Draft Submittal

FARLEY JAN. 2005 EXAM
50-348 & 50-364/2005301

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1. Operating Test Simulator Scenarios
   4 OUTLINES

Southern Nuclear
J.M. Farley Nuclear Plant

Operations Training
Simulator Exam Scenario

HLT-29 NRC EXAM SCENARIO #1

Technical Review: _____ *Date:* _____

Training Department Approval: _____ *Date:* _____

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

Examiners: _____ Operators: _____

Initial Conditions: 40% power, ramping to 100%. 940 ppm, MOL; B train on service, B Train protected.

Turnover: 1C D/G T/O for piston replacement, 1A MDAFW PUMP T/O for bearing replacement, 20 gpd SG tube leak in A SG, Steady for 3 weeks. AOP-21, Severe Weather, is in effect due to Severe thunderstorms in the area.

Event No.	Malf No.	Event Type*	Event Description
0	**	Preset	1A SW pump has degraded head. (set to make SW header pressure less than 60# in that train) link to 1B Bkn shaft
0		preset	1A SG tube leak 20 gpd.
0		preset	Raise R-70A alarm setpoint to clear alarm per AOP-2
0		Preset	Rx trip breakers fail to open
0		Preset	1A CHG PUMP does not AUTOSTART but can be started from the MCB.
0		Preset	8100 does not close on Phase A isolation
0		Preset	8112 does not close on Phase A isolation
0		Preset	Tag Out 1C DG
0		Preset	Tag Out 1A MDAFW pump
1		C (BOP) TS (SRO)	1B SW pump has a broken shaft.
2		C (RO)	PCV-145 Fails closed (DE4 comes in)
3		C (RO)	1B CRDM fan trips
4		I (BOP) TS (SRO)	FT-485 channel IV (selected FT for 1B SG fails low) Fails to 0 over 60 secs
5a			1A RCP seal leak 6-8 gpm.
5b	----	R (RO)	Ramp down due to seal failure.
6		TS (SRO) C (ALL)	Raise RCP seal leakrate to 90 gpm.
7		C (ALL)	1A RCP trips. EEP-0 entry (Need to initiate prior to power <33%).
8		M (ALL)	After entry into ESP-0.1 Increase the RCS leak to 300 gpm. Terminate scenario in ESP-1.2 after normal charging established
			Team will start the 1A or 1B chg pump and close 8100.

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

SCENARIO 1 Summary sheet

Initial Conditions: 40% power, MOL, B Train O/S, B Train protected RCS boron concentration is 940 ppm.

- 1A MDAFW PUMP T/O for bearing replacement. (OOS 5 hrs) Expected RTS in 2 days.
- 1A S/G tube leak approximately 20 gpd. Steady for 3 weeks.
- 1C D/G T/O for piston replacement. (OOS for 3 days, Expected RTS in 5 days)
- AOP-21, Severe Weather, is in effect due to severe thunderstorms in the area.

Set in:

- 1A SG tube leak 20 gpd.
- Reset R-70 Alarm setpoint to clear alarm per ARP FG1 & AOP-2.0 (must be done independent of simulator bat file setup)
- 1C D/G is tagged out.
- 1A MDAFP tagged out.
- 1A Chg Pump fails to auto start.
- MOV 8100 fails to auto close.
- MOV 8112 will not auto close or manually close from the MCB.
- 1A SW pump has degraded head. (set to make SW header pressure < 60# in that train)
- Rx trip breakers fail to open.

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

Event 2 – PCV-145 fails closed. DE4 comes in. PCV-145 taken to manual and controlled properly. Control charging flow.

Event 3 –1B CRDM fan trips. RO will have to start the other fan per the ARP.

Event 4 – FT-485 (selected FT for 1B SG fails low). Fails to 0 over 60 secs. This will cause the BOP operator to take manual control of the FRV and restore and control level. The crew should stop the ramp long enough to address the problem.

Event 5 – 1A RCP seal leak 6-8 gpm. DC2 ARP guidance will have controlled shutdown commenced to be offline in 8 hours. When Rx is secured, the RCP will be s/d.

Event 6 –Raise seal leakrate to 90 gpm. Entry into AOP-1.0, T. S. limit, 50 gpm limit for declaration of Alert, but well within the limits of plant control and should not require Trip and Safety injection.

Event 7 – 1A RCP trips above 30% power (P-8). The crew should recognize reactor trip criteria and manually trip the reactor using the handswitches and then the CRDMs. Since the CRDM breakers open, no entry into S.1 is required. Since the Rx does not trip, the main turbine will not trip and will need to be manually tripped. If not, an SI will occur. AOP-4.0 actions will be required to close the A loop Pressurizer spray valve and control feed to the 1A SG at minimum.

Event 8 – After entry into ESP-0.1 increase the RCS leak to 300 gpm. The crew will re-enter E-0; E-1; ESP-1.2 Terminate scenario in ESP-1.2 after normal charging established. The crew should detect 1A chg pump does not start on the SI signal and 8100 & 8112 does not go closed.

AOP-10/ AOP-4/AOP-1.0/EEP-0/ESP-0.1/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	IC-??? 40% RTP, MOL, B Train O/S Password: read-gto write - trg	
0	0	Quick setup (all items with * are included): bat exam_nrc01.txt	
0	0	1A SW pump degraded head PMPS/ NNCPSW1A-D / severity value = 100 / 0 ramp trgset 1 "pi3001a < 70" trg 1 "imf nncpsw1a-d 100"	*
0	0	Rx trip breakers fail to open CMF MALF/ cBKRRXTRP_cc21 / closed	*
0	0	Rx trip breakers fail to open CMF MALF/ cBKRRXTRP_cc22 / closed	*
0	0	Chg pump 1A fail to auto start on LOSP sequencer CMF MALF/ cCVP01A_d-cc3 / open	*
0	0	Chg pump 1A fail to auto start on ESF sequencer CMF MALF/ cCVP01A_d-cc6 / open	*
0	0	8100 does not close on Phase A isolation CMF MALF/ cCVH100_d_cc8 / open	*
0	0	8112 does not close on Phase A isolation CMF MALF/ cCVH112_d_cc8 / open	*
0	0	1A SGTL of 20 gpd: Remote / B21 / irf LOA-RDS001 20	*
0	0	Tag out 1C DG output bkrs unit 1 Cmf remote / cBK1DHO7_d_cd1 / open	*
0	0	Tag out 1C DG output bkrs unit 2 Cmf remote / cBK2DHO7_d_cd1 / open	*
0	0	Rack out 1A MDAFW pmp: CMFremote / cAFP01A_d_cd1 / open	*
0	0	RCS leak increases to 300 gpm MAL / MAL-RCS1A / 300 / 5 MIN RAMP Event Trigger 2 – actuate on grid voltage < 0.3 Event: egenwebb < 0.3	*
			[redacted] RUN simulator

SETUP

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
		Place Bypass & Inop status switches in up position	AFW A Trn Emergency power both units A Trn
		Check Train On Service and protected signs	BTRN BOTH
		Check DEH for limiter limiting	DEH set correctly
		Check 3009 A and C set	approx 40%
		Place Hold tags on DH07-1 and -2	2 Hold tags
		Place 1C DG MSS in Mode 3	MSS in Mode 3
		Place Hold tag on 1C DG MSS in Mode 3	Hold tag
		Place Hold tag on 1A MDAFW pump	Hold tag
		Raise R-70A alarm setpoint to clear alarm per AOP-2.0	Raise R70A setpoint
0	0	**DEH**	Clear DEH alarms
0	0	**ARDA**	RESET ARDA
0	0	**PPC**	Place Grp 1 on MCB CRT
		PPC	Check for correct FLUX target
			Acknowledge annunciators
			Verify HORNS ON
			[redacted] FREEZE simulator
		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		
	0	**Begin Exam**	[redacted] RUN simulator
		Verify Horns ON: hornflag [redacted]	Verify Horns On
1		1B SW pump has a broken shaft PMPS/ imf nNCPSW1B-B	
2		PCV-145 fails closed Cnh / imf pk145-a / 0 range of 1-10	
3		ED11 1B CRDM fan trips cmfMALF / imf cNPC3195B_cc2 / closed ED11 UV	
4		FT-485 channel IV (selected FT for 1B SG fails low) Fails to 0 over 60 sec XMT / imf FT485 / 0	
5a		1A RCP seal leak MAL / imf mal-cvc27A / 5 / 60sec ramp	
5b		Ramp down for seal failure	
6		RCS leak increases to 90 gpm MAL / imf MAL-RCS1A / 90 / No RAMP	
7		1A RCP trips on over current cmfMALF / imf cRCRCP1_cc12 / closed	
8		RCS leak increases to 300 gpm MAL / imf MAL-RCS1A / 300 / 5 MIN RAMP Trigger to egenweb<0.3	Set in bat file to auto actuate when voltage drops on Main Turb trip

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
		End of Exam	HORNS OFF
		End of Exam	FREEZE simulator

Local operator actions:

Open Rx trip breakers

CMFmalf / cBKRXTRP_cc21 / open

CMFmalf / cBKRXTRP_cc22 / open

Rack out 1A and 1B SW pump bkrs

imf cncpsw1a_d_cp2

imf cncpsw1b_d_cp2

Communications sheet

Event 1 – Outside SO – Report 1B SW pump motor is running but the shaft to the pump is not turning.
1A SW pump has no discharge pressure
Radside SO– SGBD alarm in is due to blowdown is tripped due to high SGBD Hx temp.

Event 2– None.

Event 3 – Communications: Rover sent to check ED11, 1A CRDM bkr, and reports from field that the breaker is tripped.

Event 4– Dispatcher –acknowledges when informed that the CR is in the queue and I & C is needed to trip bistables within 6 hours for FT-485 failing.

Event 5– None.

Event 6–Shift Manager & Chemistry informed & acknowledge. Gencom & Systat informed of the power reduction & acknowledge.
SM report: " I will classify the event. Continue ramping off line to be in Mode 3 in 2 hours."

Event 7–Rover asked to trip Rx trip breakers open locally. (wait 3 minutes and then open Rx trip breakers.)

Event 8– None.

