

Facility: Vogtle Scenario No.: 2 Op-Test No.: 2013-301

Examiners: _____ Operators: _____

Initial Conditions: The plant is at 100% power, MOL, steady state operations.
 (Base IC # 14, snapped to IC #171 for HL18 NRC Exam)

Equipment OOS: 'A' RHR Pump for motor repair (TS 3.5.2, Condition A), 'A' MDAFW Pump for bearing replacement (TS 3.7.5, Condition B)

Turnover: Maintain 100% power. Spent fuel movement in progress in the spent fuel pool. Mike Chance is Fuel Handling Coordinator. Containment mini-purge is in service for a Containment entry on the next shift.

Preloaded Malfunctions:

ES21A – FHB HVAC Train A Auto Actuation Failure
ES21B – FHB HVAC Train B Auto Actuation Failure
TU10B Main Turbine EHC Pump B Auto Start Failure
CV16B Block Auto Start on CCP B

Overrides

HS-5132A to OPEN (this will prevent closure of valve from QMCB)
HS-9378A to CLOSE (cause HV-9378A/B to close)

| Event No. | Malf. No. | Event Type* | Event Description |
|-----------|--------------------------------|---------------------------|---|
| T1 | RM-008, 2532A/B, 2533A/B @ 20% | I-UO I-SS TS-SS | Dropped Fuel Assembly during fuel shuffle for impending outage on Unit 2. TR 13.3.6 Fuel Handling Building Post Accident Ventilation Actuation Instrumentation (Common System), Condition A TR 13.9.5 Fuel Handling Building Post Accident Ventilation System Condition A |
| T2 | CV05 @ 50% | C-OATC C-SS TS-SS | CVCS Letdown Hx Tube Leak. LCO 3.4.13 Reactor Coolant System Leakage, Condition A |
| 3 | N/ A | N-OATC N-SS | Places Excess Letdown in service. |

| Event No. | Malf. No. | Event Type* | Event Description |
|--|---|---------------------------------|--|
| T4 | PR02A @ 100%. | I-OATC I-SS TS-SS | Controlling PRZR Pressure channel PT-455 fails high. LCO 3.3.1 Condition A, FU 6 Condition E, LCO 3.3.1 FU 8a Condition M, LCO 3.3.1 FU 8b Condition E, LCO 3.3.2 Condition A, FU 1d Condition D, LCO 3.3.2 FU 8b Condition L (One hour action), LCO 3.4.1.a Condition A |
| T5 | TU11 | C-UO C-SS | Main Turbine EHC Pump A trips with failure of standby EHC pump to automatically start. |
| T6 | SG01B @3% | R-OATC N-UO R-SS TS-SS | Steam Generator # 2, 30 gpm SGTL requiring a rapid down power. LCO 3.4.13 Reactor Coolant System Leakage, Condition B |
| 7 | SG01B @ 45% Ramp 180 seconds | M-ALL | DBA SGTR on SG # 2 (~450 gpm) |
| T8 | CV06A Critical | C-OATC C-SS | 'A' CCP trips on SI, 'B' CCP fails to auto start. |
| 9 | Preload Critical | C-UO C-SS | MDAFW discharge throttle valve to SG # 2 will not shut from QMCB. |
| T10 | Insert Trigger on SI actuation Critical | C-OATC C-SS | HV-9378A & B to Containment fail shut on SI (this will prevent opening of PRZR sprays or Auxiliary Spray to force using PORVs for depressurization to refill PRZR during 19030-C, E-3 performance). |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | |



NUCLEAR SAFETY FOCUS TARGET ZERO

Protected Train:

- ☐ Alpha
☒ Bravo

EOOS:

- ☒ Green
☐ Yellow
☐ Orange
☐ Red

Plant Conditions:

100 % power, MOL.

Major Activities:

Maintain power operations per 12004DF-1, section 4.3 for power operation. Spent fuel movement in progress in spent fuel pool. Fuel Handling Coordinator: Mike Chance.

Active LCOs:

- ☐ LCO 3.5.2 Condition A is in effect due to RHR Pump 'A' tagged out.
☐ LCO 3.7.5 Condition B is in effect due to MDAFW Pump 'A' tagged out.

OOS/ Degraded CR Instruments:

- ☐ None

Narrative Status:

- ☐ Containment mini-purge is in service for a planned Containment Entry on next shift.
- ☐ RHR Pump 'A' is tagged out for motor repair, expected return-to-service time is 24 hours with 48 hours left on a shutdown LCO of 72 hours.
- ☐ MDAFW Pump 'A' is tagged out for bearing replacement, expected return-to-service time is 14 hours with 24 hours left on a shutdown LCO of 72 hours.
- ☐ A severe thunderstorm warning has been issued for Richmond, Burke, and Screven Counties in Georgia. High winds and rain, which could be heavy at times, will be in the area for the next 10-12 hours. The Severe Weather Checklist is in effect.

UNIT 1 REACTIVITY BRIEFING SHEET

| | | | | | | |
|---------------|-----|--------------|--------|----------------|------------------|------|
| Shift: | Day | Date: | 4/9/13 | Burnup: | 11170.93 MWD/MTU | |
| | | | | | As of 4/9/13 | 8:57 |

MINIMUM SHIFT REACTIVITY INFORMATION TO BE BRIEFED

Power: 100 **Rod Motion:** AUTO

Current Temperature Control Strategy: DILUTION

Currently Making Up: 50.0 gal **Every:** 1 to 2 hrs

The desired Tavg operating band is 585.5 +/- 0.05 degrees F

| | | |
|--|------|-------------|
| CVCS makeup system boric acid flow per 100 gal makeup: | 13.0 | gallons/100 |
|--|------|-------------|

| | |
|--|-------------|
| CVCS makeup system pot setting(FIC-0110): | 3.24 |
|--|-------------|

BTRS Strategy: none

AFD Strategy: Maintain on target plus/minus 1 AFD units

Reactivity System Components Degraded/OOS:

None

Activities expected that may affect core reactivity (Reactivity Focus Items):

None

CURRENT CORE REACTIVITY PARAMETERS

Boron Worth: 8.5 pcm/ppm **PCM per 1% pwr change:** 17.9

Current MTC value: HFP: -17.9 pcm/F HZP: -3.9 pcm/F

Current BAST Cb: 7000 ppm **Current RCS Cb:** 907 ppm

| | | | |
|-------------------------------|------------------------|-------|----------------|
| Boration required per: | degree F: | 21.3 | gallons |
| | 1% pwr change: | 21.3 | gallons |
| | 10% pwr change: | 212.8 | gallons |
| | 30% pwr change: | 638.5 | gallons |

| | | | |
|-------------------------|----------------|-------|---------|
| Dilutions required per: | degree F: | 143.1 | gallons |
| | 1% pwr change: | 143.1 | gallons |

| | | |
|--|--------|---------------------------------|
| Boration required for stuck rods: | 3182.2 | gallons for 2 stuck rods |
| | 4837.3 | gallons for 3 stuck rods |

If more than 3 rods are stuck begin boration and calculate for actual number of stuck rods

Human Performance tools:

| | | |
|---------------|-------------------------|-----------------------|
| Peer check | Three-way communication | Placekeeping |
| Procedure Use | STAR | Time-Out |
| | | Situational Awareness |

Vaild for PTDB Cycle 18 Tab 1.0 rev 29 approved 9/29/12 and Tab 16.0 rev 19 approved 10/5/12

Event 1:

Dropped fuel assembly results in FHB High Radiation with failure of FHB HVAC to auto actuate. Requires manual operation of FHB ventilation.

Verifiable Actions:

UO – Manually actuates FHB Isolation using 13320-C using AHS-2532A or AHS-2533A.

UO – Resets FHB Actuation using AHS-2532B or AHS-2533B.

UO – Shuts down the desired Post Accident Filter Unit by placing either AHS-2540 or AHS-2541 to STOP.

Technical Specifications:

TR 13.3.6 Fuel Handling Building Post Accident Ventilation Actuation Instrumentation (Common System), Condition A

TR 13.9.5 Fuel Handling Building Post Accident Ventilation System, Condition A

Event 2:

CVCS Letdown Hx Tube leak rupture requiring manual isolation of CVCS letdown due to high radiation on 1RE-1950 as directed per ARP-17100-C.

Verifiable Actions:

OATC – Closes Letdown Orifices HV-8149A, B, C and Letdown Isolations LV-459 and LV-460 to isolate the letdown leak to the ACCW Hx.

OATC – Isolates letdown by closing Letdown Containment Isolations HV-8152 and HV-8160.

OATC – Adjust PV-0131, sets to max pressure. Adjust TV-0130, sets to max. temperature.

CREW – Direct closing of Letdown Heat Exchanger of manual valves as follows:

- (AB-A08) 1-1208-U6-041
- (AB-A17) 1-1217-U4-126
- (AB-108) 1-1217-U4-129.

Technical Specifications:

LCO 3.4.13, Condition A (Note: Leakage is isolated after OATC closes the Letdown Orifices and Isolations)

Event 3:

Excess Letdown will be placed in service to the seal return header to control PRZR level.

Verifiable Actions:

OATC – Sets 1HC-123 to closed. (0% demand).

OATC – Opens Excess Letdown Isolation valves 1-HV-8153 / 1-HV-8154.

OATC – Adjusts 1HC-123 to establish maximum allowable Excess Letdown flow (~30 gpm).

OATC – Adjusts 1FIC-121 and 1HC-182 to control charging and seal injection flows.

Event 4:

Controlling PRZR Pressure channel PT-455 fails high resulting in PORV 455A opening and both PRZR sprays fully open, RCS pressure will be lowering rapidly.

Verifiable Actions:

OATC – Perform IOAs of 18001-C by closing PRZR sprays, closing PORV 455A, and operating heaters as necessary to control PRZR pressure.

OATC – Manually closes PORV Block Valve 1HV-8000A to stop LOCA to PRT.

