCP.	
	RO	(Step 6) Check Charging flow FK-122 controlling in AUTO with flow indicated	RNO 6.1 Place FK-122 in manual and adjust as required to maintain pressurizer level at program level. 6.2 Adjust SEAL WTR INJECTION HIK-186 as required to maintain RCP seal injection flow 6-13 gpm.
	RO	(Step 7) Check DE3 clear	

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Event Description: 1C charging pump sheared shaft / Restore Letdown

	RO	<p>(Step 8) Determine Status of Normal Letdown: Check normal CVCS letdown - AFFECTED BY MALFUNCTION - LTDN HX OUTLET FLOW, FI-150, NO FLOW INDICATED</p> <p>(Step 8.2) Minimize RCS makeup: Manually close charging flow control: CHG FLOW <input type="checkbox"/> FK-122</p> <p>(Step 8.2.2) Minimize seal injection between 6-13 gpm</p> <p>(Step 8.2.3) Direct Chemistry to shutdown the zinc addition system (ZAS)</p> <p>(Step 8.3) Dispatch personnel to investigate cause of the Letdown malfunction</p>	<p>Letdown will have been removed from service so it will be placed in service.</p> <p>NA – this is known</p>
	RO	<p>(Step 9) Determine if normal letdown should be re-established: Check normal letdown malfunction(s) - CORRECTED</p>	
<u>Restore letdown with the following steps:</u>			
	RO	<p>(Step 9.2) Verify all letdown orifice isolation valves - CLOSED LTDN ORIF ISO 45 GPM <input type="checkbox"/> Q1E21HV8149A LTDN ORIF ISO 60 GPM <input type="checkbox"/> Q1E21HV8149B <input type="checkbox"/> Q1E21HV8149C</p> <p>(Step 9.3) Place LTDN HX OUTLET TEMP TK 144 on service: <input type="checkbox"/> Place controller in AUTO <input type="checkbox"/> Set to maintain temperature 90 to 115°F</p>	

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Event Description: 1C charging pump sheared shaft / Restore Letdown

		(Step 9.4) Verify VCT HI LVL DIVERT VLV LCV-115A alignment: <input type="checkbox"/> Position indicator VCT light -LIT <input type="checkbox"/> Handswitch in – AUTO (Step 9.5) Verify LTDN HI TEMP DIVERT VLV Q1E21TCV143: <input type="checkbox"/> Handswitch in - VCT <input type="checkbox"/> VCT light - LIT <input type="checkbox"/> DEMIN light - NOT LIT (Step 9.6) IF necessary, THEN OPEN both LTDN LINE PENE RM ISO's from the PRIP. <input type="checkbox"/> Q1E21HV8175A <input type="checkbox"/> Q1E21HV8175B	
	RO	(Step 9.7) Verify LTDN LINE CTMT ISO Q1E21HV8152 - OPEN	
	RO	(Step 9.8) Verify LTDN LINE ISO valves - OPEN <input type="checkbox"/> Q1E21LCV459 <input type="checkbox"/> Q1E21LCV460 (Step 9.9) Place LP LTDN PRESS PK 145 on service: <input type="checkbox"/> Place controller in MANUAL <input type="checkbox"/> Adjust demand signal to 50% or less	
	RO	(Step 9.10) Initiate minimum charging flow: (Step 9.10.1) Verify CHG FLOW FK 122 in - MAN (Step 9.10.2) Establish minimum charging flow based on orifices to be placed on service: <input type="checkbox"/> 1 Orifice - 18 gpm OR <input type="checkbox"/> 2 Orifices - 40 gpm (Step 9.11) Establish approximately 60 gpm letdown flow by OPENING: <input type="checkbox"/> Q1E21HV8149B OR <input type="checkbox"/> Q1E21HV8149C	Upon restoration of flow, letdown line may be flashed to steam and take time to refill.

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Event Description: 1C charging pump sheared shaft / Restore Letdown

	RO	<p>(Step 9.12) IF desired, THEN place the second orifice on service by OPENING: <input type="checkbox"/> Q1E21HV8149A</p> <p>(Step 9.13) Initiate actions to restore letdown flow to the demins per FNP-1-SOP-2.1, CHEMICAL AND VOLUME CONTROL SYSTEM PLANT STARTUP AND OPERATION</p>	
	RO	<p>(Step 9.14) [CA] IF all backup heaters energized due to pressurizer level deviation, THEN verify two sets of backup heaters in ON prior to level deviation clearing.</p> <p>(Step 9.15) Adjust LP LTDN PRESS PK 145 to maintain desired letdown pressure - BETWEEN 260-450 PSIG</p>	<p>RNO step required here due to earlier controller failure. Directs pressure control in manual.</p>
	RO	<p>(Step 9.16) Control LTDN HX OUTLET TEMP, TK 144 to maintain LTDN temp 90 to 115°F. <input type="checkbox"/> TI-116 VCT TEMP <input type="checkbox"/> TI-143 DIVERT LTDN HX TEMP <input type="checkbox"/> TI-144 CCW LTDN HX TEMP</p> <p>(Step 9.17) Refer to SOP-2.1, CVCS system PLANT STARTUP AND OPERATION, for further guidance on Letdown system control</p> <p>(step 10) Determine status of letdown flow: Check letdown flow - established</p>	
	SRO	<p>(step 10.2) Go to procedure and step in effect</p> <p>Submit a Condition Report and notify the Work Week Coordinator (Maintenance ATL on backshifts)</p> <p>Notify the Shift Manager</p>	

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Event Description: 1C charging pump sheared shaft / Restore Letdown

	SRO	<p>Refer to Technical Specifications LCOs 3.5.2, and Technical Requirements TR 13.1.5</p> <p>3.5.2 Mandatory LCO Condition A; since the 1B chg pump is aligned to A Train. 72 hour LCO until the 1B chg pump is placed on B Train and the 1C CHG pump is either racked out or has a jumper installed to allow 1B chg pump to auto start</p> <p>13.1.5 Admin LCO Condition A. Two charging pumps shall be operable. 72 hour LCO</p>		
<p align="center">TECHNICAL SPECIFICATION 3.5.2, ECCS—Operating Two ECCS trains shall be OPERABLE. APPLICABILITY: MODES 1, 2, and 3.</p>				
	SRO	CONDITION	REQUIRED ACTION	COMPLETION TIME
		A. One or more trains inoperable. AND At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.	A.1 Restore train(s) to OPERABLE status	72 hours
<p align="center">TECHNICAL REQUIREMENT 13.1.5, Charging Pumps - Operating Two charging pumps shall be FUNCTIONAL. APPLICABILITY: MODES 1, 2, 3, and 4</p>				
<p align="center"><i>This is an ADMIN LCO except during the pump swap placing 1B charging pump on A Train</i></p>				
	SRO	CONDITION	REQUIRED ACTION	COMPLETION TIME
		A. One required charging pump nonfunctional.	A.1 Restore at least two charging pumps to FUNCTIONAL status.	72 hours
<p align="center">At the discretion of the Lead Examiner move to the next event.</p>				

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Event Description: 1B SW pump trips.

1B SW pump will trip. SW pressure will lower but remain >60psig. 1C SW pump is available to start and then tech specs evaluated. When 1C SW pump started a flow transient causes a SW to TB MOV to close requiring AOP-7 entry.

Indications Available:

Annunciators:

- SW PUMP TRIPPED (AE4)
- SW TO TURB BLDG A OR B TRN FLOW HI (AF5)

Recognize indications 1B SW PUMP TRIP

- Yellow flag above 1B SW pump handswitch
- PI-3001A/B SW TO CCW HX PRESS, decreasing

Time	Pos.	Expected Actions/Behavior	Comments
Annunciator Response Procedure ARP-1.1, version 53.1, AE4			
	BOP	Announce alarm and enter ARP-AE4	
	SRO	Direct entry into ARP	
	BOP	(step 1) Check Indications and determine which SW pump tripped	1B SW pump has a yellow trip flag
	BOP	(step 2) Start the 1C SW pump	NOTE: When this pump is started MOV-515 will close and AOP-7.0 will be entered for actions see PAGE 21
	SRO	(step 3) REFER to AOP-10	IF entered actions listed on PAGE 21
	SRO	(step 4) Direct SSS entry into SOP-24.0 step 4.6 to align 1C SW pump for auto start to replace the 1E SW pump	
	BOP	(step 5) Dispatch personnel to the 1B SW pump and breaker.	Sends SSS and Outside SO
	BOP	(step 6) Return the Service Water electrical and component lineup to normal as soon as possible.	
	SRO	(step 7 of ARP AE4) Refer to tech spec 3.7.8 for LCO requirements	

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Event Description: 1B SW pump trips.

Time	Pos.	Expected Actions/Behavior		Comments
TECHNICAL SPECIFICATION 3.7.8 - Service Water System (SWS)				
Two SWS trains shall be OPERABLE.				
	SRO	3.7.8 Condition A applies due to the 1B SW pump being tripped and the 1C SW pump not being selected to auto start for the 1B SW pump		
		CONDITION	REQUIRED ACTION	COMPLETION TIME
		A. One SWS train inoperable.	A.1 -NOTES----- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources — Operating," for emergency DG made inoperable by SWS. ----- Restore SWS train to OPERABLE status.	72 hours
TECHNICAL SPECIFICATION 3.8.1 – 3 AC Sources—Operating				
	SRO	From 3.7.8 Condition A above, 3.8.1 has to be entered. Condition B applies.		
	SRO	CONDITION	REQUIRED ACTION	COMPLETION TIME
		B. One DG set inoperable	B.1 Perform SR 3.8.1.1 for the required offsite circuit(s). AND B.2 Declare required feature(s) supported by the inoperable DG set inoperable when its required redundant feature(s) is inoperable AND B.3.1 Determine OPERABLE DG set is not inoperable due to common cause failure. OR B.3.2 Perform SR 3.8.1.6 for OPERABLE DG set. AND B.4 Restore DG set to OPERABLE status	2 hours AND Once per 8 hours Thereafter 4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s) 24 hours 24 hours 10 days AND 13 days from discovery of failure to meet LCO
				The bolded conditions are the most likely path the SRO will evoke. B.1 and B.2 and B.3.1
NOTE: LOSF w/ECCS failure should be identified. Since this is a 4 hr LCO and the 1B SW pump would be selected out in ~1 hour this may have to be discussed during post exam questions.				

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Event Description: 1B SW pump trips.

Time	Pos.	Expected Actions/Behavior	Comments
	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	
AOP-10, Loss of Service Water, version 16			
	BOP	(step 1) Verify DF02, 1F 4160 V bus tie to 1K 4160 V bus and DG02, 1G 4160 V bus tie to 1L 4160 V bus, are closed	
	BOP	(step 2) Start any available SW pump	
	BOP	(step 3) IF SW pressure in both trains greater than 60 psig, THEN go to procedure and step in effect.	
AOP-7, Loss of Turbine Building Service Water, version 13			
	BOP	(step 1) Check at least one SW train aligned to turbine building. Check A train SW - ALIGNED TO TURBINE BUILDING. SW TO TURB BLDG ISO A TRN <input type="checkbox"/> Q1P16V515 open <input type="checkbox"/> Q1P16V516 open OR Check B train SW - ALIGNED TO TURBINE BUILDING SW TO TURB BLDG ISO B TRN <input type="checkbox"/> Q1P16V517 open <input type="checkbox"/> Q1P16V514 open	
	BOP	(step 2) IF main generator on line, THEN check generator hydrogen temperature less than 46°C by the following: <input type="checkbox"/> TI-4067	

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Event Description: 1B SW pump trips.

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 3) Check SW HDR Pressure – GREATER THAN 110 psig. Train A [] PI-3001A Train B [] PI-3001B	RNO 3 CLOSE SW DIL BYP ISO. Train A [] Q1P16V558 Train B [] Q1P16V557
	BOP	(step 4) Restore both trains of SW to turbine building. 4.1 Dispatch personnel to correct cause for loss of SW. 4.2 WHEN cause for loss of SW corrected, THEN verify both SW trains aligned to turbine building. SW TO TURB BLDG ISO A(B) TRN [] Q1P16V515 open [] Q1P16V516 open [] Q1P16V517 open [] Q1P16V514 open	
	SRO	(step 5) IF at least one SW train aligned to turbine building, THEN monitor turbine building component temperatures and go to procedure and step in effect.	
After Tech Spec analysis and at the discretion of the Lead Examiner move to Event .			

Op Test No.: FA2013301 Scenario # 2 Event # 7 Page 23 of 44

Event Description: 1A SGTR– 300 gpm over 5 min and stabilizes

1A SG tube leak will start and ramp in over 3 minutes. Because of power level SG tube leak alarm (FG1) does not function. Based on leak rate early in AOP-2.0 SI criteria will be met.

Indications Available:

Annunciators:

- RMS HI RAD (FH1)

Recognize indications of SG TUBE LEAK

- R-15, 19 AND 23 IN ALARM
- Charging flow ↑
- Pzr level ↓

Time	Pos.	Expected Actions/Behavior	Comments
ARP-1.6, Annunciator response procedure, FH1 Ver. 70			
	BOP	Reference ARP FH1 (step 1) Check indications on radiation monitoring system console and determine which radiation monitor channel indicates high activity. (step 2) Insure any auto actions have occurred.	
	BOP	Check ARP FH1 for actions as Rad monitors come into alarm. (step 3.3) Do not allow personnel to enter the affected area without the approval of the Health Physics Department. (step 3.6) IF high activity indication of Steam Generator Tube Leakage is present, THEN go to FNP-1-AOP-2.0, STEAM GENERATOR TUBE LEAKAGE.	

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Event Description: 1A SGTR– 300 gpm over 5 min and stabilizes

Time	Pos.	Expected Actions/Behavior	Comments
	SRO/ BOP	<p><u>IF R-15</u> alarms <u>AND</u> remains above the alarm setpoint (not a momentary spike), <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <u>IF</u> high effluent activity is possible, <u>THEN</u> implement NMP-EP-110 Notify the Counting Room to <u>immediately</u> sample the SGs per CCP-31 to determine the leak rate. Notify the Operations Shift Manager. <u>IF</u> an actual SG tube leak is confirmed, consider placing SJAЕ Filtration System in service per FNP-1-SOP-28.5. <p><u>IF R-19</u> alarms refer to SOP-45.0 for guidance in sampling SGs with R-19 in alarm.</p> <p><u>IF R-23A OR R-23B</u> alarms, contact the RAD man to verify SGBD secured.</p>	
AOP-2.0, Steam Generator Tube Leakage Ver. 35			
	RO	<p>(step 1) Maintain pressurizer level stable at normal programmed value by:</p> <ul style="list-style-type: none"> - Control charging - Reduce letdown close HV-8149 A, B, C 	<p>NOTE: [CA] step – RNO is to trip the Rx and actuate an SI Critical task to actuate SI (step 1 or 3 of this AOP)</p>
	RO	<p>(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</p> <p>_____ (charging flow)</p> <p>+ _____ (seal injection flow)</p> <p>- _____ (letdown flow)</p> <p>- _____ (#1 seal leakoff flow)</p> <p>= _____ (RCS leak rate)</p>	Plant conditions will NOT permit the use of STP-9.0, so a leak rate flow balance will be used.

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Event Description: 1A SGTR– 300 gpm over 5 min and stabilizes

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 2) Maintain VCT level greater than 20%. by: Verify RMW system in AUTO OR 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 Critical task to actuate SI (step 1 or 3 of this AOP)
	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%	
	BOP	(step 5) Monitor primary to secondary leakage Check R-70s or R-15 for increasing count rate Begin trending R-70C, 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 –
	SRO	(step 11) Evaluate Table to determine appropriate response: - ACTION LEVEL 3 Condition 1 ≥30 gpd/hr rate of increase <u>AND</u> ≥75 gpd leak in any SG	

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Event Description: 1A SGTR– 300 gpm over 5 min and stabilizes

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	<p>(step 12) For entry into Action Level 3 Condition 1 perform the following:</p> <p>12.1 Check any two of the following rad monitors trending in the same manner.</p> <p>[] R-70s/R-15 trending in the same direction with the same order of magnitude. OR [] R-70s/R-23A(B) trending in the same direction with the same order of magnitude. OR [] R-15/R-23A(B) trending in the same direction with the same order of magnitude.</p> <p>12.2 Reduce power to less than or equal to 50% rated thermal power within 1 hour.</p> <p>12.3 Place the Unit in Mode 3 within 3 hours of entering Action Level 3 Condition 1.</p>	Crew not expected to get beyond this point in AOP-2 before meeting SI Criteria.

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
<i>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.</i>	<i>B.1 Be in MODE 3. AND B.2 Be in MODE 5.</i>	6 hours 36 hours

The next event is based on evaluation of plant conditions by the crew. It is expected the RX trip and SI will be completed early in the AOP-2 actions. Tech Spec evaluation if required by examiner may be delayed until after scenario termination.

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 27 of 44

Event Description: 1A SGTR- 300 gpm over 5 min and stabilizes

EEP-0 entered based on a RX trip and SI directed by AOP-2. Crew will meet transition criteria for EEP-3.0

Indications Available:**Annunciators:**

- Various and numerous

Indications of LOSP/RX trip

- Nuclear power ↓
- Rod bottom lights
- Control Room Lighting

Time	Pos.	Expected Actions/Behavior	Comments
EEP-0, Reactor Trip or Safety Injection, rev 44			
	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 of EEP-0
	RO/ BOP	<p>(step 4) Check SI Status. (step 4.1) Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION □ ACTUATED status light lit □ MLB-1 1-1 lit □ MLB-1 11-1 lit</p> <p>(step 4.2) Verify both trains of SI-ACTUATED. □ MLB-1 1-1 lit AND □ MLB-1 11-1 lit</p>	

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Event Description: 1A SGTR– 300 gpm over 5 min and stabilizes

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	(step 5) Directs continuing into EEP-0 at step 5. Directs the BOP to perform Attachment 2 of EEP-0.	For Attachment 2 and 4 actions. <u>Go to page 37</u>
		EEP-0 FOLD OUT PAGE CRITERIA IN EFFECT Ruptured SG AFW Isolation. <ul style="list-style-type: none"> Manually stop AFW flow to a SG if BOTH conditions listed below occur: <ul style="list-style-type: none"> Level increases in an uncontrolled manner or radiation in that SG is abnormal AND <ul style="list-style-type: none"> Narrow range level – GREATER THAN 31% {48%} 	NOTE: [CA] step The action to Isolate AFW to the ruptured SG may be completed beyond this point.
	RO	(step 6) Check containment pressure- HAS REMAINED LESS THAN 27 psig (checked on IPC or PI950, 951, 952, 953,CNMT PRESSURE)	NOTE: [CA] step
	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 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.	RNO 8.1.1 Verify all available AFW pumps started. AFW pumps fail to autostart. Operator should start AFW pumps here if not already complete. May have been started earlier based on backing up an automatic function that did not occur.

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Event Description: 1A SGTR– 300 gpm over 5 min and stabilizes

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 	

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Event Description: 1A SGTR– 300 gpm over 5 min and stabilizes

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 cool down, 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>	NOTE: RNO column since RCS temp will be <547°F
	BOP	<p>(step 9.1.5 RNO) IF MSIV's are open THEN isolate steam loads in the turbine building:</p> <ul style="list-style-type: none"> MSRs reset <p>(steps 9.1.5.1 and 9.1.5.2 RNO) these actions are performed by Systems Operators when RX trip is announced in step 7.</p>	
	BOP	<p>(step 9.1.5.4 RNO) IF two SJAE's in service, THEN secure one SJAE</p> <ul style="list-style-type: none"> 1A SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed 1B SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed 	

Event Description: **1A SGTR– 300 gpm over 5 min and stabilizes**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<p>(step 9.1.6 RNO) IF cool down continues THEN close main steam isolation and bypass valves.</p> <p>1A(1B,1C) SG MSIV - TRIP</p> <ul style="list-style-type: none"> <input type="checkbox"/> Q1N11HV3369A <input type="checkbox"/> Q1N11HV3369B <input type="checkbox"/> Q1N11HV3369C <input type="checkbox"/> Q1N11HV3370A <input type="checkbox"/> Q1N11HV3370B <input type="checkbox"/> Q1N11HV3370C <p>1A(1B,1C) SG MSIV - BYPASS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Q1N11HV3368A <input type="checkbox"/> Q1N11HV3368B <input type="checkbox"/> Q1N11HV3368C <input type="checkbox"/> Q1N11HV3976A <input type="checkbox"/> Q1N11HV3976B <input type="checkbox"/> Q1N11HV3976C 	.
	RO	<p>(step 10) Check pressurizer PORVs and spray valves.</p> <p>WHEN pressurizer pressure less than 2335 psig, THEN verify both PRZR PORVs closed.</p> <p>Verify both PRZR PORVs indicate CLOSED</p> <p>Check PRZR PORV temperature STABLE OR FALLING.</p> <ul style="list-style-type: none"> <input type="checkbox"/> PORV Temp TI-463 <p>Check PRT parameters STABLE or FALLING.</p> <ul style="list-style-type: none"> <input type="checkbox"/> PRT PRESS PI 472 <input type="checkbox"/> PRT LVL LI-470 <input type="checkbox"/> PRT TEMP TI-471 <p>WHEN pressurizer pressure less than 2260 psig, THEN verify normal pressurizer spray valves closed OR in the process of closing.</p> <p>1A(1B) LOOP SPRAY VLV</p> <ul style="list-style-type: none"> <input type="checkbox"/> PK 444C <input type="checkbox"/> PK 444D <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.</p> <p>Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE</p>	

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Event Description: 1A SGTR– 300 gpm over 5 min and stabilizes

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(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	NOTE: Based on RCS pressure, close miniflows < 1300 and open when > 1900 psig.
<p style="text-align: center;">Diagnostics</p> <p>The SRO will direct the parameters to be reviewed and will determine appropriate procedure to transition to.</p>			
	SRO	(step 13) Check SGs not faulted. (step 13.1) Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig.	
	SRO	Check SGs not ruptured. <input type="checkbox"/> Check secondary radiation indication - NORMAL. <input type="checkbox"/> R-15 SJAE EXH <input type="checkbox"/> R-19 SGBD SAMPLE <input type="checkbox"/> R-23A SGBD HX OUTLET <input type="checkbox"/> R-23B SGBD TO DILUTION <input type="checkbox"/> R-15B TURB BLDG VNTL (BOP) <input type="checkbox"/> R-15C TURB BLDG VNTL (BOP) <input type="checkbox"/> R-60A MS ATMOS REL (BOP) <input type="checkbox"/> R-60B MS ATMOS REL (BOP) <input type="checkbox"/> R-60C MS ATMOS REL (BOP) <input type="checkbox"/> R-60D TDAFWP EXH (BOP) <input type="checkbox"/> No SG level rising in an uncontrolled manner.	RNO Go to FNP-1-EEP-3, STEAM GENERATOR TUBE RUPTURE.
EEP-3.0, SGTR, ver 27			
	RO	(step 1) Check RCP criteria. Check SUB COOLED MARGIN MONITOR indication - > 16°F {45°F} SUBCOOLED IN CETC MODE.	

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Event Description: 1A SGTR- 300 gpm over 5 min and stabilizes

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 2) Identify ruptured SG(s). Check any SG level - RISING IN AN UNCONTROLLED MANNER	NOTE: [CA] step
	SRO/ RO	(step 3) WHEN ruptured SG(s) identified, THEN isolate flow from ruptured SG(s). Verify ruptured SG(s) atmospheric relief valve - ALIGNED. - PC3371A, 1A MS ATMOS REL VLV, set 8.25 and in auto - Verify 3371A, 1C MS ATMOS REL VLV, is closed	NOTE: [CA] step 1A SG is ruptured Because the ARV's controller is failed placing the valve in AUTO will result in it going full open. Crew should recognize this and NOT place the controller in AUTO. Critical task
		(step 3.6) Verify blowdown from ruptured SG(s) - ISOLATED. (step 3.7) Verify at least one SG MSIV and bypass valves on 1A SG closed []3369A or []3370A And []3368A or []3976A	Critical task
	BOP	(step 4) WHEN ruptured SG(s) NR level greater than 31% THEN perform the following: Isolate AFW flow to ruptured SG(s) using FCVs. - FCV 3227A in MOD, and 3227AA closed - HV 3328A in MOD and 3228AA closed	NOTE: [CA] step Critical task
	SRO	(step 5) Check ruptured SG(s) pressure GREATER THAN 250 psig.	
	SRO	(step 6) Perform RCS cooldown. Determine required CETCs for cooldown based on ruptured SG pressure.	

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Event Description: 1A SGTR- 300 gpm over 5 min and stabilizes

Time	Pos.	Expected Actions/Behavior		Comments
		<div>RUPTURED SG PRESSURE (psig)</div>	<div>REQUIRED CORE EXIT TEMPERATURE</div>	
		1151 - 1200	536° F { 522° F }	
		1101 - 1150	531° F { 516° F }	
		1051 - 1100	525° F { 510° F }	
		1001 - 1050	519° F { 504° F }	
		951 - 1000	513° F { 498° F }	
		901 - 950	507° F { 491° F }	
		851 - 900	500° F { 484° F }	
		801 - 850	494° F { 477° F }	
		751 - 800	487° F { 469° F }	
		701 - 750	479° F { 461° F }	
		651 - 700	471° F { 453° F }	
		601 - 650	463° F { 443° F }	
		551 - 600	454° F { 434° F }	
		501 - 550	445° F { 423° F }	
		451 - 500	434° F { 412° F }	
		401 - 450	423° F { 400° F }	
		351 - 400	411° F { 386° F }	
		301 - 350	398° F { 370° F }	
		251 - 300	383° F { 353° F }	
		- 250	365° F { 332° F }	
	SRO	(step 6.2) IF the plant computer is available, THEN display Highest Core Exit Temp Chan A and B on one of the following displays. <input type="checkbox"/> 1TC1 <input type="checkbox"/> STA <input type="checkbox"/> Other display		This is normally selected by the STA and put on the control board display.

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Event Description: 1A SGTR- 300 gpm over 5 min and stabilizes

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	<p>Will direct these steps: (step 6.3) WHEN P-12 light lit (543F), THEN perform the following.</p> <p>(step 6.3.1) Block low steam line pressure SI. STM LINE PRESS SI BLOCK - RESET <input type="checkbox"/> A TRN to BLOCK <input type="checkbox"/> B TRN to BLOCK</p> <p>(step 6.3.2) Verify blocked indication.BYP & PERMISSIVE STM LINE ISOL. SAFETY INJ. <input type="checkbox"/> TRAIN A BLOCKED light lit <input type="checkbox"/> TRAIN B BLOCKED light lit</p> <p>(step 6.3.3) Bypass the steam dump interlock. STM DUMP INTERLOCK <input type="checkbox"/> A TRN to BYP INTLK <input type="checkbox"/> B TRN to BYP INTLK</p> <p>(step 6.4) IF condenser available, THEN dump steam to condenser from intact SGs at maximum attainable rate.</p> <p>BYP & PERMISSIVE <input type="checkbox"/> C-9 light lit</p> <p>STM DUMP <input type="checkbox"/> MODE SEL A-B TRN in STM PRESS</p> <p>STM DUMP INTERLOCK <input type="checkbox"/> A TRN in ON <input type="checkbox"/> B TRN in ON</p> <p>STM HDR PRESS FNP-1-SOP-62.0, EMERGENCY <input type="checkbox"/> PK 464 adjusted</p>	Critical task
	RO	<p>(step 6.5) Check hottest CETCs less than required temperature.</p> <p>(step 6.6) Stop the cooldown</p> <p>(step 6.7) [CA] Maintain core exit T/Cs - LESS THAN REQUIRED TEMPERATURE.</p>	<p>Continue to step 7 until CETCs are < required temp.</p> <p>Critical task</p>

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Event Description: 1A SGTR– 300 gpm over 5 min and stabilizes

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<p>(step 7) Check intact SG levels.</p> <p>Check any intact SG narrow range level – GREATER THAN 31%{48%}.</p> <p>[CA] WHEN SG narrow range level greater than 31%{48%}, THEN maintain SG narrow range level 31%-65%{48%-65%}.</p> <p>Control MDAFWP flow. MDAFWP FCV 3227 RESET <input type="checkbox"/> A TRN reset <input type="checkbox"/> B TRN reset MDAFWP TO 1A/1B/1C SG B TRN <input type="checkbox"/> FCV 3227 in MOD</p> <p>Control TDAFWP flow. TDAFWP FCV 3228 <input type="checkbox"/> RESET reset TDAFWP SPEED CONT <input type="checkbox"/> SIC 3405 adjusted</p>	
When cool down complete and at the discretion of the Lead Examiner, terminate the scenario.			

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Event Description: Attachment 2 of EEP-0

Cue: BOP will accomplish when at step 5 of EEP-0

Attachment 2 of EEP-0
AUTOMATIC ACTIONS VERIFICATION

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}.	Operator should proceed to step 4
	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

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>	
	BOP	<p>(step 6) Verify containment ventilation isolation.</p> <p>Verify containment purge dampers - CLOSED.</p> <p><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.</p> <p>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

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 39 of 44Event Description: **Attachment 2 of EEP-0**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<p>(step 7) Verify containment fan cooler alignment.</p> <p>Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED.</p> <p><u>CTMT CLR FAN SLOW SPEED</u></p> <p>A train</p> <p><input type="checkbox"/> 1A</p> <p><input type="checkbox"/> 1B</p> <p>B train</p> <p><input type="checkbox"/> 1C</p> <p><input type="checkbox"/> 1D</p> <p>Verify associated emergency service water outlet valves - OPEN.</p> <p>EMERG SW FROM 1A(1B,1C,1D) CTMT CLR</p> <p><input type="checkbox"/> Q1P16MOV3024A</p> <p><input type="checkbox"/> Q1P16MOV3024B</p> <p><input type="checkbox"/> Q1P16MOV3024C</p> <p><input type="checkbox"/> Q1P16MOV3024D</p>	

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 40 of 44

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	RNO 8.1 Verify MDAFW Pumps deliver flow to each SG. 8.1.1 Manually start MDAFW Pumps 8.1.2 Verify AFW flow path to AND each SG. <input type="checkbox"/> Q1N23HV3227A in MOD <input type="checkbox"/> Q1N23HV3227B in MOD <input type="checkbox"/> Q1N23HV3227C in MOD MDAFWP TO 1A(1B,1C) SG FLOW CONT <input type="checkbox"/> HIC 3227AA open <input type="checkbox"/> HIC 3227BA open <input type="checkbox"/> HIC 3227CA open AFW TO 1A(1B,1C) SG STOP VLV <input type="checkbox"/> Q1N23MOV3350A open <input type="checkbox"/> Q1N23MOV3350B open <input type="checkbox"/> Q1N23MOV3350C open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764A open <input type="checkbox"/> Q1N23MOV3764D open <input type="checkbox"/> Q1N23MOV3764F open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764E open <input type="checkbox"/> Q1N23MOV3764B open <input type="checkbox"/> Q1N23MOV3764C open
		(Step 8.2) Check TDAFW Pump start required. <input type="checkbox"/> Condition <input type="checkbox"/> TSLB <input type="checkbox"/> Setpoint <input type="checkbox"/> Coincidence	
		RCP Bus TSLB2 1-1 <input type="checkbox"/> 2680 V Undervoltage 1-2 1-3	1/2 Detectors on 2/3 Busses
		Low Low SG TSLB4 28% Water Level 4-1,4-2,4-3 In Any 5-1,5-2,5-3 2/3 SGs 6-1,6-2,6-3	2/3 Detectors on 2/3 SGs

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 41 of 44
 Event Description: **Attachment 2 of EEP-0**

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	
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		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> <p>11.3 Verify Excess Letdown Isolation valves closed. <input type="checkbox"/> Q1E21HV8153, EXC LTDN ISO <input type="checkbox"/> Q1E21HV8154, EXC LTDN ISO</p>																					

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 42 of 44

Event Description: Attachment 2 of EEP-0

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	
	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.: FA2013301 Scenario # 2 Event # 8 Page 43 of 44

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 44 of 44
 Event Description: **Attachment 4 of EEP-0**

Time	Pos.	Expected Actions/Behavior	Comments
Attachment 4 of EEP-0 TWO TRAIN ECCS ALIGNMENT VERIFICATION			
		<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>	
		<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</p> <p><input type="checkbox"/> 1B</p> <p><input type="checkbox"/> 1C</p> <p><input type="checkbox"/> 1D</p> <p>RX CAV H2 DILUTION FAN</p> <p><input type="checkbox"/> 1A</p> <p><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	<p>(Step 1.9) Verify SFP Cooling in service per SOP-54.0</p>	Will call Radside SO to accomplish this.
End of Attachment 4			

Op-Test No.: FA2013-301

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.

In the unlikely event that the simulator fails such that illogical indications result, the session will be terminated. In other words, 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-2

[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, 1350 ppm, MOL 10000 MWD/MTU FRV
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

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
- Current Risk Assessment is **GREEN** and projected is **GREEN**
- Aux steam is being supplied from Unit 2
- 1A SGFP is on service with FRV Bypass valves in AUTO
- UOP-1.2 ver 103.1, is complete through step 5.62. Continue the startup starting at step 5.63.
-
-
-
-

Equipment Status

	Maintain VCT gas pressure 25-30 psig

Reactivity Plan**Waste Management Status**

Control rods and steam dumps, as required.	#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 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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Facility:	Farley Nuclear Plant	Scenario No.:	3	Op-Test No.:	FA2013-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
<p><u>Initial Conditions:</u> 29% power, 429 ppm, EOL; Ramping up, ramp on HOLD for chemistry.</p> <p><u>Turnover:</u></p> <ul style="list-style-type: none"> Unit 2 PSS is OFF for Maintenance (OOS 2 hrs, ETR 2 hrs) 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs) 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs) Fuel handling is ongoing in the SFP. Current Risk Assessment is YELLOW and projected is YELLOW. B Train On-Service – B Train Protected. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia 					
SPLIT TRAIN ALIGNMENT					
Event No.	Malf. No.	Event Type*	Event Description		
1	Imf lt115	I (RO)	LT-115, VCT level controller, fails LOW		
2	imf mal-rms25a / preset	I (BOP) TS (SRO)	R-25A, SPENT FUEL POOL VENTILATION RAD MONITOR, fails HIGH and SFP ventilation does not secure, PRF starts TS 3.3.8 condition A		
3	Imf pt444 / preset	I (RO) TS (SRO)	PT-444, PRZR PRESS CONTROL CHANNEL, fails high PORV-444B leaks by seat- requires block valve closure T.S. 3.4.11 Condition A and TS 3.4.1 DNB Condition A (low pressure)		
4	Imf fk478-a	C (BOP)	1A FRV Fails closed in Auto, will respond in manual control		
5	Imf mal-rs4a	R (RO) N (BOP) TS (SRO)	1A SG tube leak – 15 gpm over 3 min and stabilizes. Ramp at 2 MW/min TS 3.4.13 condition B		
6	Imf mal-fwm11a	M (ALL)	Running SGFP trips. RX trip required (Loss of Feed); Rx Trip will not work in auto or manual, and one CRDM MG set breaker will not open.		
7	preset	C (RO) C (BOP)	FRP-S.1 will be entered. Insert rods and emergency borate (CT) Main Turbine will not trip in AUTO, manual trip required. (CT)		
8	preset	M (ALL)	1A SGTR increases to 500 gpm when FRP-S.1 exited.		
9	Imf mal-mss2a	M (ALL) C (BOP)	1A SG fault upstream of 1A MSIV in MSVR when 1A MSIV is closed. Close ALL MSIVs and isolate AFW flow to the Faulted SG. (CT)		
			Terminate when ECP-3.1 is entered.		

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

Event No.		Malfunction	* means in Bat file
2		HV-3990A hi rad imf csf3990a_cc1 closed	*
2		HV-3416 hi rad imf csff3416_d_cc1 closed	*
2		HV-3417A hi rad imf csf3417a_d_cc1 closed	*
3		PORV 444B sticks at 10% after being demanded closed: imf rrc444b-m (1 0) 10 1	TRG 1
7		Fail RTB from opening on manual or auto trip CMFmalf / cBKRXTRP_cc21/ closed CMFmalf / cBKRXTRP_cc22/ closed	*
7		1A CRDM MG set breaker will not open CMFmalf / c52mga_cr3	*
7		Main Turbine will not trip Automatically imf mal-tur2	*
8		1A MSIVs will not close on auto closure CMFmalf / crsh001a_cc5 /open CMFmalf / cmsh002a_d_cc5 /open	*
0		Tag 1A MDAFW pump irf cafp01a_d_cd1 open	*
0		1C DG Tagged out irf cBK1DH07_d_cd1 / open irf cBK2DH07_d_cd1 / open irf cBK1DH07_d_cd2 / open irf cBK2DH07_d_cd2 / open	*
		Triggers and Commands	
3		Event Trigger 1 – monitors PORV444B HS closed position trgset 1 "x30i115c"	*
8		Trigger 2:1A SG 500 gpm SGTR ramped in over 60 seconds when Rx trip breakers open trgset 2 "j52rtao && j52rtbo" Command: "imf mal-rs4a 500 60"	*
9		Trigger 3 On 1A MSIV closure, Fault in MSVR trgset 3 "XSLBA01" trg 3 "imf mal-mss2a 1 300"	*

Initial Conditions: 29% power, 1298 ppm, MOL; Ramping up, ramp on HOLD for chemistry.

Turnover:

- Unit 2 PSS is OFF for Maintenance (OOS 2 hrs, ETR 2 hrs)
- 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Fuel handling is ongoing in the SFP.
- Current Risk Assessment is **YELLOW** and projected is **YELLOW**,
- **B** Train On-Service – **B** Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event 1 LT-115, VCT level controller, fails low.

Verifiable actions: Auto makeup must be stopped. Manual make-up required for ramp in event 5.

Event 2 R-25A, SPENT FUEL POOL VENTILATION RAD MONITOR, FAILS HIGH - SFP ventilation does not secure, PRF starts. **TS 3.3.8 Condition A**

Verifiable actions: Manual isolation of dampers is to ensure SFP area is isolated properly.

Event 3 PT-444 fails high. Crew enters AOP-100. **TS. 3.4.11 Condition A and 3.4.1 Condition A**

Verifiable actions: Close PORV 444B. PORV 444B discovered to be leaking by (RCS pressure continues to decrease) and PORV block valve must be closed.

Event 4 1A FRV Fails closed in Auto

Verifiable actions: Take manual control of A FRV and restore SGWL

Event 5 1A SGT leak. 15 gpm over 3 minutes and stabilizes. **TS 3.4.13 condition B**

Verifiable actions: RO will adjust rods or boron to control Tavg/Tref on program, BOP will set up and start a ramp on the Main Turbine.

Event 6 Running SGFP trips.

Verifiable actions: Trip Reactor and enter FRP-S.1

Event 7 Rx will not Trip in AUTO or manual. Main Turbine will not trip in AUTO, manual trip required.

Verifiable actions: Drive rods in the fastest mode possible. Establish emergency boration **(CT)**
Manual trip of the Main Turbine **(CT)**

Event 8 1A SGTR 500 gpm when RTBs are opened will cause EEP-3 entry. **(or when FRP-S.1 exited).**

Event 9 Step 3.7 of EEP-3.0 (when 1A MSIVs are closed), 1A SG fault outside ctmt upstream of MSIVs will occur.

ALL SGs isolated in EEP-2 when 1A SG is faulted. **(CT)**

Terminate when ECP-3.1 is entered.