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Blank section for whatever is needed.
Unit No. ***One***

Offgoing Supv.	Oncoming Supv.	☐N ☒D ☐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 *40% RTP, MOL , 940 ppm Cb, 10,000 MWD, Eq Xe,*

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

Ramping to 100% power

General Information and Equipment Status

AOP-21.0, Severe Weather, is in effect due to severe thunderstorms in the area.
20 gpd SG tube leak in 1A SG, steady for the past 3 weeks. All actions of AOP completed.
1C DG tagged out for piston replacement (OOS for 3 days, RTS in 5 days)
1A MDAFW PUMP tagged out for bearing replacement (OOS for 5 hrs,RTS in 2 days)
Current Risk Assessment is YELLOW
B train is the Protected Train
B train is on service
Unit 2 is 100% power w/ no threats

Waste Management Status #3 RHT O/S

LCO Status - 3.8.1 (1C DG) 3.7.5 (1A MDAFWP)

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 Rpt Queue Rev.	AutoLog Reviewed
	☒ Yes	☒ Yes	☒ Yes	☒ Yes

Op-Test No.: HLT-29 NRC	Scenario No.: 1	Event No.: 1	Page 1 of 1
Event Description:	1B SW Pump has a broken shaft with 1A SW Pump having degraded head Initiating event: Time (2 min)		

Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications of SW pressure dropping: - PI-3001A and B pressure decreasing. Annunciators: - SW PRESS A TRN LO (AD4) - SW PRESS B TRN LO (AD5) - TURB BLDG MISC ALARMS (KF2) - 1B DG TRBL (VA3) Check for the cause, SW pump tripped, Then go to AOP-10.0.
	BOP	Place turbine on hold (if necessary)
	RO	Perform actions of AOP-10 • Start 1C SW pump to increase pressure. • Perform AOP-9, Loss of CCW • Reduce SW loads on that train.
	SRO	Ensure board operators take actions required by ARPs. - Enter AOP-10 to restore SW pressure and reduce SW loads as necessary.
	SRO	Investigate and call for repairs, look at Tech Specs (3.7.8) and inform OSS

CHECK FINAL SETUP TO SEE IF 3009 VALVES ARE SET UP SO SW PRESSURE WILL DECREASE BELOW 60 #

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

Event Description: PCV-145 Fails closed
Initiating event: NRC examiner signal

Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications of PCV-145 failure Annunciators: - LTDN HX OUTLET PRESS HI (DE4) - LTDN ORIF ISO VLV REL LINE TEMP HI (DE3) Announce PCV-145 failure Perform actions of DE4 to place controller for PCV-145 in manual and control Letdown flow. Take manual control of Charging flow, as necessary, to control Przr level.
	BOP	Place turbine load increase on HOLD if in progress.
	SRO	Refer to ARP and direct supplementary actions.

Op-Test No.: HLT-29 NRC	Scenario No.: 1	Event No.: 3	Page 1 of 1

Event Description: 1B CRDM fan trips.
Initiating event: NRC examiner signal

Time	Position	Applicant's Actions or Behavior
	RO	Annunciators: • BOTH CRDM CLG FANS STOPPED (BC3) Action: Start 1A CRDM Clg fan
	SRO	Ensure operators take ARP actions Start 1A CRDM clg fan Initiate actions to look into failure
	SRO	Initiate investigation and repair.

Op-Test No.: HLT-29 NRC	Scenario No.: 1	Event No.: 4	Page 1 of 1
Event Description:	FT-485 fails low (60 sec ramp) selected FT for 1B FRV Initiating event: NRC examiner signal		

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize indications of FT-485 failure Meter slowly dropping to 0 FRV position opening and possible SGWL deviations Annunciators: - 1B SG FEED FLOW > STM FLOW (JG2) - 1B SG LVL DEV (JF2) possible
	SRO	Ensure board operators take ARP actions. - Ensure FRV manual control taken
	BOP	- Stop the ramp, if in progress
	SRO	Direct proper control of FRV in manual Conduct a brief on FRV manual control while ramp in progress. Restart ramp. Consult Tech Specs 3.3.2 Hi Stm Flow/Lo-Lo Tavg

Op-Test No.: HLT-29 NRC	Scenario No.: 1	Event No.: 5	Page 1 of 1

Event Description: 1A RCP seal leak of approx. 7.2 gpm
Initiating event: NRC examiner signal

Time	Position	Applicant's Actions or Behavior
	RO	Annunciators in alarm: - RCP #1 SEAL LKOF FLOW HI (DC2) Read Flow recorder to indicate which pump has a problem. Determine 1A RCP seal leak - Check seal leakoff flow at 7 gpm and report.
	SRO	Instruct team by following through ARP for DC2. - instruct team to check temps of RCPs and determine a controlled shutdown is required in the next 8 hours to have RCP secured and seal isolated.
	BOP/RO	Coordinate to reduce load at 2 MW/min

Op-Test No.: HLT-29 NRC	Scenario No.: 1	Event No.: 6	Page 1 of 1

Event Description: RCS leak increases to 90 gpm
Initiating event: NRC examiner signal

Time	Position	Applicant's Actions or Behavior
	RO	Annunciators in alarm: - RMS HI RAD (FH1) - R-2,7,11 and 12 will alarm - CHG HDR FLOW HI-LO (EA2) - PRZR LVL DEV LO (HB2) Containment parameters will start to increase: Temp. humidity and pressure.
	SRO	Instruct team to implement AOP-1.0: - Maintain Przr level on program by increasing chg flow or decreasing letdown - Control VCT level or roll to RWST - Determine the leak rate - Consider classifications - ALERT - Consult Tech Specs – 3.4.13 RCS operational leakage - Consult SM and make a decision to shutdown the plant
	BOP/RO	Coordinate to reduce load at 2 MW/min Place CTMT sump pumps in PULL-TO-LOCK Secure CTMT mini-purge supply and exhaust fans and close dampers.

Op-Test No.: HLT-29 NRC	Scenario No.: 1	Event No.: 7	Page 1 of 2

Event Description: 1A RCP TRIPS - needs to be tripped prior to 30% power
Initiating event: **NRC direction**

Time	Position	Applicant's Actions or Behavior
	RO	Annunciators: ▪ 4160 Volt BKR TRIPPED (MF4) ▪ 1A RCS LOOP FLOW LO OR 1A RCP BKR OPEN (EF1) Recognize Rx trip criteria and announce to the team - Trip the reactor with handswitches - Trip the Rx with CRDM handswitches
	BOP	- Recognize Main Turbine did not trip - Trip Main Turbine
	SRO	Ensure board operators take Immediate actions of EEP-0 - Recognize a need for a Reactor Trip - Direct trip of Reactor – both handswitches - Direct trip of CRDM MG sets supply breakers - Direct Turbine Trip DO NOT enter into FRP-S.1 Perform actions of AOP-4.0 ▪ Close A spray valve ▪ Minimize AFW to A SG
	RO/BOP	Perform immediate actions of EEP-0 without reference: - Check Rx tripped ▪ RTB's & associated bypass bkrs open - Trip of Reactor – both handswitches - Trip of CRDM MG sets supply breakers - Check turbine tripped - Verify at least one train of 4160 V ESF busses energized - Check SI actuated
* Critical * Critical	ALL	Perform immediate actions of EEP-0: - Check Rx tripped RTBs & associated bypass bkrs open NI power falling Rod bottom lights lit - Check turbine tripped - Verify at least one train of 4160 V ESF busses energized - Check SI actuated or required - Exit EEP-0 enter ESP-0.1, Reactor trip response OR Continue in EEP-0 if a SI is determined to be required. **Crew should close 1A RCP Seal leakoff valve shortly after Rx trip**

Op-Test No.: HLT-29 NRC	Scenario No.: 1	Event No.: 7	Page 2 of 2

Event Description: 1A RCP TRIPS
Initiating event: **NRC direction**

Time	Position	Applicant's Actions or Behavior
	All	ESP-0.1 actions ⇒ Check RCS temperature stable at or approaching 547°F ⇒ Verify Feedwater status ⇒ Check emergency boration not required ⇒ Check AFW status ⇒ Check 4160V busses Proceed to event 8

Op-Test No.: HLT-29 NRC Scenario No.: 1 Event No.: 8 Page 1 of 4

Event Description: 300 GPM RCS leak
Initiating event: will automatically be inserted on the Main Turbine trip and ramp in over 5 min.

Time	Position	Applicant's Actions or Behavior
	ALL	Recognize entry back to EEP-0 IAW foldout page requirements ⇒ Monitor SI criteria Pzr level >7% and 16°F Subcooled in the CETC mode
* Critical		Re-enter EEP-0 from ESP-0.1 FO page on Pzr level decreasing. Perform immediate actions of EEP-0: (if reentered from ESP-0.1) - Check Rx tripped - Check turbine tripped TSLB 2 14-1 thru 14-4 Verify at least one train of 4160 V ESF busses energized - Check SI actuated or required **Continue in EEP-0** - Verify SW pumps – 2 in each train - Verify CCW started CCW flow and SW flow - Verify Chg pumps started - 1A Chg did not start and needs to be started here - Verify RHR pumps started - Verify SI flow FI-943 - Verify Ctmt Ventilation isolation - Verify CTMT fan cooler alignments 1 CTMT fan in slow in each train with Emerg SW supplied - Verify AFW status - Verify Main FW status - Check NO MSL isolation signal present - Check Ctmt pressure <27 psig PR 950 - Verify Phase A ctmt iso Verify Ph A ctmt iso actuated Check all MLB-2 lights lit- **Initiate action to make all MLB-1 lights lit MOV-8100 and 8112 did not close** - Announce "Unit 1 reactor trip and Safety Injection" - Verify all Rx trip and bypass bkrs open - Trip CRDM MG set supply breakers - Check AFW status Total AFW flow > 395 gpm or any NR level >30% Control MDAFWP and TDAFWP flow for 30% to 60% NR level

Op-Test No.: HLT-29 NRC Scenario No.: 1 Event No.: 8 Page 2 of 4

Event Description: 300 GPM RCS leak

Time	Position	Applicant's Actions or Behavior
		When two SG NR levels >25% and TDAFWP not required, stop TDAFWP
	CREW	- Verify two trains of ECCS equipment aligned Align all A Train components Both trains of SI actuated Bkrs DF01, DF02, DG15, & DG02 closed Two trains of battery chargers energized Two trains of ESF equip aligned All MLB-1 lights lit Chg pump suction and discharge vlvs open All post accident ctmt air mixing fans started - Secure secondary components Both heater drain pumps All but one cond pump Align backup cooling to cond pumps - Check RCS avg temp stable at or approaching 547°F - If heatup is in progress attempt to dump steam to condenser - If heat up continues, dump steam to atmosphere - Direct counting room to perform CCP-645, Main Steam Abnormal Environmental Release. - Check Pzr pressure & PORVs PRT parameters - Check RCP trip criteria; subcooling > 16 deg - Monitor chg pump miniflow criteria **DIAGNOSTICS** - Check SGs not faulted; no SG falling in uncontrolled manner or less than 50 psig - Check SGs not ruptured (Step 27) Secondary rad indication normal – No SG level rising in uncontrolled manner – *- Check RCS intact – NO – Ctmt rad in alarm / ctmt press increasing **Check Transition criteria to EEP-1.0**

