

**Final Submittal**  
(Blue Paper)

**FINAL SIMULATOR SCENARIOS**

**FARLEY RETAKE EXAM**

**05000348/2005302 AND 05000364/2005302**

**JULY 7, 2005 (OPERATING TEST)**

# Southern Nuclear J.M. Farley Nuclear Plant

## Operations Training Simulator Exam Scenario

### *HLT-29A NRC EXAM SCENARIO #1*

*Technical Review:* \_\_\_\_\_ *Date:* \_\_\_\_\_

*Training Department  
Approval:* \_\_\_\_\_ *Date:* \_\_\_\_\_



Facility: Farley Scenario No.: 1 Op-Test No.: HLT-29A NRC

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions: Approx. 4% power, preparing to place the Main Turbine on line. 1317 ppm, MOL; B train on service, B Train protected.

Turnover: Unit 1 startup is in progress per UOP-1.2. Currently at step 5.26.16 of UOP-1.2. FNP-1-STP-22.18, AUXILIARY FEED AUTOMATIC VALVE POSITION

VERIFICATION, must be performed in preparation for going to 10% power. There is a 2 gpd SG tube leak in 1A SG, Steady for 3 weeks.

Event No.	Malf No.	Event Type*	Event Description
1		N (RO) SRO	Perform steps 5.26.16 and .17, then complete STP-22.18, Auxiliary Feed Automatic Valve Position Verification
2		(R) RO SRO	Increase power following completion to Step 5.26.18
3		(I) RO SRO	Pressurizer channel detector PT-444 fails low.
4		C (BOP) TS (SRO)	NI-41 has a blown fuse. (RO recognize, BOP perform actions)
5		(C) RO TS (SRO)	1A CCW pump trip - failure of 1B CCW pump to auto start.
6		(I) RO	TK 144 controller fails high (temperature) Ltdown Hx outlet temp.
7		(I) RO	PK-444A PZR Master pressure controller ----- fails LOW; MOV 8000B block valve fails to close PORV 444B fails open
8		(M) ALL	SBLOCA (PORV fails completely open)
9		ALL (C)	1D Load Center Failure feeder breaker trips - 1C CCW pump fails to auto start.

Brief surrogates to hand UOP-1.2 to RO, change positions with BOP and complete the appropriate steps. Then swap positions and continue with procedure.

Facility: Farley Scenario No.: 1 Op-Test No.: HLT-29A NRC

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Initial Conditions: Approx. 4% power, preparing to place the Main Turbine on line. 1317 ppm, MOL; B train on service, B Train protected.

Turnover: Unit 1 startup is in progress per UOP-1.2. Currently at step 5.26.16 of UOP-1.2. FNP-1-STP-22.18, AUXILIARY FEED AUTOMATIC VALVE POSITION VERIFICATION, must be performed in preparation for going to 10% power. There is a 2 gpd SG tube leak in 1A SG, Steady for 3 weeks.

Event No.	Malf No.	Event Type*	Event Description
0	**	Preset	1B CCW pump fails to autostart for 1A CCW pump.
0		Preset	1C CCW pump will not autostart on the SI signal.
0		Preset	SGT leak of 2 gpd
0		preset	MOV-8000B fails to close when taken to the closed position
0		preset	PORV-444B fails open when it opens on controller failure
0		Preset	LC 1D feeder breaker (DF03) trips on SI signal
0		Preset	Fail R15 high bistable off
0		Preset	Auto actuation of train A SI failure
0		Preset	Auto actuation of train B SI failure
0		Preset	Rx trip breakers fail to open
0		Preset	Fail R4 high B/S off
0	0	Preset	1A Ctrnt cooler HS and LS control power removed

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

**SCENARIO 1 Summary sheet**

**Initial Conditions: 4% power, MOL, B Train O/S, B Train protected RCS boron concentration is 1317 ppm.**

- 1A S/G tube leak approximately 2 gpd. Steady for 3 weeks.
- Preparing to place the Main Turbine on line
- Unit 1 startup is in progress per UOP-1.2. Currently at step 5.26.18 of UOP-1.2.
- FNP-1-STP-22.18, AUXILIARY FEED AUTOMATIC VALVE POSITION VERIFICATION, must be performed in preparation for going above 10% power.

**Set in:**

- 1B CCW Pump fails to auto start for the other pump
- 1C CCW Pump fails to auto start for the ESF sequencer.
- 1A SG tube leak 2 gpd.
- MOV-8000B fails to close when taken to the closed position.
- PORV-444B fails open when it opens on controller failure.
- LC 1D feeder breaker (DF03) trips on SI signal.
- R15A high B/S off.
- Auto SI on both trains fail to actuate
- Rx Trip breakers fail to open
- Fail R4 high B/S off
- 1A Ctmt cooler HS and LS control power removed

**Event 1** – Have the RO complete UOP-1.2 steps 5.26.16 and .17, then perform STP-22.18, AUXILIARY FEED AUTOMATIC VALVE POSITION VERIFICATION.

**Event 2** – Increase power IAW UOP-1.2, step 5.30. (SIGNOFF AND PROVIDE A UOP-1.2 PROCEDURE FOR THE CREW)

**Event 3** – PT-444 Fails low. This will cause ALL the heaters to turn on and the Sprays to shut. Actual RCS pressure will begin to rise. Sprays will have to be placed in manual and pressure controlled manually.

**Event 4** – NI-41 has a blown fuse. This will cause a delay in the startup and TS entry until channel is repaired.

**Event 5** – 1A CCW pump trips - 1B CCW pump will not auto start and will have to be started. If this is not done the RCP temperature will increase and would be tripped if allowed to remain high. Also the running charging pump will overheat if 1B CCW pump is not started.

**[The BOP operator needs to be sent around back and the RO needs to take action on the board]**

**Event 6** – TK 144 controller fails high (temperature) Ltdown Hx outlet temp. The operator will have to take manual control of TK-144 and take it to a mid position and control temperature. DF1 will come into alarm when TCV-143 diverts flow around the Demins. Once temperature decreases the crew should return TCV-144 to the DEMIN position or call Chemistry to sample the Demins prior to returning TCV-143 to the Demin position.

Event 7 – PK – 444A, Pzr pressure master controller fails low. This will cause PORV-444B to open fully. The sprays will remain in the current position due to the earlier failure of PT-444. All heaters will turn off if in Auto. The PORV will remain open when the operator goes to close on the handswitch. The block valve will not close when taken to the close position. The team will have to trip the reactor and safety inject MANUALLY since auto SI and AUTO AND MANUAL Rx trip are blocked. CRDM MG sets will have to be tripped to complete the reactor trip.

Event 8 – SB LOCA due to the stuck open PORV.

Event 9 – 1D LOAD CENTER feeder breaker will trip on the safety injection. The 1C CCW pump will not auto start on the SI.

– the crew should manually trip and safety inject due to the PORV. They should start the 1C CCW pump.