ARP/ AOP-100/ AOP-2.0/ AOP-13/ FRP-S.1/ E-0/ESP-0.1/ E-3/ E-2/ E-3 / ECP-3.1

CRITICAL TASK SHEET

- 1. Insert negative reactivity into the core by **at least one** of the following methods before completing the immediate action steps of FRP-S.1: (WOG CT FR-S.1 - - C) (PRA - NR:16, 21, 23, 27)

Transition to FRP-S.1 and insert negative reactivity by:

- (1) Insertion of rods in auto or manual at ≥ 48 SPM w/in 1 minute following attempts to insert control rods by using reactor trip hand switches or opening MG set breakers
- (2) Commencing an emergency boration w/in 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breakers

(NOTE: Negative reactivity insertion using control rods should begin within 6 minutes of start of event with MFW inservice $> 40\%$ power, and 1 minute of start of event with no MFW $> 40\%$ power, and within 10 minutes if $< 40\%$ power.)

- 2. Isolate the main turbine from the SGs before plant and scenario specific criteria is exceeded: (WOG CT FR-S.1 - - A) (PRA- 10.38, 1TTOPMCBETSW-H)

- Manually trip main turbine prior to SG's boiling dry

- 3. Isolate faulted SG before transitioning out of E-2.
(WOG CT E-2 - - A)

- Isolate AFW flow
- Isolate steam flow from 1A SG

SCENARIO
OBJECTIVE/
OVERVIEW:

The team should be able to:

- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-100, and AOP-2.0 and evaluate Tech Specs.
- Respond to a loss of SGFPs and then an ATWT event when the reactor will not trip.
- The crew will have to evaluate a ruptured SG after exiting FRP-S.1 and then react to a faulted SG on the ruptured SG while in EEP-3. This will cause a transition to ECP-3.1.

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes
1. Total malfunctions (5–8)	10
2. Malfunctions after EOP entry (1–2)	4
3. Abnormal events (2–4)	5
4. Major transients (1–2)	3
5. EOPs entered/requiring substantive actions (1–2)	2
6. EOP contingencies requiring substantive actions (0–2)	1
7. Critical tasks (2–3)	3

Southern Nuclear J.M. Farley Nuclear Plant

Operations Training Simulator Exam Scenario


BOOTH INSTRUCTOR GUIDE

ILT-35 NRC EXAM SCENARIO #3

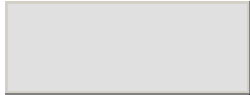

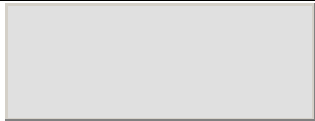
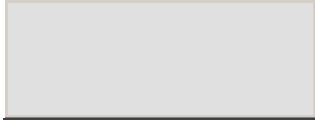
Validation time: 120 minutes Validated by McCaffery, Sorrell, Phillips The week of February 18, 2013			
TRN Supervisor Approval:	Gary Ohmstede	Date:	3/8/2013
NRC Chief Examiner	SEE NUREG 1021 FORM ES-301-3		

Facility:	Farley Nuclear Plant	Scenario No.:	3	Op-Test No.:	FA2013-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
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3	Imf pt444/ preset	I (RO) TS (SRO)	PT-444, PRZR PRESS CONTROL CHANNEL, fails high PORV-444B leaks by seat- requires block valve closure T.S. 3.4.11 Condition A and TS 3.4.1 DNB Condition A (low pressure)		
4	Imf fk478-a	C (BOP)	1A FRV Fails closed in Auto, will respond in manual control		
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6	Imf mal- fwm11a	M (ALL)	Running SGFP trips. RX trip required (Loss of Feed); Rx Trip will not work in auto or manual, and one CRDM MG set breaker will not open.		
7	preset	C (RO) C (BOP)	FRP-S.1 will be entered. Insert rods and emergency borate (CT) Main Turbine will not trip in AUTO, manual trip required. (CT)		
8	preset	M (ALL)	1A SGTR increases to 500 gpm when FRP-S.1 exited.		
9	Imf mal- mss2a	M (ALL) C (BOP)	1A SG fault upstream of 1A MSIV in MSVR when 1A MSIV is closed. Close ALL MSIVs and isolate AFW flow to the Faulted SG. (CT)		
			Terminate when ECP-3.1 is entered.		



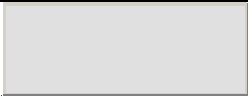
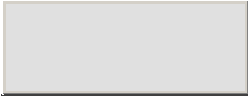
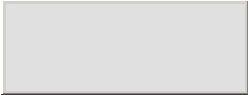
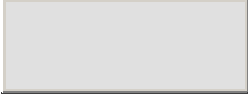
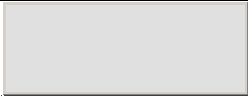
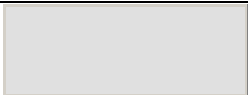
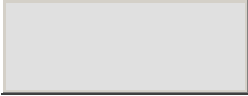
(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	Load in IC-213 and sim IC snap directory Base IC is IC-47	
		RUN	 RUN simulator
0	0	Generic setup: bat 36exam/generic_setup_HLT.txt	
		Quick setup is in IC-213	
0	0	Quick setup (all items with * are included): bat 36exam/2013nrcexam_3.txt	
		PRESETS	
2		HV-3990A hi rad imf csf3990a_cc1 closed	*
2		HV-3416 hi rad imf csff3416_d_cc1 closed	*
2		HV-3417A hi rad imf csf3417a_d_cc1 closed	*
3		PORV 444B sticks at 10% after being demanded closed: imf rrc444b-m (1 0) 10 1	TRG 1
7		Fail RTB from opening on manual or auto trip CMFmalf / cBKRXTRP_cc21/ closed CMFmalf / cBKRXTRP_cc22/ closed	*
7		1A CRDM MG set breaker will not open CMFmalf / c52mga_cr3	*
7		Main Turbine will not trip Automatically imf mal-tur2	*
8		1A MSIVs will not close on auto closure CMFmalf / crsh001a_cc5 /open CMFmalf / cmsh002a_d_cc5 /open	*
0		Tag 1A MDAFW pump irf cafp01a_d_cd1 open	*
0		1C DG Tagged out irf cBK1DH07_d_cd1 / open irf cBK2DH07_d_cd1 / open irf cBK1DH07_d_cd2 / open irf cBK2DH07_d_cd2 / open	*
		Triggers and Commands	
3		Event Trigger 1 – monitors PORV444B HS closed position trgset 1 “x30i115c”	*

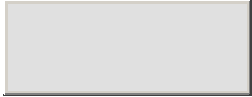

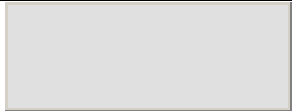

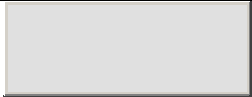
EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
8		Trigger 2:1A SG 500 gpm SGTR ramped in over 60 seconds when Rx trip breakers open trgset 2 "j52rtao && j52rtbo" Command: "imf mal-rcs4a 500 60"	*
9		Trigger 3 On 1A MSIV closure, Fault in MSVR trgset 3 "XSLBA01" trg 3 "imf mal-mss2a 1 300"	*

MCB setup			
		1C DG MSS	Place in Mode 3
		Place HOLD Tag on 1C DG MSS	1 HOLD TAG
		Place HOLD Tag on 1C DG output breakers DHO7-1 and DHO7-2	2 HOLD TAGS
		Place Unit 1 and Unit 2 Bypass and inoperable panel lights to the up position (EMERGENCY POWER SYSTEM)	Unit 1 A-Train Unit 2 A Train
		Place Unit 1 Bypass and inoperable panel lights to the up position (Auxiliary Feedwater System)	Unit 1 A-Train
		Place HOLD Tag on 1A MDAFW pump H/S	1 HOLD TAG
		DEH	Clear DEH alarms
		Select OPS 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>
		Recorders Verify memory disks cleared Cae clearrecorders.cae	
		Provide a marked up copy of UOP-3.1 v112.4 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	 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	 sv sim_clock.uvl
		VERIFY MICROPHONES READY	Batteries installed
		TURNOVER SHEET AVAILABLE	

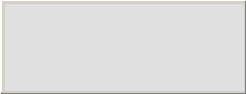
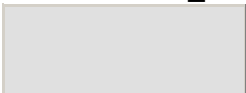
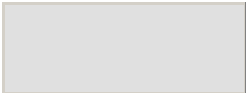
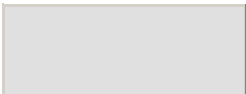
EXAM

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	 RUN simulator
		Verify Horns ON: hornflag  <u>HORNS ON = TRUE</u>	 Turn Horns ON/OFF ann horn
1	NRC CUE	LT-115, VCT level controller, fails LOW imf lt115 0 20	
2	NRC CUE	R-25A, SPENT FUEL POOL VENTILATION RAD MONITOR, fails HIGH and SFP ventilation does not secure, PRF starts TS 3.3.8 condition A imf mal-rms25a 1000000 3	
3	NRC CUE	PT-444, PRZR PRESS CONTROL CHANNEL, fails high imf pt444 2500 45 PORV-444B leaks by seat- requires block valve closure T.S. 3.4.11 Condition A and TS 3.4.1 DNB Condition A (low pressure)	 TRG 1
4	NRC CUE	1A FRV Fails closed in Auto, will respond in manual control imf fk478-a 0 25	
5	NRC CUE	1A SG tube leak – 15 gpm over 3 min and stabilizes. Ramp at 2 MW/min TS 3.4.13 condition B imf mal-rs4a 15 300	
6	NRC CUE	Running SGFP trips. RX trip required (Loss of Feed); Rx Trip will not work in auto or manual, and one CRDM MG set breaker will not open. imf mal-fwm11a	

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
7		FRP-S.1 will be entered. Insert rods and emergency borate (CT) Main Turbine will not trip in AUTO, manual trip required. (CT)	
8		1A SGTR increases to 500 gpm when FRP-S.1 exited. Malf / R / mal-rs4a / 500 / 60	TRG 2  Back up button ONLY
9		1A SG fault upstream of 1A MSIV in MSVR when 1A MSIV is closed. Imf mal-mss2a 1 50 Close ALL MSIVs and isolate AFW flow to the Faulted SG. (CT)	TRG 3 
	NRC CUE	Terminate when ECP-3.1 is entered.	
		End of Exam	 HORNS OFF
			 FREEZE simulator
		Stop data collection for Simview file sv DataCollection.uvl	
		Export data to file with the name of exam2013sen3grpX.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	3 minutes after requested	<p>Locally open reactor trip breakers</p>  <p>CMFmalf / cBKRXTRP_cc21 / open</p>  <p>CMFmalf / cBKRXTRP_cc22 / open</p>
7	WHEN REQUESTED	<p><u>TBSO:</u> "I have opened the condenser vacuum breaker isolation valves N1N51V518A and 518B."</p>  <p>REMOTE / N21 / LOA-CFW012 / 100 / 20 sec ramp</p>
8	NONE REQUIRED	
9	WHEN REQUESTED	<p>Fire alarm communications 1A – 106 is in alarm MSVR Use extremeview/cr fire panels to acknowledge</p> <p>TDAFW Pump isolation valve Close v017A</p>  <p>irf loa-afw006 0 10</p>

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>Unit 2 Unit Operator:</u> "R-25A is in high alarm. R-25A is pegged high with the RED high light LIT. R-25B is reading normal mid range scale." <u>IF requested, HP reports:</u> "Rad Levels are normal" "R-25A is pegged HIGH"
3	NONE EXPECTED	
4	NONE EXPECTED	
5	WHEN REQUESTED	AOP-2.0 communications- HP and shift radiochemist, counting room, and SM will all be notified. <u>SSS/TBSO:</u> "I will place SJAE on service." <u>Radside SO:</u> "I will secure SGBD."
6	NONE EXPECTED	
7	3 MINUTES AFTER REQUESTED	[BOOTH] OPEN the Rx trip bkrs using the buttons on LOCAL OPERATOR ACTIONS PAGE, Then report the following: <u>ROVER:</u> "I have locally Opened Unit one Reactor Trip breakers"
8	WHEN REQUESTED	<u>ANY CALL TO SHIFT RADIO CHEMIST:</u> "I am doing dose assessment and CCP-645"

Communications sheet

<u>EVENT NO.</u>	<u>TIME</u>	<u>Communication:</u>
9	WHEN REQUESTED	<u>Rover, DBSO or security:</u> "There is steam coming out of the grating of the MSVR."
	IF REQUESTED	<u>HP report:</u> "The is high activity outside the UNIT 1 MSVR"
	WHEN REQUESTED	<u>Unit 2 UO:</u> "Fire alarm is _____" [Booth] look at Pyro Panel on simulator computer and report to control room 3 minutes after requested.

Initial Conditions: 29% power, 1298 ppm, MOL; Ramping up, ramp on HOLD for chemistry.

Turnover:

- Unit 2 PSS is OFF for Maintenance (OOS 2 hrs, ETR 2 hrs)
- 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Fuel handling is ongoing in the SFP.
- Current Risk Assessment is **YELLOW** and projected is **YELLOW**,
- **B** Train On-Service – **B** Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event 1 LT-115, VCT level controller, fails low.

Verifiable actions: Auto makeup must be stopped. Manual make-up required for ramp in event 5.

Event 2 R-25A, SPENT FUEL POOL VENTILATION RAD MONITOR, FAILS HIGH - SFP ventilation does not secure, PRF starts. **TS 3.3.8 Condition A**

Verifiable actions: Manual isolation of dampers is to ensure SFP area is isolated properly.

Event 3 PT-444 fails high. Crew enters AOP-100. **TS. 3.4.11 Condition A and 3.4.1 Condition A**

Verifiable actions: Close PORV 444B. PORV 444B discovered to be leaking by (RCS pressure continues to decrease) and PORV block valve must be closed.

Event 4 1A FRV Fails closed in Auto

Verifiable actions: Take manual control of A FRV and restore SGWL

Event 5 1A SG Tube leak. 15 gpm over 3 minutes and stabilizes. **TS 3.4.13 condition B**

Verifiable actions: RO will adjust rods or boron to control Tavg/Tref on program, BOP will set up and start a ramp on the Main Turbine.

Event 6 Running SGFP trips.

Verifiable actions: Trip Reactor and enter FRP-S.1

Event 7 Rx will not Trip in AUTO or manual. Main Turbine will not trip in AUTO, manual trip required.

Verifiable actions: Drive rods in the fastest mode possible. Establish emergency boration **(CT)**
Manual trip of the Main Turbine **(CT)**

Event 8 1A SGTR 500 gpm when RTBs are opened will cause EEP-3 entry. **(or when FRP-S.1 exited).**

Event 9 Step 3.7 of EEP-3.0 (when 1A MSIVs are closed), 1A SG fault outside ctmt upstream of MSIVs will occur.

ALL SGs isolated in EEP-2 when 1A SG is faulted. **(CT)**

Terminate when ECP-3.1 is entered.

ARP/ AOP-100/ AOP-2.0/ AOP-13/ FRP-S.1/ E-0/ESP-0.1/ E-3/ E-2/ E-3 / ECP-3.1

CRITICAL TASK SHEET

- 1. Insert negative reactivity into the core by **at least one** of the following methods before completing the immediate action steps of FRP-S.1: (WOG CT FR-S.1 - - C) (PRA - NR:16, 21, 23, 27)

Transition to FRP-S.1 and insert negative reactivity by:

- (1) Insertion of rods in auto or manual at ≥ 48 SPM w/in 1 minute following attempts to insert control rods by using reactor trip hand switches or opening MG set breakers
- (2) Commencing an emergency boration w/in 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breakers

(NOTE: Negative reactivity insertion using control rods should begin within 6 minutes of start of event with MFW inservice $> 40\%$ power, and 1 minute of start of event with no MFW $> 40\%$ power, and within 10 minutes if $< 40\%$ power.)

- 2. Isolate the main turbine from the SGs before plant and scenario specific criteria is exceeded: (WOG CT FR-S.1 - - A) (PRA- 10.38, 1TTOPMCBETSW-H)

- Manually trip main turbine prior to SG's boiling dry

- 3. Isolate faulted SG before transitioning out of E-2.
(WOG CT E-2 - - A)

- Isolate AFW flow
- Isolate steam flow from 1A SG

SCENARIO
OBJECTIVE/
OVERVIEW:

The team should be able to:

- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-100, and AOP-2.0 and evaluate Tech Specs.
- Respond to a loss of SGFPs and then an ATWT event when the reactor will not trip.
- The crew will have to evaluate a ruptured SG after exiting FRP-S.1 and then react to a faulted SG on the ruptured SG while in EEP-3. This will cause a transition to ECP-3.1.

Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes
1.	Total malfunctions (5–8)	10
2.	Malfunctions after EOP entry (1–2)	4
3.	Abnormal events (2–4)	5
4.	Major transients (1–2)	3
5.	EOPs entered/requiring substantive actions (1–2)	2
6.	EOP contingencies requiring substantive actions (0–2)	1
7.	Critical tasks (2–3)	3

Op Test No.: FA2013301 Scenario # 3 Event # 1 Page 1 of 46

Event Description: **LT-115 fails LOW.**

LT-115 will fail low. This will cause an auto make-up to occur that requires manual control of the make-up system.

Indications Available:

Annunciators:

- VCT LVL HI-LO (DF3)

Recognize indications of LT-115 failing LOW

- VCT level, increasing
- LT-115 indicator reading 0

Time	Pos.	Expected Actions/Behavior	Comments
ARP-1.4, Annunciator Response Procedure, DF3 Ver 53.0			
	SRO	Directs RO to perform Actions of DF3	
	RO	(Step 1) Determine if VCT level is high or low as indicated by LI-115 and LI-112B, VCT LEVEL, on the MCB. (step 9) IF LI-115 has failed low, THEN: 9.1 Manually makeup for VCT level control. 9.2 Take manual control of the make-up system.	RO determines LI-115 is low, goes to step 9
	SRO	- Submit a Condition Report and notify the Work Week Coordinator (Maintenance ATL on backshifts) - Notify the Shift Manager	
At the discretion of the Lead Examiner move to next Event.			

Op Test No.: FA2013301 Scenario # 3 Event # 2 Page 2 of 46
 Event Description: **R-25A fails HIGH**

R-25A fails HIGH. The PRF system starts properly but the SFP ventilation system does not secure as per design.

- Fuel movement is in progress in the SFP room
- To determine the status of the rad monitor the control room will call the extra operator/ U-2 BOP.

Indications Available:

Annunciators:

- SFP AREA RE25 A OR B HI RAD (FH5)

Indications:

- A TRN PRF starting

Time	Pos.	Expected Actions/Behavior	Comments
Annunciator Response Procedure, ARP-1.6 FH5 Ver 70,			
	SRO	Direct entry into FH5. <ul style="list-style-type: none"> • Determines the cause of the alarm. (Cause will be a failed instrument so that Tech Spec 3.3.8 will be evaluated.) 	R-25A will be failed HIGH NOTE: SFP ventilation did not secure so this is a Tech Spec issue.
	BOP	(step 3 of ARP) Verify HV-3538A, SFP TO 1A PRF SUPPLY DMPR, is OPEN	
	BOP	(step 5 of ARP) Verify automatic actions have occurred. <ul style="list-style-type: none"> ○ Trips the Fuel Handling Area Supply and Exhaust Fans. ○ Closes the Fuel Handling Area Supply and Exhaust Dampers. ○ Starts the Penetration Room 1A OR 1B Filtration Units. IF any automatic actions have not occurred, THEN go to FNP-1-SOP-58.0. (The section for Fuel Handling Area Heating and Ventilation Operation for guidance)	Not all automatic actions have occurred and SOP-58.0 will be referenced. SEE PAGE 4 FOR SOP-58.0 ACTIONS
	RO	(step 6 and 7 of ARP) Announces receipt of the alarm and the evacuation of affected area.	Evacuate the SFP area if the alarm is in high

Op Test No.: FA2013301 Scenario # 3 Event # 2 Page 3 of 46

Event Description: R-25A fails HIGH

Time	Pos.	Expected Actions/Behavior	Comments
	SS	(step 8 of ARP) Call SM to evaluate classifications and to inform SM of the R-25A failure (step 9 of ARP) Call Health Physics to determine the validity of the alarm.	This will be reported as a failed instrument
	SRO	(step 12 of ARP) IF high activity indication is due to instrument failure, THEN refer to Technical Specifications, section 3.3.8.	

TECHNICAL SPECIFICATION 3.3.8, Penetration Room Filtration (PRF) System Actuation Instrumentation

The PRF actuation instrumentation for each Function in Table 3.3.8-1 shall be OPERABLE.

Table 3.3.8-1 (page 1 of 1)
PRF Actuation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS
1. Manual Initiation	1,2,3,4, (a),	2 trains
2. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains
3. SFP Room Radiation Gaseous (R-25A, B)	(a)	2

(a) During movement of irradiated fuel assemblies in the SFP room.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one channel or train inoperable.	A.1 Place one PRF train in Operation.	7 days

SFP Room Radiation Gaseous (R-25A, B)

(a) During movement of irradiated fuel assemblies in the spent fuel pool room. 2 channels required.

Condition A- Place one train PRF in operation in 7 days since only one channel is inoperable.

BASES (B 3.3.8-2) 3. Spent Fuel Pool Room Radiation

*The LCO specifies two required Gaseous Radiation Monitor channels to ensure that the radiation monitoring instrumentation necessary to initiate the PRF remains OPERABLE. Each monitor will initiate the associated train of PRF **and isolate the normal SFP Room ventilation.***

Op Test No.: FA2013301 Scenario # 3 Event # 2 Page 4 of 46
 Event Description: **R-25A fails HIGH**

Time	Pos.	Expected Actions/Behavior	Comments
SOP-58.0, Auxiliary Building Hvac System, ver 75.3			
	BOP	(step 4.8.6.a) Verify open <ul style="list-style-type: none"> HV3538A SFP TO 1A PRF SUPPLY DMPR HV3538B,SFP TO 1B PRF SUPPLY DMPR (step 4.8.6.b) is not required to be done since a fuel handling accident is not in progress. (step 4.8.6.c) Verify started <ul style="list-style-type: none"> 1A PRF RECIRC FAN M002A 1A PRF EXH FAN M001A (step 4.8.6.e) Secure SFP AHU as follows: <ul style="list-style-type: none"> Stop SFP AHU SUPP FAN M002. Stop 1A(1B) SFP EXH FAN M001A(B) (step 4.8.6.f) Verify closed the following: <ul style="list-style-type: none"> SFP EXH FAN SUCT DMPR HV3990A SFP EXH FAN SUCT DMPR HV3990B SFP AHU DISCH TO SFP HV3991A SFP AHU DISCH TO SFP HV3991B 	
After Tech Spec analysis and at the discretion of the Lead Examiner move to next Event.			

Op Test No.: FA2013301 Scenario # 3 Event # 3 Page 5 of 46

Event Description: PT-444, PRZR Press Control Channel, fails HIGH

PT-444, PRZR Press control channel, fails HIGH. The PORV closes in manual, Przr pressure control will be in manual. Due to PORV seat leakage the block valve is required to be closed to stop RCS Pressure drop.

Indications Available:

Annunciators:

- 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:

- 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 ↑

Time	Pos.	Expected Actions/Behavior	Comments
AOP-100, Instrumentation Malfunction, section 1.1 ver 12			
	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 - PRZR BLOCK VLV MOV8000B 	Steps 1 and 2 are IOAs NOTE: Block valve required due to 444B seat leakage (RCS pressure still falling) NOTE: HA5 ARP may be used to isolate leaking PORV actions on PAGE 7
		(step 2) IF pressurizer pressure is decreasing due to a mechanically stuck open spray valve PCV444C or PCV444D	
	RO	(step 3) If the PORV is open then close the PORV when RCS pressure is < 2310 psig.	
	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.: FA2013301 Scenario # 3 Event # 3 Page 6 of 46

Event Description: PT-444, PRZR Press Control Channel, fails HIGH

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	(step 5) Determine NO protection instrument failure occurred.	
	RO	(step 6) References required Technical Specifications :	See T.S. required below
	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. 	

TECHNICAL SPECIFICATION 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (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 $\geq 263,400$ GPM when using the precision heat balance method, $\geq 264,200$ GPM when using the elbow tap method, and \geq 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)

LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE.

	SRO	CONDITION	REQUIRED ACTION	COMPLETION TIME
		A. One or more PORVs inoperable and capable of being manually cycled.	A.1 Close and maintain power to associated block valve.	1 hour

When T.S. addressed and MOV-8000B closed and at the discretion of the Lead Examiner move to next Event .

Op Test No.: FA2013301 Scenario # 3 Event # 3 Page 7 of 46

Event Description: PT-444, PRZR Press Control Channel, fails HIGH

Time	Pos.	Expected Actions/Behavior	Comments
ARP-1.8, Annunciator Panel H HA5 ver 35.2			
	RO	<p>(step 5 of ARP)IF the alarm is determined to be caused by relief valve leakage, THEN isolate both relief valves by closing both PRZR PORV ISOs Q1B31MOV8000A & B and determine the leaking valve as follows:</p> <p>a) Allow relief line temperature to decrease sufficiently that temperature changes can be observed.</p> <p>b) Open PRZR PORV ISO Q1B31MOV8000A and monitor the relief line temperature.</p> <p>c) IF temperature does NOT increase, THEN no further action is necessary.</p> <p>d) IF a temperature rise is observed, THEN close PRZR PORV ISO Q1B31MOV8000A and open PRZR PORV ISO Q1B31MOV8000B.</p> <p>e) Verify that the relief line temperature decreases to ambient</p>	

Op Test No.: FA2013301 Scenario # 3 Event # 4 Page 8 of 46

Event Description: 1A FRV fails closed in AUTO. Controllable in MANUAL.

The 1A FRV AUTO controller fails to the closed position. The valve is able to be controlled in MANUAL.

Indications Available:**Annunciators:**

- JB1 1A SG STM FLOW > FEED FLOW
- JF1 1A SG LVL DEV

Indications:

- 1A SGWL decreasing
- 1A FRV demand position decreasing
- 1A SG Feed Flow decreasing

Time	Pos.	Expected Actions/Behavior	Comments
		AOP-100, Instrumentation Malfunction, section 1.5 ver 12, (AOP-13, ver 33, can be entered as well but it takes longer to take action.)	
	Team	Check that steam and feed flows matched on all SGs	
	BOP	(step 1) IF required, THEN take manual control of the affected feedwater regulating valves or bypass valves. [] 1A SG FW FLOW FK-478 <u>IF</u> a loss of main feedwater occurs, <u>THEN</u> perform the actions required by AOP-13.0, LOSS OF MAIN FEEDWATER	NOTE: Step 1 is an Immediate Operator Action and a continuing action step
	SRO	(step 2) If adverse trends in the SG level exists then establish trip criteria If an automatic action is required or set points is approached: Trip the reactor and go to EEP-0	NOTE: if the SGFP trips at 82% level then the reactor would be tripped at this point.
	BOP	(step 3) There will not be a ramp in progress since the main turbine is not on line.	
	BOP	(step 4) Determine if an instrument failure has occurred.	

Op Test No.: FA2013301 Scenario # 3 Event # 4 Page 9 of 46

Event Description: **1A FRV fails closed in AUTO. Controllable in MANUAL.**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 5) Refer to Tech Specs 3.3.1, 3.3.2 & 3.3.3 for any LCO requirements.	None required
	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 for the failed instrument, and notify the Notify the Work Week Coordinator	
When 1A FRV is in manual and SGWL is under control and at the discretion of the Lead Examiner move to the next Event			

Op Test No.: FA2013301 Scenario # 3 Event # 5 Page 10 of 46
 Event Description: **1A SG Tube Leak (15gpm)**

1A SG tube leak will start and ramp in to 15 gpm over 3 minutes. Crew is required to place the Unit in Mode 3.

Indications Available:

Annunciators:

- SG TUBE LEAK ABOVE SETPT (FG1)
- RMS HI RAD (FH1)
- SGBD PROC PNL TRBL (JB5)

Recognize indications of SG TUBE LEAK

- R-15, 19 AND 23 IN ALARM
- R-70A READING > 1000 GPD

Time	Pos.	Expected Actions/Behavior	Comments
ARP-1.6, Annunciator response procedure, FG1 Ver. 70			
	SRO	Direct ARP 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 5) Perform a qualitative confirmation for the existence of a SG tube leak by checking two independent radiation monitors R-70s/R-15, R-70s/R-23B, or R-15/R-23B trending in the same direction with the same order of magnitude. <ul style="list-style-type: none"> • Consider placing SJAE Filtration System in service per FNP-1-SOP-28.5 	
	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 action on next page.

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Event Description: 1A SG Tube Leak (15gpm)

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	(step 7) Refer to Technical Specifications section 3.4.13 for limiting conditions for operation.	T.S. Listed on PAGE15
ARP-1.6, Annunciator response procedure, FH1 Ver. 70			
	BOP	Reference ARP FH1 (step 1) Check indications on radiation monitoring system console and determine which radiation monitor channel indicates high activity. (step 2) Insure any auto actions have occurred.	
	BOP	Check ARP FH1 for actions as Rad monitors come into alarm. (step 3.3) Do not allow personnel to enter the affected area without the approval of the Health Physics Department. (step 3.6) IF high activity indication of Steam Generator Tube Leakage is present, THEN go to FNP-1-AOP-2.0, STEAM GENERATOR TUBE LEAKAGE.	

Op Test No.: FA2013301 Scenario # 3 Event # 5 Page 12 of 46
 Event Description: **1A SG Tube Leak (15gpm)**

Time	Pos.	Expected Actions/Behavior	Comments
	SRO/ BOP	<p><u>IF R-15</u> alarms <u>AND</u> remains above the alarm setpoint (not a momentary spike), <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> • <u>IF</u> high effluent activity is possible, <u>THEN</u> implement NMP-EP-110 • Notify the Counting Room to <u>immediately</u> sample the SGs per CCP-31 to determine the leak rate. • Notify the Operations Shift Manager. • <u>IF</u> an actual SG tube leak is confirmed, consider placing SJAE Filtration System in service per FNP-1-SOP-28.5. <p><u>IF R-19</u> alarms refer to SOP-45.0 for guidance in sampling SGs with R-19 in alarm.</p> <p><u>IF R-23A OR R-23B</u> alarms, contact the RAD man to verify SGBD secured.</p>	
AOP-2.0, Steam Generator Tube Leakage Ver. 35			
	RO	<p>(step 1) Maintain pressurizer level stable at normal programmed value by:</p> <ul style="list-style-type: none"> - Control charging - Reduce letdown close HV-8149 A, B, C 	<p>NOTE: [CA] step FK-122 adjusted as required</p> <p>close one or more orifice isol. valves</p>
	RO	<p>(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</p> <p>_____ (charging flow)</p> <p>+ _____ (seal injection flow)</p> <p>- _____ (letdown flow)</p> <p>- _____ (#1 seal leakoff flow)</p> <p>= _____ (RCS leak rate)</p>	

Op Test No.: FA2013301 Scenario # 3 Event # 5 Page 13 of 46

Event Description: 1A SG Tube Leak (15gpm)

Time	Pos.	Expected Actions/Behavior	Comments
	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%	
	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 –

Op Test No.: FA2013301 Scenario # 3 Event # 5 Page 14 of 46
 Event Description: **1A SG Tube Leak (15gpm)**

Time	Pos.	Expected Actions/Behavior	Comments
	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 ≥30 gpd/hr rate of increase <u>AND</u> ≥75 gpd leak in any SG	
	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	(step 12.2) Direct reducing power to ≤ 50% rated thermal power within 1 hour	Unit is below 50% already
	RO BOP	(step 12.3) Place the Unit in Mode 3 within the next 2 hours.	Begin ramping offline
	SRO	(step 12.4) Identify the correct leaking SG Using R-70s, R-60s and level rise in any SG	1A SG has a 15 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	

Op Test No.: FA2013301 Scenario # 3 Event # 5 Page 15 of 46

Event Description: 1A SG Tube Leak (15gpm)

Time	Pos.	Expected Actions/Behavior	Comments		
	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			
	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 <i>RCS operational LEAKAGE shall be limited to:</i> <i>d. 150 gallons per day primary to secondary LEAKAGE through any one SG.</i>					
		CONDITION	REQUIRED ACTION	COMPLETION TIME	

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Event Description: **1A SG Tube Leak (15gpm)**

Time	Pos.	Expected Actions/Behavior		Comments	
		<i>B. Required Action and associated Completion Time of Condition A not met.</i> OR <i>Pressure boundary LEAKAGE exists.</i> OR Primary to secondary LEAKAGE not within limit.	<i>B.1 Be in MODE 3.</i> AND <i>B.2 Be in MODE 5.</i>	6 hours 36 hours	
When ramp of 5% completed and at the discretion of the Lead Examiner move to the next Event. Tech Spec evaluation if required by examiner may be delayed until after scenario termination.					

Op Test No.: FA2013301 Scenario # 3 Event # 6 Page 17 of 46

Event Description: Only running Feed pump trips >5% power. **Loss of BOTH SGFPs.**

SGFP trips resulting in a loss of feed condition. At >5% this requires a Reactor Trip.

Indications Available:

Annunciators:

- KC3 1A or 1B SGFP TRIPPED
- JF1/2/3 SG LVL DEV

Indications

- SGFP Speed decreasing
- SGWL decreasing

Time	Pos.	Expected Actions/Behavior	Comments
AOP-13, Condensate and Feedwater Malfunction, ver 33			
NOTE: All steps listed below are immediate operator actions.			
	SRO	(step 1) Check only one SGFP running	RNO Proceed to step 2
	SRO	(Step 2) Check Both SGFPs - TRIPPED	
	RO	(Step 2.1) Check Rx power less than 5%	RNO Trip the reactor and go to FNP-1-EEP-0, REACTOR TRIP OR SAFETY INJECTION.
See next page for EEP-0 and FRP-S.1 actions.			

Op Test No.: FA2013301 Scenario # 3 Event # 7 Page 18 of 46
 Event Description: **FRP-S.1 Entry**

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. 1A SG will rupture upon exit of this procedure.

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

Enter EEP-0, Reactor Trip or Safety Injection, version 44

	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. <ul style="list-style-type: none">• N1C11E005A• N1C11E005B 1.3 IF reactor will NOT trip, THEN go to FNP-1-FRP-S.1
	SRO	Direct entry into FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION – ATWT, Ver 27.0	
Steps 1 and 2 are IOA steps			
	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.	Critical task Insert negative reactivity
	BOP	(step 2) Check Main Turbine tripped	Critical task RNO Place main turbine emergency trip switch to TRIP for at least 5 seconds.
NOTE: 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.: FA2013301 Scenario # 3 Event # 7 Page 19 of 46Event Description: **FRP-S.1 Entry**

	BOP	(step 3) Verify AFW pumps running <ul style="list-style-type: none">• Both MDAFWPs amps > 0• TDAFWP 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 pump• Open MOV 8104• Establish normal letdown flow – 8149A and either 8149B or C open• Establish normal charging flow > 40 gpm• Verify adequate emergency boration flow of > 30 gpm on FI-110• Check RCS pressure less than 2335 psig	

Op Test No.: FA2013301 Scenario # 3 Event # 7 Page 20 of 46Event Description: **FRP-S.1 Entry**

	BOP	<p>(step 5) Verify containment ventilation isolation.</p> <p>Verify containment purge dampers - CLOSED.</p> <ul style="list-style-type: none"> • 3197 • 3198D • 3198C • 3196 • 3198A • 3198B <p>Verify containment mini purge dampers - CLOSED.</p> <p>CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D</p> <ul style="list-style-type: none"> • 2866C • 2867C <p>CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C</p> <ul style="list-style-type: none"> • 2866D • 2867D <p>Stop MINI PURGE SUPP/EXH FAN.</p>	
	BOP	<p>(step 6) Check SI actuated – 6.1 BYP & PERMISSIVE SAFETY INJECTION</p> <ul style="list-style-type: none"> • ACTUATED status light lit • MLB-1 1-1 lit • MLB-1 11-1 lit <p>(IF SI has actuated) 6.2 Initiate ATTACHMENT 1, AUTOMATIC SAFETY INJECTION VERIFICATION.</p>	<p>Go to page 33 for ATT 1 actions.</p>

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Event Description: FRP-S.1 Entry

	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: Transition to EEP-0 will be made when requirements of step 8 are met. Also, at this time the 1A SG tube leak rate increases to 500gpm (SGTR).			
	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.
	BOP	(step 9) Monitor CST level. Check CST level greater than 5.3 ft. CST LVL <ul style="list-style-type: none"> • LI 4132A • LI 4132B 	NOTE: [CA] step
	BOP	(step 10) Check SG levels. Check at least one SG narrow range level - GREATER THAN 31%{48%}.	NOTE: [CA] step

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 22 of 46
 Event Description: **1A SGTR 500 gpm.**

1A SG will rupture upon exit of FRP-S.1. During isolation of the ruptured generator in EEP-3.0 a steam break will occur on 1A SG and require transition to EEP-2.0.

Indications Available:

Annunciators:

- Various and many

Recognize indications of tube rupture

- Charging Flow increasing
- VCT level decreasing
- PZR level decreasing
- Uncontrolled SGWL rise

Enter EEP-0, Reactor Trip or Safety Injection, version 44

	RO/ BOP	<p>(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 of EEP-0
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Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 23 of 46
 Event Description: **1A SGTR 500 gpm.**

	RO/ BOP	<p>(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</p> <p>(step 4.2) Verify both trains of SI- ACTUATED. <input type="checkbox"/> MLB-1 1-1 lit AND <input type="checkbox"/> MLB-1 11-1 lit</p>	
<p>NOTE: IF crew has not recognized SGTR yet they may transition to ESP-0.1. FOLDOUT PAGE criteria of ESP-0.1 to actuate SI and transition back EEP-0 is PZR level <4%. If required, actions for ESP-0.1 are located on PAGE 36</p>			
	SRO	<p>(step 5) Directs continuing into EEP-0 at step 5. Directs the BOP to perform attachment 2.</p>	<p>For Attachment 2 and 4 actions. Go to page 39</p>
		<p>EEP-0 FOLD OUT PAGE CRITERIA IN EFFECT Ruptured SG AFW Isolation.</p> <ul style="list-style-type: none"> Manually stop AFW flow to a SG if BOTH conditions listed below occur: <ul style="list-style-type: none"> Level increases in an uncontrolled manner or radiation in that SG is abnormal AND Narrow range level – GREATER THAN 31% {48%} 	<p>NOTE: [CA] step The action to Isolate AFW to the ruptured SG may be completed beyond this point.</p>
	RO	<p>(step 6) Check containment pressure- HAS REMAINED LESS THAN 27 psig</p>	<p>NOTE: [CA] step –</p>
	RO	<p>(step 7) Announce "Unit 1 reactor trip and safety injection".</p>	

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 24 of 46

Event Description: 1A SGTR 500 gpm.

	RO	<p>(step 8) Check AFW status. Check secondary heat sink Available</p> <ul style="list-style-type: none"> ○ Check total AFW flow > 395 gpm <input type="checkbox"/> FI 3229A <input type="checkbox"/> FI 3229B <input type="checkbox"/> FI 3229C ○ Total Flow FI 3229 <p>OR</p> <p>Check any SG NR level > 31% {48%}</p> <p>WHEN all SG narrow range levels less than 31%{48%}, THEN maintain total AFW flow greater than 395 gpm.</p> <p>WHEN at least two SG narrow range levels greater than 28% AND TDAFWP NOT required, THEN stop TDAFWP.</p>	
	RO	<p>(step 8.4) WHEN SG narrow range level greater than 31%{48%}, THEN maintain SG narrow range level 31%-65%{48%-65%}.</p> <ul style="list-style-type: none"> • Control MDAFWP flow. <p>MDAFWP FCV 3227 RESET</p> <ul style="list-style-type: none"> <input type="checkbox"/> A TRN reset <input type="checkbox"/> B TRN reset <p>MDAFWP TO 1A/1B/1C SG B TRN</p> <ul style="list-style-type: none"> <input type="checkbox"/> FCV 3227 in MOD <p>Control TDAFWP flow.</p> <p>TDAFWP FCV 3228</p> <ul style="list-style-type: none"> <input type="checkbox"/> RESET reset <p>TDAFWP SPEED CONT</p> <ul style="list-style-type: none"> <input type="checkbox"/> SIC 3405 adjusted 	NOTE: [CA] step –
	RO	<p>(step 9) Check RCS temperature.</p> <p>IF any RCP running, THEN check RCS average temperature - STABLE AT OR APPROACHING 547°F.</p> <p>TAVG 1A(1B,1C) RCS LOOP</p> <ul style="list-style-type: none"> <input type="checkbox"/> TI 412D <input type="checkbox"/> TI 422D <input type="checkbox"/> TI 432D 	

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Event Description: 1A SGTR 500 gpm.

