FINAL SUBMITTAL

FARLEY INITIAL EXAM
50-348 & 50-364/2001-301

JULY 23 - 27, 2001

SCENARIOS

FINAL AS GIVEN
OPERATOR ACTIONS

F.1.g - FORM ES-D-2
OPERATOR ACTIONS

OPERATING TEST A
SCENARIO 2

Initial Conditions: 55% power, MOL, Equilibrium Xenon, A Train O/S

- 1-2A Diesel Generator OOS due to brush replacement (placed out of service 3 hours ago; expected back in 3 hours)
- 1 "C" S/G tube leak approximately 10 gpd. Steady for 3 weeks.
- 1A Boric Acid Transfer pump breaker tripped and will not stay closed (occurred 1 hour ago, still investigating)
- Secondary tube leak detection monitor for the 1B S/G (R-70-B) is de-energized and tagged out
- 1B CHG PUMP o/s to equalize run times

Ops Manager directions are to ramp up at 2 MW/min.
Severe Thunder Storm warning in effect in SE Alabama.
RWST TECH SPEC MIN LEVEL TRN A alarm failed on

Set in:

- IR N-35 under compensated 10 E-10 amps, no ramp
- PORV 444B sticks OPEN when at 90% open
- 1B charging pump trips on PT-459 spike.
- BLOCK auto SI signal.
- 1C HHSI Pump fails to auto start on SI.
- FI-943 is failed LOW.
- DF01 trip linked to SI – 2 min time delay
- RWST TECH SPEC MIN LEVEL TRN A alarm failed on

Event 1A – Start 1A SGFP

Event 1 – LT-459 spikes low. 1B charging pump trips on spike. Letdown isolates.
LINK - 1B chg pump trip to LCV 459 going closed
Manual start of 1A HHSI pump

Event 2 – Place Normal Letdown back in service per SOP-2.1 or AOP-16

Event 3 –1B SG Tube leak increases to 25 gpm slowly over a relatively short period of time. AOP-2 ramp down and shutdown

Event 4 – PT-444 fails high. PORV-444B will not CLOSE. RO has to close block valve.

Event 5 – 1B SGTR increases to 400 gpm – 600 second ramp.
Requires –

- manual SI - DF01 Trips when SI linked to SI with a 2 min time delay
- Manual start of 1C HHSI pump

SOP-2.1 or AOP-16 / AOP-2/ AOP-17/ UOP-3.1 / EEP-0 / EEP-3

OPERATING TEST A
SCENARIO 2
COMMUNICATIONS SHEET

Event 1A – Start 1A SGFP

Event 1 – LT-459 spikes low. 1B charging pump trips on spike. Letdown isolates.
LINK - 1B chg pump trip to LCV 459 going closed
Manual start of 1A HHSI pump

ROVER: 1B chg pump has an overcurrent trip.
RADMAN: 1B chg pump room smells like burnt rope.

Event 2 – Place Normal Letdown back in service per SOP-2.1 or AOP-16.

Event 3 –1B SG Tube leak increases to 25 gpm slowly over a relatively short period of time. AOP-2 / AOP-17 ramp down and shutdown

Event 4 – PT-444 fails high. PORV-444B will not CLOSE. RO has to close block valve.

Event 5 – 1B SGTR increases to 400 gpm – 600 second ramp.

Requires –

- manual SI - DF01 Trips when SI linked to SI with a 2 min time delay
- Manual start of 1C HHSI pump

Procedure use-
SOP-2.1 or AOP-16 / AOP-2/ AOP-17/ UOP-3.1 / EEP-0 / EEP-3

FIGURE 1

SHIFT SUPERVISOR RELIEF CHECKLIST

FARLEY NUCLEAR PLANT

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.

Unit Status

55%, MOL, Xenon increasing, A Train on service
Boron Concentration is 1072 ppm.

STPs/Evolutions (completed/in progress/**planned**)

Operations Manager instructions: Increase power at 2 MW/min.

UOP-3.1 has been completed thru step 5.1.4.8 Pre-start checks on the SGFP have been completed

General Information and Equipment Status

1-2A Diesel Generator is tagged out for brush replacement (OOS – 3 hours ago) Expected RTS – 3 hours

1A Boric Acid Transfer pump breaker tripped and will not stay closed (occurred 1 hour ago) still investigating.

1C S/G has a 10 gpd tube leakage. Steady for the past 3 weeks.

R -70B is Tagged out for I&C to replace the detector. RTS in 18 hours.

"RWST MIN TECH SPEC LVL TRN A" EG4 is in alarm –I&C invest.

1B CHG PUMP O/S to equalize run times

Severe Thunder Storm warning in effect for SE Alabama.

