

| Facility: | Farley Nuclear Plant | Scenario No.: | 2 | Op-Test No.: | FA2013-301 |
|---|---|---|---|--------------|------------|
| Examiners: | | Operators: | | SRO | |
| | | | | RO | |
| | | | | BOP | |
| <p>Initial Conditions: 4% power, UOP-1.2, v103.1, completed thru step 5.62. Ready to perform step 5.63. MOL, 1350 ppm Cb; 1A SGFP on service. Aux steam from U-2.</p> <p>Turnover:</p> <ul style="list-style-type: none"> 1A SGFP is on service, MFR bypass valves are on service. Current Risk Assessment is GREEN and projected to remain GREEN. A Train O/S, A Train protected. | | | | | |
| SPLIT TRAIN ALIGNMENT | | | | | |
| Event No. | Malf. No. | Event Type* | Event Description | | |
| 1 | | R (RO) | Ramp up to 12% power. | | |
| 2 | imf pk145-a | I (RO) | PK-145 fails high in automatic, letdown pressure controller failure causes PCV-145 to close. | | |
| 3 | Imf SK509B -A | I (BOP) | 1A SGFP controller failure. SGFP speed will decrease to 3200 rpm until control of SGFP is regained. | | |
| 4 | Imf Ncvp0 1c-b | C (RO) TS (SRO) | 1C charging pump sheared shaft. T.S. 3.5.2 Condition A (mandatory until 1B charging pump swapped to opposite train) TRM 13.1.5 admin | | |
| 5 | | N (BOP) | Place letdown on service | | |
| 6 | Imf cncps w1b_d _co1 preset | C (BOP) TS (SRO) | 1B SW pump trips on overcurrent. When the 1C SW pump is started, MOV-515 closes. AOP-7.0 will be entered to open MOV-515. T.S. 3.7.8 Condition A and 3.8.1 Condition B | | |
| 7 | Mal- rcs4A / preset | M (ALL) C (RO) | 1A SGTR 300 gpm ramped in over 5 minutes. Block auto SI. Initiate a SI manually (CT) | | |
| 8 | preset | C (BOP) C (RO) | Block all AFW pumps from auto starting on SI signal 1A ARV FAILS OPEN during EEP-0 (CT) | | |
| | | | Terminate in EEP-3.0 when RCS cooldown (CT) is complete. | | |

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

| PRESETS | | | |
|-----------------------|--|--|-------|
| 9 | | Fail auto SI signals, Manual SI works CMFmalf / csftyinj_cc1 / open CMFmalf / csftyinj_cc11 / open | * |
| 9 | | Prevent TDAFWP auto start CMFmalf / cms3235B-cc1 / open CMFmalf / cms3235b_cc2 / open CMFmalf / cms3235a_cc1 / open CMFmalf / cms3235a_cc2 / open | * |
| 9 | | Prevent MDAFWP auto start CMFmalf / Cafp01a_d_cr7 CMFmalf / Cafp01b_d_cr7 | * |
| 6 | | Indicate high flow condition in SW header imf af5 (2 5) failon 0 | TRG 2 |
| 8 | | 3371A ARV fails open 8 minutes after SI initiated imf pk3371A-A (1 480) 10 3 | TRG 1 |
| Triggers and Commands | | | |
| 8 | | CNH / 3371A-A Auto output failure high triggered on manual SI Trigger: jpplrtsi(1) > 0 | * |
| 3 | | Trigger 2: when 1c SW pump is started indicate high flow and mov-515 closure trgset 2 "nncpsw1c > 0" Trigger 3: Remove malfunction TRG 2 to allow reopening of MOV-515 trgset 3 "mncv515 == 0" trg 3 "dmf cncv515_cc7" Trigger 4: Close mov-515 on simulated high flow condition trgset 4 "xnmae06f" trg 4 " imf cncv515_cc7 closed" Trigger 5 turn off AF5 simulated flow spike trgset 5 "mncv515 < 0.98" trg 5 "imf af5 failoff" | * |

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

Turnover:

- 1A SGFP is on service, MFR bypass valves are on service.
- Current Risk Assessment is **GREEN** and projected to remain **GREEN**.
- **A** Train O/S, **A** Train protected.

Event 1 Commence Ramp up to 12% power.

Verifiable actions: RO uses rods to increase RCS temperature, adjusts Steam Dumps to increase Stm flow and Rx power, and adjusts MFW flow to the SGs (Bypass FRVs on service).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CRITICAL TASK SHEET

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

**SCENARIO
OBJECTIVE/
OVERVIEW:**

Low power instrument and component failures with a SGTR.

The team should be able to:

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

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

| Facility: | Farley Nuclear Plant | Scenario No.: | 3 | Op-Test No.: | FA2013-301 |
|--|-----------------------------------|---|---|--------------|------------|
| Examiners: | | Operators: | | SRO | |
| | | | | RO | |
| | | | | BOP | |
| Initial Conditions: 29% power, 429 ppm, EOL; Ramping up, ramp on HOLD for chemistry. | | | | | |
| Turnover: | | | | | |
| <ul style="list-style-type: none"> Unit 2 PSS is OFF for Maintenance (OOS 2 hrs, ETR 2 hrs) 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs) 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs) Fuel handling is ongoing in the SFP. Current Risk Assessment is YELLOW and projected is YELLOW. B Train On-Service – B Train Protected. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia | | | | | |
| SPLIT TRAIN ALIGNMENT | | | | | |
| Event No. | Malf. No. | Event Type* | Event Description | | |
| 1 | Imf lt115 | I (RO) | LT-115, VCT level controller, fails LOW | | |
| 2 | imf mal- rms25a / preset | I (BOP) TS (SRO) | R-25A, SPENT FUEL POOL VENTILATION RAD MONITOR, fails HIGH and SFP ventilation does not secure, PRF starts TS 3.3.8 condition A | | |
| 3 | Imf pt444/ preset | I (RO) TS (SRO) | PT-444, PRZR PRESS CONTROL CHANNEL, fails high PORV-444B leaks by seat- requires block valve closure T.S. 3.4.11 Condition A and TS 3.4.1 DNB Condition A (low pressure) | | |
| 4 | Imf fk478-a | C (BOP) | 1A FRV Fails closed in Auto, will respond in manual control | | |
| 5 | Imf mal- rcs4a | R (RO) N(BOP) TS (SRO) | 1A SG tube leak – 15 gpm over 3 min and stabilizes. Ramp at 2 MW/min TS 3.4.13 condition B | | |
| 6 | Imf mal- fwm11a | M (ALL) | Running SGFP trips. RX trip required (Loss of Feed); | | |
| 7 | preset | C (RO) C (BOP) | Reactor Trip hand switches disabled, RX trip requires securing Rod Drive MG set breakers. Main Turbine will not trip in AUTO, manual trip required. (CT) | | |
| 8 | Imf mal- rcs4a | M (ALL) | 1A SGTR increases to 500 gpm when EEP-0 entered. | | |
| 9 | Imf mal- mss2a | M (ALL) C (BOP) | 1A SG fault upstream of 1A MSIV in MSVR when 1A MSIV is closed. Close ALL MSIVs and isolate AFW flow to the Faulted SG. (CT) | | |
| | | | Terminate when ECP-3.1 is entered. | | |

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

| | | PRESETS | |
|---|--|--|-------|
| 2 | | HV-3990A hi rad imf csf3990a_cc1 closed | * |
| 2 | | HV-3416 hi rad imf csff3416_d_cc1 closed | * |
| 2 | | HV-3417A hi rad imf csf3417a_d_cc1 closed | * |
| 3 | | PORV 444B sticks at 10% after being demanded closed: imf rrc444b-m (1 0) 10 1 | TRG 1 |
| 7 | | Fail RTB from opening on manual or auto trip CMFmalf / cBKRXTRP_cc21/ closed CMFmalf / cBKRXTRP_cc22/ closed | * |
| 7 | | Main Turbine will not trip Automatically imf mal-tur2 | * |
| 8 | | 1A MSIVs will not close on auto closure CMFmalf / crsh001a_cc5 /open CMFmalf / cmsh002a_d_cc5 /open | * |
| 0 | | Tag 1A MDAFW pump irf cafp01a_d_cd1 open | * |
| 0 | | 1C DG Tagged out irf cBK1DH07_d_cd1 / open irf cBK2DH07_d_cd1 / open irf cBK1DH07_d_cd2 / open irf cBK2DH07_d_cd2 / open | * |
| | | Triggers and Commands | |
| 3 | | Event Trigger 1 – monitors PORV444B HS closed position trgset 1 "x30i115c" | * |
| 9 | | Trigger 3 On 1A MSIV closure, Fault in MSVR trgset 3 "XSLBA01" trg 3 "imf mal-mss2a 1 300" | * |

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

Turnover:

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

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

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

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

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

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

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

Event 4 1A FRV Fails closed in Auto

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

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

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

Event 6 Running SGFP trips.

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

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

Verifiable actions: Secure Rod Drive MG Sets, Manual trip of the Main Turbine **(CT)**

Event 8 1A SGTR 500 gpm when EEP-0 entered.

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

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

Terminate when ECP-3.1 is entered.

ARP/ AOP-100/ AOP-2.0/ AOP-13/ E-0/ESP-0.1/ E-3/ E-2/ E-3 / ECP-3.1

CRITICAL TASK SHEET

- 1. Manually trip the main turbine [before a sever (orange-path) challenge develops to either the subcriticality or the integrity CSF] or [before transition to ECP-2.1] whichever happens first: (WOG CT FR-E-0 - - Q)
- 2. Isolate faulted SG before transitioning out of E-2.
(WOG CT E-2 - - A)
 - Isolate AFW flow
 - Isolate steam flow from 1A SG

SCENARIO
OBJECTIVE/
OVERVIEW:

The team should be able to:

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

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

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

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

| | | PRESETS | |
|----|--|--|--------------|
| 8 | | 1a crdm set fails to trip: CMFmalf / c52MGA_cr3 | * |
| 8 | | RTBs fail to open CMFmalf / cBKRXTRP_cc21 / closed CMFmalf / cbkrxtrp_cc22 closed | * |
| 8 | | Prevent AUTO trip of main turbine MALF / T / MAL-TUR2 | * |
| 8 | | Prevent Manual trip of main turbine MALF / T / MAL-TUR24 | * |
| 10 | | Train A auto SI failure imf csftyinj_cc1 open | * |
| 10 | | MOV-8803B does not open on SI imf csi8803b_d_cc5 open | * |
| 10 | | 1B RHR pump fails to auto start on SI imf crhp01b_d_cc9 open | * |
| 5 | | Block 1A Cond pump from auto start imf ccfcn1a_cc8 open imf ccfcn1a_cc9 open imf ccfcn1a_cc10 open | * |
| 0 | | Tag 1A MDAFW pump irf cafp01a_d_cd1 open | * |
| 0 | | 1C DG Tagged out irf cBK1DH07_d_cd1 / open irf cBK2DH07_d_cd1 / open irf cBK1DH07_d_cd2 / open irf cBK2DH07_d_cd2 / open | * |
| 5 | | 1B Condensate pump degraded head setup Imf jcfwfp1l-s 250 Imf jcfwfp1o-s 325 | * |
| 7 | | 1A Condensate pump trips 5 seconds after 1C Imf cCFCN1a_cc5 (1 5) closed | TRG 1 |
| | | Triggers and Commands | |
| 7 | | When 1C condensate pump trips 1B condensate pump degrades to no flow Trgset 1 "x22o061m" Trg 1 "imf ncfcn1b-d_th 100 60" | |
| | | | |

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

Turnover:

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

Thunderstorm warnings in effect for Southeast Alabama & Western Georgia

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

CRITICAL TASK SHEET

1. Insert negative reactivity into the core by **at least one** of the following methods before completing the immediate action steps of FRP-S.1: (WOG CT FR-S.1 - - C) (PRA - NR:16, 21, 23, 27)
- Transition to FRP-S.1 and insert negative reactivity by:
- (1) Insertion of rods in auto or manual at ≥ 48 SPM w/in 1 minute following attempts to insert control rods by using reactor trip hand switches or opening MG set breakers
 - (2) Commencing an emergency boration w/in 10 minutes following attempts to insert control rods by using reactor trip hand switches or opening MG set breakers
- (NOTE: Negative reactivity insertion using control rods should begin within 6 minutes of start of event with MFW in service $> 40\%$ power, and 1 minute of start of event with no MFW $> 40\%$ power, and within 10 minutes if $< 40\%$ power.)
2. Isolate the main turbine from the SGs before plant and scenario specific criteria is exceeded: (WOG CT FR-S.1 - - A)
- Manually trip main turbine prior to SG's boiling dry
3. Manually start at least one low head ECCS pump before transition out of E-0. (WOG CT E-0 - - H)
- The 1B LHSI does not start and the 1A LHSI pump did not start due to the SI signal not actuating.

OR

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

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

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

**SCENARIO
OBJECTIVE/
OVERVIEW:**

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

The team should be able to:

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

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

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

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

| PRESETS | | | |
|------------------------------|--|--|---------------------|
| Event No. | | Malfunction | * means in Bat file |
| 7 | | Fail RTB from opening in auto imf cbkxtrp_cc6 open imf cbkxtrp_cc5 open | * |
| 7 | | MCB side Rx Trip Switch fails to cause trip imf cbkxtrp_opos1 open | * |
| 7 | | Prevent manual trip of main turb. imf mal-tur24 | * |
| 7 | | Main turbine fails to auto trip: imf mal-tur2 | * |
| 8 | | Trip TDAFW pump after one minute on after pump speed above 3500rpm imf mal-fwm1c (2 60) | TRG 2 |
| 8 | | Degrades head of B MDAFW pump to 95% degraded over 30 seconds after TDAFW pump trips imf nafp01b-d_th (3 5) 95 30 | TRG 3 |
| 7 | | ALL MSIVs will not close on auto closure imf crsh001a_cc5 open imf cmsh002a_d_cc5 open imf crsh001b_cc5 open imf cmsh002b_d_cc5 open imf crsh001c_cc5 open imf cmsh002c_d_cc5 open | * |
| 0 | | Tag Out 1A MDAFW Pump irf cafp01a_d_cd1 open | * |
| 0 | | 1C DG Tagged out irf cBK1DH07_d_cd1 open irf cBK2DH07_d_cd1 open irf cBK1DH07_d_cd2 open irf cBK2DH07_d_cd2 open | * |
| Triggers and Commands | | | |
| 8 | | Event Trigger 1 GV2 reaches 25% going closed, it sticks at 20% open trgset 1 "rehgvpz(2) < 25" trg 1 "imf mal-tur15f 20 1" | TRG 1 |
| 8 | | Event Trigger 2 Triggers trip of TDAFW pump after startup trgset 2 "oafp02 > 3500" | TRG 2 |
| 8 | | Event Trigger 3 Degrades the head of the B MDAFW pump trgset 3 "jmfwm1c > 0" | TRG 3 |
| 1 | | Event Trigger 4 Charging pump 1C trip due to high LO temp trgset 4 "tchspoil(3) > 175" trg 4 "imf cCVP01C_d_cc15 closed" | TRG 4 |

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

Turnover:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The 1A MDAFW is tagged out.

1B MDAFW pump begins to experience degraded head.

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

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

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

CRITICAL TASK SHEET

____ 1. Failure of the turbine to trip. Manually actuate Main Steam line isolation before a severe (orange path) challenge develops to either the subcriticality or the integrity CSF: (WOG CT E-0- - P)

- Close ONE MSIV in each Main Steam Line.

____ 2. Heat sink or feed and bleed

Establish feedwater flow into at least one SG before feed and bleed is required (2 SG is < 12% WR level). (1AF-FTS-PUMP-H) (WOG CT FR-H.1 - - A)

- Verify flow to A, B, or C SG using condensate pumps.

SCENARIO
OBJECTIVE/
OVERVIEW:

The team should be able to:

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

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

Southern Nuclear J.M. Farley Nuclear Plant

Operations Training Simulator Exam Scenario

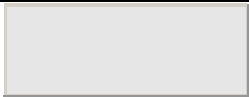

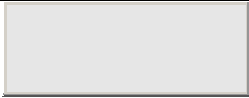
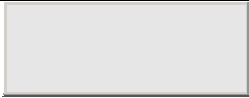
BOOTH INSTRUCTOR GUIDE

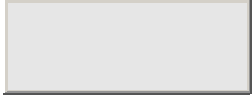

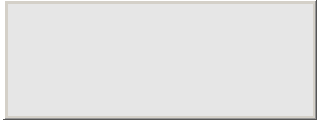
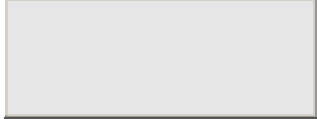
ILT-36 NRC EXAM SCENARIO #2

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



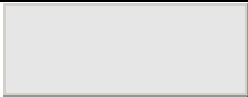
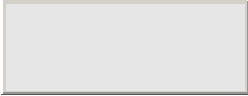
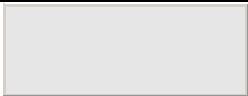


| Facility: | Farley Nuclear Plant | Scenario No.: | 2 | Op-Test No.: | FA2013-301 |
|---|---|---------------------------------------|---|--------------|------------|
| Examiners: | | Operators: | | SRO | |
| | | | | RO | |
| | | | | BOP | |
| <p>Initial Conditions: 4% power, UOP-1.2, v103.1, completed thru step 5.62. Ready to perform step 5.63. MOL, 1350 ppm Cb; 1A SGFP on service. Aux steam from U-2.</p> <p>Turnover:</p> <ul style="list-style-type: none"> 1A SGFP is on service, MFR bypass valves are on service. Current Risk Assessment is GREEN and projected to remain GREEN. A Train O/S, A Train protected. | | | | | |
| SPLIT TRAIN ALIGNMENT | | | | | |
| Event No. | Malf. No. | Event Type* | Event Description | | |
| 1 | | R (RO) | Ramp up to 12% power. | | |
| 2 | imf pk145-a | I (RO) | PK-145 fails high in automatic, letdown pressure controller failure causes PCV-145 to close. | | |
| 3 | Imf SK509B -A | I (BOP) | 1A SGFP controller failure. SGFP speed will decrease to 3200 rpm until control of SGFP is regained. | | |
| 4 | Imf Ncyp0 1c-b | C (RO) TS (SRO) | 1C charging pump sheared shaft. T.S. 3.5.2 Condition A (mandatory until 1B charging pump swapped to opposite train) TRM 13.1.5 admin | | |
| 5 | | N (BOP) | Place letdown on service | | |
| 6 | Imf cncps w1b_d _co1 preset | C (BOP) TS (SRO) | 1B SW pump trips on overcurrent. When the 1C SW pump is started, MOV-515 closes. AOP-7.0 will be entered to open MOV-515. T.S. 3.7.8 Condition A and 3.8.1 Condition B | | |
| 7 | Mal- rcs4A / preset | M (ALL) C (RO) | 1A SGTR 300 gpm ramped in over 5 minutes. Block auto SI. Initiate a SI manually (CT) | | |
| 8 | preset | C (BOP) C (RO) | Block all AFW pumps from auto starting on SI signal 1A ARV FAILS OPEN during EEP-0 (CT) | | |
| | | | Terminate in EEP-3.0 when RCS cooldown (CT) is complete. | | |

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

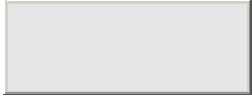

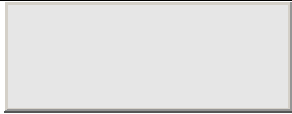

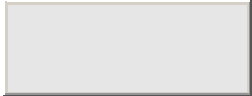
| EVENT# | TIME | EVENT DESCRIPTION / ACTION LIST | ACTIONS |
|------------------------------|------|--|--|
| 0 | 0 | Load in IC-212 and sim IC snap directory 1350 ppm Cb; 1A SGFP on service. Aux steam from U-2 Base IC is IC-33 |  |
| | | RUN |  RUN simulator |
| 0 | 0 | Generic setup: bat 36exam/generic_setup_HLT.txt |  |
| | | Quick setup is in IC-212 | |
| 0 | 0 | Quick setup (all items with * are included): bat 36exam/2013nrcexam_2.txt |  |
| PRESETS | | | |
| 9 | | Fail auto SI signals, Manual SI works CMFmalf / csftyinj_cc1 / open CMFmalf / csftyinj_cc11 / open | * |
| 9 | | Prevent TDAFWP auto start CMFmalf / cms3235B-cc1 / open CMFmalf / cms3235b_cc2 / open CMFmalf / cms3235a_cc1 / open CMFmalf / cms3235a_cc2 / open | * |
| 9 | | Prevent MDAFWP auto start CMFmalf / Cafp01a_d_cr7 CMFmalf / Cafp01b_d_cr7 | * |
| 6 | | Indicate high flow condition in SW header imf af5 (2 5) failon 0 | TRG 2 |
| 8 | | 3371A ARV fails open 8 minutes after SI initiated imf pk3371A-A (1 480) 10 3 | TRG 1 |
| Triggers and Commands | | | |
| 8 | | CNH / 3371A-A Auto output failure high triggered on manual SI Trigger: jpplrtsi(1) > 0 | * |
| 3 | | Trigger 2: when 1c SW pump is started indicate high flow and mov-515 closure trgset 2 "nnpcsw1c > 0" Trigger 3: Remove malfunction TRG 2 to allow reopening of MOV-515 trgset 3 "mncv515 == 0" trg 3 "dmf cncv515_cc7" Trigger 4: Close mov-515 on simulated high flow condition trgset 4 "xnmae06f" trg 4 " imf cncv515_cc7 closed" Trigger 5 turn off AF5 simulated flow spike trgset 5 "mncv515 < 0.98" trg 5 "imf af5 failoff" | * |

| MCB setup | | | |
|------------------|--|--|---|
| | | | |
| | | | |
| | | DEH | Clear DEH alarms |
| | | | |
| | | Select OPS GROUP on MCB monitor Acknowledge computer alarms | IPC |
| | | | |
| | | IPC: IF FF5 is in alarm, update rods | Ensure FF5 clear or update rods on IPC |
| | | | |
| | | Setup spreadsheet on OATC computer to resemble reactivity spreadsheet provided | <u>Set up computer</u> |
| | | | |
| | | Clear Recorders Cae clearrecorders.cae |  |
| | | | |
| | | Provide a marked up copy of UOP-1.2 v103.1 completed thru step 5.62, Ready to perform step 5.63. | <u>UOP-1.2 copy</u> |
| | | | |
| | | |  FREEZE simulator |
| | | | |
| | | Perform Booth Operators Setup Checklist | |
| | | | |
| | | Open Simview file to be used for plant parameter data collection: Simview / sv DataCollection.uvl |  sv DataCollection.uvl |
| | | | |
| | | If needed, adjust sim time back to 00:00:00 SIMVIEW / Sim_Clock.uvl Hours: clock(3) = 0 Minutes: clock(2) = 0 Seconds: clock(1) = 0 |  sv sim_clock.uvl |
| | | | |
| | | VERIFY MICROPHONES READY | Batteries installed |
| | | | |
| | | TURNOVER SHEET AVAILABLE | |

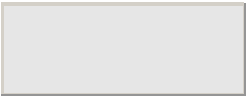
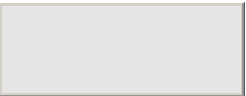
EXAM

| EVENT# | TIME | EVENT DESCRIPTION | COMMAND |
|--------------|---------------|---|---|
| Prior to RUN | 0 | | |
| | | Start data collection for Simview file On DataCollection.uvl file press DATA for drop down and then COLLECT to start collecting data | |
| | 0 | Begin Exam |  RUN simulator |
| | | Verify Horns ON: hornflag  <u>HORNS ON = TRUE</u> |  Turn Horns ON/OFF ann horn |
| 1 | Start of exam | Commence Ramp up to 12% power. | |
| 2 | NRC CUE | PK-145 fails high in automatic, letdown pressure controller failure causes PCV-145 to close. imf pk145-a 10 30 |  |
| 3 | NRC CUE | 1A SGFP controller failure. SGFP speed will decrease to 3200 rpm until control of SGFP is regained. Imf SK509B-A 0 20 |  |
| 4 | NRC CUE | 1C charging pump sheared shaft. Imf Ncvp01c-b |  |
| 5 | | Place letdown on service | |
| 6 | NRC CUE | 1B SW pump trips on overcurrent. Imf cncpsw1b_d_co1 When the 1C SW pump is started, MOV-515 closes. AOP-7.0 will be entered to open MOV-515. |  |

EXAM

| EVENT# | TIME | EVENT DESCRIPTION | COMMAND |
|--------|------------|--|---|
| 7 | NRC CUE | 1A SGTR 300 gpm ramped in over 5 minutes. Imf Mal-rs4A 300 600 |  |
| 8 | | All AFW pumps will not auto start on SI signal 1A ARV FAILS OPEN | TRG 1 |
| | | Terminate in EEP-3.0 when RCS cooldown is complete.  SG overfill variable (SG full when > 0.995) | |
| | | | |
| | | End of Exam |  HORNS OFF |
| | | | |
| | | |  FREEZE simulator |
| | | | |
| | | Stop data collection for Simview file sv DataCollection.uvl | |
| | | Export data to file with the name of exam2013sen2grpX.txt <i>NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate.</i> <i>NOTE: file will be saved in the OPENSIM directory.</i> | Ensure data file created. |
| | | When Control board data no longer needed Then Clear recorders for exam security |  |

Local operator actions:

| <u>EVENT NO.</u> | <u>TIME</u> | <u>ACTIONS</u> |
|-------------------------|--------------------|--|
| 1 | NONE REQUIRED | |
| 2 | NONE REQUIRED | |
| 3 | NONE REQUIRED | |
| 4 | NONE REQUIRED | |
| 5 | NONE REQUIRED | |
| 6 | IF REQUESTED | Alignment of 1C to auto-start for 1E SW pump will not take place during this exam. |
| | IF REQUESTED | Report alarms from TURB BLDG MISC alarm panel from panel view and clear alarms with button below. Clear TURB BLDG MISC alarm  imf kf2 failoff Report alarms from SGBD PROC PNL TRBL alarm panel from panel view and clear alarms with button below. Clear SGBD PROC PNL TRBL alarm JB5  imf jb5 failoff |
| 7 | NONE REQUIRED | |
| 8 | NONE REQUIRED | |

Communications sheet

| <u>EVENT NO.</u> | <u>TIME</u> | <u>Communication:</u> |
|-------------------------|--|--|
| ALL | AS REQUIRED (Standard communications to inform supervision) | <u>SSS, SM and Dispatcher:</u> Repeat back failure, procedure entered, plant status, CR in the cue and that type of communications. |
| 1 | IF REQUESTED | <u>SSS-plant,</u> "Will have EM prepare to close Disconnect 915 per UOP-1.2, step 5.60.7." |
| 2/3 | NONE EXPECTED | |
| 4 | WHEN REQUESTED | <u>Radside SO:</u> Called to check 1C charging pump, After 3 minutes report the following. <ul style="list-style-type: none"> • the 1C charging pump motor is running • Lube oil temperatures have decreased. • There is no discharge pressure on the local discharge pressure gage. • Making a grinding noise and pump is NOT rotating. |
| 5 | NONE EXPECTED | |
| 6 | WHEN REQUESTED | <u>SSS / OUTSIDE:</u> "1B SW pump breaker DK-04 has an overcurrent flag. I do not see any obvious problems with pump or motor. Oil levels look good." "1C SW pump appears to be operating normally" <u>TBSO:</u> The 1A TB chiller tripped alarm is in. <u>SSS:</u> "I will coordinate with the Outside SO to align 1C SW pump to auto start for 1B SW pump." (SOP-24.0D checklist) |
| 7 | WHEN REQUESTED | <u>SM:</u> "I will make the classifications and notifications." <u>SM / SSS:</u> "I will get an extra operator to secure the running DGs" <u>ANY CALL TO SHIFT CHEMIST:</u> Acknowledge to requirement for sampling. |
| 8 | NONE EXPECTED | |

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

Turnover:

- 1A SGFP is on service, MFR bypass valves are on service.
- Current Risk Assessment is **GREEN** and projected to remain **GREEN**.
- **A** Train O/S, **A** Train protected.

Event 1 Commence Ramp up to 12% power.

Verifiable actions: RO uses rods to increase RCS temperature, adjusts Steam Dumps to increase Stm flow and Rx power, and adjusts MFW flow to the SGs (Bypass FRVs on service).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CRITICAL TASK SHEET

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

**SCENARIO
OBJECTIVE/
OVERVIEW:**

Low power instrument and component failures with a SGTR.

The team should be able to:

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

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

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

Event Description: Ramp up to 12% power

Increase Reactor power to 12% and get ready to roll the Main Turbine. When simulator is taken to run the crew is expected to increase Reactor power to 12% IAW UOP-1.2. At 8% the NRC will evaluate going to the next event. This evolution will take approx. 15 -20 minutes

Indications Available:

Annunciators: NA

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

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

Event Description: Ramp up to 12% power

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|----------|
| | RO | <p>(step 5.65) WHEN Nuclear at Power Permissive P-10 permissive status light is illuminated (2/4 power ranges greater than 10%), THEN perform the following: {CMT-0003695}</p> <p>Block the intermediate range reactor trip and overpower rod stop.</p> <ul style="list-style-type: none"> Place INTERMEDIATE RANGE BLOCK TRN A to BLOCK. Place INTERMEDIATE RANGE BLOCK TRN B to BLOCK. <p>On the Bypass and Permissive Panel verify the following:</p> <ul style="list-style-type: none"> The INTERM RANGE TRAIN A TRIP BLOCKED light illuminated. The INTERM RANGE TRAIN B TRIP BLOCKED light illuminated. <p>Block the power range low setting reactor trip.</p> <ul style="list-style-type: none"> Place POWER RANGE BLOCK TRN A to BLOCK. Place POWER RANGE BLOCK TRN B to BLOCK. <p>Verify the following on the Bypass and Permissive Panel:</p> <ul style="list-style-type: none"> The POWER RANGE LOW SETTING TRAIN A TRIP BLOCKED light illuminated. The POWER RANGE LOW SETTING TRAIN B TRIP BLOCKED light illuminated. | |
| | | | |
| | RO | <p>(step 5.65.5) Verify that Low Power Trip Block P-7 status light is not illuminated to ensure the unblocking of the following reactor trips.</p> <ul style="list-style-type: none"> Pressurizer Low Pressure Pressurizer High Water Level Loss of Flow-Two Loops | |
| | | | |
| | RO | <p>(step 5.65.6) Verify NR-45B is in the desired speed, i.e., 2nd speed (2 min/div) <u>OR</u> normal speed. (10 min/div)</p> | |

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

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

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

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

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

Indications Available:

Annunciators:

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

Comment: The Letdown relief valve lifts to the PRT.