	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.</p> <p>STM DUMP INTERLOCK</p> <p><input type="checkbox"/> A TRN in OFF RESET</p> <p><input type="checkbox"/> B TRN in OFF RESET</p> <p>(step 9.1.2) Verify atmospheric reliefs closed on MCB</p> <p><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,</p> <p>AFW FLOW TO 1A(1B,1C) SG</p> <p><input type="checkbox"/> FI 3229A</p> <p><input type="checkbox"/> FI 3229B</p> <p><input type="checkbox"/> FI 3229C</p> <p>AFW TOTAL FLOW</p> <p><input type="checkbox"/> FI 3229</p> <p>IF MSIVs are closed THEN proceed to step 9.1.8</p>	NOTE: RNO column since RCS temp will be <547°F
	BOP	<p>(step 9.1.5 RNO) IF MSIV's are open THEN isolate steam loads in the turbine building:</p> <ul style="list-style-type: none"> MSRs reset <p>(steps 9.1.5.1 and 9.1.5.2 RNO) these actions are performed by Systems Operators when RX trip is announced in step 7.</p>	
	BOP	<p>(step 9.1.5.4 RNO) IF two SJAE's in service, THEN secure one SJAE</p> <ul style="list-style-type: none"> 1A SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed 1B SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed 	

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 26 of 46Event Description: **1A SGTR 500 gpm.**

	BOP	(step 9.1.6 RNO) IF cool down continues THEN close main steam isolation and bypass valves. 1A(1B,1C) SG MSIV - TRIP <input type="checkbox"/> Q1N11HV3369A <input type="checkbox"/> Q1N11HV3369B <input type="checkbox"/> Q1N11HV3369C <input type="checkbox"/> Q1N11HV3370A <input type="checkbox"/> Q1N11HV3370B <input type="checkbox"/> Q1N11HV3370C 1A(1B,1C) SGMSIV - BYPASS <input type="checkbox"/> Q1N11HV3368A <input type="checkbox"/> Q1N11HV3368B <input type="checkbox"/> Q1N11HV3368C <input type="checkbox"/> Q1N11HV3976A <input type="checkbox"/> Q1N11HV3976B <input type="checkbox"/> Q1N11HV3976C	

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Event Description: 1A SGTR 500 gpm.

	RO	<p>(step 10) Check pressurizer PORVs and spray valves. WHEN pressurizer pressure less than 2335 psig, THEN verify both PRZR PORVs closed.</p> <p>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>	
	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 and open when > 1900 psig.</p>

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 28 of 46
 Event Description: **1A SGTR 500 gpm.**

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. <input type="checkbox"/> Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig.	
	SRO	(step 14) Check SGs not ruptured <input type="checkbox"/> No SG level rising in an uncontrolled manner.	RNO: Go TO EEP-3.0
EEP-3.0, Steam Generator Tube Rupture, ver 27.0			
	RO	(step 1) Check RCP criteria. Check SUB COOLED MARGIN MONITOR indication - > 16°F{45°F} SUBCOOLED IN CETC MODE.	
	BOP	(step 2) Identify ruptured SG(s). <ul style="list-style-type: none"> Check any SG level - RISING IN AN UNCONTROLLED MANNER 	NOTE: [CA] step –
	SRO/ RO	(step 3) WHEN ruptured SG(s) identified, THEN isolate flow from ruptured SG(s). Verify ruptured SG(s) atmospheric relief valve - ALIGNED. <ul style="list-style-type: none"> PC3371A set 8.25 and in auto Verify 3371A is closed Isolate steam supply from ruptured SG(s) to TDAFWP: N/A Verify blowdown from ruptured SG(s) - ISOLATED. (step 3.7) Verify at least one SG MSIV on 1A SG closed	NOTE: [CA] step – Neither 1B or 1C SG is ruptured Closes 7614A Verifies MSIV 3369A or 3370A closed and bypass valves closed

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 29 of 46

Event Description: **1A SGTR 500 gpm.**

NOTE: Step above triggers steam fault in 1A SG. **FOLDOUT PAGE** criteria will be met to transition to EEP-2.

No SG pressure falling in an uncontrolled manner or less than 50 psig. THEN go to EEP-2.

For EEP-2 actions Go To **Page 30**

	BOP	(step 4) WHEN ruptured SG(s) NR level greater than 31% THEN perform the following: Isolate AFW flow to ruptured SG(s) using FCVs. <ul style="list-style-type: none">• FCV 3227A in MOD• HIC 3227AA closed• HV 3328A in MOD• HIC 3328AA closed	NOTE: [CA] step –

Op Test No.: FA2013301 Scenario # 3 Event # 9 Page 30 of 46

Event Description: Faulted SG Isolation

1A SG has a SGTR and is NOW faulted. Isolation will be accomplished in EEP-2.0 and transition back to EEP-3 will be made. Based on a ruptured, faulted SG transition to ECP-3.1 will be made.

Indications Available:**Annunciators:**

- MH1 FIRE
- JB4 MS LINE HI STM FLOW ALERT

Recognize indications of SGTR with a fault:

- Przr level falling rapidly
- RCS pressure dropping rapidly
- Steam Flow increasing

Time	Pos.	Expected Actions/Behavior	Comments
EEP- 2.0, Faulted SG Isolation, version 15			
	BOP	(step 1) Verify all MSIV and bypass valves - CLOSED. Place handswitches for all MSIVs to the CLOSED position (6 total)	Critical task CLOSE MSIVs.
	BOP	(step 2) Check if any SG not faulted. Check pressure in at least one SG - STABLE OR RISING. (step 3) Identify the faulted SG	Only 1A SG will be blowing down once the MSIVs are closed 1A SG
	BOP	(step 4) Isolate all faulted SGs. <ul style="list-style-type: none"> • Verify ALL ARVs closed <ul style="list-style-type: none"> ○ 3371A/B/C • Verify ALL Feed stop valves closed <ul style="list-style-type: none"> ○ 3232A/B/C • Verify blowdown from all faulted SGs ISOLATED. <ul style="list-style-type: none"> ○ 7614A/B/C 	
	BOP	(step 4.6) Verify SG blowdown sample ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE ISO <ul style="list-style-type: none"> • MLB1 19-2 lit Q1P15HV3328 • MLB1 19-3 lit Q1P15HV3329 • MLB1 19-4 lit Q1P15HV3330 	

Op Test No.: FA2013301 Scenario # 3 Event # 9 Page 31 of 46

Event Description: Faulted SG Isolation

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 5.1) Isolate AFW flow to all faulted SGs. Close MDAFWP isolation valves to all faulted SGs. (BOP) <ul style="list-style-type: none"> 3764A closed 3764E closed 	Critical task
		(Step 5.2) Close TDAFWP flow control valves to all faulted SGs. TDAFWP FCV 3228 <ul style="list-style-type: none"> RESET 3228A in MOD 3228AA closed 	Critical task AFW isolated by either this step or v017A called for.
	SRO	(step 5.3) Locally close flow control inlet to faulted SGs. <ul style="list-style-type: none"> Q1N23V017A 	
	BOP	(step 6) Check CST level greater than 5.3 feet. <ul style="list-style-type: none"> LI 4132A LI 4132B 	
The intent of Step 7 is to transition to EEP-3 if a known SGTR exists. Since there is a Rx trip and SI at this point the secondary radiation monitors may not indicate a SGTR. However, the 1A SG has a Fault and a Tube rupture and should be identified and EEP-3 entered.			
	SRO	(step 7.1) Direct Counting Room to sample per CCP-31. (step 7.2) Check secondary radiation indication - NORMAL. <ul style="list-style-type: none"> R-15 R-19 R-23A and B R-15B and C, R-60 A, B, C, D 	RNO: Go to EEP-3.0

Op Test No.: FA2013301 Scenario # 3 Event # 9 Page 32 of 46

Event Description: Faulted SG Isolation

Time	Pos.	Expected Actions/Behavior	Comments
ECP-3.0, Steam Generator Tube Rupture, ver 27.0			
Note: Crew may return to step 4			
	RO	(step 1) Check RCP criteria. Check SUB COOLED MARGIN MONITOR indication - > 16°F{45°F} SUBCOOLED IN CETC MODE.	
	BOP	(step 2) Identify ruptured SG(s). • Check any SG level - RISING IN AN UNCONTROLLED MANNER	NOTE: [CA] step –
	SRO/ RO	(step 3) WHEN ruptured SG(s) identified, THEN isolate flow from ruptured SG(s). Verify ruptured SG(s) atmospheric relief valve - ALIGNED. • PC3371A set 8.25 and in auto • Verify 3371A is closed Isolate steam supply from ruptured SG(s) to TDAFWP: N/A Verify blowdown from ruptured SG(s) - ISOLATED. (step 3.7) Verify at least one SG MSIV on 1A SG closed	NOTE: [CA] step – Neither 1B or 1C SG is ruptured Closes 7614A Verifies MSIV 3369A or 3370A closed and bypass valves closed
	BOP	(step 4) WHEN ruptured SG(s) NR level greater than 31% THEN perform the following: Isolate AFW flow to ruptured SG(s) using FCVs. • FCV 3227A in MOD • HIC 3227AA closed • HV 3328A in MOD • HIC 3328AA closed	NOTE: this is a continuing action step
	SRO	(step 5) Check ruptured SG(s) pressure GREATER THAN 250 psig.	Go to ECP-3.1 transition at this step
When the 1A MSIVs and the AFW flow to the 1A SG is isolated, then terminate the exam.			

Op Test No.: FA2013301 Scenario # 3 Event # 7 Page 33 of 46

Event Description: Attachment 1 of FRP-S.1

Time	Pos.	Expected Actions/Behavior	Comments
Attachment 1 of FRP-S.1			
AUTOMATIC SAFETY INJECTION VERIFICATION			
	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</p> <p>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 	

Op Test No.: FA2013301 Scenario # 3 Event # 7 Page 34 of 46

Event Description: Attachment 1 of FRP-S.1

	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 	

Op Test No.: FA2013301 Scenario # 3 Event # 7 Page 35 of 46Event Description: **Attachment 1 of FRP-S.1**

	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>	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	
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HI-HI ctmt press	>16.2 psig	2/3	TSLB1 2-2,3,4																								
		If a MSLI signal is present then close ALL MSIVs																									
	BOP	(step 11) Check containment pressure -HAS REMAINED LESS THAN 27 psig.																									
End of attachment 1 of FRP-S.1																											

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 36 of 46

Event Description: ESP-0.1 Actions

ESP-0.1, Reactor Trip or Safety Injection, rev 32

FOLDOUT PAGE criteria of ESP-0.1 to actuate SI and transition back EEP-0 is PZR level <4%.
When SI is actuated return to page **PAGE 22**

	RO	(step 1) Check RCS temperature <ul style="list-style-type: none"> IF any RCP running, THEN check RCS average temperature – STABLE AT OR APPROACHING 547 F 	
	BOP	(step 1.1.1 RNO) Verify steam dumps closed <ul style="list-style-type: none"> STM Dump Interlock A and B Train to OFF RESET 	
	BOP	(step 1.1.2 RNO) Verify atmospheric reliefs closed. MS ATMOS REL VLV <ul style="list-style-type: none"> PC 3371A PC 3371B PC 3371C 	
	BOP	(step 1.1.3 RNO) IF MSIV's are open THEN isolate steam loads in the turbine building while continuing with RNO step 1.1.4. <ul style="list-style-type: none"> Resets MSRs 	NOTE: steps in 1.3.1 RNO other than listed actions are dispatched outside of the control room
	BOP	(step 1.1.3.4 RNO) IF two SJAE's in service, THEN secure one SJAE <ul style="list-style-type: none"> 1A SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed 1B SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed 	
	BOP	(step 1.1.3.5 RNO) Verify SG blowdown – ISOLATED 1A(1B,1C) SGBD <ul style="list-style-type: none"> Q1G24HV7614A closed Q1G24HV7614B closed Q1G24HV7614C closed 	

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 37 of 46Event Description: **ESP-0.1 Actions**

	BOP	(step 1.1.4 RNO) IF cooldown continues, THEN minimize total AFW flow. AFW FLOW to 1A(1B,1C) SG <ul style="list-style-type: none"> • FI 3229A • FI 3229B • FI 3229C AFW TOTAL FLOW <ul style="list-style-type: none"> • FI 3229 <ul style="list-style-type: none"> ○ Control TDAFWP <ul style="list-style-type: none"> ▪ FCV 3228 Reset ▪ SIC 3405 adjusted 	NOTE: This may have been already directed to be controlled via operator aid posted on MCB
	BOP	(step 1.1.5 RNO) IF cooldown continues THEN close main steam isolation and bypass valves. 1A(1B,1C) SG MSIV - TRIP <ul style="list-style-type: none"> <input type="checkbox"/> Q1N11HV3369A <input type="checkbox"/> Q1N11HV3369B <input type="checkbox"/> Q1N11HV3369C <input type="checkbox"/> Q1N11HV3370A <input type="checkbox"/> Q1N11HV3370B <input type="checkbox"/> Q1N11HV3370C 1A(1B,1C) SG MSIV - BYPASS <ul style="list-style-type: none"> <input type="checkbox"/> Q1N11HV3368A <input type="checkbox"/> Q1N11HV3368B <input type="checkbox"/> Q1N11HV3368C <input type="checkbox"/> Q1N11HV3976A <input type="checkbox"/> Q1N11HV3976B <input type="checkbox"/> Q1N11HV3976C 	

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 38 of 46Event Description: **ESP-0.1 Actions**

		<p>(step 2) When RCS average temperature less than 554F THEN verify feedwater status</p> <p>(step 2.1) Verify main feedwater flow control and bypass valves- CLOSED</p> <p>1A(1B,1C) SG FW FLOW</p> <ul style="list-style-type: none">• FCV 478• FCV 488• FCV 498 <p>1A(1B,1C) SG FW BYP FLOW</p> <ul style="list-style-type: none">• FCV 479• FCV 489• FCV 499 <p>(step 2.2) Defeat MDAFWP auto start on SGFP trip.</p> <ul style="list-style-type: none">• 1A in DEFEAT• 1B in DEFEAT <p>(step 2.3) Verify both steam generator feed pumps - TRIPPED</p>	
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Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 39 of 46

Event Description: Attachment 2 of EEP-0

Cue: BOP will accomplish when at step 5 of EEP-0

Attachment 2 of EEP-0

AUTOMATIC ACTIONS VERIFICATION

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}.	Operator should proceed to step 4
	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

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>	
	BOP	<p>(step 6) Verify containment ventilation isolation.</p> <p>Verify containment purge dampers - CLOSED.</p> <p><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.</p> <p>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

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 41 of 46Event Description: **Attachment 2 of EEP-0**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<p>(step 7) Verify containment fan cooler alignment.</p> <p>Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED.</p> <p><u>CTMT CLR FAN SLOW SPEED</u></p> <p>A train</p> <p><input type="checkbox"/> 1A</p> <p><input type="checkbox"/> 1B</p> <p>B train</p> <p><input type="checkbox"/> 1C</p> <p><input type="checkbox"/> 1D</p> <p>Verify associated emergency service water outlet valves - OPEN.</p> <p>EMERG SW FROM 1A(1B,1C,1D) CTMT CLR</p> <p><input type="checkbox"/> Q1P16MOV3024A</p> <p><input type="checkbox"/> Q1P16MOV3024B</p> <p><input type="checkbox"/> Q1P16MOV3024C</p> <p><input type="checkbox"/> Q1P16MOV3024D</p>	

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 42 of 46

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	RNO 8.1 Verify MDAFW Pumps deliver flow to each SG. 8.1.1 Manually start MDAFW Pumps 8.1.2 Verify AFW flow path to AND each SG. <input type="checkbox"/> Q1N23HV3227A in MOD <input type="checkbox"/> Q1N23HV3227B in MOD <input type="checkbox"/> Q1N23HV3227C in MOD MDAFWP TO 1A(1B,1C) SG FLOW CONT <input type="checkbox"/> HIC 3227AA open <input type="checkbox"/> HIC 3227BA open <input type="checkbox"/> HIC 3227CA open AFW TO 1A(1B,1C) SG STOP VLV <input type="checkbox"/> Q1N23MOV3350A open <input type="checkbox"/> Q1N23MOV3350B open <input type="checkbox"/> Q1N23MOV3350C open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764A open <input type="checkbox"/> Q1N23MOV3764D open <input type="checkbox"/> Q1N23MOV3764F open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764E open <input type="checkbox"/> Q1N23MOV3764B open <input type="checkbox"/> Q1N23MOV3764C open
		(Step 8.2) Check TDAFW Pump start required. <input type="checkbox"/> Condition <input type="checkbox"/> TSLB <input type="checkbox"/> Setpoint <input type="checkbox"/> Coincidence	
		RCP Bus TSLB2 1-1 <input type="checkbox"/> 2680 V Undervoltage 1-2 1-3	1/2 Detectors on 2/3 Busses
		Low Low SG TSLB4 28% Water Level 4-1,4-2,4-3 In Any 5-1,5-2,5-3 2/3 SGs 6-1,6-2,6-3	2/3 Detectors on 2/3 SGs

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 43 of 46

Event Description: Attachment 2 of EEP-0

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></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> </tbody> </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																				
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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> <p>11.3 Verify Excess Letdown Isolation valves closed. <input type="checkbox"/> Q1E21HV8153, EXC LTDN ISO <input type="checkbox"/> Q1E21HV8154, EXC LTDN ISO</p>																					

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 44 of 46

Event Description: Attachment 2 of EEP-0

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 (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.
	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	
	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.: FA2013301 Scenario # 3 Event # 8 Page 45 of 46Event Description: **Attachment 2 of EEP-0**

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

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 46 of 46

Event Description: Attachment 4 of EEP-0

Time	Pos.	Expected Actions/Behavior	Comments
Attachment 4 of EEP-0 TWO TRAIN ECCS ALIGNMENT VERIFICATION			
		<p>(Step 1) Verify two trains of ECCS equipment aligned.</p> <ul style="list-style-type: none"> <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 <p>(Step 1.6) Verify two trains of ESF equipment aligned.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Check all MLB-1 lights LIT <p>Verify charging pump suction and discharge valves - OPEN.</p> <p>CHG PUMP DISCH HDR ISO</p> <ul style="list-style-type: none"> <input type="checkbox"/> Q1E21MOV8132A <input type="checkbox"/> Q1E21MOV8132B <input type="checkbox"/> Q1E21MOV8133A <input type="checkbox"/> Q1E21MOV8133B <p>CHG PUMP SUCTION HDR ISO</p> <ul style="list-style-type: none"> <input type="checkbox"/> Q1E21MOV8130A <input type="checkbox"/> Q1E21MOV8130B <input type="checkbox"/> Q1E21MOV8131A <input type="checkbox"/> Q1E21MOV8131B 	
		<p>(Step 1.7) Verify all post accident containment air mixing system fans - STARTED. (BOP)</p> <p>POST ACCIDENT MIXING FAN</p> <ul style="list-style-type: none"> <input type="checkbox"/> 1A <input type="checkbox"/> 1B <input type="checkbox"/> 1C <input type="checkbox"/> 1D <p>RX CAV H2 DILUTION FAN</p> <ul style="list-style-type: none"> <input type="checkbox"/> 1A <input type="checkbox"/> 1B <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.: FA2013-301

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.

In the unlikely event that the simulator fails such that illogical indications result, the session will be terminated. In other words, 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-2

[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 29% power, 429 ppm, EOL 16000 MWD/MTU
Status

TARGET ZERO
 Every Day, Every Job Safely

STPs/Evolutions:

STP-27.1 completed 2
 hours ago

B 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 Maintain 29% power and complete chemistry hold (2 more hours), then ramp to 100% power
- Current Risk Assessment is **YELLOW** and projected is **YELLOW** due to maintenance on 1A MDAFW pump and 1C DG
- UOP-3.1 ver 112.4, is complete through step 5.3.
- 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Fuel handling in ongoing in the SFP.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia
- Unit 2 PSS is OFF for Maintenance (OOS 2 hrs, ETR 2 hrs)
-

Equipment Status

Maintain VCT gas pressure 25-30 psig

Reactivity Plan

Diluting ?? gallons every 15 minutes

Waste Management Status

#3 RHT – On Service

WGS – secured

LCO Status

3.8.1 condition B, STP-27.1 completed 2 hours ago

3.7.5 Condition B

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

Facility:	Farley Nuclear Plant	Scenario No.:	4	Op-Test No.:	FA2013-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
<p>Initial Conditions: 75% power 1180 ppm, MOL, ramping down to MODE 3 due to Hurricane warnings in effect. Winds in excess of 75 mph expected at the plant site in 6 hours.</p> <p>Turnover:</p> <ul style="list-style-type: none"> Unit 2 PSS is OFF (OOS 2 hrs, ETR 2hrs) 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs) 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs) AOP-21, Severe Weather, is in effect due to Hurricane warning and high winds in the area. Current Risk Assessment is YELLOW and projected is YELLOW. B Train On-Service – B Train Protected. 					
SPLIT TRAIN ALIGNMENT					
Event No.	Malf. No.	Event Type*	Event Description		
1		R (RO) N (BOP) C (BOP)	Ramp down at 5 MW/min –ramp on hold with 2 MW/min in and HOLD not LIT- BOP will have to enter ramp rate and target, depress GO		
2	Imf cccp01c _d_cc13	TS (SRO)	1C CCW pump trips (A Train CCW which is supplying CCW to the on service Chg pump and is not the on service train). TS 3.7.7 Condition A		
3	mal- eps-inva	C (RO) TS (SRO)	1A inverter fails and does not automatically transfer to the bypass source. TS 3.8.7 and 3.8.9		
4	Imf pt508	I (BOP)	PT-508, Feedwater header pressure, fails high.		
5	mal- cvc02 120	C (RO)	Letdown leak inside ctmt. This is an isolable leak by securing letdown. 120 -130 gpm. AOP-1.0 entry and possible roll to RWST.		
6	mal cp4055k -c / preset	M (ALL) C (RO)	H2 Temp Control Valve Failure leads to RX trip. Main Turbine trips 4 minutes after 50°C is reached. Manual Rx trip required. Auto RX trip is blocked.		
7	mal- mss1a	M (ALL)	1A SG Large steam break inside CTMT ramps in slowly (In ESP-0.1, step 2). SG isolated per EEP-2. (CT)		
8	Mal- eps1 /preset	C (BOP) C (RO) C (BOP)	LOSP occurs at step 6 of EEP-0. A Train Chg pump will have to be secured due to no CCW. (Preset trip of the 1A CHG pump when temp exceeds 175°F) 1C Chg pump (B Train) does not auto start. A train Chg pump will be secured or trip. (CT) 1A CCW pump does not auto start. Required for cooling of ESF components. (CT)		
9	preset	C (BOP)	1B CS pump does not auto start. MOV 8820A does not open. Selected Ctmt coolers do not auto start. Critical Task criteria: *1 CS spray pump and 1 Ctmt clr required (CT) FRP-Z.1 orange path entry required with the conditions given if the 1B CS pump is NOT started from the MCB prior to FRP-Z.1 entry.		
			Terminate at ESP 1.1 entry		

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

Event No.		Malfunction	* means in Bat file
6		RX fails to AUTO trip imf cbkrxtrp_cc5 open imf cbkrxtrp_cc6 open	*
3		1A inverter does not auto xfer to the bypass source Imf mal-eps-invsa	*
9		1B CS pump does not auto start – will start from MCB CMFmalf / cbkp01b_d_cc5/ open	*
9		MOV 8820A does not open on phase B CMFmalf / cbk8820a_d_cc5 / open	*
9		1D ctmr coolers do not auto start CMFmalf / cchf1dl_d_cc3 / open CMFmalf / cchf1dl_d_cc4 / open	*
9		1B ctmr coolers do not auto start CMFmalf / cchf1bl_d_cc3 / open CMFmalf / cchf1bl_d_cc4 / open	*
6		Four minutes after H2 Temp reaches 50°C generator trips Imf mal-tur16 (2 240) 150 3	TRG 2
8		1C Chg pump does not auto start imf cCVP01C_d_cc6 open imf cCVP01C_d_cc3 open	*
8		1A CCW pump does not auto start imf cCCP01a_d_cc3 open imf cCCP01a_d_cc6 open	*
0		Tag 1A MDAFW pump irf cafp01a_d_cd1 open	*
0		1C DG Tagged out irf cBK1DH07_d_cd1 / open irf cBK2DH07_d_cd1 / open irf cBK1DH07_d_cd2 / open irf cBK2DH07_d_cd2 / open	*
		Triggers and Commands	
		Four minutes after H2 Temp reaches 50C generator trips Trigger2: "ti4067 > 50.0"	*
		Charging pump 1A trip due to high LO temp trgset 3 "tchspoil(1) > 175" trg 3 "imf cCVP01A_d_cc15 closed"	

Initial Conditions: 75% power 1180 ppm, MOL, ramping down to MODE 3 due to Hurricane warnings in effect. Winds in excess of 75 mph expected at the plant site in 6 hours.

Turnover:

- Unit 2 PSS is OFF (OOS 2 hrs, ETR 2hrs)
- 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- AOP-21, Severe Weather, is in effect due to Hurricane warning and high winds in the area.
- Current Risk Assessment is **YELLOW** and projected is **YELLOW**.
- **B** Train On-Service – **B** Train Protected.

- Event 1** Ramp down in power at 5 MW/min to be off line in 2 hours.
Verifiable actions: RO will adjust rods or boron to control Tav_g/Tref on program, BOP will place impulse loop in service, set target and ramp, and start a ramp on the Main Turbine.
- Event 2** 1C CCW pump trips. **TS 3.7.7 Condition A**
Verifiable actions: The 1A Chg pump will be secured and the 1C Chg pump will be started.
- Event 3** 1A inverter fails and does not automatically transfer to the bypass source. The control room will have the Rover transfer to the bypass manually. **TS 3.8.7 Condition A and 3.8.9 Condition B**
(All RMW pumps will start, all BAT pumps will start, TCV-143 will shift to the VCT and LCV-115A will shift letdown to the RHT.)
Verifiable actions: LCV-115A will be returned to the VCT position, the BAT pumps secured, RMW pump secured, TCV-143 addressed.
- Event 4** PT-508 fails high. SGFP speed decreases to 3200RPM
Verifiable actions: Take manual control of the SGFP and raise SGFP speed. Control SG water levels since they will start to decrease.
- Event 5** Letdown leak inside ctmt on letdown line between LCV-459 and orifice isolation valves.
Verifiable actions: Isolate the leak by closing LCV-459/460 and HV 8149A, B and C.
- Event 6** Hydrogen Temperature control valve fails closed slowly and cannot be corrected. Hydrogen temp requires a RX trip above 48°C if not being controlled. Main Turbine will trip 4 minutes after 50°C on turbine is reached. The AUTO RX trip is blocked.
Verifiable actions: Manual reactor trip.
- Event 7** Large Steam Break inside Containment after Step 2 of ESP-0.1. This will cause an automatic safety injection.
Verifiable actions: Possible manual SI. SG isolated per EEP-2. **(CT)**
- Event 8** Dual unit LOSP. 1-2A and 1B DGs auto start to restore power. "B" Train LOSP sequencer will not auto start, charging pump or CCW pump.
Verifiable actions: start a "B" Train CCW pump **(CT)**, and start a "B" Train Chg pump **(CT)** and secure the 1A Chg pump which has no CCW flow to it.

Event 9 Phase B will actuate at 27 psig with the following complications:

1B CS pump does **not** start and MOV-8820A does **not** open. The selected ctmt coolers (1B/1D) do **not** auto start in slow speed.

Verifiable action: Start 1B CS pump. OR Open MOV-8820A and start one Ctmt cooler

Critical Task criteria: *1 CS spray pump and 1 Ctmt clr required **(CT)**

Transition will have to be made to EEP-2 to isolate the faulted SG, and FRP-Z.1 may be entered. 1B CS pump may be started at any time and MOV-8820A opened and if done prior to FRP-Z.1 entry, then Z.1 does NOT have to be entered.

Terminate the scenario when ESP-1.1 entered after either EEP-2.0 or EEP-1.0.

UOP-3.1/ AOP-9.0/ ARP/ AOP-100/ AOP-1.0/ ARP/ EEP-0/ ESP-0.1/ EEP-2(FRP-Z.1)/ ESP-1.1 OR EEP-1.0 then ESP-1.1.

CRITICAL TASK SHEET

- ___ 1. Establish flow from at least one HHSI pump before transition out of E-0 (start the 1C or 1B Chg pump). (WOG CT E-0 - - I)
- ___ 2. Manually start minimum number of CCW pumps required to provide adequate cooling. (WOG CT E-0 - - K)
- ___ 3. Manually actuate at least the minimum required complement of containment cooling equipment before an extreme (red-path) challenge develops to the containment CSF. (WOG CT E-0 - - E)
- Start the 1B CS pump and/or open MOV-8820A and start 1 ctmr cooler in slow with emergency SW aligned after Containment pressure is/has been > 27 psig, and prior to a Red Path on FRP-Z.1 (54 psig).
 - **Critical Task criteria:** *1 CS spray pump and 1 Ctmr clr required
- ___ 4. Isolate faulted SG before transitioning out of E-2. (WOG CT E-2 - - A)
- Isolate AFW flow
 - Isolate steam flow from 1A SG

SCENARIO
OBJECTIVE/
OVERVIEW:

Ramp down in progress.

The team should be able to:

- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-100, AOP-9.0 & Tech Specs
- Respond to a leak inside ctmr by using AOP-1.0 and subsequent ramp and isolation of the leak
- Identify Reactor trip criteria and manually trip the reactor, then identify and respond to a Steam break inside ctmr, initiate a SI and ensure SI flow criteria is met, recognize failed equipment and respond appropriately.

Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes
1.	Total malfunctions (5–8)	11
2.	Malfunctions after EOP entry (1–2)	6
3.	Abnormal events (2–4)	4
4.	Major transients (1–2)	2
5.	EOPs entered/requiring substantive actions (1–2)	1
6.	EOP contingencies requiring substantive actions (0–2)	1 possible
7.	Critical tasks (2–3)	4

Southern Nuclear J.M. Farley Nuclear Plant

Operations Training Simulator Exam Scenario

BOOTH INSTRUCTOR GUIDE

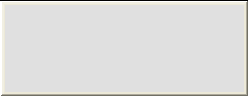

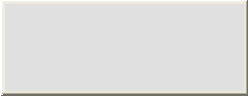


ILT-36 NRC EXAM SCENARIO #4

Validation time: 100 minutes Validated by McCaffery, Sorrell, Phillips The week of February 18, 2013			
TRN Supervisor Approval:	Gary Ohmstede	Date:	3/8/2013
NRC Chief Examiner	SEE NUREG 1021 FORM ES-301-3		





Facility:	Farley Nuclear Plant	Scenario No.:	4	Op-Test No.:	FA2013-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
IC 214(57)					
<u>Initial Conditions:</u> 75% power 1180 ppm, MOL, ramping down to MODE 3 due to Hurricane warnings in effect. Winds in excess of 75 mph expected at the plant site in 4 hours.					
<u>Turnover:</u> <ul style="list-style-type: none"> Unit 2 PSS is OFF (OOS 2 hrs, ETR 2hrs) 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs) 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs) AOP-21, Severe Weather, is in effect due to Hurricane warning and high winds in the area. Current Risk Assessment is YELLOW and projected is YELLOW. B Train On-Service – B Train Protected. 					
SPLIT TRAIN ALIGNMENT					
Event No.	Malf. No.	Event Type*	Event Description		
1		R (RO) N (BOP)	Ramp down at 5 MW/min –ramp on hold with 2 MW/min in and HOLD not LIT- BOP will have to place IMP LOOP in service, enter ramp rate and target, depress GO		
2	Imf cccp01c _d_cc1 3	C (BOP) TS (SRO)	1C CCW pump trips (A Train CCW which is supplying CCW to the on service Chg pump and is not the on service train). TS 3.7.7 Condition A		
3	mal- eps- inva	C (RO) TS (SRO)	1A inverter fails and does not automatically transfer to the bypass source. TS 3.8.7 Condition A and 3.8.9 Condition B		
4	Imf pt508	I (BOP)	PT-508, Feedwater header pressure, fails high.		
5	mal- cvc02 120	C (RO)	Letdown leak inside ctmt. This is an isolable leak by securing letdown. 120 -130 gpm. AOP-1.0 entry and possible roll to RWST.		
6	mal cp4055 k-c / preset	M (ALL) C (RO)	H2 Temp Control Valve Failure leads to RX trip. Main Turbine trips 4 minutes after 50°C is reached. Manual Rx trip required. Auto RX trip is blocked.		
7	mal- mss1a	M (ALL)	1A SG Large steam break inside CTMT ramps in slowly (In ESP-0.1, step 2). SG isolated per EEP-2. (CT)		

8	Mal-eps1 /preset	C (BOP) C (RO) C (BOP)	LOSP occurs at step 6 of EEP-0. A Train Chg pump will have to be secured due to no CCW. (Preset trip of the 1A CHG pump when temp exceeds 175°F) 1C Chg pump (B Train) does not auto start. A train Chg pump will be secured or trip. (CT) 1A CCW pump does not auto start. Required for cooling of ESF components. (CT)
9	preset	C (BOP)	1B CS pump does not auto start. MOV 8820A does not open. Selected Ctmt coolers do not auto start. Critical Task criteria: *1 CS spray pump and 1 Ctmt clr required (CT) FRP-Z.1 orange path entry required with the conditions given if the 1B CS pump is NOT started from the MCB prior to FRP-Z.1 entry.
			Terminate at ESP 1.1 entry



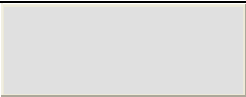
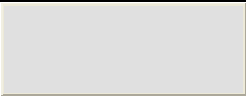
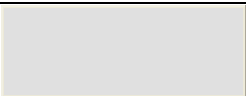
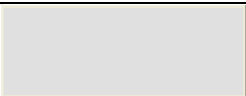

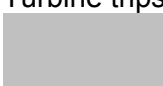

(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	Load in IC-214 Base IC is IC-57	
		RUN	 RUN simulator
0	0	Generic setup: bat 36exam/generic_setup_HLT.txt	
0	0	Quick setup (all items with * are included): bat 36exam/2013nrcexam_4.txt	
PRESETS			
6		RX fails to AUTO trip imf cbkrxtrp_cc5 open imf cbkrxtrp_cc6 open	*
3		1A inverter does not auto xfer to the bypass source Imf mal-eps-invsa	*
9		1B CS pump does not auto start – will start from MCB CMFmalf / cbkp01b_d_cc5/ open	*
9		MOV 8820A does not open on phase B CMFmalf / cbk8820a_d_cc5 / open	*
9		1D ctm coolers do not auto start CMFmalf / cchf1dl_d_cc3 / open CMFmalf / cchf1dl_d_cc4 / open	*
9		1B ctm coolers do not auto start CMFmalf / cchf1bl_d_cc3 / open CMFmalf / cchf1bl_d_cc4 / open	*
6		Four minutes after H2 Temp reaches 50°C generator trips Imf mal-tur16 (2 240) 150 3	TRG 2
8		1C Chg pump does not auto start imf cCVP01C_d_cc6 open imf cCVP01C_d_cc3 open	*
8		1A CCW pump does not auto start imf cCCP01a_d_cc3 open imf cCCP01a_d_cc6 open	*
0		Tag 1A MDAFW pump irf cafp01a_d_cd1 open	*
0		1C DG Tagged out irf cBK1DH07_d_cd1 / open irf cBK2DH07_d_cd1 / open irf cBK1DH07_d_cd2 / open irf cBK2DH07_d_cd2 / open	*
6		 Correct H2 high temp setpoint Set ctga20=118.4	*
Triggers and Commands			

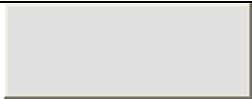

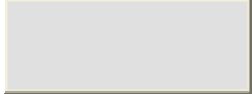

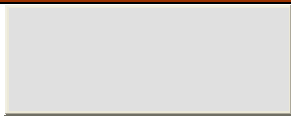

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
		Four minutes after H2 Temp reaches 50C generator trips Trigger2: "ti4067 > 50.0"	*
		Charging pump 1A trip due to high LO temp trgset 3 "tchspoil(1) > 175" trg 3 "imf cCVP01A_d_cc15 closed"	*

MCB setup			
		1C DG MSS	Place in Mode 3
		Place HOLD Tag on 1C DG MSS	1 HOLD TAG
		Place HOLD Tag on 1C DG output breakers DHO7-1 and DHO7-2	2 HOLD TAGS
		Place Unit 1 and Unit 2 Bypass and inoperable panel lights to the up position (EMERGENCY POWER SYSTEM)	Unit 1 A-Train Unit 2 A Train
		Place Unit 1 Bypass and inoperable panel lights to the up position (Auxiliary Feedwater System)	Unit 1 A-Train
		Place HOLD Tag on 1A MDAFW pump H/S	1 HOLD TAG
		DEH	Clear DEH alarms Verify impulse loop out
		Select POWER OPS PRIMARY 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>
		Recorders Verify memory disks cleared Cae clearrecorders.cae	
		Provide a marked up copy of UOP-3.1 version 112.4 through step 8.1.10 complete.	<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	 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	 sv sim_clock.uvl
		VERIFY MICROPHONES READY	Batteries installed
		TURNOVER SHEET AVAILABLE	

EXAM

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	 RUN simulator
		Verify Horns ON: hornflag  <u>HORNS ON = TRUE</u>	 Turn Horns ON/OFF ann horn
1	Start of exam	Ramp down at 5 MW/min –ramp on hold with 2 MW/min in and HOLD not LIT- BOP will place impulse loop in service, enter ramp rate and target, depress GO	
2	NRC CUE	1C CCW pump trips (A Train CCW which is supplying CCW to the on service Chg pump and is not the on service train). TS 3.7.7 Condition A Imf cccp01c_d_cc13	
3	NRC CUE	1A inverter fails and does not automatically transfer to the bypass source. TS 3.8.7 Condition A and 3.8.9 Condition B Imf mal-eps-inva	
4	NRC CUE	PT-508, Feedwater header pressure, fails high. imf pt508 1400 25	
5	NRC CUE	Letdown leak inside ctmt. This is an isolable leak by securing letdown. 120 -130 gpm. AOP-1.0 entry and possible roll to RWST. imf mal-cvc02 120 20	
6	NRC CUE	H2 Temp Control Valve Failure leads to RX trip. Main Turbine trips 4 minutes after 50°C is reached.  imf cp4055k-c 3 15	

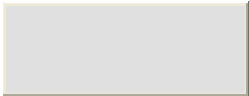
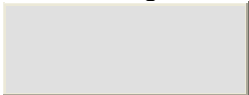
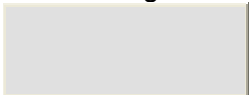
EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
		Manual Rx trip required. Auto RX trip is blocked.	
7	NRC CUE	1A SG Large steam break inside CTMT ramps in slowly (In ESP-0.1, step 2). SG isolated per EEP-2. (CT) Imf mal-mss1a 1 600	
8	NRC CUE	LOSP occurs at step 6 of EEP-0. imf mal-eps1 1 5 A Train Chg pump will have to be secured due to no CCW. (Preset trip of the 1A CHG pump when temp exceeds 175°F)  1C Chg pump (B Train) does not auto start. A train Chg pump will be secured or trip. (CT) 1A CCW pump does not auto start. Required for cooling of ESF components. (CT)	 TRG 3 If needed 
9	Preset	1B CS pump does not auto start. MOV 8820A does not open. Selected Ctmt coolers do not auto start. Critical Task criteria: *1 CS spray pump and 1 Ctmt clr required (CT) FRP-Z.1 orange path entry required with the conditions given if the 1B CS pump is NOT started from the MCB prior to FRP-Z.1 entry.	
		Terminate at ESP 1.1 entry	
		End of Exam	 HORNS OFF
			 FREEZE simulator

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
		Stop data collection for Simview file sv DataCollection.uvl	
		Export data to file with the name of exam2013sen4grpX.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 Cae clearrecorders.cae	<div></div>

Local operator actions:

<u>EVENT NO.</u>	<u>TIME</u>	<u>ACTIONS</u>
1	NONE REQUIRED	
2	NONE REQUIRED	
3	WHEN REQUESTED	Transfer 1A Inverter to the bypass source  Remote / R21 / loa-eps001 / true
4	NONE REQUIRED	
5 or 7	WHEN REQUESTED	NOTE: These buttons can be used multiple times to Acknowledge panel alarms. Acknowledge LWPP alarm  Imf mk4 failoff Acknowledge Control Room Fire Alarm Panel  Imf mh1 failoff
6	NONE REQUIRED	
7	NONE REQUIRED	
8	NONE REQUIRED	
9	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.
1	NONE EXPECTED	
2	WHEN REQUESTED	<u>ROVER:</u> - The 1C CCW pump motor has an acrid smell in the area. DF04 has an overcurrent trip flag.
3	WHEN REQUESTED	<u>ROVER and SSS-plant:</u> Reports – <ul style="list-style-type: none"> ▪ “The inverter did not swap to the Bypass source. ▪ The BYPASS SOURCE AVAILABLE light is LIT”. ▪ If asked to check breakers to power up Inverter say, “All the breakers are closed.”
	<u>Use event 4 LOA page to transfer the inverter to the bypass source</u>	Report back that “The Inverter is on the Bypass source” when re-energized.
4	NONE EXPECTED	
5	WHEN REQUESTED	<u>Extra Operator:</u> The fire alarm is 1A-22 and I have acknowledged it on the fire alarm panel. <u>Radside SO:</u> The WHT high level alarm is in.
6/7/8/9	NONE EXPECTED	

Initial Conditions: 75% power 1180 ppm, MOL, ramping down to MODE 3 due to Hurricane warnings in effect. Winds in excess of 75 mph expected at the plant site in 4 hours.