**AOP-100/ EEP-0/ EEP-1/ESP-1.2**

### SETUP

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
		Quick Setup IC (all items with # are included in IC)	NONE
0	0	Base IC-31 1% RTP, MOL, A Train O/S Exam IC-230, 4% RTP, MOL, B Train O/S, Cb=1317, Xe FREE startup	Check if this is correct
		RUN	RUN simulator
0	0	Quick setup (all items with * are included): bat exam_nrc01.txt	
0	0	Generic_setup.txt  These 2 already setup in the IC-230 file	
0	0	1B CCW pump fail to auto start on trip of 1A CCW pump trip CMF MALF/ cCCP02B_d_cc4 / open	*
0	0	1C CCW pump fail to auto start on ESF sequencer CMF MALF/ cCCP01C_d_cc3 / open	*
0	0	1A SGTL of 2 gpd (must setup value to below number to achieve gpd indicated): Remote / B21 / LOA-RDS001 / 10	*
0	0	MOV-8000B fails to close when taken to the closed position imf cRC800B_d_cc22 open	*
0	0	PORV-444B sticks open when it opens on controller failure trgset 1 "rrc444b > 0.8" trg 1 "imf rrc444b-s 75"	*
0	0	LC 1D feeder breaker (DF03) trips on SI signal trgset 2 "rsi8803A > 0.5" trg 2 "imf cbk1DF03_col"	*
0	0	Fail R15A high bistable off to prevent actuation during scenario. BST / JR15H-O / reset	*
0	0	SI auto actuation A train failure: CMFmalf/ cSFTYINJ_cc1 / open	*
0	0	SI auto actuation B train failure: CMFmalf/ cSFTYINJ_cc11 / open	*
0	0	Rx trip breakers fail to open CMF MALF/ cBKRXTRP_cc21 / closed	*
0	0	Rx trip breakers fail to open CMF MALF/ cBKRXTRP_cc22 / closed	*

### SETUP

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	Fail R4 high B/S off BST / JR04H-O / reset	*
0	0	Rack out HS 1A Ctmt cooler and LS 1A Ctmt cooler imf cCHF1AH_d_cp1 imf cCHF1AH_d_cp2 (0 2) imf cCHF1AL_d_cp2	*
0	0	Check Train On Service and protected signs	B TRN BOTH
0	0	Check DEH for limiter limiting	DEH set correctly
0	0	<b>DEH</b>	Clear DEH alarms
0	0	<b>ARDA</b>	RESET ARDA
0	0	<b>PPC</b>	Place Grp 1 on MCB CRT
		<b>PPC</b>	Check for correct FLUX target
0	0	<b>Place DANGER tags on MCB for HS and LS CTMT coolers</b>	<b>2 DANGER TAGS</b>
			Acknowledge annunciators
			Verify HORNS ON
			FREEZE simulator
		Open Simview file to be used for plant parameter data collection: Simview / DataCollection.uvl	
		<b>If needed, adjust sim time back to 00:00:00</b> <b>SIMVIEW / Sim_Clock.uvl</b> <b>Hours: clock(4) = 0</b> <b>Minutes: clock(3) = 0</b> <b>Seconds: clock(2) = 0</b>	
			sv sim_clock.uvl
0	0	<b>VERIFY MICROPHONES READY</b>	Batteries installed
0	0	<b>TURNOVER SHEET AVAILABLE</b>	

### EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
Prior to RUN	0		
		<b>Start data collection for Simview file DataCollection.uvl</b>	
	0	<b>Begin Exam</b>	RUN simulator
		<b>Verify Horns ON: hornflag</b>	Verify Horns On
1		Perform STP-22.18, Auxiliary Feed Automatic Valve Position Verification	none
2		Increase power following completion to Step 5.26.18	none
3		Pressurizer channel detector PT-444 fails low. Xmtr / pt444 / 1700 / 0	
4		NI-41 fails – blown fuse on instrument power Mal / N / imf mal-nis11A	
5		1A CCW pump trip - failure of 1B CCW pump to auto start. Imf malf / cccp01a_d_cc13 / closed	
6		TK 144 controller fails high (temperature) Ltdown Hx outlet temp. Cnh / imf tk144-a / 10 / 120	
7		PK-444 A PZR Master pressure controller ----- fails LOW Cnh / imf pk444a-m / 0  Cnh / imf pk444a-a / 0	
8		SBLOCA (PORV fails completely open)	none
9		1D Load Center Failure feeder breaker trips – 1C CCW pump fails to auto start.	preset
		<b>End of Exam</b>	
			HORNS OFF

## EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
		<b>End of Exam</b>	
		Stop data collection for Simview file <b>DataCollection.uvl</b>	FREEZE simulator
		Export data to file with the name of NRC exam01 grpX.txt  <i>NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate.</i>  <i>NOTE: file will be saved in the OPENSIM directory.</i>	Ensure data file created.

**Local operator actions:**

Event 8 – Reset B1F sequencer \_\_\_\_\_

**Communications sheet**

**Event 1** – None

**Event 2** – ACC or shift manager acknowledging when the Turbine will be tied to the grid. Chemistry informed & acknowledge. Gencom & Systat informed of the UNIT status & acknowledge

**Event 3** – Dispatcher –acknowledges when informed that the CR is in the queue and I & C is needed to trip bistables within 6 hours for PT-444 failing LOW.

Shift Manager – if called to continue tying the Main Generator on line, have them wait until PT-444 is fixed.

**Event 4** – Dispatcher –acknowledges when informed that the CR is in the queue for NI-41 fuse failing and will send I&C to fix it immediately.

Shift Manager – acknowledge entering TS 3.3.1.

**Event 5** – Dispatcher –acknowledges when informed that the CR is in the queue

Rover- check on the pump that is tripped and the breaker and pump that is running. Rover reply- there is a trip flag on DG04 and a smell of burning insulation from the moter of the CCW pump area.

**Event 6** – Dispatcher – acknowledges when informed that the CR is in the queue. When requested by I&C to investigate report: “The driver card for TK-144 has a failed power supply on it.”

**Event 7** –none

**Event 8** – Call for recirc valve disconnects, H2 analyzers and H2 concentration.

May get a call to reset the B1F sequencer, this is not necessary but will be done if called for.

**Event 9** – call to the Rover or TSC to check the breaker for the 1D Load center feeder breaker.

Unit No. One

Offgoing Supv.	Oncoming Supv.	<input type="checkbox"/> N <input checked="" type="checkbox"/> D <input type="checkbox"/> E Date
----------------	----------------	---

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

Keys turned over [ X ] Security Keys A, S, D, SW, X, on key ring SS

Unit Status *4% RTP, MOL, 1317 ppm Cb, 10,000 MWD,*

**STPs/Evolution's (completed/in progress/planned)**

*Start up in progress - at step 5.26.16 of UOP-1.2.*

**General Information and Equipment Status**

2 gpd SG tube leak in 1A SG, steady for the past 3 weeks.

1A Containment Fan Cooler tagged out ( OOS -3 hours, RTS - 4 hours)

Current Risk Assessment is GREEN

A train is the Protected Train

B train is on service

Unit 2 is 100% power w/ no threats

Diluting approximately every 10 minutes

Waste Management Status #3 RHT O/S

LCO Status - Admin LCO - 1A CTMT fan cooler - 3.6.6 condition C

Night Orders - No New Night Orders

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

<input checked="" type="checkbox"/> Part III	STP-1.0 Reviewed/signed <input checked="" type="checkbox"/> Yes	Operator Logs Reviewed <input checked="" type="checkbox"/> Yes	Cond Rpt Queue Rev. <input checked="" type="checkbox"/> Yes	AutoLog Reviewed <input checked="" type="checkbox"/> Yes
--	---	--	---	--

exam\_nrc01.txt

^exam\_nrc exam01.txt  
^used for HLT-29A nrc exam  
^  
^  
^1B CCW pump will not auto start for 1A CCW pump  
imf cccp02b\_d\_cc4 open  
^  
^1C CCW pump will not auto start on ESF sequencer  
imf cccp01c\_d\_cc3 open  
^  
^1A SGTl of 2 gpd:  
irf LOA-RDS001 10  
^  
^MOV8000B does not close when handswitch taken to close:  
imf CRC800B\_d\_cc22 open  
^  
^PORV-444B sticks open and will not close  
trgset 1 "rrc444b > 0.8"  
trg 1 "imf rrc444b-s 75"  
^  
^1D Load center trips on SI signal  
trgset 2 "rsi8803A > 0.5"  
trg 2 "imf cbk1DF03\_col"  
^  
^Fail R15 high bistable off  
imf jr15h-o reset  
^  
^Train A auto SI failure  
imf csftyinj\_cc1 open  
^  
^Train B auto SI failure  
imf csftyinj\_cc11 open  
^  
^Train A Rx trip breaker fails to open:  
imf CBKRXTRP\_cc21 closed  
^  
^Train B Rx trip breaker fails to open:  
imf CBKRXTRP\_cc22 closed  
^  
^Fail R04 high bistable off  
imf jr04h-o reset  
^  
^Rack out HS 1A Ctmt cooler  
imf CCHF1AH\_d\_cp1  
imf CCHF1AH\_d\_cp2 (0 2)  
^  
^Rack out LS 1A Ctmt cooler  
imf CCHF1AL\_d\_cp2