OATC – Controls PRZR heaters and sprays to control PRZR pressure.

OATC – Sets PRZR Master Controller to 25% demand.

OATC – Selects channel 457 / 456 on PRZR Pressure control switch PS-455F.

OATC – Places PRZR heaters and PORV 455A in AUTO and ensures proper operation.

OATC – Places PRZR Pressure Master Controller in AUTO and verifies proper operation.

OATC – Selects channel PT-457 as controlling channel on pressure recorder PS-455G.

Technical Specifications:

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation Condition A

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU 6, Condition E

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU 8a, Condition M

LCO 3.3.1 Reactor Trip System (RTS) Instrumentation FU 8b, Condition E

LCO 3.3.2 Engineered Safety Features Actuation System (ESFAS) Condition A

LCO 3.3.2 Engineered Safety Features Actuation System (ESFAS) FU 1d, Condition D

LCO 3.3.2 Engineered Safety Features Actuation System (ESFAS) FU 8b Condition L (one hour)

LCO 3.4.1.a RCS Pressure, Temperature, & Flow Departure from Nucleate Boiling (DNB) Limits

Event 5:

Main Turbine EHC Pump A trips with failure of the standby pump to automatically start.

Verifiable Actions:

UO – Starts EHC pump B prior to Main Turbine / Reactor trip on low EHC pressure of 1100 psig. This will prevent an unnecessary Turbine / Reactor trip and transient on the plant.

Technical Specifications:

None

Event 6:

A 30 gpm SGTL will occur on SG # 2 requiring a rapid down power per 18013-C, this is to preclude the tube leak from propagating into a SGTR per the EPRI Guidelines.

Verifiable Actions:

OATC – Borates as necessary for rapid down power to maintain Tavg – Tref matched.

UO – Reduces Turbine load at < 5% per minute to maintain Tavg – Tref matched.

Technical Specifications:

LCO 3.4.13, RCS Operational Leakage, Condition 'B'

Event 7, 8, 9, 10:

A DBA SGTR will occur on SG # 2 requiring a plant trip and safety injection.

Verifiable Actions:

OATC – Manually trips the reactor using either QMCB hand switch, manually actuates safety injection, and adjusts seal injection to RCPs between 8 to 13 gpm after the SI.

OATC – Manually starts CCP “B” which will not auto start on the Safety Injection signal.

Note: CCP “B” may already be running as a mitigation measure for the SGTL. If so, this action will not be performed other than verifying that the pump is still running & providing flow.

UO – Places SGBD hand switches in hard closed to prevent water hammer to SGBD system.

UO – Throttles AFW flow to maintain SG levels 10 – 65%. The UO may perform an early operator action and isolate AFW flow to SG # 2 once SG # 2 level is > 10% NR with SS permission.

UO – Isolates ruptured SG # 2 by performing the following.

- Adjusts SG # 2 ARV potentiometer set point to 7.73 (to control at 1160 psig)
- Closes 1HV-3019, SG # 2 steam supply to TDAFW pump
- Closes SG # 2 MSIV and Bypass valves
- Isolates FW flow to SG # 2 (MFIV, MFRV, BFIV, BFRV, TDAFW, MDAFW valves all shut)

UO – Blocks Low Steam line Pressure SI and SLI when RCS pressure < 2000 psig (P-11) and then places the steam dumps in Steam Pressure Mode and opens the 3 cool down steam dumps for a maximum rate Cooldown.

UO – Closes the steam dumps after selected CETC is reached and controls CETC below this temperature (usually this is 518°F or 506°F depending on ruptured SG pressure).

OATC – Arms COPS and depressurizes RCS a PORV to refill the pressurizer.

The scenario may be stopped after step # 41 with chief examiner approval.

CRITICAL TASKS:

- 1) Starts CCP which will NOT start on the SI actuation signal, with the other CCP tripping on the SI actuation signal, High Head Safety Injection will NOT be available unless the CCP is manually started no later than step 2.b RNO of AOP 18009-C, or step 3.a RNO, OATC INITIAL ACTIONS, of EOP 19000-C.
- 2) Isolates SG # 2 to limit secondary contamination and potential release environment by performing the following actions no later than the 19030-C procedure steps. These are steps 6 through 11 of 19030-C.
 - Adjusts SG # 2 ARV potentiometer set point to 7.73 (to control at 1160 psig).
 - Closes 1HV-3019, SG # 2 Steam Supply to TDAFW pump
 - Closes SG # 2 MSIV and Bypass valves.
 - Isolates FW flow to SG # 2 (MFIV, MFRV, BFIV, BFRV, TDAFW, MDAFW, and SGBD and Sample valves all shut)
 - MDAFW pump "B" discharge valve HV-5132 will NOT shut, the crew will have to either place MDADW pump "B" in PTL or dispatch personnel to manually close HV-5132 OR direct an operator to manually isolate HV-5132 using a local manual isolation valve.
- 3) Depressurizes PRZR to refill the PRZR with ECCS injection and to limit break flow using a single PRZR PORV to meet conditions of step 37 of 19030-C.

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Scenario No.: 2

Event No.: 1

Event Description: A dropped fuel assembly in the FHB will result in multiple high radiation annunciators with a FHBI auto actuation failure. The UO will have to manually actuate FHBI, then shut down one FHB Filtration Unit to comply with 18006-C, Fuel Handling Event.

| Time | Position | Applicant's Action or Behavior |
|------|------------|---|
| | CREW | <p>Diagnoses high radiation in the Fuel Handling Building (FHB).</p> <p>Symptoms / alarms:</p> <ul style="list-style-type: none"> • ALB05-C03 HIGH RADIATION ALARM • ALB05-B03 INTMD RADIATION ALARM • ALB05-A03 FHB EXH RAD MONITOR EQUIP TROUBLE <p>Indications:</p> <ul style="list-style-type: none"> • ARE-2532A/B and ARE-2533A/B red and amber lights LIT on the Safety Related Display Console (SRDC). • ARE-2532A/B and ARE-2533A/B IPC points in HIGH alarm. • 1RE-0008 IPC points in HIGH alarm. |
| | OATC UO | <p>References 17005-1, Window C03 HIGH RADIATION ALARM</p> <p>1.0 <u>PROBABLE CAUSE</u></p> <p>A high alarm on one or more of the Radiation Monitor Channels.</p> <p>2.0 <u>AUTOMATIC ACTIONS</u></p> <p>The following actions will occur if a High Level Radiation Alarm is actuated on the associated monitor.</p> <p>6. A-RE-2532A or B or A-RE-2533A or B, Fuel Handling Building Effluent Radiogas Monitors: Fuel Handling Building Isolation (FHBI).</p> |

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| Time | Position | Applicant's Action or Behavior |
|------|------------|--|
| | OATC UO | <p>3.0 <u>INITIAL OPERATOR ACTIONS</u></p> <p>NONE</p> <p>4.0 <u>SUBSEQUENT OPERATOR ACTIONS</u></p> <p>1. Check the Safety Related Display Console (QRM2), the RMS Communications Console (QRM1) and the Plant Computer to determine the monitor in alarm and Go To 17100-1, "Annunciator Response Procedure For the Process and Effluent Radiation Monitor System (RMS)" or 17102-1, "Annunciator Response Procedure for the Safety Related Display Console QRM2" as appropriate.</p> <p>2. Initiate a CR documenting alarm condition.</p> <p>5.0 <u>COMPENSATORY OPERATOR ACTIONS</u></p> <p>Monitor Plant Computer for radiation alarms if annunciator is inoperable or in solid.</p> |
| | UO | <p>References 17102-1, Annunciator Response Procedure for the Safety Related Display Console (QRM2).</p> <p><u>PROBABLE CAUSE</u></p> <p>1. High airborne radioactivity in the Fuel Handling Building.</p> <p>2. Equipment malfunction.</p> <p><u>Note to Sim Booth Operator:</u> Call & notify the Control Room of a damaged fuel assembly in the SFP area.</p> |

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| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p><u>AUTOMATIC ACTIONS</u></p> <p>Switches the Normal Fuel Handling Building Ventilation to Accident Mode Ventilation.</p> <p><u>INITIAL OPERATOR ACTIONS</u></p> <p>Evacuate the Fuel Handling Building</p> |
| | UO | <p><u>SUBSEQUENT OPERATOR ACTIONS</u></p> <ol style="list-style-type: none"> 1. Verify Fuel Handling Building is in the Accident Mode of ventilation per manual actuation of FHB Isolation section of 13320-C, "Fuel Handling Building HVAC System". (actions are on page #10) 2. Refer to 91001-C, "Emergency Classification and Implementation Instructions". 3. Notify Health Physics to sample and analyze the Fuel Handling Building Exhaust air. 4. IF the alarm is an actuation resulting from Fuel Handling, initiate 18006-C, "Fuel Handling Event", as appropriate. <p>NOTE: Exhaust gasses are again monitored at the plant vent by Plant Vent Monitors 1-RE-12442 A, B and C.</p> <ol style="list-style-type: none"> 5. Check the radiation monitor CRT or the QRM1 Control Console for level of radiation read by 1-RE-12442A, B, and C. |

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| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | SS | <p><u>SUBSEQUENT OPERATOR ACTIONS</u> continued</p> <p>6. IF sampling an analysis determine that the channel has malfunctioned.</p> <p>a. Comply with Technical Requirement TR 13.3.6.</p> <p>b. Place A-HS-2532C on QESF to TEST BLOCK CHAN 1.</p> <p>c. Request Chemistry to investigate and take corrective action.</p> <p><u>COMPENSATORY OPERATOR ACTIONS</u></p> <p>NONE</p> |
| | NOTE: | Steps for 18006-C Fuel Handling Event start on the next page. |