Op-Test No.: HLT-29 NRC Scenario No.: 1 Event No.: 8 Page 3 of 4

Event Description: 300 GPM RCS leak

Time	Position	Applicant's Actions or Behavior
* Critical	SRO	Direct transition to EEP-1, Loss of Reactor or Secondary Coolant Direct actions in EEP-1
	RO	Check RCP trip criteria - all tripped
	BOP	- Check SGs not faulted - no SG pressure falling uncontrolled - Monitor CST level - Check intact SG levels Control AFW flow to get SG NR levels >30% {50%} - Check secondary rad indications
	RO	Check Pzr PORVs- power avail to iso vlvs, at least one iso vlv open, both PORVs closed
	SRO	Direct that the following be performed within one hour of start of event: Close recirc vlv disconnects Establish 1A and 1B post LOCA ctmt H2 analyzers Plot H2 concentration If H2 concentration <4%, place both recombiners in service
	SRO	Check SI termination criteria: Subcooling > 16 {45} deg in CETC mode - Secondary heat sink available – RCS pressure stable or rising - Pzr level > 7% {50%} -
	RO	Check CS system Check RHR system Check NO SG pressure falling in an uncontrolled manner Check RCS pressure Verify 4160 V busses Check DGs and secure since they are running unloaed

Op-Test No.: HLT-29 NRC	Scenario No.: 1	Event No.: 8	Page 4 of 4
Event Description: 300 GPM RCS leak			

Time	Position	Applicant's Actions or Behavior
* Critical	SRO	• Begin evaluation of plant status • Check LHSI flow in progress - Check RCS pressure < 265 (430) – NO • Go to ESP-1.2, Post LOCA cooldown and depressurization
	SRO	Transition to ESP-1.2 Complete the following: ▪ All initial steps to step 9: - Begin RCS cooldown to cold shutdown - Reduce Pzr pressure to refill the pressurizer - Check to secure RCPs - Stop chg pumps **Anytime in this area would be a good time to secure the scenario**

Draft of scenario #2 2005 NRC exam

Southern Nuclear
J.M. Farley Nuclear Plant

Operations Training
Simulator Exam Scenario

HLT-29 NRC EXAM SCENARIO #2

Technical Review: _____ *Date:* _____

Training Department Approval: _____ *Date:* _____

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

DRAFT COPY

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

Examiners: _____ Operators: _____

Initial Conditions: 71% reactor power ramping off line @ 4 MW/MIN due to Hurricane warnings in effect. Winds in excess of 75 mph expected at the plant site in 4 hours. Need to be in mode 3 in 2 hours. EOL, B Train O/S; B Train protected

Turnover: 1C D/G T/O for piston replacement, I&C is working on PT-457 which failed low last shift. 20 gpd SG tube leak in 1A SG, AOP-21, Severe Weather, is in effect due to Hurricane warning and high winds in the area. LT-112 failed low - I&C working on it.

Event No.	Malf No.	Event Type*	Event Description
0	**	Preset	1B DG will not auto start on LOSP or SI
0		Preset	1A Inverter does not transfer to the bypass source
0		Preset	BS in trip for PT-457
0		Preset	LT-112 failed low.
0		Preset	Tag Out 1C DG
0		Preset	Place RCP BKR Ind. on SOLA power supply if not already.
0		preset	1A SG tube leak 20 gpd.
0		preset	Raise R-70A alarm setpoint to clear alarm per AOP-2
1		R (RO)	Ramp down in power.
2		I (BOP)	PT464 fails low.
3		I (RO) TS (SRO)	LT-459 fails low.
4	MISSING	N (RO)	Place letdown back in service.
			SI on Unit 2 [cSFTYINJ (cc21)] under MAL cmf
5		I (RO) TS (SRO)	PT-445 fails high PORV will stick open. MOV isolation will have to be closed.
6		C (BOP) TS (SRO)	1A inverter fails and does not automatically transfer to the bypass source.
7		M (ALL)	LOSP for BOTH units
			Recover from the spurious SI, terminate when charging flow restored in ESP-1.1.

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

Draft of scenario #2 2005 NRC exam

OPERATING TEST HLT-29 NRC
SCENARIO 2 Summary sheet

Initial Conditions: 71% power, ramping off line @ 4 MW/MIN due to Hurricane warnings in effect. Winds in excess of 75 mph expected at the plant site in 4 hours need to be in mode 3 in 2 hours. EOL, B Train O/S, B Train protected. RCS boron concentration is 1196 ppm.

- 1A S/G tube leak approximately 20 gpd. Steady for 3 weeks.
- I&C is working on PT-457 which failed low last shift.
- LT-112 has failed low. I&C is working this failure.
- 1C D/G T/O for piston replacement. (OOS for 3 days, Expected RTS in 5 days)
- AOP-21, Severe Weather, is in effect due to Hurricane warning and high winds in the area.

Set in:
- 1A SG tube leak 20 gpd.
- 1B DG will not tie on bus on AUTOSTART.
- 1A Inverter does not transfer automatically to the bypass source
- PT-457 failed low.
- LT-112 failed low.
- PORV will not close from MCB
- MAKE SURE RCP breaker indication power supplies are on the solas as per current plant

Event 1 – Ramp down in power AT 4 MW/min.

Event 2 – PT464 fails low. Take manual control of the SGFP speed.

Event 3 – LT-459 fails low. This will cause Pzr heaters to turn off, letdown to secure and charging to increase. Take manual control of FCV-122.

Event 4 – Place letdown back in service and control charging and Pzr heaters.

Unit 2 Safety Injection

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

Event 6 – 1A 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 7– Dual unit LOSP. A Unit 2 SI has occurred that will dedicate the 1-2A DG to unit 2 on the LOSP. This will cause a complete loss of power on Unit 1 due to 1-2A DG going to U-2 and ECP-0.0 entry. The team can start 1B D/G or start 2C DG to restore power.

Recover from the spurious SI, terminate when charging flow restored in ESP 1.1.

AOP-16/ EEP-0/ ECP-0/ EEP-0/ESP-1.1

		SETUP	
EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
		Quick Setup IC (all items with # are included in IC)	NONE
0	0	IC-231 71 % RTP, MOL, B Train O/S Password: read-gto write - trg	RESET IC-231
0	0	Quick setup (all items with * are included): bat exam_nrc02.txt	
0	0	LT-112 has failed low XMT / LT112xmt failure / 0 / 60 sec	*
0	0	PT-457 has failed low XMT / PT457xmt failure / 1700	*
0	0	1A Inverter does not transfer to the bypass source MAL / mal-eps-invsa	*
0	0	1B DG will not auto start on SI or LOSP SET JDGBLK1B = TRUE for DG CMF malf / cBK1DG08_d_cc8 / open for breaker	*
0	0	1A SGTL of 20 gpd: Remote / B21 / irf LOA-RDS001 20	*
0	0	Tag out 1C DG output bkrs unit 1 Cmf remote / cBK1DHO7_d_cd1 / open	*
0	0	Tag out 1C DG output bkrs unit 2 Cmf remote / cBK2DHO7_d_cd1 / open	*
0	0	PORV-445A sticks open and will not close trgset 1 "rrc445a > 0.7" trg 1 "imf rrc445a-s 50"	*
			*
			[redacted] RUN simulator

		SETUP	
EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
		Place Hold tags on DH07-1 and -2	2 Hold tags
		Place 1C DG MSS in Mode 3	MSS in Mode 3
		Place Hold tag on 1C DG MSS in Mode 3	Hold tag
		Place Bypass & Inop status switches in up position	Emergency power both units A Trn
		Check Train On Service and protected signs	B TRN BOTH
		Check DEH for limiter limiting	DEH set correctly
0	0	**DEH**	Clear DEH alarms
0	0	**ARDA**	RESET ARDA
0	0	**PPC**	Place Grp 1 on MCB CRT
		PPC	Check for correct FLUX target
			Acknowledge annunciators
			Verify HORNS ON
			FREEZE simulator
		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**	Paperwork provided by evaluators

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
	0	**Begin Exam**	RUN simulator
		Verify Horns ON: hornflag	Verify Horns On
1		Ramp down in power	
2		PT464 fails low Xmt / imf pt464 / 0	
3		Lt-459 fails low Xmt / imf lt459 / 0	
4		Place letdown inservice	
		SI on Unit 2 [cSFTYINJ_cc21)] under MAL cmf Cmf malf / imf csftyinj_cc21 / closed	
5		PT-445 fails high xmt / imf pt445 / 2500 PORV will stick open. MOV isolation will have to be closed	
6		1A inverter fails and does not transfer to the bypass source. MAL / imf mal-eps-inva Restore 1A Inverter from the bypass source. Irf loa-eps001 true	
7		LOSP – both units Malf / imf mal-eps1 / 1	

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
		Recover from spurious SI, terminate when charging flow restored	HORNS OFF
		End of Exam	FREEZE simulator

Operator actions that may be called for or need to be done:

Restore Off-site power at step 10 of EEP-0.

Malf / imf mal-eps1 / 100

nitrogen to PORVs cae file

Communications sheet

Event 1 – Shift manager, Chem, GenCom & Systat notified of the ramp down and acknowledge.

Event 2 – Dispatcher for CR & Shift Manager notified of failure and acknowledge.

Event 3 – Dispatcher for CR, I & C for tripping Bistables, & Shift Manager notified of failure and acknowledge.

Event 4 – 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".

Booth: Announce Unit 2 Reactor Trip and Safety Injection.

Event 5 – Dispatcher for CR, I & C for tripping Bistables, & Shift Manager notified of failure and acknowledge.

Event 6 – Rover sent to check 1A Inverter and acknowledges.
Rover Reports –
- "The inverter is did not swap to the Bypass source and 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.

Event 7 – None.