Event Description: Perform UOP-1.2 steps 5.26.16 and .17, then STP-22.18, Auxiliary Feed Automatic Valve Position Verification

Initiating event: Time start of scenario

Time	Position	Applicant's Actions or Behavior
Obtain copy of STP-22.18		
	RO	Perform steps 5.26.16 and 17 - Secure 1A MDAFW pump - Fully open HIC 3227AA, BA and CA to 100% demand.
	RO	Read and check AFW pump flow controllers to make sure they are in the correct position IAW STP-22.18
	RO	<ul style="list-style-type: none"> <li>▪ Sign off STP as complete</li> </ul>

Event Description: Ramp to 12% power IAW UOP-1.2

Initiating event: Upon completion of STP and subsequent steps of the UOP.

Time	Position	Applicant's Actions or Behavior
Sign as complete entire procedure up to step 5.26.15, then 5.26.19, 5.27 and 5.28		
	RO	Increases temperature and adjusts rods. [This will raise the steam dump demand]
	BOP	Completes UOP-1.2 instructions
	RO	<p><u>WHEN</u> Nuclear at Power Permissive P-10 permissive status light is illuminated (2/4 power ranges greater than 10%), <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <li>• Block the intermediate range reactor trip and overpower rod stop.</li> <li>• Verify Intermediate Range Train A and B Trip Block status lights are illuminated.</li> <li>• Block the power range low setting reactor trip. Verify Power Range Low Setting Train A and B Trip Blocked status lights are illuminated.</li> </ul>
	RO	Verify that Low Power Trip Block P-7 status light is not illuminated to ensure the unblocking of the following reactor trips.
	BOP	<u>WHEN</u> reactor power is approximately 12% or greater, <u>THEN</u> roll the main turbine to synchronous speed per step 5.33.1 <u>AND</u> perform steps, 5.33.2, 5.33.3 and if desired, 5.33.4.

Event Description: PT-444 failure LOW

Initiating event: When directed by NRC examiner

Time	Position	Applicant's Actions or Behavior
<p><b><u>Annunciators:</u></b>            HD1, PRZR PRESS REL VLV 445A OR B/U HTRS ON            HC1, PRZR PRESS HI-LO (eventually)            DD1, RCP SEL INJ FLOW LO- may come in if RCS pressure rises high enough</p> <p><b><u>Indications:</u></b>            PRZR Pressure rising            All spray valves closed            All heaters ON</p>		
	RO	<p>Recognize RCS pressure rising, all spray valves shut and heaters on</p> <ul style="list-style-type: none"> <li>- Place PK-444A in manual and run the pot setting to 50% value.</li> <li>- Control RCS pressure in band given by SRO</li> </ul> <p>Another way to take control of the spray valves in this failure is to take manual control:</p> <ul style="list-style-type: none"> <li>- Take manual control of spray valves and open to decrease pressure</li> <li>- Take manual control of heaters and turn some to off</li> </ul>
	SRO	<p>Enter AOP-100 section 1.1            Check Przr pressure stable            Direct taking control of the spray valves            Direct taking control of the heaters            SRO should brief and give a pressure band to maintain.            Inform the SM of failure and write CR for failure.</p>

Event Description: NI-41 has blown fuse

Initiating event: When directed by NRC examiner

**MAKE SURE BOP IS IN BACK**

Time	Position	Applicant's Actions or Behavior
<b><u>Annunciators:</u></b>		
<ul style="list-style-type: none"> <li>- FC1 – PR HI FLUX HI RNG RX TRIP ALERT</li> <li>- FC3 - PR HI FLUX RATE ALERT</li> <li>- FC5 – DIFF FLUX DEV ALERT</li> <li>- FD2 – PR OVERPOWER AUTO/MAN ROD STOP</li> </ul>		
<b><u>Indications: (RO needs to identify the PR NI failure)</u></b>		
<ul style="list-style-type: none"> <li>- Power range for channel 1 is blank</li> <li>- Blown fuse indication on NI-41 drawer</li> <li>- NI-41B drops to zero value</li> </ul>		
	RO identifies failure	<ul style="list-style-type: none"> <li>▪ Determine the failure and drawer</li> </ul>
	SRO	<ul style="list-style-type: none"> <li>▪ Reference ARP for failed NI channel</li> <li>Direct RO to complete actions of ARP</li> </ul>
	BOP will do these actions	ARP actions: <ul style="list-style-type: none"> <li>- Turn rod stop bypass selector switch to position for the failed channel – FD2 clears</li> <li>- Turn comparator channel defeat selector switch to position for the failed channel –FC5 clears</li> <li>- Turn upper and lower section selector switch to position for the failed channel</li> <li>- Trip Bistables for the failed channel as follows: remove control power fuses from the A drawer for the failed channel and trip bistables for NI-41 IAW table 1 ( will call I&amp;C to do this)</li> </ul>
	SRO	Initiate action to correct the problem. Call dispatcher and initiate a CR.
	SRO	Initiate action to implement TS 3.3.1 2 a condition D : Place the channel in trip in 6 hours and reduce power to less than 75% RTP OR Place the channel in trip in 6 hours and Perform SR 3.2.4.2 if required in 12 hours OR be in mode 3 in 12 hours

Event Description: 1A CCW pump trips – 1B CCW pump does not auto start

Initiating event:

When directed by NRC examiner

**MAKE SURE BOP IS IN BACK**

Time	Position	Applicant's Actions or Behavior
<b><u>Annunciators:</u></b>		
<ul style="list-style-type: none"> <li>- AA1, 1A CCW PUMP OVERLOAD TRIP</li> <li>- DF1, LTDN TO DEMIN DIVERTED- TEMP HI (may come in if not addressed in a timely manner.</li> <li>- DD3, CCW FLOW FROM RCP OIL CLRS LO</li> </ul>		
<b><u>Indications:</u></b>		
<ul style="list-style-type: none"> <li>▪ Flow in On service train dropping to 0</li> <li>▪ Green and amber light LIT for 1A CCW pump</li> </ul>		
	RO	Start 1B CCW pump Reference AA1 ARP
	SRO	Reference ARP and go to AOP-9.0 <ul style="list-style-type: none"> <li>▪ Direct starting of 1B CCW pump</li> <li>▪ Check Surge tank level</li> <li>▪ Check proper flow and adequate CCW for conditions</li> <li>▪ Check RCP motor bearing temperatures &lt; 195°F</li> <li>▪ Verify SW supplied to affected train</li> <li>▪ Check RHR affected</li> <li>▪ Evaluate classifications</li> <li>▪ Check SFP cooling affected</li> </ul> Direct racking out DG04, 1A CCW pump breaker
	SRO	Refer to TS 3.7.7 Admin LCO for tracking purposes only.
	RO	Direct the Rover to check the breakers and the 1A CCW pump
	SRO	Direct returning TCV 143 to the DEMIN position (if necessary) or call chemistry to sample Demins for damage.