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| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | SS | Enters 18006-C, Fuel Handling Event |
| | SS | <ol style="list-style-type: none"> 1. Suspend any core alteration or fuel handling activity currently in progress. 2. Secure any suspended loads while staying clear of damaged areas. 3. Announce of the Public Address System to evacuate the affected area, specifying the following: <ul style="list-style-type: none"> • The applicable unit. • Containment and/or Fuel Handling Building. • That personnel exiting Containment should remain in the vicinity until accountability and radiological monitoring is complete. (N/A) 4. Check affected area – CONTAINMENT. (NO) <p>RNO</p> <ol style="list-style-type: none"> 4. Go to Step 6 6. Check affected area – FUEL HANDLING BUILDING. (YES) |

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| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | SS | <p>7. Perform the following:</p> <ul style="list-style-type: none"> a. Verify large missile doors, small missile door, and roof penetration closed. b. Verify FHB isolation has actuated on AHS-2532A or AHS-2533A. (NO, until UO manually actuates, actions are on page # 10) c. Initiate 13320-C, FUEL HANDLING BUILDING HVAC SYSTEM to: <ul style="list-style-type: none"> 1) Verify proper FHB HVAC alignment. 2) Verify only one FHB Post Accident Exhaust Filtration Unit is operating. <p>NOTE: Actions from 13320-C for UO to perform are on Page 10.</p> |
| | SS | <p>8. Notify Shift Supervisor and Reactor Engineering of the damaged assembly location.</p> <p>9. Initiate NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION. (Notifies SM)</p> <p>10. Notifies Security to control access to the evacuated area.</p> <p>11. Notifies HP to survey personnel involved in the event.</p> |

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| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | SS | <p>NOTE: The FHS will give the SS a report to include the following</p> <ul style="list-style-type: none"> Fuel assembly was dropped, fuel movement suspended and all suspended loads are secure. Large and small missile doors are closed. The roof penetration is closed. Fuel assembly was damaged while attempting to enter Unit 1 Spent Fuel location HH24 Spent fuel pool level was stable at the normal level 218' 6". The fuel transfer canal gate valve is closed. |
| | SS | <p>12. Check Spent Fuel Pool and Reactor Cavity level:</p> <p>a. Spent Fuel Pool level – STABLE (YES)</p> <p>b. Reactor Cavity level – STABLE. (N/A)</p> <p>13. Check fuel transfer canal gate valve 1213-U6-086 – CLOSED. (YES)</p> <p>14. Check entry into affected area – PERMITTED BY HP. (Not at this time)</p> <p>15. Notify Reactor Engineering staff to evaluate the extent of the damage.</p> <p>16. Consult the Reactor Engineering staff on methods of recovering the damaged fuel assembly.</p> <p>17. Return to procedure and step in effect.</p> <p>NOTE to examiners: Tech Spec actions are on the following page.</p> |

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| Time | Position | Applicant's Action or Behavior | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--|---------------|-----------------|-----------------|---|---|------------------------------|-------------|-------------------|---------------------------|---------------|----------------------|---|--------------|----|---|---|--|-----|---|---|--------------|----|
| | SS | <p>TR 13.3.6 Fuel Handling Building Post Accident Ventilation System Instrumentation (common system)</p> <p>TR 13.3.6 The fuel handling building (FHB) post accident ventilation actuation instrumentation identified in Table 13.3.6-1 shall be OPERABLE.</p> <p>APPLICABILITY: Whenever irradiated fuel is in either storage pool.</p> <p>ACTIONS</p> <table><tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr><tr><td>A. One or more required FHB ventilation actuation Instruments inoperable.</td><td>A.1 Apply required Actions of TR 13.9.5</td><td>In accordance with TR 13.9.5</td></tr></table> <p>Table 13.3.6-1</p> <p>FHB Post Accident Ventilation Actuation Instrumentation</p> <table><tr><th>Instruments</th><th>Required Channels</th><th>Surveillance Requirements</th><th>Trip Setpoint</th></tr><tr><td>1. Manual Initiation</td><td>1</td><td>TRS 13.3.6.5</td><td>NA</td></tr><tr><td>2. FHB Exhaust Duct Radiation Signal (ARE-2532 A&B)</td><td>1</td><td>TRS 13.3.6.1 TRS 13.3.6.2 TRS 13.3.6.4</td><td>(a)</td></tr><tr><td>3. Automatic Actuation Logic and Actuation Relays</td><td>1</td><td>TRS 13.3.6.3</td><td>NA</td></tr></table> <p>(a) Setpoints will not exceed the limits of TS 5.5.4.g.</p> | CONDITION | REQUIRED ACTION | COMPLETION TIME | A. One or more required FHB ventilation actuation Instruments inoperable. | A.1 Apply required Actions of TR 13.9.5 | In accordance with TR 13.9.5 | Instruments | Required Channels | Surveillance Requirements | Trip Setpoint | 1. Manual Initiation | 1 | TRS 13.3.6.5 | NA | 2. FHB Exhaust Duct Radiation Signal (ARE-2532 A&B) | 1 | TRS 13.3.6.1 TRS 13.3.6.2 TRS 13.3.6.4 | (a) | 3. Automatic Actuation Logic and Actuation Relays | 1 | TRS 13.3.6.3 | NA |
| CONDITION | REQUIRED ACTION | COMPLETION TIME | | | | | | | | | | | | | | | | | | | | | | |
| A. One or more required FHB ventilation actuation Instruments inoperable. | A.1 Apply required Actions of TR 13.9.5 | In accordance with TR 13.9.5 | | | | | | | | | | | | | | | | | | | | | | |
| Instruments | Required Channels | Surveillance Requirements | Trip Setpoint | | | | | | | | | | | | | | | | | | | | | |
| 1. Manual Initiation | 1 | TRS 13.3.6.5 | NA | | | | | | | | | | | | | | | | | | | | | |
| 2. FHB Exhaust Duct Radiation Signal (ARE-2532 A&B) | 1 | TRS 13.3.6.1 TRS 13.3.6.2 TRS 13.3.6.4 | (a) | | | | | | | | | | | | | | | | | | | | | |
| 3. Automatic Actuation Logic and Actuation Relays | 1 | TRS 13.3.6.3 | NA | | | | | | | | | | | | | | | | | | | | | |

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Event No.: 1

Event Description: A dropped fuel assembly in the FHB will result in multiple high radiation annunciators with a FHBI auto actuation failure. The UO will have to manually actuate FHBI, then shut down one FHB Filtration Unit to comply with 18006-C, Fuel Handling Event.

| Time | Position | Applicant's Action or Behavior | | | | | | | | |
|---|---|---|--|--|-----------|-----------------|-----------------|---|---|-------------|
| | SS | <p>TR 13.9.5 Fuel Handling Building Post Accident Ventilation System (common system)</p> <p>TR 13.9.5 Two independent Fuel Handling Building Post Accident Ventilation Systems shall be OPERABLE.</p> <p>APPLICABILITY: Whenever irradiated fuel is in either storage pool.</p> <p>-----NOTE----- TR 13.0.3 is not applicable.</p> <p>ACTIONS</p> <table><tr><th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr><tr><td>B. Two Fuel Handling Building Post Accident Ventilation Systems Inoperable.</td><td>B.1 Suspend all operations involving movement of irradiated fuel in the fuel handling building, movement of new fuel over irradiated fuel in the fuel handling building, or crane operation with loads over irradiated fuel in the fuel handling building until Required Action A.1 above is met.</td><td>Immediately</td></tr></table> | | | CONDITION | REQUIRED ACTION | COMPLETION TIME | B. Two Fuel Handling Building Post Accident Ventilation Systems Inoperable. | B.1 Suspend all operations involving movement of irradiated fuel in the fuel handling building, movement of new fuel over irradiated fuel in the fuel handling building, or crane operation with loads over irradiated fuel in the fuel handling building until Required Action A.1 above is met. | Immediately |
| CONDITION | REQUIRED ACTION | COMPLETION TIME | | | | | | | | |
| B. Two Fuel Handling Building Post Accident Ventilation Systems Inoperable. | B.1 Suspend all operations involving movement of irradiated fuel in the fuel handling building, movement of new fuel over irradiated fuel in the fuel handling building, or crane operation with loads over irradiated fuel in the fuel handling building until Required Action A.1 above is met. | Immediately | | | | | | | | |

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Scenario No.: 2

Event No.: 1

Event Description: A dropped fuel assembly in the FHB will result in multiple high radiation annunciators with a FHBI auto actuation failure. The UO will have to manually actuate FHBI, then shut down one FHB Filtration Unit to comply with 18006-C, Fuel Handling Event.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | NOTE to examiners: The following steps are from 13320-C, Fuel Handling Building HVAC System Section 4.2 for manual actuation. |
| | UO | <p style="text-align: center;">NOTES</p> <ul style="list-style-type: none"> • If normal FHB HVAC supply and exhaust units are running, damper isolation will trip them on low air flow after a time delay. • Performing the next step will bring in annunciator 1ALB39-D02 if Supply # 1 and Exhaust # 1 are presently running, or 1ALB39-D03 if Supply # 2 and Exhaust # 2 are running due to tripping on low air flow. These alarms will not clear until their associated HVAC hand switches are taken to the stop normal position. • Annunciators 1ALB54-A01 and A02, FHB Post Accident Filter 1(2) trouble will both momentarily come in until air flow increases above setpoint. • Trip of normal FHB HVAC supply fans due to actuation will bring in annunciator 1ALB54-A03 or A04. Trip of normal exhaust units on low flow will illuminate annunciator 1ALB54-B03 or 1ALB54-B04. • When starting a Post Accident Filter Unit, QALB31-D02 "BEN Volt REG MODE CHANGE ALARM" may be momentarily received. No action per procedure 17031-1(2) is required. • Heat Trace Panel 1-1817-U3-007A temperature circuits C1-11, 13, 14; C2-1, 4, 6, 11 and 12 should ALL be verified $\geq 87^{\circ}\text{F}$ for a non-emergency start of FHB Post Accident Filter Unit. |

