original Submittal

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

Facility: Farley Scenario No.: 1 Op-Test No.: FA2008301

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: approx. 50% power, ramping down at 8 MW/min. ??? ppm, EOL; B train on service, A Train protected. 1A SGFP on service (IC-48)

Turnover:

- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- 1A SG has 85 gpd tube leak – AOP-2.0 is in effect
- 1E Service Water pump is tagged out for motor replacement.
- Current Risk Assessment is GREEN and projected is GREEN.
- **B** Train On-Service – **A** Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event No.	Malf No.	Event Type*	Event Description
1		R (RO & BOP)	Ramp at 8 MW/min IAW AOP-17
2		(C) (RO)	rods do not move in manual BA controller FK113 blown fuse in driver card
3		C (BOP) TS (SRO)	1D SW pump has a broken shaft. AOP-10 entry
4		I (RO)	LT-112 fails high – auto make up does not work Fail auto makeup
5		I (BOP) ~~TS~~ Delete (SRO)	Feed flow transmitter on 1B SG FT-486 channel IV (selected FT for 1B SG fails low) AOP-100
6			1B RCP seal leak 6-8 gpm. AOP-4.1 Ramp down due to seal failure if needed.
7		TS (SRO)	Raise RCP seal leak rate to 50 gpm.
8		~~M (ALL)~~ C (BOP, RO)	1B RCP shaft shears. EEP-0 entry (Need to initiate prior to power <33%).
9		M (ALL)	After entry into ESP-0.1 (when 1B SGFP is tripped) Increase the RCS leak to 300 gpm. Terminate scenario in ESP-1.2 after normal charging established
10.		C (RO)	SI auto actuation does not work, manual SI does work
11.		C (BOP)	Team will start the 1A chg pump and close MOV-8100 OR 8112.

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

Event No.	Malf. No.	Event Type*	Event Description
PRESETS			
0	IC- 48	-------	Approx 50% EOL, ramping down, B Train on service.
0	Turn on 1C SW pump	-----	1C SW pump HS to Start
0	Turn off 1E SW pump	-----	1E SW pump HS to Stop
0	Tag out 1E SW pump	------	RACKOUT BREAKER for 1E SW pump
0	Cmfmalf / cmshfpb_cp1	-----	Tag out 1B EH pump
0	SYSTEMS/MECH/BOP/1A SG	-----	Set tube leak = 85 gpd.
0	SYSTEMS/ MECH/ AUX SUPPORT SYS/ FIRE PROT/ SERV WATER	---	1SW-111/ Link XNMAD05f > 0 (will alarm on 1D SW pump trip)
0	Cmf malf / crxmkup_cc15 / open	----	Fail auto makeup
0	Raise setpoint on R-70A	-----	Set to 100 gpd
0	1E SW PUMP	---	TAG
0	1B EH PUMP	----	PLACE IN OFF AND TAG
0	Mal / C / mal-crf3	----	Rods fail to move in manual
0	ESF= imf cCVP01A_d_cc6 open LOSP=imf cCVP01A_d_cc3 open	----	1A chg pump fails to auto start on SI
0	CMFmalf / cBKRXTRP_cc21/ closed imf cBKRXTRP_cc22 closed	----	Fail RTB from opening on manual or auto trip
0	imf csftyinj_cc1 open imf csftyinj_cc11 open	-----	Fail auto SI signals, Manual SI works
	imf csftyinj_cc17 open	---	Fail auto phase A for B Train.
0	imf cCVH100_d_cc8 open	----	8100 will not go closed.
0	imf nncpsw1a-d / 50 imf nncpsw1c-d / 50	----	May have to degrade the head on 1A and 1C SW pump to get the desired values for AOP-10 entry and continuation with procedure.

We are changing the lineup of CCW so that Both trains of CCW will be running and the off service train of charging will be running. This should not affect these scenarios but if a problem arises that we did not predict in these scenarios, we may have to adjust the scenario to fit the new alignment.

SCENARIO 1 Summary sheet

Presets:

Event 1 Commence ramp at 8 MW/min heading to mode 3 due to the SGT leak.
AOP-17 entry.

Event 2 Rods fail to move in manual. Implemented after most actions of AOP-1.0 have been initiated
Boric Acid Flow controller failure. FK113 driver card develops blown fuse. FK113 on MCB will go dark and FCV-113A will fail closed.

Event 3 1D SW pump has a broken shaft. (1A and 1C SW pumps will have degraded head to decrease SW pressure below 60 psig). The crew will enter AOP-10 after ARP guidance. Containment temps will be increasing. The crew will go thru AOP-10 and reduce some SW loads.

Event 4 LT-112 fails high – auto make up does not work
The operators receive a Low level in the VCT since LCV-115A will divert to the RHT. If the operator sees the VCT level decreasing they may start a makeup or place the divert valve in the VCT position.

Event 5 FT-486 (selected feed flow FT for 1B SG fails low) fails to 0. This will cause the BOP operator to take manual control of the FRV and restore and control level. If in progress, the crew should stop the ramp long enough to address the problem.

Event 6 1B RCP seal leak 6-8 gpm. DC2 ARP and AOP-4.1 guidance will have controlled shutdown commenced to be offline in 8 hours. When Rx is secured, the RCP will be s/d.
Recommence ramp.

Event 7 Raise seal leak rate to 50 gpm. Entry into AOP-1.0, T. S. limit,
50 gpm is well within the limits of plant control and should not require Trip and Safety injection

Event 8 1B RCP shaft shears above 30% power (P-8). The crew should recognize reactor trip criteria and attempt to manually trip the reactor using the handswitches and then with the CRDMs MG set handswitches. Since the CRDM MG set breakers open, no entry into S.1 is required. Since the Rx trip breakers do not open, the main turbine will not trip and will need to be manually tripped. If not, an SI setpoint may be reached, but auto SI is blocked. AOP-4.0 actions will be required to close the B loop pressurizer spray valve and control feed to the 1B SG at minimum
(CT Manually actuate a reactor trip when the RCP Shaft shears > 30% power)

Event 8 After entry into ESP-0.1 (when 1A SGFP is tripped) RCS leak will increase to 300 gpm.

Event 9 SI auto actuation does not work, manual SI does work. Auto Phase A for B Train does not work.
The crew will have to recognize the SI is required and initiate the SI. (CT).

Event 10 The crew should detect 1A chg pump does not start on the SI signal and 8100 does not go closed and B Train phase does not actuate. The crew should start the 1A chg pump and close MOV-8100 or actuate the B Train Phase A.(CT)
The crew will re-enter E-0; E-1; ESP-1.2. Terminate scenario in ESP-1.2 after normal charging established.

CRITICAL TASK SHEET

___ 1. Manually initiate a reactor trip prior to securing the RCP above 30% power when the RCP is recognized to be failed. (WOG CT E-0 - - A)

___ 2. Manually actuate at least one train of SIS-actuated safeguards before any of the following: (WOG CT E-0 - - D)

- Transition to any E-1 series procedure or
- Transition to any FRP

___ 3. Close 8100 (manual closure) OR 8112 (by actuating B Train phase A) when they do not close on the T (Phase A) signal: (WOG CT E-0 - - O)

- Prior to completing Attachment 2 of EEP-0

SCENARIO OBJECTIVE/ OVERVIEW:

Fast ramp in progress IAW AOP-17.

The team should be able to:

- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-10, AOP-100, AOP-4.1, AOP-4.0 & Tech Specs
- Identify a broken shaft on a RCP and then respond to a SBLOCA, initiate a manual SI, recognize that several containment isolation valves did not stroke closed and close at one as required per EEP-0. Then transition properly to EEP-1.0, & ESP-1.2
- Also start a charging pump as required by procedure in EEP-0.

Southern Nuclear
J.M. Farley Nuclear Plant

Operations Training
Simulator Exam Scenario

HLT-32 NRC EXAM SCENARIO #1

Technical Review: GT Ohmstede *Date:* 07-2008

Training Department Approval: _____ *Date:* _____

SOUTHERN COMPANY
Energy to Serve Your World℠

Facility:	Farley Nuclear Plant	Scenario No.:	1	Op-Test No.:	2008-301

Examiners: _____ Operators: _____ SRO

_____ _____ RO

_____ _____ BOP

Initial Conditions: 63% power, ramping down at 8 MW/min. 78 ppm, EOL; B train on service, A Train protected. 1A SGFP on service. 100 gal dilutions every 4 minutes Xe changing at 6 pcm/min Rods in Manual

Turnover:

- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- 1A SG has 85 gpd tube leak – AOP-2.0 is in effect
- 1E Service Water pump is tagged out for motor replacement.
- Current Risk Assessment is GREEN and projected is GREEN.
- **B** Train On-Service – **A** Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

IC-54 has A Train on service. This needs to be rewritten for our purposes.

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO & BOP)	Ramp at 8 MW/min IAW AOP-17
2		(C) (RO)	rods do not move in manual or AUTO BA controller FK113 blown fuse in driver card
3		C (BOP) **TS** (SRO)	1B SW pump has a broken shaft. AOP-10 entry
4		I (RO)	LT-112 fails high – auto make up does not work Fail auto makeup
5		I (BOP)	Feed flow transmitter on 1B SG FT-486 channel IV (selected FT for 1B SG) fails low - AOP-100
6		R (RO & BOP)	1B RCP seal leak 6-8 gpm. AOP-4.1 Ramp down due to seal failure if needed.
7		**TS** (SRO)	Raise RCS leak rate to 50 gpm.
8		C (BOP)	1B RCP shaft shears. EEP-0 or AOP-4.0 entry. (AOP-4.0 will initiate a Rx trip when Tavg <541°F)
9		M (ALL)	After entry into ESP-0.1 (when 1B SGFP is tripped) Increase the RCS leak to 300 gpm. Terminate scenario in ESP-1.2 after normal charging established
10		C (RO)	SI auto actuation does not work, manual SI does work
11		C (BOP)	Team will start the 1A chg pump and close MOV-8100 OR 8112 (8112 will close if a manual Phase A actuation is accomplished)

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

Event 8 changed to a C per ES-301 page 17 of 27. This could be either M or C.

Pre-sets

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	**Base IC**- IC-54, 63% RTP, EOL, A Train O/S, Cb=78 Xe changing at 6 pcm/min **Exam IC**-208, 63% RTP, EOL, B Train O/S, Cb=78 Xe changing at 6 pcm/min **Write scenario with boric acid in lines.**	**Need to change Trains on service and make sure proper CCW lineup**
		RUN	RUN simulator
		Generic setup: bat generic_setup_HLT.txt	
0	0	Quick setup (all items with * are included): bat 2008nrcexam_01.txt	
		Align 1C to auto-start for 1E SW This should read 5 when correctly aligned	Expert / Set knswspss = 5
0	0	Tag out 1B EH pump Cmfmalf / cmshfpb_cp2	*
0	0	Rack out 1E SW pump breaker Cmf Malf/ imf cncpsw1f_d_cp2	*
0	0	1A chg pump fails to auto start on SI or LOSP ESF= imf cCVP01a_d_cc6 open LOSP=imf cCVP01a_d_cc3 open	*
0	0	1C chg pump trips when 8803A opens imf cCVP01c_d_co1 (2 0) 0 0	Trg 2
0	0	Block 1B chg pump from auto start on trip of 1c chg pmp imf ccvp01bb_d_cc7 open imf cCVP01bb_d_cc6 open imf cCVP01bb_d_cc3 open	*
0	0	Fail RTB from opening on manual or auto trip CMFmalf / imf cBKRXTRP_cc21/ closed imf cBKRXTRP_cc22 closed	*

Pre-sets

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	Fail auto SI signals, Manual SI works imf csftyinj_cc1 open imf csftyinj_cc11 open	*
0	0	Fail auto phase A for B Train. imf csftyinj_cc17 open	*
0	0	8112 will not go closed. imf cCVH112_d_cc8 open	*
0	0	May have to degrade the head on 1A and 1C SW pump to get the desired values for AOP-10 entry and continuation with procedure. imf nncpsw1a-d / 50 imf nncpsw1c-d / 50	*
0	0	PI-3001a will go to 50 psig when 1D SW pump trips imf pi3001a (1 1) 50 25	Trg 1
0	0	Set tube leak = 85 gpd. SYSTEMS/MECH/BOP/1A SG	*
0	0	Event trigger 1 monitors breaker dk04 open trgset 1 "cncpsw1b_d_co1"	Trg 1
0	0	Event trigger 2 monitors 8803A opening trgset 2 "rsi8803a > 0.5"	Trg 2

		MCB setup	
		Input into DEH: 40 MW target / 8 MW/min ramp rate	DEH settings
		Raise R-70A alarm setpoint to clear alarm per AOP-2.0 and SOP-69.0	Set to 100 gpd
		Place a Caution Tag on R-70A - Setpoint raised to 100 gpd IAW AOP-2.0	CAUTION TAG
		Turn on 1C SW pump	1C SW pump HS to Start
		Place HOLD Tag on 1E SW pump HS	1 HOLD tag
		Place 1B EH pump HS to STOP and HOLD Tag on HS	1 HOLD tag HS to STOP
		Place a Caution Tag on 1C SW pump – auto start for 1E SW pump	CAUTION TAG
		RUN SIMULATOR 5 MINUTES TO ALLOW R-15 TO STABILIZE.	
		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
		Recorders	Verify memory disks cleared
		Provide a copy marked up of UOP-3.1, version 96 and AOP-2.0 and AOP-17 for where the crew is in the scenario UOP-3.1 step 8.10.1 just completed AOP-2.0, step 11.2 and provide Data sheet 1	**UOP-3.1, AOP-2.0 and AOP-17 copy**
			Acknowledge annunciators
			Verify HORNS ON
			FREEZE simulator
		Perform Booth Operators Setup Checklist	

		Open Simview file to be used for plant parameter data collection: Simview / 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
0	0	**VERIFY MICROPHONES READY**	Batteries installed
0	0	**TURNOVER SHEET AVAILABLE**	

Pre-brief the STA -

STA can tell the crew that a cooldown to 500°F is allowed based on the latest boron concentrations; at the step to cooldown the RCS

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
Prior to RUN	0		
		Start data collection for Simview file DataCollection.uvl	
	0	**Begin Exam**	RUN simulator
		Verify Horns ON: hornflag	Verify Horns On
1	0	Ramp at 8 MW/min IAW AOP-17	
2	During ramp	rods do not move in manual -preset BA controller FK113 blown fuse in driver card Rods fail to move in manual or AUTO Mal / C / mal-crf3 and cr2	Imf FK113-V
3	NRC CUE	1B SW pump breaker trips. AOP-10 entry Cmf malf/ imf cncpsw1b_d_co1 When the step to minimize loads is being accomplished, raise SW pressure by decreasing the degraded pumps to allow pressure to rise. See instructor summary page. OR use button to delete malfunction on SW PI-3001A dmf pi3001a	
4	NRC CUE	LT-112 fails high 60 sec – auto make up does not work XMT / LT112_F 100 60	
5	NRC CUE	Feed flow transmitter on 1B SG FT-486 channel IV (selected FT for 1B SG fails low) AOP-100 XMT / FT486 / 0	
6	NRC CUE	1B RCP seal leak 6-8 gpm. AOP-4.1 Ramp down due to seal failure if needed. MAL / MAL-CVC27B / 5 / 60 sec ramp	

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
7	NRC CUE	Raise RCS leak rate to 50 gpm. MALF / R / MAL-RCS1B / 50 / 0 ramp	
8	NRC CUE	1B RCP shaft shears. EEP-0 entry (Need to initiate prior to power <33%). Actually degraded head Pmps/ imf nrcrcp2-d 0	
9	NRC CUE	After entry into ESP-0.1 (when 1B SGFP is tripped) Increase the RCS leak to 300 gpm. MALF / R / MAL-RCS1B / 300 / 60 ramp	
End	NRC CUE	Terminate scenario in ESP-1.2 after normal charging established	
		End of Exam	HORNS OFF
		End of Exam	FREEZE simulator
		Stop data collection for Simview file DataCollection.uvl	
		Export data to file with the name of NRC exam01 grpX.txt ***NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate.*** ***NOTE: file will be saved in the OPENSIM directory.***	Ensure data file created.

Local operator actions:

EVENT NO.	***TIME***	***ACTIONS***
1		NONE
2		Adjust RCS boron to force crew to borate RCS ***If needed to raise RCS temperature to get examinees to borate RCS then perform the following:*** ▪ Open file CoreBoron.uvl (using Simview program) to monitor boron changes ▪ In CoreBoron.uvl file change JMLRCS7 to TRUE – ensures boron changes will take effect ▪ From EXPERT command window use the following to make small changes to RCS boron: o ramp xrcsbor [current boron value] [desired boron value] [ramp time in seconds – should be 60] o Example: ramp xrcsbor 1227 1226 60 ▪ After boron change has been made change JMLRCS7 to FALSE
3	WHEN REQUESTED	***If requested,*** Rack out 1B SW pump breaker Cmf Malf/ imf cncpsw1b_d_cp2
4		NONE REQUIRED
5		NONE REQUIRED
6		NONE REQUIRED
7		NONE REQUIRED
8	3 minutes after requested	Locally open reactor breakers CMFmalf / cBKRXTRP_cc21 / open CMFmalf / cBKRXTRP_cc22 / open
9	WHEN REQUESTED	Clear fire alarm MH1 need button

Initial Conditions: 63% power, EOL, 19,700 MWD, B Train O/S, A Train protected, RCS boron concentration is 78 ppm, and Xe is changing at 6 pcm/min. 100 gal dilutions every 4 minutes. Rods are in manual.

- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- 1A SG has 85 gpd tube leak – AOP-2.0 is in effect
- 1E Service Water pump is tagged out for motor replacement.
- Current Risk Assessment is GREEN and projected is GREEN.
- **B** Train On-Service – **A** Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event 1 Commence ramp at 8 MW/min heading to mode 3 due to the SGT leak.

AOP-17 entry.

Event 2 Rods fail to move in AUTO. Preset in scenario. If the crew does not use boration when FK-11A fails, then manual rod control will fail as well.
Implemented after most actions of AOP-17.0 have been initiated
Boric Acid Flow controller failure. FK113 driver card develops blown fuse. FK113 on MCB will go dark and FCV-113A will fail closed.

Event 3 1B SW pump has a broken shaft. (1A and 1C SW pumps will have degraded head to decrease SW pressure below 60 psig). The crew will enter AOP-10 after ARP guidance. Containment temps will be increasing. The crew will go thru AOP-10 and reduce some SW loads.

Event 4 LT-112 fails high – auto make up works and will cause a dilution if allowed to run due to the failure on FK-113A.
DF3 will have the operator place LK-112 in manual and control as necessary.
The operators could receive a Low level in the VCT since LCV-115A will divert to the RHT if no actions are taken. If the operator sees the VCT level decreasing they may start a makeup and will place the divert valve in the VCT position.

Event 5 FT-486 (selected feed flow FT for 1B SG fails low) fails to 0. This will cause the BOP operator to take manual control of the FRV and restore and control level. If in progress, the crew should stop the ramp long enough to address the problem.

Event 6 1B RCP seal leak 6-8 gpm. DC2 ARP and AOP-4.1 guidance will have controlled shutdown commenced to be offline in 8 hours. When Rx is secured, the RCP will be S/D.
Recommence ramp.

Event 7 Raise RCS leak rate to 50 gpm. Entry into AOP-1.0, T. S. limit,
50 gpm is well within the limits of plant control and should not require Trip and Safety injection

Event 8 1B RCP shaft shears. If above 30% reactor power (P-8) the crew should recognize reactor trip criteria, if below 30% power then AOP-4.0 will be entered and Rx trip criteria due to Tavg <541°F, and attempt to manually trip the reactor using the handswitches and then with the CRDMs MG set handswitches. Since the CRDM MG set breakers open, no entry into S.1 is required. Since the Rx trip breakers do not open, the main turbine will not trip and will need to be manually tripped. AOP-4.0 actions will be required to close the B loop pressurizer spray valve and control feed to the 1B SG at minimum
(CT Manually actuate a reactor trip when the RCP Shaft shears > 30% power)

Event 9 After entry into ESP-0.1 (when 1A SGFP is tripped) RCS leak will increase to 300 gpm.

Event 10 SI auto actuation does not work, manual SI does work. Auto Phase A for B Train does not work.
The crew will have to recognize the SI is required and initiate the SI. (CT).

Event 11 The crew should detect 1C chg pump trips and 1B and 1A chg pumps do not start on the SI signal, 8112 does not go closed and B Train phase does not actuate.
The crew should start the 1B chg pump and/or 1A chg pump (CT) and close MOV-8112 or actuate the B Train Phase A (CT).
The crew will re-enter E-0; E-1; ESP-1.2. Terminate scenario in ESP-1.2 after normal charging established.

Added 1C chg pump will trip on SI and 1B chg pump will not autostart. This had to be added to get the critical task that no chg pumps are running on the SI and due to the change in the plant lineup with the off service CCW and chg pumps running.

CRITICAL TASK SHEET

___ 1. Manually initiate a reactor trip prior to securing the RCP above 30% power when the RCP is recognized to be failed. (WOG CT E-0 - - A)

___ 2. Manually actuate at least one train (chg pumps running) of SIS-actuated safeguards before any of the following: (WOG CT E-0 - - D)

- Transition to any E-1 series procedure or
- Transition to any FRP

___ 3. Close 8112 (manual closure) OR 8100 (by actuating B Train phase A) when they do not close on the T (Phase A) signal: (WOG CT E-0 - - O)

- Prior to completing Attachment 2 of EEP-0

SCENARIO OBJECTIVE/ OVERVIEW:

Fast ramp in progress IAW AOP-17.

The team should be able to:

- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-10, AOP-100, AOP-4.1, AOP-4.0 & Tech Specs
- Identify a broken shaft on a RCP and then respond to a SBLOCA, initiate a manual SI, recognize that several containment isolation valves did not stroke closed and close one as required per EEP-0. Then transition properly to EEP-1.0, & ESP-1.2
- Start a charging pump as required by procedure in EEP-0 since no charging pump will be running when the SI occurs.

Communications sheet

EVENT NO.	*TIME*	*Communication:*
1	IF REQUESTED	ACC acknowledgement about ramp off line.
2	WHEN REQUESTED	**SM/ DISPATCHER:** Response for the rod control not working in AUTO and/or Manual and acknowledgment that a CR has been written and needs to be planned and worked ASAP. **SM response:** Continue to ramp off line. Management will get together to discuss the situation. **DISPATCHER:** - acknowledges when informed that the CR is in the queue. **I&C:** - The driver card for FK-113 has a failed power supply on it. **ROVER:** Response: AFW suctions are being flushed at this time.
3	WHEN REQUESTED	**SSS / OUTSIDE**: -The 1B SW pump is not running. Breaker DK04 has an overcurrent trip flag on it and there is a burning insulation smell in the vicinity of the 1B SW pump. -I will rack out the 1B SW pump breaker - SSS: I will get the SOs to start STP-27.1 immediately.
4	WHEN REQUESTED	**DISPATCHER:** –acknowledges when informed that the CR is in the queue and I & C is needed to troubleshoot LT-112.
5	WHEN REQUESTED	**DISPATCHER:** –acknowledges when informed that the CR is in the queue and I & C is needed to trip bistables within 6 hours for FT-486 failing.
6	NONE	
7	WHEN REQUESTED	AOP-1.0 communications- HP and shift radiochemist, counting room, and SM will all be notified **SM:** I will classify the event (repeat back of R-2 and 7 in alarm)

Communications sheet

EVENT NO.	*TIME*	*Communication:*
8	WHEN REQUESTED	**ROVER:** (wait 3 minutes and then open Rx trip breakers.) See Local Operator Actions section for opening trip breakers Report: RTBs are open on Unit 1.
9	WHEN REQUESTED	**SM:** Call for recirc valve disconnects, H2 analyzers and H2 concentration **Extra operator:** I will check the fire panel around back **Rover:** I will check the pyro panel **BOTH** 1A-22, ctmt, is in alarm

Op-Test No.: Farley 2008-301 Scenario No.: 1 Event No.: 1 Page 1 of 38

Event Description: Ramp at 8 MW/min IAW AOP-17.0, Rapid Load Rejection
Cue: Start of exam.

Time	Position	Applicant's Action or Behavior
When simulator is taken to run the crew is expected to start the ramp to be less than 50% power in the next 15 minutes and then to mode 3 in the next 2 hours per AOP-2.0. The crew will use AOP-17, step 13 and following to continue the ramp. **Preset into this exam is that the control rods will not move in Auto.**		
	SRO	Will direct ramp started IAW AOP-17. Because the end point of the load reduction is event dependent, the following steps provide only basic guidance for controlling a rapid load reduction in response to an abnormal plant condition. UOP-3.1, POWER OPERATION, and UOP-2.1, SHUTDOWN OF UNIT FROM MINIMUM LOAD TO HOT STANDBY are to be referred to for specific guidance on realigning or securing equipment at the appropriate point in the rampdown.
	RO	IF AUTO rod control desired for rapid load reduction, THEN verify control rods in AUTO. - RO may use either AUTO or Manual. **Rod control does not work in auto. Boration is available to reduce power and manual rod control for now.** (Most crews will set up a continuous boration at approx. 8 gpm and then start the ramp)
	SRO	- Calls the SM and Dispatcher to have rod control worked on if discovered to be a problem. - SRO may go to AOP-19 when rods are not operating correctly, but this AOP will do nothing for this situation. - Directs the RO and BOP to continue the shutdown since we have to be off line in 2 hours 15 minutes (or whatever is left) - Should develop a strategy to control temperature and power and realize that power will be less than 50% and Delta I within limits specified in the COLR will not be in effect.

Event Description: Ramp at 8 MW/min IAW AOP-17.0, Rapid Load Rejection
Cue: Start of exam.

	BOP	**Reduce turbine load at desired rate in OPERATOR AUTO.** - Will press GO button on the DEH panel after verifying the Ramp rate is correct.
	RO	• A boration of 1 GAL per MW reduction will limit control rod insertion and assist in maintaining Delta I. • Boration response can be optimized by placing a second letdown orifice in service, or through use of the Emergency Borate valve MOV 8104. **Maintain TAVG within ±5°F of TREF by adjusting rod position and/or boron concentration.** **Maintain Delta I within limits specified in the COLR.**
	BOP	**Control RCS/Secondary parameters.** Check SG narrow range levels trending to or maintained at ~65%.
	RO	Check pressurizer level trending to or maintained on program and pressurizer pressure maintained approximately equal to 2235 psig.
	SRO	**Directs checking parameters within limits for continued at power operation.** • Pressurizer level greater than 15% • Pressurizer pressure greater than 2100 psig • SG narrow range levels 35%-75% • TAVG 541°F - 580°F • Control rod bank position Lo-Lo Annunciator FE2 Clear • Delta I within limits specified in the COLR **If these parameters can not be met then the SRO will direct the Team to trip the reactor and go to FNP-1-EEP-0, REACTOR TRIP OR SAFETY INJECTION.**
		When the desired ramp is completed then the NRC will direct going to the next event. (The unit will ramp down 5% in approximately 6 minutes)

End Event #1

Event Description: Rods fail to move in Auto and Manual
Boric Acid controller failure – FK-113 blown fuse and FCV-113A will fail closed

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: PROC CAB PWR FAILURE (EC1)– BA FLOW DEV HI-LO (DK2)		Recognize indications of FK113 failure - All RED lights on the controller are dark - Demand will go to zero - Cabinet power cabinet 6 light LIT on TSLB1 5-2 Recognize indications that rod control does not work - Tavg/Tref mismatch and rods do not move in AUTO - Rods taken to IN/OUT and no rod movement results - FCV113A closes and boration secures.
In this event the control rods will not move in Auto or Manual and this may show up early if the crew decides to use rods at the start of the event. This will force the crew to use boration. When the boration is initiated and FK113A fuse blows, the controller will go dark, EC1 will come into alarm and the boration will stop.		
	SRO/BOP	May stop the ramp by pressing the HOLD pushbutton on DEH (This is not procedurally required)
	SRO	Direct OATC to take Manual control of boric acid flow and initiate a manual boration using SOP-2.3 Appendix A SECTION 4.1, or emergency borate using the placard on the MCB IAW AOP-17 or manually borate using the section in SOP-2.3 to manually borate. (When DK2 comes into alarm, this procedure may be used as well)
	RO	Initiate a boration manually using either DK1, or SOP-2.3: - Determine the amount of Boration desired - Verify an inservice BATP running. • **Verify the expected Reactivity changes by observing VCT level, Tavg, SR SUR, IR SUR, and Control Rod Motion. Stop the Make-Up System operation and take corrective action if any change is excessive or in the wrong direction.** - Place Boric Acid to Blender FCV113A to Open. - Place MKUP TO CHG PUMP SUCTION HDR FCV113B to Open. - After desired amount of acid has entered the RCS close MKU TO CHG PUMP SUCTION HDR Q1E21FCV113B.

Event Description: Rods fail to move in Auto and Manual
Boric Acid controller failure – FK-113 blown fuse and FCV-113A will fail closed

Cue: By Examiner.

		- Close BORIC ACID TO BLENDER Q1E21FCV113A. **NOTE: IF repeated borations are expected, THEN the inservice BATP may remain running until after the final boration is completed.** Emergency Boration • Determine the amount of Boration desired • Verify an inservice BATP running • Open MOV8104
	SRO	Submit a condition report on the failed instrument, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the condition report
	INFO	RO may take the Makeup Mode selector switch to BOR and try to Borate. This will cause DK2 to come into alarm. If DK2 is applied the following actions will be taken:
	SRO	Direct Reactivity control and develop a reactivity plan. Re-commence the ramp if stopped and continue ramping off line.
		- END -

End Event #2

Event Description: 1B SW pump breaker trips

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - SW PUMP TRIPPED (AE4) - SW PRESS A TRN LO (AD4) - SW PRESS B TRN LO (AD5)		Recognize indications of LOSS OF SW PUMP - AMBER light above 1B SW pump - PI-3001A and B falling (SW TO CCW HX HDR PRESS)
With B Train SW on service the A Train CCW system will be running and the A Train Charging pump running. When the 1B SW pump trips the pressure should drop below 60 psig. This will require the CCW pump to be secured and the charging pump to be swapped.		
	BOP	Recognize, announce and reference the ARPs.
	SRO	Direct the crew to enter **AOP-10, Loss of Service Water**, directs the actions.
	BOP	Verify affected SW 4160 V supply breakers closed. [] BKR DF02 closed [] BKR DG02 closed
	SRO	Evaluate: IF SW pressure in both trains greater than 60 psig, - **NO**
	SRO/BOP	Verify all available SW PUMPs STARTED. **All available will be running**
	BOP	Secure any running DGs NOT needed for electrical power **There will be no DGs running.**
	SRO/BOP	**Check minimum SW cooling available** At least one SW train with 60 psig pressure - **YES** and At least one train of Turbine Building SW in service with Turbine Building component temperatures acceptable - **YES** and Diesel generator lube oil temperature alarms – CLEAR – **NO DG running**
	RO	Check operating CCW train - SUPPLIED FROM AFFECTED SW TRAIN. **The off service CCW train is operating and supplied from the affected train of SW**

Event Description: 1B SW pump breaker trips

Cue: By Examiner.

		Verify CCW PUMP in non affected train - STARTED. **YES** Verify CHG PUMP in non affected train - STARTED. **NO** **Start the 1C chg pump** **Secure the 1A chg pump**
	SRO	Direct BOP to start on AOP-9.0 in conjunction with this procedure Direct the BOP to monitor RCP motor bearing temperatures - LESS THAN 195°F. **RCP temps will be less than 195°F.**
	SRO	Direct Minimizing CCW loads in the affected train.
	RO	Check on service SFP HX - SUPPLIED FROM NON AFFECTED SW TRAIN. **Call Radman to check on SFP on service in the affected train and swap if necessary**
	SRO	Evaluate tagging out the CCW pump room cooler fan **NOTE in AOP-10** **This is not needed since SW flow is reduced vs lost**
	BOP/RO	Minimize SW loads: Minimize A TRAIN SW LOADS as required. Direct Radman to secure SGBD using SOP-16.1, STEAM GENERATOR BLOWDOWN PROCESSING SYSTEM. Close SW TO BLDN HX & BTRS CHLR Q1P16MOV3149. Stop A TRAIN CTMT CLRS [] A Ctmt Cooler Q1E12H001A-A [] B Ctmt Cooler Q1E12H001B-A Verify CTMT CLRS in non-affected train - STARTED. B TRAIN CTMT CLRS [] C Ctmt Cooler Q1E12H001C-B [] D Ctmt Cooler Q1E12H001D-B
RAISE SW PRESSURE HERE		

Event Description: 1B SW pump breaker trips

Cue: By Examiner.

	SRO	Call SM to Evaluate event classification and notification requirements using EIP-9, EMERGENCY CLASSIFICATION AND ACTIONS.
	SRO	Check pressure in both SW trains - GREATER THAN 60 psig. **Both trains will be higher than 60 psig. Go to procedure and step in effect.**
	SRO	**Look at Tech Specs for the tripped SW pump.** TS 3.7.8 Condition A Restore SWS train to OPERABLE status in 72 hours. 3.8.1 mandatory LCO cond B – STP-27.1 is due in 2 hours and 10 days to restore.
AOP-9 actions (if given time to take these actions):		
	BOP	**Verify CCW pump started in affected train.** **YES** **Check CCW system adequate for continued plant support.** **YES** 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. **Verify SW flow supplied to the ON SERVICE train.** **YES** CCW HX SW DISCH Q1P16FI3009AA 1A CCW HX DISC Q1P16FI3009BA 1B CCW HX DISC Q1P16FI3009CA 1C CCW HX DISC **Check ON SERVICE train affected.** **NO** **Check both RHR pumps stopped** **YES** **Check SFP cooling aligned to an operating CCW train.** **YES** **Check on service CCW train operating.** **YES** **Go to procedure and step in effect.**

END – Event 3

Event Description: LT-112 fails high (auto makeup does not work)

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - VCT LVL HI-LO (DF3)		Recognize indications of LT-112 high - VCT level will be decreasing - LCV-115A white light will be LIT - LK-112 controller will go to the 100% demand position
LT-112 will rise to 100% and LK-112 will go to 100% which will cause VCT level to decrease. LCV-115A will shift to the VCT position.		
	RO	Determine if level is high or low as indicated by LI-115 and LI-112B on the MCB. IF level is low, THEN: 3.1 **Initiate makeup**. This will have to be done manually as described in EVENT 2. 3.2 Turn VCT HI LVL Divert VLV LCV115A to the VCT position. 3.4 IF desired, and with SS permission, charging pump suction may be aligned to the RWST by the following: a) RWST TO CHG PUMP [ ] Q1E31LCV115B open [ ] Q1E21LCV115D open b) VCT OUTLET ISO [ ] Q1E21LCV115C closed [ ] Q1E21LCV115E closed Observe CHG HDR PRESS indicator PI-121 and the running Charging Pump Motor Ammeter to ensure proper pump operation. (SOER 97-1) {CMT 0006813}
	SRO	Initiate steps to have LT-112 repaired. - write a CR Call Dispatcher or WWC

End event 4

Event Description: Feed flow transmitter on 1B SG FT-486 channel IV fails low

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - 1B SG STM FLOW > FEED FLOW (JB2) - 1B SG LVL DEV (JF2)		Recognize indications of FT-486 failing low - FI-486 failing high - FRV-488 goes full open - 1A SGFP speeds up - 1B SG level increases
The FRV opens and the 1A SGFP speed increases. If no operator action is taken the 1A SGFP will trip and a reactor trip will occur on low SGWL 2 minutes and 20 seconds after failure is put in. AOP-100, section 1.5 Step 1 is an Immediate Operator action		
	Team	Check that steam and feed flows matched on all SGs - NO
	BOP	**Immediate Operator Actions:** Take manual control of SGFP speed by: o placing SK 509A in Manual and lower demand as necessary. (this is dependent on how long it takes to recognize the failure) o Take manual control of 1B SG FW FLOW FK-488
	SRO	**Check no required automatic actions required or set points being approached** The SRO is in charge of monitoring SGWLs and directing action based on the level. If an automatic action is required or set points are being approached, THEN Trip the reactor and go to EEP-0, REACTOR TRIP OR SAFETY INJECTION
	BOP	**IF a ramp is in progress, THEN place Turbine on HOLD** Press HOLD pushbutton
	SRO	Determine the instrument failure. Check Steam flow and Feed flow indicators.
	BOP	The alarm is due to the failure of a Failure Instrument (FT486 on channel IV) Select the proper controlling channels by placing BOTH Handswitches for Steam Flow and Feed Flow to the **channel III position.**

Event Description: Feed flow transmitter on 1B SG FT-486 channel IV fails low

Cue: By Examiner.

		o B SG STM FLOW SEL SW FS/488Z CH III o B SG FW FLOW SEL SW FS/488Y CH III
	SRO	**WHEN plant conditions permit, THEN return systems to automatic control** o SRO directs returning systems to normal
	BOP	Place SGFP control back to Auto Place 1B SG FW FLOW FK-488 in AUTO
	SRO	Refer to Tech Specs: None for this Flow Transmitter
	SRO	o Notify the Shift Manager o Submit a condition report for the failed instrument, and notify the Notify the Work Week Coordinator
		Go to procedure and step in effect

END – Event 5

Event Description: 1B RCP seal leak of 6-8 gpm

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - RCP #1 SEAL LKOF FLOW HI (DC2)		Recognize indications of Seal problems - 1B RCP Seal Lkoff flow > 7 gpm - FI-127A 1B RCP shaft seal flow increasing
When the Seal flow starts to increase, DC2 will come into alarm and the ARP referenced		
	Team	ARP DC2 actions: o Look at all the indications to determine if an instrument failure occurred: □ RCP SEAL LKOF HIGH RANGE recorder N1E21FR154A □ RCP SEAL LEAKOFF LOW RANGE indicators FI-156B,155B, 154B. □ #1SEAL PRESSURE indicators PI-156A, 155A, 154A. □ SHAFT SEAL FLOW FI-130A, 127A, 124A. □ LOWER SEAL WATER BRG TEMP computer points TE0131, TE0128, TE0125 □ SEAL WATER OUTLET TEMP computer points TE0132, TE0129, TE0126
	SRO	Direct the team to AOP-4.1, ABNORMAL REACTOR COOLANT PUMP SEAL LEAKAGE
	RO	Check #1 seal leakoff flow less than 5 gpm **-7.2 gpm** **NO** Go to step 3
	RO	Check #1 seal leakoff GREATER than 6 gpm **YES** Check #1 seal leakoff LESS than 8 gpm **YES**
	RO	CHECK #2 SEAL LKOF HI (DB5) CLEAR - **YES**
	BOP	Monitor RCDT level increase to approximate #2 SEAL LEAKOFF rate, while continuing with this procedure
	BOP	Check the combination of #1 SEAL LEAKOFF AND #2 SEAL LEAKOFF remains less than 8 gpm **YES**
	SRO	CHECK RCP lower seal water bearing and seal water outlet temperatures stabilizes less than 225°F **YES**

Event Description: 1B RCP seal leak of 6-8 gpm

Cue: By Examiner.

		Monitor the following computer points for the affected pump [ ] TE0129 RCP B SEAL WATER OUTLET TEMP [ ] TE 128 RCP B LOWER SEAL WATER BRG TEMP
	SRO	The intent of the following step is to have the Unit shutdown within 8 hours in order to secure the affected RCP(s) SRO should direct a controlled shutdown. Since there is already a shutdown in progress this should be discussed and the ramp continued.
	RO	Maintain GREATER than 9 gpm seal injection flow to the affected RCP while the pump is running - will raise seal injection flow to >9 gpm by increasing the demand on HCV-186.
Supplemental actions that will be carried out after the reactor trips by the RO or the BOP operators. This should be pre-briefed by the SRO.		
	RO	WHEN the reactor is shutdown, THEN STOP the affected RCP(s) o 1B RCP is secured, THEN close the pressurizer spray valve for the affected RCP o PK444D for 1B RCP WHEN the RCP has come to a complete stop as indicated by minimum RCS flow in the affected loop, THEN close the appropriate RCP SEAL LEAKOFF VALVE o Q1E21HV8141B
	SRO	WHEN affected RCP has been removed from service, THEN refer to AOP-4.0, LOSS OF REACTOR COOLANT FLOW
		Go to procedure and step in effect

END – Event 6

Event Description: RCS leak increases to 50 gpm

Cue: By Examiner

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td colspan="2">Annunciators:
- RMS HI RAD (FH1)
- CHG HDR FLOW HI-LO (EA2)</td><td>Recognize indications of RCS leak increased
- Chg flow increases
- R-2, R-7 and other radiation monitors in alarm
- VCT level decreasing and possible auto makeup</td></tr>
<tr><td colspan="3">Since the leak is only 50 GPM, there is time to take action IAW AOP-1.0 to remove letdown from service and raise charging flow.</td></tr>
<tr><td></td><td>SRO</td><td>Directs ARPs referenced and AOP-1.0 entered.</td></tr>
<tr><td></td><td>RO</td><td>Maintain pressurizer level stable at or near programmed level by :
Control charging flow Take manual control of 122
OR
Reduce letdown flow remove 1 orifice
OR
Isolating letdown remove all orifices

Per operator aid on MCB figure 1 of SOP-2.1
<u>REMOVING SECOND LTDN ORIFICE FROM SERVICE</u>
1. Place FK-122 in MANUAL and adjust < 80 gpm.
2. Close LTDN ORIF ISO 45 GPM, Q1E21HV8149A.
3. Place FK-122 in AUTO when desired
4. Refer to SOP-2.1 when time permits.

<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.</td></tr>
<tr><td colspan="3">If Przr level cannot be maintained stable at or near programmed level, then the reactor should be tripped. Control of Przr level is expected since 2 orifices are on service and the leak is only 50 gpm.</td></tr>
</table>

Event Description: RCS leak increases to 50 gpm

Cue: By Examiner

	RO	Maintain VCT level greater than 20% by: Verifing reactor makeup system - **IN AUTOMATIC** OR Control makeup in manual IAW SOP-2.3- (This will be done as described in event 2). If VCT level can not be maintained >20%, then roll the chg pump suctions to the RWST by: Q1E21LCV115B open Q1E21LCV115D open And Q1E21LCV115C closed Q1E21LCV115E closed
	SRO	Direct RO to obtain values and calculate a flow balance.
	SRO/RO	_____(charging flow) +_____(seal injection flow) -_____(letdown flow) -_____(#1 seal leakoff flow) = **Approx 50 gpm** leak rate)
	BOP	This will be confirmed using the ctmt sump level rise on the BOP
	SRO	WHEN RCS leak rate determined, THEN evaluate required actions using Technical Specifications o **3.4.13 Operational leakage Mandatory LCO** o **Condition A** due to leakage is greater than 1 gpm unidentified and 10 gpm identified o Reduce leakage to within limits in 4 hours or be in mode 3 in 6 and mode 5 in 36 hours.
	SRO	WHEN RCS leak rate determined, THEN evaluate event classifiation and notification requirements using EIP-8, NON-EMERGENCY NOTIFICATIONS and EIP-9, EMERGENCY CLASSIFICATION AND ACTIONS o Notify Shift Manager

Event Description: RCS leak increases to 50 gpm

Cue: By Examiner

	SRO	Identify RCS leakage source: o Monitor leak rate frequently o Check ctmt radiation normal - **NO (R- 2 and 7 are in alarm)** o Consult OPS Mgr for ctmt entry
	BOP	o Place Ctmt sump handswitches in pull to lock
	RO	Verify containment ventilation isolation o **Stop MINI PURGE SUPP/EXH FAN** o Verify containment mini purge dampers – CLOSED
	SRO	AOP-1 will have the crew look at many parameters to look for the leak and the SRO will direct these actions.
		When the SRO has evaluated Tech Specs the next failure can occur or the TS evaluation can be completed at the end of the scenario with follow up questions.

End of event 7

Event Description: 1B RCP shaft shears

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - RX COOLANT LOOPS TAVG DEV HI-LO (HF1) - RX COOLANT LOOPS DT DEV HI-LO (HF2) - TAVG/TREF DEV (HF3)		Recognize indications of RCP problem - 1B RCP flow decreases - B loop Thot rises and Tcold decreases - 1B SGWL deviations - RCS pressure dropping
The 1B RCP will still be running but the flow will be zero. The crew should realize reactor trip conditions if the loss of 1 RCP is with power > 30% power. If not AOP-4.0 will be entered and the Reactor tripped since the main turbine is on line and Tavg is <541°F.		
	SRO	**CRITICAL TASK** Direct the reactor trip and enter EEP-0 or direct entry into AOP 4.0 and direct the reactor trip when Tavg is <541°F.
	SRO	o Direct the BOP to secure the 1B RCP and close Q1E21HV8141B o Direct the BOP to do the IOAs of AOP-4.0, Loss of Reactor coolant flow. - Close 1B FRV in manual - Close 1B RCP loop spray valve, PK-444D The above step can be done before or after the IOAs are complete
	BOP	o Secures the 1B RCP by taking the HS to STOP o closes Q1E21HV8141B o Closes 1B FRV by taking the controller to manual and minimum o Closes 1B RCP loop spray valve, PK-444D manual and minimum
	RO/BOP	**Immediate Operator actions of EEP-0** • **Check reactor trip.** Check all reactor trip and reactor trip bypass breakers - **CLOSED** RO will open CRDM MG SET breakers **OPEN** Check nuclear power - FALLING. **YES** check rod bottom lights - LIT. **YES** Will call ROVER to open RTBs *3 min and ROVER will open RTBs* • **Check turbine - TRIPPED.** **NO** TSLB2 14-1 thru 4 lit **main turbine will have to be manually tripped** • **Check power to 4160 V ESF busses.** 4160 V ESF busses - AT LEAST ONE ENERGIZED **YES**

Event Description: 1B RCP shaft shears

Cue: By Examiner.