DF1 does not address placing TCV-143 in the DEMIN position. Discuss with surrogate SRO.

Event Description: TK-144 CONTROLLER FAILS HIGH  
 Initiating event: NRC direction

Time	Position	Applicant's Actions or Behavior
<p><b><u>Annunciators:</u></b>            DF1, LTDN TO DEMIN DIVERTED- TEMP HI            DF5, VCT TEMP HI</p> <p><b><u>Indications:</u></b>            TCV-143 temperature control valve white light (VCT) LIT            TI-144 temperature rising            TI-143, VCT temperature, rising</p>		
	RO	Recognize and diagnose failure: <ul style="list-style-type: none"> <li>- Take manual control of TK-144 and reduce temperature</li> <li>- Return TCV-143 to the DEMIN position when temperature returned to w/I limits or call chemistry to sample Demins for damage.</li> <li>-</li> </ul>
	SRO	Reference ARP Direct Manual control of TK-144 and return temperature to normal

Event Description: PK-444A CONTROLLER FAILS LOW  
 Initiating event: NRC direction

Time	Position	Applicant's Actions or Behavior
<p><b><u>Annunciators:</u></b>            HC1, PRZR PRESS HI-LO            HA4 PRZR SAFETY TEMP HI            HA5, PRZR PORV TEMP HI            HE1, REL VLV 444B/445A OPEN            HD1, PRZR CONT PRESS OUTPUT HI</p> <p><b><u>Indications:</u></b>            PRZR Pressure dropping            Tailpiece temps rising</p>		
	RO	<p>Recognize failure, Then:</p> <ul style="list-style-type: none"> <li>- Take PORV-444B to close</li> <li>- Close the spray valves – PK-444C and 444D</li> <li>- Turn on heaters that are not on</li> <li>- Recognize PORV did not close</li> <li>- Close MOV-8000B</li> <li>- Recognize MOV-8000B did not close</li> </ul>
	SRO	<p>Direct above actions and reference ARP HC1 or AOP-100 and direct actions below:</p> <ul style="list-style-type: none"> <li>- Close PORV-444B</li> <li>- Close the spray valves – PK-444C and 444D</li> <li>- Turn on heaters that are not on</li> <li>- Recognize PORV did not close</li> <li>- Close MOV-8000B</li> <li>- Recognize MOV-8000B did not close</li> <li>- Recognize the PORV is open and the block valve is open</li> </ul> <p>Direct a reactor trip prior to automatic reactor trip setpoint.</p>
	RO	<p>Trip the reactor and safety inject due to stuck open PORV</p>

Event Description: Steam space LOCA through PORV and loss of 1D 600v LCC  
 Initiating event: WHEN CONTROLLER FAILS LOW

Time	Time	Time
		IMMEDIATE ACTIONS
<u>* Critical</u>	RO	<ul style="list-style-type: none"> <li>- <u>Check Rx tripped</u></li> <li>- <u>Check Rx tripped</u></li> <li>RTB's &amp; associated bypass bkrs open</li> <li><b>* Trip CRDM MG set breakers</b></li> <li>- Will NOT auto trip and SI if operator does not manually trip/SI</li> </ul>
<u>* Critical</u>	BOP	<ul style="list-style-type: none"> <li>- Check turbine tripped</li> <li>- Verify at least one train of 4160 V ESF busses energized – Both will be energized</li> <li>- <b>* Check SI actuated</b> <ul style="list-style-type: none"> <li>• <b>Actuate SI manually based on Przr Press LO - 1850 psig</b></li> </ul> </li> </ul>
	SRO	Direct Immediate actions to be done and are complete
Procedurally go through EEP-0		
	RO	<ul style="list-style-type: none"> <li>▪ Check Rx tripped</li> <li>▪ Check turbine tripped TSLB 2 14-1 thru 14-4</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Verify at least one train of 4160 V ESF busses energized</li> </ul> Check SI actuated or required
<u>* *</u>	RO	<ul style="list-style-type: none"> <li>- Verify SW pumps – 2 in each train</li> <li>- Verify CCW started</li> <li><b><u>1C CCW pump did not start here – START 1C CCW pump</u></b></li> <li>CCW flow and SW flow</li> <li>- Verify Chg pumps started</li> <li>- Verify RHR pumps started</li> <li>- Verify SI flow FI-943</li> <li>- Check RCS pressure &lt; 265 psig</li> <li>- Check LHSI flow &gt; 1500 gpm.</li> <li>- Verify Ctmt Ventilation isolation- Stop mini purge supply/exh fan</li> </ul> Verify CTMT fan cooler alignments- There will be two Ctmt coolers running in B Train – none in A Train

Event Description: Steam space LOCA through PORV and loss of 1D 600v LCC

	BOP	<ul style="list-style-type: none"> <li>- Verify AFW pumps started</li> <li>- Verify Main FW status</li> <li>- Check NO MSL isolation signal present</li> </ul>
	RO	<ul style="list-style-type: none"> <li>- Check Ctmt pressure &lt;27 psig PR 950</li> </ul>
	BOP	Verify Phase A ctmt iso Verify Ph A ctmt iso actuated Check all MLB-2 lights lit- <b><u>Initiate action to make all MLB-2 lights lit -</u></b>
	RO	<ul style="list-style-type: none"> <li>- Announce "Unit 1 reactor trip and Safety Injection"</li> <li>- Verify all Rx trip and bypass bkrs open</li> <li>- Trip CRDM MG set supply breakers</li> </ul>
	BOP	Check AFW status Total AFW flow > 395 gpm or any NR level >30% Control MDAFWP and TDAFWP flow for 30% to 60% NR level When two SG NR levels >25% and TDAFWP not required, stop TDAFWP

Event Description: Steam space LOCA through PORV and loss of 1D 600v LCC

	BOP	Verify two trains of ECCS equipment aligned Check all MLB-1 lights lit- <b>Initiate action to make all MLB-1 lights lit</b> - BOP will do this task
	RO	Secure secondary components Both heater drain pumps All but one cond pump Align backup cooling to cond pumps
	SRO	- Check RCS avg temp stable at or approaching 547°F <ul style="list-style-type: none"> <li>• Check stm dumps and atmospherics</li> <li>• Control AFW to control cooldown</li> <li>• Direct isolating steam loads</li> <li>• If cooldown continues then close MSIVs</li> </ul> - Check Pzr pressure & PORVs PRT parameters
	SRO	The team should leave EEP-0, step 24, RNO column at this point due to PORV open and not isolated and transition to EEP-1.0

Brief surrogate SRO on transition to EEP-1.0.

Event Description: Steam space LOCA through PORV and loss of 1D 600v LCC

Time	Position	Applicant's Actions or Behavior
	SRO	Direct transition to EEP-1, Loss of Reactor or Secondary Coolant Direct actions in EEP-1
		<b>Step 1 of EEP-1.0</b>
<b>* critical</b>	RO	* Check RCP trip criteria - >16°F
<b><u>Stop scenario here based on position of candidate standing RO position. No other candidate is being evaluated.</u></b>		
	BOP	- Check SGs not faulted - no SG pressure falling uncontrolled - Check intact SG levels Control AFW flow to get SG NR levels >30% {50%} - Check secondary radiation indications
	RO	Check Pzr PORVs- - power avail to iso vlvs - no - both PORVs closed- no - at least one iso vlv open - yes
	SRO	Direct that the following be performed within one hour of start of event: Close recirc vlv disconnects Establish 1A and 1B post LOCA ctmt H2 analyzers Plot H2 concentration If H2 concentration <4%, place both recombiners in service
	SRO	Check SI termination criteria: Subcooling > 16 {45}°F in CETC mode - Secondary heat sink available - RCS pressure stable or rising - Pzr level > 7% {50%} -

Scenario #2 2005 NRC exam

**Southern Nuclear  
J.M. Farley Nuclear Plant**

**Operations Training  
Simulator Exam Scenario**

***HLT-29A NRC EXAM SCENARIO #2***

*Technical Review:* \_\_\_\_\_ *Date:* \_\_\_\_\_

*Training Department  
Approval:* \_\_\_\_\_ *Date:* \_\_\_\_\_



Facility: Farley Scenario No.: 2 Op-Test No.: HLT-29A NRC

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions: 71% reactor power ramping to 100% power following a 20 day outage.  
MOL, A Train O/S; A Train protected

Turnover: 1B D/G T/O for fuel oil filter replacement (OOS 6 hours, RTS in 3 hours).  
3 gpd SG tube leak in 1C SG, 1B HDT pump OOS due to a suction valve replacement (RTS in 4 Hours).