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Scenario No.: 2

Event No.: 1

Event Description: A dropped fuel assembly in the FHB will result in multiple high radiation annunciators with a FHBI auto actuation failure. The UO will have to manually actuate FHBI, then shut down one FHB Filtration Unit to comply with 18006-C, Fuel Handling Event.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | ALB054-A01(A02) FHB POST ACCIDENT FLTR 1(2) TROUBLE ALB054-A03(A04) FHB SPLY F-1(2) LO FLOW/TEMP TRIP ALB054-B03(B04) FHB EXH F-1(2) LO AIR FLOW <p style="text-align: center;">CAUTION</p> <p>The Train B Post Accident Filter Unit and the normal exhaust HVAC system discharge to the same exhaust header. They should not be aligned to discharge to their common exhaust stack at the same time.</p> |
| | UO | 4.2.1 Actuate FHB ISOLATION by momentarily placing either train's hand switch to ACTUATE position. FHB ISOLATION MANUAL ACTUATION AHS-2532A (A54) FHB ISOLATION MANUAL ACTUATION AHS-2533A (A55) |
| | UO | 4.2.2 Verify FHB Isolation a. FHB Isolation actuated. <ul style="list-style-type: none"> • Red Light at FHB ISOLATION MANUAL ACTUATION, AHS-2532A (A54) LIT. • Red Light at FHB ISOLATION MANUAL ACTUATION, AHS-2533A (A55) LIT. |

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Scenario No.: 2

Event No.: 1

Event Description: A dropped fuel assembly in the FHB will result in multiple high radiation annunciators with a FHBI auto actuation failure. The UO will have to manually actuate FHBI, then shut down one FHB Filtration Unit to comply with 18006-C, Fuel Handling Event.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>4.2.2 Verify FHB Isolation (continued)</p> <p style="margin-left: 40px;">b. POST ACCIDENT FILT/EXH FANS:</p> <div style="margin-left: 80px;"> Train A: A-1542-N7-001 (C54) RUNNING Train B: A-1542-N7-002 (C55) RUNNING </div> <p style="margin-left: 40px;">c. Verify Post Accident FILT/EXH FAN dampers open:</p> <ul style="list-style-type: none"> • Fan-1 INLET AHV-12510 (AZLB-62) OPEN • Fan-1 EXH AHV-12512 (AZLB-62) OPEN • Fan-2 INLET AHV-12511 (AZLB-64) OPEN • Fan-2 EXH AHV-12513 (AZLB-64) OPEN |

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Scenario No.: 2

Event No.: 1

Event Description: A dropped fuel assembly in the FHB will result in multiple high radiation annunciators with a FHBI auto actuation failure. The UO will have to manually actuate FHBI, then shut down one FHB Filtration Unit to comply with 18006-C, Fuel Handling Event.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>4.2.2 Verify FHB Isolation (continued)</p> <p>d. FHB NORM HVAC SPLY DMPRS:</p> <ul style="list-style-type: none"> • A-HV-2529 AHS-2529 (A56) CLOSED • A-HV-2528 AHS-2528 (A57) CLOSED <p>e. NORM HVAC UNIT SPLY HDR ISO DMPRS:</p> <ul style="list-style-type: none"> • A-HV-2535 AHS-2535 (B56) CLOSED • A-HV-2534 AHS-2534 (B57) CLOSED <p>f. FHB ISO DMPRS TO NORM EXH:</p> <ul style="list-style-type: none"> • A-HV-12479 AHS-12479 (D56) CLOSED • A-HV-12480 AHS-12480 (D57) CLOSED <p>g. FHB ISO DMPERS TO STACK:</p> <ul style="list-style-type: none"> • A-HV-12481 AHS-12481 (C56) CLOSED • A-HV-12482 AHS-12482 (C57) CLOSED |
| | UO | 4.2.3 Record the filter unit started in the Control Room Log. |
| | UO | <p>4.2.4 Verify the FHB Normal Supply Units STOPPED:</p> <ul style="list-style-type: none"> • FHB NORMAL SPLY UNIT FAN-1: AHS-2520 (A52) • FHB NORMAL SPLY UNIT FAN-2: AHS-2521 (B52) |

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Scenario No.: 2

Event No.: 1

Event Description: A dropped fuel assembly in the FHB will result in multiple high radiation annunciators with a FHBI auto actuation failure. The UO will have to manually actuate FHBI, then shut down one FHB Filtration Unit to comply with 18006-C, Fuel Handling Event.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>4.2.5 Verify the FHB Normal Exhaust Units STOPPED:</p> <ul style="list-style-type: none"> FHB NORM EXH UNIT FAN-1: AHS-12534 (A53) FHB NORM EXH UNIT FAN-2: AHS-12536 (B53) <p>NOTE to examiners: The UO should stop one Post Accident Filter Unit by continuing with the steps below or using section 4.13 of 18006-C (Page 15.)</p> |
| | UO | <p style="text-align: center;">NOTE</p> <p>If a FHB Isolation Signal is still present and either train's handswitch is taken to reset, then that Train's Isolation logic is rendered inoperable. A corresponding White Light will be LIT on AHS-2532B (AHS-2533B), and a corresponding alarm is received on the Unit One and Unit Two SSMP Panels and will bring in annunciators on Both Unit One and Unit Two (1/2ALB-4-E01 (E02).</p> <p>4.2.6 Reset FHB Isolation on QHVC if required as follows:</p> <p>a. Momentarily place the desired FHB Isolation reset handswitch to the RESET OVERRIDE position and release:</p> <p>Train A: AHS-2532B (B54) RESET OVERRIDE</p> <p>Train B: AHS-2533B (B55) RESET OVERRIDE</p> |

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Scenario No.: 2

Event No.: 1

Event Description: A dropped fuel assembly in the FHB will result in multiple high radiation annunciators with a FHBI auto actuation failure. The UO will have to manually actuate FHBI, then shut down one FHB Filtration Unit to comply with 18006-C, Fuel Handling Event.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <div>4.2.7</div> <div>Verify the FHB Isolation has been reset by observing a green light indication:</div> <div>FHB ISOLATION MANUAL ACTUATION, AHS-2532A (A54), green light LIT</div> <div>FHB ISOLATION MANUAL ACTUATION, AHS-2533A (A55), green light LIT</div> |
| | UO | <div>NOTE</div> <div>If Section 4.6 Post Accident Cleanup Of The FHB Using The Normal Exhaust Units is to be performed, Train B FHB post accident filter unit should be secured.</div> <div>4.2.8</div> <div>As directed by the SS, stop one of the Post Accident Filt/Exh Unit Fans:</div> <div>Train A: A-1542-N7-001 AHS-2540 (C54)</div> <div>Train B: A-1542-N7-002 AHS-2541 (C55)</div> |
| | UO | <div>4.2.9</div> <div>Verify Post Accident Filter Fan dampers close for the fan stopped.</div> <div>Fan-1 INLET AHV-12510 (AZLB-62) CLOSED</div> <div>Fan-1 EXH AHV-12512 (AZLB-62) CLOSED</div> <div>Fan-2 INLET AHV-12511 (AZLB-64) CLOSED</div> <div>Fan-2 EXH AHV-12513 (AZLB-64) CLOSED</div> |

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Scenario No.: 2

Event No.: 1

Event Description: A dropped fuel assembly in the FHB will result in multiple high radiation annunciators with a FHBI auto actuation failure. The UO will have to manually actuate FHBI, then shut down one FHB Filtration Unit to comply with 18006-C, Fuel Handling Event.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p style="text-align: center;">NOTE</p> <p>If the Normal FHB HVAC System is returned to service within 12 hours after shutdown, FHB temperature monitoring per the following step need not be completed.</p> <p>4.2.10 Initiate area temperature monitoring for the fuel handling building Units 1 and 2, per 14915, "Special Conditions Surveillance Logs."</p> |
| | UO | <p>4.2.11 Reset annunciators 1ALB39-D02 (D03) by resetting Amber lights on Fuel Handling Building Normal Supply and Exhaust units handswitches as required:</p> <ul style="list-style-type: none"> • FHB NORM EXH UNIT FAN-1 AHS-12534 (A53) • FHB NORM EXH UNIT FAN-2 AHS-12536 (B53) • FHB NORM HVAC UNIT-1 FAN-1 AHS-2520 (A52) • FHB NORM HVAC UNIT-2 FAN-1 AHS-2521 (B52) |
| | UO | <p>4.2.12 Verify associated annunciators 1ALB54-A01 and 1ALB54-A02 have extinguished</p> |

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Scenario No.: 2

Event No.: 1

Event Description: A dropped fuel assembly in the FHB will result in multiple high radiation annunciators with a FHBI auto actuation failure. The UO will have to manually actuate FHBI, then shut down one FHB Filtration Unit to comply with 18006-C, Fuel Handling Event.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | Note to Examiner: Students may use the following section 4.13 SHUTDOWN OF A FHB POST ACCIDENT FILTER UNIT AS DIRECTED FROM 18006-C "FUEL HANDLING EVENT" |
| | UO | 4.13.1 Check FHB Isolation Signal NOT present on QHVC: <ul style="list-style-type: none">• Red Light at FHB ISOLATION MANUAL ACTUATION, AHS-2532A (A54) NOT LIT• Red Light at FHB ISOLATION MANUAL ACTUATION, AHS-2533A (A55) NOT LIT |
| | UO | 4.13.2 IF any red lights are LIT, verify at SRDC that FHB Radiation Monitors are <u>NOT</u> in high alarm. <ul style="list-style-type: none">• A-RE-2532A• A-RE-2532B• A-RE-2533A• A-RE-2533B |