		A Train (F & K) power available lights lit OR B Train (G & L) power available lights lit Verify operating diesel generators are being supplied from at least one SW pump. **Check SI Status.** **NO** Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION [] ACTUATED status light lit [] MLB-1 1-1 lit [] MLB-1 11-1 lit Check SI required o Pzrz press lo 1850 psig 2/3 TSLB2 17-1 THRU 3 o Stm Line differential press 100 psid TSLB4 o Low Stm line press 585 psig 2/3 TSLB4 19-2 thru 4 o Ctmt press high 4 psig 2/3 TSLB1 1-1 THRU 1-4 If SI required then actuate an SI, If not then go to ESP-0.1, Reactor trip response.
		Crew may initiate a SI here, if so initiate the RCS break
	SRO	Directs entry to ESP-0.1
	RO	**Check RCS temperature.** Stable at or approaching 547°F **NO** o Verify Stm dumps in OFF RESET o Verify ARVs closed on MCB
	BOP	o Reduce steam loads if MSIVs open **Call TBSO to reduce stm loads in TB**
	BOP	Control MDAFWP flow rates: o AFW FCVs are taken to close position of the POTS o If cooldown contiues then close MSIVs – this should not be necessary Verify Feedwater status:

Event Description: 1B RCP shaft shears

Cue: By Examiner.

		o FCVs and Bypass valves closed- **YES** o Defeat MDAFWP auto starts **DEFEAT (BOP)** - Go to BOP and place the Auto defeat switch in the Defeat position - Verify BOTH SGFPs tripped - **Trip BOTH SGFPs from MCB**

End of event 8

Event Description: 300 gpm RCS leak

Cue: when 1A SGFP is tripped or a SI is initiated

Time	Position	Applicant's Action or Behavior
Annunciators: - PRZR LVL LO HTRS OFF LTDN SEC (HA3) - PRZR PRESS HI-LO (HC1) - PRZR LVL DEV LO (HB2) - PRZR PRESS LO SI ALERT (HC3)		Recognize indications of increased RCS leak - Przr level decreasing - Przr pressure dropping - VCT LEVEL dropping or RWST on the chg pump suctions
Since the leak has increased and the SI is blocked, the crew is expected to evaluate the plant conditions and manually SI the plant. **ESP-0.1 FO page requirement:** Greater than 16°F subcooled in CETC mode and PRZR level above 4%.		1.1 Verify SI actuated, check for CSF red or orange paths, go to EEP-0.
	SRO	**CRITICAL TASK** Direct the safety injection and re-enter EEP-0.
	RO/BOP	Immediate Operator actions of EEP-0 **Check reactor trip.** Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. check rod bottom lights - LIT. **Check turbine - TRIPPED.** TSLB2 14-1 thru 4 lit **Check power to 4160 V ESF busses.** 4160 V ESF busses - AT LEAST ONE ENERGIZED A Train (F & K) power available lights lit OR B Train (G & L) power available lights lit Verify operating diesel generators are being supplied from at least one SW pump. **Check SI Status.** **YES** Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION [] ACTUATED status light lit [] MLB-1 1-1 lit [] MLB-1 11-1 lit

Event Description: 300 gpm RCS leak

Cue: when 1A SGFP is tripped or a SI is initiated

	SRO	**Two CRITICAL TASKs In attachment 2 of EEP-0** Directs continuing into EEP-0 at step 5. Directs the BOP to do attachment 2. See Tab at end of scenario Attachment 2 and 4 for actions
	RO	6 [CA] Check containment pressure- HAS REMAINED LESS THAN 27 psig **YES**
	RO	**7 Announce "Unit 1 reactor trip and safety injection".**
	RO	**8 Check AFW status.** 8.1 Check secondary heat sink Available o Check total AFW flow > 395 gpm [] FI 3229A [] FI 3229B []FI 3229C o Total Flow FI 3229 OR Check any SG NR level > 31% {48%} 8.2 WHEN all SG narrow range levels less than 31%{48%}, THEN maintain total AFW flow greater than 395 gpm. 8.3 WHEN at least two SG narrow range levels greater than 28% AND TDAFWP NOT required, THEN stop TDAFWP. 8.4 [CA] WHEN SG narrow range level greater than 31%{48%}, THEN maintain SG narrow range level 31%-65%{48%-65%}. 8.4.1 Control MDAFWP flow. MDAFWP FCV 3227 RESET [] A TRN reset [] B TRN reset MDAFWP TO 1A/1B/1C SG B TRN [] FCV 3227 in MOD 8.4.2 Control TDAFWP flow. TDAFWP FCV 3228 [] RESET reset TDAFWP SPEED CONT [] SIC 3405 adjusted
	RO	**9 Check RCS temperature.** IF any RCP running, THEN check RCS average temperature - STABLE

Event Description: 300 gpm RCS leak

Cue: when 1A SGFP is tripped or a SI is initiated

		AT OR APPROACHING 547°F. TAVG 1A(1B,1C) RCS LOOP [] TI 412D [] TI 422D [] TI 432D
	RO	RNO IF RCS temperature less than 547°F and falling, THEN perform the following. 9.1.1 Verify steam dumps closed. STM DUMP INTERLOCK [] A TRN in OFF RESET [] B TRN in OFF RESET 9.1.2 Verify atmospheric reliefs closed on MCB **Demand at 0 and minimum red light LIT** 9.1.3 Control total AFW flow to minimize RCS cooldown, AFW FLOW TO 1A(1B,1C) SG [] FI 3229A [] FI 3229B [] FI 3229C AFW TOTAL FLOW [] FI 3229 9.1.4 IF MSIVs are closed THEN proceed to step 9.1.8 9.1.5 IF MSIVs are open, THEN isolate steam loads in the turbine building while continuing with RNO step 9.1.6. **Will call TBSO to accomplish this task**
	RO	**10 Check pressurizer PORVs and spray valves.** 10.1 [CA] WHEN pressurizer pressure less than 2335 psig, THEN verify both PRZR PORVs closed. 10.1.1 Verify both PRZR PORVs indicate CLOSED 10.1.2 Check PRZR PORV temperature STABLE OR FALLING. [] PORV Temp TI-463 10.1.3 Check PRT parameters STABLE or FALLING. [] PRT PRESS PI 472 [] PRT LVL LI-470 [] PRT TEMP TI-471

Event Description: 300 gpm RCS leak

Cue: when 1A SGFP is tripped or a SI is initiated

		10.2 [CA] WHEN pressurizer pressure to less than 2260 psig, THEN verify normal pressurizer spray valves closed OR in the process of closing. 1A(1B) LOOP SPRAY VLV [] PK 444C [] PK 444D 10.3 Check any PRZR PORV ISO - OPEN 10.2 Stop 1A AND 1B RCPs stop spray flow.
	RO	**11 Check RCP criteria.** 11.1 Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE 11.1 IF HHSI flow greater than 0 gpm, THEN stop all RCPs.
	RO	**12 Monitor charging pump miniflow criteria.** 12.1 Control charging pump miniflow valves based on RCS pressure. 1C(1A) LOOP RCS WR PRESS [] PI 402A [] PI 403A Based on RCS pressure, close miniflows < 1300 and open when > 100 psig.
Diagnostics The SRO will direct the parameters to be reviewed and will determine appropriate procedure to transition to.		
	SRO	**13 Check SGs not faulted.** o Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig.
	SRO	**14 Check SGs not ruptured.** o Check secondary radiation indication - NORMAL. Checks rad monitors R-15, 19, 23A and B, 15B and C, and 60 A, B, C, D o No SG level rising in an uncontrolled manner.
	SRO	**Check RCS intact.** Check containment radiation - NORMAL. [] R-2 CTMT 155 ft [] R-7 SEAL TABLE [] R-27A CTMT HIGH RANGE (BOP)

Event Description: 300 gpm RCS leak

Cue: when 1A SGFP is tripped or a SI is initiated

		[] R-27B CTMT HIGH RANGE (BOP) □ Check containment pressure - LESS THAN 3 psig. □ Check containment ECCS sump level - LESS THAN 0.4 ft. **Radiation levels will be elevated in ctmt and ctmt pressure will be < 3 psig and sump level is pre-event.**
Go to EEP-1, LOSS OF REACTOR OR SECONDARY COOLANT.		
	RO	**Check RCP criteria.** Check SUB COOLED MARGIN MONITOR indication - GREATER THAN 16°F{45°F} SUBCOOLED INCETC MODE. **YES**
	BOP	**Check SGs not faulted.** 2.1 Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig. **NO SG faulted**
	BOP	**3 Check intact SG levels.** 3.1 Check any intact SG narrow range level – GREATER THAN 31%{48%}. **YES** [CA] 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 [] A TRN reset [] B TRN reset MDAFWP TO 1A/1B/1C SG B TRN [] FCV 3227 in MOD Control TDAFWP flow. TDAFWP FCV 3228 [] RESET reset TDAFWP SPEED CONT [] SIC 3405 adjusted

Event Description: 300 gpm RCS leak

Cue: when 1A SGFP is tripped or a SI is initiated

	BOP	**14 Check secondary radiation indication - NORMAL.** Checks rad monitors R-15, 19, 23A and B, 15B and C, and 60 A, B, C, D
	RO	**Check pressurizer PORVs** **Check any PRZR PORV ISO – power available** [CA] WHEN pressurizer pressure less than 2335 psig, THEN verify pressurizer PORVs closed with no leakage. Verify both PRZR PORVs – CLOSED Check PRZR PORV temperature STABLE OR FALLING. [] PORV Temp TI-463 Check PRT parameters STABLE or FALLING. [] PRT PRESS PI 472 [] PRT LVL LI-470 [] PRT TEMP TI-471 Check at least one PRZR PORV ISO - OPEN
	SRO	The following will be passed off to the Shift Manager **Perform the following within 1 hour of start of event.** o Close recirculation valve disconnects using ATTACHMENT 1. o Establish 1A and 1B post LOCA containment hydrogen analyzers IN SERVICE USING ATTACHMENT 2, POST LOCA CONTAINMENT HYDROGEN ANALYZER OPERATION. o Plot hydrogen concentration on FIGURE 1. o Check containment H2 concentration - LESS THAN 3.5%.
	SRO	Evaluate SI termination criteria o Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE. o Check secondary heat sink available. >395 gpm AFW flow > 31%{48%} SGNR level o Check RCS pressure - STABLE OR RISING o Check pressurizer level GREATER THAN 13%{43%}. **<u>Continue to step 8 since a known LOCA exists</u>**
	RO	**[CA] Check containment spray system.** 8.1 Check any CS PUMP - STARTED. **NO**

Event Description: 300 gpm RCS leak

Cue: when 1A SGFP is tripped or a SI is initiated

	RO	**9 [CA] Check if LHSI Pumps should be stopped.** Check RCS pressure – GREATER THAN 275 psig{435 psig} PT-402 AND 403 **YES** Check RCS pressure - STABLE OR RISING **YES** Verify the SI reset Secure any running RHR pumps **Take HS to stop**
	SRO	**Evaluation point –** Check no SG pressure - FALLING IN AN UNCONTROLLED MANNER. - Check RCS pressure on PT-402/403. **<u>This differentiates between a steam break and an RCS leak</u>** SRO should direct the team to continue in EEP-1.
	BOP	Perform Attachment 4 to **Verify 4160 V busses energized.** Check DF01 closed Verify DF02 closed Check DG15 closed Verfiy DG02 closed 1.6 Verify all RCP busses - ENERGIZED. [] 1A 4160 V bus [] 1B 4160 V bus [] 1C 4160 V bus 1.7 Check 1E 4160 V bus - ENERGIZED. **YES** 1.8 Check 1D 4160 V bus - ENERGIZED. **YES**
	BOP	**13 Check diesel generators.** 13.2 [CA] Secure any unloaded diesel generators using SOP-38.0, DIESEL GENERATORS. **This will be normally assigned to an extra operator**
	SRO	**14 Begin evaluation of plant status.** 14.1 Verify cold leg recirculation capability - AVAILABLE. 14.1 IF cold leg recirculation capability can NOT be verified, THEN go to ECP-1.1, LOSS OF EMERGENCY COOLANT RECIRC

Event Description: 300 gpm RCS leak

Cue: when 1A SGFP is tripped or a SI is initiated

		14.1.1 Train A equipment available: □ 1A RHR Pump □ CTMT SUMP TO 1A RHR PUMP Q1E11MOV8811A □ CTMT SUMP TO 1A RHR PUMP Q1E11MOV8812A □ 1A RHR HX TO CHG PUMP SUCT Q1E11MOV8706A □ CCW TO 1A RHR HX Q1P17MOV3185A **OR** 14.1.2 Train B equipment available: □ 1B RHR Pump □ CTMT SUMP TO 1B RHR PUMP Q1E11MOV8811B □ CTMT SUMP TO 1B RHR PUMP Q1E11MOV8812B □ 1B RHR HX TO CHG PUMP SUCT Q1E11MOV8706B □ CCW TO 1B RHR HX Q1P17MOV3185B 14.2 Begin taking ECCS logs. **Assigned to extra operator**
	SRO	**These steps will be passed to the TSC by the SRO** 14.3 Evaluate RCS sampling requirements. 14.3.1 Consult TSC staff to evaluate need for RCS sampling. 14.3.2 IF RCS sample required, THEN direct Chemistry to sample RCS using CCP-1300, CHEMISTRY AND ENVIRONMENTAL ACTIVITIES DURING A RADIOLOGICAL ACCIDENT.
	SRO	14.4 Check no intersystem LOCA outside CTMT. **YES** **Evaluation point** *If an intersystem LOCA is in progress then go to ECP-1.2*
	BOP	14.4.1 Check auxiliary building radiation- NORMAL. **YES** [] R-3 RADIOCHEMISTRY LAB [] R-4 1C CHG PUMP RM [] R-5 SFP RM THEN [] R-6 SAMPLE RM AREA [] R-8 DRUMMING STATION [] R-10 PRF [] R-17A OR R-17B CCW 14.4.2 Check auxiliary building room sumps - HI LVL ALARMS **YES** CLEAR AND NO SUMP PUMPS RUNNING IN AUTO. (BOP)

Event Description: 300 gpm RCS leak

Cue: when 1A SGFP is tripped or a SI is initiated

		Check WHT and FDT levels - NO EXCESSIVE OR UNEXPLAINED LEVEL RISE. Check PI600A(B) 1A(1B) RHR PUMP DISCH PRESS - LESS THAN 450 psig. **No RHR pumps runnning** 14.5 Verify at least one train of PRF in operation using SOP-60.0, PENETRATION ROOM FILTRATION SYSTEM.
	RO	14.6 Verify VCT level – GREATER THAN 5%
	SRO	**Evaluation point** **15 Check LHSI flow in progress.** 15.1 Check RCS pressure - LESS THAN 275 psig{435 psig}. **15.1 Go to ESP-1.2, POST LOCA COOLDOWN AND DEPRESS** 1C(1A) LOOP RCS NR PRESS [] PI 402B [] PI 403B
Transition to ESP-1.2		
	RO	**Verify SI reset.** [] MLB-1 1-1 not lit (A TRN) [] MLB-1 11-1 not lit (B TRN) **Verify containment isolation phase A reset.** [] MLB-2 1-1 not lit [] MLB-2 11-1 not lit There is no Phase B signal
	BOP	**IF instrument air available, THEN establish instrument air to containment.** Verify at least one air compressor started. AIR COMPRESSOR [] 1A [] 1B [] 1C 4.2 Check INST AIR PRESS PI 4004B greater than 85 psig. IA TO CTMT [] MLB-3 1-2 NOT lit **NOT lit**

Event Description: 300 gpm RCS leak

Cue: when 1A SGFP is tripped or a SI is initiated

		IA TO PENE RM PRESS LO [] Annunciator KD1 clear **CLEAR**
	BOP	**[CA] Verify 4160 V busses energized.** Perform ATTACHMENT 1, VERIFYING 4160V BUSSES ENERGIZED. **Check Off site power available** Check DF01 closed Verify DF02 closed Check DG15 closed Verfiy DG02 closed Verify all RCP busses - ENERGIZED. **YES** [] 1A 4160 V bus [] 1B 4160 V bus [] 1C 4160 V bus Check 1E 4160 V bus - ENERGIZED. **YES** Check 1D 4160 V bus - ENERGIZED. **YES**
	RO	**Turn off all pressurizer heaters.** o Take all Przr heater HSs to the OFF position
	RO	**[CA] Check if LHSI Pumps should be stopped.** These pumps were secured in a previous step in EEP-1.0
	BOP	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. [CA] 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 [] A TRN reset [] B TRN reset MDAFWP TO 1A/1B/1C SG

Event Description: 300 gpm RCS leak

Cue: when 1A SGFP is tripped or a SI is initiated

		B TRN [] FCV 3227 in MOD 8.4.2 Control TDAFWP flow. TDAFWP FCV 3228 [] RESET reset TDAFWP SPEED CONT [] SIC 3405 adjusted
This note should be addressed by handing it off to the STA. NOTE: Comparison of Curve 61 and/or 61A with existing RCS boron concentration should be performed to verify adequate shutdown margin during cooldown to cold shutdown. **STA can tell the crew that a cooldown to 500°F is allowed based on the latest boron concentrations.**		
	SRO	**Will direct these steps:** **Begin RCS cooldown to cold shutdown.** Depending on RCS temperature the BOP will either start the cooldown and then bypass the stm dump interlock for P-12 or will bypass initially. The Stm Dumps will be set up in the STM Press mode and the cooldown started.
	BOP	WHEN P-12 light lit (543°F), THEN perform the following. Block low steam line pressure SI. Place handswitches for STM LINE PRESS SI BLOCK - RESET [] A TRN to BLOCK [] B TRN to BLOCK Verify blocked indication. BYP & PERMISSIVE STM LINE ISOL. SAFETY INJ. [] TRAIN A BLOCKED light lit [] TRAIN B BLOCKED light lit Bypass the steam dump interlock. STM DUMP INTERLOCK [] A TRN to BYP INTLK [] B TRN to BYP INTLK BYP & PERMISSIVE COND AVAIL [] C-9 status light lit

Event Description: 300 gpm RCS leak

Cue: when 1A SGFP is tripped or a SI is initiated

		STM DUMP [] MODE SEL A-B TRN in STM PRESS STM DUMP INTERLOCK [] A TRN in ON [] B TRN in ON Adjust steam header pressure controller to control cooldown rate. □ STM HDR PRESS [] PK 464 adjusted [CA] Maintain RCS cold legs cooldown rate - LESS THAN 100°F IN ANY 60 MINUTE PERIOD. RCS COLD LEG TEMP [] TR 410 Use Stm dumps to cooldown since they are available.
	SRO	Will pass this to either the BOP or TSC and will be accomplished as time permits Begin preparation of RHR system for cooldown using SOP-7.0, RESIDUAL HEAT REMOVAL SYSTEM.
	RO	**Check SUB COOLED MARGIN MONITOR indication - GREATER THAN 16°F {45°F} SUBCOOLED IN CETC MODE.** **YES**
	RO	**Check SI in service.** Check HHSI flow – GREATER THAN 0 gpm. A TRN HHSI FLOW [] FI 943
	RO	**12 Check pressurizer level.** 12.1 IF pressurizer level greater than 25%{50%}, THEN proceed to step 14. **Przr level should be greater than 25%{50%}**
	RO	**Reduce RCS pressure to refill pressurizer if Necessary** Using the RCP spray valves
When RCS pressure reduction started, end the scenario. (2 hours and 10 minutes on validation) **END OF SCENARIO**		

Event Description: Attachment 2 and 4 of EEP-0

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

Time	Position	Applicant's Action or Behavior
		Attachment 2 of EEP-0 **AUTOMATIC ACTIONS VERIFICATION**
	BOP	**Verify each SW train - HAS TWO SW PUMPs STARTED.** [] A train (1A,1B or 1C) **NO** [] B train (1D,1E or 1C) **YES** **Verify each train of CCW - STARTED.** Verify one CCW PUMP in each train- STARTED. **YES** A train HX 1C or 1B CCW FLOW [] FI 3043CA > 0 gpm OR [] FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW [] FI 3043AA > 0 gpm OR [] FI 3043BA > 0 gpm Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX [] Q1P16FI3009AA > 0 gpm [] Q1P16FI3009BA > 0 gpm [] Q1P16FI3009CA > 0 gpm
	BOP	**CRITICAL TASK –start one chg pump** **Verify one CHG PUMP in each train - STARTED.** [] A train (1A or 1B) amps > 0 **Start 1A CHG pump** [] B train (1C or 1B) amps > 0 **Start 1B Chg pump**
	BOP	**Verify RHR PUMPs - STARTED.** RHR PUMP [] 1A amps > 0 [] 1B amps > 0

Event Description: Attachment 2 and 4 of EEP-0

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

	BOP	**Verify Safety Injection Flow.** Check HHSI flow - GREATER THAN 0 gpm. [] FI 943
	BOP	Check RCS pressure - LESS THAN 275 psig{435 psig}. 5.2 Proceed to Step 6.
	BOP	**Verify containment ventilation isolation.** Verify containment purge dampers - CLOSED. [] 3197 [] 3198D [] 3198C [] 3196 [] 3198A [] 3198B Verify containment mini purge dampers - CLOSED. CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D [] 2866C [] 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C [] 2866D [] 2867D Stop MINI PURGE SUPP/EXH FAN. **Will place HS to STOP**
	BOP	**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 [] 1A [] 1B □ B train [] 1C [] 1D

Event Description: Attachment 2 and 4 of EEP-0

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

<table>
<tr><td></td><td></td><td>Verify associated emergency service water outlet valves -OPEN.
EMERG SW FROM 1A(1B,1C,1D) CTMT CLR
[] Q1P16MOV3024A
[] Q1P16MOV3024B
[] Q1P16MOV3024C
[] Q1P16MOV3024D</td></tr>
<tr><td></td><td>BOP</td><td>Verify AFW Pumps - STARTED.
Verify both MDAFW Pumps - STARTED
[] 1A MDAFW Pump amps > 0
[] 1B MDAFW Pump amps > 0
AND
[] FI-3229A indicates > 0 gpm
[] FI-3229B indicates > 0 gpm
[] FI-3229C indicates > 0 gpm

Check TDAFW Pump start required.
□Condition □TSLB □Setpoint □Coincidence□
RCP Bus Undervoltage | TSLB2 1-1 1-2 1-3 | □2680 V | 1/2 Detectors on 2/3 Busses
Low Low SG Water Level In Any 2/3 SGs | TSLB4 4-1,4-2,4-3 5-1,5-2,5-3 6-1,6-2,6-3 | 28% | 2/3 Detectors on 2/3 SGs</td></tr>
<tr><td></td><td>BOP</td><td>Verify TDAFWP started.
[] MLB-4 1-3 lit
[] MLB-4 2-3 lit
[] MLB-4 3-3 lit

TDAFWP SPEED
[] SI 3411A > 3900 rpm

TDAFWP SPEED CONT
[] SIC 3405 adjusted to 100%

Verify TDAFW flow path to each SG.
TDAFWP TO 1A(1B,1C) SG
[] Q1N23HV3228A in MOD
[] Q1N23HV3228B in MOD
[] Q1N23HV3228C in MOD

TDAFWP TO 1A(1B,1C) SG FLOW CONT</td></tr>
</table>

Event Description: Attachment 2 and 4 of EEP-0

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

		[] HIC 3228AA open [] HIC 3228BA open [] HIC 3228CA open
	BOP	**Verify main feedwater status.** Verify main feedwater flow control and bypass valves - CLOSED. 1A(1B,1C) SG FW FLOW [] FCV 478 [] FCV 488 [] FCV 498 9.2 Verify both SGFPs - TRIPPED. 9.3 Verify SG blowdown - ISOLATED. 1A(1B,1C) SGBD ISO [] Q1G24HV7614A closed [] Q1G24HV7614B closed [] Q1G24HV7614C closed 9.4 Verify SG blowdown sample - ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE STEAM GEN ISO [] MLB1 19-2 lit Q1P15HV3328 closed [] MLB1 19-3 lit Q1P15HV3329 closed [] MLB1 19-4 lit Q1P15HV3330 closed
	BOP	**Check no main steam line isolation actuation signal present.** Signal — Setpoint — coincidence — TSLB LO SG PRESS — < 585 psig — 2/3 — TSLB4 19-2,3,4 Hi stm flow — >40% — ½ 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 **IF MSLI present then shut MSIVs**
	BOP	**CRITICAL TASK – Initiate B Train Phase A Isolation or close MOV 8112** **Verify PHASE A CTMT ISO.** Verify PHASE A CTMT ISO - ACTUATED. [] MLB-2 1-1 lit

Event Description: Attachment 2 and 4 of EEP-0

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

		[] MLB-2 11-1 lit Check all MLB-2 lights - LIT.	11.2 Verify PHASE A CTMT ISO alignment using ATTACH 3, PHASE A CTMT ISO
	BOP	**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	12 Perform the following. 12.1 Open reactor trip breaker(s) manually from MCB or locally. 12.2 Record any breaker(s) manually opened.
	BOP	**Trip CRDM MG set supply breakers.** 1A(1B) MG SET SUPP BKR [] N1C11E005A [] N1C11E005B	
	BOP	**Secure secondary components.** Stop both heater drain pumps. HDP [] 1A [] 1B Check any condensate pump started. IF started, THEN stop all but one condensate pump. [] 1A [] 1B If NO condensate pumps are started then place all HSs to STOP 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	**Verify both CRACS mode selector switches in the ON position.** CRACS Mode Selector Switch [] A TRAIN [] B TRAIN	

Event Description: Attachment 2 and 4 of EEP-0

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

		Will call BOOTH to have this accomplished since this is not in the simulator
	BOP	**WHEN at least 30 seconds have passed since turbine trip,** **THEN check main generator tripped.** 230 KV BKR [] 810 - OPEN [] 914 - OPEN
	BOP	**Verify two trains of ECCS equipment aligned.** Perform ATTACHMENT 4, TWO TRAIN ECCS ALIGNMENT VERIFICATION.

Event Description: Attachment 2 and 4 of EEP-0

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

		Attachment 4 **TWO TRAIN ECCS ALIGNMENT VERIFICATION**
	BOP	**Verify two trains of ECCS equipment aligned.** Check DF01 closed Verify DF02 closed Check DG15 closed Verfiy DG02 closed Verify two trains of battery chargers – energized - Amps > 0 Verify two trains of ESF equipment aligned. Check all MLB-1 lights LIT Verify charging pump suction and discharge valves - OPEN. CHG PUMP DISCH HDR ISO [] Q1E21MOV8132A [] Q1E21MOV8132B [] Q1E21MOV8133A [] Q1E21MOV8133B CHG PUMP SUCTION HDR ISO [] Q1E21MOV8130A [] Q1E21MOV8130B [] Q1E21MOV8131A [] Q1E21MOV8131B Verify all post accident containment air mixing system fans - STARTED. (BOP) POST ACCIDENT MIXING FAN [] 1A [] 1B [] 1C [] 1D RX CAV H2 DILUTION FAN [] 1A [] 1B WHEN power restored to any deenergized emergency bus, THEN verify alignment of associated equipment.
	BOP	CAUTION: To prevent diesel generator overloading, at least 0.1 MW of diesel generator capacity must be available prior to aligning a SFP Cooling Pump to a diesel.

Event Description: Attachment 2 and 4 of EEP-0

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

		DG loading Checked – Then call Radside SO to Verify Spent Fuel Pool Cooling in service per FNP-1-SOP-54.0, SPENT FUEL PIT COOLING AND PURIFICATION SYSTEM. Verify SFP cooling in service.
End of Attachment 2 and 4		

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 Status *Mode 1 65%* RTP, EOL, 78 ppm Cb, 19,500 MWD, Xe is changing at 6 pcm/min. (currently -3548 pcm)
Rod control is in Manual. Ramping off line at 8 MW/min IAW AOP-17.0.
The SM has directed Unit 1 to be <50% power in the next 15 minutes. ACC has been notified.
UOP-3.1, v.96, step 8.10.1, is complete. AOP-2, step 11.2, is in progress

STPs/Evolutions:

1.0___; 109.1 ____No adj.

B Train On-Service – **A** Train Protected

Status of Special Testing

General Information

1. Current Risk Assessment is GREEN and projected is GREEN
2. 1A SG has an 85 gpd tube leak- AOP-2.0 is in effect
3. Have met Action level 4 of AOP-2.0 and are currently working on step 11.2.
4. R-15 is in alarm and is currently stable.
5. SJAE filtration is on service IAW AOP-2.0.
6. All required notifications IAW AOP-2.0 are complete.
7. 1B EHC pump is tagged out for motor replacement. (OOS 6 hrs, ETR 2 hrs)
8. 1E SW pump is tagged out for motor replacement.
9. 1C SW pump is running and aligned to auto start for 1E SW pump.
10. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia
11.

Equipment Status		
1B EHC pump is tagged out	1C SW pump is running/aligned to auto start for 1E SW pump	Maintain VCT gas pressure 25-30 psig
1E SW pump is tagged out		

Reactivity Plan	**Waste Management Status**
100 Gallon Dilution every 4 minutes as required to maintain temperature and power when at a stable power level.	#3 RHT – On Service
RMU line is filled with boric acid	WGS – secured

LCO Status	
1E SW pump - Admin LCO 3.7.8	

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

original submitted

Facility: Farley Scenario No.: 2 Op-Test No.: FA2008301

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: approx. ~~70~~ 74% power, 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. 1156 ~~38~~ ppm, MOL; B train on service, B Train protected.

Turnover:

- ~~1-2A DG T/O for piston replacement. (OOS 5 days, ETR 24 hrs)~~ Delete
- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- I&C is working on PT-455 which failed low last shift.
- AOP-21, Severe Weather, is in effect due to Hurricane warning and high winds in the area.
- LT-115 failed low - I&C working on it. Auto make up is in manual control.
- 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 No.	Malf No.	Event Type*	Event Description
1		R (RO & BOP)	Ramp at 5 MW/min
2		I (BOP)	PT-508, Feedwater header pressure, fails high.
3		C(RO) (SRO)	HV-8175A fails closed. Letdown relief opens.
4		N (RO)	Restore letdown or place excess letdown on service.
5		C (BOP/RO) TS (SRO)	1C inverter fails and does not automatically transfer to the bypass source. This will include actions to be taken by BOP and RO
6		I (RO) TS (SRO)	~~PT-445 fails high~~ ~~PORV will stick open. MOV isolation will have to be closed.~~ dropped rod moved this to Scenario 4
7		M (ALL)	LOSP for ~~BOTH~~ units –spurious SI due to PT-455 failed low
8		C (BOP)	1A CCW pump trips on start, 1B CCW pump will not auto start
9		M (ALL)	When ESP-1.1 entered and SI flow secured then: 1A S/G develops a ~~large feedline or~~ steamline break inside CTMT needing a SI.
10		C (BOP)	1B CS pump does not auto start. 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. 1A CS pump does not have power.

11		C (BOP)	1B MSIVs do not auto close. BOP will have to manually close one MSIV.
*(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (TS)Tech Spec, (M)ajor			

Event No.	Malf. No.	Event Type*	Event Description
	PRESETS		
0	IC- 57	-----	
0	CMFmalf / cBKRXTRP_cc21 / closed	-----	Block reactor trip train A –
0	CMFmalf / cBKRXTRP_cc22 / closed	------	Block reactor trip train B –
0	1B CS pump will not auto start imf cbkp01b_d_cc5 open	-----	1B CS pump does not auto start – will start from MCB handswitch.
	imf crsh001b_cc5 open imf cmsh002b_d_cc5 open	-----	1B MSIVs will not close on the auto closure msiv 3369B fails auto close msiv 3370B fails auto close
0	trgset 1 "rrc445a > 0.2" trg 1 "imf rrc445a-s 50"	-----	PORV-445A sticks open and will not close trgset 1 "rrc445a > 0.2" trg 1 "imf rrc445a-s 50"
0	REMOTE / B14 / LOA-ICCB – (09) for 457 / True	------	Defeat PT455 input to B train ICCMS: REMOTE / B14 / LOA-ICCB –(09) for 457 / True
0	imf mal-eps-invc = xfer switch failure MALF / E / MAL-EPS-INVSC = inverter failure	------	1C Inverter does not transfer to the bypass source
0	Xmt / lt115/ 0 / 30	------	LT-115 failed low
0	Cmfmalf / cmshfpb_cp1	-----	Tag out 1B EH pump
0	1B EH PUMP	----	PLACE IN OFF AND TAG
0	irf cbk1df08_d_cd1 open irf cbk2df08_d_cd1 open	------	Tag 1-2A DG output breakers for Unit 1 & 2 rack out 1-2A DG DF08-1 rack out 1-2A DG DF08-2
0	NA	------	1-2A DG Mode selector switch in Mode 3; **Tag out 1-2A MSS**
0	Imf pt455 low	------	PT-455 low
0	Imf cccp01a_d_cc13 closed	------	1A CCW pump trips on auto start
0	imf cccp02a_d_cc7 open imf cccp02a_d_cc8 open	------	1B CCW pump does not auto start
0	MALF / F / MAL-FWM28A / 3 / 450 Malf / m / mal-mss1a / 3 / 450	------	Feed break or steam break – see note below *

*** Either steam or feed break will depend on which failure will give the best response for entry into FRP-Z.1**

SCENARIO 2 Summary sheet

Event 1 Ramp down in power at 5 MW/min to be off line in 2.5 hours

Event 2 PT508 fails high. Take manual control of the SGFP speed.

Event 3 8175A fails closed. Letdown relief opens. Will have to reduce charging and seal injection. AOP-16

Event 4 Place Normal letdown back in service or excess letdown on service.

Unit 2 SI.

Event 5 1C inverter fails and does not automatically transfer to the bypass source. The control room will have the Rover transfer to the bypass manually. This will also cause LCV-115B and D to roll open causing the team to ramp faster until the inverter is swapped to the bypass source.

Event 6 PT-445 fails high. PORV will stick open. MOV isolation will have to be closed.

Event 7 Dual unit LOSP. This will cause a partial loss of power on Unit 1 due to 1C DG supplying U-2. 1B DG auto starts to restore power to B Train.

A spurious SI occurs.

Event 8 1A CCW pump trips on auto start. Will have to manually start 1B CCW pump (CT)

Event 9 When SI flow has been secured and ESP-1.1 entered, the following event occurs:

1A SG develops a large feed line or steam line break inside ctmt.

Event 10 1B CS pump does **not** start.

Transition will have to be made to EEP-2 (FRP-Z.1) **AFTER** re-initiating the SI flow (CT) and to isolate the faulted SG (CT)

FRP-Z.1 may be entered since the 1B CS pump does not start. 1B CS pump may be started at any time and if done prior to FRP-Z.1 entry, then Z.1 does NOT have to be entered. (CT)

Event 11 The 1B MSIVs do not auto close on any auto signal. 1B MSIV manual isolation is required (CT)

Terminate the scenario when ESP-1.1 entered for the second time.

CRITICAL TASK SHEET

___ 1. Manually start the 1B CCW pump before the 1C and/or 1B chg pump trips on high LO temp. (WOG CT E-0 - - K)

___ 2. Manually re-initiate B train of SI flow before leaving ESP-1.1. (WOG CT E-0 - - D)

___ 3. Start the 1B CS pump after Containment pressure is/has been > 27 psig, and prior to a Red Path on FRP-Z.1 (54 psig). (WOG CT E-0 - - E)

___ 4. Isolate the 1A SG (Feed flow and steam flow) (WOG CT E-2 - - A)

SCENARIO OBJECTIVE/ OVERVIEW:

Ramp in progress. Auto make up will not work.
The team should be able to:

- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-100, AOP-16 & Tech Specs
- Identify a spurious SI and then respond to a faulted SG inside ctmt, reinitiate SI flow, recognize that 1C CCW pump tripped and start the 1B CCW pump as required per EEP-0. Then transition properly to ESP-1.1, FRP-Z.1 (maybe) and EEP-2, then back to ESP-1.1.

Southern Nuclear
J.M. Farley Nuclear Plant

Operations Training
Simulator Exam Scenario

HLT-32 NRC EXAM SCENARIO #2

Technical Review: GT Ohmstede *Date:* 07-2008

Training Department Approval: _____ *Date:* _____

SOUTHERN COMPANY
Energy to Serve Your World™

Facility:	Farley Nuclear Plant	Scenario No.:	2	Op-Test No.:	2008-301

Examiners: _____ Operators: _____ SRO

_____ _____ RO

_____ _____ BOP

Initial Conditions: 74% power, ramping down to MODE 3 due to Hurricane warnings in effect. Winds in excess of 75 mph expected at the plant site in 3 hours. 1138 ppm, MOL; B train on service, B Train protected

Turnover:

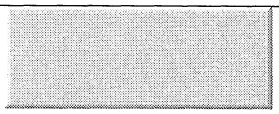
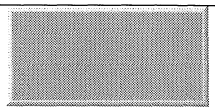
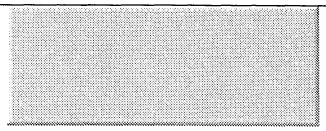
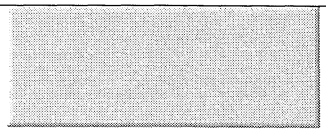
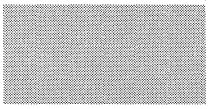
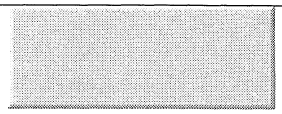
- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- I&C is working on PT-455 which failed low last shift.
- LT-115 failed low - I&C working on it. Auto make up is in manual control.
- AOP-21, Severe Weather, is in effect due to Hurricane warning and high winds in the area.
- Current Risk Assessment is GREEN and projected is GREEN.
- **B** Train On-Service – **B** Train Protected.

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO & BOP)	Ramp at 5 MW/min
2		I (BOP)	PT-508, Feedwater header pressure, fails high.
3		C(RO) (SRO)	HV-8175A fails closed. Letdown relief opens.
4		N (RO)	Restore letdown or place excess letdown on service.
5		C (RO/BOP) TS (SRO)	1C inverter fails and does not automatically transfer to the bypass source.
6		C (RO) **TS** (SRO)	One CB 'A' rod drops into the core during ramp. The team should enter and perform the actions of AOP-19 for a single dropped rod and address technical specifications. LCO 3.1.4
7		M (ALL)	LOSP for BOTH units –spurious SI due to PT-455 failed low
8		C (BOP)	1A CCW pump trips on start, 1B CCW pump will not auto start
9		M (ALL)	When ESP-1.1 entered and SI flow secured then: 1A S/G develops a large steamline break inside CTMT needing a SI.
10		C (BOP)	1B CS pump does not auto start and MOV 8820A does not open. 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. Selected Ctmt coolers do not auto start.
11		C (BOP)	1B MSIVs do not auto close. BOP will have to manually close one MSIV.

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

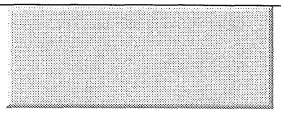
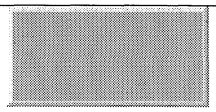
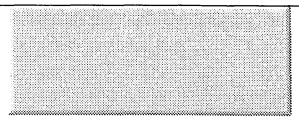
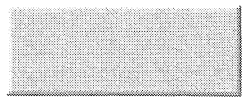
Rod drop moved from scenario 4 since RCS Tavg would drop below 541°F at that power level and the reactor would be tripped before other events took place and TS evaluated. The dropped rod makes more sense here.

Pre-sets

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
		Quick Setup IC (all items with # are included in IC)	NONE
0	0	Base IC-57 74% RTP, MOL, **B Train O/S B Train protected** Cb=1138, Xe (-501 pcm) UOP-3.1, v.96.0 at step 8.3 Using rods for temp. control along with Xe building in Pimp Loop is in	 Need to write this snap with new CCW alignment.
		RUN	 RUN simulator
		Generic setup: bat generic_setup_HLT.txt	
0	0	Quick setup (all items with * are included): bat 2008nrcexam_02.txt	
		Defeat PT455 input to B train ICCMS: REMOTE / B14 / LOA-ICCA09 / True  JICCAO09	
0	0	Block reactor trip A and B Train CMFmalf / cBKRXTRP_cc5 / closed CMFmalf / cBKRXTRP_cc6 / closed	*
0	0	1B CS pump does not auto start – will start from MCB handswitch. imf cbkp01b_d_cc5 open	*
0	0	1B MSIVs will not close on the auto closure msiv 3369B & msiv 3370B fails auto close imf crsh001b_cc5 open imf cmsh002b_d_cc5 open	*
0	0	1c Inverter static xfer switch failure Malf / E / imf mal-eps-invsc	*
0	0	LT-115 is failed low imf lt115 0	*
0	0	Rack out 1B EH pump breaker Cmfmalf / cmshfpb_cp2	*
0	0	PT-455 low Imf pt455 1700	*

Pre-sets

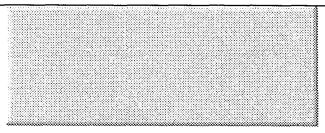
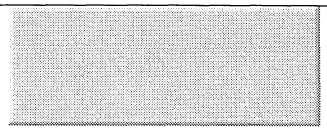
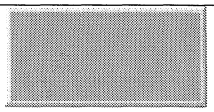
EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	1A CCW pump trips on auto start Imf cccp01a_d_cc13 (1 0) closed	*
0	0	1B CCW pump does not auto start imf cccp02b_d_cc3 open imf cccp02b_d_cc6 open imf cccp02b_d_cc7 open	*
0	0	1D ctmt coolers do not auto start imf cchf1dl_d_cc3 open imf cchf1dl_d_cc4 open	*
0	0	1B ctmt cooler trips when steam leak comes in imf cchf1bl_d_cc2 (2 0) closed	*
0	0	MOV 8820A does not open on phase B Imf cbk8820a_d_cc5 open	*
0	0	Event Trigger 1 - actuate when ni41 < 5% trgset 1 "ni42b < 2	*
0	0	Event trigger 2 monitors steam break trgset 2 "pi951 > 10"	*

MCB setup			
		Set up DEH 40 MW target / 5 MW/min ramp rate Pimp loop in service	DEH
		1B EH pump handswitch Place in OFF and TAG	1 HOLD tag
		Place makeup in stop since LT-115 is failed low	Auto makeup
0	0	**DEH**	Clear DEH alarms
0	0	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
		Recorders	Verify memory disks cleared
0	0	**Provide a copy of UOP-3.1, version 96.0, thru section 8.3 complete and signed off and AOP-21.0 marked up for where the crew is in the scenario**	**UOP-3.1 and AOP-21.0 copy**
		Horns ack **ann horn**	 Acknowledge annunciators
			Verify HORNS ON
			 FREEZE simulator
		Perform Booth Operators Setup Checklist	
		Open Simview file to be used for plant parameter data collection: Simview / sv DataCollection.uvl	
		If needed, adjust sim time back to 00:00:00 **SIMVIEW / Sim_Clock.uvl** **Hours: clock(3) = 0** **Minutes: clock(2) = 0** **Seconds: clock(1) = 0**	 sv sim_clock.uvl
0	0	**VERIFY MICROPHONES READY**	Batteries installed
0	0	**TURNOVER SHEET AVAILABLE**	

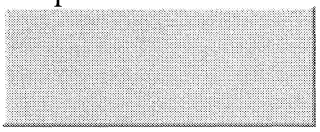
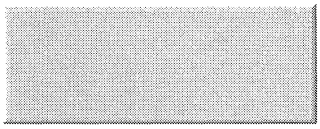
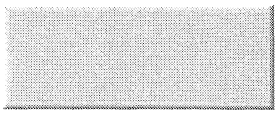
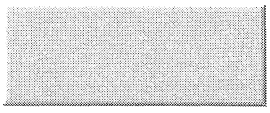
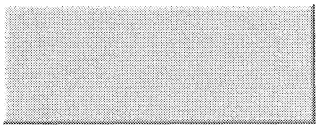
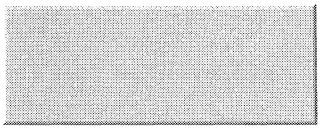
EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
Prior to RUN	0		
		Start data collection for Simview file DataCollection.uvl	
	0	**Begin Exam**	RUN simulator
		Verify Horns ON: hornflag { CONTROL XVALUE.XValueCtrl.1 \s	Verify Horns On
1	0	Ramp at 5 MW/min	
2	NRC CUE	PT-508, Feedwater header pressure, fails high. Xmt / imf pt508 1400 85	
3	NRC CUE	HV-8175A fails closed. Letdown relief opens. Remote /E21 / loa-cvc006 0 25	
4		Restore letdown or place excess letdown on service.	No failure action
5	NRC CUE	1C inverter fails Malf/ E / imf mal-eps-invc LCV-115B & D open due to LT-115 failed low	
6	NRC CUE	K-14- bank 'A' rod drops into the core during ramp Malf / R / imf mal-rod519	
7	NRC CUE	LOSP for BOTH units – spurious SI due to inverter failure and PT-455 failed low Malf/ E / imf mal-eps1 1	
8		1A CCW pump trips on start, 1B CCW pump will not auto start trip 1C chg pump at 170°F	No failure action

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
9	NRC CUE	When ESP-1.1 entered (step 6) then: 1A SG develops a large steamline break inside CTMT needing a SI. Malf / m / mal-mss1a / 10 / 180	
10		1B CS pump does not auto start. 1D ctmt cooler does not auto start and 1B ctmt cooler trips at 10 psig in ctmt. FRP-Z.1 orange path entry required with the conditions given if the 1B CS pump is NOT started or MOV 8820A opened from the MCB prior to FRP-Z.1 entry. [	No failure action
11		1B MSIVs do not auto close. BOP will have to manually close one MSIV.	
		End of Exam	 HORNS OFF ann horns
		End of Exam	 FREEZE simulator
		Stop data collection for Simview file DataCollection.uvl	
		Export data to file with the name of NRC exam01 grpX.txt ***NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate.*** ***NOTE: file will be saved in the OPENSIM directory.***	Ensure data file created.

Local operator actions:

EVENT NO.	***TIME***	***ACTIONS***
1		NONE REQUIRED
2		NONE REQUIRED
3 or 4	WHEN REQUESTED	Reopen 8175A  irf loa-cvc006 1 25
5	WHEN REQUESTED	Transfer 1C Inverter to the bypass source  Remote / R21 / irf loa-eps003 true
6		NONE REQUIRED
7		Locally open reactor trip breakers  CMFmalf / cBKRXTRP_cc21 / closed
	3 minutes after requested	 CMFmalf / cBKRXTRP_cc22 / closed
8 / 9	When requested	Clear MH1 
10	5 minutes after requested	 irf loa-afw006 0 20
11		NONE REQUIRED

Initial Conditions: 74% power, MOL, 10,000 MWD, B Train O/S, B Train protected, RCS boron concentration is 1138 ppm, and Xe worth is -501 pcm. (IC-57)

- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- I&C is working on PT-455 which failed low last shift.
- LT-115 failed low - I&C working on it. Auto make up is in manual control.
- AOP-21, Severe Weather, is in effect due to Hurricane warning and high winds in the area.
- Current Risk Assessment is GREEN and projected is GREEN,
- **B** Train On-Service – **B** Train Protected..