Waste Management Status

LCO Status

3.8.1 : 1-2A D/G

☒ Part II	P.O. Logbook, Chemistry Report, Shift Complement, Tag Order Index, reviewed as early in shift as possible			
☒ Part III	STP-1.0 reviewed/signed ☐ Yes	P.O. Logbook reviewed/initialed ☐ Yes	UO/OATC Logs reviewed/initialed ☐ Yes	Keys turned over ☐ Yes

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

Examiners: _____ Operators: SRO _____
RO _____
BOP _____

Objective: Evaluate applicant response to a S/G tube leak followed by a SGTR
Initial Conditions: (IC-13) 55%, MOL, ramping up, A Train on service. Boron Concentration is 1072 ppm.

Turnover:
1-2A Diesel Gen OOS for brush replacement (OOS 3.0 hr, ETR 3.0 hrs)
1A Boric Acid Transfer pump OOS due to the breaker tripping and will not stay closed (OOS 1 hr, investigating)
1C S/G has 10 gpd tube leak – steady for 2 weeks
Severe Thunderstorm warning in effect for southeast Alabama.
R-70B, Secondary tube leak detection monitor for 1B S/G is OOS.
RWST TECH SPEC MIN LEVEL TRAIN A annunciator is failed on.
Operations Manager directs a power increase at 2 MW/min

Event No.	Malf. No.	Event Type*	Event Description
0	IC-13	-------	55% MOL, ramping up, A Train on service.
0	PANELS/EPB/DF-08-1/CMF	------	RACKOUT BREAKER
0	PANELS/EPB/DF-08-2/CMF	------	RACKOUT BREAKER
0	PANELS/ EPB/ 4160V/ DF01	C	Breaker fault/ LINK / JPB455C = T with **2 MIN TIME DELAY**
0	PANELS/MCB/1A BA xfer pump/CMF	-----	RACKOUT BREAKER
0	PANELS/ MCB/ 1B HHSI PUMP/CMF	C	Breaker fault/ LINK to RCVL459 < 1
0	PANELS/ MCB/ 1C HHSI PUMP/CMF	C	DG07 / 2a open **and** SI seq open
0	PANEL/ MCB/ SI Trip switch/ CMF	C	Safeguards Output Card Trn A/ OPEN **and** Safeg Otpt Card Trn B/ OPEN
0	PANELS/ MCB/ ANUNCIATOR EG4	----	FAIL ON
0	PANELS/ MCB/ PI-943/ IMF / PT-943	I	FAIL LOW
0	PANELS/ MCB/ PORV444B/ CMF	C	PORV-444B sticks OPEN when at 88% - **options/ mech/ stick/ 88%**
0	IMF/LEVEL/PZR CONT/LT-459	C	CLEAR/ LINK to RCVL459 < 1
0	PANELS/ MCB/ 1A HHSI PUMP/CMF	C	86X DF07 / OPEN
0	IMF/ NI's / IR CH 1	I	LEVEL AMP/ -9 Link to SMSS < 40 Time Delay – 4 Minutes
0	SYSTEMS/MECH/BOP/1C S/G	-----	Set tube leak = 15 gpd.
0	IMF / rad monitors / R-4	------	RESET
0	NA	------	Tag 1-2A DG Unit 2 output
0	NA	------	Tag 1-2A DG Unit 1 output
0	NA	------	1-2A DG Mode selector switch in Mode 3; **Tag out 1-2A MSS**
0	NA	------	Tag 1A BAT Pump **and** place 1B BAT Pump in AUTO
0	NA	-----	Start 1B chg pump, secure 1A chg pump

0	Raise setpoint on R-70C	-----	Set to 20 gpd
0	NA	------	Place tag on R-70B and DE-ENERGIZE
Do not start scenario until data collection is set up			
1	IMF/PRESS/PRZR CONT	I(RO)	PT-444 Set=2500; Ramp 10s, PRZR Pressure Xmtr PT-444 Fails HIGH
2	IMF/LEVEL/PZR CONT/LT-459	I (RO) (SRO)	Set=0; 0s ramp, 20S DELAY. Selected Pzr level xmitter SPIKES LOW
3	Place Normal Letdown in service	N (RO) (SRO)	Use AOP-16 or ARP to place normal letdown in service.
4	SYSTEM/MECH/S/G B	N/R (ALL)	1B SG Tube Leak, SET= 25 GPM; Ramp 240s Requiring Controlled Shutdown.
5	SYSTEM/MECH/S/G B	N/R (ALL)	1B SG Tube Rupture, SET= 400 gpm; Ramp 600s
	IF 8000B IS OPENED in EEP-3.0, STEP 19.1, THEN TRIP BRKR FOR 8000B when it is opened PANELS/ MCB/ 8000B/CMF	-----	BREAKER TRIP

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

Do not reinit simulator until data is downloaded

Disable R-70B for this scenario as per below.

SPDS SETUP FOR R-70B – on SPDS, GO TO R-70B / point detail / select / password PPCS / execute / value / D / execute

D = disable
E = Enable

Enable R-70B after scenario is over.