Turnover:

- Unit 2 PSS is OFF (OOS 2 hrs, ETR 2hrs)
- 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- AOP-21, Severe Weather, is in effect due to Hurricane warning and high winds in the area.
- Current Risk Assessment is **YELLOW** and projected is **YELLOW**,
- **B** Train On-Service – **B** Train Protected.

Event 1 Ramp down in power at 5 MW/min to be off line in 2 hours.

Verifiable actions: RO will adjust rods or boron to control Tav_g/T_{ref} on program, BOP will place impulse loop in service, set target and ramp, and start a ramp on the Main Turbine.

Event 2 1C CCW pump trips. **TS 3.7.7 Condition A**

Verifiable actions: The 1A Chg pump will be secured and the 1C Chg pump will be started.

Event 3 1A inverter fails and does not automatically transfer to the bypass source. The control room will have the Rover transfer to the bypass manually. **TS 3.8.7 Condition A and 3.8.9 Condition B**

(All RMW pumps will start, all BAT pumps will start, TCV-143 will shift to the VCT and LCV-115A will shift letdown to the RHT.)

Verifiable actions: LCV-115A will be returned to the VCT position, the BAT pumps secured, RMW pump secured, TCV-143 addressed.

Event 4 PT-508 fails high. SGFP speed decreases to 3200RPM

Verifiable actions: Take manual control of the SGFP and raise SGFP speed. Control SG water levels since they will start to decrease.

Event 5 Letdown leak inside ctmt on letdown line between LCV-459 and orifice isolation valves.

Verifiable actions: Isolate the leak by closing LCV-459/460 and HV 8149A, B and C.

Event 6 Hydrogen Temperature control valve fails closed slowly and cannot be corrected. Hydrogen temp requires a RX trip above 48°C if not being controlled. Main Turbine will trip 4 minutes after 50°C on turbine is reached. The AUTO RX trip is blocked.

Verifiable actions: Manual reactor trip.

Event 7 Large Steam Break inside Containment after Step 2 of ESP-0.1. This will cause an automatic safety injection.

Verifiable actions: Possible manual SI. SG isolated per EEP-2. **(CT)**

Event 8 Dual unit LOSP. 1-2A and 1B DGs auto start to restore power. "B" Train LOSP sequencer will not auto start, charging pump or CCW pump.

Verifiable actions: start a "B" Train CCW pump **(CT)**, and start a "B" Train Chg pump **(CT)** and secure the 1A Chg pump which has no CCW flow to it.

Event 9 Phase B will actuate at 27 psig with the following complications:

1B CS pump does not start and MOV-8820A does not open. The selected ctmt coolers (1B/1D) do not auto start in slow speed.

Verifiable action: Start 1B CS pump. OR Open MOV-8820A and start one Ctmt cooler

Critical Task criteria: *1 CS spray pump and 1 Ctmt clr required **(CT)**

Transition will have to be made to EEP-2 to isolate the faulted SG, and FRP-Z.1 may be entered. 1B CS pump may be started at any time and MOV-8820A opened and if done prior to FRP-Z.1 entry, then Z.1 does NOT have to be entered.

Terminate the scenario when ESP-1.1 entered after either EEP-2.0 or EEP-1.0.

UOP-3.1/ AOP-9.0/ ARP/ AOP-100/ AOP-1.0/ ARP/ EEP-0/ ESP-0.1/ EEP-2(FRP-Z.1)/ ESP-1.1 OR EEP-1.0 then ESP-1.1.

CRITICAL TASK SHEET

- ___ 1. Establish flow from at least one HHSI pump before transition out of E-0 (start the 1C or 1B Chg pump). (WOG CT E-0 - - I)
- ___ 2. Manually start minimum number of CCW pumps required to provide adequate cooling. (WOG CT E-0 - - K)
- ___ 3. Manually actuate at least the minimum required complement of containment cooling equipment before an extreme (red-path) challenge develops to the containment CSF. (WOG CT E-0 - - E)
- Start the 1B CS pump and/or open MOV-8820A and start 1 cmtt cooler in slow with emergency SW aligned after Containment pressure is/has been > 27 psig, and prior to a Red Path on FRP-Z.1 (54 psig).
 - **Critical Task criteria:** *1 CS spray pump and 1 Cmtt clr required
- ___ 4. Isolate faulted SG before transitioning out of E-2. (WOG CT E-2 - - A)
- Isolate AFW flow
 - Isolate steam flow from 1A SG

SCENARIO
OBJECTIVE/
OVERVIEW:

Ramp down in progress.

The team should be able to:

- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-100, AOP-9.0 & Tech Specs
- Respond to a leak inside cmtt by using AOP-1.0 and subsequent ramp and isolation of the leak
- Identify Reactor trip criteria and manually trip the reactor, then identify and respond to a Steam break inside cmtt, initiate a SI and ensure SI flow criteria is met, recognize failed equipment and respond appropriately.

Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes
1.	Total malfunctions (5–8)	11
2.	Malfunctions after EOP entry (1–2)	6
3.	Abnormal events (2–4)	4
4.	Major transients (1–2)	2
5.	EOPs entered/requiring substantive actions (1–2)	1
6.	EOP contingencies requiring substantive actions (0–2)	1 possible
7.	Critical tasks (2–3)	4

Op Test No.: FA2013301 Scenario # 4 Event # 1 Page 1 of 44

Event Description: Ramping offline for Hurricane preparation

A ramp of 2 MW/min is in progress. The turnover sheet has the crew place the IMP PRESS LOOP in service per UOP-3.1 section 8.2 and then increase the ramp rate to 5 MW/min and ramp off line IAW UOP-3.1 in 6 hours.

Indications Available:

Annunciators:

Other Indications:

NONE

Time	Pos.	Expected Actions/Behavior	Comments
		UOP-3.1, Power Operation, ver 112.4 step 8.2; Decrease reactor power to minimum load	
	BOP	(step 8.2 and following) 8.2.1 Verify Turbine on HOLD. 8.2.2 Check that the DEH computer point PIA, FIRST STAGE PRESSURE #1 has stable indication.	
		8.2.3 On the FEEDBACK STATUS DISPLAY, move the cursor to IMP PRESS LOOP OUT 8.2.4 Depress the SELECT key. 8.2.5 Verify IMP PRESS LOOP is highlighted in reverse video.	
		8.2.6 Depress the START key. 8.2.7 Verify FEEDBACK STATUS indicates IMP PRESS LOOP IN.	
		(step 8.3) Commence ramping the turbine at the desired rate.	
	ALL	Re-commences Ramp by coordinating with the BOP to establish Main Turbine Target and ramp rate. (step 8.3) A Ramp rate of at 5 MW/ min will be required to ramp unit off per the turnover sheet.	

Op Test No.: FA2013301 Scenario # 4 Event # 1 Page 2 of 44

Event Description: Ramping offline for Hurricane preparation

Time	Pos.	Expected Actions/Behavior	Comments
		(step 8.4) Verify proper SGFP speed control. - Monitor SGPF ΔP	
	SRO/ RO	At step 8.5 the following note explains how flux should be controlled: NOTE: In the following step it is desirable to maintain axial flux difference within $\pm 5\%$ from the target value to help ensure axial flux does not exceed limits specified in the COLR figure 3. During transients maintaining axial flux difference within the $\pm 5\%$ of the target value may not be possible.	Flux is maintained $\pm 5\%$ from the target value
	BOP	Begin lowering turbine load to 40 MW using the appropriate DEH controls <ul style="list-style-type: none"> • Ensure load rate decrease is within required limitations. • Verify the HOLD light is LIT. • Depress the GO pushbutton and ensure the GO light is LIT. • Ensure the Main Turbine starts to ramp down, GVs start to close. 	NOTE: The ramp rate will be 5 MW/min.
	RO	Verify rods are in AUTO or Manual and maintaining Tavg close to Tref.	

Op Test No.: FA2013301 Scenario # 4 Event # 1 Page 3 of 44

Event Description: Ramping offline for Hurricane preparation

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(Step 1.0) Borating per SOP-2.3</p> <p>APPENDIX B Version 59.1</p> <ul style="list-style-type: none"> Set the boric acid integrator to the desired quantity (expect >350 gallons) Adjust LTDN TO VCT FLOW controller, LK 112, setpoint as desired M/U mode selector to STOP MKUP MODE SEL SWITCH to BOR MKUP MODE CONT SWITCH to START. <p>(Step 1.6) Verify proper boration operation by observing the following:</p> <ul style="list-style-type: none"> On service boric acid pump started. MKUP TO CHG PUMP SUCTION HDR FCV113B opens. BORIC ACID TO BLENDER FCV113A opens. Boric acid flow is displayed on FI-113 MAKEUP FLOW TO CHG/VCT. 	<p>NOTE: A continuous boration is allowed by appendix C which maintains the Boric Acid system lined up. The RO will take the MSS to START each time a boration is required</p> <p>or</p> <p>set the system up to borate continuously. (approx 700 gal continuous boration)</p>
	RO	<p>(Step 1.7) Verify the boration automatically stops when the boric acid batch integrator reaches its setpoint as follows:</p> <ul style="list-style-type: none"> Boric acid flow returns to zero as displayed on FI-113 MAKEUP FLOW TO CHG/VCT. MKUP TO CHG PUMP SUCTION HDR FCV113B closes. BORIC ACID TO BLENDER FCV113A closes. 	
At the discretion of the Lead Examiner move to Event 2.			

Op Test No.: FA2013301 Scenario # 4 Event # 2 Page 4 of 44
 Event Description: **1C CCW pump trip**

CCW pump trips on overload.

Indications Available:

Annunciators:	Indications of a Tripped CCW pump and loss of CCW flow
- 1C CCW PUMP OVERLOAD TRIP (AA3)	- No flow on FI3043CA
- CCW FLOW FROM RCP OIL CLRS LO (DD3)	- Temperature rising on running components

Time	Pos.	Expected Actions/Behavior	Comments
ARP-1.1, MCB ANNUNCIATOR PANEL A, AA3			
version 53.1			
	SRO	Reference ARP AA3. Direct entry into AOP-9 to get the 1B CCW pump running.	
	BOP	(step 1) Check 1C CCW PUMP has tripped.	
	BOP	(step 2) Check auto start of standby pump	
	SRO	(step 3) Perform the actions required by AOP-9.0, LOSS OF CCW	
	SRO	(step 4) IF 1B CCW Pump is aligned to A Train, THEN rack out 1C CCW Pump supply breaker DF04. (step 5) Refer to Technical Specification 3.7.7 for LCO requirements with a loss of the on service train of component cooling water.	
AOP-9.0, Loss of CCW,			
Version 24.0			
	BOP	(step 1) Verify CCW pump started in affected train: (No pump available in affected train)	RNO 1.1 Verify CCW pump started in non affected train 1.2 Start charging pump in non affected train. 1.3 Stop charging pump in the affected train.

Op Test No.: FA2013301 Scenario # 4 Event # 2 Page 5 of 44

Event Description: 1C CCW pump trip

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	(step 2) Check CCW system adequate for continued plant support. - Check CCW flow adequate in affected train. - Check RCP motor bearing temperatures less than 195°F. - Check CCW pump not cavitating. Stop any cavitating CCW pump. - CCW Surge tank level being maintained at or above 13 inches. RCP seal injection to all 1B and 1C RCPs greater than 6 gpm. AND - 1 gpm greater than the combined #1 and #2 seal leakoff flows for 1A RCP.	
	BOP	(step 3) Verify SW flow supplied to the ON SERVICE train CCW HX SW DISCH <input type="checkbox"/> Q1P16FI3009AA 1A CCW HX DISC <input type="checkbox"/> Q1P16FI3009BA 1B CCW HX DISC <input type="checkbox"/> Q1P16FI3009CA 1C CCW HX DISC	
	SRO	(step 4) Check ON SERVICE train affected.	Go to step 9
	BOP	(step 9) Check both RHR pumps stopped	
	SRO	(step 10) Inform the SM to evaluate event classification and notification requirements using FNP-0-EIP-8, NON-EMERGENCY NOTIFICATIONS AND NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTIONS.	
	BOP	(step 11) Check SFP cooling aligned to an operating CCW train	
	BOP	(step 12) Check on service CCW train operating	

Op Test No.: FA2013301 Scenario # 4 Event # 2 Page 6 of 44

Event Description: 1C CCW pump trip

Time	Pos.	Expected Actions/Behavior	Comments						
	SRO	(step 13) IF Desired to defeat the Autostart capability of components cooled by CCW, then remove control power from the following: A Train 1A RHR Pump, Q1R15BKRDF09 1A Charging Pump, Q1R15BKRDF06 1B Charging Pump(A Trn),Q1R15BKRDF07 B Train 1B RHR Pump, Q1R15BKRDG09 1B Charging Pump(B Trn),Q1R15BKRDG07 1C Charging Pump, Q1R15BKRDG06							
	SRO	(step 15) Go to procedure and step in effect							
TECHNICAL SPECIFICATION 3.7.7, CCW System LCO 3.7.7 Two CCW trains shall be OPERABLE APPLICABILITY: MODES 1, 2, 3, and 4.									
	SRO	<table border="1"> <thead> <tr> <th>CONDITION</th> <th>REQUIRED ACTION</th> <th>COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td>A. One CCW train inoperable.</td> <td> A.1 -----NOTE----- Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops—MODE 4," for residual heat removal loops made inoperable by CCW. ----- Restore CCW train to OPERABLE status </td> <td>72 hours</td> </tr> </tbody> </table>	CONDITION	REQUIRED ACTION	COMPLETION TIME	A. One CCW train inoperable.	A.1 -----NOTE----- Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops—MODE 4," for residual heat removal loops made inoperable by CCW. ----- Restore CCW train to OPERABLE status	72 hours	
CONDITION	REQUIRED ACTION	COMPLETION TIME							
A. One CCW train inoperable.	A.1 -----NOTE----- Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops—MODE 4," for residual heat removal loops made inoperable by CCW. ----- Restore CCW train to OPERABLE status	72 hours							
When Tech Specs addressed and at the discretion of the Lead Examiner move to Event 3.									

Op Test No.: FA2013301 Scenario # 4 Event # 3 Page 7 of 44

Event Description: 1A Inverter Fault

1A Inverter will fail and not transfer to the bypass source. At this power level the unit used to trip due to RCP BKR indication aligned to the inverter, but a design change removed that feature. Many alarms will come in and many bistables will be LIT.

Indications Available:

Annunciators: (not a complete list)

- 1A INV FAULT (WD1)
- SSPS A TRN TRBL (EC4)
- PROC CAB PWR FAILURE (EC1)
- RCP BUS UV SINGLE INPUT ALERT (EF4)
- RCP BUS UF SINGLE INPUT ALERT (EF5)
- There are many other annunciators and bistables that come in to alarm (DK3, DF1, DF2, DF3, FD3, FD4, etc.)

Recognize indications of 1A INVERTER FAILURE:

- Loss of power to NI-41 with associated alarms, bistable trip status lights and indication
- Loss of power to the inverter (amps on EPB = 0)
- Loss of power to channel I instruments

Time	Pos.	Expected Actions/Behavior	Comments
WD1, ARP-2.2, Annunciator Response Procedure, ver 32.2			
	Team	Recognize loss of inverter from alarms and loss of NIs	CAUTION: Outward rod motion is blocked by the High Power Rod Stop Bistable being tripped.
	BOP	Respond to alarms and recognize loss of inverter from loss of NIs and no amperage on 1A Inverter.	
	SRO	Direct actions of WD1 Assess plant and analyze IF a reactor trip is called for	NOTE: No reactor trip signals are present
NOTE: The following controls may be affected if 1A 120 VAC Vital Instrumentation Panel is De-energized (Refer to A-506250, Unit 1 Load List): <ul style="list-style-type: none"> • A TRN SSPS output relay power is lost. • VCT Hi Lvl Divert Valve - Q1E21LCV115A diverts to the RHT if in auto. • LTDN Hi Temp Divert Valve - Q1E21TCV143 bypasses the demineralizers. • 1A & 1B Reactor makeup water pumps start. • 1A & 1B BAT pumps start. • RMW to Blender - FCV114B and Boric Acid to blender -FCV113A opens if Rx M/U Control System is in auto. 			

Op Test No.: FA2013301 Scenario # 4 Event # 3 Page 8 of 44

Event Description: 1A Inverter Fault

Time	Pos.	Expected Actions/Behavior	Comments		
	BOP	(step 1.2) Call ROVER to Attempt to restore power from the bypass source by performing the following: <u>IF</u> the “BYPASS SOURCE AVAILABLE” lamp is illuminated on the inverter, <u>THEN</u> transfer 1C INVERTER MANUAL BYPASS SWITCH to the “BYPASS SOURCE TO LOAD” position			
	RO	(step 2) Place LCV-115A, VCT HI LVL DIVERT VALVE, in the VCT position			
	BOP	(step 3) Secure 1B RMW pump if necessary			
	RO	(step 4) Secure the running Boric Acid Transfer (BAT) pump if necessary			
	BOP	(step 5) Close FCV-114B, RMW TO BLENDER, and FCV-113A, BORIC ACID TO BLENDER.	If in AUTO		
	SRO	(step 6) <u>3.8.7</u> Condition A applies while the inverter is supplied from the bypass source and not connected to the battery. 24 hour mandatory LCO <u>3.8.9</u> Condition B applies for the time the vital panel was de-energized. 8 hour mandatory LCO to restore the vital panel to operable status When the vital panel is re-energized this will no longer be an active LCO.			
TECHNICAL SPECIFICATION 3.8.7, Inverters—Operating <i>The required Train A and Train B inverters shall be OPERABLE.</i>					
		CONDITION	REQUIRED ACTION	COMPLETION TIME	
		A. One required inverter inoperable.	A.1 -----NOTE----- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating" with any vital bus de-energized. ----- Restore inverter to OPERABLE status.	24 hours	

Op Test No.: FA2013301 Scenario # 4 Event # 3 Page 9 of 44

Event Description: 1A Inverter Fault

Time	Pos.	Expected Actions/Behavior			Comments
TECHNICAL SPECIFICATION 3.8.9, Distribution Systems— Operating <i>Train A and Train B AC, DC, and AC vital bus electrical power distribution subsystems shall be OPERABLE.</i>					
		CONDITION	REQUIRED ACTION	COMPLETION TIME	
		B. One or more AC vital buses inoperable.	B.1 Restore AC vital bus subsystem(s) to OPERABLE status.	8 hours AND 16 hours from discovery of failure to meet LCO	
		When the 1A inverter is transferred to the bypass complete the following:			
	RO	(step 7.1 and 7.2) Verify proper operation of the pressurizer heaters and level control.			
	BOP	(step 7.3) Reset hi flux positive rate trip signal on NI-41 and verify proper operation of NI-41.			
	RO	(step 7.4) Verify the following CVCS components are correctly aligned for current plant conditions: • Q1E21LCV115A, VCT HI LVL DIVERT VLV • Q1E21LCV115C & E, VCT OUTLET ISO MOVs • Q1E21LCV115B & D, RWST TO CHG PUMP MOVs • Q1E21TCV143, LTDN HIGH TEMP DIVERT VLV, is in DEMIN			<u>Normal positions of:</u> LCV115A, VCT LCV115C & E, OPEN LCV115B & D, CLOSED Q1E21TCV143, DEMIN
	RO	(step 7.5) Verify the following Reactor Makeup Control System components are correctly aligned for current plant conditions: • FCV-114B, RMW TO BLENDER • FCV-113A, BORIC ACID TO BLENDER			

Op Test No.: FA2013301 Scenario # 4 Event # 3 Page 10 of 44

Event Description: 1A Inverter Fault

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 7.6 and 7.7) Stop unnecessary Reactor Makeup Water and BAT pumps.	
	ALL	Verify all other MCB controls and indications have returned to normal.	
	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	
At the discretion of the Lead Examiner move to Event #4.			

Op Test No.: FA2013301 Scenario # 4 Event # 4 Page 11 of 44
 Event Description: **PT-508 Fails HIGH**

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.

Indications Available:

Annunciators:

- 1A,1B,OR 1C SG STM FLOW > FEED FLOW (JB1, JB2, JB3)
- 1A,1B,OR 1C SG LVL DEV (JF1, JF2, JF3)

Recognize indications of PT-508 failure

- SGFP speed ↓
- FRVs opening
- SGWL NR ↓
- Feed flows ↓ to zero

Time	Pos.	Expected Actions/Behavior	Comments
AOP-100, Instrumentation Malfunction, section 1.4 Ver 12			
	SRO	Direct entry into AOP-100	
	BOP	(step 1) <u>Immediate operator action</u> 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
	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 below for values</u>	NOTE: Approximate ΔP can be determined from the following MCB indications. [] SGFP DISCH PRESS PI4003 [] SG Pressure indications

Op Test No.: FA2013301 Scenario # 4 Event # 4 Page 12 of 44

Event Description: PT-508 Fails HIGH

Time	Pos.	Expected Actions/Behavior	Comments
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 5.			

Op Test No.: FA2013301 Scenario # 4 Event # 5 Page 13 of 44

Event Description: Letdown leak inside ctmt.

A Letdown leak inside containment between LCV-459 and 8149A,B,C develops. The leak will cause ctmt temperature, pressure and humidity to increase over a period of time. The leak will be 120 gpm which is very close to a trip setpoint per AOP-1.0, and could be isolated if they recognize where it is. It is very hard to determine the location.

A Reactor trip may be called for here but that is neither called for nor required for these conditions. If a reactor trip occurs, Event 6 will be skipped.

Indications Available:

Annunciators:

- CHG HDR FLOW HI-LO (EA2)
- RMS HI RAD (FH1)

Indications of the Letdown leak:

- TI-140, REGEN HX OUTLET TEMP increases
- Li-112B and 115, VCT LVL, decreasing
- FI-122, CHG FLOW increasing
- LT-459, PRZR LEVEL, decreasing

Time	Pos.	Expected Actions/Behavior	Comments
AOP-1.0, RCS LEAKAGE, ver. 21.0			
	SRO	Directs performance of ARPs <ul style="list-style-type: none"> - EA2, CHG HDR FLOW HI-LO - FH1, RMS HI RAD (R-2, 7, & 12: CTMT radiation alarms in) 	
	RO	Reports pressurizer level is dropping with charging maximum. Should diagnose and announce RCS leak.	
	SRO	Directs entry into AOP-1 and directs actions per RO & BOP rows below:	
	RO	(step 1) Maintain pressurizer level stable at or near programmed level by : Control charging flow: OR Reduce letdown flow OR Isolating letdown-	NOTE: [CA] step Take manual control of charging flow Removing letdown from service should be done per SOP-2.1, figure 1 on MCB

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 Event Description: **Letdown leak inside cmt.**

Time	Pos.	Expected Actions/Behavior	Comments
The actions of figure 1 will isolate the leak. <u>REMOVING LTDN FROM SERVICE</u> 1. Place PK-145 in MANUAL and adjust demand to < 50%. 2. Close LTDN ORIF ISO 45 GPM, Q1E21HV8149A AND LTDN ORIF ISO 60 GPM, HV8149B OR HV8149C, as applicable. 3. Close LTDN LINE ISO, Q1E21LCV459 and Q1E21LCV460 4. Place FK-122 in MANUAL and adjust to 0% (closed). 5. Verify SEAL WTR INJECTION HIK 186 adjusted. 6. Refer to SOP-2.1 when time permits.			
	RO	(step 2) Maintain VCT level > 20% - Ensures Reactor makeup is in AUTOMATIC to maintain VCT level > 20% - RNO- if VCT level cannot be maintained >20%, then align chg pump suctions to RWST	NOTE: [CA] step NOTE: IN AUTOMATIC Q1E21LCV115B open Q1E21LCV115D open RWST TO CHG PUMP MOV5 and Q1E21LCV115C closed Q1E21LCV115E closed VCT OUTLET ISO MOV5
	RO	(step 3) Determine leak rate based on flow balance _____(charging flow) + _____(seal injection flow) - _____(letdown flow) - _____(#1 seal leakoff flow) = _____(RCS leak rate)	
	SRO	(step 4) Leak rate should be determined to be greater than 120 gpm. - Tech Spec 3.4.13 should be evaluated > 1 gpm unidentified leakage if location of leak is NOT known.	NOTE: [CA] step
<u>NOTE TO LEAD EXAMINER:</u> IF the leak is NOT isolated, THEN LCO 3.4.13 Cond A is a MANDATORY LCO. IF the leak IS isolated, THEN there is no MANDATORY LCO.			

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Event Description: Letdown leak inside ctmt.

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	(step 5) Informs Shift Manager of Leak rate for classification and notification per EIP-8 & EP-110 <ul style="list-style-type: none"> - need for CTMT entry to look for leak source - T.S. requires fix leak in 4 hours or shutdown in 6 hours 	NOTE: [CA] step
	SRO	(step 6) Directs Unit 2 UO or extra plant operator or SSS to align 1A & 1B post LOCA containment hydrogen analyzers for service using Attachment 1	
	RO	(step 7) Frequently monitor CVCS flow balance as the actions of steps 7.2 through 7.12 are taken.	
	RO	(step 7.2) Check LCV-115A, VCT HI LVL DIVERT VLV, in the VCT position	
	SRO	(step 7.3) Check containment sump level - NOT RISING EXCESSIVELY	RNO Consult Shift Manager to evaluate requirement for containment entry
	BOP	(step 7.4) Check containment radiation – NORMAL	NOTE: CTMT radiation will be elevated

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Event Description: Letdown leak inside ctmt.

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 7.4 RNO) Evaluate placing CTMT sump pump hands witches in PULL-TO-LOCK to prevent overfilling the WHT. Verify containment ventilation isolation <ul style="list-style-type: none"> - Stop MINI PURGE SUPP/EXH FAN. Verify containment mini purge dampers - CLOSED. <ul style="list-style-type: none"> - CTMT PURGE DMPRS MINI-2866C & 2867C - CTMT PURGE DMPRS MINI-2866D & 2867D 	NOTE: This is an RNO step
	BOP	(step 7.5) Check auxiliary building radiation - NORMAL.	
	BOP	(step 7.6) Check no SG tube leakage <ul style="list-style-type: none"> - Check Secondary radiation NORMAL 	
	BOP	(step 7.7) Checks CCW radiation monitors (R-17A/B)	
	RO	(step 7.8) Check PRT conditions normal.	
		(step 7.11) Isolate RCS sampling as follows: Close the following valves located on U1 BOP PNL L: <ul style="list-style-type: none"> • PRZR Stm Sample Iso Q1P15HV3104 • PRZR Liq Sample ISO Q1P15HV3103 • RCS Loops 2&3 Sample Iso Q1P15HV3765 • ACCUM Sample ISO Q1P15HV3766 	

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Event Description: Letdown leak inside ctmr.

Time	Pos.	Expected Actions/Behavior			Comments
	SRO	(step 8) WHEN the RCS leakage source identified, THEN take appropriate actions to isolate the leak.			NOTE: [CA] step
LCO 3.4.13 Cond. A is a MANDATORY LCO until the leak is isolated.					
TECHNICAL SPECIFICATION 3.4.13, RCS Operational LEAKAGE					
<i>RCS operational LEAKAGE shall be limited to: a. No pressure boundary LEAKAGE; b. 1 gpm unidentified LEAKAGE; c. 10 gpm identified LEAKAGE;</i>					
	SRO				
		CONDITION	REQUIRED ACTION	COMPLETION TIME	
		A. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours	
When leak is isolated or decision is made to shutdown and at the discretion of the Lead Examiner move to Event 6					

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Event Description: Hydrogen Temperature controller failure

Hydrogen Temperature controller fails, operator action will not correct the fault. RX trip will be required.

Indications Available:

Annunciators:

- LJ3 H2 TEMP HI

Recognize indications of H2 controller failure

- Hydrogen Temp increasing

Time	Pos.	Expected Actions/Behavior	Comments
AOP-100, Instrumentation Malfunction, section 1.9 ver 12			
	SRO	Direct entry into AOP-100	
	BOP	(step 1) Immediate operator action Check main generator hydrogen temperature controller functioning properly in AUTO. [] HYDROGEN TEMP, CP-4055K	RNO Maintain main generator hydrogen temperature < 46°C using manual control of hydrogen temperature controller.
	SRO	(step 2) IF hydrogen temperature cannot be maintained < 46°C, THEN perform the following: IF Reactor Power is greater than or equal to 35% THEN trip the reactor and go to FNP-1-EEP-0, REACTOR TRIP OR SAFETY INJECTION.	

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Event Description: Reactor Trip, ESP-0.1 Entry

Reactor Trip and ESP-0.1 entry.

Indications Available:

Annunciators:

- Various and many

Recognize indications of reactor trip

- Nuclear power ↓
- Rod bottom lights

Time	Pos.	Expected Actions/Behavior	Comments
Enter EEP-0, Reactor Trip or Safety Injection, version 44			
	RO/ BOP	<p>(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 of EEP-0
	RO/ BOP	<p>(step 4) Check SI Status. (step 4.1) Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION □ ACTUATED status light lit □ MLB-1 1-1 lit □ MLB-1 11-1 lit</p> <p>(step 4.2) Verify both trains of SI-ACTUATED. □ MLB-1 1-1 lit AND □ MLB-1 11-1 lit</p>	
	SRO	Updates crew on transition to ESP-0.1	

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 Event Description: **ESP-0.1 Actions**

Time	Pos.	Expected Actions/Behavior	Comments
ESP-0.1, Reactor Trip or Safety Injection, rev 32			
Large stem break will be inserted after step 1 is complete			
FOLDOUT PAGE criteria of ESP-0.1 to actuate SI and transition back EEP-0 is PZR level <4%. When SI is actuated go to page PAGE 24			
	RO	(step 1) Check RCS temperature <ul style="list-style-type: none"> IF any RCP running, THEN check RCS average temperature – STABLE AT OR APPROACHING 547 F 	
	BOP	(step 1.1.1 RNO) Verify steam dumps closed <ul style="list-style-type: none"> STM Dump Interlock A and B Train to OFF RESET 	
	BOP	(step 1.1.2 RNO) Verify atmospheric reliefs closed. MS ATMOS REL VLV <ul style="list-style-type: none"> PC 3371A PC 3371B PC 3371C 	
	BOP	(step 1.1.3 RNO) IF MSIV's are open THEN isolate steam loads in the turbine building while continuing with RNO step 1.1.4. <ul style="list-style-type: none"> Resets MSRs 	NOTE: steps in 1.3.1 RNO other than listed actions are dispatched outside of the control room

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Event Description: ESP-0.1 Actions

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 1.1.3.4 RNO) IF two SJAE's in service, THEN secure one SJAE <ul style="list-style-type: none"> • 1A SJAE <ul style="list-style-type: none"> ○ A Section ISO closed ○ B Section ISO closed • 1B SJAE <ul style="list-style-type: none"> ○ A Section ISO closed ○ B Section ISO closed 	
	BOP	(step 1.1.3.5 RNO) Verify SG blowdown – ISOLATED 1A(1B,1C) SGBD <ul style="list-style-type: none"> • Q1G24HV7614A closed • Q1G24HV7614B closed • Q1G24HV7614C closed 	
	BOP	(step 1.1.4 RNO) IF cooldown continues, THEN minimize total AFW flow. AFW FLOW to 1A(1B,1C) SG <ul style="list-style-type: none"> • FI 3229A • FI 3229B • FI 3229C AFW TOTAL FLOW <ul style="list-style-type: none"> • FI 3229 <ul style="list-style-type: none"> ○ Control TDAFWP <ul style="list-style-type: none"> ▪ FCV 3228 Reset ▪ SIC 3405 adjusted 	NOTE: This may have been already directed to be controlled via operator aid posted on MCB

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Event Description: ESP-0.1 Actions

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 1.1.5 RNO) IF cooldown continues THEN close main steam isolation and bypass valves. 1A(1B,1C) SG MSIV - TRIP □ Q1N11HV3369A □ Q1N11HV3369B □ Q1N11HV3369C □ Q1N11HV3370A □ Q1N11HV3370B □ Q1N11HV3370C 1A(1B,1C) SG MSIV - BYPASS □ Q1N11HV3368A □ Q1N11HV3368B □ Q1N11HV3368C □ Q1N11HV3976A □ Q1N11HV3976B □ Q1N11HV3976C	
When ESP-0.1 step 1 is complete, a large steam break inside ctmt will be entered			

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Event Description: ESP-0.1 Actions

Time	Pos.	Expected Actions/Behavior	Comments
		<p>(step 2) When RCS average temperature less than 554F THEN verify feedwater status</p> <p>(step 2.1) Verify main feedwater flow control and bypass valves- CLOSED</p> <p>1A(1B,1C) SG FW FLOW</p> <ul style="list-style-type: none">• FCV 478• FCV 488• FCV 498 <p>1A(1B,1C) SG FW BYP FLOW</p> <ul style="list-style-type: none">• FCV 479• FCV 489• FCV 499 <p>(step 2.2) Defeat MDAFWP auto start on SGFP trip.</p> <ul style="list-style-type: none">• 1A in DEFEAT• 1B in DEFEAT <p>(step 2.3) Verify both steam generator feed pumps - TRIPPED</p>	

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Event Description: 1A SG Large steam break inside CTMT

Indications Available:

Annunciators:

- Various and many

Recognize indications

- RCS Temp decreasing
- PZR level decreasing
- Steam flow increasing

Time	Pos.	Expected Actions/Behavior	Comments
Enter EEP-0, Reactor Trip or Safety Injection, version 44			
	RO/ BOP	<p>(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 of EEP-0
	RO/ BOP	<p>(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</p> <p>(step 4.2) Verify both trains of SI-ACTUATED. <input type="checkbox"/> MLB-1 1-1 lit AND <input type="checkbox"/> MLB-1 11-1 lit</p>	

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Event Description: 1A SG Large steam break inside CTMT

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	(step 5) Directs BOP to perform attachment 2.	For Attachment 2 and 4 actions. Go to page 38
<p>NOTE: LOSP will occur at step 6.</p> <p>When Step 6 conditions are met (>27 psig) in containment Phase B will actuate. A train's discharge MOV will fail to open and B train's pump fails to start. Operators will likely back-up these automatic actions and perform the manual actions:</p> <ul style="list-style-type: none"> MOV-8820A open 1B CS Pump to start <p>Critical task to start the pump OR open the MOV</p> <p>If these manual actions are not taken Attachment 5 (RNO step 6.3.2) should be entered to complete them.</p>			
	RO	(step 6) Check containment pressure- HAS REMAINED LESS THAN 27 psig	<p>NOTE: [CA] step – RNO</p> <p>6.1 Verify PHASE B CTMT ISO - ACTUATED.</p> <ul style="list-style-type: none"> MLB-3 1-1 lit MLB-3 6-1 lit <p>6.2 Stop all RCPs.</p> <p>RCP</p> <ul style="list-style-type: none"> 1A 1B 1C <p>6.3 Verify PHASE B CTMT ISO alignment.</p> <p>6.3.1 Check All MLB-3 lights lit.</p> <p>6.3.2 IF any MLB-3 light NOT lit, THEN verify PHASE B CTMT ISO using ATTACHMENT 5, PHASE B CONTAINMENT ISOLATION.</p>
	RO	(step 7) Announce "Unit 1 reactor trip and safety injection".	

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Event Description: 1A SG Large steam break inside CTMT

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 <input type="checkbox"/> FI 3229A <input type="checkbox"/> FI 3229B <input type="checkbox"/> FI 3229C <ul style="list-style-type: none"> 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.	
	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 <input type="checkbox"/> A TRN reset <input type="checkbox"/> B TRN reset MDAFWP TO 1A/1B/1C SG B TRN <input type="checkbox"/> FCV 3227 in MOD Control TDAFWP flow. TDAFWP FCV 3228 <input type="checkbox"/> RESET reset TDAFWP SPEED CONT <input type="checkbox"/> SIC 3405 adjusted	NOTE: [CA] step –

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Event Description: 1A SG Large steam break inside CTMT

Time	Pos.	Expected Actions/Behavior	Comments
	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 <input type="checkbox"/> TI 412D <input type="checkbox"/> TI 422D <input type="checkbox"/> TI 432D	
	RO	(step 9 RNO) IF RCS temperature less than 547°F and falling, THEN perform the following. (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 (step 9.1.2) Verify atmospheric reliefs closed on MCB <input type="checkbox"/> Demand at 0 and minimum red light LIT (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 IF MSIVs are closed THEN proceed to step 9.1.8	NOTE: RNO column since RCS temp will be <547°F
	BOP	(step 9.1.5 RNO) IF MSIV's are open THEN isolate steam loads in the turbine building: <ul style="list-style-type: none"> MSRs reset (steps 9.1.5.1 and 9.1.5.2 RNO) these actions are performed by Systems Operators when RX trip is announced in step 7.	