Recognize indications of PK-145 failing:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 2 Page 9 of 44

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 3 Page 10 of 44

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

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

Indications Available:

Annunciators:

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

Recognize indications of 1A SGFP controller failing:

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 3 Page 11 of 44

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 4/5 Page 12 of 44

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

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

Indications Available:**Annunciators:**

- CHG HDR FLOW HI-LO (EA2)
- RCP SEAL INJ FLOW LO (DD1)
- REGEN HX LTDN FLOW DISCH TEMP HI (DE1)

Recognize indications of sheared shaft

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 4/5 Page 13 of 44

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 4/5 Page 14 of 44

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

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

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 4/5 Page 16 of 44

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 4/5 Page 17 of 44

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 4/5 Page 18 of 44

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 6 Page 19 of 44Event Description: **1B SW pump trips.**

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

Indications Available:

Annunciators:

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

Recognize indications 1B SW PUMP TRIP

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

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

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Event Description: 1B SW pump trips.

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

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Event Description: 1B SW pump trips.

| Time | Pos. | Expected Actions/Behavior | Comments |
|---|------|--|----------|
| | SRO | Submit a condition report on the failed component, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the condition report | |
| | | | |
| | SRO | Inform the SM of the failure and Tech Spec entry | |
| | | | |
| AOP-10, Loss of Service Water, version 16 | | | |
| | | | |
| | BOP | (step 1) Verify DF02, 1F 4160 V bus tie to 1K 4160 V bus and DG02, 1G 4160 V bus tie to 1L 4160 V bus, are closed | |
| | | | |
| | BOP | (step 2) Start any available SW pump | |
| | | | |
| | BOP | (step 3) IF SW pressure in both trains greater than 60 psig, THEN go to procedure and step in effect. | |
| | | | |
| AOP-7, Loss of Turbine Building Service Water, version 13 | | | |
| | | | |
| NOTE: Students may restore service water per ARP AF5, ver 53.1 guidance: <ul style="list-style-type: none"> If Service Water flow has been lost to the Turbine Building, THEN attempt to restore Service Water flow. Refer to FNP-1-AOP-7.0, LOSS OF TURBINE BUILDING SERVICE WATER and perform any actions required. | | | |
| | | | |
| | BOP | (step 1) Check at least one SW train aligned to turbine building. Check A train SW - ALIGNED TO TURBINE BUILDING. SW TO TURB BLDG ISO A TRN [] Q1P16V515 open [] Q1P16V516 open OR Check B train SW - ALIGNED TO TURBINE BUILDING SW TO TURB BLDG ISO B TRN [] Q1P16V517 open [] Q1P16V514 open | |

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Event Description: 1B SW pump trips.

| Time | Pos. | Expected Actions/Behavior | Comments |
|---|------|---|---|
| | BOP | (step 2) IF main generator on line, THEN check generator hydrogen temperature less than 46°C by the following: [] TI-4067 | |
| | BOP | (step 3) Check SW HDR Pressure – GREATER THAN 110 psig. Train A [] PI-3001A Train B [] PI-3001B | RNO 3 CLOSE SW DIL BYP ISO. Train A [] Q1P16V558 Train B [] Q1P16V557 |
| | BOP | (step 4) Restore both trains of SW to turbine building. 4.1 Dispatch personnel to correct cause for loss of SW. 4.2 WHEN cause for loss of SW corrected, THEN verify both SW trains aligned to turbine building. SW TO TURB BLDG ISO A(B) TRN [] Q1P16V515 open [] Q1P16V516 open [] Q1P16V517 open [] Q1P16V514 open | |
| | SRO | (step 5) IF at least one SW train aligned to turbine building, THEN monitor turbine building component temperatures and go to procedure and step in effect. | |
| After Tech Spec analysis and at the discretion of the Lead Examiner move to the next Event. | | | |

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

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

1A SG tube leak will start and ramp in over 5 minutes. Because of power level SG tube leak alarm (FG1) does not function. Based on leak rate early in AOP-2.0 SI criteria will be met.

Indications Available:

Annunciators:

- RMS HI RAD (FH1)

Recognize indications of SG TUBE LEAK

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 7 Page 24 of 44

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|-------------|--|---|
| | SRO/ BOP | <p><u>IF R-15</u> alarms <u>AND</u> remains above the alarm setpoint (not a momentary spike), <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> • <u>IF</u> high effluent activity is possible, <u>THEN</u> implement NMP-EP-110 • Notify the Counting Room to <u>immediately</u> sample the SGs per CCP-31 to determine the leak rate. • Notify the Operations Shift Manager. • <u>IF</u> an actual SG tube leak is confirmed, consider placing SJAЕ Filtration System in service per FNP-1-SOP-28.5. <p><u>IF R-19</u> alarms refer to SOP-45.0 for guidance in sampling SGs with R-19 in alarm.</p> <p><u>IF R-23A OR R-23B</u> alarms, contact the RAD man to verify SGBD secured.</p> | |
| AOP-2.0, Steam Generator Tube Leakage Ver. 35 | | | |
| | RO | <p>(step 1) Maintain pressurizer level stable at normal programmed value by:</p> <ul style="list-style-type: none"> - Control charging - Reduce letdown close HV-8149 A, B, C | <p>NOTE: [CA] step – RNO is to trip the Rx and actuate an SI Critical task to actuate SI (step 1 or 3 of this AOP)</p> |
| | RO | <p>(step 1.3) Determine leak rate, if possible (use STP-9.0, RCS leakage) (RNO step 1.3) Determine leak rate based on flow balance</p> <p>_____ (charging flow)</p> <p>+ _____ (seal injection flow)</p> <p>- _____ (letdown flow)</p> <p>- _____ (#1 seal leakoff flow)</p> <p>= _____ (RCS leak rate)</p> | Plant conditions will NOT permit the use of STP-9.0, so a leak rate flow balance will be used. |

Op Test No.: FA2013301 Scenario # 2 Event # 7 Page 25 of 44

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|---|---|
| | RO | (step 2) Maintain VCT level greater than 20%. by: Verify RMW system in AUTO OR Manually control makeup as required by using SOP-2.3, CVCS Rx makeup system | NOTE: [CA] step – RNO is to trip the Rx and actuate an SI Critical task to actuate SI (step 1 or 3 of this AOP) |
| | SRO | (step 4) Check reactor power conditions: - Check NO power ascension in progress - Check NO power reduction in progress - Check reactor power greater than 20% | |
| | BOP | (step 5) Monitor primary to secondary leakage Check R-70s or R-15 for increasing count rate Begin trending R-70C, SG TUBE LEAK, and R-15, SJAE EXH, using the plant computer and Data sheet 1. | NOTE: [CA] step – Chemistry will acknowledge CCP-31 app C |
| | BOP | (step 6) Call TBSO to place SJAE filtration on service. | |
| | SRO | (step 7) Direct chemistry to perform grab samples and leak rate determinations. CCP-201 Table 55 (step 8) Notify SM of leak rate (step 9) Continue to monitor R-70's, R-15 or CHM/HP leak rate input for primary to secondary leak rate and rate of change using Data sheet 1. | NOTE: [CA] step – NOTE: [CA] step – |
| | SRO | (Step 10) Monitor the Continuous Radiation Monitoring System operation. [] R-15 – OPERABLE OR [] R-70's - OPERABLE | NOTE: [CA] step – |
| | SRO | (step 11) Evaluate Table to determine appropriate response: - ACTION LEVEL 3 Condition 1 ≥30 gpd/hr rate of increase <u>AND</u> ≥75 gpd leak in any SG | |

Op Test No.: FA2013301 Scenario # 2 Event # 7 Page 26 of 44

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

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

TECHNICAL SPECIFICATION 3.4.13, RCS Operational LEAKAGE*RCS operational LEAKAGE shall be limited to:**d. 150 gallons per day primary to secondary LEAKAGE through any one SG.*

| | | CONDITION | REQUIRED ACTION | COMPLETION TIME | |
|--|--|---|--|-------------------------|--|
| | | <i>B. Required Action and associated Completion Time of Condition A not met. OR Pressure boundary LEAKAGE exists. OR Primary to secondary LEAKAGE not within limit.</i> | <i>B.1 Be in MODE 3. AND B.2 Be in MODE 5.</i> | 6 hours 36 hours | |

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

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

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

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

Indications Available:**Annunciators:**

- Various and numerous

Indications of LOSP/RX trip

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------------|---|--|
| EEP-0, Reactor Trip or Safety Injection, rev 44 | | | |
| | RO/ BOP | <p>Immediate Operator actions of EEP-0 (step 1) Check reactor trip. Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. Check rod bottom lights - LIT.</p> <p>(step 2) Check turbine - TRIPPED. TSLB2 14-1 thru 4 lit</p> <p>(step 3) Check power to 4160 V ESF busses. 4160 V ESF busses - AT LEAST ONE ENERGIZED</p> <p>A Train (F 4160V bus) power available lights lit OR B Train (G 4160V bus) power available lights lit</p> <p>Verify operating diesel generators are being supplied from at least one SW pump.</p> | Immediate Action steps of EEP-0 |
| | RO/ BOP | <p>(step 4) Check SI Status. (step 4.1) Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION □ ACTUATED status light lit □ MLB-1 1-1 lit □ MLB-1 11-1 lit</p> <p>(step 4.2) Verify both trains of SI-ACTUATED. □ MLB-1 1-1 lit AND □ MLB-1 11-1 lit</p> | |

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|---|---|
| | SRO | (step 5) Directs continuing into EEP-0 at step 5. Directs the BOP to perform Attachment 2 of EEP-0. | For Attachment 2 and 4 actions. <u>Go to page 37</u> |
| | | EEP-0 FOLD OUT PAGE CRITERIA IN EFFECT Ruptured SG AFW Isolation. <ul style="list-style-type: none"> Manually stop AFW flow to a SG if BOTH conditions listed below occur: <ul style="list-style-type: none"> Level increases in an uncontrolled manner or radiation in that SG is abnormal AND <ul style="list-style-type: none"> Narrow range level – GREATER THAN 31% {48%} | NOTE: [CA] step The action to Isolate AFW to the ruptured SG may be completed beyond this point. |
| | RO | (step 6) Check containment pressure- HAS REMAINED LESS THAN 27 psig (checked on IPC or PI950, 951, 952, 953,CNMT PRESSURE) | NOTE: [CA] step |
| | RO | (step 7) Announce "Unit 1 reactor trip and safety injection". | |
| | RO | (step 8) Check AFW status. Check secondary heat sink Available <ul style="list-style-type: none"> Check total AFW flow > 395 gpm FI 3229A FI 3229B FI 3229C Total Flow FI 3229 OR Check any SG NR level > 31% {48%} WHEN all SG narrow range levels less than 31%{48%}, THEN maintain total AFW flow greater than 395 gpm. WHEN at least two SG narrow range levels greater than 28% AND TDAFWP NOT required, THEN stop TDAFWP. | RNO 8.1.1 Verify all available AFW pumps started. AFW pumps fail to autostart. Operator should start AFW pumps here if not already complete. May have been started earlier based on backing up an automatic function that did not occur. |

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|--------------------------|
| | RO | (step 8.4) WHEN SG narrow range level greater than 31%{48%}, THEN maintain SG narrow range level 31%-65%{48%-65%}. <ul style="list-style-type: none"> Control MDAFWP flow. MDAFWP FCV 3227 RESET <ul style="list-style-type: none"> <input type="checkbox"/> A TRN reset <input type="checkbox"/> B TRN reset MDAFWP TO 1A/1B/1C SG B TRN <ul style="list-style-type: none"> <input type="checkbox"/> FCV 3227 in MOD Control TDAFWP flow. TDAFWP FCV 3228 <ul style="list-style-type: none"> <input type="checkbox"/> RESET reset TDAFWP SPEED CONT <ul style="list-style-type: none"> <input type="checkbox"/> SIC 3405 adjusted | NOTE: [CA] step – |
| | | | |
| | RO | (step 9) Check RCS temperature. IF any RCP running, THEN check RCS average temperature - STABLE AT OR APPROACHING 547°F. TAVG 1A(1B,1C) RCS LOOP <ul style="list-style-type: none"> <input type="checkbox"/> TI 412D <input type="checkbox"/> TI 422D <input type="checkbox"/> TI 432D | |
| | | | |

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|---|
| | RO | <p>(step 9 RNO) IF RCS temperature less than 547°F and falling, THEN perform the following.</p> <p>(step 9.1.1) Verify steam dumps closed.</p> <p>STM DUMP INTERLOCK</p> <p><input type="checkbox"/> A TRN in OFF RESET</p> <p><input type="checkbox"/> B TRN in OFF RESET</p> <p>(step 9.1.2) Verify atmospheric reliefs closed on MCB</p> <p><input type="checkbox"/> Demand at 0 and minimum red light LIT</p> <p>(step 9.1.3) Control total AFW flow to minimize RCS cool down,</p> <p>AFW FLOW TO 1A(1B,1C) SG</p> <p><input type="checkbox"/> FI 3229A</p> <p><input type="checkbox"/> FI 3229B</p> <p><input type="checkbox"/> FI 3229C</p> <p>AFW TOTAL FLOW</p> <p><input type="checkbox"/> FI 3229</p> <p>IF MSIVs are closed THEN proceed to step 9.1.8</p> | NOTE: RNO column since RCS temp will be <547°F |
| | BOP | <p>(step 9.1.5 RNO) IF MSIV's are open THEN isolate steam loads in the turbine building:</p> <ul style="list-style-type: none"> MSRs reset <p>(steps 9.1.5.1 and 9.1.5.2 RNO) these actions are performed by Systems Operators when RX trip is announced in step 7.</p> <p>(9.1.5.3 RNO is already complete) Gland seal from Unit 2</p> | |
| | BOP | <p>(step 9.1.5.4 RNO) IF two SJAE's in service, THEN secure one SJAE</p> <ul style="list-style-type: none"> 1A SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed 1B SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed | |

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|--|
| | BOP | (step 9.1.6 RNO) IF cool down continues THEN close main steam isolation and bypass valves. 1A(1B,1C) SG MSIV - TRIP <input type="checkbox"/> Q1N11HV3369A <input type="checkbox"/> Q1N11HV3369B <input type="checkbox"/> Q1N11HV3369C <input type="checkbox"/> Q1N11HV3370A <input type="checkbox"/> Q1N11HV3370B <input type="checkbox"/> Q1N11HV3370C 1A(1B,1C) SG MSIV - BYPASS <input type="checkbox"/> Q1N11HV3368A <input type="checkbox"/> Q1N11HV3368B <input type="checkbox"/> Q1N11HV3368C <input type="checkbox"/> Q1N11HV3976A <input type="checkbox"/> Q1N11HV3976B <input type="checkbox"/> Q1N11HV3976C | . |
| | | | |
| | RO | (step 10) Check pressurizer PORVs and spray valves. WHEN pressurizer pressure less than 2335 psig, THEN verify both PRZR PORVs closed. Verify both PRZR PORVs indicate CLOSED Check PRZR PORV temperature STABLE OR FALLING. <input type="checkbox"/> PORV Temp TI-463 Check PRT parameters STABLE or FALLING. <input type="checkbox"/> PRT PRESS PI 472 <input type="checkbox"/> PRT LVL LI-470 <input type="checkbox"/> PRT TEMP TI-471 WHEN pressurizer pressure less than 2260 psig, THEN verify normal pressurizer spray valves closed OR in the process of closing. 1A(1B) LOOP SPRAY VLV <input type="checkbox"/> PK 444C <input type="checkbox"/> PK 444D Check any PRZR PORV ISO - OPEN | NOTE: [CA] step – NOTE: [CA] step – |
| | | | |
| | RO | (step 11) Check RCP criteria. Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE | |

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|---|------|---|---|
| | RO | (step 12) Monitor charging pump miniflow criteria. Control charging pump miniflow valves based on RCS pressure. 1C(1A) LOOP RCS WR PRESS <input type="checkbox"/> PI 402A <input type="checkbox"/> PI 403A | NOTE: Based on RCS pressure, close miniflows < 1300 and open when > 1900 psig. |
| <p style="text-align: center;">Diagnostics</p> <p>The SRO will direct the parameters to be reviewed and will determine appropriate procedure to transition to.</p> | | | |
| | SRO | (step 13) Check SGs not faulted. (step 13.1) Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig. | |
| | SRO | Check SGs not ruptured. <input type="checkbox"/> Check secondary radiation indication - NORMAL. <input type="checkbox"/> R-15 SJAE EXH <input type="checkbox"/> R-19 SGBD SAMPLE <input type="checkbox"/> R-23A SGBD HX OUTLET <input type="checkbox"/> R-23B SGBD TO DILUTION <input type="checkbox"/> R-15B TURB BLDG VNTL (BOP) <input type="checkbox"/> R-15C TURB BLDG VNTL (BOP) <input type="checkbox"/> R-60A MS ATMOS REL (BOP) <input type="checkbox"/> R-60B MS ATMOS REL (BOP) <input type="checkbox"/> R-60C MS ATMOS REL (BOP) <input type="checkbox"/> R-60D TDAFWP EXH (BOP) <input type="checkbox"/> No SG level rising in an uncontrolled manner. | RNO Go to FNP-1-EEP-3, STEAM GENERATOR TUBE RUPTURE. |
| EEP-3.0, SGTR, ver 27 | | | |
| | RO | (step 1) Check RCP criteria. Check SUB COOLED MARGIN MONITOR indication - > 16°F {45°F} SUBCOOLED IN CETC MODE. | |

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 34 of 44

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 35 of 44

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|---|
| | SRO | <p>Will direct these steps: (step 6.3) WHEN P-12 light lit (543F), THEN perform the following.</p> <p>(step 6.3.1) Block low steam line pressure SI. STM LINE PRESS SI BLOCK - RESET <input type="checkbox"/> A TRN to BLOCK <input type="checkbox"/> B TRN to BLOCK</p> <p>(step 6.3.2) Verify blocked indication.BYP & PERMISSIVE STM LINE ISOL. SAFETY INJ. <input type="checkbox"/> TRAIN A BLOCKED light lit <input type="checkbox"/> TRAIN B BLOCKED light lit</p> <p>(step 6.3.3) Bypass the steam dump interlock. STM DUMP INTERLOCK <input type="checkbox"/> A TRN to BYP INTLK <input type="checkbox"/> B TRN to BYP INTLK</p> <p>(step 6.4) IF condenser available, THEN dump steam to condenser from intact SGs at maximum attainable rate.</p> <p>BYP & PERMISSIVE <input type="checkbox"/> C-9 light lit</p> <p>STM DUMP <input type="checkbox"/> MODE SEL A-B TRN in STM PRESS</p> <p>STM DUMP INTERLOCK <input type="checkbox"/> A TRN in ON <input type="checkbox"/> B TRN in ON</p> <p>STM HDR PRESS FNP-1-SOP-62.0, EMERGENCY <input type="checkbox"/> PK 464 adjusted</p> | <p>NOTE: Step 6.4 path depends on condenser availability, both are possible.</p> <p>Critical task</p> <p>RNO 6.4 Dump steam to atmosphere. 6.4.1 Direct counting room to perform FNP-0-CCP-645 6.4.2 Dump steam from intact SGs at maximum attainable rate. 1A(1B,1C) MS ATMOS REL VLV</p> <ul style="list-style-type: none"> • PC 3371A adjusted • PC 3371B adjusted • PC 3371C adjusted |
| | | | |
| | RO | <p>(step 6.5) Check hottest CETCs less than required temperature.</p> <p>(step 6.6) Stop the cooldown</p> <p>(step 6.7) [CA] Maintain core exit T/Cs - LESS THAN REQUIRED TEMPERATURE.</p> | <p>Continue to step 7 until CETCs are < required temp.</p> <p>Critical task</p> |
| | | | |

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 36 of 44

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

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

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 37 of 44

Event Description: Attachment 2 of EEP-0

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

Attachment 2 of EEP-0
AUTOMATIC ACTIONS VERIFICATION

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|-----------------------------------|
| | BOP | (Step 1) Verify one CHG PUMP in each train - STARTED. <input type="checkbox"/> A train (1A or 1B) amps > 0 <input type="checkbox"/> B train (1C or 1B) amps > 0 | |
| | BOP | (Step 2) Verify RHR PUMPS - STARTED. RHR PUMP <input type="checkbox"/> 1A amps > 0 <input type="checkbox"/> 1B amps > 0 | |
| | BOP | (Step 3) Verify Safety Injection Flow. (Step 3.1) Check HHSI flow - GREATER THAN 0 gpm. <input type="checkbox"/> FI 943 | |
| | BOP | (Step 3.2) Check RCS pressure - LESS THAN 275 psig{435 psig}. | Operator should proceed to step 4 |
| | BOP | (step 3.3) Check LHSI flow – greater than 1.5×10^3 gpm <input type="checkbox"/> 1A RHR HDR FLOW FI-605A <input type="checkbox"/> 1B RHR HDR FLOW FI-605B | |
| | BOP | (Step 4) Verify each SW train - HAS TWO SW PUMPS STARTED. <input type="checkbox"/> A train (1A,1B or 1C) <input type="checkbox"/> B train (1D,1E or 1C) | |

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 38 of 44

Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|-----------------------|
| | BOP | <p>(Step 5) Verify each train of CCW - STARTED.</p> <p>(Step 5.1) Verify one CCW PUMP in each train- STARTED.</p> <p>A train HX 1C or 1B CCW FLOW <input type="checkbox"/> FI 3043CA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW <input type="checkbox"/> FI 3043AA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm</p> <p>Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX <input type="checkbox"/> Q1P16FI3009AA > 0 gpm <input type="checkbox"/> Q1P16FI3009BA > 0 gpm <input type="checkbox"/> Q1P16FI3009CA > 0 gpm</p> | |
| | BOP | <p>(step 6) Verify containment ventilation isolation.</p> <p>Verify containment purge dampers - CLOSED.</p> <p><input type="checkbox"/> 3197 <input type="checkbox"/> 3198D <input type="checkbox"/> 3198C <input type="checkbox"/> 3196 <input type="checkbox"/> 3198A <input type="checkbox"/> 3198B</p> <p>Verify containment mini purge dampers - CLOSED.</p> <p>CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D <input type="checkbox"/> 2866C <input type="checkbox"/> 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C <input type="checkbox"/> 2866D <input type="checkbox"/> 2867D</p> <p>Stop MINI PURGE SUPP/EXH FAN.</p> | Will place HS to STOP |

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 39 of 44

Event Description: Attachment 2 of EEP-0

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

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

Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|--|
| | BOP | (step 8) Verify AFW Pumps - STARTED. Verify both MDAFW Pumps - STARTED <input type="checkbox"/> 1A MDAFW Pump amps > 0 <input type="checkbox"/> 1B MDAFW Pump amps > 0 AND <input type="checkbox"/> FI-3229A indicates > 0 gpm <input type="checkbox"/> FI-3229B indicates > 0 gpm <input type="checkbox"/> FI-3229C indicates > 0 gpm | RNO 8.1 Verify MDAFW Pumps deliver flow to each SG. 8.1.1 Manually start MDAFW Pumps 8.1.2 Verify AFW flow path to AND each SG. <input type="checkbox"/> Q1N23HV3227A in MOD <input type="checkbox"/> Q1N23HV3227B in MOD <input type="checkbox"/> Q1N23HV3227C in MOD MDAFWP TO 1A(1B,1C) SG FLOW CONT <input type="checkbox"/> HIC 3227AA open <input type="checkbox"/> HIC 3227BA open <input type="checkbox"/> HIC 3227CA open AFW TO 1A(1B,1C) SG STOP VLV <input type="checkbox"/> Q1N23MOV3350A open <input type="checkbox"/> Q1N23MOV3350B open <input type="checkbox"/> Q1N23MOV3350C open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764A open <input type="checkbox"/> Q1N23MOV3764D open <input type="checkbox"/> Q1N23MOV3764F open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764E open <input type="checkbox"/> Q1N23MOV3764B open <input type="checkbox"/> Q1N23MOV3764C open |
| | | (Step 8.2) Check TDAFW Pump start required. <input type="checkbox"/> Condition <input type="checkbox"/> TSLB <input type="checkbox"/> Setpoint <input type="checkbox"/> Coincidence | |
| | | RCP Bus TSLB2 1-1 <input type="checkbox"/> 2680 V Undervoltage 1-2 1-3 | 1/2 Detectors on 2/3 Busses |
| | | Low Low SG TSLB4 28% Water Level 4-1,4-2,4-3 In Any 5-1,5-2,5-3 2/3 SGs 6-1,6-2,6-3 | 2/3 Detectors on 2/3 SGs |
| | | | |
| | | | |

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 41 of 44

Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments | | | | | | | | | | | | | | | | | | | | |
|----------------------------|-----------------|--|----------------------------|----------|-------------|------|-------------|------------|-----|----------------|----------------------------|-----------------|------------|----------------------------|--|--|-----|----------------|------------------|------------|-----|---------------|--|
| | BOP | <p>(step 9) Verify main feedwater status. Verify main feedwater flow control and bypass valves - CLOSED. 1A(1B,1C) SG FW FLOW <input type="checkbox"/> FCV 478 <input type="checkbox"/> FCV 488 <input type="checkbox"/> FCV 498</p> <p>Verify both SGFPs - TRIPPED.</p> <p>Verify SG blowdown - ISOLATED. 1A(1B,1C) SGBD ISO <input type="checkbox"/> Q1G24HV7614A closed <input type="checkbox"/> Q1G24HV7614B closed <input type="checkbox"/> Q1G24HV7614C closed</p> <p>9.4 Verify SG blowdown sample - ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE STEAM GEN ISO <input type="checkbox"/> MLB1 19-2 lit Q1P15HV3328 closed <input type="checkbox"/> MLB1 19-3 lit Q1P15HV3329 closed <input type="checkbox"/> MLB1 19-4 lit Q1P15HV3330 closed</p> | | | | | | | | | | | | | | | | | | | | | |
| | BOP | <p>(Step 10) Check no MSL isolation actuation signal present.</p> <table> <tr> <th>Signal</th><th>Setpoint</th><th>coincidence</th><th>TSLB</th></tr> <tr> <td>LO SG PRESS</td><td>< 585 psig</td><td>2/3</td><td>TSLB4 19-2,3,4</td></tr> <tr> <td>Hi stm flow and Lo-Lo Tavg</td><td>>40% and <543°F</td><td>1/2 on 2/3</td><td>TSLB4 16-3,4 17-3,4 18-3,4</td></tr> <tr> <td></td><td></td><td>2/3</td><td>TSLB2 10-1,2,3</td></tr> <tr> <td>HI-HI ctmt press</td><td>>16.2 psig</td><td>2/3</td><td>TSLB1 2-2,3,4</td></tr> </table> | Signal | Setpoint | coincidence | TSLB | LO SG PRESS | < 585 psig | 2/3 | TSLB4 19-2,3,4 | Hi stm flow and Lo-Lo Tavg | >40% and <543°F | 1/2 on 2/3 | TSLB4 16-3,4 17-3,4 18-3,4 | | | 2/3 | TSLB2 10-1,2,3 | HI-HI ctmt press | >16.2 psig | 2/3 | TSLB1 2-2,3,4 | |
| Signal | Setpoint | coincidence | TSLB | | | | | | | | | | | | | | | | | | | | |
| LO SG PRESS | < 585 psig | 2/3 | TSLB4 19-2,3,4 | | | | | | | | | | | | | | | | | | | | |
| Hi stm flow and Lo-Lo Tavg | >40% and <543°F | 1/2 on 2/3 | TSLB4 16-3,4 17-3,4 18-3,4 | | | | | | | | | | | | | | | | | | | | |
| | | 2/3 | TSLB2 10-1,2,3 | | | | | | | | | | | | | | | | | | | | |
| HI-HI ctmt press | >16.2 psig | 2/3 | TSLB1 2-2,3,4 | | | | | | | | | | | | | | | | | | | | |
| | BOP | <p>(Step 11) Verify PHASE A CTMT ISO. (Step 11.1) Verify PHASE A CTMT ISO - ACTUATED. <input type="checkbox"/> MLB-2 1-1 lit <input type="checkbox"/> MLB-2 11-1 lit</p> <p>11.2 Check all MLB-2 lights - LIT.</p> <p>11.3 Verify Excess Letdown Isolation valves closed. <input type="checkbox"/> Q1E21HV8153, EXC LTDN ISO <input type="checkbox"/> Q1E21HV8154, EXC LTDN ISO</p> | | | | | | | | | | | | | | | | | | | | | |

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 42 of 44
 Event Description: **Attachment 2 of EEP-0**

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|------------------------------------|
| | BOP | (step 12) Check all reactor trip and reactor trip bypass breakers – OPEN Reactor trip breaker A Reactor trip breaker B Reactor trip bypass breaker A Reactor trip bypass breaker B | |
| | BOP | (step 13) Trip CRDM MG set supply breakers. 1A(1B) MG SET SUPP BKR <input type="checkbox"/> N1C11E005A <input type="checkbox"/> N1C11E005B | |
| | BOP | (step 14) Secure secondary components. Stop both heater drain pumps. HDP <input type="checkbox"/> 1A <input type="checkbox"/> 1B Check any condensate pump started. IF started, THEN stop all but one condensate pump. <input type="checkbox"/> 1A <input type="checkbox"/> 1B If NO condensate pumps are started then place all HSs to STOP 14.3 IF condensate pump operating, THEN verify backup cooling aligned to condensate pumps per FNP-0-SOP-0.0, APPENDIX B, TB SO Actions Following A Reactor Trip Or Safety Injection. | Will call TBSO to accomplish this. |
| | BOP | (step 15) Verify both CRACS mode selector switches in the ON position. CRACS Mode Selector Switch <input type="checkbox"/> A TRAIN <input type="checkbox"/> B TRAIN | |
| | BOP | (step 16) WHEN at least 30 seconds have passed since turbine trip, THEN check main generator tripped. 230 KV BKR <input type="checkbox"/> 810 - OPEN <input type="checkbox"/> 914 - OPEN | |

Op Test No.: FA2013301 Scenario # 2 Event # 8 Page 43 of 44Event Description: **Attachment 2 of EEP-0**

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

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------|---|--|
| Attachment 4 of EEP-0 TWO TRAIN ECCS ALIGNMENT VERIFICATION | | | |
| | | <p>(Step 1) Verify two trains of ECCS equipment aligned.</p> <p><input type="checkbox"/> Check DF01 closed</p> <p><input type="checkbox"/> Verify DF02 closed</p> <p><input type="checkbox"/> Check DG15 closed</p> <p><input type="checkbox"/> Verify DG02 closed</p> <p><input type="checkbox"/> Verify two trains of battery chargers – energized Amps > 0</p> <p>(Step 1.6) Verify two trains of ESF equipment aligned.</p> <p><input type="checkbox"/> Check all MLB-1 lights LIT</p> <p>Verify charging pump suction and discharge valves - OPEN.</p> <p>CHG PUMP DISCH HDR ISO</p> <p><input type="checkbox"/> Q1E21MOV8132A</p> <p><input type="checkbox"/> Q1E21MOV8132B</p> <p><input type="checkbox"/> Q1E21MOV8133A</p> <p><input type="checkbox"/> Q1E21MOV8133B</p> <p>CHG PUMP SUCTION HDR ISO</p> <p><input type="checkbox"/> Q1E21MOV8130A</p> <p><input type="checkbox"/> Q1E21MOV8130B</p> <p><input type="checkbox"/> Q1E21MOV8131A</p> <p><input type="checkbox"/> Q1E21MOV8131B</p> | |
| | | <p>(Step 1.7) Verify all post accident containment air mixing system fans - STARTED. (BOP)</p> <p>POST ACCIDENT MIXING FAN</p> <p><input type="checkbox"/> 1A</p> <p><input type="checkbox"/> 1B</p> <p><input type="checkbox"/> 1C</p> <p><input type="checkbox"/> 1D</p> <p>RX CAV H2 DILUTION FAN</p> <p><input type="checkbox"/> 1A</p> <p><input type="checkbox"/> 1B</p> <p>(Step 1.8) WHEN power restored to any de-energized emergency bus, THEN verify alignment of associated equipment.</p> | |
| | BOP | <p>(Step 1.9) Verify SFP Cooling in service per SOP-54.0</p> | Will call Radside SO to accomplish this. |
| End of Attachment 4 | | | |

Op-Test No.: FA2013-301

Page 1 of 2

Brief

This simulator performance scenario is performed in the EVALUATION MODE. You should not direct questions to the evaluators. Otherwise, you should perform as if you were in the MCR.