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Scenario No.: 2

Event No.: 1

Event Description: A dropped fuel assembly in the FHB will result in multiple high radiation annunciators with a FHBI auto actuation failure. The UO will have to manually actuate FHBI, then shut down one FHB Filtration Unit to comply with 18006-C, Fuel Handling Event.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>NOTES</p> <ul style="list-style-type: none"> • The FHB Isolation Signal must be reset prior to starting the Normal HVAC System. • If a FHB Isolation Signal is present as a result of a failed or inoperable radiation monitor it may be necessary to block its input per 13508-1 prior to placing FHB Normal HVAC system into service. • If a FHB Isolation Signal is still present and either train's handswitch is taken to reset, then that Train's Isolation logic is rendered inoperable. A corresponding alarm is received on the Unit One and Unit Two SSMP Panels and will bring in annunciators on BOTH Unit One and Unit Two (1/2ALB04-E01(E02) "TRAIN A(B) SYS STATUS MON PNL ALERT." |
| | UO | <p>4.13.3 IF any Red lights in Step 4.13.1 are lit AND FHB Rad monitors are in high alarm, it will be necessary to over ride the actuation signal to shutdown a Post Accident Filter Unit. If required, perform the following steps, otherwise proceed to Step 4.13.4.</p> <p>a. Notify SS that over riding the FHB Isolation Signal will INOP that train(s) of FHB activation logic and may require entry into TR13.3.6.</p> |

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Scenario No.: 2

Event No.: 1

Event Description: A dropped fuel assembly in the FHB will result in multiple high radiation annunciators with a FHBI auto actuation failure. The UO will have to manually actuate FHBI, then shut down one FHB Filtration Unit to comply with 18006-C, Fuel Handling Event.

| Time | Position | Applicant's Action or Behavior | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------|-----------------|--|-------------------------|---------------|---------------|-------|-----------------|---------|---------|-----------------|-----|---------|-----------------|-----|-------------------------|---------------|---------------|-------|-----------------|---------|---------|-----------------|-----|---------|-----------------|-----|
| | UO | <p>NOTE</p> <p>The SSMP annunciator and FHB Actuation logic override white light indication will clear when the FHB Rad Monitor high rad condition is reset.</p> <p>b. Notify Unit One and Unit Two control room operators that annunciator 1/2ALB04-E01 TRAIN A SYS STATUS MON PNL ALERT and/or annunciator 1/2ALB04-E02, TRAIN B SYS STATUS MON PNL ALERT will illuminate.</p> | | | | | | | | | | | | | | | | | | | | | | | | |
| | UO | <p>c. Reset the actuation signal using the associated handswitch.</p> <ul style="list-style-type: none"> • Train A AHS-2532B (B54) RESET OVERRIDE • Train B AHS-2533B (B55) RESET OVERRIDE | | | | | | | | | | | | | | | | | | | | | | | | |
| | UO | <p>d. Verify Associated FHB Isolation Signal is over ridden on QHVC:</p> <table> <tr> <td>(1) <u>Train A LAMP</u></td><td><u>SWITCH</u></td><td><u>STATUS</u></td></tr> <tr> <td>• RED</td><td>AHS-2532A (A54)</td><td>NOT LIT</td></tr> <tr> <td>• GREEN</td><td>AHS-2532A (A54)</td><td>LIT</td></tr> <tr> <td>• WHITE</td><td>AHS-2532B (B54)</td><td>LIT</td></tr> </table> <table> <tr> <td>(2) <u>Train B LAMP</u></td><td><u>SWITCH</u></td><td><u>STATUS</u></td></tr> <tr> <td>• RED</td><td>AHS-2533A (A55)</td><td>NOT LIT</td></tr> <tr> <td>• GREEN</td><td>AHS-2533A (A55)</td><td>LIT</td></tr> <tr> <td>• WHITE</td><td>AHS-2533B (B55)</td><td>LIT</td></tr> </table> <p>e. Proceed to Step 4.13.5</p> | (1) <u>Train A LAMP</u> | <u>SWITCH</u> | <u>STATUS</u> | • RED | AHS-2532A (A54) | NOT LIT | • GREEN | AHS-2532A (A54) | LIT | • WHITE | AHS-2532B (B54) | LIT | (2) <u>Train B LAMP</u> | <u>SWITCH</u> | <u>STATUS</u> | • RED | AHS-2533A (A55) | NOT LIT | • GREEN | AHS-2533A (A55) | LIT | • WHITE | AHS-2533B (B55) | LIT |
| (1) <u>Train A LAMP</u> | <u>SWITCH</u> | <u>STATUS</u> | | | | | | | | | | | | | | | | | | | | | | | | |
| • RED | AHS-2532A (A54) | NOT LIT | | | | | | | | | | | | | | | | | | | | | | | | |
| • GREEN | AHS-2532A (A54) | LIT | | | | | | | | | | | | | | | | | | | | | | | | |
| • WHITE | AHS-2532B (B54) | LIT | | | | | | | | | | | | | | | | | | | | | | | | |
| (2) <u>Train B LAMP</u> | <u>SWITCH</u> | <u>STATUS</u> | | | | | | | | | | | | | | | | | | | | | | | | |
| • RED | AHS-2533A (A55) | NOT LIT | | | | | | | | | | | | | | | | | | | | | | | | |
| • GREEN | AHS-2533A (A55) | LIT | | | | | | | | | | | | | | | | | | | | | | | | |
| • WHITE | AHS-2533B (B55) | LIT | | | | | | | | | | | | | | | | | | | | | | | | |

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Scenario No.: 2

Event No.: 1

Event Description: A dropped fuel assembly in the FHB will result in multiple high radiation annunciators with a FHBI auto actuation failure. The UO will have to manually actuate FHBI, then shut down one FHB Filtration Unit to comply with 18006-C, Fuel Handling Event.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>4.13.4 IF any red lights in Step 4.13.1 are energized <u>BUT NO</u> FHB Rad Monitors are in high alarm, reset the actuation signals as follows:</p> <p>a. Momentarily place the desired FHB Isolation reset handswitch to the RESET OVERRIDE position AND release.</p> <p>Train A AHS-2532B (B54)</p> <p>Train B AHS-2533B (B55)</p> <p>b. Verify the FHB Isolation has been reset by observing a green light.</p> <p>FHB ISOLATION MANUAL ACTUATION, AHS-2532A (A54) green light LIT.</p> <p>FHB ISOLATION MANUAL ACTUATION, AHS-2533A (A55) green light LIT.</p> |
| | UO | <p>4.13.5 Shutdown the desired Post Accident Filter Unit by placing its handswitch in stop:</p> <p>a. POST ACCIDENT FILT/EXH UNIT FAN A-1542-N7-001 AHS-2540 (C54)</p> <p>b. POST ACCIDENT FILT/EXH UNIT FAN A-1542-N7-002 AHS-2541 (C55)</p> <p>END OF EVENT # 1, PROCEED TO EVENT # 2.</p> |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 2

Event Description: A 30 gpm leak develops in the CVCS LTDN HX tubes that is within the capacity of normal charging. CVCS letdown flow on FI-121A will indicate lower letdown flow and an Intermediate and High Radiation Alarm (within 2 minutes) on 1-RE-1950 will annunciate.

| Time | Position | Applicant's Action or Behavior |
|------|-----------|---|
| | CREW | <p>Indications: (The following will be reflash alarms)</p> <ul style="list-style-type: none"> Intermediate and High Radiation Alarms Annunciate. 1RE-1950 ACCW System showing alarm condition on IPC and will trend upward. |
| | OATC / UO | <p>References ARP 17005-1, Window C03 "HIGH RADIATION ALARM"</p> <p>1.0 <u>PROBABLE CAUSE</u></p> <p>A high alarm on one or more of the Radiation Monitor Channels.</p> <p>2.0 <u>AUTOMATIC ACTIONS</u></p> <p>The following actions will occur if a High Level Radiation Alarm is actuated on the associated monitor:</p> <ol style="list-style-type: none"> 1-RE-0002 or 1-RE-0003, Containment Low Range Area Monitor: Containment Ventilation (CVI). A-RE-014, Waste Gas Processing System Effluent Radiogas Monitor: Closes valve A-RV-0014 to the Waste Gas Processing System discharge. 1-RE-0018, Waste Liquid Effluent Monitor: Closes 1-RV-0018 to isolate the Liquid Waste Discharge Line. 1-RE-0021, Steam Generator Blowdown Liquid Process Monitor: Isolates Steam Generator Blowdown Processing System. 1-RE-0848, Turbine Building Drain Effluent Monitor: Diverts Turbine Building Drains to Dirty Drains Tank. A-RE-2532 A or B or A-RE-2533 A or B, Fuel Handling Building Effluent Radiogas Monitors: Fuel Handling Building Isolation (FHBI). 1-RE-2565 A, B or C, Containment Ventilation Effluent Monitors: Containment Ventilation Isolation (CVI). |

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Scenario No.: 2

Event No.: 2

Event Description: A 30 gpm leak develops in the CVCS LTDN HX tubes that is within the capacity of normal charging. CVCS letdown flow on FI-121A will indicate lower letdown flow and an Intermediate and High Radiation Alarm (within 2 minutes) on 1-RE-1950 will annunciate.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | | <p>8. 1-RE-12116 and 1-RE-12117, Control Room Intake Airborne Monitors: Control Room Ventilation Isolation (CRI).</p> <p>9. 1-RE-12839 C, Condenser Air Ejector and Steam Packing Exhauster Effluent Monitor: Diverts air ejector discharge to filtration.</p> <p>10. A-RE-50003, Technical Support Center Air Intake Monitor: Technical Support Center Ventilation Isolation.</p> <p>3.0 <u>INITIAL OPERATOR ACTIONS</u></p> <p>NONE</p> <p>4.0 <u>SUBSEQUENT OPERATOR ACTIONS</u></p> <p>1. Check the Safety Related Display Console (QRM2), the RMS Communications Console (QRM1) and the Plant Computer to determine the monitor in alarm and Go To 17100-1, "Annunciator Response Procedure For The Process And Effluent Radiation Monitor System (RMS)" or 17102-1, "Annunciator Response Procedure For The Safety Related Display Control QRM2" as appropriate,</p> <p>NOTE: CREW Determines 1-RE-1950 In HIGH Alarm.</p> <p>2. Initiate a CR documenting Alarm condition.</p> <p>5.0 <u>COMPENSATORY OPERATOR ACTIONS</u></p> <p>Monitor Plant Computer for radiation alarms if annunciator is inoperable or in solid.</p> |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 2