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Event Description: 1A SG Large steam break inside CTMT

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 9.1.5.4 RNO) IF two SJAE's in service, THEN secure one SJAE <ul style="list-style-type: none"> • 1A SJAE <ul style="list-style-type: none"> ○ A Section ISO closed ○ B Section ISO closed • 1B SJAE <ul style="list-style-type: none"> ○ A Section ISO closed ○ B Section ISO closed 	
	BOP	(step 9.1.6 RNO) IF cool down continues THEN close main steam isolation and bypass valves. 1A(1B,1C) SG MSIV - TRIP <ul style="list-style-type: none"> □ Q1N11HV3369A □ Q1N11HV3369B □ Q1N11HV3369C □ Q1N11HV3370A □ Q1N11HV3370B □ Q1N11HV3370C 1A(1B,1C) SGMSIV - BYPASS <ul style="list-style-type: none"> □ Q1N11HV3368A □ Q1N11HV3368B □ Q1N11HV3368C □ Q1N11HV3976A □ Q1N11HV3976B □ Q1N11HV3976C 	

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Event Description: 1A SG Large steam break inside CTMT

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.</p> <p>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>	
	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 and open when > 1900 psig.</p>

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Event Description: 1A SG Large steam break inside CTMT

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.	RNO Go to EEP-2.0
EEP- 2.0, Faulted SG Isolation, version 15			
	BOP	(step 1) Verify all MSIV and bypass valves - CLOSED. Place handswitches for all MSIVs to the CLOSED position (6 total)	Critical task CLOSE MSIVs.
	BOP	(step 2) Check if any SG not faulted. Check pressure in at least one SG - STABLE OR RISING. (step 3) Identify the faulted SG	Only 1A SG will be blowing down once the MSIVs are closed 1A SG
	BOP	(step 4) Isolate all faulted SGs. <ul style="list-style-type: none"> Verify ALL ARVs closed <ul style="list-style-type: none"> 3371A/B/C Verify ALL Feed stop valves closed <ul style="list-style-type: none"> 3232A/B/C Verify blowdown from all faulted SGs ISOLATED. <ul style="list-style-type: none"> 7614A/B/C 	

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Event Description: 1A SG Large steam break inside CTMT

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 4.6) Verify SG blowdown sample ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE ISO <ul style="list-style-type: none"> MLB1 19-2 lit Q1P15HV3328 MLB1 19-3 lit Q1P15HV3329 MLB1 19-4 lit Q1P15HV3330 	
	BOP	(step 5.1) Isolate AFW flow to all faulted SGs. Close MDAPFW isolation valves to all faulted SGs. (BOP) <ul style="list-style-type: none"> 3764A closed 3764E closed 	Critical task
		(Step 5.2) Close TDAFWP flow control valves to all faulted SGs. TDAFWP FCV 3228 <ul style="list-style-type: none"> RESET 3228A in MOD 3228AA closed 	Critical task AFW isolated by either this step or v017A called for.
	SRO	(step 5.3) Locally close flow control inlet to faulted SGs. <ul style="list-style-type: none"> Q1N23V017A 	
	BOP	(step 6) Check CST level greater than 5.3 feet. <ul style="list-style-type: none"> LI 4132A LI 4132B 	

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Event Description: 1A SG Large steam break inside CTMT

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	(step 7.1) Direct Counting Room to sample per CCP-31. (step 7.2) Check secondary radiation indication - NORMAL. <ul style="list-style-type: none"> • R-15 • R-19 • R-23A and B • R-15B and C, • R-60 A, B, C, D 	
	SRO	(step 8.1) Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16F {45F} SUBCOOLED IN CETC MODE.	RNO Go to EEP-1
	SRO	(step 8.2) Check secondary heat sink available. <ul style="list-style-type: none"> • Total AFW Flow >395 gpm • Narrow Range level of 1 SG greater than 31%{48%} 	RNO Go to EEP-1
	SRO	(step 8.3) RCS Pressure stable or rising <ul style="list-style-type: none"> • PI 402A • PI403A 	RNO Go to EEP-1
	SRO	(step 8.4) Check pressurizer level – Greater than 13%{43%}	RNO Go to EEP-1
	SRO	(step 8.5) If all SI termination criteria satisfied THEN go to ESP 1.1	NOTE: Transition is based on timing of the SG blowing down, if the transition is not made to ESP-1.1 here, EEP-1.0 will loop around until SG is blown down to meet SI termination criteria
	SRO	(step 9) Go to EEP-1	

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 Event Description: **EEP-1.0**

Time	Pos.	Expected Actions/Behavior	Comments
EEP-1, LOSS OF REACTOR OR SECONDARY COOLANT, Rev 31			
	RO	(step 1) Check RCP criteria. Check SUB COOLED MARGIN MONITOR indication - GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE.	
	BOP	(step 2) Check SGs not faulted. Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig.	RNO Directs you to continue in EEP-1.0 if already isolated
	BOP	(step 3) Check intact SG levels. Check any intact SG narrow range level – GREATER THAN 31%{48%}. WHEN SG narrow range level greater than 31%{48%}, THEN maintain SG narrow range level 31%-65%{48%-65%}. Control MDAFWP flow. MDAFWP FCV 3227 RESET <input type="checkbox"/> A TRN reset <input type="checkbox"/> B TRN reset MDAFWP TO 1A/1B/1C SG B TRN <input type="checkbox"/> FCV 3227 in MOD Control TDAFWP flow. TDAFWP FCV 3228 <input type="checkbox"/> RESET reset TDAFWP SPEED CONT <input type="checkbox"/> SIC 3405 adjusted	NOTE: [CA] step –
	BOP	(step 4) Check secondary radiation indication - NORMAL. Checks rad monitors <input type="checkbox"/> R-15 <input type="checkbox"/> 19 <input type="checkbox"/> 23A and B <input type="checkbox"/> 15B and C, <input type="checkbox"/> 60 A, B, C, D	

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 Event Description: **EEP-1.0**

	RO	<p>(step 5) Check pressurizer PORVs Check any PRZR PORV ISO – power available WHEN pressurizer pressure less than 2335 psig, THEN verify pressurizer PORVs closed with no leakage. <input type="checkbox"/> Verify both PRZR PORVs – CLOSED</p> <p>Check PRZR PORV temperature STABLE OR FALLING. <input type="checkbox"/> PORV Temp TI-463 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><input type="checkbox"/> Check at least one PRZR PORV ISO - OPEN</p>	NOTE: [CA] step –
	SRO	<p>(step 6) Perform the following within 1 hour of start of event. <input type="checkbox"/> Close recirculation valve disconnects using ATTACHMENT 1. <input type="checkbox"/> Establish 1A and 1B post LOCA containment hydrogen analyzers IN SERVICE USING ATTACHMENT 2, POST LOCA CONTAINMENT HYDROGEN ANALYZER OPERATION.</p> <p><input type="checkbox"/> Plot hydrogen concentration on FIGURE 1.</p> <p>Check containment hydrogen concentration <input type="checkbox"/> LESS THAN 3.5%. <input type="checkbox"/> Less than 0.5%</p>	NOTE: These steps will be passed off to the Shift Manager

Op Test No.: FA2013301 Scenario # 4 Event # 7 Page 35 of 44
 Event Description: **EEP-1.0**

	SRO	<p>(step 7) Evaluate SI termination criteria <input type="checkbox"/> Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE.</p> <p>Check secondary heat sink available. <input type="checkbox"/> >395 gpm AFW flow OR <input type="checkbox"/> > 31%{48%} SGNR level</p> <p><input type="checkbox"/> Check RCS pressure - STABLE OR RISING</p> <p><input type="checkbox"/> Check pressurizer level GREATER THAN 13%{43%}.</p>	
	SRO	(step 7.5) IF all SI termination criteria satisfied, THEN go to FNP-1-ESP-1.1, SI TERMINATION.	NOTE: This is the procedure exit point once SG is blown down.
	RO	<p>(step 8) Check containment spray system. Check any CS PUMP - STARTED.</p> <p>Reset containment spray signals. CS RESET <input type="checkbox"/> A TRN <input type="checkbox"/> B TRN</p> <p>WHEN containment spray recirculation flow has been aligned for at least 8 hours, AND containment pressure is less than 16 psig, THEN stop both CS PUMPs.</p>	<p>NOTE: [CA] step –</p> <p>NOTE: [CA] step –</p>
	RO	<p>(step 9) Check if LHSI Pumps should be stopped. - Check RCS pressure – GREATER THAN 275 psig{435 psig} <input type="checkbox"/> PT-402 AND 403</p> <p>(step 9.1.1 RNO) Establish CCW flow to RHR Hxs CCW TO 1A(1B) RHR HX <input type="checkbox"/> Q1P17MOV3185A open <input type="checkbox"/> Q1P17MOV3185B open</p>	NOTE: [CA] step – RCS pressure will be

Op Test No.:	<u>FA2013301</u>	Scenario #	<u>4</u>	Event #	<u>7</u>	Page	<u>36</u>	of	<u>44</u>
Event Description:		EEP-1.0							

	BOP	(step 10) Check no SG pressure - FALLING IN AN UNCONTROLLED MANNER.	RNO With no LOCA the procedure loops back to step 1 until SI termination criteria met.

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Event Description: Attachment 2 of EEP-0

Cue: BOP will accomplish when at step 5 of EEP-0

Attachment 2 of EEP-0

AUTOMATIC ACTIONS VERIFICATION

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	Critical task Starts 1C CHG Pump
	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).	Operator should proceed to step 4
	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

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>Critical task Starts 1A CCW Pump</p>
	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>	<p>Will place HS to STOP</p>

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Event Description: Attachment 2 of EEP-0

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 7) Verify containment fan cooler alignment. Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED. <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	Critical task Start one CTMT cooler Fan

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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	RNO 8.1 Verify MDAFW Pumps deliver flow to each SG. 8.1.1 Manually start MDAFW Pumps 8.1.2 Verify AFW flow path to AND each SG. <input type="checkbox"/> Q1N23HV3227A in MOD <input type="checkbox"/> Q1N23HV3227B in MOD <input type="checkbox"/> Q1N23HV3227C in MOD MDAFWP TO 1A(1B,1C) SG FLOW CONT <input type="checkbox"/> HIC 3227AA open <input type="checkbox"/> HIC 3227BA open <input type="checkbox"/> HIC 3227CA open AFW TO 1A(1B,1C) SG STOP VLV <input type="checkbox"/> Q1N23MOV3350A open <input type="checkbox"/> Q1N23MOV3350B open <input type="checkbox"/> Q1N23MOV3350C open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764A open <input type="checkbox"/> Q1N23MOV3764D open <input type="checkbox"/> Q1N23MOV3764F open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764E open <input type="checkbox"/> Q1N23MOV3764B open <input type="checkbox"/> Q1N23MOV3764C open
		(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 <u>Undervoltage</u> 1-2 1-3	1/2 Detectors <u>on 2/3 Busses</u>
		Low Low SG <u>TSLB4</u> 28% Water Level 4-1,4-2,4-3 In Any 5-1,5-2,5-3 2/3 SGs 6-1,6-2,6-3	2/3 Detectors <u>on 2/3 SGs</u>

Op Test No.: FA2013301 Scenario # 4 Event # 8 Page 41 of 44
 Event Description: **Attachment 2 of EEP-0**

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> <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> <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	>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																								
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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> <p>11.3 Verify Excess Letdown Isolation valves closed. <input type="checkbox"/> Q1E21HV8153, EXC LTDN ISO <input type="checkbox"/> Q1E21HV8154, EXC LTDN ISO</p>																									

Op Test No.: FA2013301 Scenario # 4 Event # 8 Page 42 of 44

Event Description: Attachment 2 of EEP-0

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	
	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.:	FA2013301	Scenario #	4	Event #	8	Page	43	of	44
Event Description:		Attachment 2 of EEP-0							

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

Op Test No.: FA2013301 Scenario # 4 Event # 8 Page 44 of 44

Event Description: Attachment 4 of EEP-0

Time	Pos.	Expected Actions/Behavior	Comments
Attachment 4 of EEP-0 TWO TRAIN ECCS ALIGNMENT VERIFICATION			
		<p>(Step 1) Verify two trains of ECCS equipment aligned.</p> <ul style="list-style-type: none"> <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 <p>(Step 1.6) Verify two trains of ESF equipment aligned.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Check all MLB-1 lights LIT <p>Verify charging pump suction and discharge valves - OPEN.</p> <p>CHG PUMP DISCH HDR ISO</p> <ul style="list-style-type: none"> <input type="checkbox"/> Q1E21MOV8132A <input type="checkbox"/> Q1E21MOV8132B <input type="checkbox"/> Q1E21MOV8133A <input type="checkbox"/> Q1E21MOV8133B <p>CHG PUMP SUCTION HDR ISO</p> <ul style="list-style-type: none"> <input type="checkbox"/> Q1E21MOV8130A <input type="checkbox"/> Q1E21MOV8130B <input type="checkbox"/> Q1E21MOV8131A <input type="checkbox"/> Q1E21MOV8131B 	
		<p>(Step 1.7) Verify all post accident containment air mixing system fans - STARTED. (BOP)</p> <p>POST ACCIDENT MIXING FAN</p> <ul style="list-style-type: none"> <input type="checkbox"/> 1A <input type="checkbox"/> 1B <input type="checkbox"/> 1C <input type="checkbox"/> 1D <p>RX CAV H2 DILUTION FAN</p> <ul style="list-style-type: none"> <input type="checkbox"/> 1A <input type="checkbox"/> 1B <p>(Step 1.8) WHEN power restored to any de-energized emergency bus, THEN verify alignment of associated equipment.</p>	
	BOP	<p>(Step 1.9) Verify SFP Cooling in service per SOP-54.0, Spent Fuel Pit Cooling And Purification System.</p>	Call Radside SO
End of Attachment 4			

Op-Test No.: FA2013-301

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.

In the unlikely event that the simulator fails such that illogical indications result, the session will be terminated. In other words, 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-2

[X] Unit 1 [] Unit 2

Shift:

Date

Off-going SS	Oncoming SS	[] N [X] D	Today
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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 75% power, 1180 ppm, MOL 10000 MWD/MTU
Status

TARGET ZERO
Every Day, Every Job Safely

STPs/Evolutions:

STP-27.1 completed 2
hours ago

B 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 ramp off line at 5 MW/min
- Current Risk Assessment is **YELLOW** and projected is **YELLOW** due to maintenance on 1A MDAFW pump and 1C DG
- UOP-3.1 ver 112.4, is complete through step 8.1.10. Place IMP LOOP in service per step 8.2.
Ramp off line at 5 MW/min
- 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Unit 2 is coordinating AOP-21, Severe Weather, which is in effect due to Hurricane warning and high winds in the area.
- Winds in excess of 75 mph expected at the site in 6 hours.
- Unit 2 PSS is OFF (OOS 2 hrs, ETR 2hrs)
-

Equipment Status

	Maintain VCT gas pressure 25-30 psig

Reactivity Plan**Waste Management Status**

#3 RHT – On Service
WGS – secured

LCO Status

3.8.1 condition B, STP-27.1 completed 2 hours ago

3.7.5 Condition B

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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Facility:	Farley Nuclear Plant	Scenario No.:	5	Op-Test No.:	FA2013-301
Examiners:	Operators:		SRO		
			RO		
			BOP		
Initial Conditions: 75% power, 1177 ppm, MOL, Ramping up					
Turnover:					
<ul style="list-style-type: none"> Unit 2 PSS in OFF for Maintenance (OOS 2 hrs, ETR 2 hrs) 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs) 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs) Current Risk Assessment is YELLOW and projected is YELLOW, A Train On-Service – B Train Protected. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia 					
SPLIT TRAIN ALIGNMENT					
Event No.	Malf. No.	Event Type*	Event Description		
1	Imf lt460	I (RO) TS (SRO)	LT-460, pressurizer level, fails LOW, letdown secures TS 3.3.1 Condition M		
2		N (BOP)	Restore Letdown		
3	Imf ft495	I (BOP) TS (SRO)	FT-495, selected steam Flow Transmitter for 1C SG fails HIGH Tech Spec 3.3.2 Condition D Function 1.e.2.		
4	Imf pk444d-a	C (RO) TS (SRO)	PK-444D, 1B RCP Spray valve, will open and can be closed in manual. TS 3.4.1 (RCS pressure)		
5	Imf ncfcn1b -d % / preset	C (BOP)	1B Condensate Pump develops Degraded Head, Stby (1A cond) pump will not auto start.		
6		R (RO) N (BOP)	Loss of 500KV line, SM directs 200 MW load reduction in 25 minutes		
7	Imf cCfcn1c _cc5	M (ALL)	1C Condensate pump trips leading to BOTH SGFPs tripping		
8		C (RO) C (BOP)	Rx Trip will not work in auto or manual, and one CRDM MG set breaker will not open. FRP-S.1 will be entered and begin driving rods in. (CT) Main Turbine will not trip automatically or in manual. Main Turbine GV's fast action closed. (CT)		
9	Imf mal- rcs2b	M (ALL)	LBLOCA when ESP-0.1 entered or step 5 of EEP-0.		
10		C (BOP)	A Train SI will not auto actuate. 1B RHR pump will not auto start and MOV-8803B will not open. Required to establish one train of HHSI or LHSI flow. (CT)		
			Terminate in EEP-1.0 when transition to ESP-1.3 announced.		

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

Event No.		Malfunction	* means in Bat file
8		1a crdm set fails to trip: CMFmalf / c52MGA_cr3	*
8		RTBs fail to open CMFmalf / cBKRXTRP_cc21 / closed CMFmalf / cBKRXTRP_cc22 closed	*
8		Prevent AUTO trip of main turbine MALF / T / MAL-TUR2	*
8		Prevent Manual trip of main turbine MALF / T / MAL-TUR24	*
10		Train A auto SI failure imf csftyinj_cc1 open	*
10		MOV-8803B does not open on SI imf csi8803b_d_cc5 open	*
10		1B RHR pump fails to auto start on SI imf crhp01b_d_cc9 open	*
5		Block 1A Cond pump from auto start imf ccfcn1a_cc8 open imf ccfcn1a_cc9 open imf ccfcn1a_cc10 open	*
0		Tag 1A MDAFW pump irf cafp01a_d_cd1 open	*
0		1C DG Tagged out irf cBK1DH07_d_cd1 / open irf cBK2DH07_d_cd1 / open irf cBK1DH07_d_cd2 / open irf cBK2DH07_d_cd2 / open	*
5		1B Condensate pump degraded head setup lmf jcfwfp1l-s 240 lmf jcfwfp1o-s 325	*
		Triggers and Commands	
7		When 1C condensate pump trips 1B condensate pump degrades to no flow Trgset 1 "x22o061m" Trg 1 "imf ncfcn1b-d_th 100 60"	*

Initial Conditions: 75% power, 1177 ppm, MOL, Ramping up

Turnover:

- Unit 2 PSS in OFF for Maintenance (OOS 2 hrs, ETR 2 hrs)
- 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Current Risk Assessment is **YELLOW** and projected is **YELLOW**,
- **A** Train On-Service – **B** Train Protected.

Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

- Event 1 LT-460 fails LOW, letdown secures. **TS 3.3.1 Condition M**
Verifiable actions: RO must take manual control of Charging to maintain pressurizer level less than tech spec (63.5%).
- Event 2 Restore Letdown
Verifiable actions: BOP will restore letdown to service by operating several valves.
- Event 3 FT-495, selected steam Flow transmitter for 1C SG fails HIGH. **Tech Spec 3.3.2 Condition D Function 1.e.2.** Function 4e is not correct due to this function uses non-pressure compensated steam flow.
Verifiable actions: Take manual control of the 1C FRV and then select channel III instruments to control 1C SG functions.
- Event 4 PK-444D, 1B RCP Spray valve, will open and can be closed in manual. **TS 3.4.1 (RCS pressure)**
Verifiable actions: Place the 1B RCP spray controller in manual and control RCS pressure using heaters and sprays before a Rx trip is required.
- Event 5 1B Condensate Pump develops Degraded Head, Stby (1A cond) pump will not auto start.
Verifiable actions: start the standby Condensate pump before BOTH SGFPs trip
- Event 6 Loss of 500KV line, SM directs 200 MW load reduction in 25 minutes
Verifiable actions: RO uses boration and/or rods, BOP operates DEH to set in ramp rate, target, initiate and stop ramp as necessary.
- Event 7 1C Condensate pump trips leading to BOTH SGFPs tripping, FRP-S.1 entry required.
Verifiable actions: Insert rods in manual or auto (RO) **(CT)**
- Event 8 The Main Turbine will not trip in auto or manual, so the team will close governor valves to trip the Main Turbine (BOP) and then emergency borate (RO or BOP) **(CT)**
- Event 9 LBLOCA when ESP-0.1 entered or step 5 of EEP-0.
- Event 10 A Train SI will not auto actuate **(*CT)**
1B RHR pump will not auto start and MOV-8803B will not open. **(*CT)**
Terminate in EEP-1.0 when transition to ESP-1.3 announced.
AOP-100 / AOP-100 / AOP-100 / ARP-1.10 / AOP-17.1/ AOP-13/ FRP-S.1/ EEP-0/
EEP-1.0

CRITICAL TASK SHEET

- 1. Insert negative reactivity into the core by **at least one** of the following methods before completing the immediate action steps of FRP-S.1: (WOG CT FR-S.1 - - C) (PRA - NR:16, 21, 23, 27)

Transition to FRP-S.1 and insert negative reactivity by:

- (1) Insertion of rods in auto or manual at ≥ 48 SPM w/in 1 minute following attempts to insert control rods by using reactor trip hand switches or opening MG set breakers
- (2) Commencing an emergency boration w/in 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breakers

(NOTE: Negative reactivity insertion using control rods should begin within 6 minutes of start of event with MFW in service $> 40\%$ power, and 1 minute of start of event with no MFW $> 40\%$ power, and within 10 minutes if $< 40\%$ power.)

- 2. Isolate the main turbine from the SGs before plant and scenario specific criteria is exceeded: (WOG CT FR-S.1 - - A)
- Manually trip main turbine prior to SG's boiling dry
- 3. Manually start at least one low head ECCS pump before transition out of E-0.
(WOG CT E-0 - - H)
- The 1B LHSI does not start and the 1A LHSI pump did not start due to the SI signal not actuating.

OR

Establish flow from at least one High Head ECCS pump before transition out of E-0.
(WOG CT E-0 - - I)

- MOV-8803B does not open and due to the SI signal not actuating there will be no flow to the core.

* This is marked as one Critical task since flow to the core is the critical task. Actuating the SI signal will accomplish both tasks above or opening MOV-8803B and starting the 1B LHSI pump will accomplish the task.

**SCENARIO
OBJECTIVE/
OVERVIEW:**

Normal plant operation, fast ramp, a loss of all SGFPs, ATWT, followed by an LBLOCA.

The team should be able to:

- recognize and respond to failures of various instruments and components per AOP-100, AOP-17.1, and AOP-13.
- recognize the symptoms of an ATWT and implement the steps of FRP-S.1, EEP-0.0 and the recognize the LB LOCA and implement transition to EEP-1.0

Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes
1.	Total malfunctions (5–8)	10
2.	Malfunctions after EOP entry (1–2)	5
3.	Abnormal events (2–4)	5
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)	3

Southern Nuclear J.M. Farley Nuclear Plant

Operations Training Simulator Exam Scenario

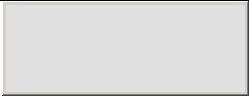

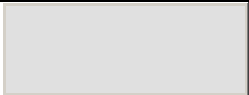
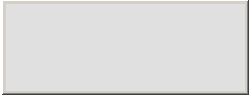
BOOTH INSTRUCTOR GUIDE

ILT-36 NRC EXAM SCENARIO #5

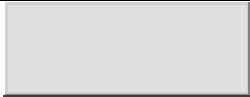


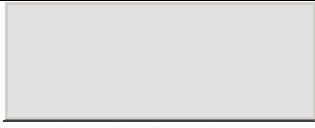
Validation time: 90 minutes Validated by McCaffery, Sorrell, Phillips The week of February 18, 2013			
TRN Supervisor Approval:	Gary Ohmstede	Date:	3-12-2013
NRC Chief Examiner	SEE NUREG 1021 FORM ES-301-3		

Facility:	Farley Nuclear Plant	Scenario No.:	5	Op-Test No.:	FA2013-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
Initial Conditions: 75% power, 1177 ppm, MOL, Ramping up					
Turnover:					
<ul style="list-style-type: none"> Unit 2 PSS in OFF for Maintenance (OOS 2 hrs, ETR 2 hrs) 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs) 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs) Current Risk Assessment is YELLOW and projected is YELLOW, A Train On-Service – B Train Protected. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia 					
SPLIT TRAIN ALIGNMENT					
Event No.	Malf. No.	Event Type*	Event Description		
1	Imf lt460	I (RO) TS (SRO)	LT-460, pressurizer level, fails LOW, letdown secures TS 3.3.1 Condition M		
2		N (BOP)	Restore Letdown		
3	Imf ft495	I (BOP) TS (SRO)	FT-495, selected steam Flow Transmitter for 1C SG fails HIGH Tech Spec 3.3.2 Condition D Function 1.e.2.		
4	Imf pk444d-a	C (RO) TS (SRO)	PK-444D, 1B RCP Spray valve, will open and can be closed in manual. TS 3.4.1 (RCS pressure)		
5	Imf ncfcn1b-d % / preset	C (BOP)	1B Condensate Pump develops Degraded Head, Stby (1A cond) pump will not auto start.		
6		R (RO) N (BOP)	Loss of 500KV line, SM directs 200 MW load reduction in 25 minutes		
7	Imf cCfcn1c_cc5	M (ALL)	1C Condensate pump trips leading to BOTH SGFPs tripping		
8		C (RO) C (BOP)	Rx Trip will not work in auto or manual, and one CRDM MG set breaker will not open. FRP-S.1 will be entered and begin driving rods in. (CT) Main Turbine will not trip automatically or in manual. Main Turbine GV's fast action closed. (CT)		
9	Imf mal-rscs2b	M (ALL)	LBLOCA when ESP-0.1 entered or step 5 of EEP-0.		
10		C (BOP)	A Train SI will not auto actuate. 1B RHR pump will not auto start and MOV-8803B will not open. Required to establish one train of HHSI or LHHSI flow. (CT)		
			Terminate in EEP-1.0 when transition to ESP-1.3 announced.		



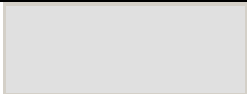
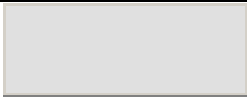
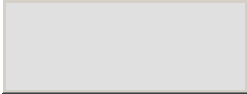

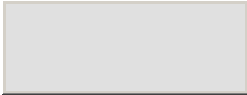

(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	Load in IC-215 Base IC is IC-56	
		RUN	 RUN simulator
0	0	Generic setup: bat 36exam/generic_setup_HLT.txt	
0	0	Quick setup (all items with * are included): bat 36exam/2012nrcexam_5.txt	
PRESETS			
8		1a crdm set fails to trip: CMFmalf / c52MGA_cr3	*
8		RTBs fail to open CMFmalf / cBKRXTRP_cc21 / closed CMFmalf / cbkrxtrp_cc22 closed	*
8		Prevent AUTO trip of main turbine MALF / T / MAL-TUR2	*
8		Prevent Manual trip of main turbine MALF / T / MAL-TUR24	*
10		Train A auto SI failure imf csftyinj_cc1 open	*
10		MOV-8803B does not open on SI imf csi8803b_d_cc5 open	*
10		1B RHR pump fails to auto start on SI imf crhp01b_d_cc9 open	*
5		Block 1A Cond pump from auto start imf ccfcn1a_cc8 open imf ccfcn1a_cc9 open imf ccfcn1a_cc10 open	*
0		Tag 1A MDAFW pump irf cafp01a_d_cd1 open	*
0		1C DG Tagged out irf cBK1DH07_d_cd1 / open irf cBK2DH07_d_cd1 / open	*

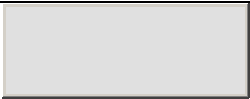
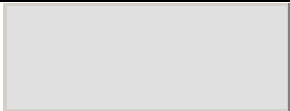

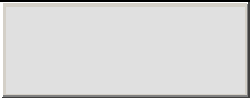
EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
		irf cBK1DH07_d_cd2 / open irf cBK2DH07_d_cd2 / open	
5		1B Condensate pump degraded head setup Imf jcfwfp11-s 250 Imf jcfwfp10-s 325	*
		Triggers and Commands	
7		When 1C condensate pump trips 1B condensate pump degrades to no flow Trgset 1 "x22o061m" Trg 1 "imf ncfcn1b-d_th 100 60"	

MCB setup			
		1C DG MSS	Place in Mode 3
		Place HOLD Tag on 1C DG MSS	1 HOLD TAG
		Place HOLD Tag on 1C DG DG output breakers DHO7-1 and DHO7-2	2 HOLD TAGS
		Place Unit 1 and Unit 2 Bypass and inoperable panel lights to the up position (EMERGENCY POWER SYSTEM)	Unit 1 A-Train Unit 2 A Train
		Place Unit 1 Bypass and inoperable panel lights to the up position (Auxiliary Feedwater System)	Unit 1 A-Train
		Place HOLD Tag on 1A MDAFW pump H/S	1 HOLD TAG
		DEH	Clear DEH alarms
		Select POWER OPS PRIMARY 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>
		Recorders Verify memory disks cleared Cae clearrecorders.cae	
		Provide a marked up copy of UOP-3.1 version 112.4 through step 8.1.10 complete.	<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	 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	 sv sim_clock.uvl
		VERIFY MICROPHONES READY	Batteries installed
		TURNOVER SHEET AVAILABLE	

EXAM

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	 RUN simulator
		Verify Horns ON: hornflag  <u>HORNS ON = TRUE</u>	 Turn Horns ON/OFF ann horn
1	NRC CUE	LT-460, pressurizer level, fails LOW, letdown secures TS 3.3.1 Condition M imf lt460 0 20	
2		Restore Letdown	
3	NRC CUE	FT-495, selected steam Flow Transmitter for 1C SG fails HIGH TS 3.3.2 Condition D Function 1.e.2. imf ft495 575 20	
4	NRC CUE	PK-444D, 1B RCP Spray valve, will open and can be closed in manual. TS 3.4.1 (RCS pressure) imf pk444d-a 10 20	
5	NRC CUE	1B Condensate Pump develops Degraded Head, Stby (1A cond) pump will not auto start. imf ncfcn1b-d_th 40 180	
6	NRC CUE	Loss of 500KV line, SM directs 200 MW load reduction in 25 minutes.	Communication required see Com's sheet.
7	After 5% pwr reduction	1C Condensate pump trips leading to BOTH SGFPs tripping imf ccfcn1c_cc5 closed 1B Condensate pump completely degrades	 TRG 1
8		Rx Trip will not work in auto or manual, and one CRDM MG set breaker will not open. FRP-S.1 will be entered and begin driving rods in. (CT)	

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
		Main Turbine will not trip automatically or in manual. Main Turbine GVs fast action closed. (CT)	
9		LBLOCA when ESP-0.1 entered or step 5 of EEP-0. imf mal-rscs2b	
10		A Train SI will not auto actuate. 1B RHR pump will not auto start and MOV-8803B will not open. Required to establish one train of HHSI or LHSI flow. (CT)	
		Terminate in EEP-1.0 when transition to ESP-1.3 announced.	
		End of Exam	 HORNS OFF
			 FREEZE simulator
		Stop data collection for Simview file sv DataCollection.uvl	
		Export data to file with the name of exam2013sen5grpX.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 Cae clearrecorders.cae	

<u>EVENT NO.</u>	<u>TIME</u>	<u>ACTIONS</u>
1	NONE REQUIRED	
2	NONE EXPECTED	
3	NONE EXPECTED	
4	NONE REQUIRED	
5	NONE REQUIRED	
6	NONE REQUIRED	
7	NONE REQUIRED	
8	3 minutes after requested	<p>Locally open reactor trip breakers</p> <div></div> <p>CMFmalf / cBKRXTRP_cc21 / open</p> <div></div> <p>CMFmalf / cBKRXTRP_cc22 / open</p>
9	WHEN REQUESTED	<p><u>Unit Two UO:</u> RESET FIRE ALARM MH1</p> <div></div> <p>Imf MH1 failoff</p>
9	WHEN REQUESTED	<p><u>SSS / RADSIDE:</u></p> <p>"I have performed steps 1 and 2 of attachment 1 of EEP-1 and need you to perform step 3 of attachment 1."</p> <div></div> <p>CAE ECCS_disc_delayed.cae</p>

<u>EVENT NO.</u>	<u>TIME</u>	<u>Communication:</u>
ALL	AS REQUIRED (Standard communicatio ns 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>Work Week Coordinator:</u> "I'll get the CR on LT-460 planned and worked." "I'll get I & C to place bistables in trip within 6 hours".
2	NONE EXPECTED	
3	WHEN REQUESTED	<u>Work Week Coordinator:</u> "I'll get I & C to place bistables in trip within 72 hours".
4	NONE EXPECTED	
5	NONE EXPECTED	
6	Event initiation	<u>SM:</u> "ACC informed me we just lost the Raccoon Creek 500kV line. Based on UOP-3.1 Appendix 5 Unit 1 is required to reduce load by 200 MW in the next 27 minutes" IF asked about Unit 2 reducing load <u>SM:</u> "Unit 2 is unable to reduce load at this time."
7	NONE EXPECTED	
8	NONE EXPECTED	

<u>EVENT NO.</u>	<u>TIME</u>	<u>Communication:</u>
9	WHEN REQUESTED	<u>SM:</u> "I will make the classifications and notifications." <u>EXTRA CONTROL ROOM OPERATOR:</u> "Both CRACS mode selector switches are in ON." <u>SM / SSS:</u> "I will get someone to perform step 6 of EEP-1." "I will get an extra operator to secure the 1B DG" <u>ANY CALL TO SHIFT CHEMIST:</u> Acknowledge to requirement for sampling. <u>Extra Operator:</u> The fire alarm is 1A-22 and I have acknowledged it on the fire alarm panel.

Initial Conditions: 75% power, 1177 ppm, MOL, Ramping up

Turnover:

- Unit 2 PSS in OFF for Maintenance (OOS 2 hrs, ETR 2 hrs)
- 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Current Risk Assessment is **YELLOW** and projected is **YELLOW**,
- **A** Train On-Service – **B** Train Protected.

Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

- Event 1 LT-460 fails LOW, letdown secures. **TS 3.3.1 Condition M**
Verifiable actions: RO must take manual control of Charging to maintain pressurizer level less than tech spec (63.5%).
- Event 2 Restore Letdown
Verifiable actions: BOP will restore letdown to service by operating several valves.
- Event 3 FT-495, selected steam Flow transmitter for 1C SG fails HIGH. **Tech Spec 3.3.2 Condition D Function 1.e.2.** Function 4e is not correct due to this function uses non-pressure compensated steam flow.
Verifiable actions: Take manual control of the 1C FRV and then select channel III instruments to control 1C SG functions.
- Event 4 PK-444D, 1B RCP Spray valve, will open and can be closed in manual. **TS 3.4.1 (RCS pressure)**
Verifiable actions: Place the 1B RCP spray controller in manual and control RCS pressure using heaters and sprays before a Rx trip is required.
- Event 5 1B Condensate Pump develops Degraded Head, Stby (1A cond) pump will not auto start.
Verifiable actions: start the standby Condensate pump before BOTH SGFPs trip
- Event 6 Loss of 500KV line, SM directs 200 MW load reduction in 25 minutes
Verifiable actions: RO uses boration and/or rods, BOP operates DEH to set in ramp rate, target, initiate and stop ramp as necessary.
- Event 7 1C Condensate pump trips leading to BOTH SGFPs tripping, FRP-S.1 entry required.
Verifiable actions: Insert rods in manual or auto (RO) **(CT)**
- Event 8 The Main Turbine will not trip in auto or manual, so the team will close governor valves to trip the Main Turbine (BOP) and then emergency borate (RO or BOP) **(CT)**
- Event 9 LBLOCA when ESP-0.1 entered or step 5 of EEP-0.
- Event 10 A Train SI will not auto actuate **(*CT)**
1B RHR pump will not auto start and MOV-8803B will not open. **(*CT)**
Terminate in EEP-1.0 when transition to ESP-1.3 announced.
AOP-100 / AOP-100 / AOP-100 / ARP-1.10 / AOP-17.1/ AOP-13/ FRP-S.1/ EEP-0/
EEP-1.0

CRITICAL TASK SHEET

- ___ 1. Insert negative reactivity into the core by **at least one** of the following methods before completing the immediate action steps of FRP-S.1: (WOG CT FR-S.1 - - C) (PRA - NR:16, 21, 23, 27)

Transition to FRP-S.1 and insert negative reactivity by:

- (1) Insertion of rods in auto or manual at ≥ 48 SPM w/in 1 minute following attempts to insert control rods by using reactor trip hand switches or opening MG set breakers
- (2) Commencing an emergency boration w/in 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breakers

(NOTE: Negative reactivity insertion using control rods should begin within 6 minutes of start of event with MFW in service $> 40\%$ power, and 1 minute of start of event with no MFW $> 40\%$ power, and within 10 minutes if $< 40\%$ power.)

- ___ 2. Isolate the main turbine from the SGs before plant and scenario specific criteria is exceeded: (WOG CT FR-S.1 - - A)

- Manually trip main turbine prior to SG's boiling dry

- ___ 3. Manually start at least one low head ECCS pump before transition out of E-0.

(WOG CT E-0 - - H)

- The 1B LHSI does not start and the 1A LHSI pump did not start due to the SI signal not actuating.

OR

Establish flow from at least one High Head ECCS pump before transition out of E-0. (WOG CT E-0 - - I)

- MOV-8803B does not open and due to the SI signal not actuating there will be no flow to the core.

* This is marked as one Critical task since flow to the core is the critical task. Actuating the SI signal will accomplish both tasks above or opening MOV-8803B and starting the 1B LHSI pump will accomplish the task.

**SCENARIO
OBJECTIVE/
OVERVIEW:**

Normal plant operation, fast ramp, a loss of all SGFPs, ATWT, followed by an LBLOCA.

The team should be able to:

- recognize and respond to failures of various instruments and components per AOP-100, AOP-17.1, and AOP-13.
- recognize the symptoms of an ATWT and implement the steps of FRP-S.1, EEP-0.0 and the recognize the LB LOCA and implement transition to EEP-1.0

Target Quantitative Attributes (Per Scenario; See Section D.5.d)		Actual Attributes
1.	Total malfunctions (5–8)	10
2.	Malfunctions after EOP entry (1–2)	5
3.	Abnormal events (2–4)	5
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)	3

Event Description: LT-460 Fails LOW, Letdown secures automatically

PT-460 will fail LOW. This LT is channel II and is the secondary channel selected since the PRZR LVL CONT SWITCH is selected to the I/II position. This will cause letdown to secure and AOP-100 actions to be taken. Letdown will be placed back in service using AOP-100.