Op-Test No.: A	Scenario No.: 2	Event No.: 1A	Page 1 of 1
Event Description:	Start SGFP 1A Initiating event: start of scenario		

Time	Position	Applicant's Actions or Behavior
	BOP/SRO	Start 1A SGFP IAW the following: (SOP-21.0 STEP4.4) • Verify controller 509B in manual / set to min. • Depress turbine latch PB • Open LP STOP VLV / HP STOP VLV • Trip SGFP • Latch SGFP • Open LP STOP VLV / HP STOP VLV • Roll SGFP to Minimum speed • Monitor vibs and TB wear limits • Transfer to Boiler control • Reset First out panel (calls TB SO) • Open SGFP DISCH VLV • Increase SGFP speed in manual • Transfer to AUTO control

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

Event Description: Pressurizer Level Transmitter LT-459 spike with resultant 1B charging pump trip.
Initiating event: 12 min from beginning of last event.

Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications of LT-459 spiking LOW and 1B chg pump trip: - Letdown secured - All Heaters off Annunciators: PRZR LVL DEV LO (HB2) PZR LVL LO B/U HTRS OFF LTDN SEC (HA3) CHG HDR FLOW HI-LO (EA2) CHG PUMP OVERLOAD TRIP (EB1)
	BOP	Place turbine on hold (if necessary)
	RO	Ensure automatic actions have occurred Start 1A charging pump Take manual control of charging flow and reduce flow to zero Adjust RCP seal injection flow as required Ensure Pressurizer Htrs are energized. Return level to the program band
	SRO	Ensure board operators take actions required by ARPs Consult Tech Specs Inform OSS Initiate investigation and repair of: - 1B Chg pump trip - Spike of LT-459 (if known) - 1A chg pump failure to auto start Possible Tech Specs: 3.5.2 and TR 13.1.3 and 13.1.5.

Op-Test No.: A	Scenario No.: 2	Event No.: 2	Page 1 of 1
Event Description:	Place Normal Letdown in service		

Time	Position	Applicant's Actions or Behavior
	SRO	Ensure board operators take ARP actions. - Restore Normal Letdown per SOP-2.1 or AOP-16
	RO	- Reestablish charging and letdown flow per SOP-2.1, CVCS Startup & Operation, Section 4.4 or AOP-16.0 – Place normal Letdown in service.
	BOP	Place Turbine on Hold if Necessary Direct CHM to remove ZAS from service Tech Spec evaluation in SOP-2.1 TS 3.5.5

Op-Test No.: A	Scenario No.: 2	Event No.: 3	Page 1 of 1
Event Description:	Steam Generator tube leak on 1B S/G 25 gpm Initiating event: NRC cue		

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize indications of S/G tube leak - Rad monitor alarms - FH1 RMS HI-RAD - Increased charging flow - Decreased VCT level
	SRO	Enter AOP-2.0 - Direct actions of AOP-2.0 - Inform OSS and contact CHM - Classify when necessary - Consult Tech Specs

	CREW	- Maintain Pzr level stable
		  - By controlling chg and excess letdown
		- Maintain VCT level >20%
		- Monitor leak rate
		- Perform classifications
		  - Perform action level 3 step 6
		- Reduce power to < or equal to 50% in 1 Hour and be in Mode 3 in the next 2 hours (3 hours total)
		- Place SJAE on service
		- Direct CHM to monitor the TB sumps
		- Identify affected S/G
		- When affected S/G identified, then isolate flow from affected S/G
		  - Verify atmospherics set at 8.25 in AUTO
		  - Closed
		  - Secure TDAFWP from 1B S/G
		  - Secure Blowdown

	RO/BOP	Perform shut down IAW AOP-2.0 using UOP-3.1/2.1and AOP-17 as necessary.

Op-Test No.: A	Scenario No.: 2	Event No.: 4	Page 1 of 1
Event Description:	Pzr pressure Xmtr PT-444 fails HIGH Initiating event: NRC DIRECTION		

Time	Position	Applicant's Actions or Behavior
	RO	Recognize failure of Pzr pressure Xmtr PT-444 - Both spray valves open - PORV PCV-444B opens Annunciators: - PRZR PORV TEMP HI (HA5) - PZR SAFETY VLV TEMP HI (HA4) - PRZR PRESS HI-LO (HC1) - PRZR CONT PRESS OUTPUT HI (HD3) - REL VLV 444B/445A OPEN (HE1) - PRT TEMP HI (HE3)
	SRO	Ensure board operators take immediate actions per ARPs Direct subsequent actions per ARPs
	RO	Determine actual Pzr pressure Attempt to close PORV PCV-444B, then close Block Valve Take manual control of heaters and spray valves; close spray valves Monitor actual pressure against DNB LCO (2209 psig) Return actual pressure to the normal band
	SRO	Notify I&C to determine the cause and correct the fault Inform OSS of conditions and make recommendations. Refer to LCOs 3.3.1 / 8 a, M and b, E 3.3.2 / 1 d, D 3.4.1and 3.4.11 / B

Op-Test No.: A	Scenario No.: 2	Event No.: 5	Page 1 of 4

Event Description: SGTR on B SG – 400 gpm
Initiating event: after ramp is initiated