Event Description: A 30 gpm leak develops in the CVCS LTDN HX tubes that is within the capacity of normal charging. CVCS letdown flow on FI-121A will indicate lower letdown flow and an Intermediate and High Radiation Alarm (within 2 minutes) on 1-RE-1950 will annunciate.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | References ARP 17100-1, "Annunciator Response Procedure For The Process And Effluent Radiation Monitor System (RMS)" for 1RE-1950. |
| | SS / UO | ARP 17100-1, 1RE-1950 Actions: Step 1. Request Chemistry to sample and analyze the ACCW. |
| | SS / UO | Step 2. Notify Health Physics of the alarm, |
| | CREW | Step 3. Locate the source of the in-leakage. a. Check IPC points T0145, P0135, and F0134 (IPC Group 21) for changes, in an attempt to determine if a Letdown HX tube leak. (YES) NOTE: Identifies changes and DIAGNOSES Letdown HX tube leakage. b. Check IPC points T2714, T2716, T2718, and T2720 (IPC Group 242) for changes, in an attempt to determine if leakage is from RCP thermal barrier. (NO) |
| | SS | Step 4. Isolate the source if possible. |
| | OATC | Step 5. <u>IF</u> 1-RE-1950 is reading high due to LTDN HX tube leakage: NOTE: SS May direct actions of ARP 17100 To Either OATC or UO. a. Place LETDOWN TO DEMIN/VCT 1-TV-0129 to the VCT position using 1-HS-0129 . (1) Verify 1-TV-0129 aligns to the VCT. b. Place VCT HUT LETDOWN DIVERT 1-LV-0112A to the HUT position using 1-HS-0112A . (1) Verify 1-LV-0112A aligns to the RHUT. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 2

Event Description: A 30 gpm leak develops in the CVCS LTDN HX tubes that is within the capacity of normal charging. CVCS letdown flow on FI-121A will indicate lower letdown flow and an Intermediate and High Radiation Alarm (within 2 minutes) on 1-RE-1950 will annunciate.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | Step 5. Cont. |
| | | c. Isolate letdown. Verify closed: <i>(CV required)</i> |
| | | (1) 1-HV-8149A, B, C. |
| | | (2) 1-LV-0459. |
| | | (3) 1-LV-0460. |
| | | (4) 1-HV-8152. |
| | | (5) 1-HV-8160. |
| | | (6) 1-PV-0131, set to max pressure. |
| | | (7) 1-TV-0130, set to max temperature. |
| | | d. Shut Letdown Heat Exchanger manual valves: |
| | | (1) (AB-A08) 1-1208-U6-041. |
| | | (2) (AB-A17) 1-1217-U4-126. |
| | | (3) (AB-108) 1-1217-U4-129. |
| | SS / UO | e. Notify Chemistry. |
| | SS | f. Initiate 18007-C, "CVCS MALFUNCTION" to deal with the loss of letdown. |
| | | NOTE: SS Should Have UO Complete Steps In ARP While He Transitions To 18007-C. |
| | UO | Step 6. Obtain detector trend from the IPC computer |
| | UO | Step 7. Monitor the channel for further changes. |
| | UO | Step 8, Step 9 and Step 10 are N/A. |
| | SS | Initiates AOP 18007-C, "CVCS MALFUNCTION" per Step 5f. above |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 2

Event Description: A 30 gpm leak develops in the CVCS LTDN HX tubes that is within the capacity of normal charging. CVCS letdown flow on FI-121A will indicate lower letdown flow and an Intermediate and High Radiation Alarm (within 2 minutes) on 1-RE-1950 will annunciate.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>18007-C, "CVCS MALFUNCTION" Section A, TOTAL LOSS OF LETDOWN FLOW.</p> <p>A1. Isolate letdown relief flowpath by performing the following:</p> <ol style="list-style-type: none"> Close letdown orifice isolation valves: <ul style="list-style-type: none"> HV-8149A HV-8149B HV-8149C Close letdown isolation valves: <ul style="list-style-type: none"> LV-459 LV-460 <p>NOTE: A1a. and b. Previously performed in ARP 17100-1</p> |
| | OATC | <p>A2. Adjust HC-182 and FI-121 as necessary to establish the following:</p> <ul style="list-style-type: none"> Seal injection flow to all RCPs – 8 TO 13 GPM. <p>-AND-</p> <ul style="list-style-type: none"> Charging flow – APPROXIMATELY 10 GPM GREATER THAN TOTAL SEAL INJECTION FLOW. |
| | | <p>NOTE: Steps A3 THROUGH Steps A5 Do Not Apply Under This Condition:</p> <p>A3. Check pipe break protection valves – OPEN. (YES).</p> <ul style="list-style-type: none"> HV-15214 HV-8160 <p>A4. Check instrument air to containment – ESTABLISHED. (YES)</p> |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 2

Event Description: A 30 gpm leak develops in the CVCS LTDN HX tubes that is within the capacity of normal charging. CVCS letdown flow on FI-121A will indicate lower letdown flow and an Intermediate and High Radiation Alarm (within 2 minutes) on 1-RE-1950 will annunciate.

| Time | Position | Applicant's Action or Behavior |
|------|-----------|---|
| | | <p>A5. Check CVCS letdown to BTRS flowpath: (YES)</p> <p class="list-item-l1">a. Check TV-0381B BTRS Demin Inlet Temperature Control – OPEN. (HS-10351 DILUTE or OFF lights lit.)</p> <p class="list-item-l1">b. Check HV-8115 LETDOWN DIVERT TO BTRS – OPEN.</p> <p>A6. Identify and correct cause for loss of letdown.</p> <p>NOTE: Identified as CVCS LTDN HX tube leak earlier.</p> |
| | SS / OATC | <p>A7. Check normal letdown – AVAILABLE.</p> <p>RNO</p> <p>A7. Perform the following:</p> <p class="list-item-l1">a. Establish Excess Letdown by initiating 13008, CHEMICAL AND VOLUME CONTROL SYSTEM EXCESS LETDOWN.</p> <p class="list-item-l1">b. Go to Step A9.</p> |
| | | <p>NOTE: Steps for placing Excess Letdown in service are listed in Event 3 starting on Page 26. Once Excess Letdown is in service, return to Page 25 of this event to finish the Loss of Letdown steps.</p> |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 2

Event Description: A 30 gpm leak develops in the CVCS LTDN HX tubes that is within the capacity of normal charging. CVCS letdown flow on FI-121A will indicate lower letdown flow and an Intermediate and High Radiation Alarm (within 2 minutes) on 1-RE-1950 will annunciate.

| Time | Position | Applicant's Action or Behavior |
|------|-----------|---|
| | SS | CONTINUES WITH 18007-C, "CVCS MALFUNCTION" A7.b. RNO <u>Go to Step A9.</u> |
| | OATC / UO | A9. Initiate Continuous Actions Page. |
| | OATC | *A10. Verify PRZR level – TRENDING TO PROGRAM. |
| | SS / OATC | *A11 Check normal letdown flow – ESTABLISHED. RNO *A11. Perform the following: a. <u>WHEN</u> normal letdown capability is restored, <u>THEN</u> restore normal letdown by initiating 13006, CHEMICAL AND VOLUME CONTROL SYSTEM. b. Evaluate the impact of continued power operation with normal letdown out of service. |
| | SS | Return to procedure and step in effect. (12004-C) Crew will call C & T to request I & C, Maintenance support, and notification of the Operations Management. Tech Spec LCO – 3.4.13, RCS Operational LEAKAGE, Condition A END OF EVENT # 2, PROCEED TO EVENT # 4. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 3

Event Description: The OATC places Excess Letdown in service per direction of the SS to maintain PRZR level after letdown is isolated to stop the Letdown Hx tube leakage. The OATC will use 13008-1, to place Excess Letdown in service.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>13008-1, Excess Letdown</p> <p>NOTE: Independent Verifications performed within Section 4.1 are documented on Checklist 1.</p> <p>4.1 EXCESS LETDOWN TO SEAL RETURN HEADER</p> <p>NOTE: 1-1208-X4-086 and 1-1208-X4-096 should be vented once per shift when excess letdown is in service to prevent gas buildup within the NCP discharge header. (SER2-05)</p> |
| | OATC | 4.1.1 Verify Reactor power is maintained < 3622.5 MWT while Excess Letdown is in service and LEFM is in service. IF LEFM is NOT in service, maintain power < 3562 MWT per guidance of 12004-C. |
| | OATC | 4.1.2 Verify that a CVCS Charging Pump is running. |
| | OATC | 4.1.3 Verify CLOSED RX HEAD VENT TO EXCESS LETDOWN ISOLATION 1-HV-8098. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 3

Event Description: The OATC places Excess Letdown in service per direction of the SS to maintain PRZR level after letdown is isolated to stop the Letdown Hx tube leakage. The OATC will use 13008-1, to place Excess Letdown in service.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | 4.1.4 Verify flow controller EXCESS LETDOWN, 1HC-123 is set to closed (0% demand). |
| | OATC | 4.1.5 Verify OPEN RCPs Seal Leakoff Isolation valves: <ul style="list-style-type: none">• 1-HV-8100 RCPS SEAL LEAKOFF ORC ISOLATION• 1-HV-8112 RCPS SEAL LEAKOFF IRC ISOLATION |
| | OATC | 4.1.6 Verify EXCESS LETDOWN TO VCT, 1HS-8143 is in the OPEN VCT position. |
| | OATC | 4.1.7 Verify Reactor power is maintained < 3622.6 MWT while Excess Letdown is in service and LEFM is in service. <u>IF</u> LEFM is <u>NOT</u> in service, maintain power ≤3562 MWT per guidance of 12004-C. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 3