Event 1 Ramp down in power at 5 MW/min to be off line in 2.5 hours

Event 2 PT508 fails high. Take manual control of the SGFP speed.

Event 3 8175A fails closed. Letdown relief opens. Will have to reduce charging and seal injection. AOP-16

Event 4 Place Normal letdown back in service or excess letdown on service.

Event 5 1C inverter fails and does not automatically transfer to the bypass source. The control room will have the Rover transfer to the bypass manually.
LCV-115B and D will open and borate the RCS. A faster ramp will be required until the inverter is swapped.

Event 6 One bank 'A' rod drops into the core during ramp. The team should enter and perform the actions of AOP-19 for a single dropped rod and address technical specifications. LCO 3.1.4.

Event 7 Dual unit LOSP. 1-2A and 1B DGs auto start to restore power.
A spurious SI occurs.

Event 8 1A CCW pump trips on auto start. Will have to manually start 1B CCW pump (CT)

Event 9 When SI flow has been secured and ESP-1.1 entered (step 6), the following event occurs:
1A SG develops a large steam line break inside ctmt.

Event 10 1B CS pump does **not** start and MOV 8820A does not open.
Transition will have to be made to EEP-2 (FRP-Z.1) to isolate the faulted SG (CT) The selected ctmt cooler (1D) does not auto start in slow speed and 1B trips when the Steam fault comes in (10 psig in ctmt).
FRP-Z.1 may be entered since the 1B CS pump does not start and MOV8820A does not open. 1B CS pump may be started at any time and MOV8820A opened (CT) and if done prior to FRP-Z.1 entry, then Z.1 does NOT have to be entered.

Event 11 The 1B MSIVs do not auto close on any auto signal. 1B MSIV manual isolation is required (CT)
Terminate the scenario when ESP-1.1 entered for the second time.

CRITICAL TASK SHEET

___ 1. Manually start the 1B CCW pump before the 1C and/or 1B chg pump trips on high LO temp. (WOG CT E-0 - - K)

___ 2. Start the 1B CS pump or open MOV-8820A after Containment pressure is/has been > 27 psig, and prior to a Red Path on FRP-Z.1 (54 psig). (WOG CT E-0 - - E)

___ 3. Isolate the 1A SG (Feed flow and steam flow) and isolate the 1B SG steam flow (WOG CT E-2 - - A)

SCENARIO OBJECTIVE/ OVERVIEW:

Ramp in progress. Auto make up will not work.
The team should be able to:

- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-100, AOP-16 & Tech Specs
- Identify a spurious SI and then respond to a faulted SG inside ctmt, reinitiate SI flow, recognize that 1C CCW pump tripped and start the 1B CCW pump as required per EEP-0. Then transition properly to ESP-1.1, FRP-Z.1 (maybe) and EEP-2, then back to ESP-1.1.

Communications sheet

EVENT NO.	*TIME*	*Communication:*
1	NONE REQUIRED	
2	WHEN REQUESTED	**SSS-plant, SM and Dispatcher:** Recognize and repeat back PT508 failure, CR in the cue and that type of communications.
3 or 4	WHEN REQUESTED Or when at decision point	**RADISDE OPERATOR:** Check 8175A and B – "8175A is closed and 8175B is open."
5	WHEN REQUESTED Remote / R21 / irf loa-eps003 true	**ROVER and SSS-plant:** Reports – ▪ "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. "All are closed. " Report back that the Inverter is on the Bypass source when re-energized.
6	WHEN REQUESTED	**SSS-plant, SM and Dispatcher:** Will send the extra operator to do STP-29.5 and STP-70 for the dropped rod.
7	WHEN REQUESTED 3 minutes after requested	**DB SO:** Report back DG parameters are normal. **ROVER:** Locally open reactor breakers **Extra operator:** Check on CRACs and BU cooling to the cond pumps
8	WHEN REQUESTED	**ROVER:** 1A CCW pump breaker DG04 has an over current trip flag. There is a strong burnt insulation smell near the 1A CCW pump. 1B CCW pump appears to be running normal- (after they start the pump if requested).
9	NONE REQUIRED	**Extra Operator:** The fire alarm is 1A-22 and I have acknowledged it on the fire alarm panel.
10	NONE REQUIRED	**ROVER:** I will unlock and close Q1N23V017A key Z-139
11	NONE REQUIRED	

Event Description: Ramp at 5 MW/min IAW UOP-3.1
Cue: Start of exam.

Time	Position	Applicant's Action or Behavior
Crew is expected to begin the ramp when shift is relieved and get to 5 MW/min per shift turnover sheet. UOP-3.1, version 96.0, section 8.3.		
	SRO	Will direct ramp started IAW UOP-3.1, section 8.3.
	SRO	Review AOP-21.0.
	SRO/RO	NOTE: In the following step it is desirable to maintain axial flux difference within ± 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 ± 5% of the target value may not be possible. For planned load reductions Engineering Support should provide a ramp strategy to maintain axial flux difference within the limits of COLR figure 3.
	RO	8.5 Attempt to maintain the axial flux difference within ± 5% from the target value by making adjustments in rod height and/or boron concentration as necessary. Refer to section 7.1 as necessary for guidance.
	BOP	Verify DEH is set up for a ramp down and the white HOLD light is LIT. Press the GO button and ensure the light comes on and the Main Turbine starts to ramp down.
	RO	Verify rods are in AUTO or Manual and maintaining Tavg close to Tref.
		When 5 MW ramp complete go to next event

End Event #1

Event Description: PT-508, Feedwater header pressure, fails high

Cue: By Examiner

Time	Position	Applicant's Action or Behavior
Annunciators: o 1A,1B,OR 1C SG LVL DEV (JF1, JF2, JF3) o 1A,1B,OR 1C SG LO LVL (JA1, JA2, JA3) o 1A,1B,OR 1C SG STM FLOW > FEED FLOW (JB1, JB2, JB3)		Recognize indications of PT-508 failure - SGFP speed decreasing - FRVs opening - SGWL NR decreasing - Feed flows derease to zero
In this event PT-508 fails high. SGFP speed will decrease and the FRVs will start to go full open. AOP-100 section 1.4 will be entered		
	BOP	**Immediate operator action** **Check that steam and feed flows matched on all SGs** o Take manual control of SK-509A and decrease SGFP speed o Possibly take manual control of all FRVs
	SRO	**Check no required automatic actions required or set points being approached** If any are approached then Trip the reactor and go to REACTOR TRIP OR SAFETY INJECTION
	BOP	o Place the Main Turbine on HOLD o Adjust SGFP speed back to within the normal operating range for the feed flow/steam flow ΔP required for the existing power level
• 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.		
	BOP	Approximate ΔP can be determined from the following MCB indications o SGFP DISCH PRESS PI4003 o SG Pressure indications At this power level DP should be approx. 130 psid
	SRO	Call Shift Manager and Submit a condition report on the failed instrument, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the condition report
	SRO	Brief crew on the manual control of the SGFP and then re-commence the ramp and continue ramping off line.

End Event #2

Event Description: HV-8175A fails closed. Letdown relief opens. Letdown is secured and then restored.

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - LTDN ORIF ISO VLV REL LINE TEMP HI (DE3) - VCT LVL HI-LO (DF3)		Recognize indications of LETDOWN RELIEF LIFTING - TI-141 is rising and indicating 250°F - PRT parameters are rising - Letdown flow and pressure decreases to zero - VCT level starts to decrease - Auto makeup starts and eventually the VCT low level alarm comes in if no action is taken
When HV8175A closes, the relief valve opens and water goes to the PRT. The ARP instructs the crew to secure letdown.		
	BOP	Recognize, announce and reference the ARPs.
	SRO	o Direct the crew to isolate letdown and place the main turbine on HOLD o Direct the crew to enter AOP-16.0 **NOTE: Transients that will require boration or dilution should be avoided if letdown has been secured.** Excess letdown may be placed on service anytime it is desired during the performance of this procedure in accordance with FNP-1-SOP-2.7, CHEMICAL AND VOLUME CONTROL SYSTEM EXCESS LETDOWN
	RO	Monitor VCT level to ensure proper level is maintained.
	RO	Observe CHG HDR PRESS and MOTOR AMPS to ensure proper charging pump operation. PI-121 AMMETER FOR RUNNING CHG PUMP
	RO	Check charging pump – RUNNING **YES**
	RO	Check Charging flow FK-122 controlling in AUTO with flow indicated **YES**

Event Description: HV-8175A fails closed. Letdown relief opens. Letdown is secured and then restored.

Cue: By Examiner.

	RO	Check DE3 clear **NO**
	RO	Check PRT parameters – STABLE **should be stable** PRT PRESS PI 472 PRT LVL LI-470 PRT TEMP TI-471
	SRO	**Determine Status of Normal Letdown** Check normal CVCS letdown - AFFECTED BY MALFUNCTION **YES** o LTDN HX OUTLET FLOW, FI-150 - NO FLOW INDICATED o Minimize RCS makeup o Manually close charging flow control o Minimize seal injection between 6-13 gpm o Direct Chemistry to shutdown the zinc addition system (ZAS) o Dispatch personnel to investigate cause of the Letdown malfunction
	SRO	IF desired due to plant conditions, THEN place excess letdown in service using FNP-1-SOP-2.7, CHEMICAL AND VOLUME CONTROL SYSTEM EXCESS LETDOWN
	SRO	**Determine if normal letdown should be re-established:** Check normal letdown malfunction(s) – CORRECTED
	BOOTH	**Phone call from roadside SO that 8175A is closed**
	RO	o Verify all letdown orifice isolation valves – CLOSED - HV8149A, B and C o Place PCV-145 in Manual and 50% demand o Place TK-144 in AUTO and set to 3.3 to maintain temp at approx. 100°F. o Verify LCV-115A is aligned - VCT light LIT - Handswitch in – AUTO o IF necessary, THEN OPEN both LTDN LINE PENE RM ISO's from the Penetration Room Isolation Panel - Call Radside SO to open 8175A and B o Verify 8152 is open o Verify LCV-459 and 460 open

Event Description: HV-8175A fails closed. Letdown relief opens. Letdown is secured and then restored.

Cue: By Examiner.

		o Initiate minimum charging flow by verifying FK-122 in manual and open to approx 40 gpm o Establish Letdown flow of approx 60 gpm by opening 8149B OR C o Adjust PK-145 to a setting between 4.3 and 7.5 to obtain approx. 260 – 450 psig o Verify letdown flow stable and place PK-145 in AUTO o Control LTDN HX OUTLET TEMP TK 144 to maintain Letdown temperature at approximately 100°F o - TI-116 VCT TEMP o TI-143 DIVERT LTDN HX TEMP o TI-144 CCW LTDN HX TEMP
	SRO	Determine if letdown flow from either Normal Letdown or Excess letdown exists. **YES** Direct going to procedure and step in effect. **At this time there will either be normal or excess letdown on service.** Validated that normal letdown is placed on service
	SRO	Call Shift Manager and Submit a condition report on the failed component (8175A), and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the condition report.

END – Event 3 and 4

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Event Description: 1C inverter fails and the bypass source is not available

Cue: **By Examiner.**

Time	Position	Applicant's Action or Behavior
Annunciators: - 1C INV FAULT (VD1) - 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 (FC1, FC5, FD3, FD4, FA1)		Recognize indications of INVERTER FAILURE - Loss of power to NI-43 with associated alarms, bistable trip status lights and indication - Loss of power to the inverter (amps on EPB = 0)
When the 1C Inverter fails, the bypass source to load does not transfer automatically.		
NOTE		In addition to items listed under Automatic Action, the following controls and indications are affected if 1C Vital Panel is De-energized. • PRZR PORV - Q1B31PCV445A will not open on high przr pressure signal. • RWST TO CHG PUMP - Q1E21LCV115B and D will open if LT 115 is inoperable. • Annunciator KG4, TURB TV closed alert, will be in alarm and TSLB2, 14-3 will be lit • Annunciator KH5, TURB Auto/Stop oil press low, will be in alarm and TSLB2, 13-3 will be lit.
	RO	Recognize loss of inverter from alarms and loss of NIs
	BOP	Respond to alarms and recognize loss of inverter from loss of Nis and no amperage on 1C Inverter.
	SRO	Direct actions of VD1 Assess plant and analyze IF a reactor trip is called for **NO**
	BOP	Call ROVER to Attempt to restore power from the bypass source by performing the following: IF the "BYPASS SOURCE AVAILABLE" lamp is illuminated on the inverter, THEN transfer 1C INVERTER MANUAL BYPASS SWITCH to the "BYPASS SOURCE TO LOAD" position
	RO	o LCV-115B and D will roll open

Event Description: 1C inverter fails and the bypass source is not available

Cue: **By Examiner.**

		o Efforts should be made to continue the ramp in progress or start a ramp to keep up with the loss of Tavg due to the boration in progress.
	BOP	Commence or continue the ramp
	RO	When the inverter is powered back up: - Verify that VCT OUTLET ISO valves - Q1E21LCV115C and E are open and can remain open. - Verify that RWST TO CHG PUMP valves - Q1E21LCV115B and D are closed. - Verify PRZR PORV - Q1B31PCV445A is closed.
	BOP	Reset the positive rate trip on NI-43 and verify proper operation on NI-43.
	SRO	Refer to TECH SPECs 3.8.7 and 3.8.9 mandatory LCO **3.8.7** Condition A applies while the inverter is supplied from the bypass source and not connected to the battery. 24 hour mandatory LCO **3.8.9** Condition B applies for the time the vital panel was de-energized. 8 hour mandatory LCO to restore the vital panel to operable status

End event 5

Event Description: K-14- bank 'A' rod drops into the core during ramp

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - ROD AT BOTTOM (FE3) - PR CH DEV (FC5) – later - COMP ALARM ROD SEQ/DEV OR PR FLUX TILT (FF5) - PR UPPER/ LOWER DET HI FLUX DEV OR AUTO DEF (FB4) (FB5)		Recognize indications of DROPPED ROD - NIs decreasing - RCS pressure dropping - RCS Tavg decreasing - Rod bottom light on DRPI - Rods stepping out if in AUTO
Rod K-14 drops and RCS temperature and pressure fall as well as power level decreases. AOP-19 will be entered to deal with the problem		
	SRO	Directs entering AOP-19 and BOP looking at ARPs Verify NO load change in progress - stop the ramp in progress
	BOP	Place the ramp on HOLD.
	SRO	Check for unexplained rod motion **NO** (if rods are in AUTO then the SRO may direct rods be placed in manual)
	RO	Rod motion may be occurring due to the dropped rod. The RO should stop the rod motion if in AUTO
	SRO	Check that no dropped rod(s) exist(s) in Mode 1 **YES**
	RO	o Should report there is a dropped rod (K-14) o Place rod control in MANUAL
	SRO	o Direct restoring Tavg to programmed value by adjusting turbine load or RCS boron concentration
	BOP	May ramp turbine down to raise Tavg
	RO	Should start a dilution to bring Tavg to Tref
		The above may be performed at the same time or one at a time depending on SS directions.
	SRO	Consult Technical Specification 3.1.4 3.1.4 Condition B mandatory LCO- within 1 hour restore the rod OR

Event Description: K-14- bank 'A' rod drops into the core during ramp

Cue: By Examiner.

		Verify the SDM OR Initiate boration to restore SDM to within limit and within 2 hours reduce power to less than or equal to 75% AND verify SDM AND perform SR 3.2.1.1 and 3.2.2.1 w/i 72 hours and re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions w/i 5 days
	SRO	Notify the Shift Manager Write CR and/ or call dispatcher or ATL
	SRO	Call to have STP-29.5, Shutdown Margin Calculation Modes 1 and 2, within 1 hour (TAVG > 547°F) and STP-7.0, QUADRANT POWER TILT RATIO CALCULATION completed
	SRO	Commence an orderly shutdown IAW UOP-3.1 and 2.1 Begin efforts to determine the cause of the dropped rod

END – Event 6

Event Description: LOSP for BOTH units –spurious SI due to PT-455 failed low
1A CCW pump trips on start, 1B CCW pump will not auto start

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - Many and various		Recognize indications of Spurious SI - No SI signal in alarm or degrading plant conditions - Przr level increasing with all ECCS pumps running - MLB-1-1 and 11-1 LIT
When a loss of power occurs, an automatic SI will occur due to PT-455 failed low. The crew will enter EEP-0 Immediate operator actions. The reactor will trip due to the loss of both CRDM MG sets.		
	RO/BOP	Immediate Operator actions of EEP-0 **Check reactor trip.** Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. check rod bottom lights - LIT. **Check turbine - TRIPPED.** TSLB2 14-1 thru 4 lit **Check power to 4160 V ESF busses.** 4160 V ESF busses - AT LEAST ONE ENERGIZED A Train (F & K) power available lights lit OR B Train (G & L) power available lights lit Verify operating diesel generators are being supplied from at least one SW pump. **Check SI Status.** **YES** Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION [] ACTUATED status light lit [] MLB-1 1-1 lit [] MLB-1 11-1 lit
	SRO	**ONE CRITICAL TASK In attachment 2 of EEP-0** Directs continuing into EEP-0 at step 5. Directs the BOP to do attachment 2.
	BOP	Completes Attachment 2 and 4

Event Description: LOSP for BOTH units –spurious SI due to PT-455 failed low
1A CCW pump trips on start, 1B CCW pump will not auto start

Cue: By Examiner.

		See Tab at end of scenario Attachment 2 and 4 for actions
	RO	**[CA] Check containment pressure- HAS REMAINED LESS THAN 27 psig** **YES**
	RO	**Announce "Unit 1 reactor trip and safety injection".**
	RO	**Check AFW status.** Check secondary heat sink Available o Check total AFW flow > 395 gpm [] FI 3229A [] FI 3229B []FI 3229C o 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. [CA] 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 [] A TRN reset [] B TRN reset MDAFWP TO 1A/1B/1C SG B TRN [] FCV 3227 in MOD 8.4.2 Control TDAFWP flow. TDAFWP FCV 3228 [] RESET reset TDAFWP SPEED CONT [] SIC 3405 adjusted
	RO	**Check RCS temperature.** IF any RCP running, THEN check RCS average temperature - STABLE AT OR APPROACHING 547°F. TAVG 1A(1B,1C) RCS LOOP

Event Description: LOSP for BOTH units –spurious SI due to PT-455 failed low
1A CCW pump trips on start, 1B CCW pump will not auto start

Cue: By Examiner.

		[] TI 412D [] TI 422D [] TI 432D
	RO	RNO IF RCS temperature less than 547°F and falling, THEN perform the following. Verify steam dumps closed. STM DUMP INTERLOCK [] A TRN in OFF RESET [] B TRN in OFF RESET Verify atmospheric reliefs closed on MCB **Demand at 0 and minimum red light LIT** Control total AFW flow to minimize RCS cooldown, AFW FLOW TO 1A(1B,1C) SG [] FI 3229A [] FI 3229B [] FI 3229C AFW TOTAL FLOW [] FI 3229 Isolate steam loads in the turbine building while continuing with RNO **Will call TBSO to accomplish this task**
	RO	**Check pressurizer PORVs and spray valves.** [CA] WHEN pressurizer pressure less than 2335 psig, THEN verify both PRZR PORVs closed. Check PRZR PORV temperature STABLE OR FALLING. [] PORV Temp TI-463 Check PRT parameters STABLE or FALLING. [] PRT PRESS PI 472 [] PRT LVL LI-470 [] PRT TEMP TI-471 [CA] 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 [] PK 444C [] PK 444D

Event Description: LOSP for BOTH units –spurious SI due to PT-455 failed low
1A CCW pump trips on start, 1B CCW pump will not auto start

Cue: By Examiner.

		Check any PRZR PORV ISO - OPEN
	RO	**Check RCP criteria.** Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE.
	RO	**Monitor charging pump miniflow criteria.** Control charging pump miniflow valves based on RCS pressure. 1C(1A) LOOP RCS WR PRESS [] PI 402A [] PI 403A Based on RCS pressure, close miniflows < 1300 and open when > 100 psig.
Diagnostics The SRO will direct the parameters to be reviewed and will determine appropriate procedure to transition to.		
	SRO	**Check SGs not faulted.** o Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig.
	SRO	**Check SGs not ruptured.** o Check secondary radiation indication - NORMAL. Checks rad monitors R-15, 19, 23A and B, 15B and C, and 60 A, B, C, D o No SG level rising in an uncontrolled manner.
	SRO	**Check RCS intact.** Check containment radiation - NORMAL. [] R-2 CTMT 155 ft [] R-7 SEAL TABLE [] R-27A CTMT HIGH RANGE (BOP) [] R-27B CTMT HIGH RANGE (BOP) □ Check containment pressure - LESS THAN 3 psig. □ Check containment ECCS sump level - LESS THAN 0.4 ft. Radiation levels will be elevated in ctmt and ctmt pressure will be < 3 psig and sump level is pre-event.
	SRO	Evaluate SI termination criteria o Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F SUBCOOLED IN CETC MODE. **YES**

Event Description: LOSP for BOTH units –spurious SI due to PT-455 failed low
1A CCW pump trips on start, 1B CCW pump will not auto start

Cue: By Examiner.

		o Check secondary heat sink available. >395 gpm AFW flow > 31% SGNR level (approx 40% -validation) o Check RCS pressure - STABLE OR RISING **YES** o Check pressurizer level GREATER THAN 13% **YES**
	RO	**Verify SI reset.** [] MLB-1 1-1 not lit (A TRN) [] MLB-1 11-1 not lit (B TRN)
	RO	Stop all but one CHG PUMP.
	RO	**Verify RCS pressure - STABLE OR RISING** **Rising** 1C(1A) LOOP RCS WR PRESS [] PI 402A [] PI 403A
	RO	**Isolate HHSI flow.** Verify charging pump miniflow valves - OPEN. 1A(1B,1C) CHG PUMP MINIFLOW ISO [] Q1E21MOV8109A [] Q1E21MOV8109B [] Q1E21MOV8109C CHG PUMP MINIFLOW ISO [] Q1E21MOV8106 Close HHSI isolation valves. HHSI TO RCS CL ISO [] Q1E21MOV8803A [] Q1E21MOV8803B **Establish normal charging.** Manually close charging flow control valve. CHG FLOW [] FK 122 Verify charging flow path aligned. Verify charging pump discharge flow path - ALIGNED. CHG PUMP DISCH HDR ISO [] Q1E21MOV8132A open [] Q1E21MOV8132B open [] Q1E21MOV8133A open [] Q1E21MOV8133B open

Event Description: LOSP for BOTH units –spurious SI due to PT-455 failed low
1A CCW pump trips on start, 1B CCW pump will not auto start

Cue: By Examiner.

		CHG PUMPS TO REGENERATIVE HX [] Q1E21MOV8107 open [] Q1E21MOV8108 open Verify only one charging line valve - OPEN. RCS NORMAL CHG LINE [] Q1E21HV8146 RCS ALT CHG LINE [] Q1E21HV8147
NOTE: The RCS may be approaching solid plant conditions. In the event the RCS must be operated water solid, charging flow should be adjusted to maintain subcooling instead of pressurizer level. The RCS should **not** be water solid but if it is the note here applies (approx 51% validation)		
	RO	[CA] Control charging flow to maintain pressurizer level 25%-50% using FK-122 FK-122 should be taken to the fully closed position so there is no charging pump flow
	SRO	Go to ESP-1.1, SI TERMINATION, step 6. Adjust charging flow to maintain pressurizer level 25%-50%
1A SG develops a large steam line break inside ctmt after ESP-1.1 entered and both RHR pumps are secured.		

End of event 7/8

Event Description: Faulted SG inside ctmt , 1B CS pump will not auto start and MOV-8820A will not open

Cue: ESP-1.1 step 6

Time	Position	Applicant's Action or Behavior	
Annunciators: - Various and many - Fire alarm (MH1) - Hi ctmt pressure (EE1) (EE2) (EE3)		Recognize indications of LARGE FEED BREAK INSIDE CTMT - Ctmt pressure rising - Przr level decreasing - SG pressures decreasing - Depoints in ctmt rising - Ctmt cooler drains increasing	
ESP-1.1 step 7 below			
	BOP	**7 Secure LHSI system.** 7.1 RHR pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST. 7.2 Stop any RHR Pumps running with suction aligned to the RWST. **7.3 Check on service train RHR pump - STOPPED.** **7.4 Isolate CCW to the on service train RHR heat exchanger.** **CCW TO 1A(1B) RHR HX** [] Q1P17MOV3185A closed OR [] Q1P17MOV3185B closed	
	SRO	**Verify SI flow not required.**	
		Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE. Check pressurizer level GREATER THAN 13%{43%}.	Perform the following. Establish HHSI flow using ATTACHMENT 3, RE-ESTABLISHING HHSI FLOW Go to EEP-1, LOSS OF REACTOR OR SECONDARY COOLANT.
	Team	**The team should notice ctmt pressure rising, Pzrz level dropping and RCS pressure dropping and refer to the foldout page to make the transition or use step 8 above to transition to EEP-1 after SI re-initiation is in progress. (both are similar to the above step)**	

Information to examiner:
Step 8 says to verify SI flow not required. If this step is used for the event in progress, the team could Establish HHSI flow using ATTACHMENT 3, RE-ESTABLISHING HHSI FLOW and then transition to EEP-1. EEP-1 will Check SGs not faulted at step 2 and then transition the team to

Event Description: Faulted SG inside ctmt , 1B CS pump will not auto start and MOV-8820A will not open

Cue: ESP-1.1 step 6

EEP-2. Also ESP-0.0 could be used here if the team was unsure of the best procedure flowpath. Transition to EEP-2 would be directed by ESP-0.0. The team could also go straight to EEP-2, and then establish SI flow when EEP-1.0 entered due to low pressurizer level. At this point in the scenario the 1B CS pump does not start and MOV-8820A did not open when Ctmt pressure rises to 27 psig HI-3. Transition to FRP-Z.1 would be required unless either the 1B CS is started or MOV-8820A is opened. Actions for EEP-2 below followed by FRP-Z.1 **Critical task to start the 1B CS pump or open MOV-8820A**		
ATTACHMENT 3 RE-ESTABLISHING HHSI FLOW		
	RO	**Align charging pump suction to RWST.** RWST TO CHG PUMP [] Q1E21LCV115B open [] Q1E21LCV115D open CHG PUMP SUCTION HDR ISO [] Q1E21MOV8130A open [] Q1E21MOV8130B open [] Q1E21MOV8131A open [] Q1E21MOV8131B open VCT OUTLET ISO [] Q1E21LCV115C closed [] Q1E21LCV115E closed **Verify charging pump miniflow valves - OPEN.** 1A(1B,1C) CHG PUMP MINIFLOW ISO [] Q1E21MOV8109A [] Q1E21MOV8109B [] Q1E21MOV8109C CHG PUMP MINIFLOW ISO [] Q1E21MOV8106 **Isolate normal letdown and charging.** LTDN ORIF ISO 45 GPM [] Q1E21HV8149A closed LTDN ORIF ISO 60 GPM [] Q1E21HV8149B closed [] Q1E21HV8149C closed

Event Description: Faulted SG inside ctmt , 1B CS pump will not auto start and MOV-8820A will not open

Cue: ESP-1.1 step 6

		LTDN LINE CTMT ISO [] Q1E21HV8152 closed Manually close charging flow control valve. CHG FLOW [] FK 122 Verify charging flow path aligned. CHG PUMP DISCH HDR ISO [] Q1E21MOV8132A open [] Q1E21MOV8132B open [] Q1E21MOV8133A open [] Q1E21MOV8133B open CHG PUMPS TO REGENERATIVE HX [] Q1E21MOV8107 closed [] Q1E21MOV8108 closed **Open HHSI isolation valves.** HHSI TO RCS CL ISO [] Q1E21MOV8803A [] Q1E21MOV8803B **Start additional CHG PUMPs as required.** **Monitor charging pump miniflow criteria.** Control charging pump miniflow valves based on RCS pressure. 1C(1A) LOOP RCS WR PRESS [] PI 402A [] PI 403A
	SRO	Direct transition to EEP-2 or FRP-Z.1 EEP-2 below and FRP-Z.1 on page 20
	BOP	Critical task **Verify all main steam isolation and bypass valves - CLOSED.** Place handswitches for all MSIVs to the CLOSED position (6 total)
	SRO	**Check if any SG not faulted.** 2.1 Check pressure in at least one SG - STABLE OR RISING. **Only 1A SG will be blowing down once the MSIVs are closed** Identify the faulted SG **1A SG**

Event Description: Faulted SG inside ctmt , 1B CS pump will not auto start and MOV-8820A will not open

Cue: ESP-1.1 step 6

	BOP	**Isolate all faulted SGs.** o Verify ALL ARVs closed - **PC3371A, B, C minimum demand** o Verify ALL Feed stop valves closed **MOV3232A, B, C** o Verify blowdown from all faulted SGs - ISOLATED. **HV 7614A** o Isolate TDAFWP steam supply from 1B SG. **The TDAFW pump should not be required.** **This will be called to the booth to be completed by the extra operator** 4.5.1 IF TDAFWP NOT required, THEN isolate TDAFWP steam supply from 1B SG at HSD panel. TDAFWP STM SUPP FROM 1B SG [] Q1N12HV3235A/26 in LOCAL (HSDP-F) TDAFWP STM SUPP FROM 1B SG [] Q1N12HV3235A/26 to STOP (HSDP-D)
	BOP	4.6 Verify SG blowdown sample ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE ISO [] MLB1 19-2 lit Q1P15HV3328 closed [] MLB1 19-3 lit Q1P15HV3329 closed [] MLB1 19-4 lit Q1P15HV3330 closed
	BOP	**Critical task** **Isolate AFW flow to all faulted SGs.** Close MDAFWP isolation valves to all faulted SGs. (BOP) **Closes MOV3764A and E on the BOP**
	RO	Close TDAFWP flow control valves to all faulted SGs. TDAFWP FCV 3228 [] RESET reset **Close HV3228A pot to 0** **Have ROVER close Q1N23V017A key Z-139**
	SRO	Call to SSS-P or TSC to have Q1N23V017A closed in the MSVR

Event Description: Faulted SG inside ctmt , 1B CS pump will not auto start and MOV-8820A will not open

Cue: ESP-1.1 step 6

	BOP	Check CST level greater than 5.3 feet **Check secondary radiation indication - NORMAL. YES** Checks rad monitors R-15, 19, 23A and B, 15B and C, and 60 A, B, C, D
	SRO	Evaluate SI termination criteria o Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE. o Check secondary heat sink available. >395 gpm AFW flow > 31%{48%} SGNR level o Check RCS pressure - STABLE OR RISING o Check pressurizer level GREATER THAN 13%{43%}.
		Enter EEP-1 or ESP-1.1 depending on SI termination criteria
		FRP-Z.1 actions here
	RO	o Verify PHASE A CTMT ISO - ACTUATED. [] MLB-2 1-1 lit [] MLB-2 11-1 lit - Check all MLB-2 lights - LIT. o Verify containment ventilation isolation. o Verify all containment purge dampers - CLOSED. o Verify containment mini purge dampers - CLOSED. o Stop MINI PURGE SUPP/EXH FAN.
	RO	**Critical task** **[CA] Check if containment spray is required.** o Containment pressure - HAS RISEN TO GREATER THAN 27 psig. o Verify PHASE B CTMT ISO - ACTUATED. [] MLB-3 1-1 lit [] MLB-3 6-1 lit o Verify containment spray pumps – RUNNING **NO**

Event Description: Faulted SG inside ctmt , 1B CS pump will not auto start and MOV-8820A will not open

Cue: ESP-1.1 step 6

		o Check containment spray flow in both trains - GREATER THAN 0 gpm. **NO** CS FLOW [] FI 958A [] FI 958B
	BOP	Check all MLB-3 lights - LIT.
	RO	Stop all RCPs. RCP [] 1A [] 1B [] 1C
	BOP	**Verify containment fan cooler alignment.** Verify all available containment fan coolers - STARTED IN SLOW SPEED. CTMT CLR FAN SLOW SPEED [] 1A **[] 1B - TRIPPED** [] 1C **[] 1D – DID NOT START** Verify associated emergency service water outlet valves - OPEN. EMERG SW FROM 1A(1B,1C,1D) CTMT CLR [] Q1P16MOV3024A [] Q1P16MOV3024B [] Q1P16MOV3024C [] Q1P16MOV3024D
	BOP	**Critical task** **Verify main steam line isolation and bypass valves - CLOSED.**
	BOP	**Check if feed flow should be isolated to any SG.** Check any SG pressure - FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig. Verify all faulted SG main feed stop valves - CLOSED. **MOV 3232A**
	SRO	Evaluation - IF all SGs faulted THEN maintain 20 gpm AFW flow to each SG. **NO**

Event Description: Faulted SG inside ctmt , 1B CS pump will not auto start and MOV-8820A will not open

Cue: ESP-1.1 step 6

	BOP	**Critical task** **Isolate AFW flow to all faulted SGs.** Close MDAFWP isolation valves to all faulted SGs. (BOP) **Closes MOV3764A and E on the BOP**
	RO	Close TDAFWP flow control valves to all faulted SGs. TDAFWP FCV 3228 [] RESET reset **Close HV3228A pot to** 0
	SRO	Call to SSS-P or TSC to have Q1N23V017A closed in the MSVR
End of FRP-Z.1		
If EEP-1 is entered these actions will be performed. **NOTE to examiner: FRP-P.1 may come in on an ORANGE path due to the steam break. If this were to occur, then the scenario should be secured when the appropriate transition is made.**		
	RO	**Check RCP criteria.** Check SUB COOLED MARGIN MONITOR indication - GREATER THAN 16°F{45°F} SUBCOOLED INCETC MODE. **YES**
	BOP	**Check SGs not faulted.** 2.1 Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig. **YES**
	BOP	**3 Check intact SG levels.** 3.1 Check any intact SG narrow range level – GREATER THAN 31%{48%}. **YES** [CA] 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

Event Description: Faulted SG inside ctmt , 1B CS pump will not auto start and MOV-8820A will not open

Cue: ESP-1.1 step 6

		[] A TRN reset [] B TRN reset MDAFWP TO 1A/1B/1C SG B TRN [] FCV 3227 in MOD Control TDAFWP flow. TDAFWP FCV 3228 [] RESET reset TDAFWP SPEED CONT [] SIC 3405 adjusted
	BOP	**Check secondary radiation indication - NORMAL.** Checks rad monitors R-15, 19, 23A and B, 15B and C, and 60 A, B, C, D
	RO	**Check pressurizer PORVs** **Check any PRZR PORV ISO – power available** [CA] WHEN pressurizer pressure less than 2335 psig, THEN verify pressurizer PORVs closed with no leakage. Verify both PRZR PORVs – CLOSED Check PRZR PORV temperature STABLE OR FALLING. [] PORV Temp TI-463 Check PRT parameters STABLE or FALLING. [] PRT PRESS PI 472 [] PRT LVL LI-470 [] PRT TEMP TI-471 Check at least one PRZR PORV ISO - OPEN
	SRO	The following will be passed off to the Shift Manager **Perform the following within 1 hour of start of event.** o Close recirculation valve disconnects using ATTACHMENT 1. o Establish 1A and 1B post LOCA containment hydrogen analyzers IN SERVICE USING ATTACHMENT 2, POST LOCA CONTAINMENT HYDROGEN ANALYZER OPERATION. o Plot hydrogen concentration on FIGURE 1. o Check containment hydrogen concentration - LESS THAN 3.5%. o Less than 0.5%

Event Description: Faulted SG inside ctmt , 1B CS pump will not auto start and MOV-8820A will not open

Cue: ESP-1.1 step 6

	SRO	Evaluate SI termination criteria o Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16F{45F} SUBCOOLED IN CETC MODE. o Check secondary heat sink available. >395 gpm AFW flow > 31%{48%} SGNR level o Check RCS pressure - STABLE OR RISING o Check pressurizer level GREATER THAN 13%{43%}. **If SI termination criteria is met then go to ESP-1.1** **IF NOT, then continue in procedure**
	RO	**[CA] Check containment spray system.** 8.1 Check any CS PUMP - STARTED. **NO**
	RO	**9 [CA] Check if LHSI Pumps should be stopped.** Check RCS pressure – GREATER THAN 275 psig{435 psig} PT-402 AND 403 **YES** Check RCS pressure - STABLE OR RISING **YES** Verify the SI reset Secure any running RHR pumps **Take HS to stop**
	SRO	**Evaluation point –** Check no SG pressure - FALLING IN AN UNCONTROLLED MANNER. Check RCS pressure on PT-402/403. This differentiates between a steam break and an RCS leak **SRO should direct the team to return to step 1 of EEP-1 until SI termination criteria is met.**
When SI termination criteria is met then go to ESP-1.1		
	RO	**Verify SI reset.** [] MLB-1 1-1 not lit (A TRN) [] MLB-1 11-1 not lit (B TRN)
	RO	**Stop all but one CHG PUMP.**

Event Description: Faulted SG inside ctmt , 1B CS pump will not auto start and MOV-8820A will not open

Cue: ESP-1.1 step 6

	RO	**Verify RCS pressure - STABLE OR RISING** **Rising** 1C(1A) LOOP RCS WR PRESS [] PI 402A [] PI 403A
	RO	**Isolate HHSI flow.** Check CHG PUMP - SUCTION ALIGNED TO RWST Q1E21LCV115B open Q1E21LCV115D open Verify charging pump miniflow valves - OPEN. 1A(1B,1C) CHG PUMP MINIFLOW ISO [] Q1E21MOV8109A [] Q1E21MOV8109B [] Q1E21MOV8109C CHG PUMP MINIFLOW ISO [] Q1E21MOV8106 20.2 Close HHSI isolation valves. HHSI TO RCS CL ISO [] Q1E21MOV8803A [] Q1E21MOV8803B **Establish normal charging.** 21.1 Manually close charging flow control valve. CHG FLOW [] FK 122 21.2 Verify charging flow path aligned. 21.2.1 Verify charging pump discharge flow path - ALIGNED. CHG PUMP DISCH HDR ISO [] Q1E21MOV8132A open [] Q1E21MOV8132B open [] Q1E21MOV8133A open [] Q1E21MOV8133B open CHG PUMPS TO REGENERATIVE HX [] Q1E21MOV8107 open [] Q1E21MOV8108 open 21.2.2 Verify only one charging line valve - OPEN. RCS NORMAL CHG LINE [] Q1E21HV8146

Event Description: Faulted SG inside ctmt , 1B CS pump will not auto start and MOV-8820A will not open

Cue: ESP-1.1 step 6

		RCS ALT CHG LINE [] Q1E21HV8147
END OF SCENARIO		

Event Description: Attachment 2 and 4 of EEP-0

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

Time	Position	Applicant's Action or Behavior
		Attachment 2 of EEP-0 **AUTOMATIC ACTIONS VERIFICATION**
	BOP	**Verify each SW train - HAS TWO SW PUMPs STARTED.** [] A train (1A,1B or 1C) [] B train (1D,1E or 1C) **CRITICAL TASK –start 1B CCW pump** **Verify each train of CCW - STARTED.** Verify one CCW PUMP in each train- STARTED. A train HX 1C or 1B CCW FLOW [] FI 3043CA > 0 gpm OR [] FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW [] FI 3043AA > 0 gpm OR [] FI 3043BA > 0 gpm Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX [] Q1P16FI3009AA > 0 gpm [] Q1P16FI3009BA > 0 gpm [] Q1P16FI3009CA > 0 gpm
	BOP	**Verify one CHG PUMP in each train - STARTED.** [] A train (1A or 1B) amps > 0 **NO** [] B train (1C or 1B) amps > 0 **YES**
	BOP	**Verify RHR PUMPs - STARTED.** RHR PUMP [] 1A amps > 0 [] 1B amps > 0

Event Description: Attachment 2 and 4 of EEP-0

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

	BOP	**Verify Safety Injection Flow.** Check HHSI flow - GREATER THAN 0 gpm. [] FI 943
	BOP	Check RCS pressure - LESS THAN 275 psig{435 psig}. 5.2 Proceed to Step 6.
	BOP	**Verify containment ventilation isolation.** Verify containment purge dampers - CLOSED. [] 3197 [] 3198D [] 3198C [] 3196 [] 3198A [] 3198B Verify containment mini purge dampers - CLOSED. CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D [] 2866C [] 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C [] 2866D [] 2867D Stop MINI PURGE SUPP/EXH FAN. **Will place HS to STOP**
	BOP	**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 [] 1A [] 1B □ B train [] 1C [] 1D

Event Description: Attachment 2 and 4 of EEP-0

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

<table>
<tr><td></td><td></td><td>Verify associated emergency service water outlet valves - OPEN.
EMERG SW FROM 1A(1B,1C,1D) CTMT CLR
[] Q1P16MOV3024A
[] Q1P16MOV3024B
[] Q1P16MOV3024C
[] Q1P16MOV3024D</td></tr>
<tr><td></td><td>BOP</td><td>Verify AFW Pumps - STARTED.
Verify both MDAFW Pumps - STARTED
[] 1A MDAFW Pump amps > 0
[] 1B MDAFW Pump amps > 0
AND
[] FI-3229A indicates > 0 gpm
[] FI-3229B indicates > 0 gpm
[] FI-3229C indicates > 0 gpm

Check TDAFW Pump start required.
<table>
<tr><th>□Condition</th><th>□TSLB</th><th>□Setpoint</th><th>□Coincidence□</th></tr>
<tr><td>RCP Bus Undervoltage</td><td>TSLB2 1-1 1-2 1-3</td><td>□2680 V</td><td>1/2 Detectors on 2/3 Busses</td></tr>
<tr><td>Low Low SG Water Level In Any 2/3 SGs</td><td>TSLB4 4-1,4-2,4-3 5-1,5-2,5-3 6-1,6-2,6-3</td><td>28%</td><td>2/3 Detectors on 2/3 SGs</td></tr>
</table></td></tr>
<tr><td></td><td>BOP</td><td>Verify TDAFWP started.
[] MLB-4 1-3 lit
[] MLB-4 2-3 lit
[] MLB-4 3-3 lit

TDAFWP SPEED
[] SI 3411A > 3900 rpm

TDAFWP SPEED CONT
[] SIC 3405 adjusted to 100%

Verify TDAFW flow path to each SG.
TDAFWP TO 1A(1B,1C) SG
[] Q1N23HV3228A in MOD
[] Q1N23HV3228B in MOD
[] Q1N23HV3228C in MOD

TDAFWP TO 1A(1B,1C) SG FLOW CONT</td></tr>
</table>

Event Description: Attachment 2 and 4 of EEP-0

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

		[] HIC 3228AA open [] HIC 3228BA open [] HIC 3228CA open
	BOP	**Verify main feedwater status.** Verify main feedwater flow control and bypass valves - CLOSED. 1A(1B,1C) SG FW FLOW [] FCV 478 [] FCV 488 [] FCV 498 Verify both SGFPs - TRIPPED. Verify SG blowdown - ISOLATED. 1A(1B,1C) SGBD ISO [] Q1G24HV7614A closed [] Q1G24HV7614B closed [] Q1G24HV7614C closed Verify SG blowdown sample - ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE STEAM GEN ISO [] MLB1 19-2 lit Q1P15HV3328 closed [] MLB1 19-3 lit Q1P15HV3329 closed [] MLB1 19-4 lit Q1P15HV3330 closed
	BOP	**Check no main steam line isolation actuation signal present.** Signal — Setpoint — coincidence — TSLB LO SG PRESS < 585 psig — 2/3 — TSLB4 19-2,3,4 Hi stm flow >40% — ½ 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 **IF MSLI present then shut MSIVs**
	BOP	**Verify PHASE A CTMT ISO.** Verify PHASE A CTMT ISO - ACTUATED. [] MLB-2 1-1 lit [] MLB-2 11-1 lit Check all MLB-2 lights - LIT.

Event Description: Attachment 2 and 4 of EEP-0

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

	BOP	**Check all reactor trip and reactor trip bypass breakers - OPEN.** Reactor trip breaker A trip breaker B Reactor trip bypass breaker A Reactor trip bypass breaker B	Perform the following. Open reactor trip breaker(s) manually from MCB or locally. Record any breaker(s) Reactor manually opened.
	BOP	**Trip CRDM MG set supply breakers.** 1A(1B) MG SET SUPP BKR [] N1C11E005A [] N1C11E005B	
	BOP	**Secure secondary components.** Stop both heater drain pumps. HDP [] 1A [] 1B Check any condensate pump started. IF started, THEN stop all but one condensate pump. [] 1A [] 1B If NO condensate pumps are started then place all HSs to STOP IF condensate pump operating, THEN verify backup cooling aligned to condensate pumps per SOP-0.0, APPENDIX B, TB SO ACTIONS FOLLOWING A REACTOR TRIP OR SAFETY INJECTION. **Will call TBSO to accomplish this.**	
	BOP	**Verify both CRACS mode selector switches in the ON position.** CRACS Mode Selector Switch [] A TRAIN [] B TRAIN Will call BOOTH to have this accomplished since this is not in the simulator	
	BOP	**WHEN at least 30 seconds have passed since turbine trip, THEN check main generator tripped.** 230 KV BKR	

Event Description: Attachment 2 and 4 of EEP-0

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

		[] 810 - OPEN [] 914 - OPEN
	BOP	**Verify two trains of ECCS equipment aligned.** Perform ATTACHMENT 4, TWO TRAIN ECCS ALIGNMENT VERIFICATION.

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, verbally state, "Unit 2" and an instructor will locate to the Unit 2 area and respond to you as quickly as possible.

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 Status Mode 1 74% RTP, MOL, 1138 ppm Cb, 10,000 MWD, Eq Xe, (-501)

Unit was ramping up IAW UOP-3.1, v.96.0, when AOP-21 was entered due to winds in excess of 75 mph expected at the plant site in 4 hours. The Shift Manager has directed Unit 1 to shutdown at 5 MW/min and be in Mode 3 in 2.5 hours. Step 8.2 of UOP-3.1 has been completed. Pimp loop is in.
All steps of AOP-21 have been completed or are in progress.