Event No.	Malf No.	Event Type*	Event Description
1		R (RO)	Increase power to 100%.
2		I (RO) TS	PT447, Turbine first stage Impulse pressure, fails low.
3		I (RO) TS (SRO)	LT-459, Przr level, fails low.
4		C (RO) TS (SRO)	1A Charging pump trips at same time LT-459 fails low.
5		N (RO) (SRO)	Place letdown back in service.
6		I (RO) TS (SRO)	PT-496 fails HIGH.
7		C (ALL) (SRO) TS	1C SG tube leak. 10 gpm over 5 minutes. Leak increases slowly requiring entry into AOP.
8		M (ALL)	1C SG tube leak increases to 300 gpm.
9			AUTO SI failure; Train A manual handswitch initiation will not work, failure of 1C chg pump to start; failure of MOV 8803B and MOV 3024C to open.

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

**Surrogate brief- if an action is not an immediate operator action in EEP-0, do not worry about it. I.e. If the pump does not start or the valve does not operate, let the procedure take care of it and have the SRO direct those actions.**

Scenario #2 July 2005 NRC exam

Facility: Farley Scenario No.: 2 Op-Test No.: HLT-29A NRC

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions: 71% reactor power ramping to 100% power following a 20 day outage.  
MOL, A Train O/S; A Train protected

Turnover: 1B D/G T/O for fuel oil filter replacement (OOS 6 hours, RTS in 3 hours),  
3 gpd SG tube leak in 1C SG, 1B HDT pump OOS due to a suction valve replacement (RTS  
in 4 Hours).

Event No.	Malf No.	Event Type*	Event Description
0	**	Preset	1A chg pump OL trip when LT-459 < 15%
0		Preset	1C Chg pump will not auto start on ESF sequencer
0		Preset	MOV 8803B fails to OPEN on SI (B train valve)
		Preset	MOV 3024C fails to OPEN on SI (B train valve)
0		Preset	SI failure – A Trn SI fails to actuate Automatically and manually.
0		Preset	1B Chg pump will not auto start on DF06 trip.
0		Preset	Rx trip breakers fail to open automatically but will open with handswitch
0		preset	1C SG tube leak 3 gpd.
0		Preset	Tag Out 1B HDT pump breaker
0		Preset	Tag Out 1B DG
0		Preset	SI failure -Train A auto SI failure
0		Preset	Fail R4 high B/S off

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

**OPERATING TEST HLT-29A NRC**  
**SCENARIO 2 Summary sheet**

**Initial Conditions: 71power, ramping to 100% power. MOL, A Train O/S, A Train protected. RCS boron concentration is 1192 ppm.**

- 1C S/G tube leak approximately 3 gpd. Steady for 3 weeks.
- 1B D/G T/O for fuel oil filter replacement (OOS 6 hours, RTS in 3 hours)
- 1B HDT pump is T/O for suction valve replacement (RTS in 4 hours)

Set in:

- 1A chg pump OL trip when LT-459 < 15%
- 1C Chg pump will not auto start on ESF sequencer
- MOV 8803B fails to open on SI (B train valve)
- MOV 3024C fails to open on SI (B train valve)
- SI failure – A Trn SI fails to actuate automatically and will not actuate manually
- 1B Chg pump will not auto start when 1A Chg pump trips.
- Rx trip breakers fail to open in auto
- 1C SG tube leak 3 gpd
- Tag Out 1B HDT pump breaker
- Tag out 1B DG output breaker
- SI failure B Train auto SI Failure
- Fail R4 high B/S off

Event 1 – Commence ramp to 100% power.

Event 2 – PT447, Turbine first stage Impulse pressure, fails low. This is a TS issue.

Event 3 - LT-459 fails low. This will cause Pzr heaters to turn off, letdown to secure and charging to increase. This is a TS issue.

Event 4– The 1A chg pump will trip at the same time as LT-459 fails low. 1B Chg pump will not auto start on this trip. This is an Admin LCO.

Event 5 – Place letdown back in service and control charging and Pzr heaters.

Event 6 – PT-496 fails HIGH. This will cause the 1C FRV to fully open. This is a TS issue.

Event 7 - 1C SG tube leak, 10 gpm over 5 minutes. Leak increases slowly requiring entry into AOP – 2.0.

Event 8–1C SG tube leak increases to SI setpoint. (300 gpm)

Event 9 – A and B train SI failure; Manual handswitch initiation will not work on A Train, Manual A Train Phase A is possible. Rx trip breakers fail to open automatically. There will be a failure of 1C chg pump to start; failure of MOV-3024C to open and 8803B to open (8803B is a critical task due to the A Train failure and no SI flow.)

AOP-100/ AOP-2.0 / EEP-0 / EEP-3.0

<b>SETUP</b>			
EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
		Quick Setup IC (all items with # are included in IC)	NONE
0	0	IC-056, 71 % RTP, MOL, A Train O/S	RESET IC-056
0	0	Quick setup (all items with * are included): bat exam_nrc02.txt	
		Add generic setup	*
0	0	1A chg pump OL trip when LT-459 < 15% trgset 1 "LI459A < 15" trg 1 "imf cCVP01A_d_co1"	*
	0	1C chg pump fails to auto start on ESF sequencer imf cCVP01C_d_cc6 open	
	0	Strm dumps fail to arm imf mal-mss10	*
0	0	MOV 8803B fails to open on SI (B train) imf csi8803b_d_cc5 open	*
0	0	MOV 3024C fails to close on SI (B train) imf cnc3024c_d_cc5 open	*
0	0	SI failure – A Trn SI fails to actuate automatically and manually. imf csftyinj_cr1 open imf csftyinj_cc1 open	*
0	0	1B Chg pump will not auto start on DF06 trip. imf cCVP01ba_d_cc7 open	*
0	0	Rx trip breakers fail to open in auto but will open with handswitch. imf cBKRXTRP_cc5 closed imf cBKRXTRP_cc6 closed	*
0	0	1C SGTL of 5 gpd (gives an indicated 3 gpd leak): REMOTE / B21 / LOA-RDS003 / 5	*
0	0	1B HDT pump control power imf cTSP001B_cp2	
	0	Tag out 1B DG output bkr CMFremote / irf cBK1DG08_d_cd1 open	*
	0	SI failure – B Train auto SI failure imf csftyinj_cc11 open	*