Time	Position	Applicant's Actions or Behavior
	CREW	Recognize B SGTR: Refer to AOP- 2.0 Continuing action step 1&2 - Feedflow/steamflow mismatch for B SG - Increasing level in B SG - Air ejector, blowdown rad mon alarms - Decreasing RCS pressure and Pzr level Automatic Rx trip (if not performed by operators) Initiate Manual SI
	SRO	Enter EEP-0, Reactor Trip or Safety Injection Direct subsequent actions of EEP-0
___*___ Critical	RO/BOP	Perform immediate actions of EEP-0 without reference: - 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 * Initiate SI as Required by plant conditions
___*___ Critical	Crew	*- Start one Chg pump in each Train – amps > 0 This will have to be verified and is critical after loss of A Train bus Verify RHR pump started amps > 0 Check HHSI flow > 0 gpm - NO FI-943 failed low - perform RNO and/or recognize failure - Verify ctmt vent isolation Ctmt purge dampers - closed Mini purge dampers - closed Stop mini purge supp/exh fan - Verify ctmt fan cooler alignment At least one ctmt fan started in slow Associated emer SW outlet vlv open - Verify at least one SW train has 2 SW pumps started - Verify at least one CCW pump started - Verify AFW pumps started – amps >0 and flow to each SG > 0 gpm - Verify MFW status Verify MFW flow control & bypass vlvs closed Verify both SG feed pumps tripped Verify SG blowdown isolated - Check no MSL iso signal present - Check that ctmt press has remained < 27 psig

Op-Test No.: A	Scenario No.: 2	Event No.: 5	Page 2 of 4
Event Description:	SGTR on B SG – 400 gpm		

Time	Position	Applicant's Actions or Behavior
	CREW	- Verify Phase A ctmt iso Verify Ph A ctmt iso actuated Check all MLB-2 lights lit - 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 - Verify two trains of ECCS equipment aligned Both trains of SI actuated Bkrs DF01, DF02, DG15, & DG02 closed- RNO align 1C DG TO 1F BUS 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 deg - 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 - Check RCP trip criteria; subcooling > 16 deg - Monitor chg pump miniflow criteria - 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 - YES No SG level rising in uncontrolled manner – 1B S/G is rising
__*__ Critical		*** Crew should Transition to EEP-3**

On step 21.1 RNO the choice will be to allow 1C DG to be placed on U-1 - no extra help will be available

Op-Test No.: A	Scenario No.: 2	Event No.: 5	Page 3 of 4
Event Description:	SGTR on B SG – 400 gpm		

Time	Position	Applicant's Actions or Behavior
	SRO	Direct transition to EEP-3 Inform OSS of conditions and direct classifications
	BOP/RO	Recognize 1B S/G as the ruptured S/G
___*___ Critical	CREW	Check RCP criteria; subcooled margin monitor > 16 deg subcooled in CETC mode * Identify ruptured SG - B 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
___*___ Critical		Check PORV's closed - PORV 444B stuck open and was isolated with power removed * This PORV must not be unisolated per note above step 5.3 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 Check if LHSI pumps should be stopped - Secure both pumps Check ruptured S/G > 410 psig Perform and 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 **IF 8000B IS OPENED, THEN TRIP BRKR FOR 8000B**

Op-Test No.: A	Scenario No.: 2	Event No.: 5	Page 4 of 4
Event Description:	SGTR on B SG – 400 gpm		

Time	Position	Applicant's Actions or Behavior
—*— Critical	Crew	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**

Op-Test No.: A	Scenario No.: 2	Event No.:	Page of
Event Description: Classification			

Time	Position	Applicant's Actions or Behavior
Alert classification based on **A2.1** – SGTR indicated by ECCS Actuation and high secondary coolant activity.		

OPERATING TEST A
SCENARIO 1

Initial Conditions: 100% power, BOL, Equilibrium Xenon, A Train O/S

- 1 B Diesel Generator OOS due to brush replacement (placed out of service 5 hours ago; expected back in 1.5 hours)

☐ 1 "C" S/G tube leak approximately 10 gpd. Steady for 3 weeks.
☐ 1B EH Fluid pump is OOS due to discharge flange leak (placed out of service approximately 2 hours ago; expected back in 1 hour)
☐ Secondary tube leak detection monitor for the 1B S/G is OOS (R-70-B) – t/o

Ops Manager directions are to remain at 100% power.
Severe Thunderstorm warning in effect in SE Alabama.
Accomplish STP-22.19 this shift.

Set in:

- Rx trip breakers will not open.
- CRDM's will not trip when switch operated. ATWT EVENT- S.1.
- 1B CCW Pump will not AUTO-START when 1C CCW Pump trips.
- MSIV's will not AUTOMATICALLY CLOSE.
- Fuel element failure when Main Turbine trips. Or close to this.
- TDAFW Pump will not AUTO-START.

Event 1 – STP- 22.19, AFW Flow Path verification

Event 2 – PT – 447 Impulse pressure fails low **slowly**. Stm Dump fails to ARM.
Rods to MANUAL
Select out channel

Event 3 –1C CCW Pump trips. 1B CCW PUMP fails to AUTO START.
UO required to start 1B CCW Pump

Event 4 – LT– 459 fails LOW. SLOW failure.