Event Description: The OATC places Excess Letdown in service per direction of the SS to maintain PRZR level after letdown is isolated to stop the Letdown Hx tube leakage. The OATC will use 13008-1, to place Excess Letdown in service.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>4.1.8 Open EXCESS LETDOWN LINE Isolation Valves:</p> <ul style="list-style-type: none"> • 1-HV-8153 EXCESS LETDOWN ISO VLV • 1HV-8154 EXCESS LETDOWN LINE ISO VLV |
| | OATC | <p>4.1.9 Record the following:</p> <ul style="list-style-type: none"> • Pressure on indicator EXCESS LETDOWN HX OUTLET, 1PI-124. • Temperature on indicator EXCESS LETDOWN HX OUTLET, 1TI-122. <p>Note to examiner: ALB63-A06 FILTERS BACKFLUSH PNL ALARM will illuminate shortly after placing Excess Letdown in service.</p> |
| | OATC | <p>4.1.10 While establishing excess letdown, perform the following:</p> <ul style="list-style-type: none"> • Monitor pressure rise on pressure indicator EXCESS LETDOWN HX OUTLET, 1PI-124 and verify it remains less than 50 pounds above pressure recorded in Step 4.1.9. • Monitor temperature rise on temperature indicator EXCESS LETDOWN HX OUTLET, 1TI-122 and verify it remains less than 165 degrees. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 3

Event Description: The OATC places Excess Letdown in service per direction of the SS to maintain PRZR level after letdown is isolated to stop the Letdown Hx tube leakage. The OATC will use 13008-1, to place Excess Letdown in service.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | 4.1.11 Slowly adjust output flow controller EXCESS LETDOWN 1HC-123 to establish maximum allowable flow (estimated to be approximately 30 gpm). |
| | OATC | 4.1.12 Perform the following as required to maintain desired pressurizer level: <ul style="list-style-type: none"> • Adjust charging using CHARGING LINE CONTROL, 1FIC-121. • Adjust seal injection using SEAL FLOW CONTROL, 1HC-182. |
| | OATC | 4.1.13 If normal letdown is isolated, align the outlet of the Seal Water Heat Exchanger to the Volume Control Tank spray nozzle as follows: (IV REQUIRED) (N/A if previously performed). <ol style="list-style-type: none"> a. Unlock and open, CVCS SEALS SEAL WATER HX OUTLET TO VCT, 1-1208-U6-104 (KEY 1OP2-281) b. Close CVCS SEALS WATER HX OUTLET TO NCP SUCTION, 1-1208-U6-106. (RA-26) |

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Scenario No.: 2

Event No.: 3

Event Description: The OATC places Excess Letdown in service per direction of the SS to maintain PRZR level after letdown is isolated to stop the Letdown Hx tube leakage. The OATC will use 13008-1, to place Excess Letdown in service.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>4.1.14 IF directed by SS to transfer excess letdown to the RCDT, perform the following:</p> <ul style="list-style-type: none">a. Verify RCDT system is aligned to accept Excess Letdown flow per 13002-1, "Reactor Drain Tank Operation".b. Place EXCESS LETDOWN TO VCT, 1HS-8143 to the OPEN VCT position.c. Monitor temperature rise on EXCESS LETDOWN HX OUTLET 1TI-122 and verify it remains less than 165 degrees.d. Slowly raise output on flow controller EXCESS LETDOWN, 1HC-123 to establish maximum allowable flow.e. If swap to RCDT is being performed for Chemistry control or level control Step 4.2.8.f. Perform the following as required to maintain desired pressurizer level:<ul style="list-style-type: none">• Adjust charging using CHARGING LINE CONTROL, 1FIC-121• Adjust seal injection using SEAL FLOW CONTROL, 1HC-182. <p>END OF EVENT # 3</p> |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 4

Event Description: PRZR Pressure channel PT-455 fails high resulting in PRZR PORV 455A and both PRZR Sprays fully opening. The OATC will have to take manual action to prevent a Reactor trip and SI.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>Diagnose the high failure of PRZR Pressure channel PT-455.</p> <p>Symptoms / alarms:</p> <ul style="list-style-type: none"> • ALB11-B03 PRZR HI PRESS • ALB11-C03 PRZR HI PRESS CHANNEL ALERT • ALB12-D03 PRZR PRESS LO PORV BLOCK • ALB12-E04 PV-0455A OPEN SIGNAL • ALB06-F06 CSFST TROUBLE <p>Indications:</p> <ul style="list-style-type: none"> • PRZR Pressure channel PT-455 off scale high. • PRZR Pressure channels PT-456, 457, and 458 rapidly lowering. • Both PRZR Sprays full open. |
| | OATC | <p><u>AOP 18001-C, Section C IMMEDIATE ACTIONS</u></p> <p>C1. Check RCS pressure - STABLE OR RISING. (NO)</p> <p>RNO:</p> <p>C1. Perform the following:</p> <ul style="list-style-type: none"> • Close spray valves. • Close affected PRZR PORV. • Operate PRZR heaters as necessary. |
| | SS | Enters AOP 18001-C, Section C and verifies immediate operator actions properly completed. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 4

Event Description: PRZR Pressure channel PT-455 fails high resulting in PRZR PORV 455A and both PRZR Sprays fully opening. The OATC will have to take manual action to prevent a Reactor trip and SI.

| Time | Position | Applicant's Action or Behavior |
|------|------------|---|
| | OATC | <p>C2. Check controlling channel – OPERATING PROPERLY. (NO)</p> <p>RNO:</p> <p>C2. Perform the following:</p> <ul style="list-style-type: none"> a. Place HS-455A in close. b. Place PRZR spray valve controllers in manual. |
| | OATC UO | C3. Initiate the Continuous Actions Page. |
| | OATC | C4. Control PRZR pressure using heaters <u>and</u> sprays – BETWEEN 2220 AND 2250 PSIG. |
| | OATC | <p>C5. Check PIC-455A Pressurizer Master Pressure Controller – IN AUTO WITH OUTPUT SIGNAL APPROXIMATELY 25%. (NO)</p> <p>RNO:</p> <p>C5. Place PIC-455A in manual and adjust controller output to approximately 25%.</p> |
| | OATC | C6. Check affected channel selected on PS-455F PRZR PRESS CNTL SELECT. (YES) |

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Scenario No.: 2

Event No.: 4

Event Description: PRZR Pressure channel PT-455 fails high resulting in PRZR PORV 455A and both PRZR Sprays fully opening. The OATC will have to take manual action to prevent a Reactor trip and SI.

| Time | Position | Applicant's Action or Behavior | | | | | | | | | | |
|-----------------------|--------------------|--|-----------------------|---------------|-------------|--------------------|------|-------------|------|-------------|------|-------------|
| | OATC | <p>C7. Select unaffected channels on PS-455F:</p> <table><tr><td><u>Failed Channel</u></td><td><u>Select</u></td></tr><tr><td>P455</td><td>CH457 / 456</td></tr><tr><td>P456</td><td>CH455 / 458</td></tr><tr><td>P457</td><td>CH455 / 456</td></tr><tr><td>P458</td><td>CH455 / 456</td></tr></table> | <u>Failed Channel</u> | <u>Select</u> | P455 | CH457 / 456 | P456 | CH455 / 458 | P457 | CH455 / 456 | P458 | CH455 / 456 |
| <u>Failed Channel</u> | <u>Select</u> | | | | | | | | | | | |
| P455 | CH457 / 456 | | | | | | | | | | | |
| P456 | CH455 / 458 | | | | | | | | | | | |
| P457 | CH455 / 456 | | | | | | | | | | | |
| P458 | CH455 / 456 | | | | | | | | | | | |
| | OATC | <p>C8. Perform the following:</p> <p>a. Check PRZR pressure – STABLE AT APPROXIMATELY 2235 PSIG.</p> <p>b. Place PRZR heaters in AUTO.</p> <p>c. Place PRZR spray valve controllers in AUTO.</p> <p>RNO:</p> <p>a. Adjust PRZR pressure to approximately 2235 psig using PRZR heaters and sprays.</p> <p>Cue to Simbooth: IF asked, the Shift Manager has given permission to place the PRZR pressure control system in auto.</p> | | | | | | | | | | |
| | OATC | <p>C9. Place PORVs in AUTO and verify proper operation.</p> | | | | | | | | | | |
| | OATC | <p>C10. Return PRZR pressure Master Controller to AUTO.</p> | | | | | | | | | | |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 4

Event Description: PRZR Pressure channel PT-455 fails high resulting in PRZR PORV 455A and both PRZR Sprays fully opening. The OATC will have to take manual action to prevent a Reactor trip and SI.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | C11. Select same channel on PS-455G PRZR PRESS REC SEL as selected on PS-455F. 457 |
| | OATC | C12. Check P-11 status light on BPLB indicates correctly for plant condition within one hour. OFF |
| | OATC | C13. Notify I&C to initiate repairs. SS will call typically call the SSS to perform the following: <ul style="list-style-type: none"> • Notify Operations Duty Manager of the AOP entry • Write a Condition Report • Notify I&C |
| | OATC | C14. Bypass the affected instrument channel using 13509 C, BYPASS TEST INSTRUMENTATION (BTI) PANEL OPERATION, if desired. NOTE: SS is NOT expected to bypass failed channel. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 4

Event Description: PRZR Pressure channel PT-455 fails high resulting in PRZR PORV 455A and both PRZR Sprays fully opening. The OATC will have to take manual action to prevent a Reactor trip and SI.