<b>SETUP</b>			
EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
0	0	Fail R4 high B/S off BST / JR04H-0 / reset	* #
			RUN simulator
		Place DANGER tag on 1B HDT pump	DANGER tag
		Place DANGER tag on DG08	DANGER tag
		Place 1B DG MSS in Mode 3	MSS in Mode 3
		Place DANGER tag on 1B DG MSS in Mode 3	DANGER tag
		Place Bypass & Inop status switches in up position	Emergency power Unit 1 B Trn
		Check Train On Service and protected signs	A TRN BOTH
		Check DEH for limiter limiting	DEH set correctly
0	0	DEH	Clear DEH alarms
0	0	ARDA	RESET ARDA
	0	PPC	Place Grp 1 on MCB CRT
		PPC	Check for correct FLUX target
			Acknowledge annunciators
			Verify HORNS ON
			FREEZE simulator
		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(4) = 0 Minutes: clock(3) = 0 Seconds: clock(2) = 0	
			sv sim_clock.uvl
0	0	VERIFY MICROPHONES READY	Batteries installed
0	0	TURNOVER SHEET AVAILABLE	Paperwork provided by evaluators

**EXAM**

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
		<b>Start data collection for Simview file DataCollection.uvl</b>	
	0	<b>Begin Exam</b>	RUN simulator
		<b>Verify Horns ON: hornflag</b>	Verify Horns On
1		Ramp up in power	**
2		PT447 fails low over 5 seconds XMT / PT447 / 0 / 5 ramp	
3		LT-459 fails low over 20 seconds XMT / LT459 / 0 / 20	
4		1A Chg pump trips when LT-459 fails low.	
5		Restore letdown	**
6		PT-496 fails LOW XMT/ PT496 / 100 / 20	
7		1C SG tube leak increases to 10 gpm Remote / LOA-RDS003 / 10 / 300	
8		1C SG TUBE RUPTURE MALF/ MAL-RCS4C / 300 / 0	
9		Failure of 1C HHSI pump to auto start; Failure of MOV's 8803B and 3024C to stroke OPEN	**
			HORNS OFF
		<b>End of Exam</b>	FREEZE simulator
		<b>Stop data collection for Simview file DataCollection.uvl</b>	

**EXAM**

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
		<b>Export data to file with name of NRC exam02 grpX.txt</b>  <i>NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate.</i>  <i>NOTE: File will be saved in the OPENSIM directory.</i>	

LOCAL OPERATOR ACTIONS:

--

**Communications sheet**

Event 1 – none.

Event 2 – Dispatcher for CR & Shift Manager notified of failure and acknowledges, I & C for tripping bistables.

Event 3 – Dispatcher for CR & Shift Manager notified of failure and acknowledge

Event 4 – Dispatcher for CR, Shift Manager notified of failure and acknowledge.

To the Rover – check the 1A chg pump and breaker.

Rover- breaker is tripped, no apparent cause at this time.

May be directed to rack out that breaker.

Dispatcher – will send EM to investigate.

Event 5 - Rad side SO acknowledges verify open PRIP Letdown isolation valves.

Radside SO reports back:

“LTDN LINE PENE RM ISO's Q1E21HV8175A and B are open”.

Event 6 – Dispatcher for CR, I & C for tripping bistables, & Shift Manager notified of failure and acknowledge.

Event 7 – Shift Chemist for sampling requirements

Event 8 – BOP to Rad man – shut HV 2229 for SI failure  
Radman acknowledge

Unit No. One

Offgoing Supv.	Oncoming Supv.	<input type="checkbox"/> N <input checked="" type="checkbox"/> D <input type="checkbox"/> E Date
----------------	----------------	---

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

Keys turned over [ X ] Security Keys A, S, D, SW, X, on key ring SS

**Unit Status** *71% RTP, MOL, 1192 ppm Cb, 10,000 MWD, Xe building in*

**STPs/Evolution's (completed/in progress/planned)**  
 Increase power to 100% following a 20 day outage.

**General Information and Equipment Status**  
 3 gpd SG tube leak in 1C SG, steady for the past 3 weeks..  
 1B DG tagged out for fuel oil filter replacement (OOS for 6 hours, RTS in 3 hours).  
 1B HDT pump OOS due to suction valve replacement. (RTS in 4 hours)

A train is the Protected Train  
 A train is on service  
 Current Risk Assessment is **YELLOW**  
 Unit 2 is 100% power with no threats.  
**Waste Management Status** #3 RHT O/S

**LCO Status** 3.8.1 (1B DG)

**Night Orders** - No New Night Orders

<input checked="" type="checkbox"/>	Part II Review Shift Complement			
	LCOs Reviewed <u>SS</u> (initials) reviewed as early in shift as possible			
<input checked="" type="checkbox"/>	Part III	STP-1.0 Reviewed/signed <input checked="" type="checkbox"/> Yes	Operator Logs Reviewed <input checked="" type="checkbox"/> Yes	Cond Rpt Queue Rev. <input checked="" type="checkbox"/> Yes
				AutoLog Reviewed <input checked="" type="checkbox"/> Yes

exam\_nrc02.txt

^exam\_nrc exam02.txt  
^used for HLT-29A nrc exam  
^  
^  
^1A Chg pump trips when LT-459A fails low  
trgset 1 "LI459A < 15"  
trg 1 "imf cCVP01A\_d\_co1"  
^  
^Prevent 1C Chg pump from auto starting on ESF sequencer:  
imf cCVP01C\_d\_cc6 open  
^  
^Steam dump malF commented out per NRC  
^Steam dumps fail to arm while in Tavg mode:  
^imf mal-mss10  
^  
^mov-8803B fails to open on SI:  
imf csi8803b\_d\_cc5 open  
^  
^mov-3024c fails to open on SI:  
imf cnc3024c\_d\_cc5 open  
^  
^Train A manual SI failure  
imf csftyinj\_cr1 open  
^  
^Train A auto SI failure  
imf csftyinj\_cc1 open  
^  
^Prevent 1B Chg pump from auto starting on DF06 opening:  
imf cCVP01ba\_d\_cc7 open  
^  
^Rx trip breakers fails to open in auto:  
imf CBKRXTRP\_cc5 open  
^  
^Rx trip breakers fails to open in auto:  
imf CBKRXTRP\_cc6 open  
^  
^1C SGTL of 3 gpd:  
irf LOA-RDS003 5  
^  
^ 1B HDT pump breaker DE06 control power off:  
imf cTSP001B\_cp2  
^  
^Rack out 1B DG output breaker DG08:  
irf cBK1DG08\_d\_cd1 open  
^  
^Train B auto SI failure  
imf csftyinj\_cc11 open  
^  
^Fail R04 high bistable off  
imf jr04h-o reset

Op-Test No.: HLT-29A NRC Scenario No.: 2 Event No.: 1

Page 1 of 1

Event Description: Increase power to 100%  
 Initiating event: When scenario starts

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

UOP-3.1, Power Operations

	BOP	Increase load by putting in ramp rate and MW endpoint. Depress GO pushbutton
	SRO	Direct reactivity brief and coordinate activities
	RO	Dilute or pull rods as necessary to maintain Tavg / Tref on program

Op-Test No.: HLT-29A NRC Scenario No.: 2 Event No.: 2 Page 1 of 2

Event Description: PT-447 Turbine Impulse Pressure FAILS LOW  
Initiating event: NRC direction

Time	Time	Time
------	------	------

## Annunciators:

- JB4, MS LINE HI STM FLOW ALERT
- HF3, TAVG/TREF DEV

## Indications:

- Rods stepping inward in Auto
- MW electrical stable
- Pressure indicator low PT-447