STPs/Evolutions: **B** Train On-Service – **B** Train Protected

1.0___; 109.1 ____No adj.; 63.7 ____; FSP-20,0 _____;

Status of Special Testing

General Information

1. Current Risk Assessment is GREEN and projected is GREEN
2. CTMT batch release – last released 2 days ago
3. 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
4. PT-455 failed low last shift- I&C is working on it.
5. LT-115 failed low last shift- I&C is working on it. Auto makeup is in manual.
6. AOP-21, Severe Weather, is in effect due to Hurricane warning and high winds in the area.
7. All notifications for the ramp have been made by the Shift Manager
8.
9.

Equipment Status		
PT-455 is failed low	1B EHC pump is tagged out	Maintain VCT gas pressure 25-30 psig
LT-115 is failed low		

Reactivity Plan	**Waste Management Status**
20 Gallon Dilutions as required to maintain temperature and power.	#3 RHT – On Service
	WGS – secured

LCO Status	
PT-455 LCO 3.3.1 cond M and E, 3.3.2 cond D and K (admin)	
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	Operator Logs Reviewed	Cond. Report Queue Reviewed	Autolog Reviewed	ELDS & GEN Spreadsheet verified	Keys Turned Over
	[X] Yes	[X] Yes	[X] Yes	[X] Yes	[X] Yes	[X] Yes

Original Submitted

Appendix D | Scenario 3 Outline | Form ES-D-1

Facility: Farley Scenario No.: 3 Op-Test No.: FA2008301

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: approx. ~~14%~~ 4 power, ??? ppm, ~~BOL~~ EOL; A train on service, A Train protected. Only partial of 2 sets of cooling tower fans will be on service. (i.e. half of the A, B,C towers)

Turnover:

- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Current Risk Assessment is GREEN and projected is GREEN,
- **A** Train On-Service – **A** Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event No.	Malf No.	Event Type*	Event Description
1 2		C (BOP)	The GSSC EXH fan trips to start this event. Loss of Vacuum
2 3		I (RO) **TS** (SRO)	LT-459 fails high slowly.
3 4		C(RO) **TS** (SRO)	1A charging pump high lube oil temperature. Will have to be secured ~~and 1B Chg pump started~~.
4 5		I (BOP)	1A SGFP controller failure. SGFP will run up to 5500 rpm until control of SGFP is regained.
5 6		R (RO) SRO	1A SGFP Trips – ramp down to <2% power and get on AFW IAW AOP- 13
6 7		M (ALL)	1A SGTR 300 gpm ramped in over 5 minutes
7 8		C (RO)	Block auto SI and manual and auto Rx trip, must open CRDM MG set breakers to get rods in
8 9		C (BOP)	FCV-3227A 1A AFW FCV fails open
9 10		C (BOP)	1A atmospheric fails open

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

R (RO/BOP) 1. Added a ramp to 12% power

Event No.	Malf. No.	Event Type*	Event Description
PRESETS			
0	IC- 25	-----	
0	Cmfmalf / cmshfpb_cp1	-----	Tag out 1B EH pump
0	1B EH PUMP	----	PLACE IN OFF AND TAG
0	Imf Hic3227AA-F link to SI flow or 8803a opening	------	FCV-3227A 1A AFW FCV fails open when SI actuation occurs
0	Cnh / Pk3371a-a	-----	1A atmospheric fails open when ctmt pressure reaches approx 10 psig
0	CMFmalf / cBKRXTRP_cc21/ closed imf cBKRXTRP_cc22 closed	----	Fail RTB from opening on manual or auto trip
0	imf csftyinj_cc1 open imf csftyinj_cc11 open	-----	Fail auto SI signals, Manual SI works
0	imf ccvp01ba_d_cc7 open	---	Block 1B chg pump from auto start on trip of 1A chg pmp DF06

SCENARIO 3 Summary sheet

Event 1 The GSSC EXH fan trips to start this event. ARP will be entered.
Loss of Vacuum will occur due to this failure – At 1.7 psia, trip main turbine, then start other GSSC EXH fan and place more CT fans on service
–AOP-8 and AOP-3.0
Regain vacuum by restarting the other GSSC EXH fan

Event 2 LT-459 fails high slowly. AOP-100 will be entered to control pressurizer level. Charging flow will decrease and it is possible at this low power to have letdown isolate. AOP-100 will restore letdown and control charging. Tech Spec entry 3.3.1

Event 3 1A charging pump high lube oil temperature. Will have to be secured and 1B Chg pump started. TS entry mandatory until the 1A chg pump breaker is racked out.
The 1A Chg pump will be tripped if temperature is allowed to reach 170°F.
Will need 1A chg pump LO temp on scenario and 1A chg pump trip button.

Event 4 1A SGFP controller failure. SGFP will run up to 5500 rpm until control of SGFP is regained. Since the FRV Bypass valves are being used to control Feed flow, this will be a different response. AOP-100 entry.

Event 5 1A SGFP Trips – ramp down to <2% power and get on AFW IAW AOP-13

Event 6 1A SGTR 300 gpm ramped in over 5 minutes with the SI and manual trip blocked.

Event 7 Actuate a manual Rx trip by opening CRDM MG set breakers and initiate a manual SI (CT)

Event 8 FCV-3227A 1A AFW FCV fails open when the SI occurs. Isolate SGs (CT)

Event 9 1A atmospheric fails open when ctmt pressure reaches approx. 10 psig
Close ARV (CT)
1A chg pump will auto start on the SI. If allowed to run and increase temperature to 170°F, then 1A chg pump will be tripped and 1B will not auto start here as well. Not critical task since one chg pump will be running.

CRITICAL TASK SHEET

___ 1. Actuate a manual Rx trip prior to SI (WOG CT E-0 - - A) and actuate SI (WOG CT E-0 - - D) when any SI setpoint reached.

___ 2. Isolate FCV-3227A 1A AFW FCV in EEP-3.0 before a transition to ECP-3.1 occurs. (WOG CT E-3 - - A)

___ 3. Close 1A ARV while in EEP-3.0 before a transition to ECP-3.1 occurs. (WOG CT E-3 - - A)

SCENARIO OBJECTIVE/ OVERVIEW:

While at 14% power with Main Turbine at 1800 rpm, the team will have to:

- Respond to a loss of vacuum and use AOP-8 to correct vacuum problem and AOP-3 for Turbine trip.
- Respond to several instrument and component problems and respond using the appropriate ARPs, AOP-100 and 13.
- Respond to a SGTR and isolate AFW flow and Steam flow from the SG using EEP-3.0.

Southern Nuclear
J.M. Farley Nuclear Plant

Operations Training
Simulator Exam Scenario

HLT-32 NRC EXAM SCENARIO #3

Technical Review: GT Ohmstede *Date:* 07-2008

Training Department Approval: _____ *Date:* _____

SOUTHERN COMPANY
Energy to Serve Your World™

Facility:	Farley Nuclear Plant		Scenario No.:	3	Op-Test No.:	2008-301

Examiners: _____ Operators: _____ SRO

_____ _____ RO

_____ _____ BOP

Initial Conditions: 4% power, UOP-1.2, v89, completed thru step step 5.55 . Ready to perform step 5.56.
524 ppm, BOL; A train on service, A Train protected.
1A SGFP on service. Aux steam from U-2. Only partial of 2 sets of cooling tower fans will be on service. (i.e. half of the A, B,C towers) 1A CW pump only O/S.

Turnover:

- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- FRV bypasses controlling feedwater to the SGs
- Current Risk Assessment is GREEN and projected is GREEN.
- **A** Train On-Service – **A** Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO/BOP)	Ramp up to 12% power and get ready to roll the turbine to 1800 rpm
2		C (BOP)	The GSSC EXH fan trips to start this event. Loss of Vacuum
3		I (RO) **TS** (SRO)	LT-459 fails high slowly. LCO 3.3.1
4		C(RO) **TS** (SRO)	1C charging pump high lube oil temperature. Will have to be secured and 1A or 1B Chg pump started IAW AOP-16. LCO 3.5.2, 13.1.5.
5		I (BOP)	1A SGFP controller failure. SGFP will run up to 5500 rpm until control of SGFP is regained.
6		R (RO) SRO	1A SGFP Trips – ramp down to <2% power and get on AFW IAW AOP- 13
7		M (ALL)	1A SGTR 300 gpm ramped in over 5 minutes
8		C (RO)	Block auto SI and manual and auto Rx trip, must open CRDM MG set breakers to get rods in
9		C (BOP)	1A atmospheric fails open
10		C (BOP)	FCV-3227A 1A AFW FCV fails open

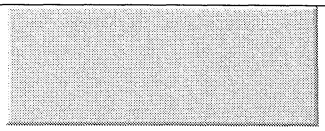
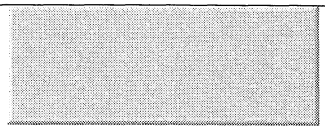
(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Added event 1 due to starting at 4% power vs 14% power for low power snap requirements.

Pre-sets

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	**Base IC**- IC-48, 4% RTP, EOL, A Train O/S, Cb= 524 ppm at UOP-1.2, v89, step 5.56 **Exam IC**- 208	**make sure proper CCW lineup and change trains to A Train OS**
		RUN	RUN simulator
		Generic setup: bat generic_setup_hlt.txt	
0	0	Quick setup (all items with * are included): bat 2008nrcexam_03.txt	
0	0	Rack out 1B EH pump Cmfmalf / imf cmshfpb_cp2	*
0	0	Fail RTB from opening on manual or auto trip CMFmalf / imf cBKRXTRP_cc21/ closed imf cBKRXTRP_cc22 closed	*
0	0	Fail auto SI signals, Manual SI works imf csftyinj_cc1 open imf csftyinj_cc11 open	*
0	0	FCV-3227A 1A AFW FCV fails open when HHSI flow >100 gpm trgset 1 "fi943 > 100" imf hic3227a-r (1 400) 1A Atmospheric opens when HHSI flow >100 gpm imf pt3371a (1 0) 1250	*

		MCB setup	
		1B EH pump handswitch Place in OFF and TAG	1 HOLD tag
		Secure half of Cooling tower fans Bottom row 1V/ 1X/ 1Z	Secure bottom row fans
		Secure the 1B CW pump	Take 1B CW pump to STOP
0	0	**DEH**	Clear DEH alarms
0	0	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
		Recorders	Verify memory disks cleared
0	0	**Provide a copy marked up of UOP-1.2, version 89 at step 5.56 for where the crew is in the scenario**	**UOP-1.2 marked up copy**
		ann ack	Acknowledge annunciators
		Verify Horns ON: hornflag	Verify HORNS ON Ann horn
			FREEZE simulator
		Freeze Xenon	
		ALLOW SIMULATOR TO RUN FOR APPROX. 5 MINUTES AND VACUUM TO STABILIZE MAKE SURE TO FREEZE XENON	

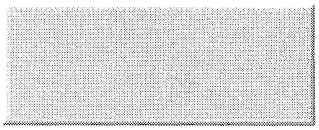
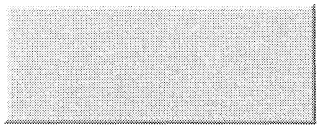
		Perform Booth Operators Setup Checklist	
		Open Simview file to be used for plant parameter data collection: Simview / sv DataCollection.uvl	
		If needed, adjust sim time back to 00:00:00 **SIMVIEW / Sim_Clock.uvl** **Hours: clock(3) = 0** **Minutes: clock(2) = 0** **Seconds: clock(1) = 0**	 sv sim_clock.uvl
0	0	**VERIFY MICROPHONES READY**	Batteries installed
0	0	**TURNOVER SHEET AVAILABLE**	

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
Prior to RUN	0		
		Start data collection for Simview file DataCollection.uvl	
	0	**Begin Exam**	RUN simulator
		Verify Horns ON: hornflag	Verify Horns On **ann horn**
1	0	Increase reactor power to 12% in order to roll Main Turbine	
2	NRC CUE after 12% power is reached	Increase cond pressure FIRST and when vacuum starts to increase, trip the GSSC exh fan The GSSC EXH fan trips. CMF MALF/ CTSP037_CC3 CLOSED DELETE VACUUM from instructor station summary after adjusting to 0 when finished with scenario	Remote /cond and FW / loa-cfw049 300 (0-1000%) adjust vacuum on instructor station summary as necessary to maintain value BELOW 1.7 psia but > 1.3 psia
3	NRC CUE	LT-459 fails high slowly. Xmt / lt459 100 75	
4	NRC CUE	1C charging pump high L.O. temperature – achieved by closing CCW supply valve V310C: REMOTE / P17 / LOA-CCW059 / 0 Monitor 1C charging pump L.O. temperature: tchspoil(3) **If 1C charging pump L.O. temperature exceeds 170°F, then trip the pump**: CMFmalf / cCVP01C_d_co1	
5	NRC CUE	1A SGFP controller failure. SGFP will run up to 5500 rpm until control of SGFP is regained. Cnh / sk509B-A 10 240	

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
6	NRC CUE	1A SGFP Trips – ramp down to <2% power and get on AFW IAW AOP- 13 Malf/ imf MAL-FWM11A	
7	NRC CUE	1A SGTR 300 gpm ramped in over 5 minutes Malf / R / imf mal-rcs4A 300 300 R-15 will come into alarm / AOP-2 entry required	
8		Block auto SI and manual and auto Rx trip, must open CRDM MG set breakers to get rods in	preset
9		1A atmospheric fails open	Trigger 1
10		FCV-3227A 1A AFW FCV fails open Ensure 9 and 10 are in before step 3 of EEP-3 (isolating flow from ruptured SG)	Trigger 1 delay 6.667 minutes
End			
		End of Exam	HORNS OFF
		End of Exam	FREEZE simulator
		Stop data collection for Simview file DataCollection.uvl	
		Export data to file with the name of NRC exam01 grpX.txt ***NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate.*** ***NOTE: file will be saved in the OPENSIM directory.***	Ensure data file created.

Local operator actions:

EVENT NO.	***TIME***	***ACTIONS***
1		Control Vacuum by adjusting loa-cfw049 to a value that will cause vacuum results needed – see instructor summary
2		NONE REQUIRED
3		NONE REQUIRED
4	2 minutes after requested:	Open DG06 1c chg pump breaker 
5		NONE REQUIRED
6		NONE REQUIRED
7	3 minutes after being called initiate action and call CR as the ROVER to tell them the RTBs are open.	Locally open reactor breakers CMFmalf / cBKRXTRP_cc21 / open  CMFmalf / cBKRXTRP_cc22 / open 
8		NONE REQUIRED
9		NONE REQUIRED

Initial Conditions: 4% power, EOL, 15,000 MWD, A Train O/S, A Train protected, RCS boron concentration is 524 ppm. 1A SGFP on service. Aux steam from U-2. Only partial of 2 sets of cooling tower fans will be on service. (i.e. half of the A, B,C towers) 1A CW pump only o/s

Turnover:

- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Current Risk Assessment is GREEN and projected is GREEN.
- FRV bypasses controlling feedwater to the SGs
- A Train On-Service – A Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event 1 Increase Reactor power to 12% and get ready to roll the Main Turbine.

Event 2 The GSSC EXH fan trips to start this event. ARP will be entered.
Loss of Vacuum will occur due to this failure –start ALL Ct fans, 1B CW pump and other GSSC EXH fan
–AOP-8
Regain vacuum by restarting the other GSSC EXH fan

Event 3 LT-459 fails high slowly. AOP-100 will be entered to control pressurizer level. Charging flow will decrease and it is possible at this low power to have letdown isolate. AOP-100 will restore letdown and control charging. Tech Spec entry 3.3.1

Event 4 1C charging pump high lube oil temperature. Will have to be secured and 1A or 1B Chg pump started. TS entry mandatory until the 1B chg pump is swapped to the other train. LCO 3.5.2, 13.1.5.

The 1C Chg pump will be tripped if temperature is allowed to reach 170°F.

Event 5 1A SGFP controller failure. SGFP will run up to 5500 rpm until control of SGFP is regained. Since the FRV Bypass valves are being used to control Feed flow, this will be a different response. AOP-100 entry. Possible trip of the 1A SGFP if control not taken and this will lead to event 6. Ramp down will not be initiated if this happens.

Event 6 1A SGFP Trips – ramp down to <2% power and get on AFW IAW AOP-13

Event 7 1A SGTR 300 gpm ramped in over 5 minutes with the AUTO SI and AUTO & manual trip blocked.

Event 8 Actuate a manual Rx trip by opening CRDM MG set breakers (CT) and initiate a manual SI (CT)

Event 9 1A atmospheric fails open when SI occurs.
Close ARV (CT)

Event 10 FCV-3227A 1A AFW FCV fails open after 6.667 minutes after the SI occurs. Isolate SGs (CT)
1C chg pump will auto start on the SI. If allowed to run and increase temperature to 170°F, then 1C chg pump will be tripped. Not critical task since one chg pump will be running.

CRITICAL TASK SHEET

___ 1. Actuate a manual Rx trip prior to SI (WOG CT E-0 - - A)

___ 2. Actuate SIwhen any SI setpoint reached. (WOG CT E-0 - - D)

___ 3. Isolate FCV-3227A 1A AFW FCV in EEP-3.0 before a transition to ECP-3.1 occurs. (WOG CT E-3 - - A)

___ 4. Close 1A ARV while in EEP-3.0 before a transition to ECP-3.1 occurs. (WOG CT E-3 - - A)

SCENARIO OBJECTIVE/OVERVIEW:

While at 12% power, the team will have to:

- Respond to a loss of vacuum and use AOP-8 to correct vacuum problem.
- Respond to several instrument and component problems and respond using the appropriate ARPs, AOP-100 and AOP-13.
- Respond to a SGTR and isolate AFW flow and Steam flow from the SG using EEP-3.0.

EVENT NO.	***TIME***	***Communication:***
2	WHEN REQUESTED	**TB SO:** report the following as requested SJAEs look fine I see no leaks on the Turbine Deck I see no problem in the TB basement Aux Stm pressure looks fine with a reading of 175 psig Finally if asked: report that the 1A GSSC exh fan is not running or that no GSSC exh fan is running **SOP-28.4 -** Place the 1B GSSC EXH FAN in service as follows: Verify open 1B GSSC EXH FAN suction valve N1N32V592. Verify closed 1A GSSC EXH FAN suction valve N1N32V592 Throttle open 1B GSSC EXH FAN discharge valve N1N32V591 to approximately 30% open. Verify closed 1A GSSC EXH FAN discharge valve N1N32V574
3	WHEN REQUESTED	**DISPATCHER:** - Acknowledges when informed that the CR is in the queue. **I&C:** - response appropriate for LT459 failing high
4	WHEN REQUESTED	**Rad Side SO:** The 1C Charging pump LO temperature reads _____ (look at monitor to read temperature) tchspoil(3)
5	IF REQUESTED	**TB SO:** SGFP is running at 5500 RPM. I see no other problems.
6 and 7	NONE REQUIRED	
8	WHEN REQUESTED	3 minutes after being called initiate action and call CR as the ROVER to tell them the RTBs are open.
9	IF REQUESTED	**ROVER:** I will close the isolation valve V017D for 3227A
10	If requested, after Atmospheric fails open report the following:	**DB SO:** There is steam coming from the top of the MSVR roof. **TB SO:** when called: It looks like an Atmospheric relief valve or code safety is lifting continuously.

Event Description: Increase Reactor power to 12% IAW UOP-1.2.
Cue: Start of exam.

Time	Position	Applicant's Action or Behavior
When simulator is taken to run the crew is expected to increase Reactor power to 12% IAW UOP-1.2. This evolution will take approx. 15 -20 minutes		
	RO	Begin to increase reactor power to greater than 12% with following controls. □ Manual adjustment of control rods □ Steam dumps in Steam Pressure Control Mode
	SRO	Monitor reactor power and Steam Dump adjustments as reactor power rises
	BOP	Will be reviewing UOP-1.2 and getting ready to roll the main turbine.
	RO	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}** Block the intermediate range reactor trip and overpower rod stop. □ Place INTEMEDIATE RANGE BLOCK TRN A to BLOCK. □ Place INTEMEDIATE RANGE BLOCK TRN B to BLOCK. On the Bypass and Permissive Panel verify the following: □ The INTERM RANGE TRAIN A TRIP BLOCKED light illuminated. □ The INTERM RANGE TRAIN B TRIP BLOCKED light illuminated. Block the power range low setting reactor trip. □ Place POWER RANGE BLOCK TRN A to BLOCK. □ Place POWER RANGE BLOCK TRN B to BLOCK. On the Bypass and Permissive Panel verify the following: □ The POWER RANGE LOW SETTING TRAIN A TRIP BLOCKED light illuminated. □ The POWER RANGE LOW SETTING TRAIN B TRIP BLOCKED light illuminated.

Event Description: Increase Reactor power to 12% IAW UOP-1.2.
Cue: Start of exam.

	RO	Verify that Low Power Trip Block P-7 status light is not illuminated to ensure the unblocking of the following reactor trips. □ Pressurizer Low Pressure □ Pressurizer High Water Level □ Loss of Flow-Two Loops
	RO	Verify NR-45B is in the desired speed, i.e., 2nd speed (2 min/div) OR normal speed. (10 min/div)
		Go to event 2 when 12% power is reached.

End Event #1

Event Description: GSSC EXH fan trips and vacuum gets worse

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - 600V BKR TRIPPED (LG3) - TURB COND VAC LO (KK1)		Recognize indications of VACUUM PROBLEMS - Vacuum rising from 1.0 to 1.6 psia - IPC alarm on GSSC brker open
In this event the GSSC EXH fan will trip causing main condenser vacuum to rise or get worse. There is only one set of CT fans on service and one Circ water pump. AOP-8 has the crew start this equipment and then send people out to find the problem. Vacuum is being adjusted in the booth so until the actions are completed vacuum will remain low and slowly decreasing.		
	SRO	Direct crew to reference LG3 to determine reason it is in alarm. There are 12 breakers listed in this ARP as to the reason, among them is EQ21, Old Gland Steam exhauster Manual; overcurrent; or undervoltage. The other GSSC EXH fan is not normally lined up so that if the fan was started w/o referencing the procedure, there would be no effect on condenser vacuum. Step 6 of AOP-8 has SOP-28.4 used to place the fan on service.
	SRO	Direct Monitoring Condenser pressure <u>WHEN</u> turbine power less than 30%, <u>THEN</u> verify condenser pressure less than 1.7 psia (3.5 inHga) **pressure should be approx 1.3 and slowly rising**
	Team	Stabilize condenser vacuum using any or all of the following actions based on plant conditions, and the rate at which vacuum is worsening
	BOP	o Start additional cooling tower fans – **call OSSO** o Verify proper operation of on service SJAEs **TBSO called** o Start an additional CW PUMP **Start 1B CW pump** o Dispatch personnel to check main turbine gland sealing steam pressures- **TBSO called** - HP gland pressure - LP gland seal pressure - HP gland steam supply
	SRO	Dispatch personnel to verify SJAE steam supply regulator - OPERATING PROPERLY. (155 ft, TURB BLDG) And to verify on service GSSC EXH FAN - OPERATING PROPERLY. (155 ft, TURB BLDG) **TBSO or SSS-Plant called**

Event Description: GSSC EXH fan trips and vacuum gets worse

Cue: By Examiner.

		<u>This step may be done earlier since LG3 is in alarm and the GSSC EXH fan will be found with a trip flag on it.</u> After report that GSSC EXH fan is tripped then start standby GSSC EXH FAN using SOP-28.4, GLAND SEALING STEAM System
	SRO	Dispatch personnel to inspect the main condenser for leaks and to vent the main condenser **TBSO or SSS-Plant called**
	BOP	Check Hotwell level less than 4 ft
Restore Vacuum slowly when GSSC EXH fan is running, CT fans called to placed on service and 1B CW pump has been started.		
		Go to event 3 when vacuum restored

End Event #2

Event Description: LT-459 fails high

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - PRZR LVL HI B/U HTRS ON (HA2) - PRZR LVL HI RX TRIP ALERT (HA1) - CHG HDR FLOW HI-LO (EA2)		Recognize indications of LT-459 failing high slowly - CHG decreasing to 0 GPM - VCT level increasing - Actual Przr level decreasing
LT-459 will increase slowly and charging flow will slowly decrease. AOP-100 will be entered for the failed Level transmitter.		
	SRO	Direct entry into AOP-100
	RO	Check pressurizer level is on or trending to program value **NO** **Take Manual control of FK-122 and raise the demand to approximately 80 – 100 gpm**
	RO	Check RCP Seal Injection flows 6-13 gpm Adjust as necessary using HIK 186
	SRO	Determine if a pressurizer level transmitter/indicator loop has failed - Failed or erroneous reading on LI459, LI460 or LI461
	RO	Select an unaffected pressurizer level channel on LS-459Z **CH III/II selected** Select an unaffected channel on the Pressurizer level recorder control switch LS/459Y **CH III or II selected** Check letdown inservice **YES**
	RO	WHEN plant conditions permit, THEN restore components to automatic control as follows: - Restore charging flow control to automatic per SOP-2.1, CVCS SYSTEM PLANT STARTUP AND OPERATION - Restore control of pressurizer heaters as necessary

Event Description: LT-459 fails high

Cue: By Examiner.

	SRO	Refer to Tech Specs 3.3.1 & 3.3.3 for any LCO requirements: 3.3.1 table 3.3.1-1 # 9 above P-7 mandatory LCO condition M Place one channel in trip in 6 hours or reduce power to <P-7 in 12 hours 3.3.3 Table 3.3.3-1 Admin LCO due to required channels is 2
	SRO	o Notify the Shift Manager o Submit a Condition Report for the failed level channel, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the Condition Report
		Go to event 4 when notifications made and all actions complete

END – Event 3

Event Description: 1C Charging pump has a high lube oil temperature

Cue: By Examiner. (From the time this is initiated until the alarm is 2.5 minutes.)

Time	Position	Applicant's Action or Behavior
Annunciators: - CHG PUMP LUBE OIL TEMP HI (EA3)		Recognize indications of CHG PUMP LUBE OIL TEMP HI - Annunciator Only
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 170°F if action is not taken to remove it from service.		
	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 temperature. (A report will be given in approx 2 minutes and will be the actual value from the plant computer.)
	RO	After the report IF local temperature indication is ≥ 160°F, THEN immediately shutdown the 1C charging pump. Start another charging pump and stop the affected pump, in accordance with SOP-2.1, CVCS PLANT STARTUP AND OPERATION
	RO	SOP-2.1 version 96 step 4.7, Starting a Charging Pump or Swapping a Charging Pump When RCS Temp is > 180°F: o Check auxiliary oil pump running for charging pump to be started as indicated by white light illuminated on MCB o Check open miniflow isolation Q1E21MOV8109A or B o Verify Q1E21MOV8106, is open. o Verify a 1A or 1B CCW pump is running o Verify FCV-122 and HIK 186 are closed o Start 1A OR 1B Charging pump o Observe CHG HDR PRESS indicator PI 121 and motor ammeter to check proper pump operation o WHEN charging pump comes up to speed, THEN check auxiliary oil pump stops as indicated by white light NOT being illuminated on MCB. o Adjust SEAL WTR INJECTION HIK 186 to maintain 6-13 gpm seal injection flow to each RCP o Adjust FCV-122 to obtain chg flow proper flow o Place FCV-122 in Auto

Op-Test No.: Farley 2008-301 Scenario No.: 3 Event No.: 4

Event Description: 1C Charging pump has a high lube oil temperature

Cue: By Examiner. (From the time this is initiated until the alarm is 2.5 minutes.)

	SRO	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 mandatory LCO Condition A. Two charging pumps shall be operable and this is a 72 hour LCO.
	SRO	The actions to place 1B Chg pump on service in the B train should be initiated here. Direct the Radside SO, Rover and the SSS-Plant to place the 1B chg pump on B Train.
		If AOP-16 were used to start the 1A chg pump after the 1C chg pump was secured would not be wrong, just a different procedure from what the the ARP had them use. The 1A chg pump would still be started properly and be in service at the end of the procedure and essentially the same steps are outlined above
		Go to event 5 when notifications made and all actions complete

End event 4

Event Description: 1A SGFP controller will fail. (SGFP speed will increase to 5500 rpm)

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - 1A,1B,OR 1C SG FEED FLOW > STM FLOW (JG1, JG2, OR JG3) - 1A, 1B, 1C SG LVL DEV (JF1, JF2, JF3)		Recognize indications of 1A SGFP controller failing - ALL FRVs close - 1A SGFP will speed up - ALL SG levels increase - Power rising - Stm dumps close
The bypass FRVs close down as the 1A SGFP speed increases. Due to the slow reaction time of the bypass valves if the operator does not take manual control of the SGFP, letdown may secure due to the przr level dropping due to the cooldown in progress, ALL SGWLs will increase and may trip the SGFP at 82%. AOP-13, section 3 or AOP-100, section 1.5 may be used depending on if the team recognizes what the problem is.		
	Team	**Check that steam and feed flows matched on all SGs - NO**
	BOP	Take manual control of SGFP speed by: o Place SK 509A in Manual and lower demand as necessary. o 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
	SRO	**Check no required automatic actions required or set points being approached** The SRO is in charge of monitoring SGWLs and directing action based on the level. IF a loss of main feedwater occurs, THEN perform the actions required by AOP-13.0, LOSS OF MAIN FEEDWATER If an automatic action is required or set points is approached: Trip the reactor and go to EEP-0
	SRO	Determine the instrument failure. The alarm is due to the failure of the controller for 1A SGFP.

Event Description: 1A SGFP controller will fail. (SGFP speed will increase to 5500 rpm)

Cue: By Examiner.

		Check Steam flow and Feed flow indicators.
	BOP	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.
	SRO	o Notify the Shift Manager o Submit a condition report for the failed instrument, and notify the Notify the Work Week Coordinator
		Go to event 6 when notifications made and all actions complete

END – Event 5

Op-Test No.: Farley 2008-301 Scenario No.: 3 Event No.: 6

Event Description: 1A SGFP will trip

Cue: By Examiner OR the SGFP may trip due to high SGWL (82%).

Time	Position	Applicant's Action or Behavior
Annunciators: - 1A OR 1B SGFP TRIPPED (KC3) - JF1, JF2, JF3 - 1A(1B,1C) SG LVL DEV - JG1, JG2, JG3 - 1A(1B,1C) SG FEED FLOW > STM FLOW - JA1, JA2, JA3 - 1A(1B,1C) SG LO LVL		Recognize indications of BOTH SGFPs tripped - SGFP speed decreasing - Feed flow decreasing - All FRV bypass valves opening
The 1A SGFP may trip on high SGWL or will be tripped by the Booth operator when the recovery from the controller failure has been completed. AOP-13 actions		
	Team	o Check Both SGFPs – TRIPPED o Check main generator OFF LINE o Check turbine tripped **YES** TSLB2 14-1 LIT TSLB2 14-2 LIT TSLB2 14-3 LIT TSLB2 14-4 LIT
	SRO	**Direct reducing reactor power to less than 2% using control rods and boron**
	RO	o Verify rod control in MANUAL o Stabilize TAVG by adjusting rod position and/or boron concentration
	BOP	o Check for proper operation of steam dumps o Verify all available AFW pumps RUNNING - BOTH MDAFW pumps amps > 0 - TDAFW pump 3226/3235A and B white bi-stable lights LIT and speed increasing. The RED light on handswitch for 3235A/3226 will be LIT. o Verify SG blowdown – ISOLATED Q1G24HV7614A closed Q1G24HV7614B closed Q1G24HV7614C closed

Event Description: 1A SGFP will trip

Cue: By Examiner OR the SGFP may trip due to high SGWL (82%).

	BOP	Maintain SG narrow range level approximately 65% by controlling MDAFWP flow - MDAFWP FCV 3227 RESET - MDAFWP TO 1A/1B/1C SG B TRN in MOD - Pots adjusted for 3227A, B, C Control TDAFWP flow - TDAFWP FCV 3228 RESET - TDAFWP SPEED CONT SIC-3405 adjusted - 3228A, B, C adjusted
When Reactor power is stable at 2% OR the reactor is tripped, then go the next event.		

END – Event 6

Event Description: 1A SGTR 300 gpm

Cue: By Examiner

Time	Position	Applicant's Action or Behavior
Annunciators: - RMS HI RAD (FH1) - CHG HDR FLOW HI-LO (EA2)		Recognize indications of SGT leak - Chg flow increases - R-15, R-19 R-23A and B - VCT level decreasing and possible auto makeup - RCS PRESSURE DECREASING - Przr level decreasing
The SGTR will ramp in over 5 minutes. The crew will enter AOP-2.0 based on entry conditions for AOP-2 since R-15 is in alarm. NOTE: The intent of step 1 is to ensure that SI is actuated if PRZR level cannot be restored to and maintained stable at the normal programmed value.		
	SRO	Directs ARPs referenced and AOP-2.0 entered.
	RO	**Maintain pressurizer level stable at programmed level by :** Control charging flow — Take manual control - FCV-122 OR Reduce letdown flow — remove 1 orifice OR Isolating letdown — remove all orifices
	RO	**Maintain VCT level greater than 20% by:** Verifing reactor makeup system - IN AUTOMATIC OR Control makeup in manual IAW SOP-2.3 If VCT level can not be maintained >20%, then Trip the reactor and actuate a SI, go to EEP-0.
	SRO	**Check reactor power conditions** - Check NO power ascension in progress. **NO** - Check NO power reduction in progress. **NO** - Check reactor power greater than 20%. **NO** RNO - Direct the counting room to determine the R-70 leak rate using CCP-31, LEAK RATE DETERMINATION. - Begin trending R-70A (B,C) or R-15 using the Plant Computer and DATA SHEET 1.

Event Description: 1A SGTR 300 gpm

Cue: By Examiner

	BOP	Place the SJAE filtration unit in service using SOP-28.5, CONDENSER AIR REMOVAL SYSTEM.
	SRO	Direct chemistry to perform grab samples and leak rate determinations in accordance with CCP-201, SCHEDULE, CHEMISTRY AND WATER TREATMENT PLANT ACTIVITIES Table 55.
	SRO	WHEN RCS leak rate determined, THEN notify Shift Manager
	SRO	Leak rate will continue to get worse until a Reactor trip and Safety Injection is called for.

End of event 7

Event Description: 1A SGTR 300 gpm

Cue: preset

Time	Position	Applicant's Action or Behavior
Annunciators: - Many and numerous		Recognize indications of SGTR - Przr level falling rapidly - RCS pressure dropping rapidly
As the leak builds in the team will have to trip the reactor and safety inject the plant.		
	SRO	**CRITICAL TASK** – to open BOTH CRDM MG set breakers Direct the reactor trip and safety injection and enter EEP-0.
	RO/BOP	Immediate Operator actions of EEP-0 **Check reactor trip.** Check all RT breakers and RT bypass breakers - **CLOSED** CRDM MG set breakers **OPEN** Check nuclear power - **FALLING.** check rod bottom lights - **LIT.** **Check turbine - TRIPPED.** TSLB2 14-1 thru 4 lit **Check power to 4160 V ESF busses.** 4160 V ESF busses - AT LEAST ONE ENERGIZED A Train (F & K) power available lights lit OR B Train (G & L) power available lights lit Verify operating diesel generators are being supplied from at least one SW pump. **Check SI Status.** **NO** Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION [] ACTUATED status light lit [] MLB-1 1-1 lit [] MLB-1 11-1 lit Check SI required o Pzrz press lo 1850 psig2/3 TSLB2 17-1 THRU 3 o Stm Line differential press 100 psid TSLB4 o Low Stm line press 585 psig 2/3 TSLB4 19-2 thru 4

Event Description: 1A SGTR 300 gpm

Cue: preset

		o Ctmt press high 4 psig 2/3 TSLB1 1-1 THRU 1-4 If SI required then actuate an SI, If not then go to ESP-0.1, Reactor trip response.
	SRO	**CRITICAL TASK** Directs safety injection if not previously performed.
	SRO	Directs continuing into EEP-0 at step 5. Directs the BOP to do attachment 2. See Tab at end of scenario Attachment 2 and 4 for actions
	RO	**6 [CA] Check containment pressure- HAS REMAINED LESS THAN 27 psig YES**
	RO	**7 Announce "Unit 1 reactor trip and safety injection".**
	RO	**8 Check AFW status.** 8.1 Check secondary heat sink Available o Check total AFW flow > 395 gpm [] FI 3229A [] FI 3229B []FI 3229C o Total Flow FI 3229 OR Check any SG NR level > 31% {48%} 8.2 WHEN all SG narrow range levels less than 31%{48%}, THEN maintain total AFW flow greater than 395 gpm. 8.3 WHEN at least two SG narrow range levels greater than 28% AND TDAFWP NOT required, THEN stop TDAFWP. 8.4 [CA] WHEN SG narrow range level greater than 31%{48%}, THEN maintain SG narrow range level 31%-65%{48%-65%}. 8.4.1 Control MDAFWP flow. MDAFWP FCV 3227 RESET [] A TRN reset [] B TRN reset MDAFWP TO 1A/1B/1C SG B TRN [] FCV 3227 in MOD 8.4.2 Control TDAFWP flow. TDAFWP FCV 3228

Event Description: 1A SGTR 300 gpm

Cue: preset

		[] RESET reset TDAFWP SPEED CONT [] SIC 3405 adjusted
	RO	**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 [] TI 412D [] TI 422D [] TI 432D
	RO	RNO IF RCS temperature less than 547°F and falling, THEN perform the following. 9.1.1 Verify steam dumps closed. STM DUMP INTERLOCK [] A TRN in OFF RESET [] B TRN in OFF RESET 9.1.2 Verify atmospheric reliefs closed on MCB Demand at 0 and minimum red light LIT 9.1.3 Control total AFW flow to minimize RCS cooldown, AFW FLOW TO 1A(1B,1C) SG [] FI 3229A [] FI 3229B [] FI 3229C AFW TOTAL FLOW [] FI 3229 9.1.4 IF MSIVs are closed THEN proceed to step 9.1.8 9.1.5 IF MSIVs are open, THEN isolate steam loads in the turbine building while continuing with RNO step 9.1.6. **Will call TBSO to accomplish this task**
	RO	**10 Check pressurizer PORVs and spray valves.** 10.1 [CA] WHEN pressurizer pressure less than 2335 psig, THEN verify both PRZR PORVs closed. 10.1.1 Verify both PRZR PORVs indicate CLOSED 10.1.2 Check PRZR PORV temperature STABLE OR FALLING. [] PORV Temp TI-463 10.1.3 Check PRT parameters STABLE or FALLING.

Event Description: 1A SGTR 300 gpm

Cue: preset

		[] PRT PRESS PI 472 [] PRT LVL LI-470 [] PRT TEMP TI-471 10.2 [CA] WHEN pressurizer pressure to less than 2260 psig, THEN verify normal pressurizer spray valves closed OR in the process of closing. — 10.2 Stop 1A AND 1B RCPs stop spray flow. 1A(1B) LOOP SPRAY VLV [] PK 444C [] PK 444D 10.3 Check any PRZR PORV ISO - OPEN
	RO	**11 Check RCP criteria.** 11.1 Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE — 11.1 IF HHSI flow greater than 0 gpm, THEN stop all RCPs.
	RO	**12 Monitor charging pump miniflow criteria.** 12.1 Control charging pump miniflow valves based on RCS pressure. 1C(1A) LOOP RCS WR PRESS [] PI 402A [] PI 403A Based on RCS pressure, close miniflows < 1300 and open when > 100 psig.
Diagnostics The SRO will direct the parameters to be reviewed and will determine appropriate procedure to transition to.		
	SRO	**13 Check SGs not faulted.** o Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig.
	SRO	**14 Check SGs not ruptured.** o Check secondary radiation indication - NORMAL. Checks rad monitors R-15, 19, 23A and B, 15B and C, and 60 A, B, C, D No SG level rising in an uncontrolled manner. **1A SGWL will be rising in an uncontrolled manner with rad monitors in alarm**

Event Description: 1A SGTR 300 gpm

Cue: preset

		Go to EEP-3, SGTR.
	RO	**Check RCP criteria.** Check SUB COOLED MARGIN MONITOR indication - GREATER THAN 16°F{45°F} SUBCOOLED INCETC MODE. **YES**
	BOP	**[CA] Identify ruptured SG(s).** Check any SG level - RISING IN a) WHEN ruptured SG(s) AN UNCONTROLLED MANNER **YES**
Event 9	SRO/RO	**CRITICAL TASK – ARV-3371A will fail open and must be isolated IAW this step** **[CA] 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 **NO** Verify 1A SG is less than 1035 psig and ARV open, then manually close the ARV – take PC to manual and close on PC3371A - If the ARV cannot be closed then unlock and close Q1N11V004A or B
Event 10	BOP	**CRITICAL TASK - FCV-3227A will fail open and must be isolated IAW this step** **[CA] WHEN ruptured SG(s) NR level greater than 31%{48%}, THEN perform the following:** [CA] Isolate AFW flow to ruptured SG(s) using FCVs. - FCV 3227A in MOD, and closed **NO** - HV 3328A in MOD and closed **YES** If AFW flow from MDAFWP(s) NOT isolated, THEN isolate flow to 1A SG by closing MOV 3764A OR E
	SRO	**Check ruptured SG(s) pressure GREATER THAN 250 psig. YES**
	SRO	Evaluate performing an RCS cooldown. Determine required CETCs for cooldown based on ruptured SG pressure.

Event Description: 1A SGTR 300 gpm

Cue: preset

RUPTURED SG PRESSURE (psig)	REQUIRED CORE EXIT TEMPERATURE
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	Direct the STA to Display the hottest CETC page 1TC1 on plant computer. This is normally selected by the STA and put on the control board display.
	SRO	**Will direct these steps:** **Begin RCS cooldown to cold shutdown.** Depending on RCS temperature the BOP will either start the cooldown and then bypass the stm dump interlock for P-12 or will bypass initially. The Stm Dumps will be set up in the STM Press mode and the cooldown started at the maximum rate. This means the steam dupms are to be opened to approx. 20%. **If the MSIVs are closed in this event, then the Atmospherics on 1B and 1C SG will be used here instead.**

Event Description: 1A SGTR 300 gpm

Cue: preset

	BOP	WHEN P-12 light lit (543°F), THEN perform the following: Block low steam line pressure SI. Place handswitches for STM LINE PRESS SI BLOCK - RESET [] A TRN to BLOCK [] B TRN to BLOCK Verify blocked indication. BYP & PERMISSIVE STM LINE ISOL. SAFETY INJ. [] TRAIN A BLOCKED light lit [] TRAIN B BLOCKED light lit Bypass the steam dump interlock. STM DUMP INTERLOCK [] A TRN to BYP INTLK [] B TRN to BYP INTLK Adjust steam header pressure controller to maximize the cooldown rate □ STM HDR PRESS [] PK 464 adjusted Use Stm dumps to cooldown since they are available. - Stop the cooldown when the hottest CETC temperature is less than the required temperature and then maintain CETCs at the required Temp.
	BOP	**Check intact SG levels.** Check any intact SG narrow range level – GREATER THAN 31%{48%}. **YES** [CA] 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 [] A TRN reset [] B TRN reset MDAFWP TO 1A/1B/1C SG B TRN [] FCV 3227 in MOD

Event Description: 1A SGTR 300 gpm

Cue: preset

		Control TDAFWP flow. TDAFWP FCV 3228 [] RESET reset TDAFWP SPEED CONT [] SIC 3405 adjusted
	RO	**Check pressurizer PORVs** **Check any PRZR PORV ISO – power available** [CA] WHEN pressurizer pressure less than 2335 psig, THEN verify pressurizer PORVs closed with no leakage. Verify both PRZR PORVs – CLOSED Check PRZR PORV temperature STABLE OR FALLING. [] PORV Temp TI-463 Check PRT parameters STABLE or FALLING. [] PRT PRESS PI 472 [] PRT LVL LI-470 [] PRT TEMP TI-471 Check at least one PRZR PORV ISO - OPEN
	BOP	**Verify SI - RESET.** MLB-1 1-1 not lit (A TRN) and MLB-1 11-1 not lit (B TRN) **Verify PHASE A CTMT ISO - RESET.** MLB-2 1-1 not lit and MLB-2 11-1 not lit
	BOP	Check PHASE B CTMT ISO - RESET. - NO ctmt pressure increase
	RO	**IF instrument air available, THEN establish instrument air to containment.** Verify at least one air compressor started. AIR COMPRESSOR [] 1A [] 1B [] 1C Check INST AIR PRESS PI 4004B greater than 85 psig. Check instrument air to containment. IA TO CTMT [] MLB-3 1-2 NOT lit IA TO PENE RM PRESS LO

Event Description: 1A SGTR 300 gpm

Cue: preset

		[] Annunciator KD1 clear **YES**
	RO	**[9 [CA] Check if LHSI Pumps should be stopped.** Check RCS pressure – GREATER THAN 275 psig{435 psig} **YES** PT-402 AND 403 Check RCS pressure - STABLE OR RISING **YES** Verify the SI reset Secure any running RHR pumps **Take HS to stop.**
	SRO	**Check if Cooldown should be stopped.** Check hottest core exit T/Cs - LESS THAN REQUIRED Temperature. Stop RCS cooldown Maintain core exit T/Cs – LESS THAN REQUIRED TEMPERATURE. **RNO** Do NOT proceed until hottest core exit T/Cs - LESS THAN REQUIRED TEMPERATURE.
	SRO	o **Check ruptured SG(s) pressure - STABLE OR RISING.** o **Check SUB COOLED MARGIN MONITOR indication - GREATER THAN 36°F{65°F} SUBCOOLED IN CETC MODE.** **YES for BOTH**
NOTE: Normal pressurizer spray may become ineffective during pressure reduction. This situation justifies using a PRZR PORV per step 18.		
	RO	**Reduce RCS pressure to minimize break flow and refill pressurizer.** Open all available normal pressurizer spray valves. 1A(1B) LOOP SPRAY VLV [] PK 444C [] PK 444D Reduce RCS pressure using ONE pressurizer PORV to minimize break flow and refill pressurizer. One PORV may be used to increase the pressure reduction and will probably be the case.