Event 5 – EH Fluid leak on 1A SGFP
AOP-17 / UOP-3.1 S/D due to imminent loss of SGFP and/or turbine trip.

Event 6 –1A EH FLUID Pump trips. ATWT EVENT / TDAFW pump will not auto start.

– Steam Line Break outside containment (1 E6) / UPSTEAM of MSIV's.

AOP-9/AOP-17/UOP-3.1/EEP-0/S.1/ESP-0.1/EEP-0/ EEP-2/EEP-1

OPERATING TEST A
SCENARIO 1
COMMUNICATIONS SHEET

Event 1 – STP- 22.19, AFW Flow Path verification

Event 2 – PT – 447 Impulse pressure fails low slowly.

Event 3 –1C CCW Pump trips. 1B CCW PUMP fails to AUTO START.
RO required to start 1B CCW Pump
ROVER reports overcurrent trip on 1C CCW Pump and strong insulation smell at pump

Event 4 – LT– 459 fails LOW. SLOW failure.

Event 5 – EH Fluid leak on 1A SGFP.

When Turbine Building SO paged:

- TB SO – Level in the EH reservoir is low. I have started a make-up and level appears to be rising.

After discussion and sent to look for this.

- There is a small EH fluid leak on 1A SGFP. It looks like it can be isolated.

When SSS-plant is paged:

- We can isolate the leak but it will isolate EH fluid to the SGFP.

Event 6 –1A EH FLUID Pump trips. ATWT EVENT / TDAFW pump will not auto start. This will initiate a FEF.

- If asked about R-4 alarm:
  Radman: I went into area and R-4 is alarming. My DAD upscaled and I left.
  HP TECH: There are high radiation levels in the vicinity of 1C chg pump.

Event 7 – MSLB outside containment (1 E6)/UPSTEAM of MSIV's.

If asked:

- DB or Rover will tell OATC / UO of steam coming out of MSVR.
- Chm notifies CR of FEF through sample results if asked.

Procedures used:
AOP-9/AOP-17/UOP-3.1/EEP-0/FRP-S.1/ESP-0.1/EEP-0/ EEP-2/EEP-1

FIGURE 1

SHIFT SUPERVISOR RELIEF CHECKLIST

FARLEY NUCLEAR PLANT

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.

Unit Status

100%, BOL, Equil. Xenon, A Train on service.
RCS boron concentration is 1156 ppm

STPs/Evolutions (completed/in progress/**planned**)

Operations Manager instructions: remain at 100% power
Perform STP-22.19, AFW Flow path verification immediately after turnover in order to remove the TDAFW pump from service for PM's.

General Information and Equipment Status

1B Diesel Generator is tagged out for brush replacement. (OOS - 5 hours)
Expected RTS in 1.5 hours
1C S/G has a 10 gpd tube leakage. Steady for the past 3 weeks.
R -70B is Tagged out for I&C to replace the detector. RTS in 18 hours.
1B EH Fluid pump OOS due to discharge flange leak. (OOS - 2 hours).
Expected RTS in 1 hour
Severe Thunder Storm warning in effect for SE Alabama.

Waste Management Status

LCO Status

3.8.1 : 1B D/G

☒ Part II P.O. Logbook, Chemistry Report, Shift Complement, Tag Order Index, reviewed as early in shift as possible

☒ Part III	STP-1.0 reviewed/signed	P.O. Logbook reviewed/initialed	UO/OATC Logs reviewed/initialed	Keys turned over
	☐ Yes	☐ Yes	☐ Yes	☐ Yes

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

Examiners: Operators: SRO

RO

BOP

Objective: Evaluate applicant response to a ATWT followed by a steam line break outside containment with a fuel element failure

Initial Conditions: (IC-8) 100%, BOL, Equil Xenon, A Train on service. Boron Concentration is 1156 ppm.

Turnover: 1B Diesel Gen OOS for brush replacement (OOS 5 hr, ETR 1.5 hrs)
1B EHC pump OOS due to a discharge flange leak (OOS 2 hr, ETR 1 hr)
1C S/G has 10 gpd tube leak – steady for 2 weeks
Severe Thunderstorm warning in effect for southeast Alabama.
R-70B, Secondary tube leak detection monitor for 1B S/G is OOS.