	RO	Determine 1 <sup>st</sup> stage pressure instrument failure Shift rod control to Manual
	SRO	Enter AOP-100 section 1.3 and direct the following: <ul style="list-style-type: none"> <li>- Determine Load rejection NOT in progress</li> <li>- Check for no rod motion. Place rods in Manual.</li> <li>- Direct PT-446 to be selected.</li> <li>- Restore Tavg to programmed value</li> </ul>
	RO	Restore Tavg to programmed value
	BOP	Select other 1 <sup>st</sup> stage press channel for control – PT-446
	SRO	<p><b>Step 6</b></p> <p><b>-Refer to:</b></p> <ul style="list-style-type: none"> <li>- <u>T.S. 3.3.1 / 17 f condition T</u></li> </ul> <p>Verify the interlock is in the required state in 1 hour or be in M-2 in 7 hours</p> <p><b>NOTE:</b> PT-446 and PT-447 are the two inputs to P13. Tech Spec 3.3.1 Table 3.3.1-1 requires two channels operable in mode 1. The one hour required action for condition T states, "Verify the interlock is in the required state for existing conditions." With either PT-446 or PT-447 disabled P13 would still be in the required state (above 10% power) as indicated by the P13-LOW TURBINE IMPULSE PRESSURE PERMISSIVE Bypass and Permissive window not illuminated.</p>

Op-Test No.: HLT-29A NRC	Scenario No.: 2	Event No.: 2	Page 2 of 2
Event Description: PT-447 Turbine Impulse Pressure FAILS LOW			
Initiating event: NRC direction			

Time	Time	Time
------	------	------

		- <u>T.S. 3.3.2 / 4 e condition D</u> Place the channel in trip in 6 hours and do a QPTR in 12 hours or be in mode 3 in 12 hours
	SRO	Step 7 - Notify the Shift Manager Step 8 - Submit a condition report Step 9 - Refer to SOP-18 if desired to RESET C-7A

Note: brief surrogate to leave rods in automatic for the ramp up.

Op-Test No.: HLT-29A NRC Scenario No.: 2 Event No.: 3/4

Page 1 of 3

Event Description: LT-459 FAILS LOW and 1A Chg pump trips  
 Initiating event: NRC direction

Time	Time	Time
------	------	------

**Annunciators:**

- HA3 - PRZR LVL LO B/U HTRS OFF LTDN SEC
- HB2 - PRZR LVL DEV LO
- EB1 - CHG PUMP OVERLOAD TRIP
- EA2 - CHG HDR FLOW HI-LO

**Indications:**

- No amps for 1A Chg pump
- FT-122 decreasing to zero
- Letdown flow and pressure decreasing to zero
- Letdown valves closing
- 1A Chg pump amber light LIT

**LT-459 failure**

	SRO	Enter AOP-100, Section 1.2 Direct the following: <ul style="list-style-type: none"> <li>- Check Pzr level is on or trending to program value</li> <li>- Adjust Seal Injection flow to 6-13 gpm</li> <li>- Determine if a Level transmitter or indicator has failed.</li> <li>- Select a different LT for Przr level control (Channel III/ II)</li> <li>- Select LS 459 Y to either LT460 or 461 position</li> </ul>
	RO	<ul style="list-style-type: none"> <li>- Take manual control of charging flow FCV-122 and reduce flow to zero.</li> <li>- Adjust Seal Injection flow to 6-13 gpm</li> <li>- Place LS 459Z in channel III/II position</li> <li>- Place LS 459Y in either LT460 or 461 position</li> </ul>
	SRO	TS 3.3.1 and 3.3.3 for applicability <ul style="list-style-type: none"> <li>- 3.3.1 Condition M – place the channel in trip in 6 hours or be less than P-7 in 12 hours.</li> <li>- 3.3.3 Admin LCO due to 2 channels are required and there are 2 channels OPERABLE.</li> </ul> <p style="text-align: center;">Call dispatcher and SM</p>

Op-Test No.: HLT-29A NRC Scenario No.: 2 Event No.: 3/4

Page 2 of 3

Event Description: LT-459 FAILS LOW and 1A Chg pump trips  
Initiating event: NRC direction

Time	Time	Time
------	------	------

Charging pump malfunction		
	BOP	Place ramp on HOLD Call Radside SO to check the 1A chg pump
	RO	Start the 1B Chg pump
	SRO	Ensure ARP EB1 actions completed.
	SRO	<ul style="list-style-type: none"> <li>▪ Initiate investigation and repair.</li> <li>▪ Discuss TS actions of 1A chg pump OOC and 1B chg pump did not auto start</li> </ul> <p>TS 3.5.2 condition A – Since the 1A chg pump is tripped and the 1B chg pump may not autostart for ESF and LOSP sequencer. The conservative decision should be to enter Condition A and either fix 1A chg pump or determine why the 1B chg pump did not start within 72 hours.</p> <ul style="list-style-type: none"> <li>• Call dispatcher and SM</li> </ul>

Op-Test No.: HLT-29A NRC Scenario No.: 2 Event No.: 5

Page 1 of 1

Event Description: Restore Letdown IAW AOP-100

Initiating event: Loss of Letdown

Time	Time	Time
------	------	------

## Indications:

- Letdown flow and pressure decreasing to zero
- Letdown valves closing

	SRO	Direct the following IAW AOP-100, step 4, 5 and 6. <ul style="list-style-type: none"> <li>- Check Letdown in service</li> <li>- HV-8149A,B,C closed -yes</li> <li>- Verify PK-145 is in manual and at 50%</li> <li>- Open HV-8152</li> <li>- Open LCV-459 and 460</li> <li>- Verify FCV-122 is in manual and minimum charging established</li> <li>- Open 8149B or C</li> <li>- Check letdown flow established – flow</li> <li>- Place PK-145 in Automatic and verify proper pressure</li> <li>- Verify TK-144 maintaining temperature – T-116, 143, 144</li> <li>- Place another orifice on service IAW SOP-2.1</li> <li>- Restore charging to automatic</li> <li>- Restore control of the heaters</li> </ul>
	RO	- Restore letdown flow per the guidance above

Op-Test No.: HLT-29A NRC Scenario No.: 2

Event No.: 6

Page 1 of 1

Event Description: PT-496 fails LOW

Initiating event: NRC Direction

Time	Time	Time
------	------	------

## Annunciators:

JG3, 1C SG FEED FLOW &gt; STM FLOW

JF3, 1C SG LVL DEV

JA4, MS LINE PRESS LO ALERT

JE3, 1C SG STM LINE HI DP ALERT

## Indications:

- 1C FRV opening
- SGWL increasing

		Immediate actions of AOP-100
	BOP	<ul style="list-style-type: none"> <li>- Take Manual control of 1C FRV</li> <li>- Close 1C FRV to restore SGWL to program</li> </ul>
	SRO	<p>Direct actions of AOP-100, section 1.5.</p> <p>Immediate actions of Step 1:</p> <ul style="list-style-type: none"> <li>- Take Manual control of 1C FRV</li> <li>- Close 1C FRV to restore SGWL to program</li> </ul> <p>Step 2 - Check no required automatic actions or setpoints being approached.</p> <p>Step 3- Place ramp on HOLD, if necessary.</p> <p>Step 4 - check for a failed instrument and select out.</p> <p>Place HS- 498Z to channel III position (FT-494)</p> <p>Step 5- return FRV to automatic control</p>
	SRO	<p>Step 6 - <u>T.S. 3.3.2 / 1 e condition D</u></p> <p>Place the channel in trip in 6 hours or be in Mode 3 in 12 hours</p> <p>Notify shift manager, write a condition report and notify work week manager.</p>

Op-Test No.: HLT-29 NRC

Scenario No.: 2

Event No.: 7

Page 1 of 2

Event Description: 1C SGT leak 10 gpm ramped in over 5 minutes  
 Initiating event: NRC direction