Event Description: 1A SGTR 300 gpm

Cue: preset

	SRO	Reduce RCS pressure until one of the following three conditions occurs, then stop RCS pressure reduction. RCS pressure less than ruptured SG pressure AND pressurizer level greater than 13%{43%} OR Pressurizer level greater than 73%{66%} OR SCMM indication less than 16°F{45°F} subcooled in CETC mode. **<u>Then verify the sprays and PORVs are closed.</u>**
	SRO	**Check RCS pressure - RISING.** PI-402 and 403 rising Evaluate SI termination criteria o Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE. o Check secondary heat sink available. >395 gpm AFW flow > 31%{48%} SGNR level o Check RCS pressure - STABLE OR RISING o Check pressurizer level GREATER THAN 13%{43%}.
		Suggested END OF SCENARIO

STEP 21 OF EEP-3.0

	RO	o **<u>Stop all but one charging pump</u>** o Isolate HHSI flow. - LCV-115B and D open - Verify charging pump miniflow valves - OPEN. 1A(1B,1C) CHG PUMP MINIFLOW ISO [] Q1E21MOV8109A [] Q1E21MOV8109B [] Q1E21MOV8109C CHG PUMP MINIFLOW ISO [] Q1E21MOV8106 Close HHSI isolation valves. HHSI TO RCS CL ISO

Event Description: 1A SGTR 300 gpm

Cue: preset

		[] Q1E21MOV8803A [] Q1E21MOV8803B o **Establish normal charging.** Manually close charging flow control valve. CHG FLOW [] FK 122 Verify charging flow path aligned. Verify charging pump discharge flow path - ALIGNED. CHG PUMP DISCH HDR ISO [] Q1E21MOV8132A open [] Q1E21MOV8132B open [] Q1E21MOV8133A open [] Q1E21MOV8133B open CHG PUMPS TO REGENERATIVE HX [] Q1E21MOV8107 open [] Q1E21MOV8108 open Verify only one charging line valve - OPEN. RCS NORMAL CHG LINE [] Q1E21HV8146 RCS ALT CHG LINE [] Q1E21HV8147 23.3 Establish desired charging flow. CHG FLOW [] FK 122 adjusted
Suggested END OF SCENARIO		

This scenario can be terminated any time the NRC examiner deems enough actions have been taken.

Event Description: Attachment 2 and 4 of EEP-0

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

Time	Position	Applicant's Action or Behavior
		Attachment 2 of EEP-0 **AUTOMATIC ACTIONS VERIFICATION**
	BOP	**1 Verify each SW train - HAS TWO SW PUMPs STARTED.** [] A train (1A,1B or 1C) [] B train (1D,1E or 1C) **2 Verify each train of CCW - STARTED.** 2.1 Verify one CCW PUMP in each train- STARTED. A train HX 1C or 1B CCW FLOW [] FI 3043CA > 0 gpm OR [] FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW [] FI 3043AA > 0 gpm OR [] FI 3043BA > 0 gpm Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX [] Q1P16FI3009AA > 0 gpm [] Q1P16FI3009BA > 0 gpm [] Q1P16FI3009CA > 0 gpm
	BOP	**3 Verify one CHG PUMP in each train - STARTED.** [] A train (1A or 1B) amps > 0 [] B train (1C or 1B) amps > 0
	BOP	**4 Verify RHR PUMPs - STARTED.** RHR PUMP [] 1A amps > 0 [] 1B amps > 0
	BOP	**5 Verify Safety Injection Flow.** 5.1 Check HHSI flow - GREATER THAN 0 gpm. [] FI 943

Event Description: Attachment 2 and 4 of EEP-0

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

	BOP	Check RCS pressure - LESS THAN 275 psig{435 psig}. 5.2 Proceed to Step 6.
	BOP	**6 Verify containment ventilation isolation.** 6.1 Verify containment purge dampers - CLOSED. [] 3197 [] 3198D [] 3198C [] 3196 [] 3198A [] 3198B 6.2 Verify containment mini purge dampers - CLOSED. CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D [] 2866C [] 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C [] 2866D [] 2867D 6.3 Stop MINI PURGE SUPP/EXH FAN. **Will place HS to STOP**
	BOP	**7 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 [] 1A [] 1B □ B train [] 1C [] 1D 7.2 Verify associated emergency service water outlet valves - OPEN. EMERG SW FROM 1A(1B,1C,1D) CTMT CLR [] Q1P16MOV3024A [] Q1P16MOV3024B [] Q1P16MOV3024C [] Q1P16MOV3024D

Event Description: Attachment 2 and 4 of EEP-0

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

<table>
<tr><td></td><td>BOP</td><td>8 Verify AFW Pumps - STARTED.
8.1 Verify both MDAFW Pumps - STARTED
[] 1A MDAFW Pump amps > 0
[] 1B MDAFW Pump amps > 0
AND
[] FI-3229A indicates > 0 gpm
[] FI-3229B indicates > 0 gpm
[] FI-3229C indicates > 0 gpm

8.2 Check TDAFW Pump start required.
<table>
<tr><td>□Condition</td><td>□TSLB</td><td>□Setpoint</td><td>□Coincidence□</td></tr>
<tr><td>RCP Bus Undervoltage</td><td>TSLB2 1-1
1-2 1-3</td><td>□2680 V</td><td>1/2 Detectors on 2/3 Busses</td></tr>
<tr><td>Low Low SG Water Level In Any 2/3 SGs</td><td>TSLB4
4-1,4-2,4-3
5-1,5-2,5-3
6-1,6-2,6-3</td><td>28%</td><td>2/3 Detectors on 2/3 SGs</td></tr>
</table>
</td></tr>
<tr><td></td><td>BOP</td><td>Verify TDAFWP started.
[] MLB-4 1-3 lit
[] MLB-4 2-3 lit
[] MLB-4 3-3 lit

TDAFWP SPEED
[] SI 3411A > 3900 rpm

TDAFWP SPEED CONT
[] SIC 3405 adjusted to 100%

8.4 Verify TDAFW flow path to each SG.
TDAFWP TO 1A(1B,1C) SG
[] Q1N23HV3228A in MOD
[] Q1N23HV3228B in MOD
[] Q1N23HV3228C in MOD

TDAFWP TO 1A(1B,1C) SG FLOW CONT
[] HIC 3228AA open
[] HIC 3228BA open
[] HIC 3228CA open</td></tr>
<tr><td></td><td>BOP</td><td>9 Verify main feedwater status.
9.1 Verify main feedwater flow control and bypass valves - CLOSED.
1A(1B,1C) SG FW FLOW
[] FCV 478
[] FCV 488</td></tr>
</table>

Event Description: Attachment 2 and 4 of EEP-0

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

		[] FCV 498 9.2 Verify both SGFPs - TRIPPED. 9.3 Verify SG blowdown - ISOLATED. 1A(1B,1C) SGBD ISO [] Q1G24HV7614A closed [] Q1G24HV7614B closed [] Q1G24HV7614C closed 9.4 Verify SG blowdown sample - ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE STEAM GEN ISO [] MLB1 19-2 lit Q1P15HV3328 closed [] MLB1 19-3 lit Q1P15HV3329 closed [] MLB1 19-4 lit Q1P15HV3330 closed
	BOP	**10 Check no main steam line isolation actuation signal present.** Signal — Setpoint — coincidence — TSLB LO SG PRESS — < 585 psig — 2/3 — TSLB4 19-2,3,4 Hi stm flow — >40% — ½ on 2/3 — TSLB4 16-3,4 and — and — — 17-3,4 18-3,4 Lo-Lo Tavg — <543°F — 2/3 — TSLB2 10-1,2,3 HI-HI ctmt press — >16.2 psig — 2/3 — TSLB1 2-2,3,4
	BOP	**11 Verify PHASE A CTMT ISO.** 11.1 Verify PHASE A CTMT ISO - ACTUATED. [] MLB-2 1-1 lit [] MLB-2 11-1 lit 11.2 Check all MLB-2 lights - LIT. 11.2 Verify PHASE A CTMT ISO alignment using ATTACH 3, PHASE A CTMT ISO
	BOP	**12 Check all reactor trip and reactor trip bypass breakers - OPEN.** 12 Perform the following. 12.1 Open reactor trip breaker(s) manually from MCB or locally. 12.2 Record any breaker(s) manually opened. Reactor trip breaker A Reactor trip breaker B Reactor trip bypass breaker A Reactor trip bypass breaker B

Event Description: Attachment 2 and 4 of EEP-0

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

	BOP	**13 Trip CRDM MG set supply breakers.** 1A(1B) MG SET SUPP BKR [] N1C11E005A [] N1C11E005B
	BOP	**14 Secure secondary components.** 14.1 Stop both heater drain pumps. HDP [] 1A [] 1B 14.2 Check any condensate pump started. 14.2.1 IF started, THEN stop all but one condensate pump. [] 1A [] 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	**15 Verify both CRACS mode selector switches in the ON position.** CRACS Mode Selector Switch [] A TRAIN [] B TRAIN Will call BOOTH to have this accomplished since this is not in the simulator
	BOP	**16 WHEN at least 30 seconds have passed since turbine trip, THEN check main generator tripped.** 230 KV BKR [] 810 - OPEN [] 914 - OPEN
	BOP	**17 Verify two trains of ECCS equipment aligned.** 17.1 Perform ATTACHMENT 4, TWO TRAIN ECCS ALIGNMENT VERIFICATION.

Event Description: Attachment 2 and 4 of EEP-0

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

Attachment 4 TWO TRAIN ECCS ALIGNMENT VERIFICATION		
	BOP	**1 Verify two trains of ECCS equipment aligned.** Check DF01 closed Verify DF02 closed Check DG15 closed Verfiy DG02 closed Verify two trains of battery chargers – energized - Amps > 0 1.6 Verify two trains of ESF equipment aligned. Check all MLB-1 lights LIT Verify charging pump suction and discharge valves - OPEN. CHG PUMP DISCH HDR ISO [] Q1E21MOV8132A [] Q1E21MOV8132B [] Q1E21MOV8133A [] Q1E21MOV8133B CHG PUMP SUCTION HDR ISO [] Q1E21MOV8130A [] Q1E21MOV8130B [] Q1E21MOV8131A [] Q1E21MOV8131B 1.7 Verify all post accident containment air mixing system fans - STARTED. (BOP) POST ACCIDENT MIXING FAN [] 1A [] 1B [] 1C [] 1D RX CAV H2 DILUTION FAN [] 1A [] 1B 1.8 WHEN power restored to any de-energized emergency bus, THEN verify alignment of associated equipment.
	BOP	Call Radside SO to Verify Spent Fuel Pool Cooling in service per SOP-54.0, SPENT FUEL PIT COOLING AND PURIFICATION SYSTEM.
End of Attachment 2 and 4		

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, verbally state, "Unit 2" and an instructor will locate to the Unit 2 area and respond to you as quickly as possible.

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 Status Mode 1, 4% RTP, EOL , 524 ppm Cb, 15,000 MWD,
UOP-1.2, v.89, completed thru step 5.55. Ready to perform step 5.56.

.

STPs/Evolutions:

A Train On-Service – **A** Train Protected

1.0___; 109.1 ____No adj. ; 63.7 ____; FSP-20,0 _____;

Status of Special Testing

General Information

1. Current Risk Assessment is GREEN and projected is GREEN
2. 1B EHC pump is tagged out for motor replacement. (OOS 6 hrs, ETR 2 hrs)
3. 1A SGFP on service. Main Feed Reg Bypass valves are controlling feed flow
4. Aux steam from U-2.
5. Only partial of 2 sets of cooling tower fans will be on service. (i.e. half of the A, B,C towers)
6. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia
7. **ALL requirements are met for MODE 1 entry**
8.
9.
10.

Equipment Status

1B EHC pump is tagged out		Maintain VCT gas pressure 25-30 psig

Reactivity Plan	**Waste Management Status**
80 Gallon Dilutions as required to maintain temperature and power.	#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	Operator Logs Reviewed	Cond. Report Queue Reviewed	Autolog Reviewed	ELDS & GEN Spreadsheet verified	Keys Turned Over
	[X] Yes	[X] Yes	[X] Yes	[X] Yes	[X] Yes	[X] Yes

original submittal

Facility: Farley Scenario No.: 4 Op-Test No.: FA2008301

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: approx. 24% power, on hold for 1-2A DG RTS. ??? ppm, MOL; A train on service, B Train protected. 1A SGFP on service (IC-??)

Turnover:

- 1-2A DG T/O for governor work. (OOS 3 hours, ETR 4 hrs)
- 1B EHC pump 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 No.	Malf No.	Event Type*	Event Description
1		(I) (RO)	TE-144 fails HIGH. TCV-143 fails to divert on high temperature. Controller can be controlled in manual. Letdown may be secured.
2		C (BOP) **TS** (SRO)	1C CCW pump trips on Overcurrent. 1B CCW pump does not auto start. CCW leak when 1B CCW pump starts- AOP-9 Leak can be isolated locally at the 1C CCW pump due to relief valve lifting.
3		C (BOP) R (RO & BOP)	Air side Seal oil pump trips and the DC pump does not auto start. This causes High Vibration on Main Turbine. 10 mils - crew will be instructed to ramp down. We are not sure if this will work. May have to change it to another failure that will give same results.
4		C (RO or BOP) **TS** (SRO)	One bank 'D' rod drops into the core during ramp. The team should enter and perform the actions of AOP-19 for a single dropped rod and address technical specifications. LCO 3.1.4 (3B scenario)
5		C (ALL)	Main Turbine vibrations increase to 15 mils – AOP-3.0 entered to trip the MT and ramp to 8% power.
6		M (ALL)	LOSP – 1C DG goes to unit 2 and 1B DG starts and trips. 2C DG will not start. Enter ECP-0 here.
7		C (BOP)	TDAFW pump will not auto start, start from MCB.
8		N (BOP)	When at ECP-0 step 16, reduce intact SGs to 200 psig, then restore off site power.

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

adjusted the pow for Scenario 2

Event No.	Malf. No.	Event Type*	Event Description
		PRESETS	
0	IC- ??	-------	Approx 25% MOL, ramping up, A Train on service.
0	Malcmf / cms3235B / cc1 & cc2 And Cms3235a (cc5)	-----	TDAFW pump will not auto start
0	irf cbk1df08_d_cd1 open irf cbk2df08_d_cd1 open	------	Tag 1-2A DG output breakers for Unit 1 & 2 rack out 1-2A DG DF08-1 rack out 1-2A DG DF08-2
0	NA	------	1-2A DG Mode selector switch in Mode 3; **Tag out 1-2A MSS**
0	Cmfmalf / cmshfpb_cp1	-----	Tag out 1B EH pump
0	tcv-143 fails to divert imf ccvt143_d_cc1 closed	-----	Fails TCV-143 from diverting on high temperature.
0	imf cccp02a_d_cc7 open imf cccp02a_d_cc8 open	----	1B CCW pump will not auto start.
0	Mal-ccw2B (0-1000%)	---	Start a CCW leak when 1B CCW pump is started.
0	Mal-eps4B (1 60) Need a trigger to make this work	------	1B DG will trip when it starts.
0	irf loa-epb005 false	------	2C DG will not start from EPB.
0	1B EH PUMP	----	PLACE IN OFF AND TAG

SCENARIO 4 Summary sheet

Presets:

Event 1 TE-144 fails HIGH. TCV-143 fails to divert on high temperature. Controller can be controlled in manual. Letdown may be secured.

Event 2 1C CCW pump trips on Overcurrent. 1B CCW pump does not auto start. CCW leak when 1B CCW pump starts- AOP-9
Leak can be isolated locally at the 1C CCW pump due to relief valve lifting.

Event 3 Air side Seal oil pump trips and the DC pump does not start. This causes High Vibration on Main Turbine. 10 mils - crew will be instructed to ramp down.

Event 4 One bank 'D' rod drops into the core during ramp. The team should enter and perform the actions of AOP-19 for a single dropped rod and address technical specifications. LCO 3.1.4 (see 3B scenario for failure codes)

Event 5 Main Turbine vibrations increase to 15 mils – AOP-3.0 entered to trip the Main Turbine and ramp to 8% power.

Event 6 LOSP – 1C DG goes to unit 2 and 1B DG starts and trips.
2C DG will not start.

Event 7 TDAFW pump will not auto start, start from MCB. (CT)

Event 8 When ECP-0 step 16, reduce intact SGs to 200 psig then restore off site power. Restore off site power. (CT is to decrease intact SGs to 200 psig)

CRITICAL TASK SHEET

___ 1. Start the TDAFW pump. (WOG CT ECA-0.0 - -B)

___ 2. Isolate RCP seal injection before a charging pump starts or is started. (WOG CT ECA-0.0 - -H)

___ 3. Depressurize the intact SG(s) at the maximum rate such that all the following limiting conditions are met:
- SG depressurization is not initiated until narrow-range level in at least one intact SG is greater than 4%
- If narrow-range level cannot be maintained greater than 4% in at least one intact SG (after depressurization is commenced), then SG depressurization is stopped until narrow-range level is restored to greater than 4% in at least one intact SG
- SG pressure does not decrease to less than 130 psig
- RCS cold leg temperature does not decrease to less than 243°F
- If a positive SUR is indicated on either the source range or the intermediate range (after depressurization is commenced), then SG depressurization is stopped and the RCS is allowed to heat up

(WOG CT ECA-0.0 - -G)

SCENARIO OBJECTIVE/ OVERVIEW: Ramp up in progress.

The team should be able to:
- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-9, AOP-19 AOP-3.0 & Tech Specs
- Respond to a loss of off-site power for which no DG will start. When ECP-0 is in progress and reducing SGs to 200 psig, off-site power will be restored.
- The crew will restore off-site power and then exit ECP-0.0.

Southern Nuclear
J.M. Farley Nuclear Plant

Operations Training
Simulator Exam Scenario

HLT-32 NRC EXAM SCENARIO #4

Technical Review: GT Ohmstede *Date:* 07-2008

Training Department Approval: _____ *Date:* _____

SOUTHERN COMPANY
Energy to Serve Your World™

Facility:	Farley Nuclear Plant		Scenario No.:	4	Op-Test No.:	2008-301

Examiners: _____ Operators: _____ SRO

_____ _____ RO

_____ _____ BOP

Initial Conditions: 25% power, on hold for 1-2A DG RTS. 1254 ppm, MOL; A train on service, B Train protected. 1A SGFP on service. Bypass FRVs in auto and transfer to the main FRVs is in progress

Turnover:

- 1-2A DG T/O for governor work. (OOS 3 hours, ETR 4 hrs)
- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Current Risk Assessment is GREEN and projected is GREEN,
- **A** Train On-Service – **B** Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event No.	Malf. No.	Event Type*	Event Description
1		(I) (RO)	TK-144 fails HIGH. TCV-143 fails to divert on high temperature. Controller can NOT be controlled in manual. Letdown will have to be secured.
2		N (BOP)	Place Excess letdown on service IAW AOP-16.
3a		C (BOP) **TS** (SRO)	1C CCW pump trips on Overcurrent. 1B CCW pump does not auto start.
3b		C (BOP)	CCW leak when 1B CCW pump starts- Leak can be isolated locally at the 1C CCW pump due to relief valve lifting.
4		C (ALL) R (RO & BOP)	Air side Seal oil pump trips and the DC pump does not auto start. This causes High Vibration on Main Turbine. 10 mils – The crew will be instructed to ramp down
5		I (RO) **TS** (SRO)	PT-445 fails high PORV will stick open. MOV isolation will have to be closed.
6		C (ALL)	Main Turbine vibrations increase to 15 mils – AOP-3.0 entered to trip the MT and ramp to 8% power.
7		M (ALL)	LOSP – 1C DG goes to unit 2 and 1B DG starts and trips. 2C DG will not start. Enter ECP-0 here.
8		C (RO)	TDAFW pump will not auto start, start from MCB.
9		C (BOP)	When at ECP-0 step 16, reduce intact SGs to 200 psig, then restore off site power.

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

PT-445 failure moved to this scenario from #2

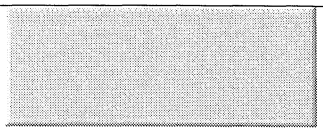
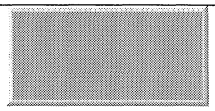
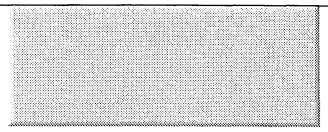
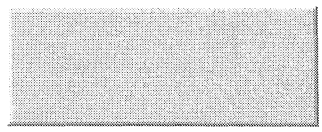
Scenario 1 failure was changed to no manual control of TCV 144 so AOP 16 and excess letdown will have to be placed on service. The result is the crew will have to ramp down with excess letdown on service. This will allow more actions to be done.

Pre-sets

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	**Base IC**- IC-37, 25% RTP, MOL, A Train O/S, Cb=1254 ppm Xe is -75 pcm UOP-1.2, v.88.0, step 5.72 in progress, UOP-3.1, just entered. **Exam IC**-210, 25% RTP, MOL, A Train O/S, Cb=1254 ppm Xe is -75 pcm	Need to change Trains on service and make sure proper CCW lineup
		Run caep file for split train	
		RUN	RUN simulator
		Generic setup: bat generic_setup_HLT.txt	
0	0	Quick setup (all items with * are included): bat 2008nrcexam_04.txt	
0	0	TDAFW pump will not auto start imf cms3235b_cc1 open imf cms3235b_cc2 open imf cms3235a_cc1 open imf cms3235a_cc2 open	*
0	0	Rack out 1B EH pump breaker Cmfmalf / cmshfpb_cp2	*
0	0	Fails TCV-143 from diverting on high temperature. imf ccvt143_d_cc1 closed	*
0	0	1B CCW pump will not auto start. imf cccp02a_d_cc7 open imf cccp02a_d_cc8 open	*
0	0	Fail Normal Air Pressure light OFF on 1-2A DG Malf / D / mal-dsg001	*
0	0	CCW leak when df04 opens imf Mal-ccw2B (2 1) 150 60	Trg 2
0	0	1B DG trips on AUTO start imf mal-eps4b (3 30)	Trg 3
0	0	Rack out 1-2A DG DF08-1 and DF08-2 irf cbk1df08_d_cd1 open irf cbk2df08_d_cd1 open	
0	0	2C DG will not start from EPB. irf loa-epb005 false	*

Pre-sets

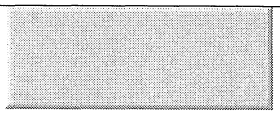
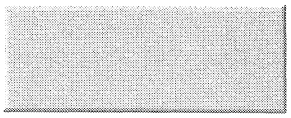
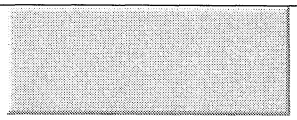
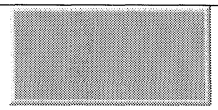
EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	Trigger 1 (Monitor for Air Side DC Seal oil pump malfunction) Run cae file cae 08_301_scn04.cae to cause ground indications and trip DC pump. high vib on main turbine ramps in over 2 minutes to 10 mils/ 7 mils Malf/ T / maltur4f and 4E (10/7) 120 Event: x23o084m Command: cae 08_301_scn04.cae	*
0	0	Trigger 2: start a CCW leak when 1B CCW pump is started Event trigger 2 monitors breaker dfo4 open trgset 2 "cccp01c_d_co1"	*
0	0	Trigger 3: 1B DG will trip when it starts. trgset 3 "xg1ba02"	*
0	0	PORV-445A sticks open and will not close trgset 4 "rrc445a > 0.2" trg 4 "imf rrc445a-s 50"	*

		MCB setup	
		1B EH pump handswitch Place in OFF and TAG	1 HOLD tag
		1-2A DG Mode selector switch	Place in Mode 3
		Place HOLD Tag 1-2A MSS	1 HOLD TAG
		Place HOLD Tag on 1-2A DG output breakers	2 HOLD TAGS
		Place Unit 1 and unit 2 Bypass and inoperable panel lights to the up position	Unit 1 A-Train Unit 2 A Train
0	0	**DEH**	Clear DEH alarms
0	0	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
		Recorders	Verify memory disks cleared
0	0	**Provide a copy marked up of UOP-1.2 V. 89 step 5.72 and UOP-3.1, version 96, step 5.0 for where the crew is in the scenario**	**UOP-1.2 and UOP-3.1 copy**
			 Acknowledge annunciators
			Verify HORNS ON
			 FREEZE simulator
		Perform Booth Operators Setup Checklist	
		Open Simview file to be used for plant parameter data collection: Simview / 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
0	0	**VERIFY MICROPHONES READY**	Batteries installed
0	0	**TURNOVER SHEET AVAILABLE**	

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
Prior to RUN	0		
		Start data collection for Simview file DataCollection.uvl	
	0	**Begin Exam**	RUN simulator
		Verify Horns ON: hornflag	Verify Horns On
1 2	2	TK-144 fails HIGH Cnh / Imf tk144-d 10 30 Imf tk144-a 10 will fail tcv144 closed with operator control allowed Place excess letdown on service	
3	NRC CUE	1C CCW pump trips on Overcurrent. Cmf malf/ imf cccp01c_d_co1	
4	NRC CUE	Air side Seal oil pump trips CMFmalf / cGS5087A_cc3 / closed	
Seal Oil Parameters units are psia ptgaaop unit are psia ptgaasop units are psia ptgah2op			
drops hydrogen pressure to 45 psig Imf mal-tur20 60 25			
5	NRC CUE	PT-445 fails high XMT/ pt445 2500 40	

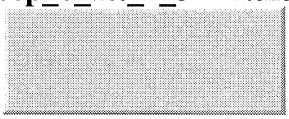
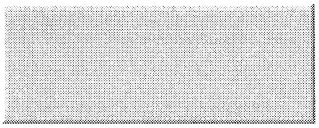
EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
6	NRC CUE	Main Turbine vibrations increase to 15 mils Malf / T / imf mal-tur4f 17 65 Malf / T / imf mal-tur4e 15 85	 
7	NRC CUE	LOSP Malf / E / imf mal-eps1 1	
8	NRC CUE	TDAFW pump will not auto start	preset
9	NRC CUE	When at ECP-0 step 16, reduce intact SGs to 200 psig, then restore off site power.	
		End of Exam	 HORNS OFF
		End of Exam	 FREEZE simulator
		Stop data collection for Simview file DataCollection.uvl	
		Export data to file with the name of NRC exam01 grpX.txt ***NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate.*** ***NOTE: file will be saved in the OPENSIM directory.***	Ensure data file created.

Local operator actions:

EVENT NO.	***TIME***	***ACTIONS***
1		NONE REQUIRED
2	Acknowledge MK4	
3		Isolate CCW leak – dmf Mal-ccw2B
4	Fail off LF5 when Seal oil backup pump is started	
5		Remove power from MOV 8000A
6		NONE REQUIRED
7		Start the 2C DG in Mode 4 Remote / r43/ loa-dsg007 true

Local operator actions:

EVENT NO.	***TIME***	***ACTIONS***
7		**Defeat Auto Starts** **Attachment Two** **ecp_0_att_2_5min.txt**  **(INSTRUCTOR MUST PERFORM THE LOCAL ACTIONS OF THE ATTACHMENT AT HSPs)** Place LOCAL/REMOTE switches for A train ESF equipment in LOCAL. CHG PUMP 1A and 1B (A TRN) CCW PUMP 1C and 1B (A TRN) MDAFWP 1A Place LOCAL/REMOTE switches for B train ESF equipment in LOCAL. CHG PUMP 1B (B TRN) and 1C CCW PUMP 1B (B TRN) and 1A MDAFWP 1B
7		**RCP Seal Isolation** **Attachment Three** **ecp_0_att_3_1min.txt**  **Instructor Note**: *No action to be taken for isolating Hotwell Fill per step 9 of ECP-0.0 (no simulator capability)*
7		**Reduce DC Loads** **Attachment Four** **(Delay any action on this)**
7		crew may direct N2 aligned to PORVs  **Expert / cae n2_porvs_align.cae**
8		NONE REQUIRED

Local operator actions:

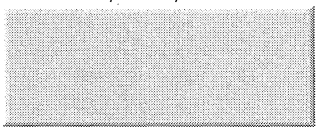
EVENT NO. ***TIME*** ***ACTIONS***

9

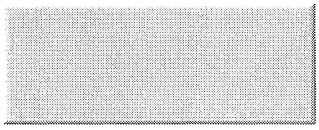
Crew should direct local operation of atmospheric relief valves

Instructor Note: These command buttons open each valve approximately 40%. To modify, use IS SUMMARY window. Range of 1.0 (full closed) to 2.0 (full open).

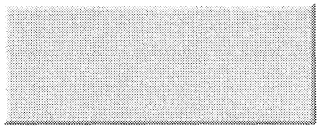
- Remote / N11 / loa-mss002 / 1.4 / 40 sec ramp



- Remote / N11 / loa-mss003 / 1.4 / 40 sec ramp

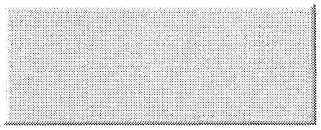


- Remote / N11 / loa-mss004 / 1.4 / 40 sec ramp



9

Restore Offsite Power



Malf / E / MAL-EPS1 / 100

Crew takes actions of ECP-0.0 to power emergency busses

Energizes dead bus per ECP-0.0, step 5.9.2 or SOP-36.2
When emergency busses energized, go to step 24 of ECP-0.0

Initial Conditions: 25% power, on hold for 1-2A DG RTS, MOL, 8000 MWD, A Train O/S, B Train protected, RCS boron concentration is 1254 ppm, and Xe is -75 pcm. 40 gal dilutions as necessary to maintain temperature and power. Rods are in manual. 1A SGFP is on service, Bypass FRVs in auto and transfer to the main FRVs is in progress.

Turnover:

- 1-2A DG T/O for governor work. (OOS 3 hours, ETR 4 hrs)
- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Current Risk Assessment is GREEN and projected is GREEN,
- **A** Train On-Service – **B** Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event 1 TK-144 fails HIGH. TCV-143 fails to divert on high temperature. Controller can not be controlled in manual. Letdown will be secured and AOP-16 will be entered to place excess letdown on service.

Event 2 Place Excess letdown on service IAW AOP-16.

Event 3 1C CCW pump trips on Overcurrent. 1B CCW pump does not auto start. CCW leak when 1B CCW pump starts- AOP-9 will be entered. Leak can be isolated locally at the 1C CCW pump due to relief valve lifting.

Event 4 Air side Seal oil pump trips and the DC pump does not start. This causes High Vibration on Main Turbine. 10 mils - crew will be instructed to ramp down.
This may require a TBSO report that the vibrations on the turbine deck are high.

Event 5 PT-445 fails high. PORV will stick open. MOV isolation will have to be closed.

Event 6 Main Turbine vibrations increase to 15 mils – AOP-3.0 entered to trip the Main Turbine and ramp to 8% power.

Event 7 LOSP – 1C DG goes to unit 2 and 1B DG starts and trips.
2C DG will not start.

Event 8 TDAFW pump will not auto start, start from MCB. (CT)

Event 9 In ECP-0, direct isolating RCP seal injection before a charging pump starts or is started. (CT)
When ECP-0 step 16, reduce intact SGs to 200 psig then restore off site power. (CT is to decrease intact SGs to 200 psig)
Restore off site power.

CRITICAL TASK SHEET

___ 1. Start the TDAFW pump. (WOG CT ECA-0.0 - -B)

___ 2. Isolate RCP seal injection before a charging pump starts or is started. (WOG CT ECA-0.0 - -H)

___ 3. Depressurize the intact SG(s) at the maximum rate such that all the following limiting conditions are met:
- SG depressurization is not initiated until narrow-range level in at least one intact SG is greater than 4%
- If narrow-range level cannot be maintained greater than 4% in at least one intact SG (after depressurization is commenced), then SG depressurization is stopped until narrow-range level is restored to greater than 4% in at least one intact SG
- SG pressure does not decrease to less than 130 psig
- RCS cold leg temperature does not decrease to less than 243°F
- If a positive SUR is indicated on either the source range or the intermediate range (after depressurization is commenced), then SG depressurization is stopped and the RCS is allowed to heat up

(WOG CT ECA-0.0 - -G)

SCENARIO OBJECTIVE/OVERVIEW:

Ramp up in progress.

The team should be able to:
- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-9, AOP-100, AOP-3.0 & Tech Specs
- Respond to a loss of off-site power for which no DG will start. When ECP-0 is in progress and reducing SGs to 200 psig, off-site power will be restored.
- The crew will restore off-site power and then exit ECP-0.0.

Communications sheet

EVENT NO.	*TIME*	*ACTIONS*
1		**Chemistry:** will be asked to respond to high temperature in Demineralizer beds. - We will sample the demin bed that was on service and let you know the sample results. Leave TCV-144 bypassing the demins until we get a sample back. **HP:** - We will monitor radiation readings in the Aux building and repost the areas as radiation levels rise.
2	WHEN REQUESTED	**RADSIDE SO:** TCV-144 is fully closed and the letdown piping is slightly brown and very warm. The RCDT system is in operation IAW SOP-50. TCV-143 no problem locally
	When 10 minutes have passed	**When 10 minutes** have passed, call OATC to report that 300 gallons has been flushed to the RCDT. When asked about MK4, alarm is due to high RCDT level.
3	WHEN REQUESTED	**ROVER:** - acknowledges and goes to look for leak - The 1C CCW pump motor has an acrid smell in the area. - DF04 has an overcurrent trip flag.
	Wait 5 minutes **after** makeup is initiated, then STOP the leak from the LOA page	- The relief on the 1C CCW pump was lifting. The relief has reseated but the relief is still leaking slightly. No valves were closed.

Communications sheet

EVENT NO.	*TIME*	*ACTIONS*
4		**TBSO**: **The following report will have to be made to direct attention to the Main Turbine due to the number of alarms in and the DEH alarm will have multiple alarms, making it difficult to find this problem.**
	After TBSO is sent to seal oil skid to look for problems	- There is a lot of vibrations in the Turbine Building, the source is unknown at this time.
	If the team does not find the MT vibration alarms, then complete the next report	- There is a lot of vibration from the Main Turbine on the Turbine deck
	TBSO report for AC Seal Oil pump	- Air Side motor very hot and a burnt insulation smell near the DC Emergency Seal Oil pump.
	WHEN REQUESTED	**SM:** I have just got off the phone from Westinghouse. We are being asked to ramp the unit off line at 2 MW/min. Stop at 12% power, remove the Main Turbine from the grid and secure the Main Turbine. Hold Reactor power at 12% until a plan is developed.
5	WHEN REQUESTED	**SSS-plant, SM and Dispatcher:** Recognize and repeat back PT445 failure, CR in the cue and that type of communications.
6	WHEN REQUESTED	**DISPATCHER:** –
	NRC prompt (if necessary)	**TBSO**: The vibration seems to be getting worse.

Communications sheet

EVENT NO.	*TIME*	*ACTIONS*
7	WHEN REQUESTED	**DBSO:** - 1C DG is running fine, no alarms - 1B DG has several alarms in: #35 – ESSENTIAL GENERATOR PROTECTION GEN DIFF #43 – EMERGENCY ENGINE SHUTDOWN - 2C DG looks good, alarm is due to SW pressure low. - After the 2C DG is tried to be started, then tell the CR that there is no obvious problem with the 2C DG. - I have placed the 2C DG Mode select switch to the MODE 4 position(see LOA page to do this action) If called about off-site power: ACC: it may be an hour before we get off-site power restored.
8	WHEN REQUESTED after the TDAFW pump handswitches have been taken to Start and the pump is running	**ROVER:** TDAFW pump looks good and is running. As appropriate. If the handswitches have not been taken to start and held long enough, report the TDAFW pump is not running and there is no obvious problem with the pump.
9	WHEN REQUESTED	**ROVER:** Acknowledge opening atmospherics (see LOA page for actions). **SM:** (when off-site power restored) ACC just called and reported that the grid is stable and offsite power is available to Farley Nuclear Plant.

Event Description: TK-144 fails HIGH; place excess letdown on service

Cue: Two minutes after the start of the exam.

Time	Position	Applicant's Action or Behavior
Annunciators: - LTDN TO DEMIN DIVERTED-TEMP HI (DF1)		Recognize indications of TK-144 failing high - TI-143 indicating off scale high (>200°F) - TI-144 indicating off scale high (>200°F) - Possible boration and RCS temperature decrease if prolonged
This failure does NOT allow manual control of TCV 144 and therefore letdown will have to be secured. AOP-16 will be entered and excess letdown placed on service IAW SOP-2.7.		
	SRO	Direct ARP DF1 entered.
	RO	Ensure Letdown is diverted to the VCT **NO** - TCV 143 white light LIT (VCT) on MCB Try to take manual control of TCV 144 **will not be able to** - Monitor charging and letdown flows and temperatures. FI 122 FI 150 TI 140 TI 144 and 143 - Adjust charging or letdown flow as required to reduce the letdown flow temperature.
	SRO	- Direct removing letdown from service by closing LTDN ORIF ISO 45 (60) GPM Q1E21HV8149A, B, and C - Direct entering AOP-16
	RO	- Takes handswitches to close for LTDN ORIF ISO 45 (60) GPM Q1E21HV8149A, B, and C - Monitor VCT level to ensure proper level is maintained - Observe CHG HDR PRESS and MOTOR AMPS to ensure proper charging pump operation. - Check charging pump running **YES** - Check Charging flow FK-122 controlling in AUTO with flow indicated **YES** - Check DE3 clear **YES**
	RO	Check PRT parameters – STABLE **should be stable** PRT PRESS PI 472 PRT LVL LI-470 PRT TEMP TI-471

Event Description: TK-144 fails HIGH; place excess letdown on service

Cue: Two minutes after the start of the exam.

	SRO	**Determine Status of Normal Letdown** Check normal CVCS letdown - AFFECTED BY MALFUNCTION **YES** o LTDN HX OUTLET FLOW, FI-150 - NO FLOW INDICATED o Minimize RCS makeup o Manually close charging flow control o Minimize seal injection between 6-13 gpm o Direct Chemistry to shutdown the zinc addition system (ZAS) o Dispatch personnel to investigate cause of the Letdown malfunction
	SRO	IF desired due to plant conditions, THEN place excess letdown in service using FNP-1-SOP-2.7, CHEMICAL AND VOLUME CONTROL SYSTEM EXCESS LETDOWN
CAUTION: Do not exceed 165° F excess letdown heat exchanger outlet temperature.		
Excess letdown flow will be limited to approximately 10-15 gpm.		
	BOP	Verify the RCDT system in operation per SOP-50.0, LIQUID WASTE PROCESSING SYSTEM Will call Radside SO and check on status and notify him/her to expect an increase in RCDT level due to excess letdown being placed on service.
	BOP	o Verify the following valves open: - HV3095 - HV3443 - HV3067 o Verify HV-137 is closed o Then open HV 8153 and 8154 o Place excess letdown divert valve Q1E21HV8143 control switch in the **RCDT position – flushing to RCDT** o Slowly throttle open the excess LTDN HX discharge valve Q1E21HCV137 to establish excess letdown flow not to exceed 165° F excess letdown heat exchanger outlet temperature
	SRO	Should read the Caution in the procedure and speak to reactivity changes associated with placing excess letdown on service. **CAUTION** A small portion of excess letdown piping can not be flushed to the RCDT (calculated to be approximately one gallon) and there are

Event Description: TK-144 fails HIGH; place excess letdown on service

Cue: Two minutes after the start of the exam.

		uncertainties associated with achieving a complete flush. Therefore, the reactivity affects associated with directing excess letdown to the VCT/Charging pump suction must be considered and contingencies established for mitigating the consequences.
	SRO	Should decide and brief the crew on aligning excess letdown to the VCT/Charging pump suction and the expectations on this. This is not required to be done since it will take a significant amount of time to do this evolution.
	SRO	Direct crew back to AOP -16 to do the following: - Continue actions to restore normal letdown - Determine status of excess letdown flow - Verify CHG FLOW FK-122 - MANUALLY CLOSED - Check Reactor – Critical - Check PZR level - LESS THAN 75% - Maintain PZR level - 20-60% - Reduce power and Tavg as necessary - Check normal boration flow path - ADEQUATE FOR DESIRED RAMP RATE - Maintain PZR Level - 20-60% by maintaining Seal injection 6-13 gpm and VCT level 20 – 60%,
		Go to next event when AOP-16 is exited

End Event #1/2

Op-Test No.: Farley 2008-301 Scenario No.: 4 Event No.: 3 Page 4 of 19

Event Description: 1C CCW pump trips and 1B CCW pump does not auto start and a CCW leak develops

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - 1C CCW PUMP OVERLOAD TRIP (AA3) - CCW FLOW FROM RCP OIL CLRS LO (DD3) When the leak starts the following will alarm - BOP PANELS ALARM (BE5) - BOP panel L and N (LH2 and NH2) CCW SUMP NORTH AND SOUTH HI-HI - CCW SRG TK LVL A TRN and B TRN HI-LO (AA4 and AB4)		Recognize indications of a Tripped CCW pump and loss of CCW flow - No flow on FI3043CA - Temperature rising on running components
When the CCW pump trips a leak will start in the CCW surge tank. Level will be slowly decreasing and eventually the Surge tank low level alarm will alert the operator to this event. AOP-9 will be used to combat the tripped CCW pump and the ARP will take care of the leak.		
	SRO	Reference ARP and decide the standby CCW pump did not auto start. Direct to start the 1B CCW pump or entry into AOP-9 to get the 1B CCW pump running.
	SRO	Note in ARP: - Resetting the lockout relay could prevent proper operation of the standby pump in the event of an LOSP. - Do not reset lockout relay without Shift Supervisor approval. If AOP-9.0 entered the following will be accomplished:
	BOP	Verify CCW pump started in affected train: - handswitch for 1B CCW pump taken to START - 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. **YES**
	BOP	- Verify SW flow supplied to the ON SERVICE train **YES** - Check ON SERVICE train affected **NO** - Check both RHR pumps stopped **YES**

Event Description: 1C CCW pump trips and 1B CCW pump does not auto start and a CCW leak develops

Cue: By Examiner.

	SRO	- Inform the SM to evaluate event classification and notification requirements using EIP-8, NON-EMERGENCY NOTIFICATIONS AND EIP-9, EMERGENCY CLASSIFICATION AND ACTIONS
	BOP	- Check SFP cooling aligned to an operating CCW train **YES** - Check on service CCW train operating **YES**
	SRO	IF 1B CCW Pump is aligned to A Train, THEN rack out 1C CCW Pump supply breaker DF04. - Notify Plant Personnel to determine and correct the cause of the fault. Refer to Technical Specification 3.7.7 for LCO requirements Due to the loss of the 1C CCW pump and the 1B CCW pump did not autostart, maintenance personnel will have to determine if the 1B CCW pump is OPERABLE based on the autostart feature (SR 3.7.7.3). Until that time, the CCW system is INOPERABLE until the 1C CCW pump is racked out and may be INOPERABLE when the results of troubleshooting are known. Mandatory LCO until the 1C CCW pump is racked out and 3.7.7 condition A restore within 72 hours is in effect.
		Actions for decreasing Surge Tank level
	BOP	- Check ST level to determine which train the leak is on - Dispatch personnel to locate and isolate the leak - Attempt to fill CCW surge tank per SOP-23.0,COMPONENT COOLING WATER SYSTEM, to maintain level above the lo level alarm point. **Step 4.18** Open Q1P17SV3028A and B on the MCB Monitor CCW ST level Maintain level between 33 and 50 inches When addition is complete the close the above valves
	SRO	Call Chm to help in locating the source of the leak
	BOP	Secure filling after the source of the leak determined and corrected and filling is no longer required.
		Go to next event when filling the Surge Tank has been secured.

End Event #3

Event Description: Air Side Seal Oil Pump trips which leads to HIGH main turbine vibrations

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - AIR SIDE SEAL OIL PUMP OFF (LF4) - SEAL OIL PRESS LO (LF5) - H2 PRESS HI-LO (LJ2) - EMERG AIR SIDE SEAL OIL B/U PUMP ALARM (LG5) - DEH TRBL (LB1) and subsequent high vibration alarms on the DEH panel screen		Recognize indications of LOSS OF SO pumps, decreasing Hydrogen pressure and high vibrations on the main turbine. - Hydrogen pressure dropping - AMBER light LIT above the Air Side SO pump - Air Side DC emerg Seal Oil pump starts and then trips - Red lights lit for high vibration for #5 and #6 bearings
When the air side SO pump trips the emerg DC SO pump starts and then trips. The ARP is a little confusing and the candidate may or may not start the Seal Oil backup pump. The SO backup pump does not have an auto start feature for this situation and if the Main Turbine tripped there would be no source of SO. They should look at and address all the alarms, but if they do not see the high vibration alarms, a phone call will alert the crew as to the high vibrations. Preferably this will be done after the TBSO is sent to investigate the main turbine and the seal oil system. Actions for the high vibrations are found in SOP-28.1.		
Note in ARP The intent of the following steps is to ensure that generator hydrogen pressure remains within the capability of the first available backup source of air side seal oil. See SOP-28.3, HYDROGEN SEAL OIL SYSTEM, precautions and limitations for additional guidance. ARP step 3 IF the DC Air Side Emergency Seal Oil Pump is supplying the seal oil pressure, (and the Attached Oil Pump is not available), THEN start the Seal Oil Backup Pump AND reduce hydrogen pressure in the generator to 45 psig or less. Intent of step 3 – with the AC pump tripped and the DC pump not available, the SO Back up should be started.		
	BOP	Start the Back up seal oil pump IAW LF5
	SRO	Reference ARPs and decide course of action Send TBSO to SO skid and main turbine to check for problems
	BOP	Receive report from TBSO of high vibrations in the turbine building. Source unknown at this time.

Event Description: Air Side Seal Oil Pump trips which leads to HIGH main turbine vibrations

Cue: By Examiner.

	SRO	Enter SOP-28.1 to look for guidance on high vibrations for the Main Turbine. P&Ls 3.4.1 Observe the following vibration limits: The limits provided below in vibration indications apply to readings taken from the Bently Nevada or DEHC displays. • 4.0 mils: Satisfactory • 7.0 mils: Alarm (Investigation is necessary if vibration is continuous.) • 14.0 mils: Decrease turbine speed or load to reduce vibration. Prior to exceeding 14 mils vibration, contact Westinghouse Coordinator for guidance. If turbine vibration exceeds 14 mils, trip the main turbine.
	SRO	Call Shift Manager to explain vibration problems. SM will tell the SS to ramp the unit off line at 2 MW/min. Stop at 12% power, remove the Main Turbine from the grid and secure the Main Turbine. Hold Reactor power at 12% until a plan is developed.
	BOP	Put in correct target and ramp rate (40 MW / 2 MW/min) Press the GO pushbutton
	RO	Adjust rods and boron IAW UOP-2.1 to ramp unit to 12% power.
When the desired power level is reached (approx 20%), then go to event 5.		