Your ability to maintain a log is not being graded, but maintaining a rough log is recommended to help during briefs.

If you need to communicate with the Unit 2 operator, call Unit 2 at 2434 or page the Unit 2 Unit Operator.

Respond to what you see. If there is a problem with the simulation, the session will be terminated or adjusted as appropriate based on the specific problem.

Assign operating positions.

Ask for and answer questions.

Appendix D

Turnover sheet

Form ES-D-2

[X] Unit 1 [] Unit 2

Shift:

Date

| | | | |
|--------------|-------------|---------------|-------|
| Off-going SS | Oncoming SS | [] N [X] D | Today |
|--------------|-------------|---------------|-------|

Part I – To be reviewed by the oncoming Supervisor prior to assuming the shift.
Security Keys A, S, D, SW, X on key ring . SS

Unit 4% power, 1350 ppm, MOL 10000 MWD/MTU FRV
Status

TARGET ZERO
Every Day, Every Job Safely

STPs/Evolutions:

A Train On-Service – A Train
Protected

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

Status of Special Testing

All MODE 1 STP's are complete. Permission to proceed to MODE 1 has been granted.

General Information

- Shift Goal is to Raise power to 12% and prepare roll the Main Turbine to 1800 rpm
- Current Risk Assessment is **GREEN** and projected is **GREEN**
- Aux steam is being supplied from Unit 2
- 1A SGFP is on service with FRV Bypass valves in AUTO
- UOP-1.2 ver 103.1, is complete through step 5.62. Continue the startup starting at step 5.63.
- Unit 2 is at 100% power with no major issues.
-
-
-

Equipment Status

| | |
|--|--------------------------------------|
| | Maintain VCT gas pressure 25-30 psig |
| | |
| | |

Reactivity Plan**Waste Management Status**

| | |
|--|---------------------|
| Control rods and steam dumps, as required. | #3 RHT – On Service |
| | WGS – secured |

LCO Status

| | |
|--|--|
| | |
| | |

Night Orders

No New Night Orders

Part II

Review Shift Complement

LCOs Reviewed SS (initials) reviewed as early in shift as possible

Part III:

| | | | | | |
|---|--|--|----------------------------------|--|-------------------------------------|
| STP-1.0 Reviewed/Signed [X] Yes | Operator Logs Reviewed [X] Yes | Cond. Report Queue Reviewed [X] Yes | Autolog Reviewed [X] Yes | ELDS & GEN Spreadsheet verified [X] Yes | Keys Turned Over [X] Yes |
|---|--|--|----------------------------------|--|-------------------------------------|

Southern Nuclear J.M. Farley Nuclear Plant

Operations Training Simulator Exam Scenario



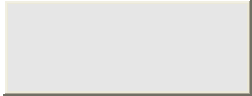

BOOTH INSTRUCTOR GUIDE

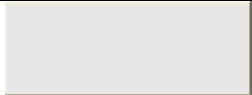

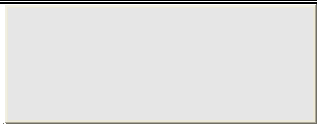
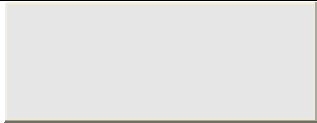
ILT-35 NRC EXAM SCENARIO #3

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



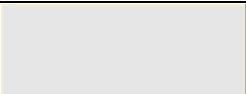

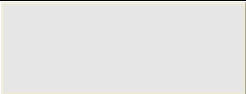
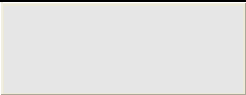
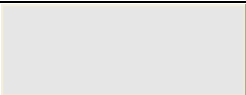


| Facility: | Farley Nuclear Plant | Scenario No.: | 3 | Op-Test No.: | FA2013-301 |
|---|-------------------------|---|---|--------------|------------|
| Examiners: | | Operators: | | SRO | |
| | | | | RO | |
| | | | | BOP | |
| <u>Initial Conditions:</u> 29% power, 429 ppm, EOL; Ramping up, ramp on HOLD for chemistry. | | | | | |
| <u>Turnover:</u> <ul style="list-style-type: none"> Unit 2 PSS is OFF for Maintenance (OOS 2 hrs, ETR 2 hrs) 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs) 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs) Fuel handling is ongoing in the SFP. Current Risk Assessment is YELLOW and projected is YELLOW, B Train On-Service – B Train Protected. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia | | | | | |
| SPLIT TRAIN ALIGNMENT | | | | | |
| Event No. | Malf. No. | Event Type* | Event Description | | |
| 1 | Imf It115 | I (RO) | LT-115, VCT level controller, fails LOW | | |
| 2 | imf mal-rms25a / preset | I (BOP) TS (SRO) | R-25A, SPENT FUEL POOL VENTILATION RAD MONITOR, fails HIGH and SFP ventilation does not secure, PRF starts TS 3.3.8 condition A | | |
| 3 | Imf pt444/ preset | I (RO) TS (SRO) | PT-444, PRZR PRESS CONTROL CHANNEL, fails high PORV-444B leaks by seat- requires block valve closure T.S. 3.4.11 Condition A and TS 3.4.1 DNB Condition A (low pressure) | | |
| 4 | Imf fk478-a | C (BOP) | 1A FRV Fails closed in Auto, will respond in manual control | | |
| 5 | Imf mal-rs4a | R (RO) N(BOP) TS (SRO) | 1A SG tube leak – 15 gpm over 3 min and stabilizes. Ramp at 2 MW/min TS 3.4.13 condition B | | |
| 6 | Imf mal-fwm11a | M (ALL) | Running SGFP trips. RX trip required (Loss of Feed); | | |
| 7 | preset | C (RO) C (BOP) | Reactor Trip hand switches disabled, RX trip requires opening CRDM MG set breakers. Main Turbine will not trip in AUTO, manual trip required. (CT) | | |
| 8 | Imf mal-rs4a | M (ALL) | 1A SGTR increases to 500 gpm when EEP-0 entered. | | |
| 9 | Imf mal-mss2a | M (ALL) C (BOP) | 1A SG fault upstream of 1A MSIV in MSVR when 1A MSIV is closed. Close ALL MSIVs and isolate AFW flow to the Faulted SG. (CT) | | |
| | | | Terminate when ECP-3.1 is entered. | | |

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

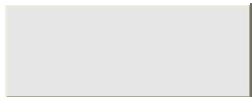
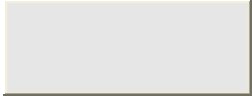
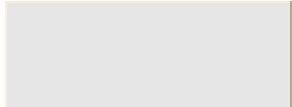

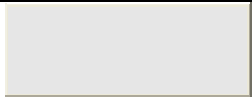
| EVENT# | TIME | EVENT DESCRIPTION / ACTION LIST | ACTIONS |
|--------|------|--|--|
| 0 | 0 | Load in IC-213 and sim IC snap directory Base IC is IC-47 |  |
| | | RUN |  RUN simulator |
| 0 | 0 | Generic setup: bat 36exam/generic_setup_HLT.txt |  |
| | | Quick setup is in IC-213 | |
| 0 | 0 | Quick setup (all items with * are included): bat 36exam/2013nrcexam_3.txt |  |
| | | | |
| | | PRESETS | |
| 2 | | HV-3990A hi rad imf csf3990a_cc1 closed | * |
| 2 | | HV-3416 hi rad imf csff3416_d_cc1 closed | * |
| 2 | | HV-3417A hi rad imf csf3417a_d_cc1 closed | * |
| 3 | | PORV 444B sticks at 10% after being demanded closed: imf rrc444b-m (1 0) 10 1 | TRG 1 |
| 7 | | Fail RTB from opening on manual or auto trip CMFmalf / cBKRXTRP_cc21/ closed CMFmalf / cBKRXTRP_cc22/ closed | * |
| 7 | | Main Turbine will not trip Automatically imf mal-tur2 | * |
| 8 | | 1A MSIVs will not close on auto closure CMFmalf / crsh001a_cc5 /open CMFmalf / cmsh002a_d_cc5 /open | * |
| 0 | | Tag 1A MDAFW pump irf cafp01a_d_cd1 open | * |
| 0 | | 1C DG Tagged out irf cBK1DH07_d_cd1 / open irf cBK2DH07_d_cd1 / open irf cBK1DH07_d_cd2 / open irf cBK2DH07_d_cd2 / open | * |
| | | Triggers and Commands | |
| 3 | | Event Trigger 1 – monitors PORV444B HS closed position trgset 1 "x30i115c" | * |
| 9 | | Trigger 3 On 1A MSIV closure, Fault in MSVR trgset 3 "XSLBA01" trg 3 "imf mal-mss2a 1 300" | * |

| MCB setup | | | |
|------------------|--|--|---|
| | | 1C DG MSS | Place in Mode 3 |
| | | Place HOLD Tag on 1C DG MSS | 1 HOLD TAG |
| | | Place HOLD Tag on 1C DG output breakers DH07-1 and DH07-2 | 2 HOLD TAGS |
| | | Place Unit 1 and Unit 2 Bypass and inoperable panel lights to the up position (EMERGENCY POWER SYSTEM) | Unit 1 A-Train Unit 2 A Train |
| | | Place Unit 1 Bypass and inoperable panel lights to the up position (Auxiliary Feedwater System) | Unit 1 A-Train |
| | | Place HOLD Tag on 1A MDAFW pump H/S | 1 HOLD TAG |
| | | | |
| | | DEH | Clear DEH alarms |
| | | | |
| | | Select OPS on MCB monitor Acknowledge computer alarms | IPC |
| | | | |
| | | IPC: IF FF5 is in alarm, update rods | Ensure FF5 clear or update rods on IPC |
| | | | |
| | | Setup spreadsheet on OATC computer to resemble reactivity spreadsheet provided | <u>Set up computer</u> |
| | | | |
| | | Recorders Verify memory disks cleared Cae clearrecorders.cae |  |
| | | | |
| | | Provide a marked up copy of UOP-3.1 v112.4 completed thru step 5.3, Ready to perform step 5.4. | <u>UOP-3.1 copy</u> |
| | | | |
| | | |  |
| | | | FREEZE simulator |
| | | | |
| | | Perform Booth Operators Setup Checklist | |
| | | | |
| | | Open Simview file to be used for plant parameter data collection: Simview / sv DataCollection.uvl |  sv DataCollection.uvl |
| | | | |
| | | If needed, adjust sim time back to 00:00:00 SIMVIEW / Sim_Clock.uvl Hours: clock(3) = 0 Minutes: clock(2) = 0 Seconds: clock(1) = 0 |  sv sim_clock.uvl |
| | | | |
| | | VERIFY MICROPHONES READY | Batteries installed |
| | | | |
| | | TURNOVER SHEET AVAILABLE | |

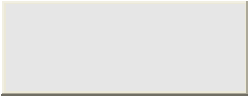
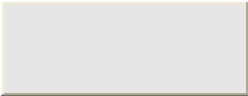


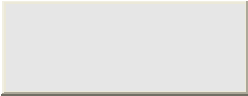
EXAM

| EVENT# | TIME | EVENT DESCRIPTION | COMMAND |
|--------------|---------|--|---|
| Prior to RUN | 0 | | |
| | | Start data collection for Simview file On DataCollection.uvl file press DATA for drop down and then COLLECT to start collecting data | |
| | 0 | Begin Exam |  RUN simulator |
| | | Verify Horns ON: hornflag  <u>HORNS ON = TRUE</u> |  Turn Horns ON/OFF ann horn |
| 1 | NRC CUE | LT-115, VCT level controller, fails LOW imf lt115 0 20 |  |
| 2 | NRC CUE | R-25A, SPENT FUEL POOL VENTILATION RAD MONITOR, fails HIGH and SFP ventilation does not secure, PRF starts TS 3.3.8 condition A imf mal-rms25a 1000000 3 |  |
| 3 | NRC CUE | PT-444, PRZR PRESS CONTROL CHANNEL, fails high imf pt444 2500 45 PORV-444B leaks by seat- requires block valve closure T.S. 3.4.11 Condition A and TS 3.4.1 DNB Condition A (low pressure) |  TRG 1 |
| 4 | NRC CUE | 1A FRV Fails closed in Auto, will respond in manual control imf fk478-a 0 25 |  |
| 5 | NRC CUE | 1A SG tube leak – 15 gpm over 3 min and stabilizes. Ramp at 2 MW/min TS 3.4.13 condition B imf mal-rcs4a 15 300 |  |
| 6 | NRC CUE | Running SGFP trips. RX trip required (Loss of Feed); imf mal-fwm11a |  |

EXAM

| EVENT# | TIME | EVENT DESCRIPTION | COMMAND |
|--------|---------|--|---|
| 7 | | Reactor Trip hand switches disabled, RX trip requires securing Rod Drive MG set breakers. Main Turbine will not trip in AUTO, manual trip required. (CT) | |
| 8 | | 1A SGTR increases to 500 gpm when EEP-0 entered. Malf / R / mal-rs4a / 500 / 60 |  |
| 9 | | 1A SG fault upstream of 1A MSIV in MSVR when 1A MSIV is closed. Imf mal-mss2a 1 50 Close ALL MSIVs and isolate AFW flow to the Faulted SG. (CT) | TRG 3  |
| | NRC CUE | Terminate when ECP-3.1 is entered. | |
| | | | |
| | | | |
| | | End of Exam |  HORNS OFF |
| | | |  FREEZE simulator |
| | | | |
| | | Stop data collection for Simview file sv DataCollection.uvl | |
| | | Export data to file with the name of exam2013sen3grpX.txt NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate. NOTE: file will be saved in the OPENSIM directory. | Ensure data file created. |
| | | When Control board data no longer needed Then Clear recorders for exam security |  |

Local operator actions:

| <u>EVENT NO.</u> | <u>TIME</u> | <u>ACTIONS</u> |
|-------------------------|---------------------------|---|
| 1 | NONE REQUIRED | |
| 2 | NONE REQUIRED | |
| 3 | NONE REQUIRED | If asked, remove power from MOV-8000B FV-W4  |
| 4 | NONE REQUIRED | |
| 5 | NONE REQUIRED | |
| 6 | NONE REQUIRED | |
| 7 | 3 minutes after requested | Locally open reactor trip breakers  CMFmalf / cBKRXTRP_cc21 / open  CMFmalf / cBKRXTRP_cc22 / open |
| 7 | WHEN REQUESTED | <u>TBSO:</u> "I have opened the condenser vacuum breaker isolation valves N1N51V518A and 518B."  REMOTE / N21 / LOA-CFW012 / 100 / 20 sec ramp |
| 8 | NONE REQUIRED | |
| 9 | WHEN REQUESTED | Fire alarm communications 1A – 106 is in alarm MSVR Use extremeview/cr fire panels to acknowledge TDAFW Pump isolation valve Close v017A  irf loa-afw006 0 10 |

Communications sheet

| <u>EVENT NO.</u> | <u>TIME</u> | <u>Communication:</u> |
|-------------------------|--|---|
| ALL | AS REQUIRED (Standard communications to inform supervision) | <u>SSS, SM and Dispatcher:</u> Repeat back failure, procedure entered, plant status, CR in the cue and that type of communications. |
| 1 | NONE EXPECTED | |
| 2 | WHEN REQUESTED | <u>Unit 2 Unit Operator:</u> "R-25A is in high alarm. R-25A is pegged high with the RED high light LIT. R-25B is reading normal mid range scale." <u>IF requested, HP reports:</u> "Rad Levels are normal" "R-25A is pegged HIGH" |
| 3 | NONE EXPECTED | |
| 4 | NONE EXPECTED | |
| 5 | WHEN REQUESTED | AOP-2.0 communications- HP and shift radiochemist, counting room, and SM will all be notified. <u>SSS/TBSO:</u> "I will place SJAE filtration on service." <u>Radside SO:</u> "I will secure SGBD." |
| 6 | NONE EXPECTED | |
| 7 | 3 MINUTES AFTER REQUESTED | [BOOTH] OPEN the Rx trip bkrs using the buttons on LOCAL OPERATOR ACTIONS PAGE, Then report the following: <u>ROVER:</u> "I have locally Opened Unit one Reactor Trip breakers" |
| 8 | WHEN REQUESTED | <u>ANY CALL TO SHIFT RADIO CHEMIST:</u> "I am doing dose assessment and CCP-645" |

Communications sheet

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

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

Turnover:

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

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

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

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

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

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

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

Event 4 1A FRV Fails closed in Auto

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

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

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

Event 6 Running SGFP trips.

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

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

Verifiable actions: Secure Rod Drive MG Sets, Manual trip of the Main Turbine **(CT)**

Event 8 1A SGTR 500 gpm when EEP-0 entered.

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

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

Terminate when ECP-3.1 is entered.

ARP/ AOP-100/ AOP-2.0/ AOP-13/ E-0/ESP-0.1/ E-3/ E-2/ E-3 / ECP-3.1

CRITICAL TASK SHEET

- 1. Manually trip the main turbine [before a sever (orange-path) challenge develops to either the subcriticality or the integrity CSF] or [before transition to ECP-2.1] whichever happens first: (WOG CT FR-E-0 - - Q)
- 2. Isolate faulted SG before transitioning out of E-2.
(WOG CT E-2 - - A)
 - Isolate AFW flow
 - Isolate steam flow from 1A SG

SCENARIO
OBJECTIVE/
OVERVIEW:

The team should be able to:

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

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

Op Test No.: FA2013301 Scenario # 3 Event # 1 Page 1 of 43

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

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

Indications Available:

Annunciators:

- VCT LVL HI-LO (DF3)

Recognize indications of LT-115 failing LOW

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

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

Op Test No.: FA2013301 Scenario # 3 Event # 2 Page 2 of 43
 Event Description: **R-25A fails HIGH**

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

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

Indications Available:

Annunciators:

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

Indications:

- A TRN PRF starting

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

Op Test No.: FA2013301 Scenario # 3 Event # 2 Page 3 of 43
 Event Description: **R-25A fails HIGH**

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

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

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

| | | | | |
|--|--|--|--|-------------------|
| | | Table 3.3.8-1 (page 1 of 1) PRF Actuation Instrumentation | | |
| | | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS |
| | | 1. Manual Initiation | 1,2,3,4, (a), | 2 trains |
| | | 2. Automatic Actuation Logic and Actuation Relays | 1,2,3,4 | 2 trains |
| | | 3. SFP Room Radiation Gaseous (R-25A, B) | (a) | 2 |
| | | (a) During movement of irradiated fuel assemblies in the SFP room. | | |
| | | CONDITION | REQUIRED ACTION | COMPLETION TIME |
| | | A. One or more Functions with one channel or train inoperable. | A.1 Place one PRF train in Operation. | 7 days |
| | | SFP Room Radiation Gaseous (R-25A, B) | | |
| | | (a) During movement of irradiated fuel assemblies in the spent fuel pool room. 2 channels required. | | |
| | | Condition A- Place one train PRF in operation in 7 days since only one channel is inoperable. | | |
| | | BASES (B 3.3.8-2) 3. Spent Fuel Pool Room Radiation | | |
| | | The LCO specifies two required Gaseous Radiation Monitor channels to ensure that the radiation monitoring instrumentation necessary to initiate the PRF remains OPERABLE. Each monitor will initiate the associated train of PRF and isolate the normal SFP Room ventilation. | | |
| | | | | |
| | | | | |
| | | | | |

Op Test No.: FA2013301 Scenario # 3 Event # 2 Page 4 of 43

Event Description: R-25A fails HIGH

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------|--|----------|
| SOP-58.0, Auxiliary Building Hvac System, ver 75.3 | | | |
| | BOP | <p>(step 4.8.6.a) Verify open</p> <ul style="list-style-type: none"> HV3538A SFP TO 1A PRF SUPPLY DMPR HV3538B,SFP TO 1B PRF SUPPLY DMPR <p>(step 4.8.6.b) is not required to be done since a fuel handling accident is not in progress.</p> <p>(step 4.8.6.c) Verify started</p> <ul style="list-style-type: none"> 1A PRF RECIRC FAN M002A 1A PRF EXH FAN M001A <p>(step 4.8.6.e) Secure SFP AHU as follows:</p> <ul style="list-style-type: none"> Stop SFP AHU SUPP FAN M002. Stop 1A(1B) SFP EXH FAN M001A(B) <p>(step 4.8.6.f) Verify closed the following:</p> <ul style="list-style-type: none"> SFP EXH FAN SUCT DMPR HV3990A SFP EXH FAN SUCT DMPR HV3990B SFP AHU DISCH TO SFP HV3991A SFP AHU DISCH TO SFP HV3991B | |
| <p>Note: Examinee may elect to start B Train PRF early to prevent action above causing an auto start. This guidance can be found in multiple locations of the procedure.</p> <ul style="list-style-type: none"> Start 1B PRF RECIRC FAN, Q1E15M002B Start 1B PRF EXH FAN, Q1E15M001B <p>After Tech Spec analysis and at the discretion of the Lead Examiner move to next Event.</p> | | | |

Op Test No.: FA2013301 Scenario # 3 Event # 3 Page 5 of 43

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

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

Indications Available:

Annunciators:

- PRZR PORV TEMP HI (HA5)
- PRZR SAFETY VLV TEMP HI (HA4)
- REL VLV 444B\445A OPEN (HE1)
- PRZR PRESS RELVLV 445A OR BU HTRS ON (HD1)
- PRZR PRESS HI-LO (HC1)

Recognize indications of PT-444 failing HIGH:

- PK-444A demand ↓
- PORV 444B open
- PI's 455;456;457, RCS Press ↓
- Pressurizer B/U heaters energizing
- TI-463 PORV Tailpiece temps ↑
- TI-465; TI-467; TI-469 Code Safety Tailpiece temps ↑

| Time | Pos. | Expected Actions/Behavior | Comments |
|---|------|---|--|
| AOP-100, Instrumentation Malfunction, section 1.1 ver 12 | | | |
| | SRO | Direct entry into AOP-100 | |
| | RO | (step 1) Take manual control of the following equipment as necessary: <ul style="list-style-type: none"> - PORV 444B, PRZR PORV. - ALL Pzr heaters - PK-444C & D, 1A& 1B LOOP SPRAY VLV - PK-444A, PRZR PRESS reference Controller - PRZR BLOCK VLV MOV8000B | Steps 1 and 2 are IOAs NOTE: Block valve required due to 444B seat leakage (RCS pressure still falling) NOTE: HA5 ARP may be used to isolate leaking PORV actions on PAGE 7 |
| | | (step 2) IF pressurizer pressure is decreasing due to a mechanically stuck open spray valve PCV444C or PCV444D | |
| | RO | (step 3) If the PORV is open then close the PORV when RCS pressure is < 2310 psig. | |
| | RO | (step 4) IF an alarm was caused by a CONTROL instrument (PT-444/445) OR component failure, THEN perform the following as required to restore RCS pressure to desired value. <ul style="list-style-type: none"> - Take manual control of PORV's, Block valves, Pressurizer heaters and spray. | |

Op Test No.: FA2013301 Scenario # 3 Event # 3 Page 6 of 43

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|---|-------------------------|
| | SRO | (step 5) Determine NO protection instrument failure occurred. | |
| | RO | (step 6) References required Technical Specifications : | See T.S. required below |
| | SRO | (step 9) Submit a condition report on the failed component, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the condition report. | |
| | SRO | (step 10) IF the pressurizer PORVs operated, THEN perform the following: <ul style="list-style-type: none"> Refer to SOP-1.2, Reactor Coolant Pressure Relief System, for cooldown of the PRT Refer to SOP-0.0, General Instructions To Operations Personnel, for reporting requirements. | |

TECHNICAL SPECIFICATION 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits

RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified in the COLR. The minimum RCS total flow rate shall be $\geq 263,400$ GPM when using the precision heat balance method, $\geq 264,200$ GPM when using the elbow tap method, and \geq the limit specified in the COLR

| | | | | |
|--|-----|--|---|-----------------|
| | SRO | CONDITION | REQUIRED ACTION | COMPLETION TIME |
| | | A. One or more RCS DNB parameters not within limits. | A.1 Restore RCS DNB parameter(s) to within limit. | 2 hours |

TECHNICAL SPECIFICATION 3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

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

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

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

Op Test No.: FA2013301 Scenario # 3 Event # 3 Page 7 of 43

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

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

Op Test No.: FA2013301 Scenario # 3 Event # 4 Page 8 of 43

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

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

Indications Available:**Annunciators:**

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

Indications:

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

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

Op Test No.: FA2013301 Scenario # 3 Event # 4 Page 9 of 43Event Description: **1A FRV fails closed in AUTO. Controllable in MANUAL.**

| Time | Pos. | Expected Actions/Behavior | Comments |
|---|------|---|---------------|
| | BOP | (step 5) Refer to Tech Specs 3.3.1, 3.3.2 & 3.3.3 for any LCO requirements. | None required |
| | | | |
| | SRO | (step 6) Notify the Shift Manager | |
| | | | |
| | SRO | (step 7) WHEN plant conditions permit, THEN return systems to automatic control. | |
| | | | |
| | SRO | (step 8) Submit a condition report for the failed instrument, and notify the Notify the Work Week Coordinator | |
| | | | |
| When 1A FRV is in manual and SGWL is under control and at the discretion of the Lead Examiner move to the next Event | | | |

Op Test No.: FA2013301 Scenario # 3 Event # 5 Page 10 of 43

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

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

Indications Available:

Annunciators:

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

Recognize indications of SG TUBE LEAK

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|---|------|--|-----------------------------|
| ARP-1.6, Annunciator response procedure, FG1 Ver. 70 | | | |
| | SRO | Direct ARP FG1 actions | |
| | BOP | (Step 1) Check N1D11RISH0070A, B, & C to determine the magnitude of the leak and the generator indicating leakage. | R-70A will be increasing |
| | BOP | (step 3) Notify Chemistry of the alarm condition (step 5) Perform a qualitative confirmation for the existence of a SG tube leak by checking two independent radiation monitors R-70s/R-15, R-70s/R-23B, or R-15/R-23B trending in the same direction with the same order of magnitude. <ul style="list-style-type: none"> • Consider placing SJAE Filtration System in service per FNP-1-SOP-28.5 | |
| | SRO | (step 6) IF this annunciator will not clear due to actual SG tube leakage OR an increase in existing tube leak is indicated, THEN go to FNP-1-AOP-2.0, STEAM GENERATOR TUBE LEAKAGE. | AOP-2.0 actions on page 12. |
| | | | |

Op Test No.: FA2013301 Scenario # 3 Event # 5 Page 11 of 43

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|---|------|---|------------------------------|
| | SRO | (step 7) Refer to Technical Specifications section 3.4.13 for limiting conditions for operation. | T.S. Listed on PAGE16 |
| ARP-1.6, Annunciator response procedure, FH1 Ver. 70 | | | |
| | BOP | Reference ARP FH1 (step 1) Check indications on radiation monitoring system console and determine which radiation monitor channel indicates high activity. (step 2) Insure any auto actions have occurred. | |
| | BOP | Check ARP FH1 for actions as Rad monitors come into alarm. (step 3.3) Do not allow personnel to enter the affected area without the approval of the Health Physics Department. (step 3.6) IF high activity indication of Steam Generator Tube Leakage is present, THEN go to FNP-1-AOP-2.0, STEAM GENERATOR TUBE LEAKAGE. | |
| | | | |