Unit No. ***One***

Offgoing Supv.	Oncoming Supv.	☐N ☒D ☐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, EOL , 1196 ppm Cb, 10,000 MWD, Eq Xe*

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

Ramping off line at 4 MW/min due to hurricane warnings in effect IAW AOP-21.0, Severe Weather. OPS Manager direction is to be in Mode 3 in 2 hours.

General Information and Equipment Status

20 gpd SG tube leak in 1A SG, steady for the past 3 weeks. All actions of AOP completed.
1C DG tagged out for piston replacement (OOS for 3 days, RTS in 5 days)
LT-112 failed low. I&C is working the transmitter.
PT-457 failed low 30 minutes ago. I&C has been called to place B/S in trip.
Unit 2 is 40% power and ramping down to mode 3.

B train is the Protected Train
B train is on service
Current Risk Assessment is YELLOW

Waste Management Status #3 RHT O/S

LCO Status 3.8.1 (1C DG) 3.3.1 and 3.3.2 (PT-457)

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 Rpt Queue Rev.	AutoLog Reviewed
	☒ Yes	☒ Yes	☒ Yes	☒ Yes

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

Event Description: Commence ramp down in power at 4 MW/min
Initiating event: start of scenario

Time	Position	Applicant's Actions or Behavior
	BOP	Put in Ramp rate of 4 MW/min Co-ordinate with OATC to ramp and Press GO -potentially remove 1 SGFP from service depending on how long ramp goes.
	RO	Perform actions of UOP-3.1 -Control reactivity
	SRO	Ensure board operators take actions required by UOPs.

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

Event Description: PT-464 fails Low.
Initiating event: NRC signal

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize indications of PT-464 failure - SGFP speed drops to 3200 rpm Annunciators: - 1A , B, C SG LVL DEV (JF1,2,3) - 1A , B, C SG STM FLOW > FEED FLOW (JG1,2,3) Take manual control of BOTH SGFPs and restore speed Place Turbine on HOLD.
	RO	Refer to ARPs
	SRO	Direct placing Main Turbine on HOLD. Direct taking Manual control of the SGFP speed control.
	SRO	Refer to ARP and direct supplementary actions.

Op-Test No.: HLT-29 NRC Scenario No.: 2 Event No.: 3 Page 1 of 1

Event Description: LY-459 fails low
Initiating event: NRC signal

Time	Position	Applicant's Actions or Behavior
	RO	Annunciators in alarm: - PRZR LVL LO HTRS OFF LTDN SEC (HA3) - PRZR LVL DEV LO (HB2) - PRZR HTR CONTROL TRBL (HD4) Take manual control of charging and decrease flow. Select Przr level selector switch to a position that LT-459 will not affect control. III/II position Reduce charging flow to a minimum due to loss of letdown Adjust Seal injection flow
	SRO	Direct Manual control of FCV-122. Direct placing Turbine on HOLD. Refer to TS 3.3.1
	BOP	Place main Turbine on HOLD.

Op-Test No.: HLT-29 NRC Scenario No.: 2 Event No.: 5 Page 1 of 1

Event Description: PT-445 fails High – PORV will stick open
Initiating event: **NRC direction**

Time	Position	Applicant's Actions or Behavior
	ALL	- Recognize indications of PORV open Annunciators in alarm: - PRZR SAFETY VLV TEMP HI (HA4) - PRZR PORV TEMP HI (HA5) - PRZR PRESS HI-LO (HC1) - REL VLV 444B/445A OPEN (HE1) - PRZR PRESS REL VLV 445A OR B/U HTRS ON (HD1) Other indications: - PRT temp rising - Przr pressure dropping. - Sprays closing down
	BOP	- Obtain ARPs for guidance -
	RO	Attempt to close the PORV Close the MOV- 8000B to isolate the leak
	SRO	Direct actions required to stop Przr pressure decrease.
	SRO	Consult TS for low pressure – TS 3.4.1 RCS pressure, temperature and DNB limits Condition A Restore w/I 2 hours Consult TS for PORV OPRABILITY – TS 3.4.11 PORVs - Condition B – close block valve w/I 1 hour and remove power and restore PORV to operable in 72 hours.

Op-Test No.: HLT-29 NRC Scenario No.: 2 Event No.: 6 Page 1 of 1

Event Description: 1A Inverter fails and does not transfer to the Bypass source
Initiating event: NRC signal

Time	Position	Applicant's Actions or Behavior
	ALL	Recognize indications of 1A Inverter failure Annunciators: ▪ 1A INV FAULT (WD1) ▪ PR HI FLUX RATE ALERT (FC3) ▪ LTDN TO DEMIN DIVERTED- TEMP HI (DF1) ▪ LTDN DIVERTED TO RHT – VCT LVL HI (DF2) ▪ ESS VLVS OFF NORM (BJ4 and BH5) Indications: NI41 fail has no power Auto makeup starts 1ABat pump is running and both RMW pumps are running Cannot pull rods due to rod stop in. Can put rods in. LCV115B/D open – boration of RCS
	BOP	- Stop the ramp if in progress - Set in a ramp to decrease load to maintain Tavg and Tref on target. Call the Rover to check on the inverter Check ARP for WD1 among others.
	SRO	- Ensure board operators take ARP actions. - Direct decreasing charging flow and letdown to decrease boron and temperature drop. - Direct a ramp to maintain Tavg/Tref on target - Direct actions of ARP to swap the inverter using the manual Bypass source Direct closing RWST and opening VCT suctions when inverter restored. **If the crew does not take timely action, a conservative decision to Trip the reactor should be made here.**
	RO	- Reduce letdown to a minimum and reduce charging to a minimum due to RWST valves open - May decrease Seal injection to a minimum Stop auto makeup in progress
	SRO	TS 3.8.7 Inverters- OPERATING Condition A Restore W/I 24 hours 3.8.9 Distribution systems operating - while the vital panel is de-energized – Condition A restore w/I 8 hours

Op-Test No.: HLT-29 NRC Scenario No.: 2 Event No.: 7 Page 1 of 4

Event Description: LOSP entry into ECP-0.0 when 1B DG does not tie on and 1-2A DG goes to unit 2

Initiating event: NRC direction

Time	Position	Applicant's Actions or Behavior
* Critical	SRO	**Enter ECP-0 directly or enter EEP-0 and transition to ECP-0.**
	BOP	Recognize Loss of ALL AC BOP operator may see 1B DG running w/o SW supplied and shut it down. If this is done the team may elect to either restart 1B DG (preferred) or to start 2C DG
* Critical	SRO/BOP	Enter into ECP-0 and perform the following: ▪ Check Rx tripped ▪ Check turbine tripped ▪ Verify RCS isolated - isolate letdown ▪ Verify AFW flow > 395 gpm ▪ Verify load shed **Start 1B DG or 2C DG and align as necessary.** ▪ **Check 1G 4160V bus energized** ▪ **Verify SW adequate to DG running.** Return to procedure and step in effect.

Op-Test No.: HLT-29 NRC Scenario No.: 2 Event No.: 7 Page 2 of 4 Event Description: Spurious SI		
		Re-enter EEP-0 from ECP-0.0 Perform immediate actions of EEP-0: - Check Rx tripped RTBs & associated bypass bkrs open NI power falling Rod bottom lights lit - Check turbine tripped TSLB 2 14-1 thru 14-4 - Check 4160V busses energized - Check for a SI signal - Verify SW pump – 2 in each train - Verify CCW started CCW flow and SW flow - Verify Chg pump started - Verify RHR pump started - Verify SI flow FI-943 **RESTORE OFF SITE POWER** - Verify Ctmt Ventilation isolation - Verify CTMT fan cooler alignment - 1 CTMT fan in slow in one train with Emerg SW supplied - Verify AFW status - Verify Main FW status - Check NO MSL isolation signal present - Check Ctmt pressure <27 psig PR 950 - Verify Phase A ctmt iso Verify Ph A ctmt iso actuated Check all MLB-2 lights lit- No – one train power supply - Announce "Unit 1 reactor trip and Safety Injection" - Verify all Rx trip and bypass bkrs open - Trip CRDM MG set supply breakers - Check AFW status Total AFW flow > 395 gpm or any NR level >30% Control MDAFWP and TDAFWP flow for 30% to 60% NR level When two SG NR levels >25% and TDAFWP not required, stop TDAFWP

Op-Test No.: HLT-29 NRC Scenario No.: 2 Event No.: 7 Page 3 of 4

Event Description: Spurious SI

Time	Position	Applicant's Actions or Behavior
	CREW	- Verify two trains of ECCS equipment aligned **<u>One train</u>** of SI actuated due to power loss Bkrs DF01, DF02, DG15, & DG02 closed Two trains of battery chargers energized - one Two trains of ESF equip aligned – one All MLB-1 lights lit – one train Chg pump suction and discharge vlvs open One train post accident ctmt air mixing fans started - Secure secondary components ALL secured due to loss of power - Check RCS avg temp stable at or approaching 547°F - If heatup is in progress attempt to dump steam to condenser - If heat up continues, dump steam to atmosphere - Direct counting room to perform CCP-645, Main Steam Abnormal Environmental Release. - Check Pzr pressure & PORVs PRT parameters - Check RCP trip criteria; subcooling > 16 deg - Monitor chg pump miniflow criteria **<u>DIAGNOSTICS</u>** - Check SGs not faulted; no SG falling in uncontrolled manner or less than 50 psig - Check SGs not ruptured (Step 27) Secondary rad indication normal – No SG level rising in uncontrolled manner – - Check RCS intact – - **Continue on in EEP-0 to ESP-1.1 transition, SI Termination**

Op-Test No.: HLT-29 NRC Scenario No.: 2 Event No.: 7 Page 4 of 4

Event Description: Spurious SI

Time	Position	Applicant's Actions or Behavior
		Check SI termination criteria: Subcooling > 16 {45} deg in CETC mode - Secondary heat sink available - RCS pressure stable or rising - Pzr level > 7% {50%} -
* Critical	SRO	**Direct transition to ESP-1.1, SI Termination** Direct actions in ESP-1.1
	RO	Check SI, Phase A and B reset Restore normal charging **Anytime in this area would be a good time to secure the scenario**

SIMULATOR EXAM SCENARIO VALIDATION CHECKLIST

For any item on checklist that is marked NO, record comment on how item is to be resolved to enable exercise guide to be used for training.