Event No.	Malf. No.	Event Type*	Event Description
0	IC-8	-------	100% BOL, Equil. Xenon, A Train on service.
0	PANELS/EPB/DG-08-1/CMF	------	RACKOUT BREAKER
0	PANELS/MCB/1B CCW PUMP	C	2a DF04 / open – Fail autostart feature
0	PANELS/MCB/1B EH PUMP/CMF	-----	Control power / FAIL
0	PANELS/MCB/MSIV/3369A	C	K616/ open - FAIL TO AUTO CLOSE
0	PANELS/MCB/MSIV/3370A	C	K616/ open - FAIL TO AUTO CLOSE
0	PANELS/MCB/MSIV/3369B	C	K616/ open - FAIL TO AUTO CLOSE
0	PANELS/MCB/MSIV/3370B	C	K616/ open - FAIL TO AUTO CLOSE
0	PANELS/MCB/MSIV/3369C	C	K616/ open - FAIL TO AUTO CLOSE
0	PANELS/MCB/MSIV/3370C	C	K616/ open - FAIL TO AUTO CLOSE
0	PANEL/MCB/Rx Trip switch/CMF/trip brkrs	C	Fail A and B reactor trip breakers closed
0	PANEL/ MCB/ A CRDM/ CMF	C	Breaker trip/ Fail
0	System/ Mech/ Bop/ TDAFW/ 3226/ CMF	C	WR-11 (right side one of two) / OPEN
0	SYSTEMS/MECH/BOP/1C S/G	-----	Set tube leak = 10 gpd.
0	IMF/ Rad Monitors/ R-4	------	RESET
0	IMF/ PRESS/ STM HDR	C	STM DUMPS FAIL TO ARM
0	FUEL FAILURE	C	Set=(.3) Fuel Failure. LINK TO SMSS < 40 / TIME DELAY OF **5 MIN**.
0	NA	-----	Tag 1B DG Unit 1 output
0	NA	------	1B DG Mode selector switch in Mode 3 **and** Tag out MSS
0	NA	-----	Tag 1B EH Fluid pump / Place in stop
0	Raise setpoint on R-70C	-----	Set to 20 gpd

0	NA	------	Place tag on R-70B and DE-ENERGIZE
Do not start scenario until data collection is set up			
1	Perform STP-22.19	N(BOP) (SRO)	AFW Flow path verification / Provide STP-22.19
2	IMF/PRESS/TURBINE IMP PRESS/PT-447	I (RO) (SRO)	Selected Turbine 1st Stage Pressure SET = 0%; Ramp 120s. Xmtr Fails LOW
3	PANELS/MCB/1C CCW PUMP/CMF	C(BOP) (SRO)	1C CCW PUMP 50G TRIP .
4	IMF/LEVEL/PZR LVL CONT/LT-459	I (RO) (SRO)	Set=0; 120s ramp. Selected Pzr level xmitter fails LOW
5	PANELS/MCB/ANNUN KG1	C/R (ALL)	ALARM – EH Fluid leak on 1A SGFP
6	PANELS/MCB/ANNUN KG2 PANELS/MCB/1B EH PUMP/CMF	I (ALL)	ALARM – when desired ramp is reached **per NRC**, bring into alarm KG2 Clear this alarm after 8 min of filling. Reinitiate 3 min later **Then** trip EH pump 1A EH PUMP/ 600V BRKER/ OPEN
6	IMF/ Rad Monitors/ R-4	------	CLEAR / **AFTER REACTOR TRIP AND PROIR TO FEF**
6A	SYS/MECH/BOP/1C S/G	M	Set=1 E6; ramp=180 sec stm line break outside containment upstream of MSIV's

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

Do not reinit simulator until data is downloaded

Disable R-70B for this scenario as per below.

SPDS SETUP FOR R-70B – on SPDS, GO TO R-70B / point detail / select / password PPCS / execute / value / D / execute

D = disable
E = Enable

Enable R-70B after scenario is over.

Op-Test No.: A	Scenario No.: 1	Event No.: 1	Page 1 of 1
Event Description:	STP-22.19, AFW Flow path verification, is performed. Initiating event: SRO direction per Turnover sheet to verify MDAFWP's OPERABLE in preparation to tag out TDAFWP		

Time	Position	Applicant's Actions or Behavior

	BOP	**Partial performance of this STP is ACCEPTABLE**
		
		Perform STP-22.19
		- Fully close FCV's 3227A, B and C
		- Start 1A MDAFWP
		- Verify proper pump start
		  - Amps
		  - Discharge pressure increase
		- Control flow and record values
		- Start 1B MDAFWP
		- Verify proper pump start
		  - Amps
		  - Discharge pressure increase
		- Stop 1A MDAFWP
		  - Verify amps fall to zero
		- Control flow and record values
		- Stop the 1B MDAFWP
		  - Verify amps fall to zero
		- Verify all FCV's are in MOD
		- Verify all FCV's are at 100% demand and full open

	SRO	Review STP and verify proper ACCEPTANCE CRITERIA

OSS: If asked, Do what the procedure tells you to do.