Op Test No.: FA2013301 Scenario # 3 Event # 5 Page 12 of 43

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|-------------|--|---|
| | SRO/ BOP | <p><u>IF R-15</u> alarms <u>AND</u> remains above the alarm setpoint (not a momentary spike), <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <u>IF</u> high effluent activity is possible, <u>THEN</u> implement NMP-EP-110 Notify the Counting Room to <u>immediately</u> sample the SGs per CCP-31 to determine the leak rate. Notify the Operations Shift Manager. <u>IF</u> an actual SG tube leak is confirmed, consider placing SJAЕ Filtration System in service per FNP-1-SOP-28.5. <p><u>IF R-19</u> alarms refer to SOP-45.0 for guidance in sampling SGs with R-19 in alarm.</p> <p><u>IF R-23A OR R-23B</u> alarms, contact the RAD man to verify SGBD secured.</p> | |
| AOP-2.0, Steam Generator Tube Leakage Ver. 35 | | | |
| | RO | <p>(step 1) Maintain pressurizer level stable at normal programmed value by:</p> <ul style="list-style-type: none"> - Control charging - Reduce letdown close HV-8149 A, B, C | <p>NOTE: [CA] step FK-122 adjusted as required</p> <p>close one or more orifice isol. valves</p> |
| | RO | <p>(step 1.3) Determine leak rate, if possible (use STP-9.0, RCS leakage) (RNO step 1.3) Determine leak rate based on flow balance</p> <p>_____ (charging flow)</p> <p>+ _____ (seal injection flow)</p> <p>- _____ (letdown flow)</p> <p>- _____ (#1 seal leakoff flow)</p> <p>= _____ (RCS leak rate)</p> | |

Op Test No.: FA2013301 Scenario # 3 Event # 5 Page 13 of 43

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|---|--|
| | RO | (step 2) Maintain VCT level greater than 20%. by: Verify RMW system in AUTO <u>OR</u> Manually control makeup as required by using SOP-2.3, CVCS Rx makeup system | NOTE: [CA] step RNO is to trip the Rx and actuate an SI |
| | | | |
| | BOP | (step 3) Check Unit in Mode 1 or Mode 2. | |
| | | | |
| | SRO | (step 4) Check reactor power conditions: - Check NO power ascension in progress - Check NO power reduction in progress - Check reactor power greater than 20% | |
| | | | |
| | BOP | (step 5) Monitor primary to secondary leakage Check R-70s or R-15 for increasing count rate Begin trending R-70A, SG TUBE LEAK, and R-15, SJAE EXH, using the plant computer and Data sheet 1. | NOTE: [CA] step Chemistry will acknowledge CCP-31 app C |
| | | | |
| | BOP | (step 6) Call TBSO to place SJAE filtration on service. | |
| | | | |
| | SRO | (step 7) Direct chemistry to perform grab samples and leak rate determinations. CCP-201 Table 55 (step 8) Notify SM of leak rate (step 9) Continue to monitor R-70's, R-15 or CHM/HP leak rate input for primary to secondary leak rate and rate of change using Data sheet 1. | NOTE: [CA] step – NOTE: [CA] step – |
| | | | |

Op Test No.: FA2013301 Scenario # 3 Event # 5 Page 14 of 43

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|-----------|---|------------------------------|
| | SRO | (Step 10) Monitor the Continuous Radiation Monitoring System operation. [] R-15 – OPERABLE OR [] R-70's - OPERABLE | NOTE: [CA] step – |
| | | | |
| | SRO | (step 11) Evaluate Table to determine appropriate response: - ACTION LEVEL 3 Condition 1 ≥30 gpd/hr rate of increase <u>AND</u> ≥75 gpd leak in any SG | |
| | | | |
| | BOP | (Step 12.1) Check any two of the following rad monitors trending in the same direction: - R-70s/R-15 OR - R-70s/R-23A(B) OR - R-15/R-23A(B) trending in the same direction with the same order of magnitude | |
| | | | |
| | SRO | (step 12.2) Direct reducing power to ≤ 50% rated thermal power within 1 hour | Unit is below 50% already |
| | RO BOP | (step 12.3) Place the Unit in Mode 3 within the next 3 hours. | Begin ramping offline |
| | | | |
| | SRO | (step 12.4) Identify the correct leaking SG Using R-70s, R-60s and level rise in any SG | 1A SG has a 15 gpm tube leak |
| | | | |
| | BOP | (step 12.6) Have Chemistry convert R-15 readings to gpd within 15 minutes. | |
| | | | |
| | SRO | (step 12.7) Call SM to evaluate emergency classifications per NMP-EP-110 and EIP 8.0 | |
| | | | |
| | SRO | (step 17) Direct Chemistry to monitor the turbine building sump for activity | |
| | | | |

Op Test No.: FA2013301 Scenario # 3 Event # 5 Page 15 of 43

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|---|--|
| | SRO | (step 18) Refer to FNP-0-AOP-2.1; Contingency Plan For Minimizing And Controlling Contaminated Secondary Condensate. | |
| | | | |
| | BOP | (step 19) Verify affected SG(s) identified. Check any SG level - RISING IN AN UNEXPLAINED MANNER. OR Check any SG radiation indication – HIGH R-70 A, B, C and R-60 A, B, C | |
| | | | |
| | BOP | (Step 20) Verify affected SG(s) atmospheric relief valve-ALIGNED - 3371A 8.25 and in AUTO | |
| | | | |
| | BOP | (Step 21) Check affected SG atmospheric relief valve 3371A – CLOSED | |
| | | | |
| | | (Step 22) if TDAFWP is running or required then direct the counting room to perform CCP-645 (STEP 23) Check 1B or 1C SG(s) - AFFECTED. | TDAFWP not running or required Not affected |
| | | | |
| | BOP | (Step 24) Verify SGBD isolated from the 1A SG- 7614A closed (Step 25) Check AS supplied from Unit 2 | It is aligned from Unit 2 |

Tech specs on next page

Op Test No.: FA2013301 Scenario # 3 Event # 5 Page 16 of 43

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

| | | | | |
|--|--|--|---|-------------------------|
| TECHNICAL SPECIFICATION 3.4.13, RCS Operational LEAKAGE RCS operational LEAKAGE shall be limited to: d. 150 gallons per day primary to secondary LEAKAGE through any one SG. | | | | |
| | | CONDITION | REQUIRED ACTION | COMPLETION TIME |
| | | B. Required Action and associated Completion Time of Condition A not met. OR Pressure boundary LEAKAGE exists. OR Primary to secondary LEAKAGE not within limit. | B.1 Be in MODE 3. AND B.2 Be in MODE 5. | 6 hours 36 hours |
| When ramp of 5% completed and at the discretion of the Lead Examiner move to the next Event. Tech Spec evaluation if required by examiner may be delayed until after scenario termination. | | | | |

Op Test No.: FA2013301 Scenario # 3 Event # 6 Page 17 of 43

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

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

Indications Available:

Annunciators:

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

Indications

- SGFP Speed decreasing
- SGWL decreasing

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

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 18 of 43
 Event Description: **1A SGTR 500 gpm.**

When the crew tries to trip the reactor, the reactor trip breakers will not open and RX trip requires securing Rod Drive MG sets. 1A SG will rupture upon entry of this procedure.

Indications Available:

Annunciators:

- Various and many

Recognize indications of event

- RTBs still closed
- Nis indicate full power

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

| | | | |
|--|------------|--|--|
| | RO/ BOP | <p>(step 1) Check reactor trip. Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. Check rod bottom lights - LIT.</p> <p>(step 2) Check turbine - TRIPPED. TSLB2 14-1 thru 4 lit</p> <p>(step 3) Check power to 4160 V ESF busses. 4160 V ESF busses - AT LEAST ONE ENERGIZED</p> <p>A Train (F 4160V bus) power available lights lit OR B Train (G 4160V bus) power available lights lit</p> <p>Verify operating diesel generators are being supplied from at least one SW pump.</p> | <p>IOA of EEP-0 RNO 1.1 Manually trip reactor. 1.2 IF reactor can NOT be tripped, THEN trip both MG set supply breakers.</p> <ul style="list-style-type: none"> • N1C11E005A • N1C11E005B <p>Critical task RNO 2.1 Place main turbine emergency trip switch to TRIP for at least 5 seconds.</p> |
| | | | |

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 19 of 43
 Event Description: **1A SGTR 500 gpm.**

| | | | |
|--|------------|--|---|
| | RO/ BOP | <p>(step 4) Check SI Status. (step 4.1) Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION <input type="checkbox"/> ACTUATED status light lit <input type="checkbox"/> MLB-1 1-1 lit <input type="checkbox"/> MLB-1 11-1 lit</p> <p>(step 4.2) Verify both trains of SI- ACTUATED. <input type="checkbox"/> MLB-1 1-1 lit AND <input type="checkbox"/> MLB-1 11-1 lit</p> | |
| | | | |
| | | | |
| <p>NOTE: IF crew has not recognized SGTR yet they may transition to ESP-0.1. FOLDOUT PAGE criteria of ESP-0.1 to actuate SI and transition back EEP-0 is PZR level <4%. If required, actions for <u>ESP-0.1</u> are located on PAGE 32</p> | | | |
| | SRO | <p>(step 5) Directs continuing into EEP-0 at step 5. Directs the BOP to perform attachment 2.</p> | <p>For Attachment 2 and 4 actions. Go to page 35</p> |
| | | | |
| | | <p>EEP-0 FOLD OUT PAGE CRITERIA IN EFFECT Ruptured SG AFW Isolation.</p> <ul style="list-style-type: none"> Manually stop AFW flow to a SG if BOTH conditions listed below occur: <ul style="list-style-type: none"> Level increases in an uncontrolled manner or radiation in that SG is abnormal AND Narrow range level – GREATER THAN 31% {48%} | <p>NOTE: [CA] step The action to Isolate AFW to the ruptured SG may be completed beyond this point.</p> |
| | | | |
| | RO | <p>(step 6) Check containment pressure- HAS REMAINED LESS THAN 27 psig</p> | <p>NOTE: [CA] step –</p> |
| | | | |
| | RO | <p>(step 7) Announce "Unit 1 reactor trip and safety injection".</p> | |
| | | | |

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 20 of 43

Event Description: 1A SGTR 500 gpm.

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

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 21 of 43

Event Description: 1A SGTR 500 gpm.

| | | | |
|--|-----|---|---|
| | RO | <p>(step 9 RNO) IF RCS temperature less than 547°F and falling, THEN perform the following.</p> <p>(step 9.1.1) Verify steam dumps closed.</p> <p>STM DUMP INTERLOCK</p> <p><input type="checkbox"/> A TRN in OFF RESET</p> <p><input type="checkbox"/> B TRN in OFF RESET</p> <p>(step 9.1.2) Verify atmospheric reliefs closed on MCB</p> <p><input type="checkbox"/> Demand at 0 and minimum red light LIT</p> <p>(step 9.1.3) Control total AFW flow to minimize RCS cooldown,</p> <p>AFW FLOW TO 1A(1B,1C) SG</p> <p><input type="checkbox"/> FI 3229A</p> <p><input type="checkbox"/> FI 3229B</p> <p><input type="checkbox"/> FI 3229C</p> <p>AFW TOTAL FLOW</p> <p><input type="checkbox"/> FI 3229</p> <p>IF MSIVs are closed THEN proceed to step 9.1.8 to break condenser vacuum</p> | NOTE: RNO column since RCS temp will be <547°F |
| | BOP | <p>(step 9.1.5 RNO) IF MSIV's are open THEN isolate steam loads in the turbine building:</p> <ul style="list-style-type: none"> MSRs reset <p>(steps 9.1.5.1 and 9.1.5.2 RNO) these actions are performed by Systems Operators when RX trip is announced in step 7.</p> <p>(9.1.5.3 is NA, it is already aligned)</p> | |
| | BOP | <p>(step 9.1.5.4 RNO) IF two SJAE's in service, THEN secure one SJAE</p> <ul style="list-style-type: none"> 1A SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed 1B SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed | |

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 22 of 43Event Description: **1A SGTR 500 gpm.**

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

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 23 of 43

Event Description: 1A SGTR 500 gpm.

| | | | |
|--|----|---|--|
| | RO | <p>(step 10) Check pressurizer PORVs and spray valves. WHEN pressurizer pressure less than 2335 psig, THEN verify both PRZR PORVs closed.</p> <p>Verify both PRZR PORVs indicate CLOSED</p> <p>Check PRZR PORV temperature STABLE OR FALLING. <input type="checkbox"/> PORV Temp TI-463</p> <p>Check PRT parameters STABLE or FALLING. <input type="checkbox"/> PRT PRESS PI 472 <input type="checkbox"/> PRT LVL LI-470 <input type="checkbox"/> PRT TEMP TI-471</p> <p>WHEN pressurizer pressure less than 2260 psig, THEN verify normal pressurizer spray valves closed OR in the process of closing. 1A(1B) LOOP SPRAY VLV <input type="checkbox"/> PK 444C <input type="checkbox"/> PK 444D</p> <p>Check any PRZR PORV ISO - OPEN</p> | <p>NOTE: [CA] step –</p> <p>NOTE: [CA] step –</p> |
| | RO | <p>(step 11) Check RCP criteria. Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE</p> | |
| | RO | <p>(step 12) Monitor charging pump miniflow criteria. Control charging pump miniflow valves based on RCS pressure. 1C(1A) LOOP RCS WR PRESS <input type="checkbox"/> PI 402A <input type="checkbox"/> PI 403A</p> | <p>NOTE: Based on RCS pressure, close miniflows < 1300 and open when > 1900 psig.</p> |

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 24 of 43

Event Description: 1A SGTR 500 gpm.

Diagnostics

The SRO will direct the parameters to be reviewed and will determine appropriate procedure to transition to.

| | | | |
|--|-----|--|---------------------------|
| | | | |
| | SRO | (step 13) Check SGs not faulted. <input type="checkbox"/> Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig. | |
| | SRO | (step 14) Check SGs not ruptured <input type="checkbox"/> No SG level rising in an uncontrolled manner. | RNO: Go TO EEP-3.0 |
| | | | |
| EEP-3.0, Steam Generator Tube Rupture, ver 27.0 | | | |
| | | | |
| | RO | (step 1) Check RCP criteria. Check SUB COOLED MARGIN MONITOR indication - > 16°F{45°F} SUBCOOLED IN CETC MODE. | |
| | | | |
| | BOP | (step 2) Identify ruptured SG(s). <ul style="list-style-type: none"> Check any SG level - RISING IN AN UNCONTROLLED MANNER | NOTE: [CA] step – |
| | | | |

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 25 of 43

Event Description: 1A SGTR 500 gpm.

| | | | |
|---|------------|--|--|
| | SRO/ RO | <p>(step 3) WHEN ruptured SG(s) identified, THEN isolate flow from ruptured SG(s).</p> <p>Verify ruptured SG(s) atmospheric relief valve - ALIGNED.</p> <ul style="list-style-type: none"> PC3371A set 8.25 and in auto Verify 3371A is closed <p>Isolate steam supply from ruptured SG(s) to TDAFWP: N/A</p> <p>Verify blowdown from ruptured SG(s) - ISOLATED.</p> <p>(step 3.7) Verify at least one SG MSIV on 1A SG closed</p> | <p>NOTE: [CA] step –</p> <p>Neither 1B or 1C SG is ruptured</p> <p>Closes 7614A</p> <p>Verifies MSIV 3369A or 3370A closed and bypass valves closed</p> |
| <p>NOTE: Step above triggers steam fault in 1A SG. FOLDOUT PAGE criteria will be met to transition to EEP-2.</p> <p>No SG pressure falling in an uncontrolled manner or less than 50 psig. THEN go to EEP-2. For EEP-2 actions Go To Page 26. Examine may transition to ECP-3.1 beyond this point, it is the intent of this scenario to Transition to EEP-2 for faulted SG isolation before termination. IF transition is made early, ECP-3.1 steps are located on Page 29. EEP-3 is continued on Page 28.</p> | | | |
| | BOP | <p>(step 4) WHEN ruptured SG(s) NR level greater than 31% THEN perform the following:</p> <p>Isolate AFW flow to ruptured SG(s) using FCVs.</p> <ul style="list-style-type: none"> FCV 3227A in MOD HIC 3227AA closed HV 3328A in MOD HIC 3328AA closed | <p>NOTE: [CA] step –</p> |

Op Test No.: FA2013301 Scenario # 3 Event # 9 Page 26 of 43

Event Description: Faulted SG Isolation

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

Indications Available:**Annunciators:**

- MH1 FIRE
- JB4 MS LINE HI STM FLOW ALERT

Recognize indications of SGTR with a fault:

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

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

Op Test No.: FA2013301 Scenario # 3 Event # 9 Page 27 of 43

Event Description: Faulted SG Isolation

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

Op Test No.: FA2013301 Scenario # 3 Event # 9 Page 28 of 43

Event Description: Faulted SG Isolation

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

Op Test No.: FA2013301 Scenario # 3 Event # 9 Page 29 of 43

Event Description: ECP-3.1

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------|---|---|
| ECP-3.1, SGTR with LOSS of Reactor Coolant SUBCOOLED RECOVERY Desired, ver 23.0 Note: If EEP-2 has not been performed, FOLDOUT page criteria directs entry to EEP-2 | | | |
| | RO | (step 1) Verify SI – RESET <ul style="list-style-type: none"> MLB-1 1-1 not lit (A TRN) MLB-1 11-1 not lit (B TRN) | |
| | | | |
| | RO | (step 2) Verify PHASE A CTMT ISO – RESET <ul style="list-style-type: none"> MLB-2 1-1 not lit MLB-2 11-1 not lit | |
| | | | |
| | RO | (step 3) Check PHASE B CTMT ISO – RESET <ul style="list-style-type: none"> MLB-3 1-1 not lit MLB-3 6-1 not lit | |
| | | | |
| | RO | (step 4) IF instrument air available, THEN establish instrument air to containment. (step 4.1) Verify at least one air compressor started. AIR COMPRESSOR 1A / 1B / 1C (step 4.2) Check INST AIR PRESS PI 4004B greater than 85 psig. (step 4.3) Check instrument air to containment. IA TO CTMT <ul style="list-style-type: none"> MLB-3 1-2 NOT lit IA TO PENE RM PRESS LO <ul style="list-style-type: none"> Annunciator KD1 clear | |
| | | | |
| | BOP | (step 5) Verify 4160 V busses energized. (step 5.1) Perform ATTACHMENT 1, VERIFYING 4160V BUSSES ENERGIZED. | [CA] Att 1 starting at PAGE 43 |
| | | | |
| | RO | (step 6) Turn off all pressurizer heaters. PRZR HTR GROUP VARIABLE 1C PRZR HTR GROUP BACKUP 1A 1B 1D 1E | |
| | | | |

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Event Description: ECP-3.1

| | | | |
|--|----|---|------|
| | RO | <p>(step 7) Check containment spray system.</p> <p>(step 7.1) Check any containment spray pump - STARTED. CS PUMP 1A 1B</p> <p>(step 7.2) Reset containment spray signals. CS RESET A TRN B TRN</p> <p>(step 7.3) WHEN containment spray recirculation flow has been aligned for at least 8 hours, AND containment pressure is less than 16 psig, THEN stop both CS PUMPS.</p> | [CA] |
| | RO | <p>(step 8) Check ruptured SG(s) level.</p> <p>(step 8.1) Check ruptured SG(s) narrow range level - GREATER THAN 31%{48%}.</p> <p>(step 8.2) Verify AFW flow to ruptured SG(s) - ISOLATED.</p> | [CA] |
| | RO | <p>(step 9) Check if LHSI Pumps should be stopped.</p> <p>(step 9.1) RHR pumps - ANY RUNNING WITH SUCTION ALIGNED TO RWST.</p> <p>(step 9.2) Check RCS pressure - GREATER THAN 275 psig{435 psig}.</p> <p>1C(1A) LOOP RCS NR PRESS <input type="checkbox"/> PI 402B <input type="checkbox"/> PI 403B</p> <p>(step 9.3) Check RCS pressure - STABLE OR RISING. 1C(1A) LOOP RCS NR PRESS <input type="checkbox"/> PI 402B <input type="checkbox"/> PI 403B</p> <p>(step 9.4) Stop any RHR Pumps running with suction from the RWST.</p> | [CA] |
| | RO | <p>(step 10) Begin evaluation of plant status.</p> <p>(step 10.1) Begin taking ECCS logs.</p> <p>(step 10.2) Check no intersystem LOCA outside CTMT. and/or leakage.</p> <p>(step 10.2.1) Check auxiliary building radiation - NORMAL.</p> <p><input type="checkbox"/> R-3 RADIOCHEMISTRY LAB <input type="checkbox"/> R-4 1C CHG PUMP RM <input type="checkbox"/> R-5 SFP RM <input type="checkbox"/> R-6 SAMPLE RM AREA</p> | |

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Event Description: ECP-3.1

| | | | |
|--|------------|---|--|
| | | <p>□ R-8 DRUMMING STATION</p> <p>□ R-10 PRF</p> <p>(step 10.2.2) Check auxiliary building room sumps - HI LVL ALARMS CLEAR AND NO SUMP PUMPS RUNNING IN AUTO. (BOP)</p> <p>(step 10.2.3) Check WHT and FDT levels - NO EXCESSIVE OR UNEXPLAINED LEVEL RISE.</p> <p>(step 10.3) Verify at least one train of PRF in operation using SOP-60.0, PENETRATION ROOM FILTRATION SYSTEM.</p> <p>(step 10.4) Close recirculation valve disconnects using ATTACHMENT 3.</p> <p>(step 10.5) Evaluate RCS sampling requirements.</p> <p>(step 10.5.1) Consult TSC staff to evaluate need for RCS sampling.</p> <p>(step 10.5.2) IF RCS sample required, THEN direct Chemistry to sample RCS using FNP-0-CCP-1300, CHEMISTRY AND ENVIRONMENTAL ACTIVITIES DURING A RADIOLOGICAL ACCIDENT.</p> <p>(step 10.6) Establish 1A and 1B post LOCA - IN SERVICE USING ATTACHMENT 4, POST LOCA CONTAINMENT HYDROGEN ANALYZER OPERATION.</p> <p>(step 10.7) Plot hydrogen concentration on FIGURE 1.</p> <p>(step 10.8) Check containment hydrogen concentration - LESS THAN 3.5%.</p> <p>(step 10.9) Check containment hydrogen concentration - LESS THAN 0.5%.</p> | |
| | SRO | <p>(step 11) Check SGs not faulted.</p> <p>(step 11.1) Check no SG pressure - FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig.</p> | <p>RNO 11.1</p> <p>IF faulted SG NOT needed for RCS cooldown AND faulted SG NOT previously isolated, THEN go to EEP-2</p> |
| | | Above is the last chance for the crew to diagnose a SG fault. | |

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Event Description: ESP-0.1 Actions

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

FOLDOUT PAGE criteria of ESP-0.1 to actuate SI and transition back EEP-0 is PZR level <4%.
When SI is actuated return to page **PAGE 18**

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

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Event Description: **ESP-0.1 Actions**

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

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 34 of 43Event Description: **ESP-0.1 Actions**

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

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Event Description: Attachment 2 of EEP-0

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

Attachment 2 of EEP-0

AUTOMATIC ACTIONS VERIFICATION

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|-----------------------------------|
| | BOP | (Step 1) Verify one CHG PUMP in each train - STARTED. <input type="checkbox"/> A train (1A or 1B) amps > 0 <input type="checkbox"/> B train (1C or 1B) amps > 0 | |
| | BOP | (Step 2) Verify RHR PUMPS - STARTED. RHR PUMP <input type="checkbox"/> 1A amps > 0 <input type="checkbox"/> 1B amps > 0 | |
| | BOP | (Step 3) Verify Safety Injection Flow. (Step 3.1) Check HHSI flow - GREATER THAN 0 gpm. <input type="checkbox"/> FI 943 | |
| | BOP | (Step 3.2) Check RCS pressure - LESS THAN 275 psig{435 psig}. | Operator should proceed to step 4 |
| | BOP | (step 3.3) Check LHSI flow – greater than 1.5×10^3 gpm <input type="checkbox"/> 1A RHR HDR FLOW FI-605A <input type="checkbox"/> 1B RHR HDR FLOW FI-605B | |
| | BOP | (Step 4) Verify each SW train - HAS TWO SW PUMPS STARTED. <input type="checkbox"/> A train (1A,1B or 1C) <input type="checkbox"/> B train (1D,1E or 1C) | |

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Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|-----------------------|
| | BOP | <p>(Step 5) Verify each train of CCW - STARTED.</p> <p>(Step 5.1) Verify one CCW PUMP in each train- STARTED.</p> <p>A train HX 1C or 1B CCW FLOW <input type="checkbox"/> FI 3043CA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW <input type="checkbox"/> FI 3043AA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm</p> <p>Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX <input type="checkbox"/> Q1P16FI3009AA > 0 gpm <input type="checkbox"/> Q1P16FI3009BA > 0 gpm <input type="checkbox"/> Q1P16FI3009CA > 0 gpm</p> | |
| | BOP | <p>(step 6) Verify containment ventilation isolation.</p> <p>Verify containment purge dampers - CLOSED.</p> <p><input type="checkbox"/> 3197 <input type="checkbox"/> 3198D <input type="checkbox"/> 3198C <input type="checkbox"/> 3196 <input type="checkbox"/> 3198A <input type="checkbox"/> 3198B</p> <p>Verify containment mini purge dampers - CLOSED.</p> <p>CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D <input type="checkbox"/> 2866C <input type="checkbox"/> 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C <input type="checkbox"/> 2866D <input type="checkbox"/> 2867D</p> <p>Stop MINI PURGE SUPP/EXH FAN.</p> | Will place HS to STOP |

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 37 of 43Event Description: **Attachment 2 of EEP-0**

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

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 38 of 43

Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|--|
| | BOP | (step 8) Verify AFW Pumps - STARTED. Verify both MDAFW Pumps - STARTED <input type="checkbox"/> 1A MDAFW Pump amps > 0 <input type="checkbox"/> 1B MDAFW Pump amps > 0 AND <input type="checkbox"/> FI-3229A indicates > 0 gpm <input type="checkbox"/> FI-3229B indicates > 0 gpm <input type="checkbox"/> FI-3229C indicates > 0 gpm | RNO 8.1 Verify MDAFW Pumps deliver flow to each SG. 8.1.1 Manually start MDAFW Pumps 8.1.2 Verify AFW flow path to AND each SG. <input type="checkbox"/> Q1N23HV3227A in MOD <input type="checkbox"/> Q1N23HV3227B in MOD <input type="checkbox"/> Q1N23HV3227C in MOD MDAFWP TO 1A(1B,1C) SG FLOW CONT <input type="checkbox"/> HIC 3227AA open <input type="checkbox"/> HIC 3227BA open <input type="checkbox"/> HIC 3227CA open AFW TO 1A(1B,1C) SG STOP VLV <input type="checkbox"/> Q1N23MOV3350A open <input type="checkbox"/> Q1N23MOV3350B open <input type="checkbox"/> Q1N23MOV3350C open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764A open <input type="checkbox"/> Q1N23MOV3764D open <input type="checkbox"/> Q1N23MOV3764F open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764E open <input type="checkbox"/> Q1N23MOV3764B open <input type="checkbox"/> Q1N23MOV3764C open |
| | | (Step 8.2) Check TDAFW Pump start required. <input type="checkbox"/> Condition <input type="checkbox"/> TSLB <input type="checkbox"/> Setpoint <input type="checkbox"/> Coincidence <input type="checkbox"/> | |
| | | RCP Bus TSLB2 1-1 <input type="checkbox"/> 2680 V Undervoltage 1-2 1-3 | 1/2 Detectors on 2/3 Busses |
| | | Low Low SG TSLB4 28% Water Level 4-1,4-2,4-3 In Any 5-1,5-2,5-3 2/3 SGs 6-1,6-2,6-3 | 2/3 Detectors on 2/3 SGs |
| | | | |
| | | | |

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 39 of 43

Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|------------|--|----------------|----------|-------------|------|-------------|------------|-----|----------------|-------------|------|------------|--------------|-----|-----|--|---------------|------------|--------|-----|----------------|------------------|------------|-----|---------------|--|
| | BOP | <p>(step 9) Verify main feedwater status. Verify main feedwater flow control and bypass valves - CLOSED. 1A(1B,1C) SG FW FLOW <input type="checkbox"/> FCV 478 <input type="checkbox"/> FCV 488 <input type="checkbox"/> FCV 498</p> <p>Verify both SGFPs - TRIPPED.</p> <p>Verify SG blowdown - ISOLATED. 1A(1B,1C) SGBD ISO <input type="checkbox"/> Q1G24HV7614A closed <input type="checkbox"/> Q1G24HV7614B closed <input type="checkbox"/> Q1G24HV7614C closed</p> <p>9.4 Verify SG blowdown sample - ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE STEAM GEN ISO <input type="checkbox"/> MLB1 19-2 lit Q1P15HV3328 closed <input type="checkbox"/> MLB1 19-3 lit Q1P15HV3329 closed <input type="checkbox"/> MLB1 19-4 lit Q1P15HV3330 closed</p> | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BOP | <p>(Step 10) Check no MSL isolation actuation signal present.</p> <table> <tr> <th>Signal</th><th>Setpoint</th><th>coincidence</th><th>TSLB</th></tr> <tr> <td>LO SG PRESS</td><td>< 585 psig</td><td>2/3</td><td>TSLB4 19-2,3,4</td></tr> <tr> <td>Hi stm flow</td><td>>40%</td><td>1/2 on 2/3</td><td>TSLB4 16-3,4</td></tr> <tr> <td>and</td><td>and</td><td></td><td>17-3,4 18-3,4</td></tr> <tr> <td>Lo-Lo Tavg</td><td><543°F</td><td>2/3</td><td>TSLB2 10-1,2,3</td></tr> <tr> <td>HI-HI ctmt press</td><td>>16.2 psig</td><td>2/3</td><td>TSLB1 2-2,3,4</td></tr> </table> | Signal | Setpoint | coincidence | TSLB | LO SG PRESS | < 585 psig | 2/3 | TSLB4 19-2,3,4 | Hi stm flow | >40% | 1/2 on 2/3 | TSLB4 16-3,4 | and | and | | 17-3,4 18-3,4 | Lo-Lo Tavg | <543°F | 2/3 | TSLB2 10-1,2,3 | HI-HI ctmt press | >16.2 psig | 2/3 | TSLB1 2-2,3,4 | |
| Signal | Setpoint | coincidence | TSLB | | | | | | | | | | | | | | | | | | | | | | | | |
| LO SG PRESS | < 585 psig | 2/3 | TSLB4 19-2,3,4 | | | | | | | | | | | | | | | | | | | | | | | | |
| Hi stm flow | >40% | 1/2 on 2/3 | TSLB4 16-3,4 | | | | | | | | | | | | | | | | | | | | | | | | |
| and | and | | 17-3,4 18-3,4 | | | | | | | | | | | | | | | | | | | | | | | | |
| Lo-Lo Tavg | <543°F | 2/3 | TSLB2 10-1,2,3 | | | | | | | | | | | | | | | | | | | | | | | | |
| HI-HI ctmt press | >16.2 psig | 2/3 | TSLB1 2-2,3,4 | | | | | | | | | | | | | | | | | | | | | | | | |
| | BOP | <p>(Step 11) Verify PHASE A CTMT ISO. (Step 11.1) Verify PHASE A CTMT ISO - ACTUATED. <input type="checkbox"/> MLB-2 1-1 lit <input type="checkbox"/> MLB-2 11-1 lit</p> <p>11.2 Check all MLB-2 lights - LIT.</p> <p>11.3 Verify Excess Letdown Isolation valves closed. <input type="checkbox"/> Q1E21HV8153, EXC LTDN ISO <input type="checkbox"/> Q1E21HV8154, EXC LTDN ISO</p> | | | | | | | | | | | | | | | | | | | | | | | | | |