END – Event 4

Event Description: PT-445 fails high

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - PRZR PRESS REL 445A OR B/U HTRS ON (HD1) - PRZR SAFETY VLV TEMP HI (HA4) - PRZR PORV TEMP HI (HA5) - REL VLV 444B/445A OPEN (HE1) - PRZR PRESS HI-LO (HC1)		Recognize indications of PT-445 failure - RCS pressure dropping - PORV 445A indicates open - All heaters ON
PT-445 failing high will cause PORV 445A to open. This will decrease actual RCS pressure and cause all the heaters to come on. Sprays will remain closed. Since the PORV is failed to remain open, the operator will not be able to close the PORV and will have to close the manual isolation valve. AOP-100 Section 1.1		
	RO	- Verify RCS pressure is stable. **NO** - Take manual control of the PORV 445A and close the valve. **NO** - If the PORV will not close then close MOV 8000A **YES**
	SRO	Check RCS pressure stable or rising **YES**
	SRO	Refer to Tech Specs for LCO requirements that exist 3.4.1 for DNBR limits Pressurizer pressure > 2209 psig Mandatory LCO condition A restore w/i 2 hours 3.4.11 PORVs Mandatory LCO condition B Close the associated block valve and remove power from the block valve in 1 hour and restore to OPERABLE w/i 72 hours
	SRO	Notify the Shift Manager
	SRO	Submit a Condition Report and notify the Work Week Coordinator (Maintenance ATL on backshifts)
	SRO	IF the pressurizer power operated relief valves operated, THEN perform the following: - Refer to SOP-1.2, REACTOR COOLANT PRESSURE RELIEF SYSTEM, for cooldown of the pressurizer relief tank
		- Refer to SOP-0.0, GENERAL INSTRUCTIONS TO OPERATIONS PERSONNEL, for reporting requirements

Event Description: PT-445 fails high

Cue: By Examiner.

		15.5 Documenting and Reporting Safety Valve, Relief Valve, and Reactor Vessel Head Vent Valve Failures and Challenges In order to comply with NRC reporting requirements, an LCO and condition report must be filled out each time a pressurizer or steam generator power operated relief valve or safety valve becomes inoperable, OR a safety or power operated relief valve lifts on either the pressurizer or a steam generators. The condition report should contain at least the following information: • Which safety or power operated relief lifted or was inoperable. • Reactor power level. • RCS temperature and pressure. • Steam generator level and pressure. • Approximately how long the valve was open.
		Go to next event when the above requirements are met.

End event 5

Event Description: Main Turbine vibrations increase – MT trip required

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - NONE		Recognize indications of increasing vibrations on the Main Turbine - Monitor the DEH vibration panel - Check the Turbine Supervisory panel for high vibrations
Enter SOP-28.1 to look for guidance on high vibrations for the Main Turbine. P&Ls 3.4.1 Observe the following vibration limits: The limits provided below in vibration indications apply to readings taken from the Bently Nevada or DEHC displays. 14.0 mils: If turbine vibration exceeds 14 mils, trip the main turbine. **Phone call from turbine deck may be needed to initiate this event**		
	SRO	Direct a Turbine trip Direct entry in to AOP-3.0
	RO/ BOP	Check Turbine tripped Check TSLB2 14-1 thru 4 Check DEH display for GV and TV closed
	RO	Stabilize reactor power Verify Rod Control in MANUAL Adjust control rods in MANUAL to control RCS TAVG Verify steam dumps modulate to maintain reactor power less than 35%.
	BOP	WHEN at least 30 seconds have passed since turbine trip, THEN check main generator tripped
	RO	Check all RCPs – STARTED
	BOP	- Check SG levels - STABLE OR TRENDING TO 65% - Verify MSRs – RESET - Stop both heater drain pumps. - Transfer to STM PRESS mode by: o Reduce Rx power to less than 8% o Place stby conds pump in STOP o WHEN SGFP suction pressure greater than 500 psig, THEN

Event Description: Main Turbine vibrations increase – MT trip required

Cue: By Examiner.

		stop all but one CNDS PUMP o WHEN BYP & PERMISSIVE NUCLEAR AT POWER PERMISSIVE P-10 status light NOT lit, THEN perform the following o Verify intermediate range reactor trip and rod stop - UNBLOCKED o Verify power range low setpoint reactor trip – UNBLOCKED o Verify BYP & PERMISSIVE LOW POWER TRIP BLOCK P-7 status light – LIT o Check reactor power - LESS THAN 8%. When Rx power is less than 8%, then manually control the ARVs to reduce stm dump demand to 0. Place STM DUMP MODE SEL A-B TRN switch to RESET Place steam dump system in steam pressure mode using SOP-18.0, STEAM DUMP SYSTEM Manaully close the ARVs and verify they are set to 8.25 and in AUTO. Go to procedure and step in effect
		Go to the next event when control of the unit at 8% power is achieved.

END – Event 6

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Event Description: LOSP – ECP-0 entered, TDAFW pump does not auto start and then off-site power is restored

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - numerous		Recognize indications of LOSS OF ALL AC - All lights in CR go out, then re-energize when Unit 2 DGs tie on. - All Unit 1 4160V emergency busses are de-energized
Off-site power is lost with the 1-2A DG tagged out. Unit 2 will get the 1C DG and 2B DG and 1B DG will trip on start. The 2C DG will not be available and the crew will have to implement the remaining steps in ECP-0. The TDAFW Pump will not auto start and will be started from the MCB, and then Off site power will be restored when the ARVs are opened to decrease SG pressure to 200 psig. Off site power will be brought back on to the bus to re-start emergency loads. When one train has been restored the scenario will be terminated.		
	SRO	Recognize Rx trip and loss of all AC and do one of the following: Enter EEP-0 and do IOAs or go directly to ECP-0:
	RO/BOP	Immediate Operator actions of EEP-0 Check reactor trip. Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. check rod bottom lights - LIT. Check turbine - TRIPPED. TSLB2 14-1 thru 4 lit Check power to 4160 V ESF busses. 4160 V ESF busses - AT LEAST ONE ENERGIZED A Train (F & K) power available lights lit OR B Train (G & L) power available lights lit **NO** ENTER ECP-0 HERE Immediate Operator actions of ECP-0 Check reactor tripped. **No power** 1.1 Check reactor trip and reactor trip bypass breakers - OPEN. 1.1.1 Manually trip reactor. [] Reactor trip breaker A

Event Description: LOSP – ECP-0 entered, TDAFW pump does not auto start and then off-site power is restored

Cue: By Examiner.

		[] Reactor trip breaker B [] Reactor trip bypass breaker A [] Reactor trip bypass breaker B IF any reactor trip breaker NOT open or any reactor trip bypass breaker NOT open, THEN locally open affected breaker. (121 ft, AUX BLDG rod control room) **call for this ROVER** Check nuclear power - FALLING. **YES** PR1(2,3,4) PERCENT FULL POWER [] NI 41B [] NI 42B [] NI 43B [] NI 44B IR1(2) CURRENT [] NI 35B [] NI 36B Check turbine tripped. **YES** [] TSLB2 14-1 lit [] TSLB2 14-2 lit [] TSLB2 14-3 lit [] TSLB2 14-4 lit
	RO	**Verify RCS isolated.** o WHEN RCS pressure less than 2335 psig, THEN verify both PRZR PORVs closed. o Verify normal letdown isolated. **YES** All orifice isolation valves closed or leltdown isolation valves closed o **Verify excess letdown line - ISOLATED.** **NO** Close HV 8153 and 8154 o Verify all reactor vessel head vent valves - CLOSED. RX VESSEL HEAD VENT OUTER ISO [] Q1B13SV2213A [] Q1B13SV2213B RX VESSEL HEAD VENT INNER ISO [] Q1B13SV2214A [] Q1B13SV2214B

Event Description: LOSP – ECP-0 entered, TDAFW pump does not auto start and then off-site power is restored

Cue: By Examiner.

	BOP/RO	**Verify total AFW flow GREATER THAN 395 gpm.** **CRITICAL TASK -** Verify proper AFW alignment. Verify TDAFWP running. **Take handswitches for TDAFWP to START** TDAFWP STM SUPP FROM 1B(1C) SG [] MLB-4 1-3 lit [] MLB-4 2-3 lit [] MLB-4 3-3 lit TDAFWP SPEED [] SI 3411A > 3900 rpm TDAFWP SPEED CONT [] SIC 3405 adjusted to 100%
	BOP	**[CA] Restore power to any emergency bus.** Verify supply breakers for major loads on emergency 4160 V busses - OPEN. [] BKR DF01 (1A S/U XFMR TO 1F 4160 V BUS) [] BKR DF15 (1B S/U XFMR TO 1F 4160 V BUS) [] BKR DF-13-1 (1F 4160 V BUS TIE TO 1H 4160 V BUS) [] BKR DG01 (1A S/U XFMR TO 1G 4160 V BUS) [] BKR DG15 (1B S/U XFMR TO 1G 4160 V BUS [] 1A BATT CHARGER BKR ED-04-1 [] 1C BATT CHARGER A TRN BKRED-09-1 [] 1C BATT CHARGER B TRN BKR EE-06-1 [] 1B BATT CHARGER BKR EE-05-1 [] 1C CCW PUMP BKR DF-04-1

Event Description: LOSP – ECP-0 entered, TDAFW pump does not auto start and then off-site power is restored

Cue: By Examiner.

		[] 1B CCW PUMP BKR DF-05-1 [] 1B CCW PUMP BKR DG-05-1 [] 1A CCW PUMP BKR DG-04-1 [] 1A SW PUMP BKR DK-03-1 [] 1B SW PUMP BKR DK-04-1 [] 1C SW PUMP BKR DK-05-1 [] 1C SW PUMP BKR DL-05-1 [] 1D SW PUMP BKR DL-03-1 [] 1E SW PUMP BKR DL-04-1 [] #4 RW PUMP BKR DJ-03-1 [] #5 RW PUMP BKR DJ-04-1 [] #8 RW PUMP BKR DH-03-1 [] #9 RW PUMP BKR DH-04-1 [] #10 RW PUMP BKR DH-05-1 [] 1B CRDM CLG FAN BKR ED-11-1 [] 1A CRDM CLG FAN BKR EE-13-1 [] 1A CS PUMP BKR DF-11-1 [] 1B CS PUMP BKR DG-11-1 [] 1A RHR PUMP BKR DF-09-1 [] 1B RHR PUMP BKR DG-09-1 [] 1A CHG PUMP BKR DF-06-1 [] 1B CHG PUMP A TRN BKR DF-07-1

Event Description: LOSP – ECP-0 entered, TDAFW pump does not auto start and then off-site power is restored

Cue: By Examiner.

		[] 1B CHG PUMP B TRN BKR DG-07-1 [] 1C CHG PUMP BKR DG-06-1 [] 1A MDAFWP BKR DF-10-1 [] 1B MDAFWP BKR DG-10-1
	BOP	Check 1-2A, 1C or 1B diesel generator running for Unit 1. **NO** Perform 2C DG SBO start: o MSS in MODE 1 o USS in UNIT 1 o When load shed has been competed then depress START PB 2C DG will not start
	SRO	Continue in procedure At step 5.8 Continue efforts to start at least one diesel generator. 5.9 Restore offsite power to any emergency bus and then continue efforts to energize any 4160V emergency bus and proceed to step 6. Request Shift Manager coordinate efforts to restore offsite power to at least one startup transformer.
	SRO	Direct step 6 actions: [CA] WHEN power is restored to any emergency bus, THEN proceed to step 24. [CA] WHEN an SI signal is present, THEN reset SI signal.
	SRO	Call for this to be done **Defeat auto start of safeguards equipment using ATTACHMENT 2.** **CRITICAL TASK -** **Isolate RCP seals using ATTACHMENT 3.**
	BOP	Locally close HOTWELL FILL INLET ISO N1P11V501 and HOTWELL FILL MAN BYP N1P11V506. (137 ft TURB BLDG) Call TSC for TBSO

Event Description: LOSP – ECP-0 entered, TDAFW pump does not auto start and then off-site power is restored

Cue: By Examiner.

	BOP	Verify main steam isolation and bypass valves - CLOSED. Verify main feedwater flow control and bypass valves - flow path(s). CLOSED. 1A(1B,1C) SG FW FLOW [] FCV 478 [] FCV 488 [] FCV 498 1A(1B,1C) SG FW BYP FLOW [] FCV 479 [] FCV 489 [] FCV 499 Verify blowdown - ISOLATED. 1A(1B,1C) SGBD ISO Q1G24HV7614A closed Q1G24HV7614B closed Q1G24HV7614C closed **Check SGs not faulted.** **NO** **Check SGs not ruptured.** **NO** Check intact SG narrow range level - GREATER THAN 31%{48%} . [CA] WHEN intact narrow range SG level greater than 31%{48%}, THEN maintain intact SG narrow range level 31%-65%{48%-65%}. Control TDAFWP speed. SIC 3405 adjusted Control TDAFWP flow control valves with handwheels. **Local action**
	SRO	Call to De-energize non-essential DC loads using ATTACHMENT 4. Direct electrical maintenance personnel to calculate remaining battery capacity.
	BOP	Monitor CST level. CST LVL [] LI 4132A [] LI 4132B

Event Description: LOSP – ECP-0 entered, TDAFW pump does not auto start and then off-site power is restored

Cue: By Examiner.

	BOP	**CRITICAL TASK – commencing this evolution is all that is required** **Reduce intact SGs pressure to 200 psig.** Check at least one intact SG narrow range level – GREATER THAN 31%{48%}.
	RO	16.2 WHEN P-12 light lit, THEN perform the following. 16.2.1 Block low steam line pressure SI. STM LINE PRESS SI BLOCK - RESET [] A TRN to BLOCK [] B TRN to BLOCK 16.2.2 Verify blocked indication. BYP & PERMISSIVE STM LINE ISOL SAFETY INJ. [] TRAIN A BLOCKED light lit [] TRAIN B BLOCKED light lit 16.3 WHEN pressurizer pressure less than 2000 psig, THEN perform the following. 16.3.1 Block low pressurizer pressure SI. PRZR PRESS SI BLOCK – RESET [] A TRN to BLOCK [] B TRN to BLOCK 16.3.2 Verify blocked indication. BYP & PERMISSIVE PRZR. SAFETY INJECTION [] TRAIN A BLOCKED light lit [] TRAIN B BLOCKED light lit
	BOP	Co-ordinate this activity using radio handsets: Dump steam from intact SGs at maximum controllable rate. Locally control intact SG atmospheric relief valves with handwheel. (127 ft, AUX BLDG main steam valve room) 3371A, B ,C open locally Maintain at least one intact SG narrow range level GREATER THAN 31%{48%}.

Event Description: LOSP – ECP-0 entered, TDAFW pump does not auto start and then off-site power is restored

Cue: By Examiner.

Instructor Note: *ACC informs crew that offsite power now available, and reliable. 1A & 1B Start Up transformers energized.*		
	SRO	Crew takes actions of ECP-0.0 to power emergency busses
	SRO	Energizes dead bus per ECP-0.0, step 5.9.2 or SOP-36.2 When emergency busses energized, go to step 24 of ECP-0.0.
	BOP	WHEN any startup transformer energized, THEN close associated startup transformer output breaker. Take the SYCH switch to the BYPASS position and then o DF01 and/or DG15
	BOP	WHEN 1F or 1G 4160 V bus energized from any startup transformer, THEN verify the associated river water bus breaker closed.
	SRO	When emergency busses energized, go to step 24 of ECP-0.0. Check at least one train of 4160 V ESF busses - ENERGIZED. **YES**
	BOP	Verify SW system operating. Verify electrical alignment.
Terminate the scenario.		

END – Event 6

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, verbally state, "Unit 2" and an instructor will locate to the Unit 2 area and respond to you as quickly as possible.

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 Mode 1 25% RTP, MOL , 1254 ppm Cb, 8,000 MWD, Xe, (-75 PCM)
Status Ramping up is on HOLD until the 1-2A DG is RTS.
1A SGFP is running, Transferring to Main FRVs in progress.
UOP-1.2, v.89, at step 5.72 and UOP-3.1, version 96 step 5.2 is complete and 5.3 in progress

STPs/Evolutions:	**A** Train On-Service – **B** Train Protected

1.0___; 109.1 ____No adj. ; 63.7 ____; FSP-20,0 _____;

Status of Special Testing

General Information

1. Current Risk Assessment is GREEN and projected is GREEN
2. 1-2A DG T/O for governor work. (OOS 3 hours, ETR 4 hrs)
3. 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
4. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia
5.
6.
7.
8.
9.
10.

Equipment Status		
1-2A DG T/O for governor work		Maintain VCT gas pressure 25-30 psig

Reactivity Plan	**Waste Management Status**
40 Gallon Dilutions as required to maintain temperature and power.	#3 RHT – On Service
	WGS – secured;

LCO Status	
3.8.1 condition B, STP-27.1 completed 2 hours ago	

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

Original submittal

Facility: Farley Scenario No.: 5 Op-Test No.: FA2008301

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: Mode 3, MOL, Xe decreasing from its peak following the reactor trip, The reactor tripped 8 hours ago as a result of loss of both SGFPs, **A** Train On-Service – **A** Train Protected,

Turnover:

- 0% RTP, MOL ,940 ppm Cb, 10,000 MWD, Xe concentration is slowly decreasing.
- Reactor tripped 8 hours ago as a result of a loss of both SGFPs & repairs are in progress.
- Reactor Startup planned in 12 hours, ECC being calculated by Reactor Engineering.
- CTMT batch release – last release 2 days ago.
- CTMT mini-purge running for vibration analysis.
- Current Risk Assessment is GREEN and projected is GREEN
- **A** Train On-Service – **A** Train Protected
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia.

Those items in red denote a change from the NRC exam this was taken from per NRC lead examiner instructions.

Event No.	Malf No.	Event Type*	Event Description
1	1	I (BOP) TS (SRO)	Rad monitor R35B, control room radiation monitor, fails high. 3 Control room dampers fail to automatically close. Manual isolation of dampers is required. 3.3.7
2	2	I (RO)	PT- 444 fails high. AOP-100 entry to restore RCS pressure.
3	3	C (RO)	Initiate an entry into AOP-27 for emergency boration (SSS phone call due to SDM OOS). Boric acid pump 1A will not start. 1B Bat pump will start. TS will be handled by SSS per the phone call.

4	4	C (RO & BOP) TS (SRO)	1A S/U transformer trips on fault, 1A RCP loses power, AOP-4 required and AOP-5 required.
5	 5 6	M (ALL) C (BOP) C (BOP or RO)	A SBLOCA (200 gpm over 30 seconds) occurs. (Automatic SI fails to actuate, man actuation required CT) 1A & 1B CTMT coolers fail to auto start, man start of at least one required 1A RHR pump fails to automatically start, can be manually started.
6		M(ALL)	A LBLOCA occurs 12 minutes after SBLOCA and power to MOV8811B (CTMT SUMP to 1B RHR Pump) will be lost. When RWST level reaches 32 feet, 'A' RHR pump trips on overcurrent. The combination of problems will prevent the crew from transferring to CL recirc. The crew should transition to ECP-1.1 per step 14.1 RNO or FO page of EEP-1(CT. Makeup to the RWST and minimize RWST outflow When ECP-1.1 is entered and evaluation of equipment running complete, then restore power to 8811B.
			Terminate when transition back to ESP-1.3 or EEP-1.0 is complete, depending on RWST level

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

SCENARIO 5 Summary sheet

Initial Conditions:

- Mode 3, MOL, Xe decreasing from its peak following the reactor trip.
- The reactor tripped 8 hours ago as a result of loss of both SGFPs and repairs are in progress
- Currently at step 2.7 of UOP-1.3.
- The Startup is planned for 12 hours from now.
- CTMT mini-purge running for vibration analysis
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Presets:

Event No.	Event Type*	Event Description
0	preset	Isolate MSDPs, preset to prevent RCS cooldown
		3622 will not close on hi rad Cmf mal / chvh3622_d_cc3 open 3624 will not close on hi rad Cmf mal / chvh3624_d_cc3 open 3626 will not close on hi rad Cmf mal / chvh3626_d_cc3 open
2	preset	Boric Acid Pump A fails to start in Manual. Cmfmalf / ccvp005a_cr2
3	preset	flash annunciator JK1, A MDAFWP SUCT PRESS LO, when FCV3227C > 0.6, clear when FCV3227C > 0.9
5	Preset	1A RHR pump fails to auto start. Manual start allowed.
6	Preset	• LBLOCA occurs 12 minutes after SBLOCA • auto SI train A & B fails • 1A & 1B CTMT coolers don't auto start on SI • 1A RHR Pump trips when RWST level reaches 32' • 1B RHR Pump Discharge valve 8811B breaker trips after the LOCA add button to clear the fault on 8811B and allow opening when directed.

Event 1 Rad monitor R35B, control room radiation monitor, fails high. 3 Control room dampers fail to automatically close on BOP. Manual isolation of dampers is required. LD4 BOP annunciator.

Event 2 PT- 444 will fail high. AOP-100 entry to restore RCS pressure.

Event 3 Initiate an entry into AOP-27 for emergency boration (SSS phone call due to SDM OOS). Boric acid pump 1A will not start. 1B Bat pump will start.

Event 4 1A S/U transformer trips on fault. This results in a loss of power to 'A' train ESF busses as well as the 'A' RCP bus. The crew should enter AOP-4 for the loss of flow in the 'A' loop and AOP-5 for the loss of the train of power. Closing the A loop spray valve will be required (RO) & secure feeding the SG by closing A loop AFW FCV (BOP)

LCO 3.8.1 should be evaluated for the loss of one of the two required qualified circuits.

Event 5 A SBLOCA (200 gpm over 30 seconds) occurs. Automatic SI fails to actuate. 1A RHR pump fails to automatically start; can be manually started. 1A & 1B CTMT CRLS do not auto start.

The crew is expected to identify the fault, respond by entering EEP-0 and completing the immediate operator actions – which includes Manual actuation of SI. (**CT** Manually actuate at least one train of SI before transitioning to E-1)

Event 6 A LBLOCA occurs 12 minutes after SBLOCA and power to MOV8811B (CTMT SUMP to 1B RHR Pump) will be lost. When RWST level reaches 32 feet, 'A' RHR pump trips on overcurrent. The combination of problems will prevent the crew from transferring to CL recirc. The crew should transition to ECP-1.1 per step 14.1 RNO or the foldout page (**CT**. Makeup to the RWST and minimize RWST outflow.

When ECP-1.1 is entered and evaluation of equipment running complete, then restore power to 8811B.

Terminate when transition back to ESP-1.3 or EEP-1.0 is complete, depending on RWST level.

CRITICAL TASK SHEET

___ 1. Manually actuate at least one train of SIS-actuated safeguards before any of the following: Manually actuate at least one train of SIS-actuated safeguards before any of the following: (WOG CT E-0 - - D)

- Transition to any E-1 series procedure or
- Transition to any FRP
- Completion of step 9 in ESP-0.1

- Manually Actuate SI

___ 2. Makeup to the RWST and minimize RWST outflow. (WOG CT ECA-1.1 - - B)

- Begin makeup to the RWST using the makeup system in the manual mode per SOP-2.3 or Direct the TSC to begin evaluating alternate makeup methods,
  and
- Establish the required number of SI pumps running at step 11 of ECP-1.1

SCENARIO OBJECTIVE/ OVERVIEW:

Mode 3 with component and instrumentation failures, LBLOCA, failure of CS systems, ECP-1.1 entry required

The team should be able to:

- recognize and respond to failures of various instruments and components per ARPs, AOP-27, AOP-4.0, AOP-5.0, AOP-100, & Tech Specs
- identify a SBLOCA, LBLOCA, initiate a manual SI, recognize that the required Containment Cooling System components are not operating and start Ctmt coolers as required per EEP-0, EEP-1.0, & ECP-1.1
- Commence makeup to the RCS using AOP-27.

Southern Nuclear
J.M. Farley Nuclear Plant

Operations Training
Simulator Exam Scenario

HLT-32 NRC EXAM SCENARIO #5

Technical Review: GT Ohmstede *Date:* 07-2008

Training Department Approval: _____ *Date:* _____

SOUTHERN COMPANY
Energy to Serve Your World™

Facility:	Farley Nuclear Plant		Scenario No.: 5		Op-Test No.:	2008-301

Examiners: _____ Operators: _____ SRO

_____ _____ RO

_____ _____ BOP

Initial Conditions: Mode 3, MOL, Xe decreasing from its peak following the reactor trip, The reactor tripped 8 hours ago as a result of loss of both SGFPs,

Turnover:

- 0% RTP, MOL ,917 ppm Cb, 10,000 MWD,
- Xe concentration is slowly decreasing (-2969).
- Reactor tripped 8 hours ago as a result of a loss of both SGFPs & repairs are in progress.
- CTMT mini-purge running for vibration analysis
- Reactor Startup planned in 12 hours, ECC being calculated by Reactor Engineering.
- Current Risk Assessment is GREEN and projected is GREEN
- **A** Train On-Service – **A** Train Protected
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia.

Event No.	Malf. No.	Event Type*	Event Description
1		I (BOP) **TS (SRO)**	Rad monitor R35A, control room radiation monitor, fails high. 3 Control room dampers fail to automatically close. Manual isolation of dampers is required. 3.3.7
2		I (RO)	PT- 444 fails high. AOP-100 entry to restore RCS pressure.
3		C (RO)	Initiate an entry into AOP-27 for emergency boration (SSS phone call due to SDM OOS). Boric acid pump 1A will not start. 1B Bat pump will start. TS will be handled by SSS per the phone call.
4		C (RO & BOP) **TS (SRO)**	1A S/U transformer trips on fault, 1A RCP loses power, AOP-4 required and AOP-5 required.
5		M (ALL) C (BOP) C (BOP or RO)	A SBLOCA (200 gpm over 30 seconds) occurs. (Automatic SI fails to actuate, man actuation required **CT**) 1A & 1B CTMT coolers fail to auto start, man start of at least one required 1A RHR pump fails to automatically start, can be manually started.

6		M(ALL)	A LBLOCA occurs 12 minutes after SBLOCA and - power to MOV8811B (CTMT SUMP to 1B RHR Pump) will be lost. - When RWST level reaches 32 feet, 'A' RHR pump trips on overcurrent. The combination of problems will prevent the crew from transferring to CL recirc. The crew should transition to ECP-1.1 per step 14.1 RNO or FO page of EEP-1(**CT**. Makeup to the RWST and minimize RWST outflow) When ECP-1.1 is entered and evaluation of equipment running complete, then restore power to 8811B.
7			Terminate when transition back to ESP-1.3 or EEP-1.0 is complete, depending on RWST level

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

Pre-sets

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	**Base IC**- IC-019, Hotwell flush at 0.20 UOP-2.3 complete UOP-1.3, v. 57, at step 5.21 Critical rod height D @ 144 21 hours after trip, MOL, 917 ppm boron Xe -2969 Currently at step 5.16 and step 2.7 of UOP-1.3 **Exam IC**-????,	Need to change Trains on service and make sure proper CCW lineup
		RUN	RUN simulator
		Generic setup: bat generic_setup_HLT.txt	
0	0	Quick setup (all items with * are included): bat 2008nrcexam_05.txt	
0	0	3622, 3624 and 3626 will not close on hi rad Cmf mal / chvh3622_d_cc3 open Cmf mal / chvh3624_d_cc3 open Cmf mal / chvh3626_d_cc3 open	*
0	0	Boric Acid Pump A fails to start in Manual. Cmfmalf / ccvp005a_cr2	*
0	0	auto SI train A fails imf csftyinj_cc1 open	*
0	0	auto SI train B fails imf csftyinj_cc11 open	*
0	0	1A RHR pump fails to auto start on SI. Manual start allowed. imf crhp01a_d_cc9 open	*
0	0	1A & 1B ctmt crls do not auto start on LOSP or ESF sequencer imf cchf1al_d_cc3 open imf cchf1bl_d_cc3 open imf cchf1al_d_cc4 open imf cchf1bl_d_cc4 open	*
0	0	Isolate MSDPs, preset to help prevent RCS cooldown irf loa-mss057 0 irf loa-mss058 0 irf loa-mss059 0 irf loa-mss060 0	*
0	0	1A RHR pump trips on overload after auto start (Trigger 1) imf crhp01a_d_co1 (1 0)	* Trigger 1

Pre-sets

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	MOV8811A breaker trips during LOCA irf crh8811b_d_cd1 (2 0) open	*Trigger 2
0	0	LBLOCA occurs 12 minutes after SBLOCA imf mal-rcs2a (3 00:12:00)	* Trigger 3
0	0	Event Trigger 1 - RWST LI 4075a < 32, event 7 trgset 1 "li4075a < 32"	Trg 1
0	0	trigger 2 - trigger on LBLOCA trgset 2 "jmrcs2a"	Trg 2
0	0	trigger 3 - SBLOCA trgset 3 "jmrcs1a	Trg 3*

MCB setup			
		NONE required	
0	0	**DEH**	Clear DEH alarms
0	0	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
		Recorders	Verify memory disks cleared
0	0	**Provide a marked up copy of UOP-1.3.** v 57 The following steps should be signed off: P&L: 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.8, 2.9, 2.10 Steps: 5.3, 5.6, 5.7, 5.8, 5.9, 5.11, 5.12, 5.14, 5.15, 5.16	**UOP-1.3 copy**
		ann ack	Acknowledge annunciators
		Verify Horns ON: hornflag	Verify HORNS ON
			FREEZE simulator
		Perform Booth Operators Setup Checklist	
		Open Simview file to be used for plant parameter data collection: Simview / **sv DataCollection.uvl**	
		If needed, adjust sim time back to 00:00:00 **SIMVIEW / Sim_Clock.uvl** **Hours: clock(3) = 0** **Minutes: clock(2) = 0** **Seconds: clock(1) = 0**	sv sim_clock.uvl
0	0	**VERIFY MICROPHONES READY**	Batteries installed
0	0	**TURNOVER SHEET AVAILABLE**	

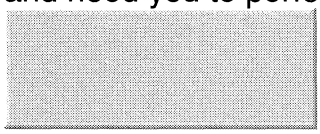
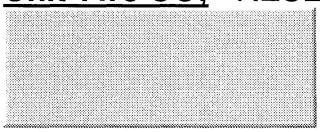
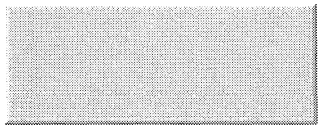
EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
Prior to RUN	0		
		Start data collection for Simview file DataCollection.uvl	
	0	**Begin Exam**	RUN simulator
		Verify Horns ON: hornflag	Verify Horns On ann horn
1	2	Rad monitor R35A, control room radiation monitor, fails high. 3 Control room dampers fail to automatically close. Manual isolation of dampers is required. 3.3.7 MAL/ R / imf mal-rmsip35A	
1		Delete R-35A malfunction dmf mal-rmsip35A	
1		Reset R-35A Remote / D11 / irf loa-rmm001 true	
2	NRC CUE	PT- 444 fails high. AOP-100 entry to restore RCS pressure. MXT / PT444 2500 30	
3	NRC CUE	Initiate an entry into AOP-27 for emergency boration (SSS phone call due to SDM OOS). Boric acid pump 1A will not start. 1B Bat pump will start. TS will be handled by SSS per the phone call.	No button All communications
4	NRC CUE	1A S/U transformer trips on fault, 1A RCP loses power, AOP-4 required, 1A & 1B CTMT CRLS do not auto start imf mal-genmla Malf / G / MAL-GENMLA	
5	NRC CUE	200 gpm SBLOCA occurs. • Automatic SI fails to actuate imf mal-rcs1a 200 30 Malf / R / MAL-RCS1A / 200 gpm / 30 sec ramp	

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
6	NRC CUE	LBLOCA occurs. imf mal-rcs2a Malf / R / MAL-RCS2A • Power to MOV8811B (CTMT SUMP to 1B RHR Pump) will be lost. When RWST level reaches 32 feet, 'A' RHR pump trips on overcurrent. The combination of problems will prevent the crew from transferring to CL recirc. ECP-1.1 entry required.	
End	NRC CUE		
		End of Exam	HORNS OFF
		End of Exam	FREEZE simulator
		Stop data collection for Simview file **sv DataCollection.uvl**	
		Export data to file with the name of NRC exam01 grpX.txt ***NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate.*** ***NOTE: file will be saved in the OPENSIM directory.***	Ensure data file created.

Local operator actions:

EVENT NO.	***TIME***	***ACTIONS***
1	NONE REQUIRED	
2	NONE REQUIRED	
3	NONE REQUIRED	
4	NONE REQUIRED	
5	NONE REQUIRED	
6	WHEN REQUESTED	**SSS / RADSIDE:** "I have performed steps 1 and 2 of attachment 1 of EEP-1 and need you to perform step 3 of attachment 1."  Button goes here CAE ECCS_disc_delayed.cae
6	WHEN REQUESTED	**Unit Two UO;** RESET FIRE ALARM MH1  ANN / MH1 failoff
6	When ECP-1.1 is entered and evaluation of equipment running complete, then restore power to 8811B.	"Fire alarm is reset. Fire alarm was 1A-22 in Unit One CTMT" 

Initial Conditions: **Mode 3, MOL, Xe decreasing from its peak following the reactor trip, The reactor tripped 8 hours ago as a result of loss of both SGFPs.**

Turnover:

- 0% RTP, MOL ,917 ppm Cb, 10,000 MWD, Xe concentration is slowly decreasing (-2969).
- Reactor Startup planned in 12 hours, ECC being calculated by Reactor Engineering.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia.
- Currently at step 5.16 and 2.7 of UOP-1.3.
- CTMT mini-purge running for vibration analysis
- Current Risk Assessment is GREEN and projected is GREEN
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event 1 Rad monitor R35A, control room radiation monitor, fails high. 3 Control room dampers fail to automatically close on BOP. Manual isolation of dampers is required. LD4 BOP annunciator.

Event 2 PT- 444 will fail high. AOP-100 entry to restore RCS pressure.

Event 3 Initiate an entry into AOP-27 for emergency boration (SSS phone call due to SDM OOS). Boric acid pump 1A will not start. 1B Bat pump will start.

Event 4 1A S/U transformer trips on fault. This results in a loss of power to 'A' train ESF busses as well as the 'A' RCP bus. The crew should enter AOP-4 for the loss of flow in the 'A' loop and AOP-5 for the loss of the train of power. Closing the A loop spray valve will be required (RO) & secure feeding the SG by closing A loop AFW FCV (BOP)

LCO 3.8.1 should be evaluated for the loss of one of the two required qualified circuits.

Event 5 A SBLOCA (200 gpm over 30 seconds) occurs. Automatic SI fails to actuate. 1A RHR pump fails to automatically start; can be manually started. 1A & 1B CTMT CRLS do not auto start.

The crew is expected to identify the fault, respond by entering EEP-0 and completing the immediate operator actions – which includes Manual actuation of SI. (CT Manually actuate at least one train of SI before transitioning to E-1)

Event 6 A LBLOCA occurs 12 minutes after SBLOCA and power to MOV8811B (CTMT SUMP to 1B RHR Pump) will be lost. When RWST level reaches 32 feet, 'A' RHR pump trips on overcurrent. The combination of problems will prevent the crew from transferring to CL recirc. The crew should transition to ECP-1.1 per step 14.1 RNO or the foldout page of EEP-1.0 (CT. Makeup to the RWST and minimize RWST outflow.)

When ECP-1.1 is entered and evaluation of equipment running complete, then restore power to 8811B.

Event 7 Terminate when transition back to ESP-1.3 or EEP-1.0 is complete, depending on RWST level.

CRITICAL TASK SHEET

___ 1. Manually actuate at least one train of SIS-actuated safeguards before any of the following: Manually actuate at least one train of SIS-actuated safeguards before any of the following: (WOG CT E-0 - - D)

- Transition to any E-1 series procedure or
- Transition to any FRP
- Completion of step 9 in ESP-0.1

- Manually Actuate SI

___ 2. Makeup to the RWST and minimize RWST outflow. (WOG CT ECA-1.1 - - B)

- Begin makeup to the RWST using the makeup system in the manual mode per SOP-2.3 or Direct the TSC to begin evaluating alternate makeup methods,
  and
- Establish the required number of CS pumps running in of ECP-1.1

SCENARIO OBJECTIVE/ OVERVIEW:

Mode 3 with component and instrumentation failures, LBLOCA, failure of CS systems, ECP-1.1 entry required

The team should be able to:

- recognize and respond to failures of various instruments and components per ARPs, AOP-27, AOP-4.0, AOP-5.0, AOP-100, & Tech Specs
- identify a SBLOCA, LBLOCA, initiate a manual SI, recognize that the required Containment Cooling System components are not operating and start Ctmt coolers as required per EEP-0, EEP-1.0, & ECP-1.1
- Commence makeup to the RCS using AOP-27.

Communications sheet

EVENT NO.	*TIME*	*ACTIONS*
1	WHEN REQUESTED	**ROVER:** - R35B is reading normal, but R35A is reading LOW END of scale and the Yellow alert light is lit, Red HIGH light is lit and the power on light is not lit. - TSC HVAC is in recirc mode of operation
	IF REQUESTED	- BOTH control room doors are closed - HV3622, 3624 and 3626 appear to be open but it is hard to tell from the floor. Do you want me to get a ladder to check the position?
	WHEN REQUESTED	**SM/ DISPATCHER:** ACKNOLWEDGE Tech Specs and CR that will be written and in the queue.
2	WHEN REQUESTED	**SM:** ACKNOLWEDGE PT444 failure and CR that will be written and in the queue.
	As Directed	**SSS:** The SDM IAW STP-29.1 is positive and requires emergency boration IAW AOP-27.0. I will write the LCO on Tech Spec 3.1.1 mandatory LCO to immediately initiate boration to restore SDM to w/I limits
4	WHEN REQUESTED	**SM:** "I will make the classifications and notifications." **DB SO:** "The only alarms I have in for 1C and 1-2A DGs is location 14 and 24 for air reservoir pressure being low. The air compressors are running and air pressure is recovering."

Communications sheet

EVENT NO.	*TIME*	*ACTIONS*
5	WHEN REQUESTED	**SM:** "I will make the classifications and notifications." **EXTRA CONTROL ROOM OPERATOR:** "Both CRACS mode selector switches are in ON." **SM / SSS:** "I will align backup cooling to the condensate pumps." **SM / SSS:** "I will get someone to perform step 6 of EEP-1." **ANY CALL TO SHIFT CHEMIST:** Acknowledge to requirement for sampling
5	WHEN REQUESTED	**DB SO:** "The only alarms I have in for 1C and 1-2A DGs is location 14 and 24 for air reservoir pressure being low. The air compressors are running and air pressure is recovering."
5	WHEN REQUESTED	**RADSIDE SO:** "The A RHR pump has a burnt insulation smell in the room, and the motor is hot to the touch". "I don't see any problem with the MOV-8811B (CTMT SUMP TO 1B RHR PUMP) breaker FV-B5, except that it's tripped". **ROVER:** "The A RHR pump breaker, DF-09, is tripped on overcurrent."
6	WHEN REQUESTED	**RADSIDE SO:** I have reset Breaker FV-B5 for MOV 8811B, CTMT sump to 1B RHR pump.

Op-Test No.: Farley 2008-301 Scenario No.: 5 Event No.: 1 Page 1 of 32

Event Description: Rad monitor R35A, control room radiation monitor, fails high

Cue: Start of exam.

Time	Position	Applicant's Action or Behavior
Annunciators: - BOP/ R-35A HI ALARM (LD4) - BOP PANELS ALARM (BE5)		Recognize indications of R-35A failing HIGH - NONE
When R-35A fails high the only indication will be annunciators. Since R-35A is in the plant and not in the simulator, a call to the extra operator will get a response. Applicable ARPs need to be entered		
	SRO	Direct ARP entry for LD4
	BOP	Verify Computer Room AHU dampers closed. • QSV47HV3622 COMPUTER RM HVAC RTN **OPEN** • QSV47HV3624 CONT RM HVAC SUPP **OPEN** • QSV47HV3626 COMPUTER RM HVAC SUPP **OPEN** **BOP should close these 3 valves**
	SRO	Call to have TSC HVAC verified to be in recirc mode
	BOP	Verify both control room doors closed
	SRO	Consult Technical Specifications 3.3.7 to determine the required alignment for the following: • Control Room Pressurization Units • Control Room Recirculation Units • Control Room Utility Exhaust Fan **TS 3.3.7** Table 3.3.7-1 has two Functions that need to be addressed: #2 Automatic actuation Logic and Actuation relays – 2 Trains Since the HV3626, 3624 and 3622 did not close, this has to be entered. Bases says not to go to 3.3.2 for phase A functions if only the CFEF functions are affected. This is a mandatory LCO, Condition A to place one CREFS train in emergency recirculation mode in 7 days. #3 R-35A is INOPERABLE. An ADMIN LCO is needed since the unit is in mode 3 with no fuel movement in progress and only one rad monitor is required in this condition.

Event Description: Rad monitor R35A, control room radiation monitor, fails high

Cue: Start of exam.

	SRO	Submit a condition report on the failed instrument, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the condition report
	SRO	Inform the SM of the failure and Tech Spec entry
It is not necessary to place CREFS in emerg recirc mode, but if it is desired for a normal evolution, the SM could call to make sure this is done prior to moving on once the SRO has identified this to be a necessary action in the next 7 days and conservative to do it sooner then to wait. FNP-0-SOP- 56 section 4.8 or 4.9		
Go to event 2 when Tech Specs have been evaluated and notifications have been made.		

End Event #1

Event Description: PT-444 fails high

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - PRZR PRESSURE HI-LO (HC1) - PRZR HI-LO PRESS ALERT (HC2) - PRZR PRESS REL VLV445A OR B/U HTRS ON (HD1)		Recognize indications of PT-444 FAILING HIGH - PORV-444B open - Przr pressure decreasing - All heaters OFF - All spray valves open
In mode 3 the actions are the same as at power. RCS pressure will be decreasing due to sprays open and PORV 444A open. AOP-100 Section 1.1		
	SRO	Direct entry into AOP-100.
	RO	- Verify RCS pressure is stable. **NO** - Take manual control of the PK-444A. **YES** **OR** - Take manual control of the spray valves and heaters and PORVs Close spray valves and PORV 444B and turn on heaters **PORV will close on handswitch**
	SRO	Check RCS pressure stable or rising **YES** Set control band for RCS pressure. **2220-2250 psig**
	SRO	Refer to Tech Specs for LCO requirements that exist: 3.4.1 for DNBR limits Pressure will have dropped below 2209 psig Mandatory LCO restore pressure in 2 hours 3.4.11 PORVs- does not apply since the PORV can be controlled from PK444A and is capable of being opened and closed manually.
	SRO	- Notify the Shift Manager - Refer to SOP-0.0, GENERAL INSTRUCTIONS TO OPERATIONS PERSONNEL, for reporting requirements - SOP-0 – 15.5 Documenting and Reporting Safety Valve, Relief Valve, and

Event Description: PT-444 fails high

Cue: By Examiner.

		Reactor Vessel Head Vent Valve Failures and Challenges In order to comply with NRC reporting requirements, an LCO and condition report must be filled out each time a pressurizer or steam generator power operated relief valve or safety valve becomes inoperable, **OR a safety or power operated relief valve lifts on either the pressurizer or a steam generators.** The condition report should contain at least the following information: • Which safety or power operated relief lifted or was inoperable. • Reactor power level. • RCS temperature and pressure. • Steam generator level and pressure. • Approximately how long the valve was open.
	SRO	Submit a Condition Report and notify the Work Week Coordinator (Maintenance ATL on backshifts
Go to event 3 when notifications have been made.		

End Event #2

Event Description: Phone call to enter AOP-27 to restore SDM

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - NONE		Recognize indications of AOP-27 entry - Phone call
The phone call will initiate this event. 1A BAT pump will not start, 1B BAT pump will start. AOP-27 entered		
	RO	Start a BAT pump - 1B BAT pump started - Open MOV 8104 - Verify one chg pump started - Establish adequate letdown Verify 8149A and either 8149B or C open - Establish charging flow rate of 40 gpm - Verify boration flow > 30 gpm on FI-110 - Secure ZAS – Chemsitry called
	SRO	WHEN shutdown margin greater than Technical Specification requirement, THEN proceed to step 10 and secure the emergency boration. SRO should direct a sample and STP-29.1 done again to verify SDM obtained.
Go to event 4 when the SRO has called for a new SDM STP and the emergency boratio is in progress.		

END – Event 3

Op-Test No.: Farley 2008-301 Scenario No.: 5 Event No.: 4

Event Description: 1A S/U transformer trips on fault

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - 1A S/U XFMR UV (MB1) - 1A 4KV BUS UV (ME1) - 1D OR 1E 4KV BUS SUPP BKR TRIPPED(MD4) - 1D OR 1E 4KV BUS UV (ME4) - 4160 VOLT BKR TRIPPED (MF4) - 1A RCS LOOP FLOW LO OR 1A RCP BKR OPEN (EF1) - RCP BUS UV SINGLE INPUT ALERT (EF4) - 1-2A DG TRBL (WA3) - 1F, 1H, OR 1K 4KV BUS BKR AUTO TRIP (WE1) - 1H 4KV BUS UV OR LOSS OF DC (WE3)		**Indications for loss of 1A S/U transformer:** - 1A RCP amps decrease to zero (0) - 1A RCS loop flow decreases to zero and then increases as back-flow is established - 1-2A DG starts and connects to 1F 4160v bus - Amp meter II-2001B for 1A 4160v bus decreases to zero - Bus potential lights for "BUS A", "BUS D", "1I", "1P", 1B", "1U", "1W", "1Y"
1A 4160v BUS WILL BE DE-ENERGIZED AND 1-2A DG will pick up the 4160V emergency bus. AOP-4 and AOP-5 entry required		
	SRO	Directs AOP-4.0, LOSS OF REACTOR COOLANT FLOW, entry and directs actions per below: (This may directed by SRO to occur concurrently with AOP-5.0)
	RO	Performs AOP-4 immediate operator actions: • Manually closes 1A RCS loop spray valve PK-444C
	BOP	• Secures feeding 1A SG by closing MDAFW FCV 3227A
	RO	• Monitors Tavg for RCS loops $\geq$ 541°F Minimum Temp for Criticality o (A loop may be < 541°F, but this TS is not applicable in mode 3) • Maintains PRZR pressure 2200-2300 psig with heaters and B loop spray valve as required

Event Description: 1A S/U transformer trips on fault

Cue: By Examiner.