Op-Test No.: A	Scenario No.: 1	Event No.: 2	Page 1 of 1
Event Description:	PT-447, Selected Turbine 1st Stage Pressure Xmtr Fails LOW slowly Initiating event: NRC signal		

Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications of 1st Stage Press failure - Rods stepping inward in Auto Annunciators: - MS LINE HI STM FLOW ALERT (JB4) - TAVG/TREF DEV (HF3) - BANK D FULL ROD WTHDRL AUTO ROD STOP (FD5) possible
	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
	RO/SRO/BOP	May notice: - BYP and PERMISSIVE PANEL C-7A interlock light illuminated - Steam dumps do not arm

Op-Test No.: A	Scenario No.: 1	Event No.: 3	Page 1 of 1
Event Description:	1C CCW Pump trips Initiating event: Time During rod restoration		

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Recognize indications of 1C CCW Pump trip. - Loss of CCW flow to A Train - Amber light above 1C CCW handswitch and green light lit Annunciators - 1C CCW PUMP OVERLOAD TRIP (AA3) - CCW FLOW FROM RCP OIL CLRS LO (DD3) - LTDN TO DEMIN DIVERTED – TEMP HI (DF1) possible
	SRO	Ensure board operators take ARP actions. - Ensure AOP-9.0 actions taken Ensure Tech Specs addressed (3.7.7)
	BOP	- AOP-9.0 actions taken - Verify start of 1B CCW Pump - Verify proper flow - Check SW supply to on service CCW train - AVAILABLE
	SRO	Initiate investigation and repair. Pursue racking out DF04 – 1C CCW Pump supply breaker per ARP

AFTER EVENT:

SRO QUESTION: What is the status of CCW system based on Initial conditions and the event that occurred?
Is it OPERABLE/INOPERABLE? What TS actions apply?

1C CCW pump tripped and is INOPERABLE. 1B CCW pump did not auto start for 1C CCW pump and needs to be tested to determine OPERABILTY, ie, will it autostart on SI/LOSP.
At present it is an Admin with a possible loss of both pumps and therefore 1 train. 3.7.7 condition A.

Op-Test No.: A	Scenario No.: 1	Event No.: 4	Page 1 of 1
Event Description:	Pressurizer Level Transmitter LT-459 fails LOW Initiating event: Time (8 min)		

Time	Position	Applicant's Actions or Behavior
	RO	Recognize indications of LT-459 Failing LOW: - charging flow increasing. - VCT level decreasing - Seal inj flow decreasing - Possible auto make-up - Pressurizer level trend up - Letdown secured - Back-up heaters off Annunciators: - PRZR LVL DEV LO (HB2) - PZR LVL LO B/U HTRS OFF LTDN SEC (HA3) - CHG HDR FLOW HI-LO (EA2) - PZR HTR CONT TRBL (DD4) - RCP SEAL INJ FLOW LO (DD1) possible
	BOP	Place turbine on hold (if necessary)
	RO	Determine actual Pzr level deviation Ensure automatic actions have occurred Take manual control of charging flow and reduce flow to zero – if necessary Adjust RCP seal injection flow as required Shift to alternate Pzr level transmitter LT-461/460 Reestablish charging and letdown flow per SOP-2.1, CVCS Startup & Operation, Section 4.4 or AOP-16.0 – if necessary Ensure Pressurizer Htrs are energized. Return level to the program band
	SRO	Ensure board operators take actions required by ARPs. - May enter AOP-16 to restore letdown
	SRO	Consult Tech Specs: - 3.3.1 / 9 condition M - 3.3.3 / 7 condition F - admin for post accident monitoring Investigate and call for repairs and inform OSS

Op-Test No.: A	Scenario No.: 1	Event No.: 5	Page 1 of 1

Event Description: EH FLUID LEAK – annunciator KG1 in alarm
Initiating event: Time (6 min)

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize annunciator in alarm Annunciators: - EH FLUID SYS TRBL (KG1) Call TB SO to locate problem
	SRO	- Ensure ARP actions taken
	BOP	Upon receiving call from TB SO report to SRO conditions of losing EH fluid from 1A SGFP and make up to the EH System is in progress, maintaining level steady at present.
	SRO	Evaluate situation and order ramp to 60%. - Enter AOP – 17, RAPID LOAD REDUCTION - may enter AOP-13, LOSS OF MFW ramp would be very quick.

	All	Co-ordinate to ramp unit to 60% per AOP-17.
		- Auto rod control
		- Reduce turbine load at desired rate
		- Maintain Tavg/Tref w/i 5 deg F
		- Maintain Delta I w/i limits
		- Control
		  - SGWL
		  - Przr level
		  - pressure
		  within limits.

When desired ramp is reached, bring KG2 into alarm per NRC signal to initiate next event.

Make leak progressively worse.

Op-Test No.: A	Scenario No.: 1	Event No.: 6	Page 1 of 4

Event Description: 1A EH FLUID PUMP TRIPS
Initiating event: when unit has been ramped down and KG2 is in alarm as directed by NRC