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Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|---|---|
| | BOP | (step 12) Check all reactor trip and reactor trip bypass breakers – OPEN Reactor trip breaker A Reactor trip breaker B Reactor trip bypass breaker A Reactor trip bypass breaker B | |
| | BOP | (step 13) Trip CRDM MG set supply breakers. 1A(1B) MG SET SUPP BKR <input type="checkbox"/> N1C11E005A <input type="checkbox"/> N1C11E005B | |
| | BOP | (step 14) Secure secondary components. Stop both heater drain pumps. HDP <input type="checkbox"/> 1A <input type="checkbox"/> 1B Check any condensate pump started. IF started, THEN stop all but one condensate pump. <input type="checkbox"/> 1A <input type="checkbox"/> 1B If NO condensate pumps are started then place all HSs to STOP (step 14.3) IF condensate pump operating, THEN verify backup cooling aligned to condensate pumps per FNP-0-SOP-0.0, APPENDIX B, TB SO Actions Following A Reactor Trip Or Safety Injection. | Will call TBSO to accomplish this. |
| | BOP | (step 15) Verify both CRACS mode selector switches in the ON position. CRACS Mode Selector Switch <input type="checkbox"/> A TRAIN <input type="checkbox"/> B TRAIN | |
| | BOP | (step 16) WHEN at least 30 seconds have passed since turbine trip, THEN check main generator tripped. 230 KV BKR <input type="checkbox"/> 810 - OPEN <input type="checkbox"/> 914 - OPEN | |

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 41 of 43Event Description: **Attachment 2 of EEP-0**

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

Op Test No.: FA2013301 Scenario # 3 Event # 8 Page 42 of 43

Event Description: Attachment 4 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------|---|-----------------|
| Attachment 4 of EEP-0 TWO TRAIN ECCS ALIGNMENT VERIFICATION | | | |
| | | <p>(Step 1) Verify two trains of ECCS equipment aligned.</p> <p><input type="checkbox"/> Check DF01 closed</p> <p><input type="checkbox"/> Verify DF02 closed</p> <p><input type="checkbox"/> Check DG15 closed</p> <p><input type="checkbox"/> Verify DG02 closed</p> <p><input type="checkbox"/> Verify two trains of battery chargers – energized Amps > 0</p> <p>(Step 1.6) Verify two trains of ESF equipment aligned.</p> <p><input type="checkbox"/> Check all MLB-1 lights LIT</p> <p>Verify charging pump suction and discharge valves - OPEN.</p> <p>CHG PUMP DISCH HDR ISO</p> <p><input type="checkbox"/> Q1E21MOV8132A</p> <p><input type="checkbox"/> Q1E21MOV8132B</p> <p><input type="checkbox"/> Q1E21MOV8133A</p> <p><input type="checkbox"/> Q1E21MOV8133B</p> <p>CHG PUMP SUCTION HDR ISO</p> <p><input type="checkbox"/> Q1E21MOV8130A</p> <p><input type="checkbox"/> Q1E21MOV8130B</p> <p><input type="checkbox"/> Q1E21MOV8131A</p> <p><input type="checkbox"/> Q1E21MOV8131B</p> | |
| | | <p>(Step 1.7) Verify all post accident containment air mixing system fans - STARTED. (BOP)</p> <p>POST ACCIDENT MIXING FAN</p> <p><input type="checkbox"/> 1A</p> <p><input type="checkbox"/> 1B</p> <p><input type="checkbox"/> 1C</p> <p><input type="checkbox"/> 1D</p> <p>RX CAV H2 DILUTION FAN</p> <p><input type="checkbox"/> 1A</p> <p><input type="checkbox"/> 1B</p> <p>(Step 1.8) WHEN power restored to any de-energized emergency bus, THEN verify alignment of associated equipment.</p> | |
| | BOP | <p>(Step 1.9) Verify SFP Cooling in service per SOP-54.0, Spent Fuel Pit Cooling And Purification System.</p> | Call Radside SO |
| End of Attachment 4 | | | |

Op Test No.: FA2013301 Scenario # 3 Event # 9 Page 43 of 43

Event Description: Attachment 1 of ECP-3.1

| Time | Pos. | Expected Actions/Behavior | Comments |
|--------------------------------------|------|---|----------|
| Attachment 1 of ECP-3.1 | | | |
| Verify 4160V Busses Energized | | | |
| | BOP | <p>(step 1.1) Check offsite power - AVAILABLE.</p> <p>(step 1.2) Check BKR DF01 (1A startup transformer to 1F 4160 V bus) - CLOSED.</p> <p>(step 1.3) Verify BKR DF02 (1F 4160 V bus tie to 1K 4160 V bus) - CLOSED.</p> <p>(step 1.4) Check BKR DG15 (1B startup transformer to 1G 4160 V bus) - CLOSED.</p> <p>(step 1.5) Verify BKR DG02 (1G 4160 V bus tie to 1L 4160 V bus) - CLOSED.</p> <p>(step 1.6) Verify all RCP busses - ENERGIZED.</p> <p><input type="checkbox"/> 1A 4160 V bus</p> <p><input type="checkbox"/> 1B 4160 V bus</p> <p><input type="checkbox"/> 1C 4160 V bus</p> <p>(step 1.7) Check 1E 4160 V bus - ENERGIZED.</p> <p>(step 1.8) Check 1D 4160 V bus - ENERGIZED.</p> <p>(step 1.9) IF 1D 4160 V bus energized, THEN proceed to step PROCEDURE STEPS, step 6.</p> | |
| | | | |

Op-Test No.: FA2013-301

Page 1 of 2

Brief

This simulator performance scenario is performed in the EVALUATION MODE. You should not direct questions to the evaluators. Otherwise, you should perform as if you were in the MCR.

Your ability to maintain a log is not being graded, but maintaining a rough log is recommended to help during briefs.

If you need to communicate with the Unit 2 operator, call Unit 2 at 2434 or page the Unit 2 Unit Operator.

Respond to what you see. If there is a problem with the simulation, the session will be terminated or adjusted as appropriate based on the specific problem.

Assign operating positions.

Ask for and answer questions.

Appendix D**Turnover sheet****Form ES-D-2**☒ Unit 1 ☐ Unit 2**Shift:****Date**

| | | | |
|---------------------|--------------------|--|-------|
| Off-going SS | Oncoming SS | <input type="checkbox"/> N <input checked="" type="checkbox"/> D | Today |
|---------------------|--------------------|--|-------|

Part I – To be reviewed by the oncoming Supervisor prior to assuming the shift.
Security Keys A, S, D, SW, X on key ring . ____ SS

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

TARGET ZERO
Every Day, Every Job Safely

STPs/Evolutions:

STP-27.1 completed 2
hours ago

B Train On-Service – B Train
Protected

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

Status of Special Testing**General Information**

1. Shift Goal is to Maintain 29% power and complete chemistry hold (2 more hours), then ramp to 100% power
2. Current Risk Assessment is **YELLOW** and projected is **YELLOW** due to maintenance on 1A MDAFW pump and 1C DG
3. UOP-3.1 ver 112.4, is complete through step 5.3.
4. 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
5. 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
6. Fuel handling in ongoing in the SFP.
7. Thunderstorm warnings in effect for Southeast Alabama & Western Georgia
8. Unit 2 PSS is OFF for Maintenance (OOS 2 hrs, ETR 2 hrs)
9. Unit 2 is at 100% power with no major issues.

Equipment Status

Maintain VCT gas pressure 25-30 psig

Reactivity Plan

Diluting 25 gallons every 15 minutes to maintain
current conditions

Waste Management Status

#3 RHT – On Service

WGS – secured

LCO Status

3.8.1 Condition B for 1C DG, STP-27.1 completed 2 hours
ago

3.7.5 Condition B for 1A MDAFW Pump

Night Orders

No New Night Orders

Part II

Review Shift Complement

LCOs Reviewed ____ SS ____ (initials) reviewed as early in shift as possible

Part III:

STP-1.0

Operator Logs

Cond. Report

Autolog

ELDS & GEN

Keys

Reviewed/Signed

Reviewed

Queue

Reviewed

Spreadsheet

Turned

☒ Yes

☒ Yes

☒ Yes

☒ Yes

☒ Yes

☒ Yes

Reviewed

verified

Over

Southern Nuclear J.M. Farley Nuclear Plant

Operations Training Simulator Exam Scenario



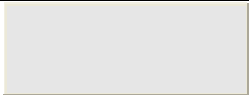
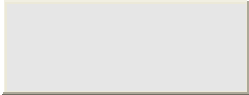
BOOTH INSTRUCTOR GUIDE

ILT-36 NRC EXAM SCENARIO #5

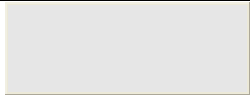


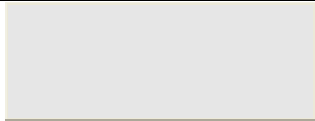
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|---|------------------------------|-------|-----------|
| Validation time: 90 minutes Validated by McCaffery, Sorrell, Phillips The week of February 18, 2013 | | | |
| | | | |
| TRN Supervisor Approval: | Gary Ohmstede | Date: | 3-12-2013 |
| | |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

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



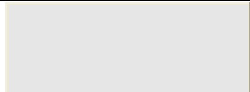
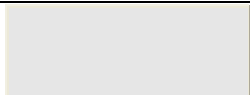
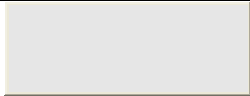
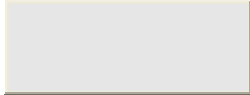

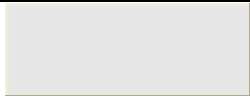
(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

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

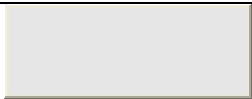
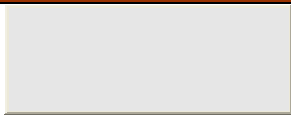

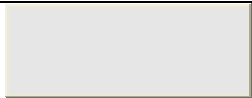
| EVENT# | TIME | EVENT DESCRIPTION / ACTION LIST | ACTIONS |
|--------|------|---|--------------|
| | | irf cBK1DH07_d_cd2 / open irf cBK2DH07_d_cd2 / open | |
| 5 | | 1B Condensate pump degraded head setup Imf jcfwfp1l-s 250 Imf jcfwfp1o-s 325 | * |
| 7 | | 1A Condensate pump trips 5 seconds after 1C Imf cCFCN1a_cc5 (1 5) closed | TRG 1 |
| | | Triggers and Commands | |
| 7 | | When 1C condensate pump trips 1B condensate pump degrades to no flow Trgset 1 "x22o061m" Trg 1 "imf ncfcn1b-d_th 100 60" | |
| | | | |

| MCB setup | | | |
|------------------|--|--|---|
| | | 1C DG MSS | Place in Mode 3 |
| | | Place HOLD Tag on 1C DG MSS | 1 HOLD TAG |
| | | Place HOLD Tag on 1C DG DG output breakers DHO7-1 and DHO7-2 | 2 HOLD TAGS |
| | | Place Unit 1 and Unit 2 Bypass and inoperable panel lights to the up position (EMERGENCY POWER SYSTEM) | Unit 1 A-Train Unit 2 A Train |
| | | Place Unit 1 Bypass and inoperable panel lights to the up position (Auxiliary Feedwater System) | Unit 1 A-Train |
| | | Place HOLD Tag on 1A MDAFW pump H/S | 1 HOLD TAG |
| | | | |
| | | DEH | Clear DEH alarms |
| | | | |
| | | Select POWER OPS PRIMARY on MCB monitor Acknowledge computer alarms | IPC |
| | | | |
| | | IPC: IF FF5 is in alarm, update rods | Ensure FF5 clear or update rods on IPC |
| | | | |
| | | Setup spreadsheet on OATC computer to resemble reactivity spreadsheet provided | <u>Set up computer</u> |
| | | | |
| | | Recorders Verify memory disks cleared Cae clearrecorders.cae |  |
| | | | |
| | | Provide a marked up copy of UOP-3.1 version 112.4 through step 5.19 complete. | <u>UOP-3.1 copy</u> |
| | | | |
| | | |  |
| | | | FREEZE simulator |
| | | | |
| | | Perform Booth Operators Setup Checklist | |
| | | | |
| | | Open Simview file to be used for plant parameter data collection: Simview / sv DataCollection.uvl |  sv DataCollection.uvl |
| | | | |
| | | If needed, adjust sim time back to 00:00:00 SIMVIEW / Sim_Clock.uvl Hours: clock(3) = 0 Minutes: clock(2) = 0 Seconds: clock(1) = 0 |  sv sim_clock.uvl |
| | | | |
| | | VERIFY MICROPHONES READY | Batteries installed |
| | | | |
| | | TURNOVER SHEET AVAILABLE | |

EXAM

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

EXAM

| EVENT# | TIME | EVENT DESCRIPTION | COMMAND |
|--------|------|--|---|
| | | Main Turbine will not trip automatically or in manual. Main Turbine GVs fast action closed. (CT) | |
| 9 | | LBLOCA when ESP-0.1 entered or step 5 of EEP-0. imf mal-rscs2b |  |
| 10 | | A Train SI will not auto actuate. 1B RHR pump will not auto start and MOV-8803B will not open. Required to establish one train of HHSI or LHSI flow. (CT) | |
| | | Terminate in EEP-1.0 when transition to ESP-1.3 announced. | |
| | | | |
| | | End of Exam |  HORNS OFF |
| | | | |
| | | |  FREEZE simulator |
| | | | |
| | | Stop data collection for Simview file sv DataCollection.uvl | |
| | | Export data to file with the name of exam2013sen5grpX.txt <i>NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate.</i> <i>NOTE: file will be saved in the OPENSIM directory.</i> | Ensure data file created. |
| | | When Control board data no longer needed Then Clear recorders for exam security Cae clearrecorders.cae |  |

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

| <u>EVENT NO.</u> | <u>TIME</u> | <u>Communication:</u> |
|-----------------------------|---|---|
| ALL | AS REQUIRED (Standard communicatio ns to inform supervision) | <u>SSS, SM and Dispatcher:</u> Repeat back failure, procedure entered, plant status, CR in the cue and that type of communications. |
| 1 | WHEN REQUESTED | <u>Work Week Coordinator:</u> “I’ll get the CR on LT-460 planned and worked.” “I’ll get I&C to place bistables in trip within 6 hours”. |
| 2 | NONE EXPECTED | |
| 3 | WHEN REQUESTED | <u>Work Week Coordinator:</u> “I’ll get I&C to place bistables in trip within 72 hours”. <u>SM:</u> “You have permission to return FK-498 to Auto” |
| 4 | NONE EXPECTED | |
| 5 | WHEN REQUESTED | <u>TBSO:</u> “Walked down condensate pump’s and found no obvious problems” |
| 6 | Event initiation | <u>SM:</u> “ACC informed me we just lost the Raccoon Creek 500kV line. Based on UOP-3.1 Appendix 5 Unit 1 is required to reduce load by 200 MW in the next 27 minutes” IF asked about Unit 2 reducing load then respond with: <u>SM:</u> “Unit 2 is unable to reduce load at this time.” |
| 7 | NONE EXPECTED | |
| 8 | NONE EXPECTED | |

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

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

Turnover:

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

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

CRITICAL TASK SHEET

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

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

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

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

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

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

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

(WOG CT E-0 - - H)

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

OR

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

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

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

**SCENARIO
OBJECTIVE/
OVERVIEW:**

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

The team should be able to:

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

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

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

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

Indications Available:

Annunciators:

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

Indications of LT-460 failing LOW

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

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

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

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

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

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

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

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------|---|----------|
| Continue AOP-100 actions here | | | |
| | RO | (step 8) Restore control of pressurizer heaters: <ul style="list-style-type: none">- 1A PRZR HTR GROUP BACKUP- 1B PRZR HTR GROUP BACKUP- 1D PRZR HTR GROUP BACKUP- 1E PRZR HTR GROUP BACKUP (ARP HD4 Actions) <ul style="list-style-type: none">- Places 1C PZR HTR switch in OFF and then back to the ON position | |
| | SRO | (step 9) Submit a Condition Report for failed channel and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the Condition Report. | |
| When Tech Specs have been evaluated and letdown is in service, then at the discretion of the Lead Examiner move to Event 3. | | | |

Event Description: FT-495 Fails HIGH

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

Indications Available:

Annunciators:

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

Indications of FT-495 failing HIGH:

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

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

Event Description: FT-495 Fails HIGH

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

Event Description: FT-495 Fails HIGH

| Time | Pos. | Expected Actions/Behavior | | | Comments |
|---|------|---|---|------------------------------------|----------|
| | SRO | (step 5) Refer to Tech Specs 3.3.1, 3.3.2, and 3.3.3 for any LCO requirements. T.S. 3.3.2 Condition D applicable | | | |
| | | | | | |
| TECHNICAL SPECIFICATION 3.3.2, ESFAS Instrumentation | | | | | |
| <i>The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE</i> | | | | | |
| | | | | | |
| Table 3.3.2-1 ESFAS Instrumentation | | | | | |
| Function 4e – High steam flow in two steam lines coincident w/ lo-lo Tavq | | | | | |
| Applicable in Modes 1, 2 and 3 with MSIVs open | | | | | |
| required channels 2 per stm line condition D | | | | | |
| | | | | | |
| | | | | | |
| | | CONDITION | REQUIRED ACTION | COMPLETION TIME | |
| | | D. One channel inoperable. | D.1 -----NOTE----- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----- Place channel in trip. OR D.2.1 Be in MODE 3. AND D.2.2 Be in MODE 4. | 72 hrs 78 hrs 84 hrs | |
| | | | | | |
| | SRO | (step 6) Notify the Shift Manager | | | |
| | | | | | |
| | | (step 7) WHEN plant conditions permit, THEN return systems to automatic control. | | | |
| | | | | | |
| | SRO | (step 8) Submit a condition report on the failed component, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the condition report. | | | |
| | | | | | |
| When Tech Specs have been evaluated, then at the discretion of the Lead Examiner move to Event 4. | | | | | |

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

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

Indications Available:

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

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

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

| Time | Pos. | Expected Actions/Behavior | | | Comments |
|--|------|---|---|-----------------|----------|
| | SRO | (step 6) Refer to Tech Specs for LCO requirements that exist. <ul style="list-style-type: none">Sections 3.3.1, 3.3.2, & 3.3.3 for instrument failuresSection 3.4.1 for DNB limitsSection 3.4.5 RCS Loops – Mode 3Section 3.4.11 PORVs | | | |
| | | | | | |
| TECHNICAL SPECIFICATION 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits | | | | | |
| <i>If RCS pressure drops below 2209 psig then this TS applies. It is expected that pressure will drop below 2209 psig for this event.</i> | | | | | |
| | | | | | |
| | | CONDITION | REQUIRED ACTION | COMPLETION TIME | |
| | | A. One or more RCS DNB parameters not within limits. | A.1 Restore RCS DNB parameter(s) to within limit. | 2 hours | |
| | | | | | |
| | SRO | (step 7) Notify Shift Manager | | | |
| | | | | | |
| | SRO | (step 8) WHEN plant conditions permit, THEN restore components to automatic control. | | | |
| | | | | | |
| | SRO | (step 9) Submit a Condition Report and notify the Work Week Coordinator | | | |
| | | | | | |
| | SRO | (step 11) Go to procedure and step in effect. | | | |
| | | | | | |
| When Tech Specs have been evaluated (if required) and the plant is under control and at the discretion of the Lead Examiner move to Event 5 | | | | | |

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

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

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

Indications Available:

Annunciators:

- KB4 SGFP SUCT PRESS LO
- JF1,2,3 SG LVL DEV

Recognize indications of

- SGFP suction pressure decreasing

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------|---|----------|
| NOTE: Crew may enter AOP-13, which is on the Next Page. | | | |
| ARP-1.10, Main Control Board Ann Panel K, KB4 ver 70.2 | | | |
| | BOP | (step 1) WHEN low pressure alarm comes in, THEN observe suction pressure on MCB recorder PR-4039 or plant computer. | |
| | BOP | (step 2) IF a malfunction of SGWLC has raised SGFP speed, THEN take manual control of appropriate SGFP speed controller and adjust, as required | |
| | BOP | (step 3) IF a feedwater heater malfunction is indicated, THEN go to FNP-1-AOP-13.0, CONDENSATE AND FEEDWATER MALFUNCTION | |
| | BOP | (step 4) IF pressure continues to decrease below 300 PSIG, THEN verify both heater drain pumps are running. | |
| | BOP | (step 5) IF a heater drain pump has tripped, THEN perform the following: | |
| | BOP | (step 6) IF a heater drain pump has not tripped, THEN check the power supply breakers in the L & N Racks AND reset if necessary | |

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|---|------|---|---|
| | BOP | (step 7) IF suction pressure continues to decrease, THEN start the standby condensate pump. | |
| | SRO | (step 10) IF operation with three condensate pumps is required, THEN carefully monitor Tave, reactor power, pressurizer level and pressure, and S/G level due to effects of colder feedwater. | |
| AOP-13, Condensate and Feedwater Malfunction ver 33.0 | | | |
| Note: AOP-13 allows direct entry to step 6 | | | |
| | BOP | (STEP 6.1) Check SGFP suction pressure stabilizes above 275 psig. | RNO (6.1.1) <u>Verify standby condensate pump started.</u> (6.1.2) IF suction pressure still falling, THEN reduce turbine load rapidly using AOP-17.1 (6.1.3) IF SGFP(s) trip occurs, THEN return to step 1. |
| | BOP | (Step 6.2) Check required number of heater drain pumps running. | |
| | BOP | (step 6.3) Check required number of condensate pumps running. | |
| | BOP | (Step 6.4) Verify proper position of condensate and feedwater system valves. | Contains all field actions and will be dispatched. |
| | BOP | (step 6.5) Check LESS THAN three condensate pumps running. | RNO When acceptable stop on condensate pump and place in Auto. |
| | BOP | (step 6.6) Check SGFP suction pressure stabilizes GREATER THAN - 300 psig. | |
| At the discretion of the Lead Examiner move to next Event 6. | | | |

Event Description: Fast ramp required AOP-17.1 entry.

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

Event Description: Fast ramp required AOP-17.1 entry.

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

Event Description: Fast ramp required AOP-17.1 entry.

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

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

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

Indications Available:

Annunciators:

- KB4 SGFP SUCT PRESS PO
- KC3 1A or 1B SGFP TRIPPED
- JF1,2,3 SG LVL DEV

Indications

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

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

Event Description: FRP-S.1 Entry

When the crew tries to trip the reactor, the reactor trip breakers will not open and one of the CRDM MG set breakers will not open.

Indications Available:

Annunciators:

- Various and many

Recognize indications of ATWT event

- RTBs still closed
- Nis indicate full power
- Conditions warrant a reactor trip and one is not received

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------------|--|--|
| | | | |
| | | Enter EEP-0, Reactor Trip or Safety Injection, version 44 | |
| | SRO | Reactor trip Direct the reactor trip and enter EEP-0. | |
| | RO/ BOP | Immediate Operator actions of EEP-0 (step 1) Check reactor trip. Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. check rod bottom lights - LIT. | RNO 1.1 Manually trip reactor. 1.2 IF reactor can NOT be tripped, THEN trip both MG set supply breakers. <ul style="list-style-type: none"> • N1C11E005A • N1C11E005B 1.3 IF reactor will NOT trip, THEN go to FNP-1-FRP-S.1 |
| | SRO | Direct entry into FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION – ATWT, Ver 27.0 | |
| | | Steps 1 and 2 are IOA steps | |
| | RO | (step 1) IF reactor still NOT tripped, THEN perform the following: <ul style="list-style-type: none"> • Insert control rods in manual control. OR <ul style="list-style-type: none"> • Verify rods insert in AUTO at greater than 48 steps per minute. | Critical task Insert negative reactivity |
| | | | |

Event Description: FRP-S.1 Entry

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------|---|--|
| | BOP | (step 2) Check Main Turbine tripped | RNO 2.1 Place main turbine emergency trip switch to TRIP for at least 5 seconds. Critical task RNO 2.2 IF turbine can NOT be tripped, THEN reduce GV position demand signal to zero from DEH panel. <input type="checkbox"/> TURBINE MANUAL depressed <input type="checkbox"/> GV CLOSE depressed <input type="checkbox"/> FAST ACTION depressed |
| | | | |
| NOTE: Any time beyond this point crew may elect to take Early Action for Step 7 and direct an SO to locally open the RTB's. | | | |
| | | | |
| | BOP | (step 3) Verify AFW pumps running <ul style="list-style-type: none"> Both MDAFWPs amps > 0 TDAFWP speed > 3900 rpm | |
| | | | |
| | RO | (step 4) Initiate Emergency Boration of the RCS. <ul style="list-style-type: none"> Verify at least one CHG PUMP - RUNNING. Start a BAT pump Open MOV 8104 Establish normal letdown flow – 8149A and either 8149B or C open Establish normal charging flow > 40 gpm Verify adequate emergency boration flow of > 30 gpm on FI-110 Check RCS pressure less than 2335 psig | |
| | | | |

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|--|
| | BOP | (step 5) Verify containment ventilation isolation. Verify containment purge dampers - CLOSED. <ul style="list-style-type: none"> 3197 3198D 3198C 3196 3198A 3198B Verify containment mini purge dampers - CLOSED. CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D <ul style="list-style-type: none"> 2866C 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C <ul style="list-style-type: none"> 2866D 2867D Stop MINI PURGE SUPP/EXH FAN . | BOP will take HS 3198 and HS 3196 to close and HS 2868 to stop. This will close required dampers and secure the fan. |
| | | | |
| | BOP | (step 6) Check SI actuated – 6.1 BYP & PERMISSIVE SAFETY INJECTION <ul style="list-style-type: none"> ACTUATED status light lit MLB-1 1-1 lit MLB-1 11-1 lit (IF SI has actuated) 6.2 Initiate ATTACHMENT 1, AUTOMATIC SAFETY INJECTION VERIFICATION. | Go to page 38 for ATT 1 actions. |
| | | | |

Event Description: FRP-S.1 Entry

| Time | Pos. | Expected Actions/Behavior | Comments |
|---|------|---|---|
| | RO | (step 7) Check ALL RTBs open Check Main Turbine tripped | RNO Dispatch an operator to locally trip the reactor trip and bypass breakers. |
| | | | |
| NOTE: Transition to EEP-0 will be made when requirements of step 8 are met. | | | |
| | RO | (step 8) Check if reactor still critical. If power range indication is GREATER THAN OR EQUAL TO 5%. OR Check any intermediate range startup rate - POSITIVE. | NOTE: [CA] step RNO Go to procedure and step in effect. |
| | BOP | (step 9) Monitor CST level. Check CST level greater than 5.3 ft. CST LVL <ul style="list-style-type: none"> LI 4132A LI 4132B | NOTE: [CA] step |
| | BOP | (step 10) Check SG levels. Check at least one SG narrow range level - GREATER THAN 31%{48%}. | NOTE: [CA] step |
| | | | |
| Large Break LOCA will be initiated when EITHER ESP-0.1 entered or at Step 5 of EEP-0 | | | |

Event Description: **LBLOCA**

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

Indications Available:

Annunciators:

- Various and many

Recognize indications of LOCA

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------------|---|--|
| | | | |
| Enter EEP-0, Reactor Trip or Safety Injection, version 44 | | | |
| | RO/ BOP | <p>(step 1) Check reactor trip. Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. Check rod bottom lights - LIT.</p> <p>(step 2) Check turbine - TRIPPED. TSLB2 14-1 thru 4 lit</p> <p>(step 3) Check power to 4160 V ESF busses. 4160 V ESF busses - AT LEAST ONE ENERGIZED</p> <p>A Train (F 4160V bus) power available lights lit OR B Train (G 4160V bus) power available lights lit</p> <p>Verify operating diesel generators are being supplied from at least one SW pump.</p> | Immediate Action steps of EEP-0 |
| | | | |