		• Checks normal letdown established – AOP-4.0 step 5 o IF Letdown not established, restore using AOP-4.0 attachment 1 (attached) • Maintain PRZR level at ~22% level
	SRO	Directs to open Reactor Trip breakers within 6 hours
	RO	Checks B and C RCPs running – AOP-4.0 step 8
	SRO	Procedure step 9 is: Go to UOP-2.1, SHUTDOWN OF UNIT FROM MINIMUM LOAD TO HOT STANDBY o After evaluation of this step AOP-5.0 is directed to be entered
		AOP-5.0, LOSS OF A OR B TRAIN ELECTRICAL POWER
	BOP	• Verifies at least one train of 4160V BUSSES energized: **YES** – A train from 1-2A DG, B train from off-site through B SU XFMR • Checks 1-2A DG Started & output breaker closed o Started o 59-61 Hz o 3740-4580 V o 1F 4160V bus power light lit
	BOP	• Verifies SW supply flow in A train adequate o 2 'A' train SW pumps running o SW TO/FROM DG BLDG in 'A' train OPEN: V519/V537 o Dual indication (throttled) on SW TO TURB BLDG ISO valves V515 & V517 o Opens SW TO TURB BLDG ISO B TRAIN V517 o Closes 'A' train SW TO/FROM TURB BLDG ISO valves V515, V516, V540, & V542 o Closes MOV3135

Event Description: 1A S/U transformer trips on fault

Cue: By Examiner.

		o Directs Radside SO to secure SGBD per SOP-16.1 o Closes MOV3149 o Checks no 1-2A DG lube oil temp annunciator in alarm (calls Diesel building SO to check local annunciator. Panel)
	BOP	If not required, then stop any running MDAFW pump: - Momentarily place MDAFW FCV 3227 RESET A TRN OR B TRN switches to the reset position - Stop 1A MDAFW Pump WHEN MDAFW Pump is stopped, THEN perform the following: o Verify MDAFWP TO 1A,1B AND 1C SG Q1N11HV3227A,B AND C in MOD. o Verify MDAFWP TO 1A/1B/1C SG B TRN FCV 3227 in MOD. o Fully open MDAFWP to 1A,1B AND 1C SG FLOW CONT HIC-3227AA, BA AND CA (100% demand)
	BOP	Checks SW available in 'B' train – AOP-5.0 step 6 • 1D & 1E SW pumps running • 'B' train SW pressure > 60 psig
	RO	• Starts 'A' CCW pump (B train) – AOP-5.0 step 7 • Starts 'C' charging pump – AOP-5.0 step 9
	BOP or RO	Checks 'A' train CCW operating – AOP-5.0 step 10 • 'C' HX FI 3043CA > 0 gpm
	BOP	• Maintains SG NR levels 61-69% with a MDAFW pump, & controlling FCV-3227A, B, & C – AOP-5.0 step 11 • Checks RHR NOT required • Maintains Mode 3 stable per UOP • Verifies 4160V NON-Vital busses energized – AOP-5.0 step 15 o 1B, 1C, 1E 4160V busses energized.

Event Description: 1A S/U transformer trips on fault

Cue: By Examiner.

		o Reports 1A & 1D 4160V busses are NOT energized Performs steps for 1D bus deenergized: - Establish power to 1A 600 V LC emergency section loads - Verify pressurizer heater group 1A – OFF - Verify open BKR EA08-1. - Verify closed BKRs ED08-1 and EA09-1 - WHEN pressurizer heater group 1A operation is desired, THEN place HTR GRP 1A BLOCKING BYPASS SW to BYPASS - IF required, THEN manually energize pressurizer heater group 1A
	BOP	Align 1C air compressor for service - Place the 1C air compressor handswitch in RUN/START - Verify 1C air compressor started - Check INST AIR PRESS PI 4004B - GREATER THAN 85 psig - Verify instrument air aligned to containment MLB-3 1-2 NOT lit IA to PENE RM PRESS LO Annunciator KD1 clear
	BOP	Verify unaffected train Energized – AOP-5.0 step 16 • LCs E, C, L, J, S • MCCs B, G, T, V
	BOP	• Calls Radside SO to check SFP in service & place on service on B train if necessary • Check 'A' train125V DC battery loads < 250 amps
	RO	Verifies DRPI energized – AOP-5.0 step 20
	SRO	Check Tech Spec met for 3.4.5, RCS Loops—MODE 3 o (only 2 loops in operation are required in mode 3, so this is met) - LCO on 3.8.1 AC Sources—Operating, Mandatory LCO Condition A - - One of the two offsite required circuits is inoperable Initiate STP-27.1, AC SOURCE VERIFICATION

Event Description: 1A S/U transformer trips on fault

Cue: By Examiner.

	SRO	Determines offsite power NOT available for train A and returns to step 2 – AOP-5.0 step 23
Go to event 5 when Immediate operator actions of AOP-4 complete, reactor trip breakers open, LCO 3.8.1 identified, actions of AOP-5.0 in progress AND discretion of NRC examiner		

End event 4

Event Description: SB LOCA - 200 GPM

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - PRZR LVL DEV LO (HB2) - PRZR PRESS HI-LO (HC1) - CTMT SUMP LVL HI-HI OR TRBL (located on BOP panel P) (PG3)		Recognize indications of SB LOCA - PRZR level indication trending to down - PRZR pressure trending down - Charging flow increasing - CTMT sump level (LI-3282A & B) increasing
Automatic SI fails to actuate. 1A RHR pump fails to automatically start; can be manually started. The crew is expected to identify the fault, respond by entering EEP-0 and completing the immediate operator actions – which includes Manual actuation of SI.		
	SRO	Directs ARPs referenced and AOP-1.0 entered.
	RO	**Maintain pressurizer level stable at or near programmed level by :** Control charging flow **Take manual control of 122** OR Reduce letdown flow **remove 1 orifice** OR Isolating letdown **remove all orifices**
If Przr level cannot be maintained stable at or near programmed level, then the reactor should be tripped.		
	RO	**Maintain VCT level greater than 20% by:** Verifing reactor makeup system - **IN AUTOMATIC** OR Control makeup in manual IAW SOP-2.3 If VCT level can not be maintained >20%, then roll the chg pump suctions to the RWST by: Q1E21LCV115B open Q1E21LCV115D open And Q1E21LCV115C closed Q1E21LCV115E closed

Event Description: SB LOCA - 200 GPM

Cue: By Examiner.

	SRO	Direct RO to obtain values and calculate a flow balance.
	SRO	_____(charging flow) +_____(seal injection flow) -_____(letdown flow) -_____(#1 seal leakoff flow) =_**Approx 200 gpm** leak rate)
NOTE: It is anticipated that examinees will determine PRZR level cannot be maintained above 15% and will manually SI before any time after step 3 is performed		
CRITICAL TASK: WHEN SI Setpoint is exceeded, THEN Manually actuate at least one train of SI before transitioning to E-1 - Verification of Immediate operator actions		
	SRO	**CRITICAL TASK- Reactor trip and safety injection** Direct the reactor trip and enter EEP-0.
	RO/BOP	Immediate Operator actions of EEP-0 **Check reactor trip.** Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. check rod bottom lights - LIT. **Check turbine - TRIPPED.** TSLB2 14-1 thru 4 lit **Check power to 4160 V ESF busses.** 4160 V ESF busses - AT LEAST ONE ENERGIZED A Train (F & K) power available lights lit OR B Train (G & L) power available lights lit Verify operating diesel generators are being supplied from at least one SW pump. **Check SI Status.** **YES** Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION [] ACTUATED status light lit

Event Description: SB LOCA - 200 GPM

Cue: By Examiner.

		[] MLB-1 1-1 lit [] MLB-1 11-1 lit
	SRO	Directs continuing into EEP-0 at step 5. Directs the BOP to do attachment 2. See Tab at end of scenario Attachment 2 and 4 for actions
	RO	**6 [CA] Check containment pressure- HAS REMAINED LESS THAN 27 psig YES**
	RO	**7 Announce "Unit 1 reactor trip and safety injection".**
	RO	**8 Check AFW status.** 8.1 Check secondary heat sink Available o Check total AFW flow > 395 gpm [] FI 3229A [] FI 3229B []FI 3229C o Total Flow FI 3229 OR Check any SG NR level > 31% {48%} 8.2 WHEN all SG narrow range levels less than 31%{48%}, THEN maintain total AFW flow greater than 395 gpm. 8.3 WHEN at least two SG narrow range levels greater than 28% AND TDAFWP NOT required, THEN stop TDAFWP. 8.4 [CA] WHEN SG narrow range level greater than 31%{48%}, THEN maintain SG narrow range level 31%-65%{48%-65%}. 8.4.1 Control MDAFWP flow. MDAFWP FCV 3227 RESET [] A TRN reset [] B TRN reset MDAFWP TO 1A/1B/1C SG B TRN [] FCV 3227 in MOD 8.4.2 Control TDAFWP flow. TDAFWP FCV 3228 [] RESET reset TDAFWP SPEED CONT [] SIC 3405 adjusted

Event Description: SB LOCA - 200 GPM

Cue: By Examiner.

	RO	**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 [] TI 412D [] TI 422D [] TI 432D
	RO	RNO IF RCS temperature less than 547°F and falling, THEN perform the following. 9.1.1 Verify steam dumps closed. STM DUMP INTERLOCK [] A TRN in OFF RESET [] B TRN in OFF RESET 9.1.2 Verify atmospheric reliefs closed on MCB Demand at 0 and minimum red light LIT 9.1.3 Control total AFW flow to minimize RCS cooldown, AFW FLOW TO 1A(1B,1C) SG [] FI 3229A [] FI 3229B [] FI 3229C AFW TOTAL FLOW [] FI 3229 9.1.4 IF MSIVs are closed THEN proceed to step 9.1.8 9.1.5 IF MSIVs are open, THEN isolate steam loads in the turbine building while continuing with RNO step 9.1.6. **Will call TBSO to accomplish this task**
	RO	**10 Check pressurizer PORVs and spray valves.** 10.1 [CA] WHEN pressurizer pressure less than 2335 psig, THEN verify both PRZR PORVs closed. 10.1.1 Verify both PRZR PORVs indicate CLOSED 10.1.2 Check PRZR PORV temperature STABLE OR FALLING. [] PORV Temp TI-463 10.1.3 Check PRT parameters STABLE or FALLING. [] PRT PRESS PI 472 [] PRT LVL LI-470 [] PRT TEMP TI-471

Event Description: SB LOCA - 200 GPM

Cue: By Examiner.

		10.2 [CA] WHEN pressurizer pressure to less than 2260 psig, THEN verify normal pressurizer spray valves closed OR in the process of closing. 1A(1B) LOOP SPRAY VLV [] PK 444C [] PK 444D 10.3 Check any PRZR PORV ISO - OPEN 10.2 Stop 1A AND 1B RCPs stop spray flow.
	RO	**11 Check RCP criteria.** 11.1 Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE 11.1 IF HHSI flow greater than 0 gpm, THEN stop all RCPs.
	RO	**12 Monitor charging pump miniflow criteria.** 12.1 Control charging pump miniflow valves based on RCS pressure. 1C(1A) LOOP RCS WR PRESS [] PI 402A [] PI 403A Based on RCS pressure, close miniflows < 1300 and open when > 100 psig.
Diagnostics The SRO will direct the parameters to be reviewed and will determine appropriate procedure to transition to.		
	SRO	**13 Check SGs not faulted.** o Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig.
	SRO	**14 Check SGs not ruptured.** o Check secondary radiation indication - NORMAL. Checks rad monitors R-15, 19, 23A and B, 15B and C, and 60 A, B, C, D o No SG level rising in an uncontrolled manner.
	SRO	**Check RCS intact.** Check containment radiation - **NO.** [] R-2 CTMT 155 ft [] R-7 SEAL TABLE [] R-27A CTMT HIGH RANGE (BOP)

Event Description: SB LOCA - 200 GPM

Cue: By Examiner.

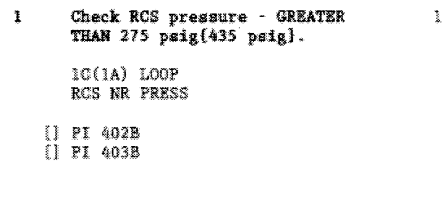
		[] R-27B CTMT HIGH RANGE (BOP) ☐ Check containment pressure - LESS THAN 3 psig. ☐ Check containment ECCS sump level - LESS THAN 0.4 ft.	**NO**
ENTER EEP-1. LB LOCA SHOULD HAVE OCCURRED BY NOW LB LOCA will occur 12 minutes after the SB LOCA			

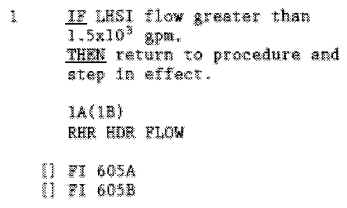
End of event 5

Event Description: LB LOCA

Cue: 12 minutes after SB LOCA

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Action or Behavior</th></tr>
<tr><td colspan="2">Annunciators:
- All CTMT PRESS annunciators in alarm (EE1, EE2, EE3, EE4, EE5)
- Various and numerous</td><td>Recognize indications of LB LOCA
- Phase B actuation
- RVLIS lights turn RED
- ECCS flow increases
- RCS SUBCOOLING < 16°F
- Rapid rise in ctmt pressure</td></tr>
<tr><td colspan="3">EEP-0 FO page requirements:
Greater than 16°F {45°F} subcooled in CETC mode
1.1 IF HHSI flow greater than 0 gpm, THEN stop ALL RCPs

Check MINI-flow criteria and close all chg pump miniflow valves
Utilize bracketed numbers in procedures – adverse containment criteria</td></tr>
<tr><td colspan="3"><u>When the transition to EEP-1 is made and the LB LOCA exists, FRP-P.1 will have to be addressed</u>
<u>EEP-1, LOSS OF REACTOR OR SECONDARY COOLANT.</u></td></tr>
<tr><td></td><td>SRO/RO
BOP</td><td>Recognizes CSF Red Path FRP-P.1</td></tr>
<tr><td></td><td>SRO</td><td>Updates Team on FRP-P.1 Entry</td></tr>
<tr><td></td><td>SRO/RO</td><td>Performs Actions of FRP-P.1
 

RCS <435 psig
RNO applied LHSI Flow > 1.5 x 10^3 gpm</td></tr>
<tr><td></td><td>SRO</td><td>Updates team and returns to procedure and step in effect EEP-1</td></tr>
<tr><td></td><td></td><td><u>EEP-1, LOSS OF REACTOR OR SECONDARY COOLANT.</u></td></tr>
<tr><td></td><td>RO</td><td>Check RCP criteria.
Check SUB COOLED MARGIN MONITOR indication - GREATER</td></tr>
</table>

Event Description: LB LOCA

Cue: 12 minutes after SB LOCA

		THAN 16°F{45°F} SUBCOOLED IN CETC MODE. **NO** IF HHSI flow greater than 0 gpm, THEN stop all RCPs. RCP [] 1A [] 1B [] 1C
	BOP	**Check SGs not faulted.** Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig. **YES**
	BOP	**Check intact SG levels.** Check any intact SG narrow range level – GREATER THAN 31%{48%}. **YES** [CA] 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 [] A TRN reset [] B TRN reset MDAFWP TO 1A/1B/1C SG B TRN [] FCV 3227 in MOD Control TDAFWP flow. TDAFWP FCV 3228 [] RESET reset TDAFWP SPEED CONT [] SIC 3405 adjusted
	BOP	**Check secondary radiation indication - NORMAL.** Checks rad monitors R-15, 19, 23A and B, 15B and C, and 60 A, B, C, D
	RO	**Check pressurizer PORVs** **Check any PRZR PORV ISO – power available** [CA] WHEN pressurizer pressure less than 2335 psig, THEN verify pressurizer PORVs closed with no leakage. Verify both PRZR PORVs – CLOSED

Event Description: LB LOCA

Cue: 12 minutes after SB LOCA

		Check PRZR PORV temperature STABLE OR FALLING. [] PORV Temp TI-463 Check PRT parameters STABLE or FALLING. [] PRT PRESS PI 472 [] PRT LVL LI-470 [] PRT TEMP TI-471 Check at least one PRZR PORV ISO - OPEN
	SRO	The following will be passed off to the Shift Manager **Perform the following within 1 hour of start of event.** o Close recirculation valve disconnects using ATTACHMENT 1. o Establish 1A and 1B post LOCA containment hydrogen analyzers IN SERVICE USING ATTACHMENT 2, POST LOCA CONTAINMENT HYDROGEN ANALYZER OPERATION. o Plot hydrogen concentration on FIGURE 1. o Check containment hydrogen concentration - LESS THAN 3.5%. o Less than 0.5%
	SRO	Evaluate SI termination criteria o Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE. o Check secondary heat sink available. >395 gpm AFW flow > 31%{48%} SGNR level o Check RCS pressure - STABLE OR RISING o Check pressurizer level GREATER THAN 13%{43%}. **Continue to step 8 since a known LOCA exists**
	RO	**[CA] Check containment spray system.** 8.1 Check any CS PUMP - STARTED. **YES** Reset containment spray signals. CS RESET [] A TRN [] B TRN
	RO	**9 [CA] Check if LHSI Pumps should be stopped.** Check RCS pressure – GREATER THAN 275 psig{435 psig} **NO**

Event Description: LB LOCA

Cue: 12 minutes after SB LOCA

		PT-402 AND 403 Establish CCW flow to RHR heat exchangers. <u>CCW TO 1A(1B) RHR HX</u> Q1P17MOV3185A open Q1P17MOV3185B open
	SRO	**Evaluation point –** Check no SG pressure - FALLING IN AN UNCONTROLLED MANNER. Check RCS pressure on PT-402/403. <u>This differentiates between a steam break and an RCS leak</u> SRO should direct the team to continue in EEP-1 and **<u>NOT</u>** return to step 1.
	BOP	Perform **<u>Attachment 4</u>** to **Verify 4160 V busses energized.** Check DF01 closed – **NO** **Verify energized by 1-2A DG** Verify DF02 closed - **YES** Check DG15 closed - **YES** Verfiy DG02 closed - **YES** 1.6 Verify all RCP busses - ENERGIZED. [] 1A 4160 V bus - **NO** [] 1B 4160 V bus - **YES** [] 1C 4160 V bus - **YES** 1.7 Check 1E 4160 V bus - ENERGIZED. **YES** 1.8 Check 1D 4160 V bus - ENERGIZED. **NO** Establish power to 1A 600 V LC emergency section loads. o Place handswitch for pressurizer heater group 1A in OFF. o Verify open BKR EA08-1. o Verify closed BKRs ED08-1 and EA09-1. o WHEN pressurizer heater group 1A operation is desired, THEN place HTR GRP 1A BLOCKING BYPASS SW to BYPASS. o IF required, THEN manually energize pressurizer heater group 1A. o Verify 1C air compressor in service. 1.11 Align 1A air compressor.

Event Description: LB LOCA

Cue: 12 minutes after SB LOCA

		o Check INST AIR PRESS PI 4004B- GREATER THAN 85 psig o Verify instrument air aligned to containment. (BOP) IA TO PENE RM [] N1P19HV3825 open [] N1P19HV3885 open IA TO CTMT [] Q1P19HV3611 open
	BOP	**Check diesel generators.** [CA] Monitor any loaded diesel generator for proper voltage, frequency and load. [CA] Secure any unloaded diesel generators using FNP-0-SOP-38.0,DIESEL GENERATORS. This will be accomplished by the extra operator or the BOP if time permits. This is generally not the case and the DGs will continue to run.
	SRO	**This is a foldout page requirement and may be used any time the conditions are met.** **Begin evaluation of plant status.** Verify cold leg recirculation capability - AVAILABLE. 14.1.1 Train A equipment available: RECIRCULATION □ 1A RHR Pump □ CTMT SUMP TO 1A RHR PUMP Q1E11MOV8811A □ CTMT SUMP TO 1A RHR PUMP Q1E11MOV8812A □ 1A RHR HX TO CHG PUMP SUCT Q1E11MOV8706A □ CCW TO 1A RHR HX Q1P17MOV3185A OR 14.1.2 Train B equipment available: □ 1B RHR Pump 14.1 IF cold leg recirculation capability can NOT be verified, THEN go to ECP-1.1, LOSS OF EMERGENCY COOLANT

Event Description: LB LOCA

Cue: 12 minutes after SB LOCA

		□ CTMT SUMP TO 1B RHR PUMP Q1E11MOV8811B □ CTMT SUMP TO 1B RHR PUMP Q1E11MOV8812B □ 1B RHR HX TO CHG PUMP SUCT Q1E11MOV8706B □ CCW TO 1B RHR HX Q1P17MOV3185B
	SRO	**These steps will be passed to the TSC by the SRO When RWST level is < 32 feet, 1A RHR pump will trip and MOV 8811A breaker will have tripped when LB LOCA occurs.** Transition to ECP-1.1 is a critical task
	BOP	Checks for no intersystem LOCA outside CTMT • Aux building radiation NORMAL • Aux building no HI sump levels & pumps not running • WHT and FDT levels not rising unexplained • Verify at least one train of PRF in operation using SOP-60.0, PRF System (Attached) • Verifies VCT level >5% • Checks LHSI flow in progress by low RCS PRESSURE & LHSI flows >1.5 x E3
	SRO	Check when to transfer to cold leg recirculation: RETURNS to step 14 & loops in procedure from steps 14 to 16 until RHR pump trips, THEN transitions to ECP-1.1
	RO	Verify ECCS pumps not affected by sump blockage • Monitor ECCS pump suction conditions - **no indication of cavitation**
	SRO	WHEN emergency coolant recirculation capability is restored, THEN go to procedure and step in effect.

Event Description: LB LOCA

Cue: 12 minutes after SB LOCA

	RO	Will go to RNO step 3 • Continue attempts to restore at least one train of recirc equipment and go to step 4
	BOP	- Verify SI – RESET - Check PHASE B CTMT ISO - RESET. - Verify containment spray signals - RESET.
	RO	Reset containment sump to RHR valve switches.
	BOP	Verify containment fan cooler alignment. All started in slow speed, associated emergency service water outlet valves open EMERG SW FROM 1A(1B,1C,1D) CTMT CLR [] Q1P16MOV3024A [] Q1P16MOV3024B [] Q1P16MOV3024C [] Q1P16MOV3024D
	BOP	Check RWST level greater than 4.5 feet **YES**
	RO	- Check containment spray aligned to RWST - Determine number of CTMT spray pump required based on table - Establish required number of CS pumps running

Event Description: LB LOCA

Cue: 12 minutes after SB LOCA

10.2 Determine number of containment spray pumps required based on the Table below.

RWST LEVEL	CONTAINMENT PRESSURE	FAN COOLERS RUNNING IN EMERGENCY MODE	SPRAY PUMPS REQUIRED
GREATER THAN 12.5 FT	GREATER THAN 54 PSIG	—	2
	BETWEEN 27 PSIG AND 54 PSIG	0, 1	2
		2, 3	1
		4	0
	LESS THAN 27 PSIG	—	0
BETWEEN 4.5 FT and 12.5 FT	GREATER THAN 54 PSIG	—	2
	BETWEEN 27 PSIG and 54 PSIG	1, 2	1
		3, 4	0
	LESS THAN 27 PSIG	—	0
LESS THAN 4.5 FT	—	—	0

CRITICAL TASK:
Makeup to the RWST and minimize RWST outflow.

- Establish the required number of CS pumps running – probably none

	RO	check status of CS pump – any started, check CTMT sump level > {4.6} aligned for recirc mode if sump level met sump suctions open, RWST suction isolations closed.
	SRO	Make up to the RWST as necessary using FNP-1-SOP-2.3 (SRO notifies SM, SSS, or TSC staff to perform this evolution)

Event Description: LB LOCA

Cue: 12 minutes after SB LOCA

CRITICAL TASK: Makeup to the RWST and minimize RWST outflow. • When the direction to makeup to the RWST using the makeup system in the manual mode per SOP-2.3 or Direct the TSC to begin evaluating alternate makeup methods has been made, then put in the next event below.		
		At this time restore power to MOV 8811B and report to SS that power is restored to MOV8811B
		Transition back to EEP-1 at the step to check RWST level less than 12.5 feet, or to ESP-1.3 if RWST level is <12.5 feet
END OF SCENARIO		

Event Description: Attachment 2 and 4 of EEP-0

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

Time	Position	Applicant's Action or Behavior
		Attachment 2 of EEP-0 **AUTOMATIC ACTIONS VERIFICATION**
	BOP	**1 Verify each SW train - HAS TWO SW PUMPs STARTED.** [] A train (1A,1B or 1C) [] B train (1D,1E or 1C) **2 Verify each train of CCW - STARTED.** 2.1 Verify one CCW PUMP in each train- STARTED. A train HX 1C or 1B CCW FLOW [] FI 3043CA > 0 gpm OR [] FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW [] FI 3043AA > 0 gpm OR [] FI 3043BA > 0 gpm Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX [] Q1P16FI3009AA > 0 gpm [] Q1P16FI3009BA > 0 gpm [] Q1P16FI3009CA > 0 gpm
	BOP	**3 Verify one CHG PUMP in each train - STARTED.** [] A train (1A or 1B) amps > 0 **Start 1A or 1B CHG pump** [] B train (1C or 1B) amps > 0 **Start 1C Chg pump**
	BOP	**4 Verify RHR PUMPs - STARTED.** RHR PUMP [] 1A amps > 0 [] 1B amps > 0
	BOP	**5 Verify Safety Injection Flow.** 5.1 Check HHSI flow - GREATER THAN 0 gpm. [] FI 943

Event Description: Attachment 2 and 4 of EEP-0

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

	BOP	Check RCS pressure - LESS THAN 275 psig{435 psig}. 5.2 Proceed to Step 6.
	BOP	**6 Verify containment ventilation isolation.** 6.1 Verify containment purge dampers - CLOSED. [] 3197 [] 3198D [] 3198C [] 3196 [] 3198A [] 3198B 6.2 Verify containment mini purge dampers - CLOSED. CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D [] 2866C [] 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C [] 2866D [] 2867D 6.3 Stop MINI PURGE SUPP/EXH FAN. **Will place HS to STOP**
	BOP	**7 Verify containment fan cooler alignment.** 7.1 Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED. CTMT CLR FAN SLOW SPEED □ A train [] 1A [] 1B □ B train [] 1C [] 1D 7.2 Verify associated emergency service water outlet valves - OPEN. EMERG SW FROM 1A(1B,1C,1D) CTMT CLR

Event Description: Attachment 2 and 4 of EEP-0

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

<table>
<tr><td></td><td></td><td>[] Q1P16MOV3024A
[] Q1P16MOV3024B
[] Q1P16MOV3024C
[] Q1P16MOV3024D</td></tr>
<tr><td></td><td>BOP</td><td>8 Verify AFW Pumps - STARTED.
8.1 Verify both MDAFW Pumps - STARTED
[] 1A MDAFW Pump amps > 0
[] 1B MDAFW Pump amps > 0
AND
[] FI-3229A indicates > 0 gpm
[] FI-3229B indicates > 0 gpm
[] FI-3229C indicates > 0 gpm

8.2 Check TDAFW Pump start required.
☐Condition ☐TSLB ☐Setpoint ☐Coincidence☐
RCP Bus Undervoltage | TSLB2 1-1 1-2 1-3 | ☐2680 V | 1/2 Detectors on 2/3 Busses
Low Low SG Water Level In Any 2/3 SGs | TSLB4 4-1,4-2,4-3 5-1,5-2,5-3 6-1,6-2,6-3 | 28% | 2/3 Detectors on 2/3 SGs</td></tr>
<tr><td></td><td>BOP</td><td>8.3 Verify TDAFWP started.
[] MLB-4 1-3 lit
[] MLB-4 2-3 lit
[] MLB-4 3-3 lit

TDAFWP SPEED
[] SI 3411A > 3900 rpm

TDAFWP SPEED CONT
[] SIC 3405 adjusted to 100%

8.4 Verify TDAFW flow path to each SG.
TDAFWP TO 1A(1B,1C) SG
[] Q1N23HV3228A in MOD
[] Q1N23HV3228B in MOD
[] Q1N23HV3228C in MOD

TDAFWP TO 1A(1B,1C) SG FLOW CONT
[] HIC 3228AA open
[] HIC 3228BA open
[] HIC 3228CA open</td></tr>
</table>

Event Description: Attachment 2 and 4 of EEP-0

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

	BOP	**9 Verify main feedwater status.** 9.1 Verify main feedwater flow control and bypass valves - CLOSED. 1A(1B,1C) SG FW FLOW [] FCV 478 [] FCV 488 [] FCV 498 9.2 Verify both SGFPs - TRIPPED. 9.3 Verify SG blowdown - ISOLATED. 1A(1B,1C) SGBD ISO [] Q1G24HV7614A closed [] Q1G24HV7614B closed [] Q1G24HV7614C closed 9.4 Verify SG blowdown sample - ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE STEAM GEN ISO [] MLB1 19-2 lit Q1P15HV3328 closed [] MLB1 19-3 lit Q1P15HV3329 closed [] MLB1 19-4 lit Q1P15HV3330 closed
	BOP	**10 Check no main steam line isolation actuation signal present.** Signal / Setpoint / coincidence / TSLB LO SG PRESS < 585 psig / 2/3 / TSLB4 19-2,3,4 Hi stm flow >40% / ½ 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 **IF MSLI present then shut MSIVs**
	BOP	**11 Verify PHASE A CTMT ISO.** 11.1 Verify PHASE A CTMT ISO - ACTUATED. [] MLB-2 1-1 lit [] MLB-2 11-1 lit 11.2 Check all MLB-2 lights - LIT. 11.2 Verify PHASE A CTMT ISO alignment using ATTACH 3, PHASE A CTMT ISO

Event Description: Attachment 2 and 4 of EEP-0

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

	BOP	**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	12 Perform the following. 12.1 Open reactor trip breaker(s) manually from MCB or locally. 12.2 Record any breaker(s) manually opened.
	BOP	**13 Trip CRDM MG set supply breakers.** 1A(1B) MG SET SUPP BKR [] N1C11E005A [] N1C11E005B	
	BOP	**14 Secure secondary components.** 14.1 Stop both heater drain pumps. HDP [] 1A [] 1B 14.2 Check any condensate pump started. 14.2.1 IF started, THEN stop all but one condensate pump. [] 1A [] 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	**15 Verify both CRACS mode selector switches in the ON position.** CRACS Mode Selector Switch [] A TRAIN [] B TRAIN Will call BOOTH to have this accomplished since this is not in the simulator	
	BOP	**16 WHEN at least 30 seconds have passed since turbine trip, THEN check main generator tripped.**	

Event Description: Attachment 2 and 4 of EEP-0

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

		230 KV BKR [] 810 - OPEN [] 914 - OPEN
	BOP	**17 Verify two trains of ECCS equipment aligned.** 17.1 Perform ATTACHMENT 4, TWO TRAIN ECCS ALIGNMENT VERIFICATION.

Event Description: Attachment 2 and 4 of EEP-0

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

		Attachment 4 **TWO TRAIN ECCS ALIGNMENT VERIFICATION**
	BOP	**1 Verify two trains of ECCS equipment aligned.** Check DF01 closed Verify DF02 closed Check DG15 closed Verfiy DG02 closed Verify two trains of battery chargers – energized - Amps > 0 1.6 Verify two trains of ESF equipment aligned. Check all MLB-1 lights LIT Verify charging pump suction and discharge valves - OPEN. CHG PUMP DISCH HDR ISO [] Q1E21MOV8132A [] Q1E21MOV8132B [] Q1E21MOV8133A [] Q1E21MOV8133B CHG PUMP SUCTION HDR ISO [] Q1E21MOV8130A [] Q1E21MOV8130B [] Q1E21MOV8131A [] Q1E21MOV8131B 1.7 Verify all post accident containment air mixing system fans - STARTED. (BOP) POST ACCIDENT MIXING FAN [] 1A [] 1B [] 1C [] 1D RX CAV H2 DILUTION FAN [] 1A [] 1B 1.8 WHEN power restored to any deenergized emergency bus, THEN verify alignment of associated equipment.
	BOP	Call Radside SO to Verify Spent Fuel Pool Cooling in service per SOP-54.0, SPENT FUEL PIT COOLING AND PURIFICATION SYSTEM.
		End of Attachment 2 and 4

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, verbally state, "Unit 2" and an instructor will locate to the Unit 2 area and respond to you as quickly as possible.

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 Status Mode 3, 0% RTP; MOL 10,000 MWD; RCS 917 ppm Cb; Xe. Decreasing (-2969)

STPs/Evolutions:

A Train On-Service – **A** Train Protected

1.0___; 109.1 ____No adj. ; 63.7 ____; FSP-20,0 _____;

Status of Special Testing

General Information

1. Current Risk Assessment is GREEN and projected is GREEN
2. Reactor tripped 8 hours ago as a result of loss of both SGFPs & repairs are in progress
3. Currently at step 5.16 and step 2.7 of UOP-1.3
4. Reactor Startup planned in 12 hours, ECC being calculated by Reactor Engineering
5. CTMT mini-purge running for vibration analysis
6. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia
7.
8.
9.
10.

Equipment Status		
		Maintain VCT gas pressure 25-30 psig

Reactivity Plan	**Waste Management Status**
NA	#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	Operator Logs Reviewed	Cond. Report Queue Reviewed	Autolog Reviewed	ELDS & GEN Spreadsheet verified	Keys Turned Over
	[X] Yes	[X] Yes	[X] Yes	[X] Yes	[X] Yes	[X] Yes

Original Submitted

Facility: Farley Scenario No.: 6 Op-Test No.: FA2008301

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions: 100% power. ~~???~~ 855 ppm, MOL; B train on service, B Train protected.

Turnover:

- 1-2A DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- 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 No.	Malf No.	Event Type*	Event Description
.1		C (BOP) R (RO)	Load rejection 200 MW
#4		C (RO)	PK-444A fails high – Cnh / imf pk444a-m / 0 manual portion will not work Cnh / imf pk444a-a / 0 auto will not work
#5		N (BOP) R (RO) **TS** (SRO)	1C SG tube leak – 15 gpm over 3 min and stabilizes Commence ramp off line
#2		(I) (RO)	FT-122 fails high
#3		C (BOP) **TS** (SRO)	CST rupture – crane accident – will place SW on AFW suctions
6		M (ALL)	Loss of air – will cause a Rx trip to be called for
7		C (ALL)	Rx Trip will not work in auto or manual, and one CRDM MG set breaker will not open. FRP-S.1 will be entered.
8		C (RO)	PORV fails open – can be isolated with MCB handswitch
9		M (ALL)	~~SG code safety fails open on 1C SG~~ Stm Break in TB d
10		M (ALL)	1C SGTR 500 gpm when EEP-0 step 5 reached

1C SG MSIV not able to close

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

Event No.	Malf. No.	Event Type*	Event Description
PRESETS			
0	IC- ??	-------	Approx 100% MOL, B Train on service.
0	irf cbk1df08_d_cd1 open irf cbk2df08_d_cd1 open	------	Tag 1-2A DG output breakers for Unit 1 & 2 rack out 1-2A DG DF08-1 rack out 1-2A DG DF08-2
0	NA	------	1-2A DG Mode selector switch in Mode 3; **Tag out 1-2A MSS**
0	Cmfmalf / cmshfpb_cp1	-----	Tag out 1B EH pump
0	1B EH PUMP	----	PLACE IN OFF AND TAG
0	CMFmalf lmf cBKRXTRP_cc21/ closed imf cBKRXTRP_cc22 closed		Rx does not trip in auto or manual–Fail RTBs closed
0	CMFmalf / imf c52mga_cr3	-----	1A CRDM MG set breaker will not open
0	Vlv / rrc444b-s (0-100%) for stuck valve This should not be needed since the failure of the controller will allow HS to work	----	PORV fails open when it lifts- can be closed from MCB handswitch
0	Mal-mss3F 50% set on trigger with 8104 opening or FI-110 flow	---	1C SG code safety fails open when emergency borate valve opens. (may have to change this based on timing)

SCENARIO 6 Summary sheet

Presets:

Event 1 — Load rejection 200 MW, AOP-17 entry required.

Event 2 — PK-444A fails high –will have to react to rising RCS pressure AOP-100 entry – manual control of RCS pressure

Event 3 — 1C SG tube leak – 15 gpm over 3 min and steady
Commence ramp off line – need to make this a high enough leak to be at 50% in 1 hour and mode 3 in 2 hours.

Event 4 — FT-122 fails high – AOP-16 entry

Event 5 — CST rupture – crane accident – will place SW on AFW suctions

Event 6 — Loss of air – will cause a Rx trip to be called for AOP-6 entry

Event 7 — Rx Trip will not work. Drive rods in the fastest mode possible. Establish emergency boration(CT)

Event 8 — PORV fails open – can be isolated with MCB handswitch (CT)

Event 9 — SG code safety fails open on 1C SG – MSIVs will close automatically EEP-2.0 entered to isolate the faulted SG. 1C SG isolated in EEP-2. (CT)

Event 10 — 1C SGTR 500 gpm when EEP-0 step 5 reached. EEP-3 entered and feed is isolated per EEP-3 for these conditions. (CT)

When EEP-3 entered at the step to check SG pressures, ECP-3.1 should be entered.

CRITICAL TASK SHEET

___ 1. Rx Trip will not work.
- Enter FRP-S.1 and shutdown reactor.
- Drive rods in the fastest mode possible. Establish emergency boration

(WOG CT E-0 - - M)

___ 2. Close PORV with MCB handswitch at or before EEP-0 step 10.1, "Check pressurizer PORVs and spray valves [closed]".
(WOG CT E-0 - - M)

___ 3. Isolate the faulted steam generator 1A prior to transition out of EEP-2:
(WOG CT E-2 - -A)

___ 4. Identify and isolate flow to/from the ruptured steam generator before a transition to ECP-3.1 occurs or prior to commencing RCS cooldown.
(PRA - NR:6)
(WOG CT E-3 – A)

SCENARIO OBJECTIVE/ OVERVIEW:

The team should be able to:
- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-100, AOP-16 AOP-2.0 and AOP-6.0 & Tech Specs
- Respond to a loss of air and then an ATWT event when the reactor will not trip, then isolate a failed open PORV.
- The crew will have to evaluate a faulted SG while in FRP-S.1 and then react to a SGTR after entering EEP-0 on the same faulted SG.

Southern Nuclear
J.M. Farley Nuclear Plant

Operations Training
Simulator Exam Scenario

HLT-32 NRC EXAM SCENARIO #6

Technical Review: GT Ohmstede *Date:* 07-2008

Training Department Approval: _____ *Date:* _____

SOUTHERN COMPANY
Energy to Serve Your World℠

Facility:	Farley Nuclear Plant		Scenario No.:	6	Op-Test No.:	2008-301

Examiners: _____ Operators: _____ SRO

_____ _____ RO

_____ _____ BOP

Initial Conditions: 100% power. 855 ppm, MOL; B train on service, B Train protected

Turnover:

- 1-2A DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Current Risk Assessment is GREEN and projected is GREEN,
- **B** Train On-Service – **B** Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event No.	Malf. No.	Event Type*	Event Description
1		C (BOP) R (RO)	Load rejection 200 MW
2		(I) (RO)	FT-122 fails high
3		C (BOP) **TS** (SRO)	CST rupture – crane accident – will place SW on AFW suctions
4		C (RO)	PK-444A fails high – Cnh / imf pk444a-d / 10/ 45 manual and auto portion will not work
5		R (RO/ BOP) **TS** (SRO)	1C SG tube leak – 15 gpm over 3 min and stabilizes Commence ramp off line
6		M (ALL)	Loss of air – will cause a Rx trip to be called for
7		C (ALL)	Rx Trip will not work in auto or manual, and one CRDM MG set breaker will not open. FRP-S.1 will be entered.
8		C (RO)	PORV fails open – can be isolated with MCB handswitch
9		M (ALL) C (BOP)	Main Steam header break downstream of MSIVs 1C SG MSIVs will not auto close
10		M (ALL)	1C SGTR 500 gpm when 1C SG pressure drops to 600 psig or step 5 of EEP-0

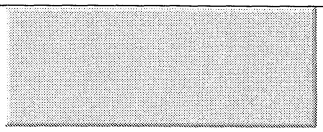
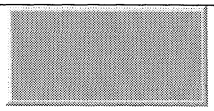
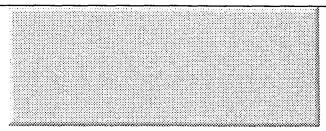
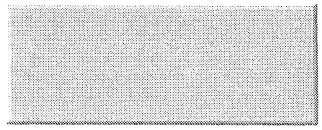
(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Pre-sets

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	**Base IC**- IC-74, 100% RTP, MOL, B Train O/S, B Train Protected, Cb=855, Eq. Xe (-2726 pcm)	Need to change Trains on service and make sure proper CCW lineup
		RUN	RUN simulator
		Generic setup: bat generic_setup_HLT.txt	
0	0	Quick setup (all items with * are included): bat 2008nrcexam_06.txt	
0	0	Tag out 1B EH pump Cmfmalf / cmshfpb_cp2	*
0	0	Fail RTB from opening on manual or auto trip CMFmalf / imf cBKRXTRP_cc21/ closed imf cBKRXTRP_cc22/ closed	*
0	0	1A CRDM MG set breaker will not open imf c52mga_cr3	*
0	0	main turb fails to auto trip imf mal-tur2	*
0	0	1C MSIVs will not close on auto closure imf crsh001c_cc5 open imf cmsh002c_d_cc5 open	*
0	0	Tag 1-2A DG output breakers for Unit 1 & 2 rack out 1-2A DG DF08-1 rack out 1-2A DG DF08-2 irf cbk1df08_d_cd1 open irf cbk2df08_d_cd1 open	*

Pre-sets

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
	0	Main Steam header break downstream of MSIVs when AFW flow > 500 gpm trgset 1 "fi3229 > 500" Main Steam header break imf Mal-mss9 (1 0) .5	*
	0	event trigger 1 - PORV-445a sticks 80% after opening > 20% trgset 2 "rrc445a > 0.2" Porv 445a sticks at 80% trg 2 "imf rrc445a-s 80"	*
	0	1C SGTR when 1C SG pressure drops to 600 psig trgset 3 "pi494 < 600" trg 3 "imf mal-rcs4c 500 60"	*

		MCB setup	
		Place 1B EH pump HS to STOP and HOLD Tag on HS	1 HOLD tag HS to STOP
		1-2A DG Mode selector switch	Place in Mode 3
		Place HOLD Tag 1-2A MSS	1 HOLD TAG
		Place HOLD Tag on 1-2A DG output breakers	2 HOLD TAGS
		Place Unit 1 and unit 2 Bypass and inoperable panel lights to the up position	Unit 1 A-Train Unit 2 A Train
0	0	**DEH**	Clear DEH alarms
0	0	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
		Recorders	Verify memory disks cleared
			 Acknowledge annunciators
			Verify HORNS ON
			 FREEZE simulator
		Perform Booth Operators Setup Checklist	
		Open Simview file to be used for plant parameter data collection: Simview / 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
0	0	**VERIFY MICROPHONES READY**	Batteries installed
0	0	**TURNOVER SHEET AVAILABLE**	

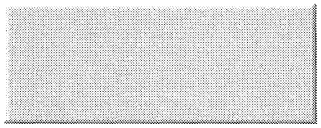
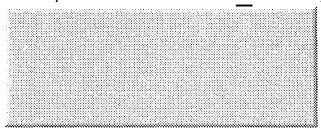
EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
Prior to RUN	0		
		Start data collection for Simview file DataCollection.uvl	
	0	**Begin Exam**	RUN simulator
		Verify Horns ON: hornflag	Verify Horns On
1	2	Load rejection 200 MW, AOP-17 entry required. Malf/ T / mal-tur18 700	
2	NRC CUE	FT-122 fails high – AOP-16 entry Xmt / imf ft122 150 30	
3	NRC CUE	CST rupture – crane accident – CST level will trend down to 14 feet over 5 min irf loa-cfw001 14 300 CST level will drop to 0 over a slower time frame irf loa-cfw001 0 300	
4	NRC CUE	PK-444A fails high –will have to react to rising RCS pressure AOP-100 entry – manual control of RCS pressure Cnh / imf pk444a-d / 10/ 45 manual and auto portion will not work	
5	NRC CUE	1C SG tube leak – 15 gpm over 3 min and stabilizes Imf mal-rcs4c 15 180	
6	NRC CUE	Loss of air – will cause a Rx trip to be called for AOP-6 entry Mal-aux1a 80 60	

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
7	Preset	Rx Trip will not work. Drive rods in the fastest mode possible. Establish emergency boration	
8	Preset	PORV fails open – can be isolated with MCB handswitch	
9	Preset	Main Steam header break downstream of MSIVs 1C MSIVs will not auto close	
10	Preset	1C SGTR of 500 gpm Set to come in when 1C SG is <600 psig Malf / R / imf mal-rcs4c 500 60 If this does not come in, activate button at step 5 of EEP-0	
end		When EEP-3 entered at the step to check SG pressures, ECP-3.1 should be entered.	
		End of Exam	HORNS OFF
		End of Exam	FREEZE simulator
		Stop data collection for Simview file DataCollection.uvl	
		Export data to file with the name of NRC exam01 grpX.txt ***NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate.*** ***NOTE: file will be saved in the OPENSIM directory.***	Ensure data file created.

Local operator actions:

EVENT NO.	***TIME***	***ACTIONS***
1	NONE REQUIRED	
2	NONE REQUIRED	
3	NONE REQUIRED	
4	NONE REQUIRED	
5	NONE REQUIRED	
6	NONE REQUIRED	
7	3 minutes after requested	Locally open reactor breakers  CMFmalf / cBKRXTRP_cc21 / open  CMFmalf / cBKRXTRP_cc22 / open
8 / 9 / 10		NONE REQUIRED

Initial Conditions: 100% power, MOL, 10,000 MWD, B Train O/S, B Train protected, RCS boron concentration is 855 ppm, and Eq. Xe (-2726 ppm)

Turnover:

- 1-2A DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Current Risk Assessment is GREEN and projected is GREEN,
- **B** Train On-Service – **B** Train Protected.
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

Event 1 Load rejection 200 MW, AOP-17 entry required.