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize annunciator KG2 in alarm - EH FLUID LEVEL LO-LO (KG2) Recognize indications of 1B EH Fluid pump tripping: - Lowering pressure of EH Fluid system - Possible turbine throttle and governor valves going shut - Possible SGFP trip Annunciators: - DEH TRBL (LB1) - EH FLUID SYS TRBL (KG1) - TURB AUTO STOP OIL TURB TRIP (GH2) - RX TRIP CAUSED BY TURB TRIP (GF4)
	SRO	Ensure board operators take Immediate actions of EEP-0 - Turbine trip without a Reactor Trip - Direct trip of Reactor – both handswitches - Direct trip of CRDM MG sets supply breakers Direct entry into FRP-S.1
* Critical	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 * Enter FRP-S.1 Drive rods in AUTO (>48 spm) or MANUAL
* Critical * Critical	ALL	- Check turbine tripped - * Verify AFW pumps running (TDAFW PUMP will not AUTO start) - * Emergency Borate - Establish adequate charging flow/letdown flow - Verify containment ventilation isolated - Check Rx trip brkers open – call for Rover to open – (wait 3 min. from call) - Check turbine stop valves closed - Monitor CST level - Check S/G levels > 31% - Verify dilution flow paths isolated - Check for uncontrolled cooldown - Check S/G's not faulted - Check CETC's < 1200 deg F - Check if Rx critical - Transition to EEP-0

Op-Test No.: A	Scenario No.: 1	Event No.: 6	Page 2 of 4
Event Description:	STEAM LINE BREAK OUTSIDE CONTAINMENT / UPSTREAM OF MSIV'S with Fuel Element Failure Initiating event: Transition to EEP-0		

Time	Position	Applicant's Actions or Behavior
	CREW	MSIV's may be closed when CREW determines a steam leak exists. RE-Enter EEP-0 Perform 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 Direct subsequent actions of EEP-0 **OR** - Transition to ESP-0.1 **Approx. step 6 of ESP-0.1, initiate steam break**
* Critical		* When Pzr level decreases to 7%, Verify SI actuated per foldout page and return to EEP-0 **The Team should recognize the rad monitors in alarm and diagnose a FEF.** - 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 Direct subsequent actions of EEP-0 - Verify one CHG PUMP in each train started – amps > 0 - Verify at least one RHR pump started – amps > 0 - Check SI flow - HHSI FLOW > 0 gpm - RCS pressure < 265 psig - LHSI flow >1500 gpm
* Critical		-* Verify ctmt vent isolation Ctmt purge dampers - closed Mini purge dampers - closed Stop mini purge supp/exh fan - Verify ctmt fan cooler alignment At least one ctmt fan started in slow Associated emer SW outlet vlv open

Op-Test No.: A Scenario No.: 1 Event No.: 6 Page 3 of 4

Event Description: STEAM LINE BREAK OUTSIDE CONTAINMENT / UPSTREAM OF MSIV'S with Fuel Element Failure

Time	Position	Applicant's Actions or Behavior
_____* Critical	CREW	- Verify at least one SW train has 2 SW pumps started - Verify at least one CCW pump started - Verify AFW flow to each SG > 0 gpm and amps >0 - Check TDAFWP start required Verify MFW status Verify MFW flow control & bypass vlvs closed Verify both SG feed pumps tripped Verify SG blowdown isolated * - Check no MSL iso signal present - if present MSIV's need to be manually closed - Check that ctmt press has remained < 27 psig - Verify Phase A ctmt iso Verify Ph A ctmt iso actuated Check all MLB-2 lights lit - 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 - 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 Two SW pumps running in both SW trains 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 deg **RNO** - Verify stm dumps closed. - Atmospherics closed - Isolate TB loads - Minimize AFW flow - Close MSIV's - Check Pzr pressure - Check RCP trip criteria; subcooling > 16 deg - Monitor chg pump miniflow criteria

Op-Test No.: A	Scenario No.: 1	Event No.: 6	Page 4 of 4
Event Description:	STEAM LINE BREAK OUTSIDE CONTAINMENT / UPSTREAM OF MSIV'S with Fuel Element Failure		

Time	Position	Applicant's Actions or Behavior
_____ Critical		Check SGs not faulted; no SG falling in uncontrolled manner or less than 50 psig CREW should transition to EEP-2.0
	CREW	Recognize MSL break: - increased steam flow for conditions - increased feeding to S/G's - Decreasing level in all SG's - Decreasing RCS pressure and Pzr level as well as high cooldown rate - Possible SI (if MSIV's not closed by operators)
	SRO	Direct transition to correct procedure EEP-2
_____ Critical	CREW	Enter EEP-2 - Perform actions of EEP-2 - Verifiy all MSIV's shut, if not previously done - Check S/G's not faulted - Identify faulted S/G's - Isolate all faulted S/G's - Isolate AFW flow to all faulted S/G's - Monitor CST level - Check secondary Radiation - Transition to EEP-1
_____ Critical	SRO	Direct Transition to EEP-1 - Update and Inform OSS of plant conditions

End at step 10 of EEP-1.0

Op-Test No.: A	Scenario No.: 1	Event No.:	Page of
Event Description: Classification			

Time	Position	Applicant's Actions or Behavior
Site Area classification based on **S5.2** – Transients requiring operation of shutdown systems with a failure to trip (continued power operation but no core damage immediately evident) **S3.1** (Possible) might be checked also IF they recognize the FEF and IF they evaluate using Figure 8. Depending on how long the scenario is run which could show a high SI flow and the reading on R-27A might indicate elevated, figure 8 may yield > 300 microCuries/gram.		