YES	NO	
		1. Exam Scenario critical elements can be achieved by crew.
		2. Exam scenario can be performed within time constraints.
		3. Exam scenario Guide contains appropriate and sufficient:
		Instructor cues
		Field reports
		Simulator Commands
		Detail
		Termination point
		4. Simulator discrepancies do not negatively impact exam.
		5. Simulator responded in expected manner:
		Alarms
		Controls
		Trends and values
		6. Appropriate Technical Specifications referenced in exam scenario guide.
		7. Appropriate Emergency Classification identified in scenario guide.
		8. Procedures referenced in exam scenario guide could be used without deviation to accomplish objectives (unless deviation planned as part of exam).
		9. Reactivity control manipulations can be completed without procedural exceptions for credit per 10CFR55.46(c)(1)(ii).

Validation Date:	
Validation Members:	

COMMENTS:

NOTE: Attach a separate copy of this form to each scenario reviewed. This form is used as guidance for the examination team as they conduct their review for the proposed scenarios.

SCENARIO NUMBER:_____ REVIEWER:_____

Qualitative Attributes

☐		The scenario has clearly stated objectives in the scenario summary.
☐		The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue crew into expected events.
☐		The scenario consists mostly of related events.
☐		Each event description consists of-- • the point in the scenario when it is to be initiated • the malfunction(s) that are entered to initiate the event • the event termination point
☐		No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.
☐		The events are valid with regard to physics and thermodynamics.
☐		Sequencing/timing of events is reasonable, and allows for the examination team to obtain complete evaluation results commensurate with the scenario objectives.
N/A		If time compression techniques are used, scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.
☐		The simulator modeling is not altered.
☐		All crew competencies can be evaluated.
☐		The scenario has been validated.
☐		If the sampling plan indicates that the scenario was used for training during the requalification cycle, evaluate the need to modify or replace the scenario.

Quantitative Attributes

		Total malfunctions inserted: 4-8
		Malfunctions that occur after ERP entry: 1-4
		Abnormal Events: 1-2
		Major Transients: 1-2
		ERPs used beyond primary scram response ERP: 1-3
		ERP Contingency Procedures used: 0-3
		Approximate scenario run time: 45-60 minutes (one scenario may approach 90 minutes)
		EOP run time: 40-70% of scenario run time
		Crew Critical Tasks: 2-5
		Technical Specifications are exercised during the test

COMMENTS: _____

Southern Nuclear
J.M. Farley Nuclear Plant

Operations Training
Simulator Exam Scenario

HLT-29 NRC EXAM SCENARIO #3

Technical Review: _____ *Date:* _____

Training Department Approval: _____ *Date:* _____

SOUTHERN COMPANY

Energy to Serve Your World℠

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

DRAFT COPY

Facility: Farley Scenario No.: 3 Op-Test No.: HLT-29 NRC

Examiners: _____ Operators: _____

Initial Conditions: 100% power BOL; rods in AUTO; A Train O/S; B Train protected

Turnover: 1C D/G T/O for piston replacement, 1A MDAFW PUMP T/O for bearing replacement, 20 gpd SG tube leak in 1A SG, AOP-21, Severe Weather, is in effect due to severe thunderstorms in the area.

Event No.	Malf. No.	Event Type*	Event Description
0	**	preset	Block auto trip of Main Turbine.
0		preset	Block auto start of 1C Cond Pump on low SGFP Suction Pressure (will still start manually).
0		preset	Block autoPhase A (will actuate from handswitch).
0		preset	1A SG tube leak 20 gpd.
0		preset	Raise R-70A alarm setpoint to clear alarm per AOP-2
0		preset	1C DG DH07-1 and DH07-2 control power off
0		preset	1A MDAFW pump control power off
1		I (RO) I (BOP) TS (SRO)	PT-447 impulse pressure channel fails low.
2		N (BOP) R (RO) TS (SRO)	1C SG tube leak increases to 10 gpm over 5 min.
3		C (BOP)	1A HDT pump trips due to the HDT dump valve failing open.
4		I (RO)	LT-115 fails low.
5		I (RO)	PK444C demand fails high (in auto and maual) and 1A RCP spray valve sticks open mechanically.
6		M (ALL)	1C SGTR 500 gpm ramped in over 5 min. This is linked to FI414 <80% when RCS flow in A loop drops below 80%.
		C (ALL) C (BOP)	Phase A isolation will not occur on SI. Main Turbine has to be manually tripped.
			Terminate scenario when RCS pressure reduction complete and normal chg established

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

Draft of scenario #3 2005 NRC exam

OPERATING TEST HLT-29 NRC
SCENARIO 3 Summary sheet

Initial Conditions: 100% power; BOL, rods in AUTO; A Train O/S, B Train protected; RCS boron concentration is _____ ppm.

- 1C D/G T/O for piston replacement. (OOS for 3 days, Expected RTS in 5 days)
- 1A MDAFW PUMP T/O for bearing replacement. (OOS 5 hrs) Expected RTS in 2 days.
- 1A S/G tube leak approximately 20 gpd. Steady for 3 weeks.
- AOP-21, Severe Weather, is in effect due to severe thunderstorms in the area.

Set in:
- Block auto trip of Main Turbine.
- Block auto start of 1C Cond Pump on low SGFP Suction Pressure but will start manually.
- 1A SG tube leak 20 gpd.
- Phase A will not occur but will actuate from handswitch.
- 1A MDAFW pump T/O.
- 1C DG T/O.

Event 1 – PT-447 impulse pressure channel fails low. The OATC should place rods in manual; BOP will select PT-446 as the controlling channel. Recover rods and power/Tavg to normal.

Event 2 –1C SG tube leak increases to 10 gpm over 5 min. AOP-2.0 entry and ramp due to increased leak.

Event 3 –1A HDT pump trips due to the HDT dump valve failing open. Stby Cond. Pump won't start in auto. Start the stby cond pump and find the problem with the HDT valve. TB SO reports.

Event 4 – LT-115 fails low. Auto make up will start and the RO will have to take control of makeup.

Event 5 – PK444C demand fails high in auto and man. 1A Spray valve sticks open mechanically.

Event 6 – 1C SGTR 500 gpm SI ramped in over 5 min. Terminate scenario when RCS on normal chg.

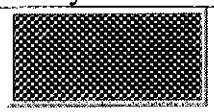
Phase A does not automatically occur. Main Turbine trip does not automatically occur.

AOP-2.0/ EEP-0/ESP-0.1/EEP-0/ EEP-3

SETUP

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
		Quick Setup IC (all items with # are included in IC)	NONE
0	0	Baseline IC: IC-233 85% RTP, BOL	RESET IC-233
0	0	Quick setup (all items with * are included): bat exam_nrc03.txt	
0	0	Phase A will not occur but will actuate from handswitch Block Phase A isolation occurring on SI Cmf malf / imf csftyinj_cr5	*
0	0	Block auto trip of Main Turbine Cmf malf / imf mal-tur2	*
0	0	1A SGTL of 20 gpd: Remote / B21 / / irf LOA-RDS001 20	*
0	0	Tag out 1C DG output bkrs unit 1 Cmf remote / cBK1DHO7_d_cd1 / open	*
0	0	Tag out 1C DG output bkrs unit 2 Cmf remote / cBK2DHO7_d_cd1 / open	*
0	0	Rack out 1A MDAFW pmp: CMFremote / cAFP01A_d_cd1 / open	*
0	0	1C Cond pump will not auto start Cmf malf / imf ccfcn1c_cc8 open Cmf malf / imf ccfcn1c_cc9 open Cmf malf / imf ccfcn1c_cc10 open	*
			RUN simulator
		Place Hold tags on DH07-1 and -2	2 Hold tags
		Place 1C DG MSS in Mode 3	MSS in Mode 3
		Place Hold tag on 1C DG MSS in Mode 3	Hold tag
		Place Hold tag on 1A MDAFW pump	Hold tag
		Raise R-70A alarm setpoint to clear alarm per AOP-2	Raise setpoint
		Place Bypass & Inop status switches in up position	Emergency power both units A Trn A Train AFW
		Check Train On Service and protected signs	B TRN BOTH
0	0	Check DEH for limiter limiting	DEH set correctly
0	0	**ARDA**	RESET ARDA
0	0	**PPC**	Place Grp 1 on MCB CRT
		PPC	Check for correct FLUX target

SETUP

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
			Acknowledge annunciators
			Verify HORNS ON
			 FREEZE simulator
		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**	Paperwork provided

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
	0	**Begin Exam**	[redacted] RUN simulator
		Verify Horns ON: hornflag [redacted]	Verify Horns On
1		PT-447 impulse pressure channel fails low. XMT / IMF PT447 / 0	
2		1C SG tube leak increases to 10 gpm over 5 min. MAL / IMF MAL-RCS4C / 10 / 300 sec	
3		1A HDT pump trips due to the HDT dump valve failing open. Malf / imf mal-fwm9 100	
4		LT-115 fails low. XMT / IMF LT115 / 0 / 15 sec	
5		PK444C fails high and sticks open mechanically. 1A RCP spray valve full open. CNH / IMF PK444C-B / 10	
6		1C SGTR 500 gpm after SI ramped in 5 min. MAL / IMF MAL-RCS4C / 500 / 300 sec Linked to RCS flow < 80% in BAT file	
		end scenario when RCS depressurized and on normal chg. **End of Exam**	HORNS OFF
		End of Exam	[redacted] FREEZE simulator

Operator actions:

Malf / imf mal-fwm9 1

Communications sheet

Event 1 – Dispatcher for CR, I & C for placing bistables in trip, & Shift manager informed and acknowledge.

Event 2 – None.

Event 3 – TB SO called to check out the 1A HDT level.
TB SO reports: "The HDT is low".

Later reports will include the Dump valve V915A is failed open. TBSO will be asked to jack the valve closed.
TB SO reports: " the HDT dump valve is jacked closed."

Event 4 –Rad side SO – when asked for VCT level locally
Radman – VCT level reads _____ . Whatever current reading is.

Event 5 – None.

Event 6 – None.

Event 7 – None.