Indications Available:

Annunciators:

- PRZR LVL LO HTRS OFF LTDN SEC (HA3)
- PRZR LVL DEV LO (HB2)
- PRZR HTR CONT TRBL (HD4)

Indications of LT-460 failing LOW

- LI-460 failing low
- Backup Heater Breakers open
- PI-145 Ltn HX outlet pressure ↓
- LI-459A and 461 ↑
- FI-122 charging flow ↓
- FK-122 demand ↓
- FI-150 letdown flow goes to 0 gpm
- LCV-460 goes closed
- LI-112B & LI 115 VCT Level ↓

Time	Pos.	Expected Actions/Behavior	Comments
AOP-100, Instrumentation Malfunction, section 1.2 Ver 12,			
	SRO	Direct BOP to reference ARPs	
	BOP	Performs actions of ARPs (most probably addresses ARPs by priority HA3 first) <ul style="list-style-type: none"> • Checks indications and determine actual pressurizer level and pressure • Verifies automatic actions have occurred (LCV-460 closed) Informs SRO if an Instrument Failure has Occurred ARP directs entry into AOP-100. HB2 (step 1) Place the Turbine on hold	
	SRO	SRO will direct entry to AOP-100.	
	RO	Determines and reports LT-460 failure to SRO	
	RO	(step 1) Checks pressurizer level on or trending to program value. (PRZR level increasing)	RNO: manual control of charging flow taken FK-122, CHG FLOW CONTROLLER, in manual and charging flow reduced

Event Description: **LT-460 Fails LOW, Letdown secures automatically**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 2) Check RCP seal injection flows - Adjusts SI flow to 6-13 gpm by using HIK-186, SEAL WTR INJECTION CONTROLLER.	
	SRO/ RO	(step 3) Determine if a PRZR level transmitter / indicator loop has failed. LI-459, LI-460, or LI-461	Determines LI-460 failed low
	SRO/ RO	(Step 3) IF selected PRZR level control channel failed THEN select and unaffected channel. Controlling channel I / II is affected - RO directed to select channel I / III on LS-459Z, PRZR LEVEL CONTROL CHANNEL SWICH IF required THEN select an unaffected channel on the PRZR level recorder control switch LS/459Y, PRZR LEVEL RECORDER INPUTS SWITCH	Channel 459 selected no action required
	SRO/ RO	(step 4) Check letdown in service - Orifice isolation valves one or more open HV-8149A,B,C, LTDN ORIF ISO VLVS - Flow indicated on FI-150, LTDN HX OUTLET FLOW.	Letdown NOT in service
	RO	(step 4 RNO) Establish normal letdown as follows: - Verify closed all letdown orifice isolation valves • HV-8149A • HV-8149B • HV-8149C - Verify LP LTDN PRESS PK 145 in manual and demand adjusted to 50% or less. IF necessary THEN open LTDN LINE PENE RM ISOs HV-8175A and B from PRIP.	Action not required

Event Description: LT-460 Fails LOW, Letdown secures automatically

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 4 RNO) <ul style="list-style-type: none"> - Verify open LTDN LINE CTMT ISO HV-8152 - Verify open both LTDN LINE ISO LCV-459 and 460 - Verify FK-122 in Man and establish required minimum charging flow for one orifice to be placed on service. (18 GPM) - Open LTDN ORIF ISO 60 GPM HV-8149B or C to establish approx. 60 gpm letdown flow 	Will open LCV-460
NOTE: Crew may use posted procedure guidance to restore a 45 gpm orifice at this point. <p style="text-align: center;">PLACING SECOND LTDN ORIFICE ON SERVICE DURING TRANSIENT CONDITIONS</p> <ol style="list-style-type: none"> 1. Place FK-122 in MANUAL and adjust to greater than 80 gpm. 2. Place PK-145 in MANUAL and adjust to less than or equal to 50%. 3. Open LTDN ORIF ISO 45 GPM, Q1E21HV8149A. 4. Establish desired LTDN pressure and return PK-145 to AUTO. (260-450 psig) 5. Restore FK-122 to AUTO when desired. 6. Refer To SOP-2.1 when time permits. 			
	RO	(step 5) Check letdown flow established: <ul style="list-style-type: none"> - Check letdown flow indicated FI-150 - Place PK-145 in auto. <ul style="list-style-type: none"> • Verify that PK-145 set between 4.3-7.5 to maintain 260-450 psig letdown pressure • Place PK-145 in Auto - Verify LTDN HX outlet temp maintained at approximately 100°F. 	Checks these indicators: TI-116 VCT Temp TI-143 Divert letdown HX temp TI-144 CCW letdown HX temp
	SRO	(step 6) Refer to Tech Specs 3.3.1 & 3.3.3 determine any LCO requirements. Tech Spec 3.3.1. Condition M	

Time	Pos.	Expected Actions/Behavior	Comments
TECHNICAL SPECIFICATION 3.3.1, Reactor Trip System (RTS)			
Instrumentation			
The RTS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE .			
Table 3.3.1-1 Reactor Trip System Instrumentation			
Function 9 - Pressurizer Water Level —High		Applicable in Mode 1 >P-7	
3 required channels		condition M	
	SRO	<div>CONDITION</div> <div>M. One channel inoperable.</div>	<div>REQUIRED ACTION</div> <div> <p>-----NOTE-----</p> <p>The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels.</p> <p>-----</p> <p>M.1 Place channel in trip. OR M.2 Reduce THERMAL POWER to < P-7.</p> </div> <div>COMPLETION TIME</div> <div> <p>72 hours</p> <p>78 hours</p> </div>
	SRO	(step 7) Notify Shift Manager	
	RO	(step 8) WHEN plant conditions permit THEN restore components to automatic control as follows: Restore charging flow control to automatic per SOP-2.1, Chemical and Volume Control System Plant Startup and Operation	
SOP-2.1, CVCS Startup and Operation, section 4.7.2 version 131,			
	RO	<div>(step 4.7.2)</div> <ul style="list-style-type: none"> - Place LK-459F, PZR LVL Controller, in manual - Verify Pzr level is w/l 3% of setpoint as indicated on LR-459 - Manually adjust the output meter on LK-459F to equal the position of the meter pointer on CHG FLOW FI-122A - Place LK-459F in AUTO - Place FK-122 in AUTO 	

Event Description: **LT-460 Fails LOW, Letdown secures automatically**

Time	Pos.	Expected Actions/Behavior	Comments
Continue AOP-100 actions here			
	RO	(step 8) Restore control of pressurizer heaters: - 1A PRZR HTR GROUP BACKUP - 1B PRZR HTR GROUP BACKUP - 1D PRZR HTR GROUP BACKUP - 1E PRZR HTR GROUP BACKUP (ARP HD4 Actions) - Places 1C PZR HTR switch in OFF and then back to the ON position	
	SRO	(step 9) Submit a Condition Report for failed channel and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the Condition Report.	
When Tech Specs have been evaluated and letdown is in service, then at the discretion of the Lead Examiner move to Event 3.			

Event Description: **FT-495 Fails HIGH**

FT-495, selected steam flow transmitter for 1C SG fails high. The team should select channel III instruments to control 1C SG functions. Team is expected to perform actions of AOP-100.

Indications Available:

Annunciators:

- 1C SG Stm Flow > Feed Flow (JB3)
- MS Line HI Stm Flow Alert (JB4)
- 1C SG LVL DEV (JF3)

Indications of FT-495 failing HIGH:

- FI-494 Steam Flow ↑
- TSLB 4 18-4 LIT
- 1C FRV FK-498 Demand ↑
- FI-497 & 496 Feed Flow 1C SG ↑
- 1C SG level LI-494, 495, 496 ↑
- A & B SG level ↓
- SGFP speed ↑
- SGFP suction pressure ↓

Time	Pos.	Expected Actions/Behavior	Comments
AOP-100, Instrumentation Malfunction, section 1.5 Ver 12			
	BOP	Announces Receipt of MCB Alarms May notice FI-495, steam flow transmitter for 1C SG, Failed High and inform SRO.	
	SRO	Instructs BOP/RO to perform Immediate Operator Actions of AOP-100	
	BOP	(step 1) Maintain SG levels at 65%. IF required, THEN, take manual control of SGFP speed control as necessary to restore SG level to 65% <ul style="list-style-type: none"> • SGFP master controller SK-509A OR <ul style="list-style-type: none"> • SGFP individual controllers as needed. <ul style="list-style-type: none"> [] SK-509B [] SK-509C IF required, THEN take manual control of the affected feedwater regulating valves <ul style="list-style-type: none"> [] 1A SG FW FLOW FK-478 [] 1B SG FW FLOW FK-488 [] 1C SG FW FLOW FK-498 	NOTE: Step 1 is an Immediate Operator Action and a continuing action step

Event Description: FT-495 Fails HIGH

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	If a loss of main feedwater occurs, then perform the actions of AOP-13, Loss of Main Feedwater	This should not result in a loss of MFW
	SRO	(step 2) If an adverse trend in SG level exists, then establish Trip Criteria	Trip criteria expected: <ul style="list-style-type: none"> Rx trip on low SG level 28% Main Turbine and Feed Pump Trip @ 82% SG level
	BOP	(step 3) IF a ramp is in progress, THEN place Turbine on HOLD	
	SRO/ BOP	(step 4) Determine if an instrument failure has occurred. Check for a failed or erroneous indications from the following Steam flow or feed flow indicators. <div style="text-align: center;"> STM FLOW FEED FLOW S/G CH III CH IV CH III CH IV A S/G FI-474 FI-475 FI-477 FI-476 B S/G FI-484 FI-485 FI-487 FI-486 C S/G FI-494 FI-495 FI-497 FI-496 </div> Check for failed or erroneous readings on the following SG pressure indicators <div style="text-align: center;"> S/G CH II CH III CH IV A S/G PI-474 PI-475 PI-476 B S/G PI-484 PI-485 PI-486 C S/G PI-494 PI-495 PI-496 </div>	FT-495 has failed high
	SRO/ BOP	IF the alarm(s) was due to a SGWLC System controlling channel failure, THEN select the unaffected channel and verify proper system response Places switches FS/498Z and FS/498Y for 1C SG in the III position: FT-494 (STM Flow) & FT-497 (FEED Flow)	BOP will verify proper system response

Event Description: FT-495 Fails HIGH

Time	Pos.	Expected Actions/Behavior			Comments
	SRO	(step 5) Refer to Tech Specs 3.3.1, 3.3.2, and 3.3.3 for any LCO requirements. T.S. 3.3.2 Condition D applicable			
TECHNICAL SPECIFICATION 3.3.2, ESFAS Instrumentation					
<i>The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE</i>					
Table 3.3.2-1 ESFAS Instrumentation					
Function 2e – High steam flow in two steam lines coincident w/ lo-lo Tav _g					
Applicable in Modes 1, 2 and 3 with MSIVs open					
required channels 2 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	
	SRO	(step 6) Notify the Shift Manager			
		(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.			
When Tech Specs have been evaluated, then at the discretion of the Lead Examiner move to Event 4.					

Event Description: PK-444D, 1B RCP Spray valve controller, fails high. 1B RCP spray valve will open, able to be controlled in manual.

PK-444D will open and can be closed in manual. RO will place PK-444D in manual and close, then ensure all heaters are on.

Indications Available:

Annunciators:	Recognize indications of spray valve failure and heater trip:
- PRZR PRESS HI-LO (HC1)	- PK-444D demand ↑
- PRZR PRESSREL VLV 445A OR B/U	- Pzr pressure ↓
- HTRS ON (HD1)	- Amber light above 1A Pzr Htr control
- PRZR HTR BKR TRIPPED (HD5)	

Time	Pos.	Expected Actions/Behavior	Comments
AOP-100, Instrumentation Malfunction, section 1.1 Ver 12			
	SRO	(step 1) Direct entry into AOP-100 Perform the IOAs of AOP-100 for RCS pressure.	
	BOP	(step 1) Take manual control of PK-444D, 1B LOOP SPRAY VLV, and close the controller. - Take manual control of Pzr heaters as necessary	NOTE: Step 1 and 2 is an Immediate Operator Action
	SRO	(step 2) addresses a stuck open spray valve. - This is not the case since PK-444D, 1B LOOP SPRAY VLV, can be closed from the controller	
	RO	(step 3) IF PORV is open and pressurizer pressure is less than 2310 psig, THEN close the PORV.	
	RO	(step 4) Take manual control of Sprays, Heaters, PORVs and PORV isolation valves, as necessary	
	SRO	(step 5) IF a PROTECTION instrument failure has occurred, THEN determine which pressure channel has caused the alarm.	

Event Description: PK-444D, 1B RCP Spray valve controller, fails high. 1B RCP spray valve will open, able to be controlled in manual.

Time	Pos.	Expected Actions/Behavior			Comments
	SRO	(step 6) Refer to Tech Specs for LCO requirements that exist. <ul style="list-style-type: none">Sections 3.3.1, 3.3.2, & 3.3.3 for instrument failuresSection 3.4.1 for DNB limitsSection 3.4.5 RCS Loops – Mode 3Section 3.4.11 PORVs			
TECHNICAL SPECIFICATION 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits					
<i>If RCS pressure drops below 2209 psig then this TS applies. It is expected that pressure will drop below 2209 psig for this event.</i>					
		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	
	SRO	(step 7) Notify Shift Manager			
	SRO	(step 8) WHEN plant conditions permit, THEN restore components to automatic control.			
	SRO	(step 9) Submit a Condition Report and notify the Work Week Coordinator			
	SRO	(step 11) Go to procedure and step in effect.			
When Tech Specs have been evaluated (if required) and the plant is under control and at the discretion of the Lead Examiner move to Event 5					

NOTE: Next event takes 3-5 minutes to build in

Event Description: 1B Condensate pump degraded head. Leads to SGFP low suction pressure.

1B Condensate pump head degrades. STBY Condensate pump will not start. Operator must recognize degrading feed pump suction pressure and start the STBY condensate pump per ARP guidance. This event takes 3-5 minutes to build in. First alarm is SGFP Suction Pressure Low.

Indications Available:

Annunciators:	Recognize indications of
- KB4 SGFP SUCT PRESS LO	- SGFP suction pressure decreasing

Time	Pos.	Expected Actions/Behavior	Comments
ARP-1.10, Main Control Board Ann Panel K, KB4 ver 70.2			
	BOP	(step 1) WHEN low pressure alarm comes in, THEN observe suction pressure on MCB recorder PR-4039 or plant computer.	
	BOP	(step 2) IF a malfunction of SGWLC has raised SGFP speed, THEN take manual control of appropriate SGFP speed controller and adjust, as required	
	BOP	(step 3) IF a feedwater heater malfunction is indicated, THEN go to FNP-1-AOP-13.0, CONDENSATE AND FEEDWATER MALFUNCTION	
	BOP	(step 4) IF pressure continues to decrease below 300 PSIG, THEN verify both heater drain pumps are running.	
	BOP	(step 5) IF a heater drain pump has tripped, THEN perform the following:	
	BOP	(step 6) IF a heater drain pump has not tripped, THEN check the power supply breakers in the L & N Racks AND reset if necessary	

Event Description: **1B Condensate pump degraded head. Leads to SGFP low suction pressure.**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 7) IF suction pressure continues to decrease, THEN start the standby condensate pump prior to reaching 275 PSIG.	
	SRO	(step 10) IF operation with three condensate pumps is required, THEN carefully monitor Tave, reactor power, pressurizer level and pressure, and S/G level due to effects of colder feedwater.	
At the discretion of the Lead Examiner move to next Event 6.			

Event Description: Fast ramp required AOP-17.1 entry.

Time	Pos.	Expected Actions/Behavior	Comments
AOP-17.1, Rapid Turbine Load Reduction, version 4			
	SRO	(step 1) Perform a rapid ramp briefing <ul style="list-style-type: none"> - Use attachment 1 as time permits - Contact Rx Engineering as soon as practical for fast ramp recovery recommendation - Notify SRC of power reduction if it will result in greater than 15% Rx power change in 1 hour to perform STP-746 (SR 3.4.16.2) 	
	BOP	(step 2) Reduce turbine load at desired rate in OPERATOR AUTO (DEH) <ul style="list-style-type: none"> - Desired rate will be between 7 and 11 MW/min On the DEH panel: <ul style="list-style-type: none"> - Press SETPOINT - Set desired TARGET - Select desired RATE - Verify the HOLD light is LIT. - Press the GO pushbutton and ensure the GO light is LIT - Ensure the Main Turbine starts to ramp UP, GVs start to open. 	
	RO	(step 3) RO will maintain Tavg w/i $\pm 5^{\circ}\text{F}$ of Tref by adjusting rod position or boron concentration. Verify rods are in AUTO or MANUAL as desired	Continuing action step
	RO	(step 3.2) If required Initiate a manual boration per SOP-2.3 below:	See next page for SOP-2.3 actions
	RO	(step 3.2.1) IF desired the Boration response can be optimized by: <ul style="list-style-type: none"> - Placing a second letdown orifice in service. OR <ul style="list-style-type: none"> - Use of the Emergency Borate valve MOV 8104. (step 3.2.2) Start additional pressurizer heaters as required. <ul style="list-style-type: none"> - To aid in maintaining pressurizer pressure. - To increase Boron mixing 	

Event Description: Fast ramp required AOP-17.1 entry.

Time	Pos.	Expected Actions/Behavior	Comments
		(step 3.3) RO will adjust rod position to maintain Delta I w/i limits	
		(step 3.4) check proper operation of the Steam Dumps. <ul style="list-style-type: none"> - Check LOSS OF LOAD INTERLOCK C-7A on the BYP & PERMISSIVES panel is illuminated. - Check STM DUMP MODE SEL TRAINS A B in TAVG. - Check STM DUMP INTLK TRAIN A and B in ON. - Check steam dumps properly responding to TAVG/TREF deviation 	
SOP-2.3, CVCS Rx Makeup Control System version 59.1			
	RO	(Step 1.0) Borating per SOP-2.3 appendix B <ul style="list-style-type: none"> • Set the boric acid integrator to the desired quantity • Adjust LTDN TO VCT FLOW LK 112 setpoint as desired • M/U mode selector to STOP • MKUP MODE SEL SWITCH to BOR • MKUP MODE CONT SWITCH to START. (Step 1.6) Verify proper boration operation by observing the following: <ul style="list-style-type: none"> • On service boric acid pump started. • MKUP TO CHG PUMP SUCTION HDR FCV113B opens. • BORIC ACID TO BLENDER FCV113A opens. • Boric acid flow is displayed on FI-113 MAKEUP FLOW TO CHG/VCT. 	NOTE: A continuous boration is allowed by appendix C which maintains the BA system lined up and the RO will take the MSS to START each time a boration is required.
AOP-17.1 actions CONTINUED below:			
	BOP/ RO	(step 4) Control secondary parameters <ul style="list-style-type: none"> - SG NR levels maintained at 65% - Pzr level trending to or maintained on program - Pzr pressure = to 2235 psig 	Continuing action step

Event Description: Fast ramp required AOP-17.1 entry.

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	(step 5) Check parameters w/l limits for continued operation <ul style="list-style-type: none"> - PZR level >15% - Pzr press > 2100 psig - SG NR levels 35-75% - Tavg 541 – 580°F - Control bank LO-LO position clear (FE2) - Delta I w/l limits 	Continuing action step
	RO	(step 6) when power reduction completed then restore Tavg to programmed value <ul style="list-style-type: none"> • Adjust turbine load at less than or equal to 2 MW/min. • Refer to Table 1 to aid in determining needed boration and/or rod position. • WHEN TAVG is within 3°F of TREF, THEN adjust boron and rods as needed to control Delta I. 	Continuing action step
	RO	(step 7) Check LOSS OF LOAD INTERLOCK C-7A NOT illuminated.	
	BOP/ RO	(step 8) Check plant stable.	
<p>When 5% ramp is reached, next event will be inserted. Failure to insert event at this time will make it not function as intended.</p>			

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Event Description: **1C Condensate pump trips. Loss of BOTH SGFPs.**

1C Condensate pump trips and suction pressure decreases to SGFP automatic trip setpoint (30 second delay), causing a LOSS OF FEED >5% power.

Indications Available:

Annunciators:

- KC3 1A or 1B SGFP TRIPPED
- KB4 SGFP SUCT PRESS PO

Indications

- SGFP speed decreasing
- SGWL decreasing
- SGFP suction pressure decreasing

Time	Pos.	Expected Actions/Behavior	Comments
AOP-13, Condensate and Feedwater Malfunction, ver 33			
	SRO	(step 1) Check only one SGFP running	RNO Proceed to step 2
	SRO	(Step 2) Check Both SGFPs - TRIPPED	
	RO	(Step 2.1) Check Rx power less than 5%	RNO Trip the reactor and go to FNP-1-EEP-0, REACTOR TRIP OR SAFETY INJECTION.
See next page for FRP-S.1 actions.			

Event Description: FRP-S.1 Entry

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.

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
-------------------------------------	--

Time	Pos.	Expected Actions/Behavior	Comments
		Enter EEP-0, Reactor Trip or Safety Injection, version 44	
	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	Direct entry into FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION – ATWT, Ver 27.0	
		Steps 1 and 2 are IOA steps	
	RO	(step 1) IF reactor still NOT tripped, THEN perform the following: • Insert control rods in manual control. OR • Verify rods insert in AUTO at greater than 48 steps per minute.	Critical task Insert negative reactivity

Event Description: FRP-S.1 Entry

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 2) Check Main Turbine tripped	RNO 2.1 Place main turbine emergency trip switch to TRIP for at least 5 seconds. Critical task RNO 2.2 IF turbine can NOT be tripped, THEN reduce GV position demand signal to zero from DEH panel. <input type="checkbox"/> TURBINE MANUAL depressed <input type="checkbox"/> GV CLOSE depressed <input type="checkbox"/> FAST ACTION depressed
NOTE: 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.			
	BOP	(step 3) Verify AFW pumps running <ul style="list-style-type: none"> Both MDAFWPs amps > 0 TDAFWP 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 pump Open MOV 8104 Establish normal letdown flow – 8149A and either 8149B or C open Establish normal charging flow > 40 gpm Verify adequate emergency boration flow of > 30 gpm on FI-110 Check RCS pressure less than 2335 psig 	

Event Description: FRP-S.1 Entry

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.	
	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 38 for ATT 1 actions.

Event Description: FRP-S.1 Entry

Time	Pos.	Expected Actions/Behavior	Comments
	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: Transition to EEP-0 will be made when requirements of step 8 are met.			
	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.
	BOP	(step 9) Monitor CST level. Check CST level greater than 5.3 ft. CST LVL <ul style="list-style-type: none"> LI 4132A LI 4132B 	NOTE: [CA] step
	BOP	(step 10) Check SG levels. Check at least one SG narrow range level - GREATER THAN 31%{48%}.	NOTE: [CA] step
Large Break LOCA will be initiated when EITHER ESP-0.1 entered or at Step 5 of EEP-0			

Event Description: **LBLOCA**

LBLOCA will occur when step 5 of EEP-0 is started

Indications Available:

Annunciators:

- Various and many

Recognize indications of tube rupture

- Charging Flow increasing
- VCT level decreasing
- PZR level decreasing
- CTMT pressure increasing

Time	Pos.	Expected Actions/Behavior	Comments
Enter EEP-0, Reactor Trip or Safety Injection, version 44			
	RO/ BOP	<p>(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 of EEP-0

Event Description: LBLOCA

Time	Pos.	Expected Actions/Behavior	Comments
	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 4.2) Verify both trains of SI- ACTUATED. <input type="checkbox"/> MLB-1 1-1 lit AND <input type="checkbox"/> MLB-1 11-1 lit	
NOTE: When FRP-P.1 is entered actions are located on PAGE 34			
NOTE: Crew may transition to ESP-0.1 depending on plant conditions. FOLDOUT PAGE criteria of ESP-0.1 to actuate SI and transition back EEP-0 is PZR level <4%. If required, actions for ESP-0.1 are located on PAGE 35			
	SRO	(step 5) Directs continuing into EEP-0 at step 5. Directs the BOP to perform attachment 2.	For Attachment 2 and 4 actions. Go to page 41
		EEP-0 FOLD OUT PAGE CRITERIA IN EFFECT Ruptured SG AFW Isolation. <ul style="list-style-type: none"> Manually stop AFW flow to a SG if BOTH conditions listed below occur: <ul style="list-style-type: none"> Level increases in an uncontrolled manner or radiation in that SG is abnormal AND Narrow range level – GREATER THAN 31% {48%} 	NOTE: [CA] step The action to Isolate AFW to the ruptured SG may be completed beyond this point.

Event Description: LBLOCA

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 6) Check containment pressure- HAS REMAINED LESS THAN 27 psig	NOTE: [CA] step – RNO 6.1 Verify PHASE B CTMT ISO - ACTUATED. <ul style="list-style-type: none"> • MLB-3 1-1 lit • MLB-3 6-1 lit 6.2 Stop all RCPs. RCP <ul style="list-style-type: none"> • 1A • 1B • 1C 6.3 Verify PHASE B CTMT ISO alignment. 6.3.1 Check All MLB-3 lights lit. 6.3.2 IF any MLB-3 light NOT lit, THEN verify PHASE B CTMT ISO using ATTACHMENT 5, PHASE B CONTAINMENT ISOLATION.
	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 □ 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.	

Event Description: LBLOCA

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 	

Event Description: LBLOCA

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>	NOTE: RNO column since RCS temp will be <547°F
	BOP	<p>(step 9.1.5 RNO) IF MSIV's are open THEN isolate steam loads in the turbine building:</p> <ul style="list-style-type: none"> MSRs reset <p>(steps 9.1.5.1 and 9.1.5.2 RNO) these actions are performed by Systems Operators when RX trip is announced in step 7.</p>	
	BOP	<p>(step 9.1.5.4 RNO) IF two SJAE's in service, THEN secure one SJAE</p> <ul style="list-style-type: none"> 1A SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed 1B SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed 	

Event Description: **LBLOCA**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 9.1.6 RNO) IF cool down continues THEN close main steam isolation and bypass valves. 1A(1B,1C) SG MSIV - TRIP ☐ Q1N11HV3369A ☐ Q1N11HV3369B ☐ Q1N11HV3369C ☐ Q1N11HV3370A ☐ Q1N11HV3370B ☐ Q1N11HV3370C 1A(1B,1C) SGMSIV - BYPASS ☐ Q1N11HV3368A ☐ Q1N11HV3368B ☐ Q1N11HV3368C ☐ Q1N11HV3976A ☐ Q1N11HV3976B ☐ Q1N11HV3976C	

Event Description: LBLOCA

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(step 10) Check pressurizer PORVs and spray valves.</p> <p>WHEN pressurizer pressure less than 2335 psig, THEN verify both PRZR PORVs closed.</p> <p>Verify both PRZR PORVs indicate CLOSED</p> <p>Check PRZR PORV temperature STABLE OR FALLING.</p> <p><input type="checkbox"/> PORV Temp TI-463</p> <p>Check PRT parameters STABLE or FALLING.</p> <p><input type="checkbox"/> PRT PRESS PI 472</p> <p><input type="checkbox"/> PRT LVL LI-470</p> <p><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.</p> <p>1A(1B) LOOP SPRAY VLV</p> <p><input type="checkbox"/> PK 444C</p> <p><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.</p> <p>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.</p> <p>Control charging pump miniflow valves based on RCS pressure.</p> <p>1C(1A) LOOP RCS WR PRESS</p> <p><input type="checkbox"/> PI 402A</p> <p><input type="checkbox"/> PI 403A</p>	<p>NOTE: Based on RCS pressure, close miniflows < 1300 and open when > 1900 psig.</p>

Event Description: LBLOCA

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. <input type="checkbox"/> Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig.	
	SRO	(step 14) Check SGs not ruptured Check secondary radiation indication - NORMAL. <input type="checkbox"/> R-15 SJAE EXH <input type="checkbox"/> R-19 SGBD SAMPLE <input type="checkbox"/> R-23A SGBD HX OUTLET <input type="checkbox"/> R-23B SGBD TO DILUTION <input type="checkbox"/> R-15B TURB BLDG VNTL (BOP) <input type="checkbox"/> R-15C TURB BLDG VNTL (BOP) <input type="checkbox"/> R-60A MS ATMOS REL (BOP) <input type="checkbox"/> R-60B MS ATMOS REL (BOP) <input type="checkbox"/> R-60C MS ATMOS REL (BOP) <input type="checkbox"/> R-60D TDAFWP EXH (BOP) <input type="checkbox"/> No SG level rising in an uncontrolled manner.	
		(step 15) Check RCS intact. <ul style="list-style-type: none"> Check containment radiation - NORMAL. <input type="checkbox"/> R-2 CTMT 155 ft <input type="checkbox"/> R-7 SEAL TABLE <input type="checkbox"/> R-27A CTMT HIGH RANGE (BOP) <input type="checkbox"/> R-27B CTMT HIGH RANGE (BOP) Check containment pressure - LESS THAN 3 psig. Check containment ECCS sump level - LESS THAN 0.4 ft. 	RNO Go to FNP-1-EEP-1, LOSS OF REACTOR OR SECONDARY COOLANT.
Transition to EEP-1.0, version 31			

Event Description: LBLOCA

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 1) Check SUB COOLED MARGIN MONITOR indication - GREATER, THAN 16°F{45°F} SUBCOOLED IN CETC MODE.	RNO 1.1 IF HHSI flow greater than 0 gpm THEN stop all RCPs. RCP □ 1A □ 1B □ 1C
	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 > {48} Controls MDAFW & TDAFW flows as necessary to maintain levels {48%-65%} Stops TDAFW pump WHEN at least 2 SGs >28%	
	BOP	(step 4) Check SGs not ruptured - Check secondary radiation indication - NORMAL.	□ R-15 □ 19 □ 23A and B □ 15B and C, □ 60 A, B, C, D
		(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 (1 hour from start of event requirements - not available to perform in simulator-SRO calls for SSS or an extra to perform) - 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	

Event Description: LBLOCA

Time	Pos.	Expected Actions/Behavior	Comments
	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.
	RO	(step 8) Checks containment spray system - any CS pump started - Reset containment spray signals. CS RESET □ A TRN □ B TRN	
	RO	(step 9) Determines LHSI pumps should NOT be stopped due to RCS Pressure < {435 psig}, RCS pressure stable or rising and RHR pumps running with suction aligned from RWST □ PI 402B □ PI 403B	(step 9 RNO) Establish CCW flow to RHR heat exchangers. CCW TO 1A(1B) RHR HX □ Q1P17MOV3185A open □ Q1P17MOV3185B open
	BOP	(step 11) Performs EEP-1 ATT 4, VERIFYING 4160 V BUSSES ENERGIZED	See Tab at end of scenario for Attachment 4 actions. Page 45
	SRO	(step 12) Directs securing Unloaded DGs	(extra, Unit two UO, or BOP)

Event Description: LBLOCA

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(step 13) Begin evaluation of plant status.</p> <p>(step13.1) Verify cold leg recirculation-AVAILABLE.</p> <p>(step 13.1.1) Train A equipment available:</p> <ul style="list-style-type: none"> <input type="checkbox"/> 1A RHR Pump <input type="checkbox"/> CTMT SUMP TO 1A RHR PUMP Q1E11MOV8811A <input type="checkbox"/> CTMT SUMP TO 1A RHR PUMP Q1E11MOV8812A <input type="checkbox"/> 1A RHR HX TO CHG PUMP SUCT Q1E11MOV8706A <input type="checkbox"/> CCW TO 1A RHR HX Q1P17MOV3185A <p>OR</p> <p>(step 13.1.2) Train B equipment available:</p> <ul style="list-style-type: none"> <input type="checkbox"/> 1B RHR Pump <input type="checkbox"/> CTMT SUMP TO 1B RHR PUMP Q1E11MOV8811B <input type="checkbox"/> CTMT SUMP TO 1B RHR PUMP Q1E11MOV8812B <input type="checkbox"/> 1B RHR HX TO CHG PUMP SUCT Q1E11MOV8706B <input type="checkbox"/> CCW TO 1B RHR HX Q1P17MOV3185B <p>(step13.2) Begin taking ECCS logs</p>	
	BOP	<p>13.3 Evaluate RCS sampling requirements.</p> <p>13.3.1 Consult TSC staff to evaluate need for RCS sampling.</p>	

Event Description: LBLOCA

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	13.4 Check no intersystem LOCA outside CTMT. 13.4.1 Check auxiliary building radiation - NORMAL. □ R-3 RADIOCHEMISTRY LAB □ R-4 1C CHG PUMP RM □ R-5 SFP RM □ R-6 SAMPLE RM AREA □ R-8 DRUMMING STATION □ R-10 PRF □ R-17A OR R-17B CCW	
	BOP	13.4.2 Check auxiliary building room sumps - HI LVL ALARMS CLEAR AND NO SUMP PUMPS RUNNING IN AUTO. (BOP)	
	BOP	13.4.3 Check WHT and FDT levels - NO EXCESSIVE OR UNEXPLAINED LEVEL RISE.	
	RO	13.4.4 Check PI600A(B) 1A(1B) RHR PUMP DISCH PRESS - LESS THAN 450 psig.	
	BOP	13.5 Verify at least one train of PRF in operation using FNP-1-SOP-60.0, PENETRATION ROOM FILTRATION SYSTEM. 13.6 Verify VCT level - GREATER THAN 5%.	
	RO	14 Check LHSI flow in progress. 14.1 Check RCS pressure - LESS THAN 275 psig{435 psig}. 1C(1A) LOOP RCS NR PRESS □ PI 402B □ PI 403B	

Event Description: **LBLOCA**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	14.2 Verify both LHSI flows - GREATER THAN 1.5x103 gpm. 1A(1B) RHR HDR FLOW <input type="checkbox"/> FI 605A <input type="checkbox"/> FI 605B	
	BOP	15 Check when to transfer to cold leg recirculation. 15.1 Check RWST level - LESS THAN 12.5 ft. RWST LVL <input type="checkbox"/> LI 4075A <input type="checkbox"/> LI 4075B	RNO 15.1 Return to step 13.
	SRO	15.2 Go to FNP-1-ESP-1.3, TRANSFER TO COLD LEG RECIRCULATION.	

Op Test No.: <u>FA2013301</u>	Scenario # <u>5</u>	Event # <u>9</u>	Page <u>34</u> of <u>48</u>
Event Description: FRP-P.1			

FRP-P.1 entered due to LBLOCA.	
Indications Available:	
Annunciators: -	Recognize indications P.1 <ul style="list-style-type: none"> • CSF Indicators on IPC • STA evaluation

Time	Pos.	Expected Actions/Behavior	Comments
FRP-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITIONS, Ver 20			
	SRO	Direct entry into FRP-P.1	
	RO	(step 1) Check RCS pressure GREATER THAN 275 psig{435 psig}. <ul style="list-style-type: none"> • PI 402B • PI 403B 	RNO IF LHSI flow greater than 1500 gpm then return to procedure and step in effect. <ul style="list-style-type: none"> • FI 605A • FI 605B

Event Description: ESP-0.1 Actions

ESP-0.1, Reactor Trip Response, rev 32

FOLDOUT PAGE criteria of ESP-0.1 to actuate SI and transition back EEP-0 is PZR level <4%.
When SI is actuated return to **PAGE 21**

	RO	(step 1) Check RCS temperature <ul style="list-style-type: none"> IF any RCP running, THEN check RCS average temperature – STABLE AT OR APPROACHING 547 F 	
	BOP	(step 1.1.1 RNO) Verify steam dumps closed <ul style="list-style-type: none"> STM Dump Interlock A and B Train to OFF RESET 	
	BOP	(step 1.1.2 RNO) Verify atmospheric reliefs closed. MS ATMOS REL VLV <ul style="list-style-type: none"> PC 3371A PC 3371B PC 3371C 	
	BOP	(step 1.1.3 RNO) IF MSIV's are open THEN isolate steam loads in the turbine building while continuing with RNO step 1.1.4. <ul style="list-style-type: none"> Resets MSRs 	NOTE: steps in 1.3.1 RNO other than listed actions are dispatched outside of the control room
	BOP	(step 1.1.3.4 RNO) IF two SJAE's in service, THEN secure one SJAE <ul style="list-style-type: none"> 1A SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed 1B SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed 	
	BOP	(step 1.1.3.5 RNO) Verify SG blowdown – ISOLATED 1A(1B,1C) SGBD <ul style="list-style-type: none"> Q1G24HV7614A closed Q1G24HV7614B closed Q1G24HV7614C closed 	

Event Description: ESP-0.1 Actions

	BOP	<p>(step 1.1.4 RNO) IF cooldown continues, THEN minimize total AFW flow.</p> <p>AFW FLOW to 1A(1B,1C) SG</p> <ul style="list-style-type: none"> • FI 3229A • FI 3229B • FI 3229C <p>AFW TOTAL FLOW</p> <ul style="list-style-type: none"> • FI 3229 <ul style="list-style-type: none"> ○ Control TDAFWP <ul style="list-style-type: none"> ▪ FCV 3228 Reset ▪ SIC 3405 adjusted 	<p>NOTE: This may have been already directed to be controlled via operator aid posted on MCB</p>
	BOP	<p>(step 1.1.5 RNO) IF cooldown continues THEN close main steam isolation and bypass valves.</p> <p>1A(1B,1C) SG</p> <p>MSIV - TRIP</p> <ul style="list-style-type: none"> □ Q1N11HV3369A □ Q1N11HV3369B □ Q1N11HV3369C □ Q1N11HV3370A □ Q1N11HV3370B □ Q1N11HV3370C <p>1A(1B,1C) SG</p> <p>MSIV - BYPASS</p> <ul style="list-style-type: none"> □ Q1N11HV3368A □ Q1N11HV3368B □ Q1N11HV3368C □ Q1N11HV3976A □ Q1N11HV3976B □ Q1N11HV3976C 	

Event Description: ESP-0.1 Actions

		<p>(step 2) When RCS average temperature less than 554F THEN verify feedwater status</p> <p>(step 2.1) Verify main feedwater flow control and bypass valves- CLOSED</p> <p>1A(1B,1C) SG FW FLOW</p> <ul style="list-style-type: none">• FCV 478• FCV 488• FCV 498 <p>1A(1B,1C) SG FW BYP FLOW</p> <ul style="list-style-type: none">• FCV 479• FCV 489• FCV 499 <p>(step 2.2) Defeat MDAFWP auto start on SGFP trip.</p> <ul style="list-style-type: none">• 1A in DEFEAT• 1B in DEFEAT <p>(step 2.3) Verify both steam generator feed pumps - TRIPPED</p>	
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Event Description: Attachment 1 of FRP-S.1

Time	Pos.	Expected Actions/Behavior	Comments
Attachment 1 of FRP-S.1			
AUTOMATIC SAFETY INJECTION VERIFICATION			
	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</p> <p>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 	

Event Description: Attachment 1 of FRP-S.1

	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 	

Event Description: Attachment 1 of FRP-S.1

	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</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> <p>If a MSLI signal is present then close ALL MSIVs</p>	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																								
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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																											

Event Description: Attachment 2 of EEP-0

Cue: BOP will accomplish when at step 5 of EEP-0

Attachment 2 of EEP-0

AUTOMATIC ACTIONS VERIFICATION

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)	

Event Description: Attachment 2 of EEP-0

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>	
	BOP	<p>(step 6) Verify containment ventilation isolation.</p> <p>Verify containment purge dampers - CLOSED.</p> <p><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.</p> <p>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

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

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<p>(step 7) Verify containment fan cooler alignment.</p> <p>Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED.</p> <p><u>CTMT CLR FAN SLOW SPEED</u></p> <p>A train</p> <p><input type="checkbox"/> 1A</p> <p><input type="checkbox"/> 1B</p> <p>B train</p> <p><input type="checkbox"/> 1C</p> <p><input type="checkbox"/> 1D</p> <p>Verify associated emergency service water outlet valves - OPEN.</p> <p>EMERG SW FROM 1A(1B,1C,1D) CTMT CLR</p> <p><input type="checkbox"/> Q1P16MOV3024A</p> <p><input type="checkbox"/> Q1P16MOV3024B</p> <p><input type="checkbox"/> Q1P16MOV3024C</p> <p><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	RNO 8.1 Verify MDAFW Pumps deliver flow to each SG. 8.1.1 Manually start MDAFW Pumps 8.1.2 Verify AFW flow path to AND each SG. <input type="checkbox"/> Q1N23HV3227A in MOD <input type="checkbox"/> Q1N23HV3227B in MOD <input type="checkbox"/> Q1N23HV3227C in MOD MDAFWP TO 1A(1B,1C) SG FLOW CONT <input type="checkbox"/> HIC 3227AA open <input type="checkbox"/> HIC 3227BA open <input type="checkbox"/> HIC 3227CA open AFW TO 1A(1B,1C) SG STOP VLV <input type="checkbox"/> Q1N23MOV3350A open <input type="checkbox"/> Q1N23MOV3350B open <input type="checkbox"/> Q1N23MOV3350C open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764A open <input type="checkbox"/> Q1N23MOV3764D open <input type="checkbox"/> Q1N23MOV3764F open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764E open <input type="checkbox"/> Q1N23MOV3764B open <input type="checkbox"/> Q1N23MOV3764C open
		(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 <u>Undervoltage</u> 1-2 1-3	1/2 Detectors <u>on 2/3 Busses</u>
		Low Low SG <u>TSLB4</u> 28% Water Level 4-1,4-2,4-3 In Any 5-1,5-2,5-3 2/3 SGs 6-1,6-2,6-3	2/3 Detectors <u>on 2/3 SGs</u>

Event Description: Attachment 2 of EEP-0

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>½ on 2/3 2/3</td><td>TSLB4 16-3,4 17-3,4 18-3,4 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	½ on 2/3 2/3	TSLB4 16-3,4 17-3,4 18-3,4 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	½ on 2/3 2/3	TSLB4 16-3,4 17-3,4 18-3,4 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> <p>11.3 Verify Excess Letdown Isolation valves closed. <input type="checkbox"/> Q1E21HV8153, EXC LTDN ISO <input type="checkbox"/> Q1E21HV8154, EXC LTDN ISO</p>																	

Event Description: Attachment 2 of EEP-0

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	
	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.:	<u>FA2013301</u>	Scenario #	<u>5</u>	Event #	<u>8</u>	Page	<u>47</u>	of	<u>48</u>
Event Description:		Attachment 2 of EEP-0							

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

Event Description: Attachment 4 of EEP-0

Time	Pos.	Expected Actions/Behavior	Comments
Attachment 4 of EEP-0 TWO TRAIN ECCS ALIGNMENT VERIFICATION			
		<p>(Step 1) Verify two trains of ECCS equipment aligned.</p> <ul style="list-style-type: none"> <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 <p>(Step 1.6) Verify two trains of ESF equipment aligned.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Check all MLB-1 lights LIT <p>Verify charging pump suction and discharge valves - OPEN.</p> <p>CHG PUMP DISCH HDR ISO</p> <ul style="list-style-type: none"> <input type="checkbox"/> Q1E21MOV8132A <input type="checkbox"/> Q1E21MOV8132B <input type="checkbox"/> Q1E21MOV8133A <input type="checkbox"/> Q1E21MOV8133B <p>CHG PUMP SUCTION HDR ISO</p> <ul style="list-style-type: none"> <input type="checkbox"/> Q1E21MOV8130A <input type="checkbox"/> Q1E21MOV8130B <input type="checkbox"/> Q1E21MOV8131A <input type="checkbox"/> Q1E21MOV8131B 	
		<p>(Step 1.7) Verify all post accident containment air mixing system fans - STARTED. (BOP)</p> <p>POST ACCIDENT MIXING FAN</p> <ul style="list-style-type: none"> <input type="checkbox"/> 1A <input type="checkbox"/> 1B <input type="checkbox"/> 1C <input type="checkbox"/> 1D <p>RX CAV H2 DILUTION FAN</p> <ul style="list-style-type: none"> <input type="checkbox"/> 1A <input type="checkbox"/> 1B <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.: FA2013-301

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.