Event Description: LBLOCA

| Time | Pos. | Expected Actions/Behavior | Comments |
|---|------|---|---|
| | RO | (step 4) Check SI Status. (step 4.1) Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION <input type="checkbox"/> ACTUATED status light lit <input type="checkbox"/> MLB-1 1-1 lit <input type="checkbox"/> MLB-1 11-1 lit (step 4.2) Verify both trains of SI- ACTUATED. <input type="checkbox"/> MLB-1 1-1 lit AND <input type="checkbox"/> MLB-1 11-1 lit | |
| NOTE: When FRP-P.1 is entered actions are located on PAGE 34 | | | |
| NOTE: Crew may transition to ESP-0.1 depending on plant conditions. FOLDOUT PAGE criteria of ESP-0.1 to actuate SI and transition back EEP-0 is PZR level <4%. If required, actions for ESP-0.1 are located on PAGE 35 | | | |
| | SRO | (step 5) Directs continuing into EEP-0 at step 5. Directs the BOP to perform attachment 2. | For Attachment 2 and 4 actions. Go to page 41 |
| | | | |
| | | | |

Event Description: LBLOCA

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|--|
| | RO | (step 6) Check containment pressure- HAS REMAINED LESS THAN 27 psig | NOTE: [CA] step – RNO 6.1 Verify PHASE B CTMT ISO - ACTUATED. <ul style="list-style-type: none"> • MLB-3 1-1 lit • MLB-3 6-1 lit 6.2 Stop all RCPs. RCP <ul style="list-style-type: none"> • 1A • 1B • 1C 6.3 Verify PHASE B CTMT ISO alignment. 6.3.1 Check All MLB-3 lights lit. 6.3.2 IF any MLB-3 light NOT lit, THEN verify PHASE B CTMT ISO using ATTACHMENT 5, PHASE B CONTAINMENT ISOLATION. |
| | | | |
| | RO | (step 7) Announce "Unit 1 reactor trip and safety injection". | |
| | | | |
| | RO | (step 8) Check AFW status. Check secondary heat sink Available <ul style="list-style-type: none"> ○ Check total AFW flow > 395 gpm <input type="checkbox"/> FI 3229A <input type="checkbox"/> FI 3229B <input type="checkbox"/> FI 3229C <ul style="list-style-type: none"> ○ Total Flow FI 3229 OR Check any SG NR level > 31% {48%} WHEN all SG narrow range levels less than 31%{48%}, THEN maintain total AFW flow greater than 395 gpm. WHEN at least two SG narrow range levels greater than 28% AND TDAFWP NOT required, THEN stop TDAFWP. | |
| | | | |

Event Description: LBLOCA

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|--------------------------|
| | RO | (step 8.4) WHEN SG narrow range level greater than 31%{48%}, THEN maintain SG narrow range level 31%-65%{48%-65%}. <ul style="list-style-type: none"> Control MDAFWP flow. MDAFWP FCV 3227 RESET <ul style="list-style-type: none"> <input type="checkbox"/> A TRN reset <input type="checkbox"/> B TRN reset MDAFWP TO 1A/1B/1C SG B TRN <ul style="list-style-type: none"> <input type="checkbox"/> FCV 3227 in MOD Control TDAFWP flow. TDAFWP FCV 3228 <ul style="list-style-type: none"> <input type="checkbox"/> RESET reset TDAFWP SPEED CONT <ul style="list-style-type: none"> <input type="checkbox"/> SIC 3405 adjusted | NOTE: [CA] step – |
| | | | |
| | RO | (step 9) Check RCS temperature. IF any RCP running, THEN check RCS average temperature - STABLE AT OR APPROACHING 547°F. TAVG 1A(1B,1C) RCS LOOP <ul style="list-style-type: none"> <input type="checkbox"/> TI 412D <input type="checkbox"/> TI 422D <input type="checkbox"/> TI 432D | |
| | | | |

Event Description: LBLOCA

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|--|
| | RO | <p>(step 9 RNO) IF RCS temperature less than 547°F and falling, THEN perform the following.</p> <p>(step 9.1.1) Verify steam dumps closed. STM DUMP INTERLOCK <input type="checkbox"/> A TRN in OFF RESET <input type="checkbox"/> B TRN in OFF RESET</p> <p>(step 9.1.2) Verify atmospheric reliefs closed on MCB <input type="checkbox"/> Demand at 0 and minimum red light LIT</p> <p>(step 9.1.3) Control total AFW flow to minimize RCS cooldown, AFW FLOW TO 1A(1B,1C) SG <input type="checkbox"/> FI 3229A <input type="checkbox"/> FI 3229B <input type="checkbox"/> FI 3229C AFW TOTAL FLOW <input type="checkbox"/> FI 3229</p> <p>IF MSIVs are closed THEN proceed to step 9.1.8 to break condenser vacuum</p> | <p>NOTE: RNO column since RCS temp will be <547°F</p> <p>COND VAC BKR MAN ISO (155 ft, TURB BLDG) <input type="checkbox"/> N1N51V518A open <input type="checkbox"/> N1N51V518B open COND VAC BKR VLVS <input type="checkbox"/> N1N51V519A/519B open</p> |
| | BOP | <p>(step 9.1.5 RNO) IF MSIV's are open THEN isolate steam loads in the turbine building:</p> <ul style="list-style-type: none"> MSRs reset <p>(steps 9.1.5.1 and 9.1.5.2 RNO) these actions are performed by Systems Operators when RX trip is announced in step 7.</p> | |
| | BOP | <p>(step 9.1.5.4 RNO) IF two SJAE's in service, THEN secure one SJAE</p> <ul style="list-style-type: none"> 1A SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed 1B SJAE <ul style="list-style-type: none"> A Section ISO closed B Section ISO closed | |

Event Description: **LBLOCA**

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

Event Description: LBLOCA

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|---|---|
| | RO | <p>(step 10) Check pressurizer PORVs and spray valves.</p> <p>WHEN pressurizer pressure less than 2335 psig, THEN verify both PRZR PORVs closed.</p> <p>Verify both PRZR PORVs indicate CLOSED</p> <p>Check PRZR PORV temperature STABLE OR FALLING.</p> <p><input type="checkbox"/> PORV Temp TI-463</p> <p>Check PRT parameters STABLE or FALLING.</p> <p><input type="checkbox"/> PRT PRESS PI 472</p> <p><input type="checkbox"/> PRT LVL LI-470</p> <p><input type="checkbox"/> PRT TEMP TI-471</p> <p>WHEN pressurizer pressure less than 2260 psig, THEN verify normal pressurizer spray valves closed OR in the process of closing.</p> <p>1A(1B) LOOP SPRAY VLV</p> <p><input type="checkbox"/> PK 444C</p> <p><input type="checkbox"/> PK 444D</p> <p>Check any PRZR PORV ISO - OPEN</p> | <p>NOTE: [CA] step –</p> <p>NOTE: [CA] step –</p> |
| | RO | <p>(step 11) Check RCP criteria.</p> <p>Check SUB COOLED MARGIN MONITOR indication – GREATER THAN 16°F{45°F}</p> <p>SUBCOOLED IN CETC MODE</p> | <p>RNO If HHSl flow greater than 0 gpm THEN stop all RCP's.</p> <p>NOTE: Also required by Foldout page.</p> |
| | RO | <p>(step 12) Monitor charging pump miniflow criteria.</p> <p>Control charging pump miniflow valves based on RCS pressure.</p> <p>1C(1A) LOOP RCS WR PRESS</p> <p><input type="checkbox"/> PI 402A</p> <p><input type="checkbox"/> PI 403A</p> | <p>NOTE: Based on RCS pressure, close miniflows < 1300 and open when > 1900 psig.</p> |

Event Description: LBLOCA

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------|--|---|
| Diagnostics | | | |
| The SRO will direct the parameters to be reviewed and will determine appropriate procedure to transition to. | | | |
| | | | |
| | SRO | (step 13) Check SGs not faulted. <input type="checkbox"/> Check no SG pressure – FALLING IN AN UNCONTROLLED MANNER OR LESS THAN 50 psig. | |
| | SRO | (step 14) Check SGs not ruptured Check secondary radiation indication - NORMAL. <input type="checkbox"/> R-15 SJAE EXH <input type="checkbox"/> R-19 SGBD SAMPLE <input type="checkbox"/> R-23A SGBD HX OUTLET <input type="checkbox"/> R-23B SGBD TO DILUTION <input type="checkbox"/> R-15B TURB BLDG VNTL (BOP) <input type="checkbox"/> R-15C TURB BLDG VNTL (BOP) <input type="checkbox"/> R-60A MS ATMOS REL (BOP) <input type="checkbox"/> R-60B MS ATMOS REL (BOP) <input type="checkbox"/> R-60C MS ATMOS REL (BOP) <input type="checkbox"/> R-60D TDAFWP EXH (BOP) <input type="checkbox"/> No SG level rising in an uncontrolled manner. | |
| | | | |
| | | (step 15) Check RCS intact. <ul style="list-style-type: none"> Check containment radiation - NORMAL. <input type="checkbox"/> R-2 CTMT 155 ft <input type="checkbox"/> R-7 SEAL TABLE <input type="checkbox"/> R-27A CTMT HIGH RANGE (BOP) <input type="checkbox"/> R-27B CTMT HIGH RANGE (BOP) Check containment pressure - LESS THAN 3 psig. Check containment ECCS sump level - LESS THAN 0.4 ft. | RNO Go to FNP-1-EEP-1, LOSS OF REACTOR OR SECONDARY COOLANT. |
| | | | |
| Transition to EEP-1.0, version 31 | | | |
| At the discretion of Chief examiner, if critical tasks met scenario may be terminated here. | | | |
| | | | |

Event Description: LBLOCA

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|--|
| | RO | (step 1) Check SUB COOLED MARGIN MONITOR indication - GREATER, THAN 16°F{45°F} SUBCOOLED IN CETC MODE. | RNO 1.1 IF HHSI flow greater than 0 gpm THEN stop all RCPs. RCP □ 1A □ 1B □ 1C |
| | BOP | (step 2) Check SGs not faulted - no press falling uncontrolled - none less than 50 psig | |
| | BOP | (step 3) Checks intact SG levels Verifies any intact SG NR level > {48} Controls MDAPW & TDAFW flows as necessary to maintain levels {48%-65%} Stops TDAFW pump WHEN at least 2 SGs >28% | |
| | BOP | (step 4) Check SGs not ruptured - Check secondary radiation indication - NORMAL. | □ R-15 □ 19 □ 23A and B □ 15B and C, □ 60 A, B, C, D |
| | | (step 5) Checks PORVs - Iso valves open with power - PORVs closed with no leakage - no evidence of leak by via downstream temps & PRT parameters | |
| | SRO | (step 6) directs step 6 be performed (1 hour from start of event requirements - not available to perform in simulator-SRO calls for SSS or an extra to perform) - Close recirc disconnects - Establish 1A & 1B post LOCA H2 analyzer on service per ATT 2 - Plot H2 on Fig 1 - Check and control H2 concentration in Cmt | |

Event Description: LBLOCA

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|-----------|---|---|
| | SRO RO | (step 7) Checks for SI termination criteria and continues on without terminating SI due to inadequate RCS pressure & Pzr level | SI termination criteria may be met but transition to ESP-1.1 is incorrect. |
| | | | |
| | RO | (step 8) Checks containment spray system - any CS pump started - Reset containment spray signals. CS RESET □ A TRN □ B TRN | |
| | | | |
| | RO | (step 9) Determines LHSI pumps should NOT be stopped due to RCS Pressure < {435 psig}, RCS pressure stable or rising and RHR pumps running with suction aligned from RWST □ PI 402B □ PI 403B | (step 9 RNO) Establish CCW flow to RHR heat exchangers. CCW TO 1A(1B) RHR HX □ Q1P17MOV3185A open □ Q1P17MOV3185B open |
| | | | |
| | BOP | (step 11) Performs EEP-1 ATT 4, VERIFYING 4160 V BUSSES ENERGIZED | See Tab at end of scenario for Attachment 4 actions. Page 45 |
| | | | |
| | SRO | (step 12) Directs securing Unloaded DGs | (extra, Unit two UO, or BOP) |
| | | | |

Event Description: LBLOCA

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

Event Description: LBLOCA

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

Event Description: **LBLOCA**

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

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

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

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

Event Description: ESP-0.1 Actions

ESP-0.1, Reactor Trip Response, rev 32

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

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

Event Description: ESP-0.1 Actions

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

Event Description: ESP-0.1 Actions

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

Event Description: Attachment 1 of FRP-S.1

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|---|----------|
| | | Attachment 1 of FRP-S.1 | |
| | | AUTOMATIC SAFETY INJECTION VERIFICATION | |
| | BOP | <p>(step 1) Check power to 4160 V ESF busses. 4160 V ESF busses - AT LEAST ONE ENERGIZED</p> <p>A Train (F & K) power available lights lit OR B Train (G & L) power available lights lit</p> <p>Verify operating diesel generators are being supplied from at least one SW pump.</p> | |
| | | | |
| | | <p>(step 2) Check SI Status. Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION <input type="checkbox"/> ACTUATED status light lit <input type="checkbox"/> MLB-1 1-1 lit <input type="checkbox"/> MLB-1 11-1 lit</p> | |
| | | | |
| | BOP | <p>(step 3) Verify MFW status Verify main FRVs and bypass valves - valves CLOSED. 1A(1B,1C) SG STOP VLVFW FLOW</p> <ul style="list-style-type: none"> FCV 478 FCV 488 FCV 498 <p>Verify both SGFPs - TRIPPED.</p> <p>Verify SGBD isolated - HV 7614A, B C – closed</p> <p>Verify SGBD sample valves closed by MLB-4 6-4, 7-4 and 8-4 LIT</p> | |
| | | | |
| | BOP | <p>(step 4) Verify Phase A actuated – MLB-2 1-1 and 11-1 Lit All MLB-2 lights LIT</p> | |
| | | | |
| | BOP | <p>(step 5) Verify one CHG PUMP in each train - STARTED.</p> <ul style="list-style-type: none"> A train (1A or 1B) amps > 0 B train (1C or 1B) amps > 0 | |
| | | | |

Event Description: Attachment 1 of FRP-S.1

| | | | |
|--|-----|--|--|
| | BOP | (step 6) Verify RHR PUMPs - STARTED. <ul style="list-style-type: none"> RHR PUMP 1A and 1B amps > 0 | |
| | | | |
| | BOP | (step 7) Verify each train of CCW - STARTED. Verify one CCW PUMP in each train- STARTED. A train HX 1C or 1B CCW FLOW <ul style="list-style-type: none"> FI 3043CA > 0 gpm OR <ul style="list-style-type: none"> FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW <ul style="list-style-type: none"> FI 3043AA > 0 gpm OR <ul style="list-style-type: none"> FI 3043BA > 0 gpm Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX <ul style="list-style-type: none"> Q1P16FI3009AA > 0 gpm Q1P16FI3009BA > 0 gpm Q1P16FI3009CA > 0 gpm (step 8) Verify each SW train - HAS TWO SW PUMPs STARTED. <ul style="list-style-type: none"> A train (1A,1B or 1C) B train (1D,1E or 1C) | |
| | | | |
| | BOP | (step 9) Verify containment fan cooler alignment. Verify at least one containment fan cooler per train - STARTED IN SLOW SPEED. CTMT CLR FAN SLOW SPEED A train <ul style="list-style-type: none"> 1A 1B B train <ul style="list-style-type: none"> 1C 1D Verify associated emergency service water outlet valves - OPEN. EMERG SW FROM 1A(1B,1C,1D) CTMT CLR <ul style="list-style-type: none"> Q1P16MOV3024A Q1P16MOV3024B Q1P16MOV3024C Q1P16MOV3024D | |

Event Description: Attachment 1 of FRP-S.1

| | BOP | <p>(Step 10) Check no MSL isolation actuation signal present.</p> <table> <tr> <th>Signal</th><th>Setpoint</th><th>coincidence</th><th>TSLB</th></tr> <tr> <td>LO SG PRESS</td><td>< 585 psig</td><td>2/3</td><td>TSLB4 19-2,3,4</td></tr> <tr> <td>Hi stm flow</td><td>>40%</td><td>1/2 on 2/3</td><td>TSLB4 16-3,4</td></tr> <tr> <td>and</td><td>and</td><td></td><td>17-3,4 18-3,4</td></tr> <tr> <td>Lo-Lo Tavg</td><td><543°F</td><td>2/3</td><td>TSLB2 10-1,2,3</td></tr> <tr> <td>HI-HI ctmt press</td><td>>16.2 psig</td><td>2/3</td><td>TSLB1 2-2,3,4</td></tr> </table> <p>If a MSLI signal is present then close ALL MSIVs</p> | Signal | Setpoint | coincidence | TSLB | LO SG PRESS | < 585 psig | 2/3 | TSLB4 19-2,3,4 | Hi stm flow | >40% | 1/2 on 2/3 | TSLB4 16-3,4 | and | and | | 17-3,4 18-3,4 | Lo-Lo Tavg | <543°F | 2/3 | TSLB2 10-1,2,3 | HI-HI ctmt press | >16.2 psig | 2/3 | TSLB1 2-2,3,4 | |
|---------------------------------------|------------|--|----------------|----------|-------------|------|-------------|------------|-----|----------------|-------------|------|------------|--------------|-----|-----|--|---------------|------------|--------|-----|----------------|------------------|------------|-----|---------------|--|
| Signal | Setpoint | coincidence | TSLB | | | | | | | | | | | | | | | | | | | | | | | | |
| LO SG PRESS | < 585 psig | 2/3 | TSLB4 19-2,3,4 | | | | | | | | | | | | | | | | | | | | | | | | |
| Hi stm flow | >40% | 1/2 on 2/3 | TSLB4 16-3,4 | | | | | | | | | | | | | | | | | | | | | | | | |
| and | and | | 17-3,4 18-3,4 | | | | | | | | | | | | | | | | | | | | | | | | |
| Lo-Lo Tavg | <543°F | 2/3 | TSLB2 10-1,2,3 | | | | | | | | | | | | | | | | | | | | | | | | |
| HI-HI ctmt press | >16.2 psig | 2/3 | TSLB1 2-2,3,4 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BOP | (step 11) Check containment pressure -HAS REMAINED LESS THAN 27 psig. | | | | | | | | | | | | | | | | | | | | | | | | | |
| End of attachment 1 of FRP-S.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Event Description: Attachment 2 of EEP-0

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

Attachment 2 of EEP-0

AUTOMATIC ACTIONS VERIFICATION

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|----------|
| | BOP | (Step 1) Verify one CHG PUMP in each train - STARTED. <input type="checkbox"/> A train (1A or 1B) amps > 0 <input type="checkbox"/> B train (1C or 1B) amps > 0 | |
| | BOP | (Step 2) Verify RHR PUMPS - STARTED. RHR PUMP <input type="checkbox"/> 1A amps > 0 <input type="checkbox"/> 1B amps > 0 | |
| | BOP | (Step 3) Verify Safety Injection Flow. (Step 3.1) Check HHSI flow - GREATER THAN 0 gpm. <input type="checkbox"/> FI 943 | |
| | BOP | (Step 3.2) Check RCS pressure - LESS THAN 275 psig(435 psig). | |
| | BOP | (step 3.3) Check LHSI flow – greater than 1.5×10^3 gpm <input type="checkbox"/> 1A RHR HDR FLOW FI-605A <input type="checkbox"/> 1B RHR HDR FLOW FI-605B | |
| | BOP | (Step 4) Verify each SW train - HAS TWO SW PUMPS STARTED. <input type="checkbox"/> A train (1A,1B or 1C) <input type="checkbox"/> B train (1D,1E or 1C) | |
| | | | |

Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|-----------------------|
| | BOP | <p>(Step 5) Verify each train of CCW - STARTED.</p> <p>(Step 5.1) Verify one CCW PUMP in each train- STARTED.</p> <p>A train HX 1C or 1B CCW FLOW <input type="checkbox"/> FI 3043CA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW <input type="checkbox"/> FI 3043AA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm</p> <p>Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX <input type="checkbox"/> Q1P16FI3009AA > 0 gpm <input type="checkbox"/> Q1P16FI3009BA > 0 gpm <input type="checkbox"/> Q1P16FI3009CA > 0 gpm</p> | |
| | BOP | <p>(step 6) Verify containment ventilation isolation.</p> <p>Verify containment purge dampers - CLOSED.</p> <p><input type="checkbox"/> 3197 <input type="checkbox"/> 3198D <input type="checkbox"/> 3198C <input type="checkbox"/> 3196 <input type="checkbox"/> 3198A <input type="checkbox"/> 3198B</p> <p>Verify containment mini purge dampers - CLOSED.</p> <p>CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D <input type="checkbox"/> 2866C <input type="checkbox"/> 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C <input type="checkbox"/> 2866D <input type="checkbox"/> 2867D</p> <p>Stop MINI PURGE SUPP/EXH FAN.</p> | Will place HS to STOP |

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

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

Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|--|
| | BOP | (step 8) Verify AFW Pumps - STARTED. Verify both MDAFW Pumps - STARTED <input type="checkbox"/> 1A MDAFW Pump amps > 0 <input type="checkbox"/> 1B MDAFW Pump amps > 0 AND <input type="checkbox"/> FI-3229A indicates > 0 gpm <input type="checkbox"/> FI-3229B indicates > 0 gpm <input type="checkbox"/> FI-3229C indicates > 0 gpm | RNO 8.1 Verify MDAFW Pumps deliver flow to each SG. 8.1.1 Manually start MDAFW Pumps 8.1.2 Verify AFW flow path to AND each SG. <input type="checkbox"/> Q1N23HV3227A in MOD <input type="checkbox"/> Q1N23HV3227B in MOD <input type="checkbox"/> Q1N23HV3227C in MOD MDAFWP TO 1A(1B,1C) SG FLOW CONT <input type="checkbox"/> HIC 3227AA open <input type="checkbox"/> HIC 3227BA open <input type="checkbox"/> HIC 3227CA open AFW TO 1A(1B,1C) SG STOP VLV <input type="checkbox"/> Q1N23MOV3350A open <input type="checkbox"/> Q1N23MOV3350B open <input type="checkbox"/> Q1N23MOV3350C open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764A open <input type="checkbox"/> Q1N23MOV3764D open <input type="checkbox"/> Q1N23MOV3764F open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764E open <input type="checkbox"/> Q1N23MOV3764B open <input type="checkbox"/> Q1N23MOV3764C open |
| | | (Step 8.2) Check TDAFW Pump start required. <input type="checkbox"/> Condition <input type="checkbox"/> TSLB <input type="checkbox"/> Setpoint <input type="checkbox"/> Coincidence <input type="checkbox"/> | |
| | | RCP Bus TSLB2 1-1 <input type="checkbox"/> 2680 V <u>Undervoltage</u> 1-2 1-3 | 1/2 Detectors on 2/3 Busses |
| | | Low Low SG <u>TSLB4</u> 28% Water Level 4-1,4-2,4-3 In Any 5-1,5-2,5-3 2/3 SGs 6-1,6-2,6-3 | 2/3 Detectors on 2/3 SGs |
| | | | |
| | | | |

Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments | | | | | | | | | | | | | | | | | | | | |
|----------------------------|-----------------|--|----------------------------|----------|-------------|------|-------------|------------|-----|----------------|----------------------------|-----------------|------------|----------------------------|--|--|-----|----------------|------------------|------------|-----|---------------|--|
| | BOP | <p>(step 9) Verify main feedwater status. Verify main feedwater flow control and bypass valves - CLOSED. 1A(1B,1C) SG FW FLOW <input type="checkbox"/> FCV 478 <input type="checkbox"/> FCV 488 <input type="checkbox"/> FCV 498</p> <p>Verify both SGFPs - TRIPPED.</p> <p>Verify SG blowdown - ISOLATED. 1A(1B,1C) SGBD ISO <input type="checkbox"/> Q1G24HV7614A closed <input type="checkbox"/> Q1G24HV7614B closed <input type="checkbox"/> Q1G24HV7614C closed</p> <p>9.4 Verify SG blowdown sample - ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE STEAM GEN ISO <input type="checkbox"/> MLB1 19-2 lit Q1P15HV3328 closed <input type="checkbox"/> MLB1 19-3 lit Q1P15HV3329 closed <input type="checkbox"/> MLB1 19-4 lit Q1P15HV3330 closed</p> | | | | | | | | | | | | | | | | | | | | | |
| | BOP | <p>(Step 10) Check no MSL isolation actuation signal present.</p> <table> <tr> <th>Signal</th><th>Setpoint</th><th>coincidence</th><th>TSLB</th></tr> <tr> <td>LO SG PRESS</td><td>< 585 psig</td><td>2/3</td><td>TSLB4 19-2,3,4</td></tr> <tr> <td>Hi stm flow and Lo-Lo Tavg</td><td>>40% and <543°F</td><td>1/2 on 2/3</td><td>TSLB4 16-3,4 17-3,4 18-3,4</td></tr> <tr> <td></td><td></td><td>2/3</td><td>TSLB2 10-1,2,3</td></tr> <tr> <td>HI-HI ctmt press</td><td>>16.2 psig</td><td>2/3</td><td>TSLB1 2-2,3,4</td></tr> </table> | Signal | Setpoint | coincidence | TSLB | LO SG PRESS | < 585 psig | 2/3 | TSLB4 19-2,3,4 | Hi stm flow and Lo-Lo Tavg | >40% and <543°F | 1/2 on 2/3 | TSLB4 16-3,4 17-3,4 18-3,4 | | | 2/3 | TSLB2 10-1,2,3 | HI-HI ctmt press | >16.2 psig | 2/3 | TSLB1 2-2,3,4 | |
| Signal | Setpoint | coincidence | TSLB | | | | | | | | | | | | | | | | | | | | |
| LO SG PRESS | < 585 psig | 2/3 | TSLB4 19-2,3,4 | | | | | | | | | | | | | | | | | | | | |
| Hi stm flow and Lo-Lo Tavg | >40% and <543°F | 1/2 on 2/3 | TSLB4 16-3,4 17-3,4 18-3,4 | | | | | | | | | | | | | | | | | | | | |
| | | 2/3 | TSLB2 10-1,2,3 | | | | | | | | | | | | | | | | | | | | |
| HI-HI ctmt press | >16.2 psig | 2/3 | TSLB1 2-2,3,4 | | | | | | | | | | | | | | | | | | | | |
| | BOP | <p>(Step 11) Verify PHASE A CTMT ISO. (Step 11.1) Verify PHASE A CTMT ISO - ACTUATED. <input type="checkbox"/> MLB-2 1-1 lit <input type="checkbox"/> MLB-2 11-1 lit</p> <p>11.2 Check all MLB-2 lights - LIT.</p> <p>11.3 Verify Excess Letdown Isolation valves closed. <input type="checkbox"/> Q1E21HV8153, EXC LTDN ISO <input type="checkbox"/> Q1E21HV8154, EXC LTDN ISO</p> | | | | | | | | | | | | | | | | | | | | | |

Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|---|
| | BOP | (step 12) Check all reactor trip and reactor trip bypass breakers – OPEN Reactor trip breaker A Reactor trip breaker B Reactor trip bypass breaker A Reactor trip bypass breaker B | |
| | BOP | (step 13) Trip CRDM MG set supply breakers. 1A(1B) MG SET SUPP BKR <input type="checkbox"/> N1C11E005A <input type="checkbox"/> N1C11E005B | |
| | BOP | (step 14) Secure secondary components. Stop both heater drain pumps. HDP <input type="checkbox"/> 1A <input type="checkbox"/> 1B Check any condensate pump started. IF started, THEN stop all but one condensate pump. <input type="checkbox"/> 1A <input type="checkbox"/> 1B If NO condensate pumps are started then place all HSs to STOP 14.3 IF condensate pump operating, THEN verify backup cooling aligned to condensate pumps per FNP-0-SOP-0.0, APPENDIX B, TB SO Actions Following A Reactor Trip Or Safety Injection. | Will call TBSO to accomplish this. |
| | BOP | (step 15) Verify both CRACS mode selector switches in the ON position. CRACS Mode Selector Switch <input type="checkbox"/> A TRAIN <input type="checkbox"/> B TRAIN | |
| | BOP | (step 16) WHEN at least 30 seconds have passed since turbine trip, THEN check main generator tripped. 230 KV BKR <input type="checkbox"/> 810 - OPEN <input type="checkbox"/> 914 - OPEN | |

| | | | | | | | | | |
|--------------------|------------------|------------------------------|----------|---------|----------|------|-----------|----|-----------|
| Op Test No.: | <u>FA2013301</u> | Scenario # | <u>5</u> | Event # | <u>8</u> | Page | <u>47</u> | of | <u>48</u> |
| Event Description: | | Attachment 2 of EEP-0 | | | | | | | |

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

Event Description: Attachment 4 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------|--|-----------------|
| Attachment 4 of EEP-0 TWO TRAIN ECCS ALIGNMENT VERIFICATION | | | |
| | | <p>(Step 1) Verify two trains of ECCS equipment aligned.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Check DF01 closed <input type="checkbox"/> Verify DF02 closed <input type="checkbox"/> Check DG15 closed <input type="checkbox"/> Verify DG02 closed <input type="checkbox"/> Verify two trains of battery chargers – energized Amps > 0 <p>(Step 1.6) Verify two trains of ESF equipment aligned.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Check all MLB-1 lights LIT <p>Verify charging pump suction and discharge valves - OPEN.</p> <p>CHG PUMP DISCH HDR ISO</p> <ul style="list-style-type: none"> <input type="checkbox"/> Q1E21MOV8132A <input type="checkbox"/> Q1E21MOV8132B <input type="checkbox"/> Q1E21MOV8133A <input type="checkbox"/> Q1E21MOV8133B <p>CHG PUMP SUCTION HDR ISO</p> <ul style="list-style-type: none"> <input type="checkbox"/> Q1E21MOV8130A <input type="checkbox"/> Q1E21MOV8130B <input type="checkbox"/> Q1E21MOV8131A <input type="checkbox"/> Q1E21MOV8131B | |
| | | <p>(Step 1.7) Verify all post accident containment air mixing system fans - STARTED. (BOP)</p> <p>POST ACCIDENT MIXING FAN</p> <ul style="list-style-type: none"> <input type="checkbox"/> 1A <input type="checkbox"/> 1B <input type="checkbox"/> 1C <input type="checkbox"/> 1D <p>RX CAV H2 DILUTION FAN</p> <ul style="list-style-type: none"> <input type="checkbox"/> 1A <input type="checkbox"/> 1B <p>(Step 1.8) WHEN power restored to any de-energized emergency bus, THEN verify alignment of associated equipment.</p> | |
| | BOP | (Step 1.9) Verify SFP Cooling in service per SOP-54.0, Spent Fuel Pit Cooling And Purification System. | Call Radside SO |
| End of Attachment 4 | | | |

Op-Test No.: FA2013-301

Page 1 of 2

Brief

This simulator performance scenario is performed in the EVALUATION MODE. You should not direct questions to the evaluators. Otherwise, you should perform as if you were in the MCR.