Unit No. ***One***

Offgoing Supv.	Oncoming Supv.	☐N ☒D ☐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 *100% RTP, BOL , ????? ppm Cb, 5,000 MWD, Eq Xe*

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

Remain at 100% power

General Information and Equipment Status

AOP-21.0, Severe Weather, is in effect due to severe thunderstorms in the area.
20 gpd SG tube leak in 1A SG, steady for the past 3 weeks. All actions of AOP completed.
1C DG tagged out for piston replacement (OOS for 3 days, RTS in 5 days)
1A MDAFW PUMP tagged out for bearing replacement (OOS for 5 hrs, RTS in 2 days)
Current Risk Assessment is YELLOW
3 train is the Protected Train
A train is on service
Unit 2 is 100% power w/ no threats

Waste Management Status #3 RHT O/S

LCO Status 3.8.1 (1C DG) 3.7.5 (1A MDAFWP)

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 Rpt Queue Rev.	AutoLog Reviewed
	☒ Yes	☒ Yes	☒ Yes	☒ Yes

Op-Test No.: HLT-29 NRC Scenario No.: 3 Event No.: 1 Page 1 of 1 Event Description: PT-447, Selected Turbine 1st Stage Pressure Xmtr Fails LOW slowly Initiating event: 2 minutes		
Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications of 1st Stage Press failure - Rods stepping inward in Auto - MW electrical stable Annunciators: - MS LINE HI STM FLOW ALERT (JB4) - TAVG/TREF DEV (HF3)
	RO	Check loop temperatures and 1st stage pressures Determine 1st stage pressure instrument failure Shift rod control to Manual
	SRO / RO	Direct rods restored to normal rod height Restore rods to normal
	SRO	Refer to ARP and direct supplementary actions: Select other 1st stage press channel for control Match Tavg with Tref Refer to: - T.S. 3.3.1 / 17 f condition T - T.S. 3.3.2 / 4 e condition D

Op-Test No.: HLT-29 NRC Scenario No.: 3 Event No.: 2 Page 1 of 1 Event Description: 1C SGT leak 10 gpm ramped in over 5 minutes Initiating event: NRC signal		
Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications of Tube leak Annunciators: - (FG1) SG TUBE LEAK ABOVE SETPOINT - (FH1) RMS HI-RAD Control reactivity on the ramp IAW UOP-3.1
	BOP	▪ Call TB SO to place SJAE filtration on service ▪ Initiate ramp on Main turbine ▪ Call Chemistry and HP
	SRO / RO	Enter AOP-2.0, SG tube leak ▪ Maintain Przr level on program by reducing letdown or control charging ▪ Maintain VCT level >20% ▪ Monitor leak rate ▪ Inform SM for EIP entry ▪ Apply action level 6 and commence Ramp to 50% in 1 hour and to mode 3 in 2 hours after that.
	SRO	Refer to ARP and direct AOP-2.0 actions: Ensure Tech Specs addressed 3.4.13 RCS operational leakage

Op-Test No.: HLT-29 NRC Scenario No.: 3 Event No.: 3 Page 1 of 1

Event Description: 1A HDT pump trips due to V915A failing open
Initiating event: NRC signal

Time	Position	Applicant's Actions or Behavior
	BOP	Annunciators in alarm: - 1A OR 1B HDT PUMP TRIPPED (LA1) - SGFP SUCT PRESS LO (KB4) probable Send TBSO to check out HDT level and pump and dump valve.
	SRO	Reference the ARPs and find the problem
	BOP/RO	- Start the 1C Cond pump - Get level raised in the HDT and then restart the HDT pump - Secure the Cond pump when everything settles down

Op-Test No.: HLT-29 NRC Scenario No.: 3 Event No.: 4 Page 1 of 1 Event Description: LT-115 fails low slowly Initiating event: NRC signal		
Time	Position	Applicant's Actions or Behavior
	RO	• Recognize annunciators coming in to alarm. Annunciators • VCT LVL HI-LO (DF3) Action: Secure the auto makeup in progress
	SRO	Ensure operators take ARP actions
	SRO	Initiate investigation and repair.

Op-Test No.: HLT-29 NRC Scenario No.: 3 Event No.: 5 Page 1 of 1

Event Description: Continue ramp off line until ramp requirements met then go to event 5
event 5 PK-444C fails high and sticks open mechanically
Initiating event: NRC signal

Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications PK-444C - Green light off below PK444C - RCS pressure dropping - 1B spray full closed Annunciators - PRZR PRESS HI-LO (HC1) - PRZR PRESS REL VLV 445A OR B/U HTRS ON (HD1)
* Critical	SRO	Ensure board operators take ARP actions. - Direct operators to trip the reactor and stop 1A and 1B RCPs. - Do IA of EEP-0 - Control AFW flow to SGs

Op-Test No.: HLT-29 NRC Scenario No.: 3 Event No.: 6 Page 1 of 5

Event Description: SGTR 500 gpm over 5 minutes
Initiating event: Linked to RCS flow in A loop < 80% or Immediately after RCPs are secured

Time	Position	Applicant's Actions or Behavior
	BOP	- Recognize Main Turbine did not trip Trip Main Turbine
	SRO	Ensure board operators take Immediate actions of EEP-0 - Recognize a need for a Reactor Trip - Direct Turbine Trip
	RO/BOP	Perform immediate actions of EEP-0 without reference: - Check Rx tripped RTB's & associated bypass bkrs open NI power falling Rod bottom lights lit - Trip of Reactor – both handswitches - Trip of CRDM MG sets supply breakers - Check turbine tripped - Verify at least one train of 4160 V ESF busses energized - Check SI actuated
	ALL	Perform immediate actions of EEP-0: - Check Rx tripped RTBs & associated bypass bkrs open NI power falling Rod bottom lights lit - **Check turbine tripped** If main turbine is not tripped, an automatic SI will occur. - Verify at least one train of 4160 V ESF busses energized - Check SI actuated - Exit EEP-0 enter ESP-0.1, Reactor trip response
	All	ESP-0.1 actions (if needed, may continue in EEP-0) ⇒ Check RCS temperature stable at or approaching 547°F ⇒ Verify Feedwater status ⇒ Check emergency boration not required ⇒ Check AFW status ⇒ Check 4160V busses **The team should recognize SGTR and take action to manually SI the plant- If not an AUTO SI will occur.**

Op-Test No.: HLT-29 NRC Scenario No.: 3 Event No.: 6 Page 2 of 5

Event Description: 500 GPM SGTR
Initiating event: entry into ESP-0.1 or at step 4 of EEP-0 if SI initiated

Time	Position	Applicant's Actions or Behavior
	ALL	If in ESP-0.1: Recognize entry back to EEP-0 IAW foldout page requirements ⇒ Monitor SI criteria Pzr level >7% and 16°F Subcooled in the CETC mode
* Critical		Re-enter EEP-0 from ESP-0.1 FO page on Pzr level decreasing. Perform immediate actions of EEP-0: - Check Rx tripped RTBs & associated bypass bkrs open NI power falling Rod bottom lights lit - Check turbine tripped TSLB 2 14-1 thru 14-4 - Check 4160 V busses energized - Check for SI signal - Verify SW pumps – 2 in each train - Verify CCW started CCW flow and SW flow - Verify Chg pumps started - Verify RHR pumps started - Verify SI flow FI-943 - Verify Ctmt Ventilation isolation - Verify CTMT fan cooler alignments 1 CTMT fan in slow in each train with Emerg SW supplied - Verify AFW status - Verify Main FW status - Check NO MSL isolation signal present - Check Ctmt pressure <27 psig PR 950 - Verify Phase A ctmt iso Verify Ph A ctmt iso actuated **Check all MLB-2 lights lit – NO AUTO actuation of Phase A** - Announce "Unit 1 reactor trip and Safety Injection" - Verify all Rx trip and bypass bkrs open - Trip CRDM MG set supply breakers - Check AFW status Total AFW flow > 395 gpm or any NR level >30% Control MDAFWP and TDAFWP flow for 30% to 60% NR level When two SG NR levels >25% and TDAFWP not required, stop TDAFWP

Op-Test No.: HLT-29 NRC Scenario No.: 3 Event No.: 6 Page 3 of 5

Event Description: 500 GPM SGTR

Time	Position	Applicant's Actions or Behavior
	CREW	- Verify two trains of ECCS equipment aligned Both trains of SI actuated Bkrs DF01, DF02, DG15, & DG02 closed Two trains of battery chargers energized Two trains of ESF equip aligned All MLB-1 lights lit Chg pump suction and discharge vlvs open All post accident ctmt air mixing fans started - Secure secondary components Both heater drain pumps All but one cond pump Align backup cooling to cond pumps - Check RCS avg temp stable at or approaching 547°F - If heatup is in progress attempt to dump steam to condenser - If heat up continues, dump steam to atmosphere - Direct counting room to perform CCP-645, Main Steam Abnormal Environmental Release. - Check Pzr pressure & PORVs PRT parameters - Check RCP trip criteria; subcooling > 16 deg - Monitor chg pump miniflow criteria **DIAGNOSTICS** - Check SGs not faulted; no SG falling in uncontrolled manner or less than 50 psig *- Check SGs not ruptured (Step 27) Secondary rad indication normal – No SG level rising in uncontrolled manner – YES **Transition criteria to EEP-3.0**
* Critical		

Op-Test No.: HLT-29 NRC Scenario No.: 3 Event No.: 6 Page 4 of 5

Event Description: 500 GPM SGTR

Time	Position	Applicant's Actions or Behavior
	SRO	Direct transition to EEP-3 Inform SM of conditions and direct classifications
	BOP/RO	Recognize 1C S/G as the ruptured S/G
	CREW	Check RCP criteria; subcooled margin monitor > 16 deg subcooled in CETC mode
* Critical		* Identify ruptured SG - C Isolate flow from ruptured SG Align atmos rel vlv and verify closed Attempt to close Atmos Relief in Manual Iso TDAFWP steam supply from 1B SG at HSD pnl Verify blowdown isolated Verify MS iso and bypass vlvs closed When ruptured S/G > 31% Then isolate flow to ruptured S/G by isolating AFW Flow Check PORV's closed Check S/G's not faulted Check intact S/G level > 31% Reset SI Reset Phase A Reset Phase B Check IA to CONTAINMENT Verify 4160v Buses energized

Op-Test No.: HLT-29 NRC Scenario No.: 3 Event No.: 6 Page 5 of 5

Event Description: 500 GPM SGTR

Time	Position	Applicant's Actions or Behavior
	Crew	Check if LHSI pumps should be stopped - Secure both pumps Check ruptured S/G > 410 psig Perform an RCS cooldown - Use steam dumps at Maximum attainable rate - Stop cooldown Check Ruptured S/G pressure stable or rising Check Subcooled Margin Monitor > 36 deg F Reduce RCS pressure to minimize break flow Use normal spray and available PORV
		Reduce RCS pressure until 1 of the following 3 conditions occur: - RCS pressure < ruptured S/G pressure and Pzr level > 7% OR - Pzr level > 73% OR - SMM < 16 deg F - Close Sprays and PORV's * SI TERMINATION - Check SMM > 16 deg F - Check Secondary heat sink available - Check RCS pressure stable or rising - Check Pzr level > 7% Stop all but one Chg pump Continue with procedure until NRC recommends securing

Southern Nuclear
J.M. Farley Nuclear Plant

Operations Training
Simulator Exam Scenario

HLT-29 NRC EXAM SCENARIO #4

Technical Review: _____ *Date:* _____

Training Department Approval: _____ *Date:* _____

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Appendix D Scenario Outline Form ES-D-1

DRAFT COPY

Facility: Farley Scenario No.: 4 Op-Test No.: HLT-29 NRC
Examiners: _____ Operators: _____

Initial Conditions: 100% power. MOL; A Train O/S; B Train protected.
Turnover: 1C D/G T/O for piston replacement, I &C is working on PT-457 which failed low last shift. 20 gpd SG tube leak in 1A SG, AOP-21, Severe Weather, is in effect due to Severe thunderstorms in the area.