Event 2 FT-122 fails high – AOP-16 entry

Event 3 CST rupture – crane accident – will place SW on AFW suctions TS actions

Event 4 PK-444A fails high –will have to react to rising RCS pressure AOP-100 entry – manual control of RCS pressure

Event 5 1C SG tube leak – 15 gpm over 3 min and stabilizes
Commence ramp off line – need to make this a high enough leak to be at 50% in 1 hour and mode 3 in 2 hours.

Event 6 Loss of air – will cause a Rx trip to be called for AOP-6 entry

Event 7 Rx Trip will not work. Drive rods in the fastest mode possible. Establish emergency boration(CT)

Event 8 PORV fails open – can be isolated with MCB handswitch (CT)

Event 9 Main Steam header break – 1C MSIVs will not auto close
FRP-S.1, EEP-0.0 or EEP-2.0 entered to isolate the faulted SG.
1C SG isolated in EEP-0, EEP-2 or FRP-S.1. (CT)

Event 10 SGTR 500 gpm when 1C SG pressure decreases to 600 psig (or at step 5 of EEP-0)

EEP-3 entered and feed is isolated per EEP-3 for these conditions. (CT)

End point When SGs are at the desired cooldown temperature and RCS cooldown has been stopped.
Or after step 17 when RCS depressurization is completed.

CRITICAL TASK SHEET

___ 1. Rx Trip will not work.
- Enter FRP-S.1 and shutdown reactor.
- Drive rods in the fastest mode possible. Establish emergency boration

(WOG CT E-0 - - M)

___ 2. Close PORV with MCB handswitch at or before EEP-0 step 10.1, "Check pressurizer PORVs and spray valves [closed]".
(WOG CT E-0 - - M)

___ 3. Isolate the faulted steam header prior to transition out of EEP-2:
(WOG CT E-2 - -A)

___ 4. Identify and isolate flow to/from the ruptured steam generator before a transition to ECP-3.1 occurs or prior to commencing RCS cooldown.
(PRA - NR:6)
(WOG CT E-3 – A)

SCENARIO OBJECTIVE/ OVERVIEW:

The team should be able to:
- Respond to a failed equipment and instruments and complete the appropriate ARPs, AOP-100, AOP-16 AOP-2.0 and AOP-6.0 & Tech Specs
- Respond to a loss of air and then an ATWT event when the reactor will not trip, then isolate a failed open PORV.
- The crew will have to evaluate a faulted SG while in FRP-S.1 and then react to a SGTR after entering EEP-0 on the same faulted SG.

Communications sheet

EVENT NO.	*TIME*	*ACTIONS*
1	WHEN REQUESTED	**ACC:** Acknowledge loss of load.
2	WHEN REQUESTED	**DISPATCHER:** - Acknowledges when informed that the CR is in the queue.
3	When the CST low level alarm comes in report:	**DBSO:** A crane has fallen on top of the CST and sliced the tank open from top to bottom.
4	WHEN REQUESTED	**DISPATCHER:** - Acknowledges when informed that the CR is in the queue.
5	WHEN REQUESTED	AOP-2.0 communications- HP and shift radiochemist, counting room, and SM will all be notified.
6	WHEN REQUESTED	**TBSO:** There is a large pipe rupture in the Turbine Building Instrument air piping.
7	3 minutes open the RTBs and then report:	**ROVER:** See Local Operator Actions section for opening trip breakers "The RTBs are open on UNIT 1"
8	None required	
9	WHEN REQUESTED	**SM:** I will classify the event **SRC:** I am doing dose assessment and CCP-645

Op-Test No.: Farley 2008-301 Scenario No.: 6 Event No.: 1

Event Description: 200 MW load rejection
Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - TAVG/TREF DEV (HF3) - 1A, 1B, 1C SG LVL DEV (JF1, 2, 3)		Recognize indications of 200 MW load rejection • DEH MW dropping • Rapid Auto Rod Insertion • Steam Dumps armed and opened • Rapid change in SGFP suction pressure
If the BOP takes the DEH to Turb manual then the load rejection will not be as severe.		
	Team	Recognize load rejection and enter AOP-17 • DEH MW dropping • Rapid Auto Rod Insertion • Steam Dumps armed and opened • TAVG TREF mismatch greater than 5°F • SG level deviation alarms • Rapid change in SGFP suction pressure
	RO	Takes manual control of rods (if desired)
	BOP	**Verify turbine valve position stable** Display the VALVE TEST page and determine valve positions
	RO	**Stabilize TAVG by adjusting rod position and/or boron** Using rod control SOP-2.3 – manual boration Or Emergency boration (figure 6 on MCB) Add steps here
	BOP	Check steam generator narrow range levels trending to or maintained at 65% if not then take manual control of FRVs
	RO	Check pressurizer level trending to or maintained on program If HIGH- then start additional heaters and verify Przr level returns to the expected level as Tavg approaches Tref Or If LOW- Adjust LK459F to obtain desired level

Event Description: 200 MW load rejection
Cue: By Examiner.

	RO	Check pressurizer pressure maintained approximately equal to 2235 psig If not then start additional heaters or control spray flow using PK444C PK444D
	SRO	Check parameters within limits for continued at power operation • Pressurizer level greater than 15% • Pressurizer pressure greater than 2100 psig • SG narrow range levels 35%-75% • TAVG 541°F - 580°F • Control rod bank position Lo-Lo Annunciator FE2 Clear • Delta I within limits specified in the COLR If NOT – then trip the reactor
	RO	Restore TAVG to programmed value Maintain Delta I within limits specified in the COLR during restoration of TAVG • IF Delta I low, THEN borate RCS to allow control rods to be withdrawn. • IF Delta I high, THEN dilute to support inward rod motion. Adjust rod position and/or boron concentration to restore TAVG to programmed value
	BOP	WHEN the steam dump valves have automatically closed AND plant conditions are stabilized, THEN reset the LOSS-OF-LOAD INTERLOCK C-7A o Check STM DUMP DEMAND TI408 indicating 0% demand o Place the STM DUMP MODE SEL TRAINS A-B to RESET and spring return to TAVG
	SRO	Notify the Shift Radiochemist of any significant changes in plant load and to sample RCS per FNP-1-STP-746 if Rx Power changes by > 15% of rated thermal power within a 1 hr. period. (T.S. surveillance requirement SR 3.4.16.2)
	SRO	Address Tech specs – RCS pressure <2209 psig 3.4.1 condition A restore DNB w/I 2 hours

Event Description: 200 MW load rejection
Cue: By Examiner.

	SRO	o Submit a Condition Report and notify the Work Week Coordinator (Maintenance ATL on backshifts) o Notify the Shift Manager

End Event #1

Event Description: FT-122 fails high

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - CHG HDR FLOW HI-LO (EA2) - REGEN HX LTDN FLOW DISCH TEMP HI (DE1) - SEAL WTR INJ FLTR HI DP (DC4)		Recognize indications of FT-122 FAILING HIGH - FT-122 will indicate >150 gpm (pegged high) - VCT level will increase - Przr level will decrease - FK-122 demand will go to 0 - LK-459F will increase
Actual valve position will close down and cause the above indications.		
	SRO	Determine a charging system malfunction is occurring and direct entry into AOP-16.
	RO	- 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	Check charging pump – RUNNING **YES**
	RO	Check Charging flow FK-122 controlling in AUTO with flow indicated There will be flow indicated and 122 in AUTO - Seal inj flow will increase due to FCV122 going closed. **The answer to this question should be NO and 122 taken to manual control -RNO** An incorrect determination here will cause the crew to place 122 on the bypass.
	RO	- Check DE3 clear **YES** - Check Letdown on service **YES**
	RO	- Determine Charging Status Check charging - AFFECTED BY MALFUNCTION **NO** With 122 in manual the condition is cleared

Event Description: FT-122 fails high

Cue: By Examiner.

	SRO	o Submit a Condition Report and notify the Work Week Coordinator (Maintenance ATL on backshifts) o Notify the Shift Manager

End Event #2

Event Description: CST rupture

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - CST LVL HI-LO (JE5) - CST LVL LO-LO A TRN and B TRN (JD4 and JE4)		Recognize indications of CST LEVEL DROPPING - LI-4005 B decreasing - Computer alarms
CST level will decrease over a 5 min time frame to 14 feet. The first alarm comes in at 16 feet so if the crew does not notice the decreasing level, the first alarm will be at about the 4 minute mark. The DBSO will be sent out to look for the problem and then a report will be given about a crane accident. **150,000 gallons = 12 feet**		
	SRO	Direct ARP reference (JE5) and a call to the DBSO to look for problems.
	BOP	Direct DBSO to commence filling the tank (Unless report of rupture has come in)
	SRO	Make a decision to do the following: IF Auxiliary Feedwater is required and Tank Level if < 5.3 feet, THEN shift Auxiliary Feed Pump Suctions to the Service Water System per SOP-22.0, AUXILIARY FEEDWATER SYSTEM. With no ramp down in progress, this will be a hard decision to make.
	SRO	Monitor condensate storage tank level on LI-4005B, LI-4132A and LI-4132B to verify validity of alarm Direct BOP to monitor this issue
	SRO	**Evaluate Tech Specs 3.7.6 condition A** Verify by adminstartive means OPERABLILITY of backup water supply w/I 4 hours and restore the CST to OPERABLE status w/I 7 days
Since there is no ramp in progress there is no urgency to place the AFW system on the service water system. However, since the CST is empty, a prudent decision to align it to the SW system should be made to protect the AFW pumps in the event of an autostart signal. **SOP-22 will be used to place SW as the suction to AFW. Section 4.7**		

Event Description: CST rupture

Cue: By Examiner.

If the crew decides not to place SW on the AFW suction at this time, consider going to the next event when the crew will be required to ramp and then this will be critical.		
	BOP	- Obtain the required keys from the key locker - Notify shift chemist of decision to align SW to the AFW suctions. - Verify SW is in service - On the BOP open the following valves: Open MDAFWP SW SUPP: (BOP key operated switches) • Q1N23MOV3209A • Q1N23MOV3209B Open: (BOP) • MDAFWP SW SUPP Q1N23MOV3210A • MDAFWP SW SUPP Q1N23MOV3210B • TDAFWP SW SUPP Q1N23MOV3216.
	SRO	o Submit a Condition Report and notify the Work Week Coordinator (Maintenance ATL on backshifts) o Notify the Shift Manager

END – Event 3

Event Description: PK-444A fails high

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
Annunciators: - PRZR PRESS REL 445A OR B/U HTRS ON (HD1) - PRZR LVL DEV LO (HB2) - PRZR HTR CONT TRBL (HD4) - CHG HDR FLOW HI-LO (EA2)		Recognize indications of PK-444A FAILING HIGH - PK-444A demand rising - All BU Htrs ON - RCS pressure rising
PK-444A will go to 100% demand and all heaters will be ON. Actual pressure will increase, but the sprays and heaters and PORV444B will not respond. If manual control of individual components is not taken, PORV445A will open. Manual control of PK-444A is not possible due to the failure. AOP-100 Section 1.1		
	SRO	Direct entry into AOP-100.
	RO	- Verify RCS pressure is stable. **NO** - Take manual control of the PK-444A. **NO** - Take manual control of the spray valves and heaters and control pressure
	SRO	Check RCS pressure stable or rising **YES** Set control band for RCS pressure. **2220-2250 psig**
	SRO	Notify the Shift Manager
	SRO	Submit a Condition Report and notify the Work Week Coordinator (Maintenance ATL on backshifts

End event 4

Event Description: SGT leak of 15 gpm

Cue: By Examiner.

Time	Position	Applicant's Action or Behavior
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-70C READING > 1000 GPD
FG1 and FH1 actions		
	BOP	Reference ARP and check R-70s to determine SG in alarm.
	SRO	- Notify Chemistry of the alarm condition - Direct entry into AOP-2
	BOP	Check ARP FH1 for actions as Rad monitors come into alarm. - Do not allow personnel to enter the affected area without the approval of the Health Physics Department.
	SRO	IF **R-15** alarms AND remains above the alarm setpoint (not a momentary spike), THEN perform the following: - IF high effluent activity is possible, THEN implement EIP-9.0, ACTIONS. **Call SM** - Notify the Counting Room to immediately sample the SGs per CCP-31 to determine the leak rate. - Notify the Operations Shift Manager. IF **R-19** alarms refer to SOP-45.0 for guidance in sampling SGs with R-19 in alarm. IF **R-23A** OR **R-23B** alarms contact the RAD man to verify blowdown secured.
	SRO	Direct entry and actions of AOP-2.0
	RO	Maintain pressurizer level stable at normal programmed value by: - Control charging **FK-122 adjusted as required** - Reduce letdown **close one or more orifice isol. Valves**

Event Description: SGT leak of 15 gpm

Cue: By Examiner.

	RO	Maintain VCT level greater than 20%. by: Verify RMW system in AUTO OR Manually control makeup as required by using SOP-2.3
	BOP	Check that the Continuous Radiation Monitoring System is operable Either R-15- OPERABLE OR R-70s- OPERABLE **YES**
	SRO	Check reactor power conditions: - Check NO power ascension in progress - Check NO power reduction in progress - Check reactor power greater than 20% **YES to all**
	BOP	Monitor primary to secondary leakage Check R-70s or R-15 for increasing count rate **YES** Begin trending R-70C and R-15 using the plant computer and Data sheet 1.
	BOP	Call TBSO to place SJAE filtration on service.
	SRO	- Direct chemistry to perform grab samples and leak rate determinations. CCP-201 Table 55 - Notify SM of leak rate - Evaluate Step 10 table to determine appropriate response: - ACTION LEVEL 4 ≥30 gpd/hr rate of increase AND ≥75 gpd leak in any SG Step 11 actions: 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	- Direct reducing power to ≤ 50% rated thermal power within 1 hour and place the Unit in Mode 3 within the next 2 hours. (3 hrs total) - Identify the correct leaking SG **1C SG** Using R-70s, R-60s and level rise in any SG

Event Description: SGT leak of 15 gpm

Cue: By Examiner.

	BOP	- Commence the ramp to <50% power in the next 1 hour - Calculates ramp speed
	SRO	Call SM to evaluate emergency classifications Evaluates Tech Specs 3.4.13 mandatory LCO RCS operational LEAKAGE shall be limited to: d. 150 gallons per day primary to secondary LEAKAGE through any one steam generator (SG). Condition B- be in mode 3 in 6 hours.
	BOP	- Direct Chemistry to monitor the turbine building sump for activity - Verify affected SG(s) atmospheric relief valve-ALIGNED - Check affected SG atmospheric relief valve – CLOSED - Isolate steam supply from affected SG(s) to TDAFWP from 1C SG by directing ROVER to do the following: Establish LOCAL control from HSD Panel AND Isolate TDAFWP steam supply from 1C SG by taking HV3235B in LOCAL and then to STOP
	BOP	- Verify SGBD isolated from the 1C SG- 7614C closed - Check AS supplied from Unit 2 **NO** Call SSS to align AS
Go to next event when the ramp is sufficient or when the actions of AOP-2 complete.		

END – Event 5

Event Description: Loss of Instrument AIR

Cue: By Examiner

Time	Position	Applicant's Action or Behavior
Annunciators: - IA PRESS LO (KD2) - SA PRESS LO (KD3) Eventually SGWLs will be affected - 1A, 1B, 1C SG LVL DEV (JF1/2/3) - 1A, 1B, 1C SG STM FLOW > FEED FLOW (JB1/2/3)		Recognize indications of LOSS OF IA - PI4001 A and B dropping - Various valve and indication erratic
This loss of IA is placed such that SA will isolate, and Essential air to the TB will isolate and IA to the Penetration rooms and ctmt will be unaffected. This will cause FRVs to lose air and go closed. This will prompt a reactor trip.		
	SRO	Notice loss of air and check IA compressors running and Direct entry to AOP-6
	BOP	Direct TBSO to locate and isolate leaks in air header.
IF the reactor is tripped due to a loss of instrument air, THEN the actions of this procedure should be implemented in conjunction with ESP-0.1, REACTOR TRIP RESPONSE		
	SRO	Direct Reactor trip when the FRVs and other indications start becoming erratic.
	BOP	- Start any available air compressor
	SRO	- Direct Reactor trip

END – Event 6

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Event Description: FRP-S.1 entry, isolation of PORV that is failed open and MSIV closure due to steam header rupture.

Cue: Preset

Time	Position	Applicant's Action or Behavior
Annunciators: - Various and many		Recognize indications of ATWT event - RTBs still closed - Nis indicate full power - Conditions warrant a reactor trip and one is not received
When the crew tries to trip the reactor the reactor trip breaker will not open and the CRDM MG set breakers will not open. PORV 445A will stick open when it does open, MS header will be faulted when AFW flow increases and 1C SG will rupture when 1C SG drops to 600 psig or at step 5 of EEP-0.		
	SRO	Direct entry into EEP-0 – IOAs
	RO/BOP	Immediate Operator actions of EEP-0 **Check reactor trip.** Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. check rod bottom lights - LIT. TRIP CRDM MG set supply breakers. 1A(1B) MG SET SUPP BKR [] N1C11E005A [] N1C11E005B **Reactor is not tripped by RTBs or CRDM MG sets.**
	SRO	Direct entry into FRP S.1 and complete IOAs.
	RO	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. Dispatch an operator to locally trip the reactor trip and bypass breakers. **3 minutes from this phone call RTBs will be opened from BOOTH**
	BOP	Check Main Turbine tripped Place MAIN TURB EMERG TRIP switch to TRIP for at least 5 seconds.

Event Description: FRP-S.1 entry, isolation of PORV that is failed open and MSIV closure due to steam header rupture.

Cue: Preset

	BOP	Verify AFW pumps running - Both MDAFWPs amps > 0 - TDAFWP speed > 3900 rpm
	RO	Initiate Emergency Boration of the RCS. - Verify at least one CHG PUMP - RUNNING. - Start a BAT pump - Open MOV 8104 - Establish normal letdwn flow – 8149A and either 8149B or C open - Check RCS pressure less than 2335 psig - Establish normal charging flow > 40 gpm - Verify adequate emergency boration flow of > 30 gpm on FI-110
	BOP	**Verify containment ventilation isolation.** Verify containment purge dampers - CLOSED. [] 3197 [] 3198D [] 3198C [] 3196 [] 3198A [] 3198B Verify containment mini purge dampers - CLOSED. CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D [] 2866C [] 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C [] 2866D [] 2867D Stop MINI PURGE SUPP/EXH FAN. **Will place HS to STOP**
	BOP	Check SI actuated – complete attachment 1 if SI has actuated See attached sheets for Attachment 1 of FRP-S.1
	RO	- Check ALL RTBs open - Check Main Turbine tripped

Event Description: FRP-S.1 entry, isolation of PORV that is failed open and MSIV closure due to steam header rupture.

Cue: Preset

	RO	[CA] Check if reactor still critical. **If RTBs are open or power range indication is < 5% power OR IR SUR is negative, then go to EEP-0 step 1** **If not continue in this procedure.**
	SRO directed	The flowing will be accomplished IF the reactor is still critical at this point - **Monitor CST level.** - **Check SG NR levels > 31% and maintain SG NR levels 31%-65%** - **Verify dilution paths isolated.** - **Check for reactivity addition from UNCONTROLLED RCS cooldown:** **Critical task if this step is done, the MSIVs are still open and the fault is active:** **Check main steam line isolation and bypass valves - CLOSED.** **Check SGs not faulted. This is No SG faulted if the MSIVs are all closed** - **Check core exit T/Cs – LESS than 1200°F** **If RTBs are open or power range indication is < 5% power OR IR SUR is negative, then go to EEP-0 step 1**
	SRO	Transition back to EEP-0
	RO/BOP	Immediate Operator actions of EEP-0 **Check reactor trip.** Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. check rod bottom lights - LIT. **Check turbine - TRIPPED.** TSLB2 14-1 thru 4 lit **Check power to 4160 V ESF busses.** 4160 V ESF busses - AT LEAST ONE ENERGIZED A Train (F & K) power available lights lit OR B Train (G & L) power available lights lit Verify operating diesel generators are being supplied from at least one SW pump.

Event Description: FRP-S.1 entry, isolation of PORV that is failed open and MSIV closure due to steam header rupture.

Cue: Preset

		Check SI Status. **YES** Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION [] ACTUATED status light lit [] MLB-1 1-1 lit [] MLB-1 11-1 lit If YES will continue IN EEP-0 step 5 IF NO then will go to ESP-0.1 **THE SGTR will be put in at this point**
	SRO	Directs continuing into EEP-0 at step 5. Directs the BOP to do attachment 2. See Tab at end of scenario Attachment 2 and 4 for actions
	RO	**6 [CA] Check containment pressure- HAS REMAINED LESS THAN 27 psig** **YES**
	RO	**7 Announce "Unit 1 reactor trip and safety injection".**
	RO	**8 Check AFW status.** 8.1 Check secondary heat sink Available o Check total AFW flow > 395 gpm [] FI 3229A [] FI 3229B [] FI 3229C o Total Flow FI 3229 OR Check any SG NR level > 31% {48%} 8.2 WHEN all SG narrow range levels less than 31%{48%}, THEN maintain total AFW flow greater than 395 gpm. 8.3 WHEN at least two SG narrow range levels greater than 28% AND TDAFWP NOT required, THEN stop TDAFWP. 8.4 [CA] WHEN SG narrow range level greater than 31%{48%}, THEN maintain SG narrow range level 31%-65%{48%-65%}. 8.4.1 Control MDAFWP flow. MDAFWP FCV 3227 RESET

Event Description: FRP-S.1 entry, isolation of PORV that is failed open and MSIV closure due to steam header rupture.

Cue: Preset

		[] A TRN reset [] B TRN reset MDAFWP TO 1A/1B/1C SG B TRN [] FCV 3227 in MOD 8.4.2 Control TDAFWP flow. TDAFWP FCV 3228 [] RESET reset TDAFWP SPEED CONT [] SIC 3405 adjusted
	RO	**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 [] TI 412D [] TI 422D [] TI 432D
	RO	RNO IF RCS temperature less than 547°F and falling, THEN perform the following. 9.1.1 Verify steam dumps closed. STM DUMP INTERLOCK [] A TRN in OFF RESET [] B TRN in OFF RESET 9.1.2 Verify atmospheric reliefs closed on MCB Demand at 0 and minimum red light LIT 9.1.3 Control total AFW flow to minimize RCS cooldown, AFW FLOW TO 1A(1B,1C) SG [] FI 3229A [] FI 3229B [] FI 3229C AFW TOTAL FLOW [] FI 3229
	RO	**Critical task if PORV still open** **10 Check pressurizer PORVs and spray valves.** 10.1 [CA] WHEN pressurizer pressure less than 2335 psig,

Event Description: FRP-S.1 entry, isolation of PORV that is failed open and MSIV closure due to steam header rupture.

Cue: Preset

		THEN verify both PRZR PORVs closed. Verify both PRZR PORVs indicate CLOSED **NO-PORV 445A-open** Close MOV8000A **MOV8000A closed** 10.1.2 Check PRZR PORV temperature STABLE OR FALLING. [] PORV Temp TI-463 10.1.3 Check PRT parameters STABLE or FALLING. [] PRT PRESS PI 472 [] PRT LVL LI-470 [] PRT TEMP TI-471 10.2 [CA] WHEN pressurizer pressure less than 2260 psig, THEN verify normal pressurizer spray valves closed OR in the process of closing. — 10.2 Stop 1A AND 1B RCPs to stop spray flow. 1A(1B) LOOP SPRAY VLV [] PK 444C [] PK 444D 10.3 Check any PRZR PORV ISO - OPEN
	RO	**11 Check RCP criteria.** 11.1 Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE — 11.1 IF HHSI flow greater than 0 gpm, THEN stop all RCPs.
	RO	**12 Monitor charging pump miniflow criteria.** 12.1 Control charging pump miniflow valves based on RCS pressure. 1C(1A) LOOP RCS WR PRESS [] PI 402A [] PI 403A Based on RCS pressure, close miniflows < 1300 and open when > 1900 psig.

Event Description: FRP-S.1 entry, isolation of PORV that is failed open and MSIV closure due to steam header rupture.

Cue: Preset

Diagnostics The SRO will direct the parameters to be reviewed and will determine appropriate procedure to transition to.		
	SRO	**13 Check SGs not faulted.** o Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig.
	SRO	**14 Check SGs not ruptured.** o Check secondary radiation indication - NORMAL. Checks rad monitors R-15, 19, 23A and B, 15B and C, and 60 A, B, C, D o No SG level rising in an uncontrolled manner.
If the MSIVs are still open here then EEP-2 would be the procedure to transition to. EEP-2 below		
	BOP	Critical task **Verify all main steam isolation and bypass valves - CLOSED.** Place handswitches for all MSIVs to the CLOSED position (6 total)
	SRO	**Check if any SG not faulted.** 2.1 Check pressure in at least one SG - STABLE OR RISING. **Only 1B SG will be blowing down** Identify the faulted SG **1B SG**
	BOP	**Isolate all faulted SGs.** o Verify ALL ARVs closed - **PC3371A, B, C minimum demand** o Verify ALL Feed stop valves closed **MOV3232A, B, C** o Verify blowdown from all faulted SGs - ISOLATED. **HV 7614A, B, C** o Isolate TDAFWP steam supply from 1B SG. **The TDAFW pump should not be required.** **This will be called to the booth to be completed by the extra operator** 4.5.1 IF TDAFWP NOT required, THEN isolate TDAFWP steam supply from 1B SG at HSD panel. TDAFWP STM SUPP FROM 1B SG [] Q1N12HV3235A/26 in LOCAL

Event Description: FRP-S.1 entry, isolation of PORV that is failed open and MSIV closure due to steam header rupture.

Cue: Preset

		(HSDP-F) TDAFWP STM SUPP FROM 1B SG [] Q1N12HV3235A/26 to STOP (HSDP-D)
	BOP	4.6 Verify SG blowdown sample ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE ISO [] MLB1 19-2 lit Q1P15HV3328 closed [] MLB1 19-3 lit Q1P15HV3329 closed [] MLB1 19-4 lit Q1P15HV3330 closed
	BOP	**5 Isolate AFW flow to all faulted SGs.** 5.1 Close MDAFWP isolation valves to all faulted SGs. (BOP) Closes MOV3764D and B on the BOP
	RO	Close TDAFWP flow control valves to all faulted SGs. TDAFWP FCV 3228 [] RESET reset Close HV3228B pot to 0
	SRO	Call to SSS-P or TSC to have Q1N23V017B closed in the MSVR
	BOP	Check CST level greater than 5.3 feet **Check secondary radiation indication - NORMAL. NO** Checks rad monitors R-15, 19, 23A and B, 15B and C, and 60 A, B, C, D 1C SGWL will be rising
	SRO	Direct transition to EEP-3, STEAM GENERATOR TUBE RUPTURE.

End of event 7/8/9

Event Description: 1C SGTR 500 gpm

Cue:preset or at step 5 of EEP 0

Time	Position	Applicant's Action or Behavior
Annunciators: - Rad monitors in alarm		Recognize indications of SGTR - Przr level falling rapidly - RCS pressure dropping rapidly
		EEP-3, SGTR.
	RO	**Check RCP criteria.** Check SUB COOLED MARGIN MONITOR indication - GREATER THAN 16°F{45°F} SUBCOOLED INCETC MODE. **YES**
	BOP	**[CA] Identify ruptured SG(s).** Check any SG level - RISING IN a) WHEN ruptured SG(s) AN UNCONTROLLED MANNER **YES**
	SRO/RO	Critical task **[CA] 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 **YES**
	BOP	**[CA] WHEN ruptured SG(s) NR level greater than 31% THEN perform the following:** [CA] Isolate AFW flow to ruptured SG(s) using FCVs. - FCV 3227A in MOD, and closed **YES** - HV 3328A in MOD and closed **YES**
	SRO	**Check ruptured SG(s) pressure GREATER THAN 250 psig.** **YES** If the SG ARV is still open, it is possible to be less than 250 psig and this would not be a correct flow path.
	SRO	Evaluate performing an RCS cooldown. Determine required CETCs for cooldown based on ruptured SG pressure.

Event Description: 1C SGTR 500 gpm

Cue:preset or at step 5 of EEP 0

RUPTURED SG PRESSURE (psig)	REQUIRED CORE EXIT TEMPERATURE
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	Direct the STA to Display the hottest CETC page 1TC1 on plant computer. This is normally selected by the STA and put on the control board display.
	SRO	**Will direct these steps:** The Steam Dumps are not available so the following applies: - Dump steam to atmosphere. - Direct counting room to perform CCP-645. - Dump steam at the maximum attainable rate from **INTACT SGs** 1A(1B,1C) MS ATMOS REL VLV [] PC 3371A adjusted [] PC 3371B adjusted [] PC 3371C adjusted Stop the cooldown when the hottest CETC temperature is less than the required temperature and then maintain CETCs at the required Temp.

Event Description: 1C SGTR 500 gpm

Cue:preset or at step 5 of EEP 0

	BOP	**Check intact SG levels.** Check any intact SG narrow range level – GREATER THAN 31%{48%}. **YES** [CA] 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 [] A TRN reset [] B TRN reset MDAFWP TO 1A/1B/1C SG B TRN [] FCV 3227 in MOD Control TDAFWP flow. TDAFWP FCV 3228 [] RESET reset TDAFWP SPEED CONT [] SIC 3405 adjusted
	RO	**Check pressurizer PORVs** **Check any PRZR PORV ISO – power available** [CA] WHEN pressurizer pressure less than 2335 psig, THEN verify pressurizer PORVs closed with no leakage. Verify both PRZR PORVs – CLOSED Check PRZR PORV temperature STABLE OR FALLING. [] PORV Temp TI-463 Check PRT parameters STABLE or FALLING. [] PRT PRESS PI 472 [] PRT LVL LI-470 [] PRT TEMP TI-471 Check at least one PRZR PORV ISO - OPEN
NOTE: The purpose of the above step is to establish an available PORV flowpath for SGTR mitigation. A failed open PORV must not be unisolated. A leaking PORV which is isolated with power available to the isolation valve should remain isolated until needed for RCS pressure reduction. Any leaking PORV should be re-isolated when not in use.		

Event Description: 1C SGTR 500 gpm

Cue:preset or at step 5 of EEP 0

	BOP	**Verify SI - RESET.** MLB-1 1-1 not lit (A TRN) and MLB-1 11-1 not lit (B TRN) **Verify PHASE A CTMT ISO - RESET.** MLB-2 1-1 not lit and MLB-2 11-1 not lit
	BOP	Check PHASE B CTMT ISO - RESET. - NO ctmt pressure increase
	RO	**IF instrument air available, THEN establish instrument air to containment.** Verify at least one air compressor started. AIR COMPRESSOR [] 1A [] 1B [] 1C Check INST AIR PRESS PI 4004B greater than 85 psig. Check instrument air to containment. IA TO CTMT [] MLB-3 1-2 NOT lit IA TO PENE RM PRESS LO [] Annunciator KD1 clear **YES**
	RO	**[9 [CA] Check if LHSI Pumps should be stopped.** Check RCS pressure – GREATER THAN 275 psig{435 psig} **YES** PT-402 AND 403 Check RCS pressure - STABLE OR RISING **YES** Verify the SI reset Secure any running RHR pumps **Take HS to stop.**
	SRO	**Check if Cooldown should be stopped.** Check hottest core exit T/Cs - LESS THAN REQUIRED Temperature. Stop RCS cooldown Maintain core exit T/Cs – LESS THAN REQUIRED TEMPERATURE. **RNO** Do NOT proceed until hottest core exit T/Cs - LESS THAN REQUIRED TEMPERATURE.

Event Description: 1C SGTR 500 gpm

Cue:preset or at step 5 of EEP 0

	SRO	o **Check ruptured SG(s) pressure - STABLE OR RISING.** o **Check SUB COOLED MARGIN MONITOR indication - GREATER THAN 36°F{65°F} SUBCOOLED IN CETC MODE.** **YES for BOTH**
NOTE: Normal pressurizer spray may become ineffective during pressure reduction. This situation justifies using a PRZR PORV per step 18.		
	RO	**Reduce RCS pressure to minimize break flow and refill pressurizer.** Open all available normal pressurizer spray valves. 1A(1B) LOOP SPRAY VLV [] PK 444C [] PK 444D Reduce RCS pressure using ONE pressurizer PORV to minimize break flow and refill pressurizer. **DO NOT USE PORV-445A TO DO THE DE-PRESSURIZATION PER NOTE IN EEP-3.** One PORV may be used to increase the pressure reduction and will probably be the case.
	SRO	Reduce RCS pressure until one of the following three conditions occurs, then stop RCS pressure reduction. RCS pressure less than ruptured SG pressure AND pressurizer level greater than 13%{43%} OR Pressurizer level greater than 73%{66%} OR SCMM indication less than 16°F{45°F} subcooled in CETC mode. **Then verify the sprays and PORVs are closed.**
	SRO	**Check RCS pressure - RISING.** PI-402 and 403 rising Evaluate SI termination criteria

Event Description: 1C SGTR 500 gpm

Cue:preset or at step 5 of EEP 0

		o Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE. o Check secondary heat sink available. >395 gpm AFW flow > 31%{48%} SGNR level o Check RCS pressure - STABLE OR RISING o Check pressurizer level GREATER THAN 13%{43%}.
Suggested END OF SCENARIO		

STEP 21 OF EEP-3.0

	RO	o **Stop all but one charging pump** o Isolate HHSI flow. - LCV-115B and D open - Verify charging pump miniflow valves - OPEN. 1A(1B,1C) CHG PUMP MINIFLOW ISO [] Q1E21MOV8109A [] Q1E21MOV8109B [] Q1E21MOV8109C CHG PUMP MINIFLOW ISO [] Q1E21MOV8106 Close HHSI isolation valves. HHSI TO RCS CL ISO [] Q1E21MOV8803A [] Q1E21MOV8803B o **Establish normal charging.** Manually close charging flow control valve. CHG FLOW [] FK 122 Verify charging flow path aligned. Verify charging pump discharge flow path - ALIGNED. CHG PUMP DISCH HDR ISO

Event Description: 1C SGTR 500 gpm

Cue:preset or at step 5 of EEP 0

		[] Q1E21MOV8132A open [] Q1E21MOV8132B open [] Q1E21MOV8133A open [] Q1E21MOV8133B open CHG PUMPS TO REGENERATIVE HX [] Q1E21MOV8107 open [] Q1E21MOV8108 open Verify only one charging line valve - OPEN. RCS NORMAL CHG LINE [] Q1E21HV8146 RCS ALT CHG LINE [] Q1E21HV8147 23.3 Establish desired charging flow. CHG FLOW [] FK 122 adjusted
Another suggested END OF SCENARIO		

This scenario can be terminated any time the NRC examiner deems enough actions have been taken.

Event Description: Attachment 1 of FRP-S.1

Cue:as directed by procedure

Time	Position	Applicant's Action or Behavior
		Attachment 1 of FRP-S.1 **AUTOMATIC SAFETY INJECTION VERIFICATION**
	BOP	**Check power to 4160 V ESF busses.** 4160 V ESF busses - AT LEAST ONE ENERGIZED A Train (F & K) power available lights lit OR B Train (G & L) power available lights lit Verify operating diesel generators are being supplied from at least one SW pump. **Check SI Status.** **NO** Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION [] ACTUATED status light lit [] MLB-1 1-1 lit [] MLB-1 11-1 lit
	BOP	Verify MFW status - Verify main FRVs and bypass valves - valves CLOSED. 1A(1B,1C) SG STOP VLVFW FLOW [] FCV 478 [] FCV 488 [] FCV 498 - Verify both SGFPs - TRIPPED. - Verify SGBD isolated - HV 7614A, B C – closed - Verify SGBD sample valves closed by MLB-4 6-4, 7-4 and 8-4 LIT - Verify Phase A actuated – MLB-2 1-1 and 11-1 Lit - all MLB-2 lights LIT
	BOP	**Verify one CHG PUMP in each train - STARTED.** [] A train (1A or 1B) amps > 0 [] B train (1C or 1B) amps > 0
	BOP	**Verify RHR PUMPs - STARTED.** RHR PUMP [] 1A amps > 0

Event Description: Attachment 1 of FRP-S.1

Cue:as directed by procedure

		[] 1B amps > 0
	BOP	**Verify each train of CCW - STARTED.** Verify one CCW PUMP in each train- STARTED. A train HX 1C or 1B CCW FLOW [] FI 3043CA > 0 gpm OR [] FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW [] FI 3043AA > 0 gpm OR [] FI 3043BA > 0 gpm Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX [] Q1P16FI3009AA > 0 gpm [] Q1P16FI3009BA > 0 gpm [] Q1P16FI3009CA > 0 gpm **Verify each SW train - HAS TWO SW PUMPs STARTED.** [] A train (1A,1B or 1C) [] B train (1D,1E or 1C)
	BOP	**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 [] 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

Event Description: Attachment 1 of FRP-S.1

Cue:as directed by procedure

	BOP	Check no main steam line isolation actuation signal present. Critical task if Steam header fault still in and this attachment is being done If a MSLI signal is present then close ALL MSIVs
	BOP	Check containment pressure -HAS REMAINED LESS THAN 27 psig.
End of attachment 1 of FRP-S.1		

Event Description: Attachment 2 and 4 of EEP-0

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

Time	Position	Applicant's Action or Behavior
		Attachment 2 of EEP-0 **AUTOMATIC ACTIONS VERIFICATION**
	BOP	**1 Verify each SW train - HAS TWO SW PUMPs STARTED.** [] A train (1A,1B or 1C) [] B train (1D,1E or 1C) **2 Verify each train of CCW - STARTED.** 2.1 Verify one CCW PUMP in each train- STARTED. A train HX 1C or 1B CCW FLOW [] FI 3043CA > 0 gpm OR [] FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW [] FI 3043AA > 0 gpm OR [] FI 3043BA > 0 gpm Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX [] Q1P16FI3009AA > 0 gpm [] Q1P16FI3009BA > 0 gpm [] Q1P16FI3009CA > 0 gpm
	BOP	**Verify one CHG PUMP in each train - STARTED.** [] A train (1A or 1B) amps > 0 **Start 1A or 1B CHG pump** [] B train (1C or 1B) amps > 0 **Start 1C Chg pump**
	BOP	**Verify RHR PUMPs - STARTED.** RHR PUMP [] 1A amps > 0 [] 1B amps > 0
	BOP	**Verify Safety Injection Flow.** Check HHSI flow - GREATER THAN 0 gpm. [] FI 943

Event Description: Attachment 2 and 4 of EEP-0

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

	BOP	Check RCS pressure - LESS THAN 275 psig{435 psig}. 5.2 Proceed to Step 6.
	BOP	**6 Verify containment ventilation isolation.** 6.1 Verify containment purge dampers - CLOSED. [] 3197 [] 3198D [] 3198C [] 3196 [] 3198A [] 3198B 6.2 Verify containment mini purge dampers - CLOSED. CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D [] 2866C [] 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C [] 2866D [] 2867D 6.3 Stop MINI PURGE SUPP/EXH FAN. **Will place HS to STOP**
	BOP	**7 Verify containment fan cooler alignment.** 7.1 Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED. CTMT CLR FAN SLOW SPEED □ A train [] 1A [] 1B □ B train [] 1C [] 1D 7.2 Verify associated emergency service water outlet valves - OPEN. EMERG SW FROM 1A(1B,1C,1D) CTMT CLR

Event Description: Attachment 2 and 4 of EEP-0

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

<table>
<tr><td></td><td></td><td>[] Q1P16MOV3024A
[] Q1P16MOV3024B
[] Q1P16MOV3024C
[] Q1P16MOV3024D</td></tr>
<tr><td></td><td>BOP</td><td>8 Verify AFW Pumps - STARTED.
8.1 Verify both MDAFW Pumps - STARTED
[] 1A MDAFW Pump amps > 0
[] 1B MDAFW Pump amps > 0
AND
[] FI-3229A indicates > 0 gpm
[] FI-3229B indicates > 0 gpm
[] FI-3229C indicates > 0 gpm

8.2 Check TDAFW Pump start required.
<table>
<tr><th>□Condition</th><th>□TSLB</th><th>□Setpoint</th><th>□Coincidence□</th></tr>
<tr><td>RCP Bus Undervoltage</td><td>TSLB2 1-1
1-2 1-3</td><td>□2680 V</td><td>1/2 Detectors on 2/3 Busses</td></tr>
<tr><td>Low Low SG Water Level In Any 2/3 SGs</td><td>TSLB4
4-1,4-2,4-3
5-1,5-2,5-3
6-1,6-2,6-3</td><td>28%</td><td>2/3 Detectors on 2/3 SGs</td></tr>
</table>
</td></tr>
<tr><td></td><td>BOP</td><td>8.3 Verify TDAFWP started.
[] MLB-4 1-3 lit
[] MLB-4 2-3 lit
[] MLB-4 3-3 lit

TDAFWP SPEED
[] SI 3411A > 3900 rpm

TDAFWP SPEED CONT
[] SIC 3405 adjusted to 100%

8.4 Verify TDAFW flow path to each SG.
TDAFWP TO 1A(1B,1C) SG
[] Q1N23HV3228A in MOD
[] Q1N23HV3228B in MOD
[] Q1N23HV3228C in MOD

TDAFWP TO 1A(1B,1C) SG FLOW CONT
[] HIC 3228AA open
[] HIC 3228BA open</td></tr>
</table>

Event Description: Attachment 2 and 4 of EEP-0

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

		[] HIC 3228CA open
	BOP	**9 Verify main feedwater status.** 9.1 Verify main feedwater flow control and bypass valves - CLOSED. 1A(1B,1C) SG FW FLOW [] FCV 478 [] FCV 488 [] FCV 498 9.2 Verify both SGFPs - TRIPPED. 9.3 Verify SG blowdown - ISOLATED. 1A(1B,1C) SGBD ISO [] Q1G24HV7614A closed [] Q1G24HV7614B closed [] Q1G24HV7614C closed 9.4 Verify SG blowdown sample - ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE STEAM GEN ISO [] MLB1 19-2 lit Q1P15HV3328 closed [] MLB1 19-3 lit Q1P15HV3329 closed [] MLB1 19-4 lit Q1P15HV3330 closed
	BOP	**10 Check no main steam line isolation actuation signal present.** Signal / Setpoint / coincidence / TSLB LO SG PRESS < 585 psig / 2/3 / TSLB4 19-2,3,4 Hi stm flow >40% and Lo-Lo Tavg <543°F / ½ 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	**11 Verify PHASE A CTMT ISO.** 11.1 Verify PHASE A CTMT ISO - ACTUATED. [] MLB-2 1-1 lit [] MLB-2 11-1 lit 11.2 Check all MLB-2 lights - LIT. 11.2 Verify PHASE A CTMT ISO alignment using ATTACH 3, PHASE A CTMT ISO
	BOP	**12 Check all reactor trip and reactor trip bypass breakers - OPEN.** 12 Perform the following. 12.1 Open reactor trip

Event Description: Attachment 2 and 4 of EEP-0

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

		breaker(s) manually from MCB or locally. Reactor trip breaker A Reactor trip breaker B Reactor trip bypass breaker A Reactor trip bypass breaker B 12.2 Record any breaker(s) manually opened.
	BOP	**13 Trip CRDM MG set supply breakers.** 1A(1B) MG SET SUPP BKR [] N1C11E005A [] N1C11E005B
	BOP	**14 Secure secondary components.** 14.1 Stop both heater drain pumps. HDP [] 1A [] 1B 14.2 Check any condensate pump started. 14.2.1 IF started, THEN stop all but one condensate pump. [] 1A [] 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 SOP-0.0, APPENDIX B, TB SO ACTIONS FOLLOWING A REACTOR TRIP OR SAFETY INJECTION. **Will call TBSO to accomplish this.**
	BOP	**15 Verify both CRACS mode selector switches in the ON position.** CRACS Mode Selector Switch [] A TRAIN [] B TRAIN Will call BOOTH to have this accomplished since this is not in the simulator
	BOP	**16 WHEN at least 30 seconds have passed since turbine trip, THEN check main generator tripped.** 230 KV BKR [] 810 - OPEN

Event Description: Attachment 2 and 4 of EEP-0

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

		[] 914 - OPEN
	BOP	**17 Verify two trains of ECCS equipment aligned.** 17.1 Perform ATTACHMENT 4, TWO TRAIN ECCS ALIGNMENT VERIFICATION.
End of Attachment 2		

Event Description: Attachment 2 and 4 of EEP-0

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

		Attachment 4 **TWO TRAIN ECCS ALIGNMENT VERIFICATION**
	BOP	**1 Verify two trains of ECCS equipment aligned.** Check DF01 closed Verify DF02 closed Check DG15 closed Verfiy DG02 closed Verify two trains of battery chargers – energized - Amps > 0 1.6 Verify two trains of ESF equipment aligned. Check all MLB-1 lights LIT Verify charging pump suction and discharge valves - OPEN. CHG PUMP DISCH HDR ISO [] Q1E21MOV8132A [] Q1E21MOV8132B [] Q1E21MOV8133A [] Q1E21MOV8133B CHG PUMP SUCTION HDR ISO [] Q1E21MOV8130A [] Q1E21MOV8130B [] Q1E21MOV8131A [] Q1E21MOV8131B 1.7 Verify all post accident containment air mixing system fans - STARTED. (BOP) POST ACCIDENT MIXING FAN [] 1A [] 1B [] 1C [] 1D RX CAV H2 DILUTION FAN [] 1A [] 1B
	BOP	Call Radside SO to Verify Spent Fuel Pool Cooling in service per SOP-54.0, SPENT FUEL PIT COOLING AND PURIFICATION SYSTEM.
		End of Attachment 4

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, verbally state, "Unit 2" and an instructor will locate to the Unit 2 area and respond to you as quickly as possible.

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 Status *Mode 1* 100% RTP, MOL, 855 ppm Cb, 10,000 MWD, Eq Xe, *(-2726)*

STPs/Evolutions:

B Train On-Service – **B** Train Protected

1.0___; 109.1 ____No adj. ; 63.7 ____; FSP-20,0 _____;

Status of Special Testing

General Information

1. Current Risk Assessment is GREEN and projected is GREEN
2. 1-2A DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
3. 1B EHC pump T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
4. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia
5.
6.
7.
8.
9.
10.

Equipment Status		
1-2A DG Tagged out		Maintain VCT gas pressure 25-30 psig
1B EHC pump is tagged out		

Reactivity Plan	**Waste Management Status**
20 Gallon Dilutions as required to maintain temperature and power.	#3 RHT – On Service
	WGS – secured;

LCO Status	
3.8.1 condition B, STP-27.1 completed 2 hours ago	

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