Your ability to maintain a log is not being graded, but maintaining a rough log is recommended to help during briefs.

If you need to communicate with the Unit 2 operator, call Unit 2 at 2434 or page the Unit 2 Unit Operator.

Respond to what you see. If there is a problem with the simulation, the session will be terminated or adjusted as appropriate based on the specific problem.

Assign operating positions.

Ask for and answer questions.

Appendix D**Turnover sheet****Form ES-D-2**☒ Unit 1 ☐ Unit 2

Shift:

Date

| | | | |
|--------------|-------------|--|-------|
| Off-going SS | Oncoming SS | <input type="checkbox"/> N <input checked="" type="checkbox"/> D | Today |
|--------------|-------------|--|-------|

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

Security Keys A, S, D, SW, X on key ring . ____ SS

Unit 75% power, 1177 ppm, MOL 10,000 MWD/MTU
StatusTARGET ZERO
Every Day, Every Job Safely**STPs/Evolutions:**STP-27.1 completed 2
hours ago**A** Train On-Service – **B** Train
Protected

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

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

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

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

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

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

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

8. Unit 2 is at 100% power with no major issues.

9.

Equipment Status

Maintain VCT gas pressure 25-30 psig

Reactivity Plan70 gallon dilutions every 10 minutes to maintain
current conditions.**Waste Management Status**

#3 RHT – On Service

WGS – secured

LCO Status3.8.1 Condition B for 1C DG, STP-27.1 completed 2 hours
ago

3.7.5 Condition B for 1A MDAFW Pump

Night Orders*No New Night Orders***Part II**

Review Shift Complement

LCOs Reviewed ____ SS ____ (initials) reviewed as early in shift as possible

Part III:

STP-1.0

Operator Logs

Cond. Report

Autolog

ELDS & GEN

Keys

Reviewed/Signed

Reviewed

Queue

Reviewed

Spreadsheet

Turned

☒ Yes☒ Yes☒ Yes☒ Yes☒ Yes☒ Yes

Reviewed

verified

Over

Southern Nuclear J.M. Farley Nuclear Plant

Operations Training Simulator Exam Scenario



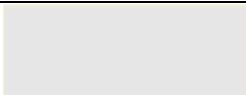
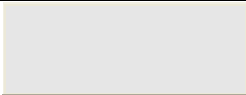
BOOTH INSTRUCTOR GUIDE

ILT-36 NRC EXAM SCENARIO #6

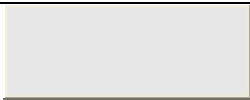

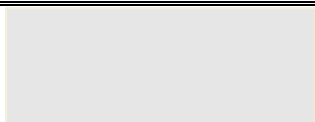

| | | | |
|--|------------------------------|-------|---------|
| Validation time: 100 minutes Validated by McCaffery, Sorrell, Phillips The week of February 18, 2013 | | | |
| | | | |
| TRN Supervisor Approval: | Gary Ohmstede | Date: | 3-13-13 |
| | | | |
| NRC Chief Examiner | SEE NUREG 1021 FORM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

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


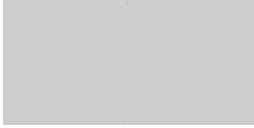
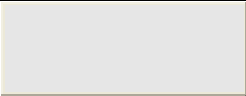

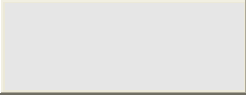


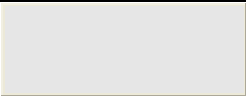

(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

| EVENT# | TIME | EVENT DESCRIPTION / ACTION LIST | ACTIONS |
|----------------|------|--|--|
| 0 | 0 | Load in IC-216 and sim IC snap directory Base IC- 58 |  |
| | | RUN |  RUN simulator |
| 0 | 0 | Generic setup: bat 36exam/generic_setup_HLT.txt |  |
| 0 | 0 | Quick setup (all items with * are included): bat 36exam/2013nrcexam_6.txt |  |
| PRESETS | | | |
| Event No. | | Malfunction | * means in Bat file |
| 7 | | Fail RTB from opening in auto imf cbrxtrp_cc6 open imf cbrxtrp_cc5 open | * |
| 7 | | MCB side Rx Trip Switch fails to cause trip imf cbrxtrp_opos1 open | * |
| 7 | | Prevent manual trip of main turb. imf mal-tur24 | * |
| 7 | | Main turbine fails to auto trip: imf mal-tur2 | * |
| 8 | | Trip TDAFW pump after one minute on after pump speed above 3500rpm imf mal-fwm1c (2 60) | TRG 2 |
| 8 | | Degrades head of B MDAFW pump to 95% degraded over 30 seconds after TDAFW pump trips imf nafp01b-d_th (3 5) 95 30 | TRG 3 |
| 7 | | ALL MSIVs will not close on auto closure imf crsh001a_cc5 open imf cmsh002a_d_cc5 open imf crsh001b_cc5 open imf cmsh002b_d_cc5 open imf crsh001c_cc5 open imf cmsh002c_d_cc5 open | * |
| 0 | | Tag Out 1A MDAFW Pump irf cafp01a_d_cd1 open | * |
| 0 | | 1C DG Tagged out irf cBK1DH07_d_cd1 open irf cBK2DH07_d_cd1 open irf cBK1DH07_d_cd2 open irf cBK2DH07_d_cd2 open | * |

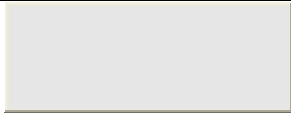

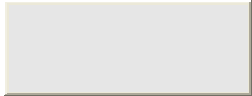
| | | Triggers and Commands | |
|---|--|--|--------------|
| 8 | | Event Trigger 1 GV2 reaches 25% going closed, it sticks at 20% open trgset 1 "rehgvpz(2) < 25" trg 1 "imf mal-tur15f 20 1" | TRG 1 |
| 8 | | Event Trigger 2 Triggers trip of TDAFW pump after startup trgset 2 "oafp02 > 3500" | TRG 2 |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

| <u>MCB setup</u> | | | |
|------------------|--|--|--|
| | | 1C DG MSS | Place in Mode 3 |
| | | Place HOLD Tag on 1C DG MSS | 1 HOLD TAG |
| | | Place HOLD Tag on 1C DG DG output breakers DHO7-1 and DHO7-2 | 2 HOLD TAGS |
| | | Place Unit 1 and Unit 2 Bypass and inoperable panel lights to the up position (EMERGENCY POWER SYSTEM) | Unit 1 A-Train Unit 2 A Train |
| | | Place Unit 1 Bypass and inoperable panel lights to the up position (Auxiliary Feedwater System) | Unit 1 A-Train |
| | | Place HOLD Tag on 1A MDAFW pump H/S | 1 HOLD TAG |
| | | | |
| | | DEH | Clear DEH alarms |
| | | Verify Impulse loop is NOT in service | |
| | | Select OPS on MCB monitor | IPC |
| | | Acknowledge computer alarms | |
| | | | |
| | | IPC: IF FF5 is in alarm, update rods | Ensure FF5 clear or update rods on IPC |
| | | | |
| | | Setup spreadsheet on OATC computer to resemble reactivity spreadsheet provided | <u>Set up computer</u> |
| | | | |
| | | Recorders Verify memory disks cleared |  |
| | | Cae clearrecorders.cae | |
| | | | |
| | | Provide a marked up copy of UOP-3.1 version 112.4 up to step 8.2. | <u>UOP-1.3 copy</u> |
| | | | |
| | | |  |
| | | | FREEZE simulator |
| | | | |
| | | Perform Booth Operators Setup Checklist | |
| | | | |
| | | Open Simview file to be used for plant parameter data collection: Simview / sv DataCollection.uvl |  sv DataCollection.uvl |
| | | | |
| | | If needed, adjust sim time back to 00:00:00 SIMVIEW / Sim_Clock.uvl Hours: clock(3) = 0 Minutes: clock(2) = 0 Seconds: clock(1) = 0 |  sv sim_clock.uvl |
| | | | |
| | | VERIFY MICROPHONES READY | Batteries installed |
| | | | |
| | | TURNOVER SHEET AVAILABLE | |

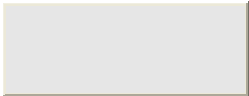
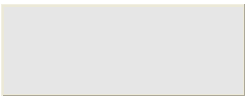
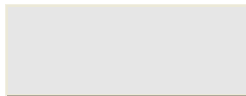
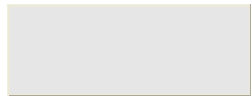

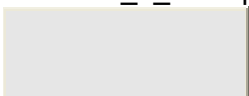
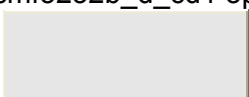
EXAM

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


EXAM

| EVENT# | TIME | EVENT DESCRIPTION | COMMAND |
|--------|--------|--|---|
| | Preset | The Main Turbine will not trip in auto or manual, closing GV's in manual one GV sticks, required to close MSIV's. (CT) | |
| 8 | Preset | TDAFW pump will trip 1 minute after it starts. | |
| | Preset | The 1B MDAFW pump begins to experience degraded head. | |
| | | Terminate event when condensate flow to SGs accomplished (CT) and FRP-H.1 transition criteria reached. | |
| | | | |
| | | End of Exam |  |
| | | | HORNS OFF |
| | | |  |
| | | | FREEZE simulator |
| | | Stop data collection for Simview file sv DataCollection.uvl | |
| | | Export data to file with the name of exam2013sen6grpX.txt <i>NOTE: Substitute grpX with grp1, grp2, or grp3 as appropriate.</i> <i>NOTE: file will be saved in the OPENSIM directory.</i> | Ensure data file created. |
| | | When Control board data no longer needed Then Clear recorders for exam security Cae clearrecorders.cae |  |

Local operator actions:

| <u>EVENT NO.</u> | <u>TIME</u> | <u>ACTIONS</u> |
|-------------------------|--------------------|---|
| 1 | NONE REQUIRED | |
| 2 | NONE REQUIRED | |
| 3 | NONE REQUIRED | |
| 4 | NONE REQUIRED | |
| 5 | NONE REQUIRED | |
| 6 | NONE REQUIRED | |
| 7 | NONE REQUIRED | |
| 8 | WHEN REQUESTED | <p><u>MAINTENANCE PERSONNEL:</u> When requested to place jumpers to defeat FW isolation.</p> <p></p> <p>REMOTE / N21 / LOA-CFW047 / installed</p> <p>After five minutes, I&C reports: “Jumpers are installed per the attachment in FRP-H.1.”</p> <p><u>SO:</u> When requested open SGFP bypass valve and isolate mini flows.</p> <p>  </p> <p>irf loa-cfw021 1 30 irf loa-cfw015 0 20 irf loa-cfw016 0 20</p> |
| 8 | WHEN REQUESTED | <p><u>SO:</u> When requested for MCC Operations After 3 minutes report “On station to operate breakers”</p> <p>Buttons open the respective breakers</p> <p></p> <p>irf cmf3232a_d_cd1 open</p> <p></p> <p>irf cmf3232b_d_cd1 open</p> <p></p> <p>irf cmf3232c_d_cd1 open</p> |

Communications sheet

| <u>EVENT NO.</u> | <u>TIME</u> | <u>ACTIONS</u> |
|-------------------------|--|---|
| ALL | AS REQUIRED (Standard communications to inform supervision) | <u>SSS, SM and Dispatcher:</u> Repeat back failure, procedure entered, plant status, CR in the cue and that type of communications. |
| 1 | NONE REQUIRED | |
| 2 | 1 minute after requested | <u>Unit 1 Radside</u> "1C Charging pump oil temperature is  and rising slowly" |
| 3 | WHEN REQUESTED | <u>TBSO:</u> "The 1B SGFP is speeding up and slowing down. I can't tell why from out here. I don't see any other apparent problems." |
| 4 | NONE REQUIRED | |
| 5 | NONE REQUIRED | |
| 6 | NONE REQUIRED | |
| 7 | NONE REQUIRED | |
| 8 | WHEN REQUESTED | <u>ROVER:</u> "The TDAFWP linkage is broken and cannot be reset" "The 1B MDAFWP is running normally" |

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

Turnover:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The 1A MDAFW is tagged out.

1B MDAFW pump begins to experience degraded head.

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

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

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

CRITICAL TASK SHEET

- ___ 1. Failure of the turbine to trip. Manually actuate Main Steam line isolation before a severe (orange path) challenge develops to either the subcriticality or the integrity CSF: (WOG CT E-0- - P)

- Close ONE MSIV in each Main Steam Line.

- ___ 2. Heat sink or feed and bleed

Establish feedwater flow into at least one SG before feed and bleed is required (2 SG is < 12% WR level). (1AF-FTS-PUMP-H) (WOG CT FR-H.1 - - A)

- Verify flow to A, B, or C SG using condensate pumps.

SCENARIO
OBJECTIVE/
OVERVIEW:

The team should be able to:

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

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

Op Test No.: FA2013301 Scenario # 6 Event # 1 Page 1 of 46

Event Description: Ramping Down for CTMT entry

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

Indications Available:

Annunciators:

Other Indications:

NONE

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

Op Test No.: FA2013301 Scenario # 6 Event # 1 Page 2 of 46

Event Description: Ramping Down for CTMT entry

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

Op Test No.: FA2013301 Scenario # 6 Event # 1 Page 3 of 46

Event Description: Ramping Down for CTMT entry

| Time | Pos. | Expected Actions/Behavior | Comments |
|---|------|--|----------|
| | RO | (Step 1.7) Verify the boration automatically stops when the boric acid batch integrator reaches its setpoint as follows: <ul style="list-style-type: none">• Boric acid flow returns to zero as displayed on FI-113 MAKEUP FLOW TO CHG/VCT.• MKUP TO CHG PUMP SUCTION HDR FCV113B closes.• BORIC ACID TO BLENDER FCV113A closes. | |
| | | | |
| At the discretion of the Lead Examiner move to Event 2. ~3 minutes to first alarm for Event 2. | | | |

Op Test No.: FA2013301 Scenario # 6 Event # 2 Page 4 of 46

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

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

Indications Available:

Annunciators:

- CHG PUMP LUBE OIL TEMP HI (EA3)

Indications of CHG PUMP LUBE OIL TEMP HI

- Annunciator Only

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

Op Test No.: FA2013301 Scenario # 6 Event # 2 Page 5 of 46

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

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

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

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

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

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

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

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

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

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

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

Op Test No.: FA2013301 Scenario # 6 Event # 2 Page 9 of 46

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

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

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

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|---|----------|
| | RO | (Step 9.4) Verify VCT HI LVL DIVERT VLV LCV-115A alignment: <ul style="list-style-type: none"> • Position indicator VCT light - LIT • Handswitch in – AUTO (Step 9.5) Verify LTDN HI TEMP DIVERT VLV Q1E21TCV143: <ul style="list-style-type: none"> • Handswitch in - VCT • VCT light - LIT • DEMIN light - NOT LIT (Step 9.6) IF necessary, THEN OPEN both LTDN LINE PENE RM ISO's from the PRIP. <ul style="list-style-type: none"> • Q1E21HV8175A • Q1E21HV8175B | |
| | | | |
| | RO | (Step 9.7) Verify LTDN LINE CTMT ISO Q1E21HV8152 - OPEN | |
| | | | |
| | RO | (Step 9.8) Verify LTDN LINE ISO valves - OPEN <ul style="list-style-type: none"> • Q1E21LCV459 • Q1E21LCV460 (Step 9.9) Place LP LTDN PRESS PK 145 on service: <ul style="list-style-type: none"> • Place controller in MANUAL • Adjust demand signal to 50% or less | |
| | | | |

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

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|----------|
| | RO | (Step 9.10) Initiate minimum charging flow: (Step 9.10.1) Verify CHG FLOW FK 122 in - MAN (Step 9.10.2) Establish minimum charging flow based on orifices to be placed on service: 1 Orifice - 18 gpm OR 2 Orifices - 40 gpm (Step 9.11) Establish approximately 60 gpm letdown flow by OPENING: • Q1E21HV8149B OR • Q1E21HV8149C | |
| | | | |
| | RO | (Step 9.12) IF desired, THEN place the second orifice on service by OPENING: Q1E21HV8149A (Step 9.13) Initiate actions to restore letdown flow to the demins per FNP-1-SOP-2.1, CHEMICAL AND VOLUME CONTROL SYSTEM PLANT STARTUP AND OPERATION | |
| | | | |

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

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

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

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

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

| Time | Pos. | Expected Actions/Behavior | | | Comments |
|--|------|--|---|-----------------|----------|
| ARP-1.5, EA3 | | | | | |
| | SRO | <i>(step 5 of EA3 ARP) Refer to Technical Specifications LCOs 3.5.2, and Technical Requirements TR 13.1.5.</i> 3.5.2 mandatory LCO Condition A; since this pump is aligned to B Train and the swing pump is aligned to A Train. 72 hour LCO 13.1.5 admin LCO and mandatory LCO while swapping chg pumps from one train to the other Condition A. Two charging pumps shall be operable and this is a 72 hour LCO. | | | |
| TECHNICAL SPECIFICATION 3.5.2, ECCS—Operating Two ECCS trains shall be OPERABLE. | | | | | |
| <i>B Train ECCS is INOPERABLE until the 1B chg pump is aligned to B Train and the 1C Chg pump is tagged out or a jumper is installed to permit the 1B Chg pump to auto start</i> | | | | | |
| | | CONDITION | REQUIRED ACTION | COMPLETION TIME | |
| | | A. One or more trains Inoperable AND At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available. | A.1 Restore train(s) to OPERABLE status. | 72 hours | |
| TECHNICAL REQUIREMENT 13.1.5, Charging Pumps - Operating Two charging pumps shall be OPERABLE. | | | | | |
| <i>This is an admin LCO to start. When the 1B chg pump is being placed on the B Train then this will be a mandatory LCO for that time period.</i> | | | | | |
| | | CONDITION | REQUIRED ACTION | COMPLETION TIME | |
| | | A. One required charging pump inoperable | A.1 Restore at least two charging pumps to OPERABLE status. | 72 hours | |
| <ul style="list-style-type: none"> <u>LOSF determination required within 4 hours per 3.8.1 .</u> | | | | | |
| At the discretion of the Lead Examiner move to Event 3 | | | | | |

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

Event Description: 1B SGFP controller oscillation failure

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

Indications Available:

Annunciators:

- DEH TRBL (LB1)
- 1A, 1B, 1C SG LVL DEV (JF1, JF2, JF3)

Recognize indications of 1B SGFP controller failing:

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------|--|---|
| AOP-100, Instrumentation Malfunction, section 1.4, ver 12 | | | |
| (AOP-13, ver 30, can be entered as well but it takes longer to take action.) | | | |
| | BOP | <p>(step 1) Take manual control of SGFP speed by: Place SK 509A, 509B or 509C, 1A/B SGFP SPEED CONT, in Manual and raise demand as necessary.</p> <p>Take manual control of all FRV valves</p> <ul style="list-style-type: none"> • 1A SG FW FLOW FK-478 • 1B SG FW FLOW FK-488 • 1C SG FW FLOW FK-498 <p><u>IF</u> a loss of main feedwater occurs, <u>THEN</u> perform the actions required by AOP-13.0, LOSS OF MAIN FEEDWATER</p> | NOTE: Step 1 is an Immediate Operator Action and a continuing action step |
| | SRO | <p>(step 2) If adverse trends in the SG level exists then establish trip criteria</p> <p>If an automatic action is required or set points is approached: Trip the reactor and go to EEP-0</p> | NOTE: if the SGFP trips at 82% level then the reactor would be tripped at this point. |
| | BOP | (step 3) IF a ramp is in progress, THEN place turbine on HOLD. | |

Op Test No.: FA2013301 Scenario # 6 Event # 3 Page 15 of 46

Event Description: 1B SGFP controller oscillation failure

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------|--|----------|
| | BOP | (step 4) Adjust speed back to within the normal operating range for the feed flow/steam flow ΔP required for the existing power level. | 150 psid |
| | | | |
| | BOP | (step 5) Check Steam Dumps in the Tavg mode | |
| | | | |
| | SRO | (step 6) Notify the Shift Manager | |
| | | | |
| | SRO | (Step 8) Submit a condition report for the failed instrument, and notify the Notify the Work Week Coordinator | |
| | | | |
| At the discretion of the Lead Examiner move to Event 4 | | | |

Op Test No.: FA2013301 Scenario # 6 Event # 4 Page 16 of 46

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

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

Indications Available:

Annunciators:

- CHG HDR FLOW HI-LO (EA2)

Recognize indications of LK-459F failing low:

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|----------------------------------|
| | | | |
| | | AOP-100, Instrumentation Malfunction, section 1.2 ver 12.0 is the expected procedure to enter based on a component malfunction. However, if the crew determines this is a CVCS malfunction then AOP-16 would be entered. | |
| | SRO | Direct entry into AOP-100 or AOP-16.0 | AOP-16 steps on next page |
| | | AOP-100 steps below: | |
| | RO | (step 1) Check pressurizer level is on or trending to program value | |
| | | | |
| | RO | (step 1 RNO) Take Manual control of FK-122, CHG FLOW controller, and raise the demand to approximately 80 – 100 gpm | |
| | | | |
| | RO | (step 2) Check RCP Seal Injection flows 6-13 gpm □ Adjust as necessary using HIK 186, RCP SEAL INJECTION FLOW CONTROLLER | |
| | | | |
| | SRO | (step 3) Determine if a pressurizer level transmitter/indicator loop has failed □ Failed or erroneous reading on LI459, LI460 or LI461 | NOTE: LK-459F has failed |
| | | | |
| | RO | (step 4) Check letdown in service | Letdown will still be in service |
| | | | |
| | | No action for step 5 and 6 | |
| | | | |
| | SRO | (step 7) Notify the Shift Manager | |
| | | | |

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

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|---|------|--|---|
| | RO | (step 8) <u>WHEN</u> plant conditions permit, <u>THEN</u> restore components to automatic control as follows: □ Restore charging flow control to automatic | NOTE: LK-459F will not be fixed so Pzr level control will in manual the rest of the scenario |
| | SRO | (step 9) Submit a Condition Report for the failed level channel, and notify the Work Week Coordinator (Maintenance ATL on backshifts) of the Condition Report | |
| AOP-16.0, CVCS Malfunction, Ver 18.0 | | | |
| | RO | (Step 1) Verify CHG flow adequate to cool letdown CHG FLOW - FI-122A LTDN HX OUTLET FLOW - FI-150 REGEN HX OUTLET TEMP - TI-140 | Closes HV8149 A, B and C |
| | BOP | (Step 2) Stop any load change in progress | |
| | RO | (Step 3) Monitor VCT level (Step 4) Observe CHG HDR PRESS and MOTOR AMPS to ensure proper charging pump operation - PI-121 and ammeter for chg pump | |
| | RO | (Step 5) Check charging pump – RUNNING | |
| | RO | (Step 6) Check Charging flow FK-122, CHG FLOW controller, controlling in AUTO with flow indicated FK- 122, CHG FLOW controller, is taken to manual control –RNO Adjust SEAL WTR INJECTION HIK-186 as required to maintain RCP seal injection flow 6-13 gpm. | NOTE: There will be flow indicated and FK-122 in AUTO |

Op Test No.: FA2013301 Scenario # 6 Event # 4 Page 18 of 46

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|---|----------|
| | RO | (Step 7) Check DE3 clear (Step 8) Determine Status of Normal Letdown: Manually close charging FK-122, CHG FLOW controller. Minimize seal injection between 6-13 gpm Direct Chemistry to shutdown the zinc addition system (ZAS) | |
| | RO | (Step 9.2) Verify all letdown orifice isolation valves - CLOSED LTDN ORIF ISO 45 GPM <input type="checkbox"/> Q1E21HV8149A LTDN ORIF ISO 60 GPM <input type="checkbox"/> Q1E21HV8149B <input type="checkbox"/> Q1E21HV8149C (Step 9.3) Place LTDN HX OUTLET TEMP TK 144 on service: <input type="checkbox"/> Place controller in AUTO <input type="checkbox"/> Set to maintain temperature 90 to 115°F (Step 9.4) Verify LTDN HI TEMP DIVERT VLV Q1E21TCV143: <input type="checkbox"/> DEMIN light - LIT <input type="checkbox"/> Handswitch in – AUTO (Step 9.5) Verify LTDN HI TEMP DIVERT VLV Q1E21TCV143: <input type="checkbox"/> Handswitch in - VCT <input type="checkbox"/> VCT light - LIT <input type="checkbox"/> DEMIN light - NOT LIT (Step 9.6) IF necessary, THEN OPEN both LTDN LINE PENE RM ISO's from the PRIP. <input type="checkbox"/> Q1E21HV8175A <input type="checkbox"/> Q1E21HV8175B | |

Op Test No.: FA2013301 Scenario # 6 Event # 4 Page 19 of 46

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

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

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

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

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

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

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

Indications Available:

Annunciators:

RCP SEAL INJ FLOW LO (DD1)
 SEAL WTR INJ FLTR HI DP (DC4)
 CHG HDR FLOW HI-LO (EA2)
 RMS HI RAD (FH1)
 CCW SRG TK LVL HI (AA4 & AB4)

Indications of the leak:

Li-112B and 115, VCT LVL, decreasing
 FI-122, CHG FLOW increasing

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

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

Event Description: Thermal Barrier Leak

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

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

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

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

Event Description: Thermal Barrier Leak

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

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

Event Description: Thermal Barrier Leak

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

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

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

Indications Available:

Annunciators:

- LB1 DEH TRBL
- KK1 TURB COND VAC LO
- KK2 TURB COND VAC LO-LO

Recognize indications of degrading vacuum

- Condenser pressure increasing

| Time | Pos. | Expected Actions/Behavior | Comments |
|---|-------------|---|----------|
| ARP-1.10, Annunciator Response Procedure, KK1/KK2 Ver 70.2 | | | |
| | | | |
| | SRO/ BOP | (KK1 step1) Perform the actions required by FNP-1-AOP-8.0, PARTIAL LOSS OF CONDENSER VACUUM. | |
| | | | |
| | BOP | (KK1 step2) IF condenser pressure approaches the setpoint for KK2, (refer to KK2), THEN ensure the OPERATOR ACTIONS for KK2 are understood. | |
| | | | |
| | BOP | (KK2 step1) Determine if the alarm is valid. | |
| | | | |
| | SRO/ BOP | (KK2 step 2) IF reactor power is greater than or equal to 35%, THEN trip the reactor and perform the actions required by EEP-0, | |
| | | | |
| | BOP | (KK2 step 3) IF reactor power is less than 35%, THEN trip the turbine and perform the actions required by FNP-1-AOP-3.0, TURBINE TRIP < P-9 SETPOINT. | |
| | | | |
| AOP-8.0 PARTIAL LOSS OF COND VACUUM Ver 22.1 | | | |
| | | | |

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|----------|
| | BOP | (step 1) Monitor Condenser pressure (step 1.1) IF annunciator KK1, TURB COND VAC LO in alarm OR setpoint exceeded, THEN increased monitoring of condenser pressure is required: • 1.485 psia when < 25% turbine power • 2.901 psia when > 47.9% turbine power • Varies Linearly Between 25% (1.485 psia) and 47.9% (2.901 psia) | |
| | BOP | (step 2) Monitor turbine trip criteria. (step 2.1) Check condenser pressure less than annunciator KK2, TURB COND VACLO-LO setpoint for existing turbine power using MWe or PT-446/447: • 1.885 psia when < 25% turbine power • 3.8 psia when > 55.9% turbine power • Varies Linearly Between 25% (1.885 psia) and 55.9% (3.8 psia) | |
| | BOP | (step 3) Stabilize condenser vacuum using any or all of the following actions based on plant conditions, and the rate at which vacuum is worsening. 3.1 IF the rate of condenser pressure increase is significant and approaching annunciator KK1, TURB COND VAC LO setpoint, THEN reduce load prior to reaching annunciator KK1 setpoint. | |

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

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

Indications Available:**Annunciators:**

- Various and numerous

Indications of RX trip

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------------|---|--|
| EEP-0, Reactor Trip or Safety Injection, rev 44 | | | |
| | RO/ BOP | <p>Immediate Operator actions of EEP-0 (step 1) Check reactor trip. Check all reactor trip breakers and reactor trip bypass breakers - OPEN. Check nuclear power - FALLING. Check rod bottom lights - LIT.</p> <p>(step 2) Check turbine - TRIPPED. TSLB2 14-1 thru 4 lit</p> | <p>Immediate Action steps of EEP-0</p> <p>NOTE: First hand switch fails, second hand switch is successful.</p> <p>RNO 2.1 Place main turbine emergency trip switch to TRIP for at least 5 seconds.</p> <p>2.2 IF turbine can NOT be tripped, THEN reduce GV position demand signal to zero from DEH panel. <input type="checkbox"/> TURBINE MANUAL depressed <input type="checkbox"/> GV CLOSE depressed <input type="checkbox"/> FAST ACTION depressed</p> <p>(CT)2.3 IF steam flow to main turbine is NOT secured, THEN close all main steam line isolation and bypass valves.</p> |