In the unlikely event that the simulator fails such that illogical indications result, the session will be terminated. In other words, 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-2

[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 75% power, 1177 ppm, MOL 10,000 MWD/MTU
 Status

TARGET ZERO
 Every Day, Every Job Safely

STPs/Evolutions:

STP-27.1 completed 2 hours ago

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

A Train On-Service – B Train
 Protected

Status of Special Testing**General Information****1. Shift Goal is to ramp unit to 100% power.**2. Current Risk Assessment is **YELLOW** and projected is **YELLOW** due to maintenance on 1A MDAFW pump and 1C DG

3. UOP-3.1 ver 112.4, is complete through step 5.19

4. 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)

5. 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)

6. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

7. Unit 2 PSS in OFF for Maintenance (OOS 2 hrs, ETR 2 hrs)

8.

9.

Equipment Status

Maintain VCT gas pressure 25-30 psig

Reactivity Plan**Waste Management Status**

#3 RHT – On Service

WGS – secured

LCO Status

3.8.1 condition B, STP-27.1 completed 2 hours ago

3.7.5 Condition B

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

Facility:	Farley Nuclear Plant	Scenario No.:	6	Op-Test No.:	FA2013-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
<p><u>Initial Conditions:</u> 85% power, ramping to 18% power, 915 ppm, MOL.</p> <p><u>Turnover:</u></p> <ul style="list-style-type: none"> • Ramping unit to 18% power for containment entry to add oil to the 1B RCP. • 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs). • 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs) • Fuel handling is on going in the SFP room with the last fuel bundle being moved. • Current Risk Assessment is YELLOW and projected is YELLOW. • A Train On-Service – B 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)	Ramp down at 2 MW/min –ramp on hold with 2 MW/min in and HOLD not LIT- BOP will have to place the IMP PRESS LOOP in service, enter ramp rate and target, depress GO		
2	Irf loa-ccw059	C (RO) TS (SRO)	1C charging pump high lube oil temperature. Will have to be secured and 1A or 1B Chg pump started. TS 3.5.2 Condition A		
3	Preset	I (BOP)	1B SGFP develops speed oscillations –can be controlled in manual.		
4	Imf lk459f-d	I (RO)	LK-459F, PRZR LVL CONTROLLER, fails LOW		
5	imf mal-ccw6c	C (BOP) TS (SRO)	1C RCP Thermal Barrier leak TS 3.4.13 Condition A (until leak is isolated)		
6	irf loa-cfw049	M (ALL)	Vacuum degrades requiring a RX trip		
7	Preset	C (RO) C (BOP)	Reactor will not automatically trip; manual RX trip will occur upon operation of the second hand switch. (CT) The Main Turbine will not trip in auto or manual, closing GVs in manual one GV sticks, required to close MSIV's. (CT)		
8	Preset	M(ALL)	TDAFW pump will trip 1 minute after it starts. The 1B MDAFW pump begins to experience degraded head.		
			Terminate event when condensate flow to SGs accomplished (CT) and FRP-H.1 transition criteria reached.		

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

Event No.		Malfunction	* means in Bat file
7		Fail RTB from opening in auto imf cbkrxtrp_cc6 open imf cbkrxtrp_cc5 open	*
7		MCB side Rx Trip Switch fails to cause trip imf cbkrxtrp_opos1 open	*
7		Prevent manual trip of main turb. imf mal-tur24	*
7		Main turbine fails to auto trip: imf mal-tur2	*
8		Trip TDAFW pump after one minute on after pump speed above 3500rpm imf mal-fwm1c (2 60)	TRG 2
8		Degrades head of B MDAFW pump to 95% degraded over 30 seconds after TDAFW pump trips imf nafp01b-d_th (3 5) 95 30	TRG 3
7		ALL MSIVs will not close on auto closure 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	*
0		Tag Out 1A MDAFW Pump irf cafp01a_d_cd1 open	*
0		1C DG Tagged out irf cBK1DH07_d_cd1 open irf cBK2DH07_d_cd1 open irf cBK1DH07_d_cd2 open irf cBK2DH07_d_cd2 open	*
		Triggers and Commands	
8		Event Trigger 1 GV2 reaches 25% going closed, it sticks at 20% open trgset 1 "rehgvpz(2) < 25" trg 1 "imf mal-tur15f 20 1"	TRG 1
8		Event Trigger 2 Triggers trip of TDAFW pump after startup trgset 2 "oafp02 > 3500"	TRG 2
		^Event Trigger 3 Degrades the head of the B MDAFW pump trgset 3 "jmfwm1c > 0"	TRG 3

Initial Conditions: 85% power, ramping to 18% power, 915 ppm, MOL.

Turnover:

- Ramping unit to 18% power for containment entry to add oil to the B RCP.
- 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Fuel handling is on going in the SFP room with the last fuel bundle being moved.
- Current Risk Assessment is **YELLOW** and projected is **YELLOW**.
- **A** Train On-Service – **B** Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event 1 Ramp down in power at 2 MW/min to 18% power.

Verifiable actions: RO will adjust rods or boron to control Tav_g/Tref on program, BOP will place impulse loop in service, set target and ramp, and start a ramp on the Main Turbine.

Event 2 1C charging pump HIGH lube oil temperature. The 1C Chg pump will be tripped if temperature reaches 175°F. **TS 3.5.2 Condition A**

Verifiable actions: 1C charging pump will have to be secured and 1A or 1B Chg pump started. If the charging pump trips, then letdown will be secured and re-established.

Event 3 1B SGFP develops speed oscillations and fails to minimum speed if left in Auto after 6 minutes.

Verifiable actions: Take manual control of SGFP speed and control SGWL.

Event 4 LK-459F, PRZR LVL CONTROLLER fails LOW

Verifiable actions: RO will take manual control of charging and adjust seal injection flows.

Event 5 1C RCP Thermal Barrier leak, RCS into the CCW system. **TS 3.4.13 Condition A** (until leak is isolated)

Verifiable actions: Establish excess letdown, secure normal letdown, re-establish normal letdown and secure excess letdown, Isolate CCW cooling to thermal barrier to stop the leak.

Event 6 Degrading Vacuum, Auto Main Turbine and Rx trips are blocked. (SGFPs will trip on low vacuum at approx. 11 to 12 minutes)

Event 7 Reactor will not automatically trip; manual RX trip will occur upon operation of the second hand switch. **(CT)**

Main Turbine will not trip automatically or manually, Manual Fast action will be used to close GVs, One GV sticks open requiring MSIV closure **(CT)**

Verifiable actions: RO will trip the reactor. BOP will close the MSIV's

Event 8 TDAFW pump will trip 1 minute after when it starts.

The 1A MDAFW is tagged out.

1B MDAFW pump begins to experience degraded head.

Establish Condensate Pump flow to the SGs. **(CT)**

Terminate event when Condensate Pump flow to SGs accomplished and FRP-H.1 transition criteria reached.

ARP / AOP-16 / AOP-100/ AOP-1/ AOP-8 / EEP-0/ FRP-H.1

CRITICAL TASK SHEET

- ___ 1. Actuate a manual Rx trip within 40 seconds of Rx Trip criteria met. 1RTOPMANRT---H (page 252 Tm = 40 seconds, T core damage = 6 minutes) (WOG CT E-0 - - A)
- ___ 2. Failure of the turbine to trip. Manually actuate Main Steam line isolation before a severe (orange path) challenge develops to either the subcriticality or the integrity CSF: (WOG CT E-0- - P)
- Close ONE MSIV in each Main Steam Line.
- ___ 3. Heat sink or feed and bleed
- Establish feedwater flow into at least one SG before feed and bleed is required (2 SG is < 12% WR level). (1AF-FTS-PUMP-H) (WOG CT FR-H.1 - - A)
- Verify flow to A, B, or C SG using condensate pumps.

SCENARIO
OBJECTIVE/
OVERVIEW:

The team should be able to:

- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-100, and Tech Specs
- Respond to a RCS Leak per AOP-1 and then a 41 BRK trip event where the Rx trip will not work automatically and the Main Turbine will not trip
- The crew will have to establish water flow to the SGs with the condensate pumps per FRP-H.1.

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

Southern Nuclear J.M. Farley Nuclear Plant

Operations Training Simulator Exam Scenario

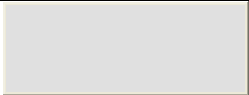

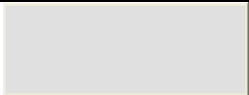

BOOTH INSTRUCTOR GUIDE

ILT-36 NRC EXAM SCENARIO #6

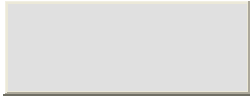

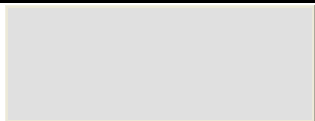

Validation time: 100 minutes Validated by McCaffery, Sorrell, Phillips The week of February 18, 2013			
TRN Supervisor Approval:	Gary Ohmstede	Date:	3-13-13
NRC Chief Examiner	SEE NUREG 1021 FORM ES-301-3		

Facility:	Farley Nuclear Plant	Scenario No.:	6	Op-Test No.:	FA2013-301
Examiners:		Operators:		SRO	
				RO	
				BOP	
<u>Initial Conditions:</u> 85% power, ramping to 18% power, 915 ppm, MOL.					
<u>Turnover:</u> <ul style="list-style-type: none"> • Ramping unit to 18% power for containment entry to add oil to the 1B RCP. • 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs). • 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs) • Fuel handling is on going in the SFP room with the last fuel bundle being moved. • Current Risk Assessment is YELLOW and projected is YELLOW. • A Train On-Service – B 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)	Ramp down at 2 MW/min –ramp on hold with 2 MW/min in and HOLD not LIT- BOP will have to place the IMP PRESS LOOP in service, enter ramp rate and target, depress GO		
2	Irf loa-ccw059	C (RO) TS (SRO)	1C charging pump high lube oil temperature. Will have to be secured and 1A or 1B Chg pump started. TS 3.5.2 Condition A		
3	Preset	I (BOP)	1B SGFP develops speed oscillations –can be controlled in manual.		
4	Imf lk459f-d	I (RO)	LK-459F, PRZR LVL CONTROLLER, fails LOW		
5	imf mal-ccw6c	C (BOP) TS (SRO)	1C RCP Thermal Barrier leak TS 3.4.13 Condition A (until leak is isolated)		
6	irf loa-cfw049	M (ALL)	Vacuum degrades requiring a RX trip		
7	Preset	C (RO) C (BOP)	Reactor will not automatically trip; manual RX trip will occur upon operation of the second hand switch. (CT) The Main Turbine will not trip in auto or manual, closing GVs in manual one GV sticks, required to close MSIV's. (CT)		
8	Preset	M(ALL)	TDAFW pump will trip 1 minute after it starts. The 1B MDAFW pump begins to experience degraded head.		
			Terminate event when condensate flow to SGs accomplished (CT) and FRP-H.1 transition criteria reached.		



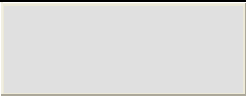

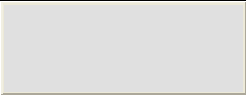
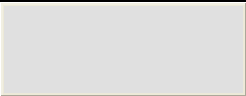

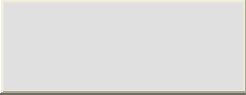
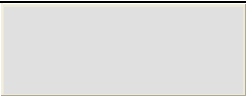
(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	Load in IC-216 and sim IC snap directory Base IC- 58	
		RUN	 RUN simulator
0	0	Generic setup: bat 36exam/generic_setup_HLT.txt	
0	0	Quick setup (all items with * are included): bat 36exam/2013nrcexam_6.txt	
PRESETS			
Event No.		Malfunction	* means in Bat file
7		Fail RTB from opening in auto imf cbkrxtrp_cc6 open imf cbkrxtrp_cc5 open	*
7		MCB side Rx Trip Switch fails to cause trip imf cbkrxtrp_opos1 open	*
7		Prevent manual trip of main turb. imf mal-tur24	*
7		Main turbine fails to auto trip: imf mal-tur2	*
8		Trip TDAFW pump after one minute on after pump speed above 3500rpm imf mal-fwm1c (2 60)	TRG 2
8		Degrades head of B MDAFW pump to 95% degraded over 30 seconds after TDAFW pump trips imf nafp01b-d_th (3 5) 95 30	TRG 3
7		ALL MSIVs will not close on auto closure 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	*
0		Tag Out 1A MDAFW Pump irf cafp01a_d_cd1 open	*
0		1C DG Tagged out irf cBK1DH07_d_cd1 open irf cBK2DH07_d_cd1 open irf cBK1DH07_d_cd2 open irf cBK2DH07_d_cd2 open	*

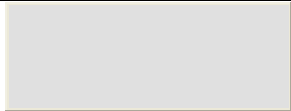

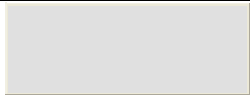
		Triggers and Commands	
8		Event Trigger 1 GV2 reaches 25% going closed, it sticks at 20% open trgset 1 "rehgvpz(2) < 25" trg 1 "imf mal-tur15f 20 1"	TRG 1
8		Event Trigger 2 Triggers trip of TDAFW pump after startup trgset 2 "oafp02 > 3500"	TRG 2
8		Event Trigger 3 Degrades the head of the B MDAFW pump trgset 3 "jmfwm1c > 0"	TRG 3
1		Event Trigger 4 Charging pump 1C trip due to high LO temp trgset 4 "tchspoil(3) > 175" trg 4 "imf cCVP01C_d_cc15 closed"	TRG 4

MCB setup			
		1C DG MSS	Place in Mode 3
		Place HOLD Tag on 1C DG MSS	1 HOLD TAG
		Place HOLD Tag on 1C DG DG output breakers DHO7-1 and DHO7-2	2 HOLD TAGS
		Place Unit 1 and Unit 2 Bypass and inoperable panel lights to the up position (EMERGENCY POWER SYSTEM)	Unit 1 A-Train Unit 2 A Train
		Place Unit 1 Bypass and inoperable panel lights to the up position (Auxiliary Feedwater System)	Unit 1 A-Train
		Place HOLD Tag on 1A MDAFW pump H/S	1 HOLD TAG
		DEH	Clear DEH alarms
		Select OPS 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>
		Recorders Verify memory disks cleared Cae clearrecorders.cae	
		Provide a marked up copy of UOP-3.1 version 112.4 through step 8.2 complete.	<u>UOP-1.3 copy</u>
			 FREEZE simulator
		Perform Booth Operators Setup Checklist	
		Open Simview file to be used for plant parameter data collection: Simview / sv DataCollection.uvl	 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	 sv sim_clock.uvl
		VERIFY MICROPHONES READY	Batteries installed
		TURNOVER SHEET AVAILABLE	


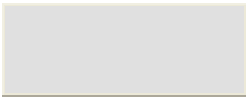
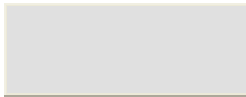
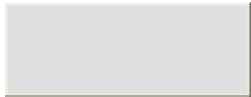

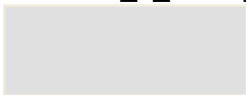
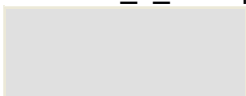
EXAM

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	 RUN simulator
		Verify Horns ON: hornflag  <u>HORNS ON = TRUE</u>	 Turn Horns ON/OFF ann horn
1	Start of exam	Ramp down at 2 MW/min –ramp on hold ramp on hold with 2 MW/min in and HOLD not LIT- BOP will have to enter ramp rate and target, depress GO	
2	NRC CUE	1C charging pump high lube oil temperature. Will have to be secured and 1A or 1B Chg pump started. TS 3.5.2 Condition A 	
3	NRC CUE	1B SGFP develops speed oscillations –can be controlled in manual. cae \\36exam\\senario6v2.cae	
4	NRC CUE	LK-459F, PRZR LVL CONTROLLER, fails LOW imf lk459f-d 0 20	
5	NRC CUE	1C RCP Thermal Barrier leak TS 3.4.13 Condition A (until leak is isolated) imf mal-ccw6c 15 20	
6	NRC CUE	Vacuum degrades requiring a RX trip irf loa-cfw049 1000 30	
7	Preset	Reactor will not automatically trip; manual RX trip will occur upon operation of the second hand switch. (CT)	


EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
	Preset	The Main Turbine will not trip in auto or manual, closing GV's in manual one GV sticks, required to close MSIV's. (CT)	
8	Preset	TDAFW pump will trip 1 minute after it starts.	
	Preset	The 1B MDAFW pump begins to experience degraded head.	
		Terminate event when condensate flow to SGs accomplished (CT) and FRP-H.1 transition criteria reached.	
		End of Exam	
			 HORNS OFF
			 FREEZE simulator
		Stop data collection for Simview file sv DataCollection.uvl	
		Export data to file with the name of exam2013sen6grpX.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 Cae clearrecorders.cae	

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	WHEN REQUESTED	<p><u>MAINTENANCE PERSONNEL:</u> When requested to place jumpers to defeat FW isolation.</p> <p></p> <p>REMOTE / N21 / LOA-CFW047 / installed</p> <p>After five minutes, I&C reports: "Jumpers are installed per the attachment in FRP-H.1."</p> <p><u>SO:</u> When requested open SGFP bypass valve and isolate mini flows.</p> <p>  </p> <p>irf loa-cfw021 1 30 irf loa-cfw015 0 20 irf loa-cfw016 0 20</p>
8	WHEN REQUESTED	<p><u>SO :</u> When requested for MCC Operations After 3 minutes report "On station to operate breakers"</p> <p>Buttons open the respective breakers</p> <p></p> <p>irf cmf3232a_d_cd1 open</p> <p></p> <p>irf cmf3232b_d_cd1 open</p> <p></p> <p>irf cmf3232c_d_cd1 open</p>

Communications sheet

<u>EVENT NO.</u>	<u>TIME</u>	<u>ACTIONS</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 REQUIRED	
2	2 minutes after requested	<u>Unit 1 Radside</u> "1C Charging pump oil temperature is  "
3	WHEN REQUESTED	<u>TBSO:</u> "The 1B SGFP is speeding up and slowing down. I can't tell why from out here. I don't see any other apparent problems."
4	NONE REQUIRED	
5	NONE REQUIRED	
6	NONE REQUIRED	
7	NONE REQUIRED	
8	NONE REQUIRED	

Initial Conditions: 85% power, ramping to 18% power, 915 ppm, MOL.

Turnover:

- Ramping unit to 18% power for containment entry to add oil to the B RCP.
- 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Fuel handling is on going in the SFP room with the last fuel bundle being moved.
- Current Risk Assessment is **YELLOW** and projected is **YELLOW**.
- **A** Train On-Service – **B** Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event 1 Ramp down in power at 2 MW/min to 18% power.

Verifiable actions: RO will adjust rods or boron to control Tavg/Tref on program, BOP will place impulse loop in service, set target and ramp, and start a ramp on the Main Turbine.

Event 2 1C charging pump HIGH lube oil temperature. The 1C Chg pump will be tripped if temperature reaches 175°F. **TS 3.5.2 Condition A**

Verifiable actions: 1C charging pump will have to be secured and 1A or 1B Chg pump started. If the charging pump trips, then letdown will be secured and re-established.

Event 3 1B SGFP develops speed oscillations and fails to minimum speed if left in Auto after 6 minutes.

Verifiable actions: Take manual control of SGFP speed and control SGWL.

Event 4 LK-459F, PRZR LVL CONTROLLER fails LOW

Verifiable actions: RO will take manual control of charging and adjust seal injection flows.

Event 5 1C RCP Thermal Barrier leak, RCS into the CCW system. **TS 3.4.13 Condition A** (until leak is isolated)

Verifiable actions: Establish excess letdown, secure normal letdown, re-establish normal letdown and secure excess letdown, Isolate CCW cooling to thermal barrier to stop the leak.

Event 6 Degrading Vacuum, Auto Main Turbine and Rx trips are blocked. (SGFPs will trip on low vacuum at approx. 11 to 12 minutes)

Event 7 Reactor will not automatically trip; manual RX trip will occur upon operation of the second hand switch. **(CT)**

Main Turbine will not trip automatically or manually, Manual Fast action will be used to close GVs, One GV sticks open requiring MSIV closure **(CT)**

Verifiable actions: RO will trip the reactor. BOP will close the MSIV's

Event 8 TDAFW pump will trip 1 minute after when it starts.

The 1A MDAFW is tagged out.

1B MDAFW pump begins to experience degraded head.

Establish Condensate Pump flow to the SGs. **(CT)**

Terminate event when Condensate Pump flow to SGs accomplished and FRP-H.1 transition criteria reached.

ARP / AOP-16 / AOP-100/ AOP-1/ AOP-8 / EEP-0/ FRP-H.1

CRITICAL TASK SHEET

- ___ 1. Actuate a manual Rx trip within 40 seconds of Rx Trip criteria met. 1RTOPMANRT---H (page 252 Tm = 40 seconds, T core damage = 6 minutes) (WOG CT E-0 - - A)
- ___ 2. Failure of the turbine to trip. Manually actuate Main Steam line isolation before a severe (orange path) challenge develops to either the subcriticality or the integrity CSF: (WOG CT E-0- - P)
- Close ONE MSIV in each Main Steam Line.
- ___ 3. Heat sink or feed and bleed
- Establish feedwater flow into at least one SG before feed and bleed is required (2 SG is < 12% WR level). (1AF-FTS-PUMP-H) (WOG CT FR-H.1 - - A)
- Verify flow to A, B, or C SG using condensate pumps.

SCENARIO
OBJECTIVE/
OVERVIEW:

The team should be able to:

- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-100, and Tech Specs
- Respond to an RCS Leak per AOP-1 and then a loss of vacuum event where the Rx will not trip automatically and the Main Turbine will not trip
- The crew will have to establish water flow to the SGs with the condensate pumps per FRP-H.1.

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

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Event Description: Ramping Down for CTMT entry

A ramp of 2 MW/min is in progress. The turnover sheet has the crew place the IMP PRESS LOOP in service per UOP-3.1 section 8.2 and then increase the ramp rate to 5 MW/min and ramp off line IAW UOP-3.1 in 6 hours.

Indications Available:

Annunciators:

Other Indications:

NONE

Time	Pos.	Expected Actions/Behavior	Comments
UOP-3.1, Power Operation, ver 112.4 step 8.2; Decrease reactor power to minimum load			
	BOP	(step 8.2.1) Verify Turbine on HOLD. (step 8.2.2) Check that the DEH computer point PIA, FIRST STAGE PRESSURE #1 has stable indication.	
	BOP	(step 8.2.3) On the FEEDBACK STATUS DISPLAY, move the cursor to IMP PRESS LOOP OUT (step 8.2.4) Depress the SELECT key. (step 8.2.5) Verify IMP PRESS LOOP is highlighted in reverse video.	
	BOP	(step 8.2.6) Depress the START key. (step 8.2.7) Verify FEEDBACK STATUS indicates IMP PRESS LOOP IN.	
	ALL	Re-commences Ramp by coordinating with the BOP to establish Main Turbine Target and ramp rate. (step 8.3) A Ramp rate of at 2 MW/ min will be required to ramp unit off per the turnover sheet.	
	BOP	(step 8.4) Verify proper SGFP speed control. - Monitor SGPF differential pressure	

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Event Description: Ramping Down for CTMT entry

Time	Pos.	Expected Actions/Behavior	Comments
	SRO/ RO	At step 8.5 the following note explains how flux should be controlled: NOTE: In the following step it is desirable to maintain axial flux difference within $\pm 5\%$ from the target value to help ensure axial flux does not exceed limits specified in the COLR figure 3. During transients maintaining axial flux difference within the $\pm 5\%$ of the target value may not be possible.	Flux is maintained $\pm 5\%$ from the target value
	BOP	Begin lowering turbine load to 40 MW using the appropriate DEH controls <ul style="list-style-type: none"> • Ensure load rate increase is within required limitations. • Verify the HOLD light is LIT. • Depress the GO pushbutton and ensure the GO light is LIT. • Ensure the Main Turbine starts to ramp down, GVs start to close. 	NOTE: The ramp rate will be 2 MW/min.
	RO	Verify rods are in AUTO or Manual and maintaining Tavg close to Tref.	
	RO	(Step 1.0) Borating per SOP-2.3 APPENDIX B Version 59.1 <ul style="list-style-type: none"> • Set the boric acid integrator to the desired quantity (expect >350 gallons) • Adjust LTDN TO VCT FLOW controller, LK 112, setpoint as desired • M/U mode selector to STOP • MKUP MODE SEL SWITCH to BOR • MKUP MODE CONT SWITCH to START. (Step 1.6) Verify proper boration operation by observing the following: <ul style="list-style-type: none"> • On service boric acid pump started. • MKUP TO CHG PUMP SUCTION HDR FCV113B opens. • BORIC ACID TO BLENDER FCV113A opens. • Boric acid flow is displayed on FI-113 MAKEUP FLOW TO CHG/VCT. 	NOTE: A continuous boration is allowed by appendix C which maintains the Boric Acid system lined up. The RO will take the MSS to START each time a boration is required or set the system up to borate continuously. (approx 700 gal continuous boration)

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Event Description: Ramping Down for CTMT entry

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 1.7) Verify the boration automatically stops when the boric acid batch integrator reaches its setpoint as follows: <ul style="list-style-type: none">• Boric acid flow returns to zero as displayed on FI-113 MAKEUP FLOW TO CHG/VCT.• MKUP TO CHG PUMP SUCTION HDR FCV113B closes.• BORIC ACID TO BLENDER FCV113A closes.	
At the discretion of the Lead Examiner move to Event 2.			

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Event Description: **1C charging pump high lube oil temperature. This takes 3 minutes to get the first alarm.**

The charging pump will be running without CCW. Oil temperatures will rise slowly and the alarm will come in at 140°F. 2 minutes after the alarm comes in the temperature will be at 160°F. Then 2 minutes later the temperature will be at 170°F. We will trip the pump at 175°F if action is not taken to remove it from service.

Indications Available:

Annunciators:

- CHG PUMP LUBE OIL TEMP HI (EA3)

Indications of CHG PUMP LUBE OIL TEMP HI

- Annunciator Only

Time	Pos.	Expected Actions/Behavior	Comments
Annunciator Response Procedure, ARP-1.5, EA3 Ver 58.0			
	SRO	Direct entry into the ARP and evaluate securing the 1C charging pump.	
	RO	Call the Radside SO to look at the 1C Chg pump local temperature indication.	NOTE: A report will be given in approx 2 minutes and will be the actual value from the plant computer.
	BOP	(step 1) After the report IF local temperature indication is $\geq 160^{\circ}\text{F}$, <u>THEN</u> immediately shutdown the 1C charging pump. Start another charging pump per SOP-2.1, CVCS Plant Startup And Operation	NOTE: The temperature will be >160°F and the 1C chg pump will be secured per the ARP. Since the pump is secured, DE1, REGEN HX LTDN FLOW DISCH TEMP HI will come into alarm. It is possible that letdown is secured per that ARP and AOP-16 entered.
		SOP-2.1 is on the next page AOP-16 is on PAGE 6 Tech Spec requirements on PAGE 13	

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Event Description: 1C charging pump high lube oil temperature. This takes 3 minutes to get the first alarm.

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>SOP-2.1, CVCS Plant Startup and Operation, ver 130.4</p> <p>(step 4.8) Starting a Charging Pump or Swapping a Charging Pump When RCS Temp is > 180°F:</p> <p>(step 4.8.1) Check auxiliary oil pump running for charging pump to be started as indicated by white light illuminated on MCB</p> <p>(step 4.8.2) Check open mini-flow isolation Q1E21MOV8109A or B.</p> <p>(step 4.8.3) Verify Q1E21MOV8106, CHG PUMP MINIMFLOW ISO, is open.</p> <p>(step 4.8.4) Verify a 1C or 1B CCW pump is running.</p> <p>(step 4.8.5) Verify FCV-122, CHG FLOW CONTROLLER, and HIK 186, SEALWTR INJ CONTROLLER are closed if no other chg pump is running</p>	
	RO	<p>(step 4.8.6) Start 1A OR 1B Charging pump</p> <p>(step 4.8.7) Observe CHG HDR PRESS indicator PI 121 and motor ammeter to check proper pump operation</p> <p>(step 4.8.8) <u>WHEN</u> charging pump comes up to speed, <u>THEN</u> check auxiliary oil pump stops as indicated by white light <u>NOT</u> being illuminated on MCB.</p>	
	RO	(step 4.8.9) Locally verify that the selected charging pump room cooler is delivering actual air flow.	

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Event Description: 1C charging pump high lube oil temperature. This takes 3 minutes to get the first alarm.

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 4.8.10) IF swapping chg pumps, then perform the following: <ul style="list-style-type: none"> - Adjust FCV-122, CHG FLOW CONTROLLER, to obtain chg flow proper flow - Place FCV-122, CHG FLOW CONTROLLER, in Auto - Adjust SEAL WTR INJECTION HIK 186 to maintain 6-13 gpm seal injection flow to each RCP - STOP the 1C CHG if not already secured 	
	SRO	IF RCS pressure is between 2215 and 2255 psig, Direct STP-8.0, RCP seal injection leakage test to be performed	NOTE: This will be assigned to an extra operator
AOP-16, CVCS Malfunction, ver 18:			
	RO	(Step 1) Verify charging flow adequate to cool letdown. CHG FLOW <input type="checkbox"/> FI-122A LTDN HX OUTLET FLOW <input type="checkbox"/> FI-150 REGEN HX OUTLET TEMP <input type="checkbox"/> TI-140	RNO – close all LTDN ORIF ISO's <input type="checkbox"/> Q1E21HV8149A <input type="checkbox"/> Q1E21HV8149B <input type="checkbox"/> Q1E21HV8149C
	BOP	(Step 2) Stop any load change in progress	
	RO	(Step 3) Monitor VCT level to ensure proper level is maintained (Step 4) [CA] Observe CHG HDR PRESS and MOTOR AMPS to ensure proper charging pump operation. <input type="checkbox"/> PI-121 <input type="checkbox"/> AMMETER FOR RUNNING CHG PUMP	

Op Test No.: FA2013301 Scenario # 6 Event # 2 Page 7 of 46

Event Description: **1C charging pump high lube oil temperature. This takes 3 minutes to get the first alarm.**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(Step 5) Check charging pump – RUNNING</p> <p>RNO STEP 5</p> <p>(step 5) RNO Start an available charging pump as follows:</p> <p>(step 5.1) Check VCT level and pressure adequate.</p> <p>(step 5.2) Verify charging suction flowpath aligned:</p> <p>VCT OUTLET ISO valves</p> <ul style="list-style-type: none"> • Q1E21LCV115C - OPEN • Q1E21LCV115E – OPEN <p>OR</p> <p>RWST TO CHG PUMP valves</p> <ul style="list-style-type: none"> • Q1E21LCV115B - OPEN • Q1E21LCV115D – OPEN <p>(step 5.3) Check auxiliary oil pump running for charging pump to be started as indicated by white light illuminated on MCB.</p> <p>(step 5.4) Check open miniflow isolation for charging pump to be started:</p> <ul style="list-style-type: none"> • 1A CHG PUMP MINIFLOW ISO, Q1E21MOV8109A • 1B CHG PUMP MINIFLOW ISO, Q1E21MOV8109B • 1C CHG PUMP MINIFLOW ISO, Q1E21MOV8109C <p>(step 5.5) Verify CHG PUMP MINIFLOW ISO, Q1E21MOV8106, is open.</p> <p>(step 5.6) Verify the following are closed:</p> <ul style="list-style-type: none"> • CHG FLOW FK 122 • SEAL WTR INJECTION HIK 186 <p>(step 5.7) Verify a CCW pump is running in same train aligned to supply charging pump to be started.</p>	

Op Test No.: FA2013301 Scenario # 6 Event # 2 Page 8 of 46

Event Description: **1C charging pump high lube oil temperature. This takes 3 minutes to get the first alarm.**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	RNO Step 5 Continued (step 5.8) Start selected charging pump. (step 5.9) Observe CHG HDR PRESS indicator PI 121 and motor ammeter to check proper pump operation. (step 5.10) WHEN charging pump comes up to speed, THEN check auxiliary oil pump stops as indicated by white light NOT being illuminated on MCB. (step 5.11) Adjust SEAL WTR INJECTION HIK 186 to maintain 6-13 gpm seal injection flow to each RCP.	
	RO	(Step 6) Check Charging flow FK-122 controlling in AUTO with flow indicated	RNO 6.1 Place FK-122 in manual and adjust as required to maintain pressurizer level at program level. 6.2 Adjust SEAL WTR INJECTION HIK-186 as required to maintain RCP seal injection flow 6-13 gpm.
	RO	(Step 7) Check DE3 clear	

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Event Description: **1C charging pump high lube oil temperature. This takes 3 minutes to get the first alarm.**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(Step 8) Determine Status of Normal Letdown: Check normal CVCS letdown - AFFECTED BY MALFUNCTION - LTDN HX OUTLET FLOW, FI-150, NO FLOW INDICATED</p> <p>(Step 8.2) Minimize RCS makeup: Manually close charging flow control: CHG FLOW □ FK-122</p> <p>(Step 8.2.2) Minimize seal injection between 6-13 gpm</p> <p>(Step 8.2.3) Direct Chemistry to shutdown the zinc addition system (ZAS)</p> <p>(Step 8.3) Dispatch personnel to investigate cause of the Letdown malfunction</p>	<p>Letdown will have been removed from service so it will be placed in service.</p> <p>NA – this is known</p>
	RO	<p>(Step 9) Determine if normal letdown should be re-established:</p> <p>Check normal letdown malfunction(s) - CORRECTED</p>	
	RO	<p>(Step 9.2) Verify all letdown orifice isolation valves - CLOSED LTDN ORIF ISO 45 GPM</p> <ul style="list-style-type: none"> • Q1E21HV8149A <p>LTDN ORIF ISO 60 GPM</p> <ul style="list-style-type: none"> • Q1E21HV8149B • Q1E21HV8149C <p>(Step 9.3) Place LTDN HX OUTLET TEMP TK 144 on service:</p> <ul style="list-style-type: none"> • Place controller in AUTO • Set to maintain temperature 90 to 115°F 	

Op Test No.: FA2013301 Scenario # 6 Event # 2 Page 10 of 46

Event Description: **1C charging pump high lube oil temperature. This takes 3 minutes to get the first alarm.**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 9.4) Verify LTDN HI TEMP DIVERT VLV Q1E21TCV143: <ul style="list-style-type: none"> • DEMIN light - LIT • Handswitch in – AUTO (Step 9.5) Verify LTDN HI TEMP DIVERT VLV Q1E21TCV143: <ul style="list-style-type: none"> • Handswitch in - VCT • VCT light - LIT • DEMIN light - NOT LIT (Step 9.6) IF necessary, THEN OPEN both LTDN LINE PENE RM ISO's from the PRIP. <ul style="list-style-type: none"> • Q1E21HV8175A • Q1E21HV8175B 	
	RO	(Step 9.7) Verify LTDN LINE CTMT ISO Q1E21HV8152 - OPEN	
	RO	(Step 9.8) Verify LTDN LINE ISO valves - OPEN <ul style="list-style-type: none"> • Q1E21LCV459 • Q1E21LCV460 (Step 9.9) Place LP LTDN PRESS PK 145 on service: <ul style="list-style-type: none"> • Place controller in MANUAL • Adjust demand signal to 50% or less 	

Op Test No.: FA2013301 Scenario # 6 Event # 2 Page 11 of 46

Event Description: **1C charging pump high lube oil temperature. This takes 3 minutes to get the first alarm.**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(Step 9.10) Initiate minimum charging flow:</p> <p>(Step 9.10.1) Verify CHG FLOW FK 122 in - MAN</p> <p>(Step 9.10.2) Establish minimum charging flow based on orifices to be placed on service:</p> <p>1 Orifice - 18 gpm</p> <p>OR</p> <p>2 Orifices - 40 gpm</p> <p>(Step 9.11) Establish approximately 60 gpm letdown flow by OPENING:</p> <ul style="list-style-type: none"> • Q1E21HV8149B <p>OR</p> <ul style="list-style-type: none"> • Q1E21HV8149C 	
	RO	<p>(Step 9.12) IF desired, THEN place the second orifice on service by OPENING: Q1E21HV8149A</p> <p>(Step 9.13) Initiate actions to restore letdown flow to the demins per FNP-1-SOP-2.1, CHEMICAL AND VOLUME CONTROL SYSTEM PLANT STARTUP AND OPERATION</p>	

Op Test No.: FA2013301 Scenario # 6 Event # 2 Page 12 of 46

Event Description: **1C charging pump high lube oil temperature. This takes 3 minutes to get the first alarm.**

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(Step 9.14) [CA] IF all backup heaters energized due to pressurizer level deviation, THEN verify two sets of backup heaters in ON prior to level deviation clearing.</p> <p>(Step 9.15) Adjust LP LTDN PRESS PK 145 to maintain desired letdown pressure - BETWEEN 260-450 PSIG</p> <p>(Step 9.15.1) Set controller between 4.3 and 7.5</p> <p>(Step 9.15.2) Check letdown flow – STABLE</p> <p>(Step 9.15.3) Place PK 145 in AUTO</p> <p>(Step 9.15.4) Control Letdown pressure as desired</p>	
	RO	<p>(Step 9.16) Control LTDN HX OUTLET TEMP, TK 144 to maintain LTDN temp 90 to 115°F.</p> <ul style="list-style-type: none"> • TI-116 VCT TEMP • TI-143 DIVERT LTDN HX TEMP • TI-144 CCW LTDN HX TEMP <p>(Step 9.17) Refer to SOP-2.1, CVCS system PLANT STARTUP AND OPERATION, for further guidance on Letdown system control</p> <p>(step 10) Determine status of letdown flow: Check letdown flow - established</p>	
	SRO	<p>(step 10.2) Go to procedure and step in effect</p> <p>Submit a Condition Report and notify the Work Week Coordinator (Maintenance ATL on backshifts)</p> <p>Notify the Shift Manager</p>	

Op Test No.: FA2013301 Scenario # 6 Event # 2 Page 13 of 46

Event Description: 1C charging pump high lube oil temperature. This takes 3 minutes to get the first alarm.