Event No.	Malf .No.	Event Type*	Event Description
0	**	preset	1A MDAFW Pump trips on over current when started. 1A MDAFW pump trips/ imf cafp01a_d_co2
0		preset	TDAFW pump trips on autostart. imf sic3405-f (1 0) set trigger 1 / trgset 1 "ni41b < 2"
0		preset	1B MDAFW Pump has degraded head. Low flow pmps / imf nafp01b-d / 30%
0		preset	1B EH Fluid pump has degraded head and fails to auto start. Pmps / imf nmshfpb-d / 50% malcmf/ imf cmshfpb_cc4 open
0		preset	1B CCW pump does not auto start on trip of C CCW pump. (can be manually started).
0		preset	PT-457 failed and bistables tripped
0		preset	1A SG tube leak 20 gpd.
0		preset	Raise R-70A alarm setpoint to clear alarm per AOP-2
0		preset	Remove control power from DH07-1 and DH07-2
1		C (ALL)	Load rejection (approx 20% load rejection) Malf / mal-turb18 / 745 mw
2		C (BOP) TS (SRO)	#4 GV fails open on load rejection. Malf / Mal-tur15h 100 90 120 set in
3		C (RO) TS (SRO)	1C CCW pump trips on Overcurrent. Cmf malf / cccp01c_d_cc13 / closed
4		I (RO)	FT-122 fails high Xmt / ft122 / 150 / 45 sec
5		C (BOP)	1B SGFP SK-509C speed decrease to 3200 rpm. Cnh / sk509c-a / 0
6a		C (BOP)	1B SGFP trips. AOP-13 entry- loss of one SGFP. Mal / mal-fwm11b
6b		R (RO)	Load reduction to 60% power because 1B SGFP tripped.
7		C (BOP)	EH Fluid pressure drops slowly. 1B EH Pump does not autostart, must be manually started. (1B EH Pump has degraded head) Cmfmalf / cmshfpa_cf1
8		M (ALL)	FRP H.1 entered when leave EEP-0 (step 4 directs to esp-0.1 for Reactor trip only) or directed (with SI). Terminate on exit to ESP-0.1 or ESP-1.1 if SI in progress.

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

OPERATING TEST HLT-29 NRC
SCENARIO 4 Summary sheet

Initial Conditions: 100% power; MOL, A Train O/S, B Train protected RCS boron concentration is _____ ppm.

Initial conditions
- 1A S/G tube leak approximately 20 gpd. Steady for 3 weeks.
- I&C is working on PT-457 which failed low last shift, Bistables are tripped.
- 1C D/G T/O for piston replacement. (OOS for 3 days, Expected RTS in 5 days)
- AOP-21, Severe Weather, is in effect due to Severe thunderstorms in the area.

Set in:
- 1A SG tube leak 20 gpd.
- PT-457 failed and bistables tripped
- 1C DG T/O.
- 1A MDAFW Pump trips on over current when started.
- TDAFW pump trips on autostart.
- 1B MDAFW Pump has degraded head. Low flow
- 1B EH fluid pump has degraded head and does not autostart.
- 1B CCW pump does not auto start on 1C CCW pump trip.
- #4 GV goes full open after load rejection and then closes, starts to oscillate.

Event 1 – Load rejection (approx 20% load rejection). AOP-17 entry AND RCS pressure may go low, but DNB TS entry is not applicable due to a transient >10%.

Event 2 – #4 GV goes full open, then shut, open etc., after load rejection. Call to isolate EH to #4 GV. TS entry.

Event 3 – 1C CCW pump trips on over current. Entry into AOP-9.0. 1B CCW pump does not auto start. 1B CCW pump must be manually started. TS addressed.

Event 4 – FT-122 fails High. Charging flow taken to manual control and Pzr level controlled in manual.

Event 5 – 1B SGFP SK-509C speed decreases to 3200 rpm. BOP takes manual control of 1B SGFP and raises speed.

Event 6 – 1B SGFP trips. AOP-13 entry- loss of one SGFP. Load reduction to 60% power because 1B SGFP tripped. This will have to be done in manual control.

Event 7 – EH Fluid pump trips, the other EH fluid pump does not auto start and when manually started has degraded head or trips. Rx trips on loss of both SGFPs and turbine trip.

Event 8 – FRP- H.1 entered when leaving EEP-0 (step 4 directs to ESP-0.1 for Reactor trip w/ no SI) or as directed in EEP-0 (with SI). Terminate on exit to ESP-0.1 or ESP-1.1 if SI in progress after FRP-H.1 complete. No EH avail for SGFP, so condensate flow is required to provide heat sink.

AOP-17/ AOP-9/ AOP-13/ EEP-0/ESP-0.1/FRP-H.1/EEP-0 or ESP-0.1

SETUP

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
		Quick Setup IC (all items with # are included in IC)	NONE
0	0	Baseline IC: 100% RTP, MOL	RESET IC-
0	0	Quick setup (all items with * are included): bat exam_nrc04.txt	
0	0	1A MDAFW Pump trips on over current when started. 1A MDAFW pump trips/ imf cafp01a_d_co2	*
0	0	TDAFW pump trips on autostart. imf sic3405-f (1 0) set trigger 1 / trgset 1 "ni41b < 2"	*
0	0	1B MDAFW Pump has degraded head. Low flow pmps / imf nafp01b-d / 30%	*
0	0	1B EH Fluid pump has degraded head. Pmps / imf nmshfpb-d / 100%	*
0	0	PT-457 failed low: Xmt /imf pt457 0	*
0	0	1A SGTL of 20 gpd: Remote / B21 / irf LOA-RDS001 20	*
0	0	Rack out 1C DG output breaker DH07-1: Cmf remote / irf cBK1DH07_d_cd1 open	*
0	0	Rack out 1C DG output breaker DH07-2: Cmf remote / irf cBK2DH07_d_cd1 open	*
0	0	1B CCW pump does not auto start Cmfmalf / imf ccp02a_d_cc7 or cc8	*
0	0	#4 GV goes full open after load rejection Mal / Mal-tur15h 100 90 120	*
			[redacted] RUN simulator
		Place Hold tags on DH07-1 and -2	2 Hold tags
		Place 1C DG MSS in Mode 3	MSS in Mode 3
		Place Hold tag on 1C DG MSS in Mode 3	Hold tag
0	0	**DEH**	Clear DEH alarms
0	0	**ARDA**	RESET ARDA
0	0	**PPC**	Place Grp 1 on MCB CRT
		PPC	Check for correct FLUX target

SETUP

EVENT#	TIME	EVENT DESCRIPTION / ACTION LIST	ACTIONS
		Place Bypass & Inop status switches in up position	Emergency power both units A Trn
		Check Train On Service and protected signs	B TRN BOTH
		Check DEH for limiter limiting	DEH set correctly
			Acknowledge annunciators
			Verify HORNS ON
			[redacted] FREEZE simulator
		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**	Paperwork provided

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
	0	**Begin Exam**	[redacted] RUN simulator
		Verify Horns ON: hornflag [redacted]	Verify Horns On
1		Load rejection (approx 20% load rejection) Malf / imf mal-tur18 / 745 mw	
2		#4 GV comes open 120 sec after load rejection and then closes and opens until the Team addresses the issue	
3		1C CCW pump trips on Overcurrent. Cmf malf / imf cccp01c_d_cc13 / closed	
4		FT-122 fails high Xmt / imf ft122 / 150 / 45 sec	
5		1B SGFP speed decreases to 3200 rpm. Cnh / imf sk509c-a 0 10	
6a		1B SGFP trips. AOP-13 entry- loss of one SGFP. Mal / imf mal-fwm11b	
6b		Load reduction to 60% power because 1B SGFP tripped.	
7		1A EH Fluid pump has degraded head. Pmps / imf nmshfpa-d / 90%	

EXAM

EVENT#	TIME	EVENT DESCRIPTION	COMMAND
8		FRP H.1 entered when leavING EEP-0 (step 4 directs to esp-0.1 for Reactor trip only) or directed (with SI). Terminate on exit to ESP-0.1 or ESP-1.1 if SI in progress FROM frp-H.1.	
		End of Exam	HORNS OFF
		End of Exam	FREEZE simulator

Local operator actions:

Communications sheet

'ent 1 – none

Event 2 –Dispatch TBSO to look at Main turbine GVs and TVs.

Report: TBSO: #4 GV is oscillating.

Later TBSO will indicate N1C23V629D and V565D is closed.

Event 3 – Disaptch ROVER to look at 1C CCW pump and breaker.
Reports from field.
ROVER: 1C CCW pump has no apparent problem.
DF04 has a tripped indication.

Event 4 – May dispatch the Radside SO to investigate FT-122 and/or FCV-122. Radside SO reports: "No apparent problem with FT-122 (and/or FCV-122). FCV-122 is closed".

Event 5 – May dispatch TB SO to investigate SGFP. TB SO reports: "The B SGFP GV is oscillating but no visual problem."

Event 6 – None.

vent 7 – May dispatch TB SO to investigate the EH pump. TB SO reports: "the 1A EH Pump has a burnt smell and is very hot to the touch. [when 1B is started] 1B EH Pump is running, but not producing any discharge pressure".