Op Test No.: FA2013301 Scenario # 6 Event # 7 Page 29 of 46

Event Description: Entry to EEP-0 based on Condenser Vacuum

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------------|---|--|
| | RO/ BOP | (step 3) Check power to 4160 V ESF busses. 4160 V ESF busses - AT LEAST ONE ENERGIZED A Train (F 4160V bus) power available lights lit OR B Train (G 4160V bus) power available lights lit Verify operating diesel generators are being supplied from at least one SW pump. | |
| | RO/ BOP | (step 4) Check SI Status. (step 4.1) Check any SI actuated indication. BYP & PERMISSIVE SAFETY INJECTION <input type="checkbox"/> ACTUATED status light lit <input type="checkbox"/> MLB-1 1-1 lit <input type="checkbox"/> MLB-1 11-1 lit (step 4.2) Verify both trains of SI-ACTUATED. <input type="checkbox"/> MLB-1 1-1 lit AND <input type="checkbox"/> MLB-1 11-1 lit | |
| | SRO | (step 5) Directs continuing into EEP-0 at step 5. Directs the BOP to perform Attachment 2 of EEP-0. | For Attachment 2 and 4 actions. Go to page 39 |
| | | (Fold out page step 5) 5 Ruptured SG AFW Isolation. 5.1 Manually stop AFW flow to a SG if BOTH conditions listed below occur: <input type="checkbox"/> Level increases in an uncontrolled manner or radiation in that SG is abnormal AND <input type="checkbox"/> Narrow range level – GREATER THAN 31% {48%} | NOTE: [CA] step The action to Isolate AFW to the ruptured SG may be completed beyond this point. |
| | RO | (step 6) Check containment pressure- HAS REMAINED LESS THAN 27 psig (checked on IPC or PI950, 951, 952, 953,CNMT PRESSURE) | NOTE: [CA] step |
| | RO | (step 7) Announce "Unit 1 reactor trip and safety injection". | |

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

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

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

| | | | |
|--|-----|---|------------------------|
| | | | |
| FRP-H.1, LOSS OF HEATSINK, Ver 27.0 | | | |
| | | | |
| | SRO | (step 1) Check secondary heat sink - REQUIRED. <ul style="list-style-type: none"> • Check RCS pressure > any non-faulted SG pressure on PT-402/403 • Check RCS hot leg temperatures > 350°F on TR 413 | |
| | | | |
| | SRO | (step 2) Directs monitoring of bleed and feed criteria <ul style="list-style-type: none"> • Check at least two SG wide range levels GREATER THAN 12% {31%}. • Check pressurizer pressure < 2335 psig | |
| | | | |
| | SRO | (step 3) Direct I&C to defeat feedwater isolation signal by installing jumpers per ATTACHMENT 1. | NOTE: Calls I&C |
| | | | |
| | BOP | (step 4) Check CST level > 5.3 feet and call for makeup to CST as required | |
| | | | |

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

| | | | |
|--|-----|--|---|
| | BOP | <p>(step 5) Try to establish AFW flow to at least one SG.</p> <p>(step 5.1) Verifies blowdown isolated from all SGs</p> <p>1A(1B,1C) SGBD ISO</p> <ul style="list-style-type: none"> • Q1G24HV7614A closed • Q1G24HV7614B closed • Q1G24HV7614C closed <p>(step 5.2) Verifies SG blowdown sample valves isolated</p> <ul style="list-style-type: none"> • MLB4 6-4 lit • MLB4 7-4 lit • MLB4 8-4 lit <p>(step 5.3) Recognizes AFW pumps not available</p> <p>.</p> | <p>NOTE: [CA] Step</p> <p>RNO</p> <p>5.3 PERFORM local start from Hot shutdown panels. (BOOTH OPERATOR WILL PERFORM THESE ACTIONS if/when directed)</p> |
| | | | |
| | | <p>(step 5.4) Verify at least one flow path to at least one SG ALIGNED</p> <p>Checks OPEN MDAFP to 1A/B/C SG (where x = respective SG A, B or C)</p> <ul style="list-style-type: none"> - HV3227x MDAFW TO SG MOD - HIC3227xA MDAFW FCVs adjusted - HV3228x TDAFW to SG MOD - HIC3228xA TDAFW FCVs adjusted - MOV-3350x AFW STOP vlv OPEN - MOV3764x MDAFW to SG OPEN | |
| | | <p>(step 5.5) [CA] Check total AFW flow to SGs greater than 395 gpm.</p> <p>WHEN any feed flow established AND at least one SG narrow range level greater than 31%{48%} THEN go to procedure and step in effect</p> | Continue efforts to establish AFW flow. |
| | | | |
| | RO | (step 6) Stops all RCPs | |
| | | | |

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

Event Description: Transition to FRP-H.1

| | | | |
|---|-----|--|--|
| | SRO | (step 7) Try to establish main feedwater flow to intact SGs with one SGFP. | RNO Perform the following. a) Verify at least one CNDS PUMP - STARTED b) If unable to establish main feedwater flow and at least one condensate pump is started, THEN proceed to step 9 OBSERVE CAUTION PRIOR TO STEP 9. |
| | RO | (step 9) Try to establish condensate flow to intact SGs. 9.1 IF SI has NOT actuated since reactor trip, THEN reset FW ISO. | NOTE: [CA] Step RNO 9.1 Verify SI RESET. <input type="checkbox"/> MLB-1 1-1 not lit <input type="checkbox"/> MLB-1 11-1 not lit |
| NOTE: Step 9.8, pressurizer pressure reduction, should be performed in conjunction with steps 9.2 through 9.7. | | | |
| | BOP | (step 9.2) Check feedwater isolation signal to intact SGs main feedwater regulating bypass valves defeated per ATTACHMENT 1. | |
| | BOP | (step 9.3) Verify all main feedwater flow control and bypass valves - CLOSED IN MANUAL. 1A(1B,1C) SG FW FLOW <ul style="list-style-type: none"> • FK 478 • FK 488 • FK 498 1A(1B,1C) SG FW BYP FLOW <ul style="list-style-type: none"> • FK 479 • FK 489 • FK 499 | |
| | BOP | (step 9.4) Verify backup cooling aligned to condensate pumps per FNP-1-SOP-21.0. | |

Op Test No.: FA2013301 Scenario # 6 Event # 8 Page 34 of 46

Event Description: Transition to FRP-H.1

| | | | |
|--|-----|--|---|
| | BOP | <p>(step 9.5) Locally open SGFP BYP N1N21V509. (155 ft, TURB BLDG)</p> <p>(step 9.6) Locally isolate SGFP miniflow valves. (155 ft, TURB BLDG) SGFP 1A(1B) RECIRC FCV INLET ISO</p> <ul style="list-style-type: none"> • N1N21V502A closed • N1N21V502B closed | |
| | | | |
| | BOP | <p>(step 9.7) Perform the following.</p> <p>9.7.1 Dispatch personnel to 1V 600 V MCC.</p> <p>9.7.2 Place handswitch for main feedwater stop valves to intact SGs to OPEN and hold in that position.</p> <ul style="list-style-type: none"> • 1A(1B,1C) SG STOP VLV Q1N21MOV 3232A • 3232B • 3232C <p>9.7.3 WHEN main feedwater stop valves to intact SGs open, THEN direct personnel to open associated breakers.</p> <ul style="list-style-type: none"> • FV-K2 • FV-K3 • FV-L2 | |
| | | | |
| | BOP | (step 9.7.4) WHEN associated breaker open, THEN allow main feedwater stop valve handswitch to spring return. | |
| | | | |
| | RO | <p>(step 9.8) Reduce PRZR pressure to less than 1950 psig.</p> <p>9.8.1 Check either condition for using auxiliary spray satisfied.</p> <ul style="list-style-type: none"> • Normal letdown in service. <p>OR</p> <ul style="list-style-type: none"> • No PRZR PORV available. | <p>RNO 9.8.1 Perform the following. If normal letdown secured and THEN open only one PRZR PORV to reduce PRZR pressure to less than 1950 psig. AND Proceed to step 9.9.</p> |
| | | | |

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

| | | | |
|--|----|---|--|
| | RO | (step 9.8.2) Manually open both normal pressurizer spray valves. 1A(1B) LOOP SPRAY VLV <ul style="list-style-type: none"> • PK 444C • PK 444D | |
| | | | |
| | RO | (step 9.8.3) Open auxiliary spray valve. RCS PRZR AUX SPRAY <ul style="list-style-type: none"> • Q1E21HV8145 open | |
| | | | |
| | RO | (step 9.8.4) Verify flow path aligned CHG FLOW <ul style="list-style-type: none"> • FK 122 manually open CHG PUMPS TO REGENERATIVE HX <ul style="list-style-type: none"> • Q1E21MOV8107 open • Q1E21MOV8108 open RCS NORMAL CHG LINE <ul style="list-style-type: none"> • Q1E21HV8146 closed RCS ALT CHG LINE <ul style="list-style-type: none"> • Q1E21HV8147 closed | |
| | | | |
| | RO | (step 9.8.5) Operate the following valves as required to reduce PRZR pressure to less than 1950 psig. CHG FLOW <ul style="list-style-type: none"> • FK 122 manually open 1A(1B) LOOP SPRAY VLV <ul style="list-style-type: none"> • PK 444C manually open/closed • PK 444D manually open/closed RCS PRZR AUX SPRAY <ul style="list-style-type: none"> • Q1E21HV8145 open/closed RCS NORMAL CHG LINE <ul style="list-style-type: none"> • Q1E21HV8146 open/closed RCS ALT CHG LINE <ul style="list-style-type: none"> • Q1E21HV8147 open/closed | |
| | | | |
| | RO | (step 9.9) Maintain PRZR pressure at 1900-1950 psig. | |

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

| | | | |
|--|----|---|---|
| | | | |
| | RO | <p>(step 9.9.1) IF using auxiliary spray, THEN operate the following valves as required to control PRZR pressure.</p> <p>CHG FLOW</p> <ul style="list-style-type: none"> FK 122 manually open <p>1A(1B) LOOP SPRAY VLV</p> <ul style="list-style-type: none"> PK 444C manually open/closed PK 444D manually open/closed <p>RCS PRZR AUX SPRAY</p> <ul style="list-style-type: none"> Q1E21HV8145 open/closed <p>RCS NORMAL CHG LINE</p> <ul style="list-style-type: none"> Q1E21HV8146 open/closed <p>RCS ALT CHG LINE</p> <ul style="list-style-type: none"> Q1E21HV8147 open/closed | RNO 9.9.1 IF using a PRZR PORV, THEN open only one PRZR PORV to control PRZR pressure. |
| | RO | <p>(step 9.10) WHEN pressurizer pressure less than 2000 psig, THEN perform the following.</p> <p>9.10.1 Block low pressurizer pressure SI. PRZR PRESS SI BLOCK - RESET</p> <ul style="list-style-type: none"> A TRN to BLOCK B TRN to BLOCK <p>9.10.2 Verify blocked indication. BYP & PERMISSIVE PRZR. SAFETY INJECTION</p> <ul style="list-style-type: none"> TRAIN A BLOCKED light lit TRAIN B BLOCKED light lit | |
| | | | |

Op Test No.: FA2013301 Scenario # 6 Event # 8 Page 37 of 46

Event Description: Transition to FRP-H.1

| | | | |
|--|--|---|---|
| | | <p>(step 9.11) WHEN P-12 light lit (543□F), THEN perform the following.</p> <p>9.11.1 Block low steam line pressure SI. STM LINE PRESS SI BLOCK - RESET</p> <ul style="list-style-type: none"> • A TRN to BLOCK • B TRN to BLOCK <p>9.11.2 Verify blocked indication. BYP & PERMISSIVE STM LINE ISOL. SAFETY INJ.</p> <ul style="list-style-type: none"> • TRAIN A BLOCKED light lit • TRAIN B BLOCKED light lit <p>9.11.3 Bypass the steam dump interlock. STM DUMP INTERLOCK</p> <ul style="list-style-type: none"> • A TRN to BYP INTLK • B TRN to BYP INTLK | |
| | | <p>(step 9.12) IF condenser available, THEN dump steam to condenser from intact SGs at maximum attainable rate.</p> <p>MSIVs are closed so ARVs will be used.</p> | <p>RNO 9.12 Dump steam to atmosphere. 9.12.1 Direct counting room to perform FNP-0-CCP-645, MAIN STEAM ABNORMAL ENVIRONMENTAL RELEASE.</p> <p>RNO 9.12.2 IF normal air available, THEN control atmospheric relief valves to dump steam from at least one intact SG at maximum attainable rate. 1A(1B,1C) MS ATMOS REL VLV □ PC 3371A adjusted □ PC 3371B adjusted □ PC 3371C adjusted</p> |
| | | (step 9.13) WHEN SG(s) pressure reduced to less than 540 psig, THEN stop pressure reduction. | |

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

| | | | |
|---|--|--|--|
| | | (step 9.14) Maintain SG(s) pressure - STABLE AT EXISTING VALUE. | |
| | | | |
| | | (step 9.15) Verify at least one CNDS PUMP - STARTED. | |
| | | | |
| | | (step 9.16) Check SGFP BYP N1N21V509 - OPEN. (155 ft, TURB BLDG) | |
| | | | |
| | | (step 9.17) Initially open feedwater regulating bypass valves just off the closed seat to initiate flow and minimize any water hammer. FW BYP FLOW FK <ul style="list-style-type: none"> • 479 adjusted • 489 adjusted • 499 adjusted | |
| | | | |
| | | (step 9.18) Control feedwater regulating bypass valves to supply main feedwater to at least one intact SG. | (CT) |
| | | | |
| | | (step 10) Check SG levels. 10.1 Verify feed flow to at least one SG. <ul style="list-style-type: none"> • Check SG wide range level - RISING. OR <ul style="list-style-type: none"> • Check core exit T/C temperature - FALLING. | |
| | | | |
| | | (step 10.2) Check at least one SG narrow range level - GREATER THAN 31%{48%}. | 10.2 Continue feeding SGs to restore at least one SG narrow range level greater than 31%{48%}. |
| | | | |
| Terminate scenario when FRP-H.1 is exited. | | | |

Op Test No.: FA2013301 Scenario # 6 Event # 7 Page 39 of 46

Event Description: Attachment 2 of EEP-0

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

Attachment 2 of EEP-0

AUTOMATIC ACTIONS VERIFICATION

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|-----------------------------------|
| | BOP | (Step 1) Verify one CHG PUMP in each train - STARTED. <input type="checkbox"/> A train (1A or 1B) amps > 0 <input type="checkbox"/> B train (1C or 1B) amps > 0 | |
| | BOP | (Step 2) Verify RHR PUMPS - STARTED. RHR PUMP <input type="checkbox"/> 1A amps > 0 <input type="checkbox"/> 1B amps > 0 | |
| | BOP | (Step 3) Verify Safety Injection Flow. (Step 3.1) Check HHSI flow - GREATER THAN 0 gpm. <input type="checkbox"/> FI 943 | |
| | BOP | (Step 3.2) Check RCS pressure - LESS THAN 275 psig{435 psig}. | Operator should proceed to step 4 |
| | BOP | (step 3.3) Check LHSI flow – greater than 1.5×10^3 gpm <input type="checkbox"/> 1A RHR HDR FLOW FI-605A <input type="checkbox"/> 1B RHR HDR FLOW FI-605B | |
| | BOP | (Step 4) Verify each SW train - HAS TWO SW PUMPS STARTED. <input type="checkbox"/> A train (1A,1B or 1C) <input type="checkbox"/> B train (1D,1E or 1C) | |

Op Test No.: FA2013301 Scenario # 6 Event # 7 Page 40 of 46

Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|-----------------------|
| | BOP | <p>(Step 5) Verify each train of CCW - STARTED.</p> <p>(Step 5.1) Verify one CCW PUMP in each train- STARTED.</p> <p>A train HX 1C or 1B CCW FLOW <input type="checkbox"/> FI 3043CA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm B train HX 1A or 1B CCW FLOW <input type="checkbox"/> FI 3043AA > 0 gpm OR <input type="checkbox"/> FI 3043BA > 0 gpm</p> <p>Verify SW flow to associated CCW HX's SW FROM 1A(1B, 1C) CCW HX <input type="checkbox"/> Q1P16FI3009AA > 0 gpm <input type="checkbox"/> Q1P16FI3009BA > 0 gpm <input type="checkbox"/> Q1P16FI3009CA > 0 gpm</p> | |
| | BOP | <p>(step 6) Verify containment ventilation isolation.</p> <p>Verify containment purge dampers - CLOSED.</p> <p><input type="checkbox"/> 3197 <input type="checkbox"/> 3198D <input type="checkbox"/> 3198C <input type="checkbox"/> 3196 <input type="checkbox"/> 3198A <input type="checkbox"/> 3198B</p> <p>Verify containment mini purge dampers - CLOSED.</p> <p>CTMT PURGE DMPRS MINI-2866C & 2867C FULL-3198A & 3198D <input type="checkbox"/> 2866C <input type="checkbox"/> 2867C CTMT PURGE DMPRS MINI-2866D & 2867D FULL-3196 & 3197 BOTH-3198B & 3198C <input type="checkbox"/> 2866D <input type="checkbox"/> 2867D</p> <p>Stop MINI PURGE SUPP/EXH FAN.</p> | Will place HS to STOP |

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

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

Op Test No.: FA2013301 Scenario # 6 Event # 7 Page 42 of 46

Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|--|
| | BOP | (step 8) Verify AFW Pumps - STARTED. Verify both MDAFW Pumps - STARTED <input type="checkbox"/> 1A MDAFW Pump amps > 0 <input type="checkbox"/> 1B MDAFW Pump amps > 0 AND <input type="checkbox"/> FI-3229A indicates > 0 gpm <input type="checkbox"/> FI-3229B indicates > 0 gpm <input type="checkbox"/> FI-3229C indicates > 0 gpm | RNO 8.1 Verify MDAFW Pumps deliver flow to each SG. 8.1.1 Manually start MDAFW Pumps 8.1.2 Verify AFW flow path to AND each SG. <input type="checkbox"/> Q1N23HV3227A in MOD <input type="checkbox"/> Q1N23HV3227B in MOD <input type="checkbox"/> Q1N23HV3227C in MOD MDAFWP TO 1A(1B,1C) SG FLOW CONT <input type="checkbox"/> HIC 3227AA open <input type="checkbox"/> HIC 3227BA open <input type="checkbox"/> HIC 3227CA open AFW TO 1A(1B,1C) SG STOP VLV <input type="checkbox"/> Q1N23MOV3350A open <input type="checkbox"/> Q1N23MOV3350B open <input type="checkbox"/> Q1N23MOV3350C open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764A open <input type="checkbox"/> Q1N23MOV3764D open <input type="checkbox"/> Q1N23MOV3764F open MDAFWP TO 1A(1B,1C) SG ISO (BOP) <input type="checkbox"/> Q1N23MOV3764E open <input type="checkbox"/> Q1N23MOV3764B open <input type="checkbox"/> Q1N23MOV3764C open |
| | | (Step 8.2) Check TDAFW Pump start required. <input type="checkbox"/> Condition <input type="checkbox"/> TSLB <input type="checkbox"/> Setpoint <input type="checkbox"/> Coincidence | |
| | | RCP Bus TSLB2 1-1 <input type="checkbox"/> 2680 V Undervoltage 1-2 1-3 | 1/2 Detectors on 2/3 Busses |
| | | Low Low SG TSLB4 28% Water Level 4-1,4-2,4-3 In Any 5-1,5-2,5-3 2/3 SGs 6-1,6-2,6-3 | 2/3 Detectors on 2/3 SGs |
| | | | |
| | | | |

Op Test No.: FA2013301 Scenario # 6 Event # 7 Page 43 of 46

Event Description: Attachment 2 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments | | | | | | | | | | | | | | | | | | | | |
|----------------------------|-----------------|--|----------------------------|----------|-------------|------|-------------|------------|-----|----------------|----------------------------|-----------------|------------|----------------------------|--|--|-----|----------------|------------------|------------|-----|---------------|--|
| | BOP | <p>(step 9) Verify main feedwater status. Verify main feedwater flow control and bypass valves - CLOSED. 1A(1B,1C) SG FW FLOW <input type="checkbox"/> FCV 478 <input type="checkbox"/> FCV 488 <input type="checkbox"/> FCV 498</p> <p>Verify both SGFPs - TRIPPED.</p> <p>Verify SG blowdown - ISOLATED. 1A(1B,1C) SGBD ISO <input type="checkbox"/> Q1G24HV7614A closed <input type="checkbox"/> Q1G24HV7614B closed <input type="checkbox"/> Q1G24HV7614C closed</p> <p>9.4 Verify SG blowdown sample - ISOLATED MLB lights lit. 1A(1B,1C) SGBD SAMPLE STEAM GEN ISO <input type="checkbox"/> MLB1 19-2 lit Q1P15HV3328 closed <input type="checkbox"/> MLB1 19-3 lit Q1P15HV3329 closed <input type="checkbox"/> MLB1 19-4 lit Q1P15HV3330 closed</p> | | | | | | | | | | | | | | | | | | | | | |
| | BOP | <p>(Step 10) Check no MSL isolation actuation signal present.</p> <table> <tr> <th>Signal</th><th>Setpoint</th><th>coincidence</th><th>TSLB</th></tr> <tr> <td>LO SG PRESS</td><td>< 585 psig</td><td>2/3</td><td>TSLB4 19-2,3,4</td></tr> <tr> <td>Hi stm flow and Lo-Lo Tavg</td><td>>40% and <543°F</td><td>1/2 on 2/3</td><td>TSLB4 16-3,4 17-3,4 18-3,4</td></tr> <tr> <td></td><td></td><td>2/3</td><td>TSLB2 10-1,2,3</td></tr> <tr> <td>HI-HI ctmt press</td><td>>16.2 psig</td><td>2/3</td><td>TSLB1 2-2,3,4</td></tr> </table> | Signal | Setpoint | coincidence | TSLB | LO SG PRESS | < 585 psig | 2/3 | TSLB4 19-2,3,4 | Hi stm flow and Lo-Lo Tavg | >40% and <543°F | 1/2 on 2/3 | TSLB4 16-3,4 17-3,4 18-3,4 | | | 2/3 | TSLB2 10-1,2,3 | HI-HI ctmt press | >16.2 psig | 2/3 | TSLB1 2-2,3,4 | |
| Signal | Setpoint | coincidence | TSLB | | | | | | | | | | | | | | | | | | | | |
| LO SG PRESS | < 585 psig | 2/3 | TSLB4 19-2,3,4 | | | | | | | | | | | | | | | | | | | | |
| Hi stm flow and Lo-Lo Tavg | >40% and <543°F | 1/2 on 2/3 | TSLB4 16-3,4 17-3,4 18-3,4 | | | | | | | | | | | | | | | | | | | | |
| | | 2/3 | TSLB2 10-1,2,3 | | | | | | | | | | | | | | | | | | | | |
| HI-HI ctmt press | >16.2 psig | 2/3 | TSLB1 2-2,3,4 | | | | | | | | | | | | | | | | | | | | |
| | BOP | <p>(Step 11) Verify PHASE A CTMT ISO. (Step 11.1) Verify PHASE A CTMT ISO - ACTUATED. <input type="checkbox"/> MLB-2 1-1 lit <input type="checkbox"/> MLB-2 11-1 lit</p> <p>11.2 Check all MLB-2 lights - LIT.</p> <p>11.3 Verify Excess Letdown Isolation valves closed. <input type="checkbox"/> Q1E21HV8153, EXC LTDN ISO <input type="checkbox"/> Q1E21HV8154, EXC LTDN ISO</p> | | | | | | | | | | | | | | | | | | | | | |

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

| Time | Pos. | Expected Actions/Behavior | Comments |
|------|------|--|---|
| | BOP | (step 12) Check all reactor trip and reactor trip bypass breakers – OPEN Reactor trip breaker A Reactor trip breaker B Reactor trip bypass breaker A Reactor trip bypass breaker B | |
| | BOP | (step 13) Trip CRDM MG set supply breakers. 1A(1B) MG SET SUPP BKR <input type="checkbox"/> N1C11E005A <input type="checkbox"/> N1C11E005B | |
| | BOP | (step 14) Secure secondary components. Stop both heater drain pumps. HDP <input type="checkbox"/> 1A <input type="checkbox"/> 1B Check any condensate pump started. IF started, THEN stop all but one condensate pump. <input type="checkbox"/> 1A <input type="checkbox"/> 1B If NO condensate pumps are started then place all HSs to STOP 14.3 IF condensate pump operating, THEN verify backup cooling aligned to condensate pumps per FNP-0-SOP-0.0, APPENDIX B, TB SO Actions Following A Reactor Trip Or Safety Injection. | Will call TBSO to accomplish this. |
| | BOP | (step 15) Verify both CRACS mode selector switches in the ON position. CRACS Mode Selector Switch <input type="checkbox"/> A TRAIN <input type="checkbox"/> B TRAIN | |
| | BOP | (step 16) WHEN at least 30 seconds have passed since turbine trip, THEN check main generator tripped. 230 KV BKR <input type="checkbox"/> 810 - OPEN <input type="checkbox"/> 914 - OPEN | |

| | | | | | | | | | |
|--------------------|------------------|------------------------------|----------|---------|----------|------|-----------|----|-----------|
| Op Test No.: | <u>FA2013301</u> | Scenario # | <u>6</u> | Event # | <u>7</u> | Page | <u>45</u> | of | <u>46</u> |
| Event Description: | | Attachment 2 of EEP-0 | | | | | | | |

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

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Event Description: Attachment 4 of EEP-0

| Time | Pos. | Expected Actions/Behavior | Comments |
|--|------|---|-----------------|
| Attachment 4 of EEP-0 TWO TRAIN ECCS ALIGNMENT VERIFICATION | | | |
| | | <p>(Step 1) Verify two trains of ECCS equipment aligned.</p> <p><input type="checkbox"/> Check DF01 closed</p> <p><input type="checkbox"/> Verify DF02 closed</p> <p><input type="checkbox"/> Check DG15 closed</p> <p><input type="checkbox"/> Verify DG02 closed</p> <p><input type="checkbox"/> Verify two trains of battery chargers – energized Amps > 0</p> <p>(Step 1.6) Verify two trains of ESF equipment aligned.</p> <p><input type="checkbox"/> Check all MLB-1 lights LIT</p> <p>Verify charging pump suction and discharge valves - OPEN.</p> <p>CHG PUMP DISCH HDR ISO</p> <p><input type="checkbox"/> Q1E21MOV8132A</p> <p><input type="checkbox"/> Q1E21MOV8132B</p> <p><input type="checkbox"/> Q1E21MOV8133A</p> <p><input type="checkbox"/> Q1E21MOV8133B</p> <p>CHG PUMP SUCTION HDR ISO</p> <p><input type="checkbox"/> Q1E21MOV8130A</p> <p><input type="checkbox"/> Q1E21MOV8130B</p> <p><input type="checkbox"/> Q1E21MOV8131A</p> <p><input type="checkbox"/> Q1E21MOV8131B</p> | |
| | | <p>(Step 1.7) Verify all post accident containment air mixing system fans - STARTED. (BOP)</p> <p>POST ACCIDENT MIXING FAN</p> <p><input type="checkbox"/> 1A</p> <p><input type="checkbox"/> 1B</p> <p><input type="checkbox"/> 1C</p> <p><input type="checkbox"/> 1D</p> <p>RX CAV H2 DILUTION FAN</p> <p><input type="checkbox"/> 1A</p> <p><input type="checkbox"/> 1B</p> <p>(Step 1.8) WHEN power restored to any de-energized emergency bus, THEN verify alignment of associated equipment.</p> | |
| | BOP | <p>(Step 1.9) Verify SFP Cooling in service per SOP-54.0, Spent Fuel Pit Cooling And Purification System.</p> | Call Radside SO |
| End of Attachment 4 | | | |

Op-Test No.: FA2013-301

Page 1 of 2

Brief

This simulator performance scenario is performed in the EVALUATION MODE. You should not direct questions to the evaluators. Otherwise, you should perform as if you were in the MCR.

Your ability to maintain a log is not being graded, but maintaining a rough log is recommended to help during briefs.

If you need to communicate with the Unit 2 operator, call Unit 2 at 2434 or page the Unit 2 Unit Operator.

Respond to what you see. If there is a problem with the simulation, the session will be terminated or adjusted as appropriate based on the specific problem.

Assign operating positions.

Ask for and answer questions.

Appendix D**Turnover sheet****Form ES-D-2**☒ Unit 1 ☐ Unit 2**Shift:****Date**

| | | | |
|---------------------|--------------------|--|-------|
| Off-going SS | Oncoming SS | <input type="checkbox"/> N <input checked="" type="checkbox"/> D | Today |
|---------------------|--------------------|--|-------|

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

Security Keys A, S, D, SW, X on key ring. ____ SS

Unit 85% power, 915 ppm, MOL 10000 MWD/MTU
Status Ramping down

TARGET ZERO
 Every Day, Every Job Safely

STPs/Evolutions:

STP-27.1 completed 2 hours ago

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

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

Status of Special Testing**General Information**

- Shift goal is to place the IMP PRESS LOOP in service and ramp down to 18% power for containment entry to add oil to the 1B RCP.
- Current Risk Assessment is **YELLOW** and projected is **YELLOW** due to maintenance on 1A MDAFW pump and 1C DG
- UOP-3.1 ver 112.4 in progress at step 8.2
- 1C DG T/O for governor work. (OOS 2 days, ETR 4 hrs)
- 1A MDAFW T/O for motor bearing replacement. (OOS 6 hrs, ETR 2 hrs)
- Thunderstorm warnings in effect for Southeast Alabama & Western Georgia
- Fuel handling is on going in the SFP room with the last fuel bundle being moved.
- Unit 2 PSS in OFF for Maintenance (OOS 2 hrs, ETR 2 hrs)
- Unit 2 is at 100% power with no major issues.

Equipment Status

Maintain VCT gas pressure 25-30 psig

Reactivity Plan

20 Gallon dilutions ever 20 minutes to maintain current conditions.

Waste Management Status

#3 RHT – On Service

WGS – secured

LCO Status

3.8.1 Condition B for 1C DG, STP-27.1 completed 2 hours ago

3.7.5 Condition B for 1A MDAFW Pump

Night Orders*No New Night Orders***Part II**

Review Shift Complement

LCOs Reviewed ____ SS ____ (initials) reviewed as early in shift as possible

Part III:

STP-1.0

Reviewed/Signed

Operator Logs

Reviewed

Cond. Report

Queue

Reviewed

Autolog

Reviewed

ELDS & GEN

Spreadsheet

verified

[X] Yes

Keys

Turned

Over

[X] Yes

[X] Yes

[X] Yes

[X] Yes

[X] Yes