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

## Annunciators:

- (FG1 ) SG TUBE LEAK ABOVE SETPOINT
- (FH1) RMS HI-RAD

## Indications of Tube leak

- Radiation alarms R-15, 70C

	SRO	Enter AOP-2.0, SG tube leak
	SRO	Direct actions in AOP-2.0: <ul style="list-style-type: none"> <li>▪ Maintain Przr level on program by reducing letdown or control charging</li> <li>▪ Maintain VCT level &gt;20%</li> <li>▪ Determine RCS leak rate</li> </ul>
	RO	Determine RCS leak rate
	SRO	<ul style="list-style-type: none"> <li>▪ Inform SM for EIP entry</li> <li>▪ Apply action level 3 Step 6 and commence Ramp to 50% in 1 hour and to mode 3 in 2 hours after that.</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Monitor leak rate</li> <li>▪ Insert ramp rate of 3-4 MW/min to decrease load to 50% in 1 hour.</li> <li>▪ Call ACC and PCC about ramp.</li> <li>▪ Initiate ramp on Main turbine</li> <li>▪ Check R-70A,B,C readings</li> </ul>

Op-Test No.: HLT-29 NRC

Scenario No.: 2

Event No.: 7

Page 2 of 2

Event Description: 1C SGT leak 10 gpm ramped in over 5 minutes  
 Initiating event: NRC direction

Time	Position	Applicant's Actions or Behavior
	RO	<ul style="list-style-type: none"> <li>▪ Control reactivity on the ramp IAW UOP-3.1</li> <li>▪ Use Rods or borate</li> <li>- If delta I is low the crew will probably borate to lower RCS temp</li> <li>- If delta I is high the crew will probably use rods to lower RCS temp</li> </ul>
	BOP	<ul style="list-style-type: none"> <li>▪ Call TB SO to verify SJAE filtration on service</li> <li>▪ Call Chemistry and HP</li> </ul>
	BOP	<p>Identify affected SG</p> <ul style="list-style-type: none"> <li>▪ Verify atmospheric (3371C) for 1C SG in 8.25 and AUTO</li> <li>▪ Verify 3371C is closed</li> </ul>
	BOP	<p>Call to have TDAFW pump isolated at HSD panel and close 3234B on BOP</p>
	SRO	<p>Ensure Tech Specs addressed 3.4.13 RCS operational leakage Condition A – Reduce leakage within limits in 4 hours or be in M-3 in 6 hours and M-5 in 36 hours.          This will probably not be done due to speed of Ramp.</p>

Op-Test No.: HLT-29A NRC Scenario No.: 2 Event No.: 8

Page 1 of 5

Event Description: SGTR 300 gpm  
Initiating event: NRC direction

Time	Position	Applicant's Actions or Behavior
	SRO	Return to AOP-2.0 continuing action step 1 and 2 Direct actions in AOP-2.0: - Maintain Przr level on program by reducing letdown or control charging - Maintain VCT level >20% When Pzr level continues to decrease after charging flow is increased and letdown secured, then direct a reactor trip and safety injection IAW AOP-2.0.
	SRO	Enter EEP-0
IMMEDIATE ACTIONS		
* Critical	RO	1- <u>Check Rx tripped</u> <b>*RTB's &amp; associated bypass bkrs open</b> NI power falling Rod bottom lights lit
* Critical	BOP	2 Check turbine tripped 3 Verify at least one train of 4160 V ESF busses energized 4 <b>Check SI actuated</b> - Cmtt pressure less than 4 psig - SG pressure - SG D/P - Pzr pressure low  <b>RNO Verify Both Trains of SI actuated – NO</b> A and B Train will not actuate automatically – Handswitch will not cause an SI actuation for A Train. Phase A actuation will work but is not required by procedure at this point
* Critical	RO	5 Verify SW pumps – 2 in each train 6 Verify CCW started CCW flow and SW flow  7 Verify 1 Chg pump in each train started – <b>NO</b> <b>Start 1C CHG pump</b> – critical if the SI has not been manually actuated 8 Verify RHR pumps started

Op-Test No.: HLT-29A NRC Scenario No.: 2 Event No.: 8

Page 2 of 5

Event Description: SGTR 300 gpm  
Initiating event: NRC direction

Time	Position	Applicant's Actions or Behavior
* Critical		<p><b>9 Verify SI flow FI-943 – possibly NO FLOW (MOV-8803B will not open on SI signal and 8803A did not open due on A Train SI failure.</b></p> <p><b>9 RNO column – Verify proper SI alignment</b></p> <ul style="list-style-type: none"> <li>- 8107/ 8108 closed</li> <li>- LCV115B/D open</li> <li>- LCV115C/E closed</li> <li>- <b>*8803A or B OPEN – will have to open both valves</b></li> <li>- 8130A,B/ 8131A,B /8132A,B/ 8133A,B OPEN</li> </ul> <p>Check RCS pressure less than 265 psig – NO go to step 10</p>
* Critical	RO	<p>10 Verify Ctmt Ventilation isolation</p> <p>11 Verify CTMT fan cooler alignments 1 CTMT fan in slow in each train with Emerg SW supplied –<b>NO</b></p> <ul style="list-style-type: none"> <li>- <b>A Train Ctmt fan coolers will have to be started.</b></li> </ul> <p><b>*MOV-3024A,B,C will not open on SI signal</b></p> <p><b>OPEN MOV-3024A,B,C</b></p>
	BOP	<p>12 Verify AFW pumps started</p> <p>13 Verify Main FW status</p> <p>14 Check NO MSL isolation signal present</p>
	RO	<p>15 Check Ctmt pressure &lt;27 psig PR 950</p>
* Critical	BOP	<p><b>16 *Verify Phase A ctmt iso</b></p> <p>MLB-2 1-1 and 11-1 LIT – <b>NOT LIT</b> for A Train – manual actuation of A Train possible or do Attachment 2</p> <p>17 Announce “Unit 1 reactor trip and Safety Injection”</p>
	RO	<p>18 Verify all Rx trip and bypass bkrs open</p> <p>19 Trip CRDM MG set breakers</p>
	BOP	<p>20 Check AFW status</p> <p>Total AFW flow &gt; 395 gpm or any NR level &gt;30%</p> <p>Control MDAFWP and TDAFWP flow for 30% to 60% NR level</p>



Op-Test No.: HLT-29A NRC Scenario No.: 2 Event No.: 8  
 Event Description: SGTR 300 gpm  
 Initiating event: NRC direction

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	SRO	Transition criteria to EEP-3.0 Inform SM of conditions and direct classifications
	RO	1 Check RCP criteria; subcooled margin monitor > 16°F subcooled in CETC mode
<u>*</u> Critical	BOP	2 * Identify ruptured SG - 1C SG 3 Isolate flow from ruptured SG - Align atmos rel vlv and verify closed - Iso TDAFWP steam supply from 1C SG at HSD panel - Verify blowdown isolated - Verify 1C MS iso and bypass vlvs closed 4 When ruptured S/G > 31% Then isolate flow to ruptured S/G by isolating AFW Flow
	RO	5 Check PORV's closed
	BOP	6 Check S/G's not faulted 7 Check intact S/G level > 31%
	RO	8 Reset SI 9 Reset Phase A 10 Reset Phase B
	BOP	11 Check IA to CONTAINMENT 12 Verify 4160v Buses energized

Op-Test No.: HLT-29A NRC Scenario No.: 2 Event No.: 8 Page 5 of 5  
 Event Description: SGTR 300 gpm  
 Initiating event: NRC direction

Time	Position	Applicant's Actions or Behavior
------	----------	---------------------------------

	RO	13 Check if LHSI pumps should be stopped Secure both pumps
	BOP	14 Check ruptured S/G > 410 psig  15 Perform an RCS cooldown  Determine the proper pressure/temperature for cooldown.  Ruptured SG pressure                      CETC temperature to cooldown 1001-1100                                      512° 901-1000                                        499° 801-900                                         485°
		<b>Secure scenario when proper temperature is determined for the ruptured SG pressure.</b>