Time	Pos.	Expected Actions/Behavior			Comments
ARP-1.5, EA3					
	SRO	(step 5 of EA3 ARP) Refer to Technical Specifications LCOs 3.5.2, and Technical Requirements TR 13.1.5. 3.5.2 mandatory LCO Condition A; since this pump is aligned to B Train and the swing pump is aligned to A Train. 72 hour LCO 13.1.5 admin LCO and mandatory LCO while swapping chg pumps from one train to the other Condition A. Two charging pumps shall be operable and this is a 72 hour LCO.			
TECHNICAL SPECIFICATION 3.5.2, ECCS—Operating					
Two ECCS trains shall be OPERABLE.					
B Train ECCS is INOPERABLE until the 1B chg pump is aligned to B Train and the 1C Chg pump is tagged out or a jumper is installed to permit the 1B Chg pump to auto start					
		CONDITION	REQUIRED ACTION	COMPLETION TIME	
		A. One or more trains Inoperable AND At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.	A.1 Restore train(s) to OPERABLE status.	72 hours	
TECHNICAL REQUIREMENT 13.1.5, Charging Pumps - Operating					
Two charging pumps shall be OPERABLE.					
This is an admin LCO to start. When the 1B chg pump is being placed on the B Train then this will be a mandatory LCO for that time period.					
		CONDITION	REQUIRED ACTION	COMPLETION TIME	
		A. One required charging pump inoperable	A.1 Restore at least two charging pumps to OPERABLE status.	72 hours	
At the discretion of the Lead Examiner move to Event 3					

Op Test No.: FA2013301 Scenario # 6 Event # 3 Page 14 of 46

Event Description: 1B SGFP controller oscillation failure

1B SGFP automatic speed controller will oscillate speed. The net effect causes SGWL to decrease because speed falls faster than it rises.

Indications Available:

Annunciators:

- 1A, 1B, 1C SG LVL DEV (JF1, JF2, JF3)

Recognize indications of 1B SGFP controller failing:

- ALL FRV bypasses go open
- 1A SGFP will slow down / speed up
- ALL SG levels ↓ (net effect)

Time	Pos.	Expected Actions/Behavior	Comments
AOP-100, Instrumentation Malfunction, section 1.4, ver 12			
(AOP-13, ver 30, can be entered as well but it takes longer to take action.)			
	BOP	<p>(step 1) Take manual control of SGFP speed by: Place SK 509A or 509B, 1A/B SGFP SPEED CONT, in Manual and raise demand as necessary.</p> <p>Take manual control of all FRV bypass valves 1A SG BYPASS FLOW FK-479 1B SG BYPASS FLOW FK-489 1C SG BYPASS FLOW FK-499</p> <p><u>IF</u> a loss of main feedwater occurs, <u>THEN</u> perform the actions required by AOP-13.0, LOSS OF MAIN FEEDWATER</p>	NOTE: Step 1 is an Immediate Operator Action and a continuing action step
	SRO	<p>(step 2) If adverse trends in the SG level exists then establish trip criteria</p> <p>If an automatic action is required or set points is approached: Trip the reactor and go to EEP-0</p>	NOTE: if the SGFP trips at 82% level then the reactor would be tripped at this point.
	BOP	(step 3) IF a ramp is in progress, THEN place turbine on HOLD.	

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Event Description: 1B SGFP controller oscillation failure

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 4) Adjust speed back to within the normal operating range for the feed flow/steam flow ΔP required for the existing power level.	
	BOP	(step 5) Check Steam Dumps in the Tavg mode	
	SRO	(step 6) Notify the Shift Manager	
	SRO	(Step 8) Submit a condition report for the failed instrument, and notify the Notify the Work Week Coordinator	
At the discretion of the Lead Examiner move to Event 4			

Op Test No.: FA2013301 Scenario # 6 Event # 4 Page 16 of 46
 Event Description: **LK-459F, PRZR LVL CONTROLLER, Fails LOW**

LK-459F will fail low slowly and charging flow will slowly decrease. The crew will enter AOP-100 and take manual control of charging. Charging will remain in manual control the rest of the scenario.

Indications Available:

Annunciators:

- CHG HDR FLOW HI-LO (EA2)

Recognize indications of LK-459F failing low:

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

Time	Pos.	Expected Actions/Behavior	Comments
		AOP-100, Instrumentation Malfunction, section 1.2 ver 12.0 is the expected procedure to enter based on a component malfunction. However, if the crew determines this is a CVCS malfunction then AOP-16 would be entered.	
	SRO	Direct entry into AOP-100 or AOP-16.0	AOP-16 steps on next page
		AOP-100 steps below:	
	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 raise the demand to approximately 80 – 100 gpm	
	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 □ Failed or erroneous reading on LI459, LI460 or LI461	NOTE: LK-459F has failed
	RO	(step 4) Check letdown in service	Letdown will still be in service
		No action for step 5 and 6	
	SRO	(step 7) Notify the Shift Manager	

Op Test No.: FA2013301 Scenario # 6 Event # 4 Page 17 of 46

Event Description: LK-459F, PRZR LVL CONTROLLER, Fails LOW

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 8) <u>WHEN</u> plant conditions permit, <u>THEN</u> restore components to automatic control as follows: □ Restore charging flow control to automatic	NOTE: LK-459F will not be fixed so Pzr level control will in manual the rest of the scenario
	SRO	(step 9) Submit a Condition Report for the failed level channel, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the Condition Report	
AOP-16.0, CVCS Malfunction, Ver 18.0			
	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	Closes HV8149 A, B and C
	BOP	(Step 2) Stop any load change in progress	
	RO	(Step 3) Monitor VCT level (Step 4) Observe CHG HDR PRESS and MOTOR AMPS to ensure proper charging pump operation - PI-121 and ammeter for chg pump	
	RO	(Step 5) Check charging pump – RUNNING	
	RO	(Step 6) 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 flow indicated and FK-122 in AUTO

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Event Description: LK-459F, PRZR LVL CONTROLLER, Fails LOW

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 7) Check DE3 clear (Step 8) 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)	
	RO	(Step 9.2) Verify all letdown orifice isolation valves - CLOSED LTDN ORIF ISO 45 GPM <input type="checkbox"/> Q1E21HV8149A LTDN ORIF ISO 60 GPM <input type="checkbox"/> Q1E21HV8149B <input type="checkbox"/> Q1E21HV8149C (Step 9.3) Place LTDN HX OUTLET TEMP TK 144 on service: <input type="checkbox"/> Place controller in AUTO <input type="checkbox"/> Set to maintain temperature 90 to 115°F (Step 9.4) Verify LTDN HI TEMP DIVERT VLV Q1E21TCV143: <input type="checkbox"/> DEMIN light - LIT <input type="checkbox"/> Handswitch in – AUTO (Step 9.5) Verify LTDN HI TEMP DIVERT VLV Q1E21TCV143: <input type="checkbox"/> Handswitch in - VCT <input type="checkbox"/> VCT light - LIT <input type="checkbox"/> DEMIN light - NOT LIT (Step 9.6) IF necessary, THEN OPEN both LTDN LINE PENE RM ISO's from the PRIP. <input type="checkbox"/> Q1E21HV8175A <input type="checkbox"/> Q1E21HV8175B	

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Event Description: LK-459F, PRZR LVL CONTROLLER, Fails LOW

Time	Pos.	Expected Actions/Behavior	Comments
	RO	<p>(Step 9.7) Verify LTDN LINE CTMT ISO Q1E21HV8152 – OPEN</p> <p>(Step 9.8) Verify LTDN LINE ISO valves - OPEN</p> <p><input type="checkbox"/> Q1E21LCV459</p> <p><input type="checkbox"/> Q1E21LCV460</p> <p>(Step 9.9) Place LP LTDN PRESS PK 145 on service:</p> <p><input type="checkbox"/> Place controller in MANUAL</p> <p><input type="checkbox"/> Adjust demand signal to 50% or less</p> <p>(Step 9.10) Initiate minimum charging flow:</p> <p>(Step 9.10.1) Verify CHG FLOW FK 122 in - MAN</p> <p>(Step 9.10.2) Establish minimum charging flow based on orifices to be placed on service:</p> <p><input type="checkbox"/> 1 Orifice - 18 gpm</p> <p>OR</p> <p><input type="checkbox"/> 2 Orifices - 40 gpm</p> <p>(Step 9.11) Establish approximately 60 gpm letdown flow by OPENING:</p> <p><input type="checkbox"/> Q1E21HV8149B</p> <p>OR</p> <p><input type="checkbox"/> Q1E21HV8149C</p> <p>(Step 9.12) IF desired, THEN place the second orifice on service by OPENING:</p> <p><input type="checkbox"/> Q1E21HV8149A</p> <p>(Step 9.13) Initiate actions to restore letdown flow to the demins per FNP-1-SOP-2.1, CHEMICAL AND VOLUME CONTROL SYSTEM PLANT STARTUP AND OPERATION</p>	

Op Test No.: FA2013301 Scenario # 6 Event # 4 Page 20 of 46

Event Description: LK-459F, PRZR LVL CONTROLLER, Fails LOW

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(Step 9.14) [CA] IF all backup heaters energized due to pressurizer level deviation, THEN verify two sets of backup heaters in ON prior to level deviation clearing.	NOTE: [CA] step –
	RO	(Step 9.15.1) Set controller between 4.3 and 7.5 (Step 9.15.2) Check letdown flow – STABLE (Step 9.15.3) Place PK 145 in AUTO (Step 9.15.4) Control Letdown pressure as desired (Step 9.16) Control LTDN HX OUTLET TEMP, TK 144 to maintain LTDN temp 90 to 115°F. <input type="checkbox"/> TI-116 VCT TEMP <input type="checkbox"/> TI-143 DIVERT LTDN HX TEMP <input type="checkbox"/> TI-144 CCW LTDN HX TEMP (Step 9.17) Refer to SOP-2.1, CVCS system PLANT STARTUP AND OPERATION, for further guidance on Letdown system control (step 10) Determine status of letdown flow: Check letdown flow - established	
	SRO	(step 10.2) Go to procedure and step in effect Submit a Condition Report and notify the Work Week Coordinator (Maintenance ATL on backshifts) Notify the Shift Manager	
At the discretion of the Lead Examiner move to Event 5.			

Op Test No.: FA2013301 Scenario # 6 Event # 5 Page 21 of 46Event Description: **Thermal Barrier Leak**

Leak from RCS to the CCW system via the thermal barrier. This is a difficult leak location.

Indications Available:

Annunciators:

CHG HDR FLOW HI-LO (EA2)

RMS HI RAD (FH1)

CCW SRG TK LVL HI (AA4 & AB4)

Indications of the leak:

Li-112B and 115, VCT LVL, decreasing

FI-122, CHG FLOW increasing

Time	Pos.	Expected Actions/Behavior	Comments
ARP-1.1 ANNUNCIATOR RESPONSE, AA4/AB4 ver. 53.1			
	BOP	(step 1) Check level HI or LOW – step 4 if HI	
	BOP	(step 4.1) Determine source of in-leakage and isolate if possible. (step 4.2) Check Radiation Monitors R-17A and R-17B for increasing count rates. (step 4.3) Verify the following make up valves are closed. <ul style="list-style-type: none"> • MKUP TO CCW FROM DW STOR TK Q1P17MOV3030A • MKUP TO CCW FROM DW STOR TK Q1P17MOV3030B • MKUP TO CCW FROM RMW Q1P17MOV3031A • MKUP TO CCW FROM RMW Q1P17MOV3031B (step 4.4) IF desired, THEN close CCW SRG TK DEMIN INLET ISO N1P11V045. (step 4.6) IF CCW Surge Tank level raise is due to RCS leakage, THEN refer to AOP-1.0	
AOP-1.0, RCS LEAKAGE, ver. 21.0			
	SRO	Directs entry into AOP-1 and directs actions per RO & BOP rows below:	

Op Test No.: FA2013301 Scenario # 6 Event # 5 Page 22 of 46

Event Description: Thermal Barrier Leak

Time	Pos.	Expected Actions/Behavior	Comments
	RO	(step 1) Maintain pressurizer level stable at or near programmed level by : Control charging flow: OR Reduce letdown flow OR Isolating letdown-	NOTE: This is a continuing action step Take manual control of charging flow Removing letdown from service should be done per SOP-2.1, figure 1 on MCB
REMOVING LTDN FROM SERVICE 1. Place PK-145 in MANUAL and adjust demand to < 50%. 2. Close LTDN ORIF ISO 45 GPM, Q1E21HV8149A AND LTDN ORIF ISO 60 GPM, HV8149B OR HV8149C, as applicable. 3. Close LTDN LINE ISO, Q1E21LCV459 and Q1E21LCV460 4. Place FK-122 in MANUAL and adjust to 0% (closed). 5. Verify SEAL WTR INJECTION HIK 186 adjusted. 6. Refer to SOP-2.1 when time permits.			
	RO	(step 2) Maintain VCT level > 20% - Ensures Reactor makeup is in AUTOMATIC to maintain VCT level > 20% - RNO- if VCT level can not be maintained >20%, then align chg pump suctions to RWST	NOTE: This is a continuing action step NOTE: IN AUTOMATIC Q1E21LCV115B open Q1E21LCV115D open RWST TO CHG PUMP MOV5 and Q1E21LCV115C closed Q1E21LCV115E closed VCT OUTLET ISO MOV5
	RO	(step 3) Determine leak rate based on flow balance _____(charging flow) + _____(seal injection flow) - _____(letdown flow) - _____(#1 seal leakoff flow) = _____(RCS leak rate)	

Op Test No.: FA2013301 Scenario # 6 Event # 5 Page 23 of 46Event Description: **Thermal Barrier Leak**

Time	Pos.	Expected Actions/Behavior	Comments
	SRO	(step 4) Leak rate should be determined to be ~15 gpm. Tech Spec 3.4.13 should be evaluated: - > 1 gpm unidentified leakage if location of leak is NOT known. OR - >10 gpm identified if location is known.	NOTE: [CA] step
<u>NOTE TO LEAD EXAMINER:</u> IF the leak is <u>NOT</u> isolated, THEN LCO 3.4.13 Cond A is a MANDATORY LCO. IF the leak IS isolated, THEN there is no MANDATORY LCO.			
	SRO	(step 5) Informs Shift Manager of Leak rate for classification and notification per EIP-8 & EP-110 - need for CTMT entry to look for leak source - T.S. requires fix leak in 4 hours or shutdown in 6 hours	NOTE: [CA] step
	SRO	(step 6) WHEN RCS leak rate greater than 50 gpm, THEN align 1A and 1B post LOCA containment hydrogen analyzers for service using Attachment 1.	
NOTE: <ul style="list-style-type: none"> The intent of step 7 is to provide a systematic leakage search plan. <u>Steps 7.2 through 7.12 may be done in any order.</u> IF at any time the location of an RCS leak is discovered or reported, THEN actions to isolate the leak should be taken immediately. WHEN all leakage sources have been identified, THEN continue with step 8 and further leakage identification actions may be terminated. 			
	RO	(step 7) Frequently monitor CVCS flow balance as the actions of steps 7.2 through 7.12 are taken.	
	RO	(step 7.2) Check LCV-115A, VCT HI LVL DIVERT VLV, in the VCT position	
	SRO	(step 7.3) Check containment sump level - NOT RISING EXCESSIVELY	

Op Test No.: FA2013301 Scenario # 6 Event # 5 Page 24 of 46

Event Description: Thermal Barrier Leak

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 7.4) Check containment radiation – NORMAL	
	BOP	(step 7.5) Check auxiliary building radiation - NORMAL.	
	BOP	(step 7.6) Check no SG tube leakage - Check Secondary radiation NORMAL	
	BOP	(step 7.7) Checks CCW radiation monitors (R-17A/B) a) Establish excess letdown using SOP-2.7 b) Secure normal letdown. c) IF CCW parameters return to normal, THEN return to step 3. d) Establish normal letdown using SOP-2.1 e) Secure excess letdown. f) IF seal injection supplied to all RCPs, THEN isolate CCW from RCP thermal barrier heat exchangers. CCW FROM RCP THRM BARR □ Q1P17HV3045 closed □ Q1P17HV3184 closed g) IF CCW parameters do NOT return to normal, THEN restore CCW from RCP thermal barrier heat exchangers. CCW FROM RCP THRM BARR □ Q1P17HV3045 open □ Q1P17HV3184 open	NOTE: Crew may not complete this entire step. Once leak location is understood, should proceed to steps to isolate it. NOTE: This step will isolate the leak
	RO	(step 7.8) Check PRT conditions normal.	

Op Test No.: FA2013301 Scenario # 6 Event # 5 Page 25 of 46

Event Description: Thermal Barrier Leak

Time	Pos.	Expected Actions/Behavior	Comments						
	BOP	(step 7.11) Isolate RCS sampling as follows: Close the following valves located on U1 BOP PNL L: <ul style="list-style-type: none"> • PRZR Stm Sample Iso Q1P15HV3104 • PRZR Liq Sample ISO Q1P15HV3103 • RCS Loops 2&3 Sample Iso Q1P15HV3765 • ACCUM Sample ISO Q1P15HV3766 							
	SRO	(step 8) WHEN the RCS leakage source identified, THEN take appropriate actions to isolate the leak.	NOTE: [CA] step						
LCO 3.4.13 Cond. A is a MANDATORY LCO until the leak is isolated.									
TECHNICAL SPECIFICATION 3.4.13, RCS Operational LEAKAGE RCS operational LEAKAGE shall be limited to: <ul style="list-style-type: none"> a. No pressure boundary LEAKAGE; b. 1 gpm unidentified LEAKAGE; c. 10 gpm identified LEAKAGE; 									
	SRO	<table border="1"> <thead> <tr> <th>CONDITION</th> <th>REQUIRED ACTION</th> <th>COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td>A. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.</td> <td>A.1 Reduce LEAKAGE to within limits.</td> <td>4 hours</td> </tr> </tbody> </table>	CONDITION	REQUIRED ACTION	COMPLETION TIME	A. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours	
CONDITION	REQUIRED ACTION	COMPLETION TIME							
A. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours							
<p>When leak is isolated, or Tech Specs are evaluated and a decision is made to shutdown, then at the discretion of the Lead Examiner, move to Event 7.</p> <p>Tech Specs can be discussed at the end of the scenario since if/when the leak is isolated the LCO will no longer be applicable.</p>									

Op Test No.: FA2013301 Scenario # 6 Event # 6 Page 26 of 46Event Description: **Vacuum degrades, trip required**

Vacuum degrades over 4 minutes requiring a trip. The SGFPs will trip if no action is taken approx. 11-12 minutes into the event.

Indications Available:

Annunciators:

- KK1 TURB COND VAC LO
- KK2 TURB COND VAC LO-LO

Recognize indications of degrading vacuum

- Condenser pressure increasing

Time	Pos.	Expected Actions/Behavior	Comments
ARP-1.10, Annunciator Response Procedure, KK1/KK2 Ver 70.2			
	SRO/ BOP	(KK1 step1) Perform the actions required by FNP-1-AOP-8.0, PARTIAL LOSS OF CONDENSER VACUUM.	
	BOP	(KK1 step2) IF condenser pressure approaches the setpoint for KK2, (refer to KK2), THEN ensure the OPERATOR ACTIONS for KK2 are understood.	
	BOP	(KK2 step1) Determine if the alarm is valid.	
	SRO/ BOP	(KK2 step 2) IF reactor power is greater than or equal to 35%, THEN trip the reactor and perform the actions required by EEP-0,	
	BOP	(KK2 step 3) IF reactor power is less than 35%, THEN trip the turbine and perform the actions required by FNP-1-AOP-3.0, TURBINE TRIP < P-9 SETPOINT.	
AOP-8.0 PARTIAL LOSS OF COND VACUUM Ver 22.1			
	BOP	(step 1) Monitor Condenser pressure (step 1.1) IF annunciator KK1, TURB COND VAC LO in alarm OR setpoint exceeded, THEN increased monitoring of condenser pressure is required: <ul style="list-style-type: none"> • 1.485 psia when < 25% turbine power • 2.901 psia when > 47.9% turbine power • Varies Linearly Between 25% (1.485 psia) and 47.9% (2.901 psia) 	

Op Test No.: FA2013301 Scenario # 6 Event # 6 Page 27 of 46Event Description: **Vacuum degrades, trip required**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	(step 2) Monitor turbine trip criteria. (step 2.1) Check condenser pressure less than annunciator KK2, TURB COND VACLO-LO setpoint for existing turbine power using MWe or PT-446/447: <ul style="list-style-type: none">• 1.885 psia when < 25% turbine power• 3.8 psia when > 55.9% turbine power• Varies Linearly Between 25% (1.885 psia) and 55.9% (3.8 psia)	
	BOP	(step 3) Stabilize condenser vacuum using any or all of the following actions based on plant conditions, and the rate at which vacuum is worsening. 3.1 IF the rate of condenser pressure increase is significant and approaching annunciator KK1, TURB COND VAC LO setpoint, THEN reduce load prior to reaching annunciator KK1 setpoint.	

Op Test No.: FA2013301 Scenario # 6 Event # 7 Page 28 of 46Event Description: **Entry to EEP-0 based on Condenser Vacuum**

RX trip is successful on second hand switch, One Governor valve sticks requiring MSIV's to be closed.

Indications Available:**Annunciators:**

- Various and numerous

Indications of RX trip

- Nuclear power decreasing
- Rod bottom lights
- Control Room Lighting

Time	Pos.	Expected Actions/Behavior	Comments
EEP-0, Reactor Trip or Safety Injection, rev 44			
	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>Immediate Action steps of EEP-0</p> <p>NOTE: First hand switch fails, second hand switch is successful.</p> <p>RNO 2.1 Place main turbine emergency trip switch to TRIP for at least 5 seconds.</p> <p>2.2 IF turbine can NOT be tripped, THEN reduce GV position demand signal to zero from DEH panel. <input type="checkbox"/> TURBINE MANUAL depressed <input type="checkbox"/> GV CLOSE depressed <input type="checkbox"/> FAST ACTION depressed</p> <p>2.3 IF steam flow to main turbine is NOT secured, THEN close all main steam line isolation and bypass valves.</p>

Op Test No.: FA2013301 Scenario # 6 Event # 7 Page 29 of 46Event Description: **Entry to EEP-0 based on Condenser Vacuum**

Time	Pos.	Expected Actions/Behavior	Comments
	RO/ BOP	<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>	
	RO/ BOP	<p>(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</p> <p>(step 4.2) Verify both trains of SI-ACTUATED. <input type="checkbox"/> MLB-1 1-1 lit AND <input type="checkbox"/> MLB-1 11-1 lit</p>	
	SRO	<p>(step 5) Directs continuing into EEP-0 at step 5. Directs the BOP to perform Attachment 2 of EEP-0.</p>	<p>For Attachment 2 and 4 actions. Go to page 39</p>
		<p>(Fold out page step 5) 5 Ruptured SG AFW Isolation.</p> <p>5.1 Manually stop AFW flow to a SG if BOTH conditions listed below occur: <input type="checkbox"/> Level increases in an uncontrolled manner or radiation in that SG is abnormal AND <input type="checkbox"/> Narrow range level – GREATER THAN 31% {48%}</p>	<p>NOTE: [CA] step The action to Isolate AFW to the ruptured SG may be completed beyond this point.</p>
	RO	<p>(step 6) Check containment pressure- HAS REMAINED LESS THAN 27 psig (checked on IPC or PI950, 951, 952, 953,CNMT PRESSURE)</p>	<p>NOTE: [CA] step</p>
	RO	<p>(step 7) Announce "Unit 1 reactor trip and safety injection".</p>	

Op Test No.: FA2013301 Scenario # 6 Event # 7 Page 30 of 46Event Description: **Entry to EEP-0 based on Condenser Vacuum**

Time	Pos.	Expected Actions/Behavior	Comments
	SRO/ RO	<p>(step 8) Check AFW status.</p> <p>Check secondary heat sink Available</p> <ul style="list-style-type: none"> ○ Check total AFW flow > 395 gpm □ FI 3229A □ FI 3229B □ FI 3229C ○ Total Flow FI 3229 <p>OR</p> <p>Check any SG NR level > 31% {48%}</p> <p>WHEN all SG narrow range levels less than 31%{48%}, THEN maintain total AFW flow greater than 395 gpm.</p> <p>WHEN at least two SG narrow range levels greater than 28% AND TDAFWP NOT required, THEN stop TDAFWP.</p>	<p>RNO</p> <p>8.1.1 Verify all available AFW pumps started.</p> <p>8.1.2 Verify total AFW flow greater than 395 gpm.</p> <p>8.1.3 IF total AFW flow less than 395 gpm, AND all SG narrow range levels less than or equal to 31%(48%), THEN go to FNP-1-FRP-H.1</p>
	SRO	Direct transition to FRP-H.1	

Op Test No.: FA2013301 Scenario # 6 Event # 8 Page 31 of 46Event Description: **Transition to FRP-H.1**

FRP-H.1, LOSS OF HEATSINK, Ver 27.0			
	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 < 2235 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	

Op Test No.: FA2013301 Scenario # 6 Event # 8 Page 32 of 46Event Description: **Transition to FRP-H.1**

	BOP	<p>(step 5) Try to establish AFW flow to at least one SG.</p> <p>(step 5.1) Verifies blowdown isolated from all SGs</p> <p>1A(1B,1C) SGBD ISO</p> <ul style="list-style-type: none"> • Q1G24HV7614A closed • Q1G24HV7614B closed • Q1G24HV7614C closed <p>(step 5.2) Verifies SG blowdown sample valves isolated</p> <ul style="list-style-type: none"> • MLB4 6-4 lit • MLB4 7-4 lit • MLB4 8-4 lit <p>(step 5.3) Recognizes AFW pumps not available</p> <p>.</p>	<p>NOTE: [CA] Step</p> <p>RNO</p> <p>5.3 PERFORM local start from Hot shutdown panels. (BOOTH OPERATOR WILL PERFORM THESE ACTION if/When directed)</p>
		<p>(step 5.4) Verify at least one flow path to at least one SG ALIGNED</p> <p>Checks OPEN MDAFP to 1A/B/C SG (where x = respective SG A, B or C)</p> <ul style="list-style-type: none"> - 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 	
		<p>(step 5.5) [CA] Check total AFW flow to SGs greater than 395 gpm.</p> <p>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</p>	Continue efforts to establish AFW flow.
	RO	(step 6) Stops all RCPs	

Op Test No.: FA2013301 Scenario # 6 Event # 8 Page 33 of 46

Event Description: Transition to FRP-H.1

	SRO	(step 7) Try to establish main feedwater flow to intact SGs with one SGFP.	RNO Perform the following. a) Verify at least one CNDS PUMP - STARTED b) If unable to establish main feedwater flow and at least one condensate pump is started, THEN proceed to step 9 OBSERVE CAUTION PRIOR TO STEP 9.
	RO	(step 9) Try to establish condensate flow to intact SGs. 9.1 IF SI has NOT actuated since reactor trip, THEN reset FW ISO.	NOTE: [CA] Step RNO 9.1 Verify SI RESET. <input type="checkbox"/> MLB-1 1-1 not lit <input type="checkbox"/> MLB-1 11-1 not lit
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.	

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Event Description: Transition to FRP-H.1

	BOP	<p>(step 9.5) Locally open SGFP BYP N1N21V509. (155 ft, TURB BLDG)</p> <p>(step 9.6) Locally isolate SGFP miniflow valves. (155 ft, TURB BLDG) SGFP 1A(1B) RECIRC FCV INLET ISO</p> <ul style="list-style-type: none"> • N1N21V502A closed • N1N21V502B closed 	
	BOP	<p>(step 9.7) Perform the following.</p> <p>9.7.1 Dispatch personnel to 1V 600 V MCC.</p> <p>9.7.2 Place handswitch for main feedwater stop valves to intact SGs to OPEN and hold in that position.</p> <ul style="list-style-type: none"> • 1A(1B,1C) SG STOP VLV Q1N21MOV 3232A • 3232B • 3232C <p>9.7.3 WHEN main feedwater stop valves to intact SGs open, THEN direct personnel to open associated breakers.</p> <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	<p>(step 9.8) Reduce PRZR pressure to less than 1950 psig.</p> <p>9.8.1 Check either condition for using auxiliary spray satisfied.</p> <ul style="list-style-type: none"> • Normal letdown in service. <p>OR</p> <ul style="list-style-type: none"> • No PRZR PORV available. 	<p>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.</p>

Op Test No.: FA2013301 Scenario # 6 Event # 8 Page 35 of 46Event Description: **Transition to FRP-H.1**

	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 	
	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.	

Op Test No.: FA2013301 Scenario # 6 Event # 8 Page 36 of 46Event Description: **Transition to FRP-H.1**

	RO	<p>(step 9.9.1) IF using auxiliary spray, THEN operate the following valves as required to control PRZR pressure.</p> <p>CHG FLOW</p> <ul style="list-style-type: none"> FK 122 manually open <p>1A(1B) LOOP SPRAY VLV</p> <ul style="list-style-type: none"> PK 444C manually open/closed PK 444D manually open/closed <p>RCS PRZR AUX SPRAY</p> <ul style="list-style-type: none"> Q1E21HV8145 open/closed <p>RCS NORMAL CHG LINE</p> <ul style="list-style-type: none"> Q1E21HV8146 open/closed <p>RCS ALT CHG LINE</p> <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	<p>(step 9.10) WHEN pressurizer pressure less than 2000 psig, THEN perform the following.</p> <p>9.10.1 Block low pressurizer pressure SI. PRZR PRESS SI BLOCK - RESET</p> <ul style="list-style-type: none"> A TRN to BLOCK B TRN to BLOCK <p>9.10.2 Verify blocked indication. BYP & PERMISSIVE PRZR. SAFETY INJECTION</p> <ul style="list-style-type: none"> TRAIN A BLOCKED light lit TRAIN B BLOCKED light lit 	

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Event Description: Transition to FRP-H.1

		<p>(step 9.11) WHEN P-12 light lit (543□F), THEN perform the following.</p> <p>9.11.1 Block low steam line pressure SI. STM LINE PRESS SI BLOCK - RESET</p> <ul style="list-style-type: none"> • A TRN to BLOCK • B TRN to BLOCK <p>9.11.2 Verify blocked indication. BYP & PERMISSIVE STM LINE ISOL. SAFETY INJ.</p> <ul style="list-style-type: none"> • TRAIN A BLOCKED light lit • TRAIN B BLOCKED light lit <p>9.11.3 Bypass the steam dump interlock. STM DUMP INTERLOCK</p> <ul style="list-style-type: none"> • A TRN to BYP INTLK • B TRN to BYP INTLK 	
		<p>(step 9.12) IF condenser available, THEN dump steam to condenser from intact SGs at maximum attainable rate.</p> <p>MSIVs are closed so ARVs will be used.</p>	<p>RNO 9.12 Dump steam to atmosphere. 9.12.1 Direct counting room to perform FNP-0-CCP-645, MAIN STEAM ABNORMAL ENVIRONMENTAL RELEASE.</p> <p>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 □ PC 3371A adjusted □ PC 3371B adjusted □ PC 3371C adjusted</p>
		(step 9.13) WHEN SG(s) pressure reduced to less than 540 psig, THEN stop pressure reduction.	

Op Test No.: FA2013301 Scenario # 6 Event # 8 Page 38 of 46Event Description: **Transition to FRP-H.1**

		(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 	
		(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.			

Op Test No.: FA2013301 Scenario # 6 Event # 7 Page 39 of 46Event Description: **Attachment 2 of EEP-0**

Cue: BOP will accomplish when at step 5 of EEP-0

Attachment 2 of EEP-0
AUTOMATIC ACTIONS VERIFICATION

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}.	Operator should proceed to step 4
	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

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>	
	BOP	<p>(step 6) Verify containment ventilation isolation.</p> <p>Verify containment purge dampers - CLOSED.</p> <p><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.</p> <p>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

Op Test No.: FA2013301 Scenario # 6 Event # 7 Page 41 of 46Event Description: **Attachment 2 of EEP-0**

Time	Pos.	Expected Actions/Behavior	Comments
	BOP	<p>(step 7) Verify containment fan cooler alignment.</p> <p>Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED.</p> <p><u>CTMT CLR FAN SLOW SPEED</u></p> <p>A train</p> <p><input type="checkbox"/> 1A</p> <p><input type="checkbox"/> 1B</p> <p>B train</p> <p><input type="checkbox"/> 1C</p> <p><input type="checkbox"/> 1D</p> <p>Verify associated emergency service water outlet valves - OPEN.</p> <p>EMERG SW FROM 1A(1B,1C,1D) CTMT CLR</p> <p><input type="checkbox"/> Q1P16MOV3024A</p> <p><input type="checkbox"/> Q1P16MOV3024B</p> <p><input type="checkbox"/> Q1P16MOV3024C</p> <p><input type="checkbox"/> Q1P16MOV3024D</p>	

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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	RNO 8.1 Verify MDAFW Pumps deliver flow to each SG. 8.1.1 Manually start MDAFW Pumps 8.1.2 Verify AFW flow path to AND each SG. <input type="checkbox"/> Q1N23HV3227A in MOD <input type="checkbox"/> Q1N23HV3227B in MOD <input type="checkbox"/> Q1N23HV3227C in MOD MDAFWP TO 1A(1B,1C) SG FLOW CONT <input type="checkbox"/> HIC 3227AA open <input type="checkbox"/> HIC 3227BA open <input type="checkbox"/> HIC 3227CA open AFW TO 1A(1B,1C) SG STOP VLV <input type="checkbox"/> Q1N23MOV3350A open <input type="checkbox"/> Q1N23MOV3350B open <input type="checkbox"/> Q1N23MOV3350C open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764A open <input type="checkbox"/> Q1N23MOV3764D open <input type="checkbox"/> Q1N23MOV3764F open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764E open <input type="checkbox"/> Q1N23MOV3764B open <input type="checkbox"/> Q1N23MOV3764C open
		(Step 8.2) Check TDAFW Pump start required. <input type="checkbox"/> Condition <input type="checkbox"/> TSLB <input type="checkbox"/> Setpoint <input type="checkbox"/> Coincidence	
		RCP Bus TSLB2 1-1 <input type="checkbox"/> 2680 V Undervoltage 1-2 1-3	1/2 Detectors on 2/3 Busses
		Low Low SG TSLB4 28% Water Level 4-1,4-2,4-3 In Any 5-1,5-2,5-3 2/3 SGs 6-1,6-2,6-3	2/3 Detectors on 2/3 SGs

Op Test No.: FA2013301 Scenario # 6 Event # 7 Page 43 of 46Event Description: **Attachment 2 of EEP-0**

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> <p>11.3 Verify Excess Letdown Isolation valves closed. <input type="checkbox"/> Q1E21HV8153, EXC LTDN ISO <input type="checkbox"/> Q1E21HV8154, EXC LTDN ISO</p>																					

Op Test No.: FA2013301 Scenario # 6 Event # 7 Page 44 of 46Event Description: **Attachment 2 of EEP-0**

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	
	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.:	<u>FA2013301</u>	Scenario #	<u>6</u>	Event #	<u>7</u>	Page	<u>45</u>	of	<u>46</u>
Event Description:		Attachment 2 of EEP-0							

Time	Pos.	Expected Actions/Behavior	Comments
	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.: FA2013301 Scenario # 6 Event # 7 Page 46 of 46Event Description: **Attachment 4 of EEP-0**

Time	Pos.	Expected Actions/Behavior	Comments
Attachment 4 of EEP-0 TWO TRAIN ECCS ALIGNMENT VERIFICATION			
		<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>	
		<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</p> <p><input type="checkbox"/> 1B</p> <p><input type="checkbox"/> 1C</p> <p><input type="checkbox"/> 1D</p> <p>RX CAV H2 DILUTION FAN</p> <p><input type="checkbox"/> 1A</p> <p><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	<p>(Step 1.9) Verify SFP Cooling in service per SOP-54.0, Spent Fuel Pit Cooling And Purification System.</p>	Call Radside SO
End of Attachment 4			

Op-Test No.: FA2013-301

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.

In the unlikely event that the simulator fails such that illogical indications result, the session will be terminated. In other words, 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-2

[X] Unit 1 [] Unit 2

Shift:

Date

Off-going SS	Oncoming SS	[] N [X] D	Today
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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, 915 ppm, MOL 10000 MWD/MTU
Status Ramping down

TARGET ZERO
 Every Day, Every Job Safely

STPs/Evolutions:

STP-27.1 completed 2
 hours ago

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

A Train On-Service – B Train
 Protected

Status of Special Testing**General Information**

- Shift goal is to place the IMP PRESS LOOP in service and ramp down to 18% power for containment entry to add oil to the 1B RCP.
- Current Risk Assessment is **YELLOW** and projected is **YELLOW** due to maintenance on 1A MDAFW pump and 1C DG
- UOP-3.1 ver 112.4 in progress at step 8.2
- 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia
- Unit 2 PSS in OFF for Maintenance (OOS 2 hrs, ETR 2 hrs)
- Fuel handling is on going in the SFP room with the last fuel bundle being moved.
-

Equipment Status

Maintain VCT gas pressure 25-30 psig

Reactivity Plan**Waste Management Status**

#3 RHT – On Service

WGS – secured

LCO Status

3.8.1 condition B, STP-27.1 completed 2 hours ago

3.7.5 Condition B

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