Rover will be asked to check out 1A and 1B MDAFW pump. Will also be asked to check TDAFW pump.

Rover: 1A MDAFW pump room smells like burnt insulation. DF10 is tripped on overcurrent.

1B MDAFW pump motor is running but the discharge pressure is low.

TDAFW pump overspeed trip linkage is broken. Will not be able to reset it.

TBSO will be asked to shut SGFP miniflows and open V509.

RAD side SO will be asked to open breakers for 3232 valves.

Reports consistent with above actions will be provided.

Unit No. ***One***

Offgoing Supv.	Oncoming Supv.	☐N ☒D ☐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 *100% RTP, MOL ,914 ppm Cb, 10,000 MWD, Eq Xe*

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

General Information and Equipment Status

AOP-21.0, Severe Weather, is in effect due to severe thunderstorms in the area.
20 gpd SG tube leak in 1A SG, steady for the past 3 weeks. All actions of AOP completed.
1C DG tagged out for piston replacement (OOS for 3 days, RTS in 5 days)
Current Risk Assessment is YELLOW
A train is the Protected Train
A train is on service
Unit 2 is 100% power w/ no threats
PT-457 failed, I & C working

Waste Management Status #3 RHT O/S

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 Rpt Queue Rev.	AutoLog Reviewed
	☒ Yes	☒ Yes	☒ Yes	☒ Yes

Op-Test No.: HLT 29 NRC Scenario No.: 4 Event No.: 1 Page 1 of 1

Event Description: Load Rejection (20%)
Initiating event: 2 minutes

Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications of Load Rejection - Rods stepping inward in Auto - MWs decreasing - Main Gen Throttle valves closing Annunciators: - TAVG/TREF DEV (HF3) - PRZR PRESS HI-LO (HC1) - SG LVL DEV (JF1, JF2, JF3)
	RO	- Check loop temperatures, Reactor Power, MWs, and 1st stage pressures - Shift rod control to Manual - When directed, restore Tavg & ΔI with rods & Bor/Dil
	BOP	- Check loop temperatures, Reactor Power, MWs, and 1st stage pressures - Place Turbine in Manual on DEH - Notice steam dumps arm & open - When plant stable and dumps shut, reset C-7
	SRO / RO	Directs AOP-17, Rapid Load Reduction, entry - Direct Tavg stabilized at existing value - Tavg & Rod height restored to normal via boration - Restore rods to normal
	SRO	Refer to ARPs and direct supplementary actions: Match Tavg with Tref May refer to DNB T.S. if RCS Press <2209 psig (**This T. S. Does not apply in this case due to a step power change >10%**): - T.S. 3.4.1

Op-Test No.: HLT 29 NRC Scenario No.: 4 Event No.: 2 Page 1 of 1

Event Description: #4 GV Slowly OPENS, then closes and continues until EH fluid is isolated to valve.
Initiating event: 120 sec after load rejection

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize indications of #4 GV oscillating Annunciators: - TAVG/TREF DEV (HF3) - PRZR PRESS HI-LO (HC1) - SG LVL DEV (JF1, JF2, JF3)
	SRO	Identify the problem Enter SOP-72 APP. 1, as well as other ARPs Direct isolating #4 GV EH fluid ▪ Close N1C23V629D and V565D ▪ **Enter TRM 13.3.3** for #4 GV failure. Determine cause and send out CR and repair teams
	RO	Assists BOP and looks at ARPs Controls reactivity

Op-Test No.: HLT 29 NRC Scenario No.: 4 Event No.: 3 Page 1 of 1

Event Description: 1C CCW pump trips on OC (1B CCW pump does not auto start)
Initiating event: NRC signal

Time	Position	Applicant's Actions or Behavior
	RO	Annunciators in alarm - 1C CCW PUMP OVERLOAD TRIP (AA3) - LTDN TO DEMIN DIVERTED-TEMP HI (DF1) - CCW FLOW FROM RCP OIL COOLERS LO (DD3) - Start 1B CCW Pump - Verifies flow & temps normal
	BOP	Assists RO
	SRO	May enter AOP-9.0, Loss of Component Cooling Water Addresses TS for 1C CCW pump tripping and 1B CCW pump NOT auto starting (Basis requires auto start capability) - 3.7.7 Condition Report for 1C CCW Pump

Op-Test No.: HLT 29 NRC Scenario No.: 4 Event No.: 4 Page 1 of 1

Event Description: FT-122 FAILS HIGH
Initiating event: NRC signal

Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications of FT-122 failing high Annunciators: - (EA2) CHG FLOW HI-LO Chg flow indication high, followed by pressurizer level decreasing Chg pump amps low Dispatch Radside SO to investigate FT-122 & FCV-122 Take manual control of Pressurizer Level to control at program level
	BOP	Assist RO
	SRO	Direct addressing ARPs Condition Report on FT-122

Op-Test No.: HLT 29 NRC Scenario No.: 4 Event No.: 5 Page 1 of 1

Event Description: 1B SGFP speed decreases to 3200 rpm
Initiating event: NRC signal

Time	Position	Applicant's Actions or Behavior
	RO	Assist BOP
	BOP	Recognize indications of SGFP speed failure - 1B SGFP speed decreasing - 1A SGFP speed increasing - Feed flow less than Steam flow - All SG levels affected similarly Annunciators: - (JF1, JF2, JF3) SG LVL DEV Action: - Manual control of SGFP speed to restore program ΔP - Dispatch TB SO to investigate SGFP
	SRO	Direct operators take ARP actions OSS informed SS should direct a ramp down in power to remove the SGFP from service. Initiate investigation and repair.

Op-Test No.: HLT 29 NRC	Scenario No.: 4	Event No.: 6	Page 1 of 1
Event Description:	1B SGFP trips and subsequent load reduction		
	Initiating event: NRC signal		

Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications for 1B SGFP Trip Annunciators: - (JF1, JF2, JF3) SG LVL DEV - (KC3) 1A OR 1B SGFP TRIPPED Actions: - Immediate Actions for AOP-13.0, Loss of Main Feedwater - Place Rods in Auto, or control in Manual during fast ramp - Borate as necessary
	UO	Recognize indications for 1B SGFP Trip Annunciators: - (JF1, JF2, JF3) SG LVL DEV - (KC3) 1A OR 1B SGFP TRIPPED Actions: - Immediate Actions for AOP-13.0, Loss of Main Feedwater - Ramp via DEH SGFP TRIP (red) pushbutton - Monitor SG Levels to recommend Reactor Trip if SG levels closely approach 28%
	SRO	Direct AOP-13.0 entry Ensure limits for continued operation are not exceeded during the transient. If AOP-13.0 limits for continued operation are exceeded, direct a manual reactor trip.

Op-Test No.: HLT 29 NRC	Scenario No.: 4	Event No.: 7	Page 1 of 3

Event Description: 1A EH pump has degraded head which causes EH pressure to drop slowly (1B EH pumpdoes not autostart and has degraded head when started)
Initiating event: NRC signal

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize the EH fluid pressure is dropping and that the 1B has not auto started. Annunciators: - EH FLUID SYS TRBL alarm (KG1) - DEH TRBL (LB1) Recognize Main Turbine and SGFP will trip Actions: - Start 1B EH pump (it will not develop pressure) - Manually Trip Main Turbine and SGFP IF time permits. - **Probable AUTO trip of SGFPs and Mn Turbine**
	SRO	Enter AOP-13 – Loss of SGFPs Ensure board operators take Immediate actions of AOP-13 & EEP-0 - Start 1B EH pump (it will not develop pressure) - Recognize a need for a Reactor Trip - Direct Reactor and Turbine Trip
	RO/BOP	Perform immediate actions of EEP-0 without reference: - Check Rx tripped RTB's & associated bypass bkrs open NI power falling Rod bottom lights lit Trip of Reactor - Check turbine tripped - Verify at least one train of 4160 V ESF busses energized - Check SI actuated
	ALL	Perform immediate actions of EEP-0: - Check Rx tripped RTBs & associated bypass bkrs open NI power falling Rod bottom lights lit - Check turbine tripped - Verify at least one train of 4160 V ESF busses energized - Check SI actuated - Exit EEP-0 enter ESP-0.1, Reactor trip response
* Critical	SRO	- **Recognize loss of all feedwater** - **Direct entry to FRP-H.1, Loss of Secondary Heat Sink** - **SGFP not available, condensate pump flow will be required**

Op-Test No.: HLT 29 NRC Scenario No.: 4 Event No.: 7 Page 2 of 3

Event Description: FRP-H.1 entry and steps

Time	Position	Applicant's Actions or Behavior
	ALL	Check Secondary heat sink required- - Check RCS pressure greater than nonfaulted SGs – NONE - Check RCS hot leg temps >350°F – yes Monitor Feed and Bleed criteris - Two SG WR levels > 12% - Przr pressure < 2335 psig Attachment 1 sent out to be completed CST level Try to establish AFW flow to at least 1 SG - Verfy SGBD isolated - Verify SGDB sample lines isolated - Verify all AFW pumps started – NO - Check AFW flow > 395 gpm – NO - RNO column Stop ALL RCPs Try to establish Main Feedwater flow to the SGs. (This cannot be done from the SGFPs due to the loss of EH system to supply oil to the valves) Some of the actions for the SGFP will be performed, then transition to step 9 for the condensate pump.
* Critical		**Try to establish condensate flow to the intact SGs** - Rest FW ISO - Attachment 1 - Verify all Main FW FCVs and Bypass FCVs closed in manual - Verify B/U cooling to the cond pumps is established - Have TBSO open V509 and Close V502A & B - Have Radside SO open breakers for 3232A, B, C - Reduce RCS pressure to <1950 psig using aux spray - Perform actions when <2000 psig – BLOCK LP SI and P-12 light lit actions - Use STM DUMPS to dump steam from the SGs at MAXIMUM rate to < 540 psig - Open Bypass FRVs to feed SGs

Op-Test No.: HLT 29 NRC Scenario No.: 4 Event No.: 7		Page 3 of 3
Event Description: FRP-H.1 entry and steps		
Time	Position	Applicant's Actions or Behavior
	ALL	Verify flow to at least one SG - SG WR levels RISING – YES - CETCs falling – YES
* Critical		**Go to procedure and step in affect** The crew should transition back to Step 4 of EEP-0 or to step 1 of ESP-0.1