| Time | Position | Applicant's Action or Behavior | | | | | | | | | | | | | | | | | | |
|-------------------------|------------------------------|---|-----------------|------------------|-----------|---------------|--------|--------------|----------------------|--------------|-----------------------|--------------|-----------------|------------------|-----------|---------------|-------------------------|--------------|-------------------|------------------------------|
| | SS | <p>C15. Trip the affected channel bistables and place the associated MASTER TEST switches in TEST position per TABLE C1 within 72 hours. (TS 3.3.1 & 3.3.2)</p> <p>NOTE: SS expected to leave bistables untripped during allowed out of service time to facilitate troubleshooting by I&C.</p> | | | | | | | | | | | | | | | | | | |
| | SS | <p>C16. Initiate the applicable actions of:</p> <ul style="list-style-type: none">TS 3.3.1 Reactor Trip<table><tr><td><u>Function</u></td><td><u>Condition</u></td></tr><tr><td>LCO 3.3.1</td><td>A (Immediate)</td></tr><tr><td>6 OTΔT</td><td>E (72 hours)</td></tr><tr><td>8a Low PRZR pressure</td><td>M (72 hours)</td></tr><tr><td>8b High PRZR pressure</td><td>E (72 hours)</td></tr></table>TS 3.3.2 ESFAS<table><tr><td><u>Function</u></td><td><u>Condition</u></td></tr><tr><td>LCO 3.3.2</td><td>A (Immediate)</td></tr><tr><td>1d SI low PRZR pressure</td><td>D (72 hours)</td></tr><tr><td>8b P-11 Interlock</td><td>L (one hour action)</td></tr></table>TS 3.4.1.a DNB<p>RCS pressure < 2199 psig B (2 hours)</p> | <u>Function</u> | <u>Condition</u> | LCO 3.3.1 | A (Immediate) | 6 OTΔT | E (72 hours) | 8a Low PRZR pressure | M (72 hours) | 8b High PRZR pressure | E (72 hours) | <u>Function</u> | <u>Condition</u> | LCO 3.3.2 | A (Immediate) | 1d SI low PRZR pressure | D (72 hours) | 8b P-11 Interlock | L (one hour action) |
| <u>Function</u> | <u>Condition</u> | | | | | | | | | | | | | | | | | | | |
| LCO 3.3.1 | A (Immediate) | | | | | | | | | | | | | | | | | | | |
| 6 OTΔT | E (72 hours) | | | | | | | | | | | | | | | | | | | |
| 8a Low PRZR pressure | M (72 hours) | | | | | | | | | | | | | | | | | | | |
| 8b High PRZR pressure | E (72 hours) | | | | | | | | | | | | | | | | | | | |
| <u>Function</u> | <u>Condition</u> | | | | | | | | | | | | | | | | | | | |
| LCO 3.3.2 | A (Immediate) | | | | | | | | | | | | | | | | | | | |
| 1d SI low PRZR pressure | D (72 hours) | | | | | | | | | | | | | | | | | | | |
| 8b P-11 Interlock | L (one hour action) | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 4

Event Description: PRZR Pressure channel PT-455 fails high resulting in PRZR PORV 455A and both PRZR Sprays fully opening. The OATC will have to take manual action to prevent a Reactor trip and SI.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | SS | <p>C17. Check repairs and surveillances - COMPLETE.</p> <p>RNO:</p> <p>C17. Perform the following:</p> <ul style="list-style-type: none">a. WHEN repairs and surveillances are complete, THEN perform step C18.b. Return to procedure and step in effect. <p>END OF EVENT # 4, PROCEED TO EVENT # 5.</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 5

Event Description: Main Turbine EHC pump 1 trips and the standby pump fails to automatically start on low pressure. The UO will refer to ARP-17033-1 for corrective actions. The standby pump will be manually started to prevent a turbine trip on low EHC pressure.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>Diagnoses trip of EHC pump:</p> <p><u>Alarms:</u> ALB33-B07 480V SWGR 1NB02 TROUBLE ALB20-D05 HYD FLUID LO PRESS (after several minutes)</p> <p><u>Indications:</u> EHC pump 1 (HS-6539): Red – OFF Amber – ON Green – ON EHC pressure (PI-6338) <1600 psig and lowering. EHC Pump 1 amps (II-40073) drop to 0 amps.</p> |
| | UO | <p>Refers to ARP 17033-1 for Window B07. (480V SWGR 1NB02 TROUBLE)</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 5

Event Description: Main Turbine EHC pump 1 trips and the standby pump fails to automatically start on low pressure. The UO will refer to ARP-17033-1 for corrective actions. The standby pump will be manually started to prevent a turbine trip on low EHC pressure.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p><u>ARP 17033-1 WINDOW B07</u></p> <p>1.0 <u>PROBABLE CAUSE</u></p> <ol style="list-style-type: none">1. One of the breakers on Switchgear 1NB02 tripped due to a fault.2. Bus ground fault.3. Potential transformer/fuse failure.4. Loss of bus voltage from Switchgear 1NA04.5. Transformer 1NB02X winding high temperature.6. Loss of 125V DC control power from Panel 1ND21.7. Loss of power to transformer temperature monitor. <p>2.0 <u>AUTOMATIC ACTIONS</u></p> <p>NONE</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 5

Event Description: Main Turbine EHC pump 1 trips and the standby pump fails to automatically start on low pressure. The UO will refer to ARP-17033-1 for corrective actions. The standby pump will be manually started to prevent a turbine trip on low EHC pressure.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>NOTE: Loss of 125V DC control power results in loss of breaker remote/local remote operating capabilities and associated control circuit trip features.</p> <p>3.0 <u>INITIAL OPERATOR ACTIONS</u></p> <p>NONE</p> <p>4.0 <u>SUBSEQUENT OPERATOR ACTIONS</u></p> <ol style="list-style-type: none"> 1. Check for associated alarms and indications. 2. Dispatch an operator to Switchgear 1NB02 to check for: <ol style="list-style-type: none"> a. Ground fault indications. b. Other abnormal conditions. 3. IF alarm is due to a breaker tripping on fault or undervoltage: <ol style="list-style-type: none"> a. Determine affected loads. b. Start redundant loads, if applicable. 4. IF alarm is due to a loss of 125V DC control power, dispatch an operator to the switchgear to manually operate breakers, under the direction of the Control Room. 5. IF a bus ground fault is indicated, selectively shift to redundant loads and de-energize components to locate the ground. |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 5

Event Description: Main Turbine EHC pump 1 trips and the standby pump fails to automatically start on low pressure. The UO will refer to ARP-17033-1 for corrective actions. The standby pump will be manually started to prevent a turbine trip on low EHC pressure.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>4.0 <u>SUBSEQUENT OPERATOR ACTIONS (continued)</u></p> <p>6. Initiate maintenance as required to correct cause of the alarm.</p> <p>5.0 <u>COMPENSATORY OPERATOR ACTIONS</u></p> <p>1. Initiate maintenance to correct problem (i.e., restore alarm).</p> <p>2. IF after three days the alarm has NOT been restored, initiate a Temporary Modification per 00307-C, "Temporary Modifications" to clear the bad input(s). Record this action required on Figure 5 of 10018-C, "Annunciator Control."</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 5

Event Description: Main Turbine EHC pump 1 trips and the standby pump fails to automatically start on low pressure. The UO will refer to ARP-17033-1 for corrective actions. The standby pump will be manually started to prevent a turbine trip on low EHC pressure.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p><u>ARP 17020-1 WINDOW D05</u></p> <p>1.0 <u>PROBABLE CAUSE</u></p> <ol style="list-style-type: none"> 1. Failure of Electrohydraulic Control (EHC) Fluid Pumps. 2. Clogged strainers and filters in pump suction or discharge. 3. EHC Fluid System leak. <p>2.0 <u>AUTOMATIC ACTIONS</u></p> <ol style="list-style-type: none"> 1. If pressure drops below 1400 psig, the standby EHC Fluid Pump will start. 2. If pressure continues to drop to 1100 psig, the Turbine will trip. <p>3.0 <u>INITIAL OPERATOR ACTIONS</u></p> <ol style="list-style-type: none"> 1. IF a reactor trip occurs, Go To 19000 C, "E 0 Reactor Trip Or Safety Injection." 2. Verify standby EHC Fluid Pump is on, if needed. <p>4.0 <u>SUBSEQUENT OPERATOR ACTIONS</u></p> <p style="text-align: center;">CAUTION</p> <p>EHC fluid is a fire resistant fluid that may be harmful to personnel. Observe proper safety precautions when in contact with this fluid.</p> <ol style="list-style-type: none"> 1. Dispatch an operator to the Hydraulic Power Unit to check for system leaks or pump failure. 2. IF equipment failure is indicated, initiate maintenance as required. |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 5

Event Description: Main Turbine EHC pump 1 trips and the standby pump fails to automatically start on low pressure. The UO will refer to ARP-17033-1 for corrective actions. The standby pump will be manually started to prevent a turbine trip on low EHC pressure.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | NOTE: Student notices green and amber lights for EHC pump 1 and then starts EHC pump 2 with SS permission. NOTE: After starting EHC pump 2 EHC pressure returns to 1600 psig. |
| | UO SS | Will call SSS to: <ul style="list-style-type: none">• Call C & T• Write a condition report• Notify Maintenance• Notify Operations Management |
| | | END OF EVENT # 5, PROCEED TO EVENT # 6. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6

Event Description: SG 2 develops a 30 gpm tube leak requiring entry into AOP 18009-C. With SGTL > 5 gpm a rapid shutdown using AOP 18013-C is required. This event will be used for the required reactivity manipulation.

| Time | Position | Applicant's Action or Behavior |
|------|------------|---|
| | CREW | <p>Diagnose SG Tube Leakage.</p> <p>Symptoms / alarms: (These are reflash alarms)</p> <ul style="list-style-type: none"> • ALB05-C03 HIGH RADIATION ALARM • ALB05-B03 INTMD RADIATION ALARM • RE-0724 – Primary to secondary leakage monitor (IPC) • RE-0810 – SJAE low range monitor (IPC) • RE-12839C – SJAE monitor (IPC) <p>Indications:</p> <ul style="list-style-type: none"> • Charging flow increases if in auto. (expect manual control) PRZR level slowly lowers. |
| | SS | Enters AOP 18009-C, Steam Generator Tube Leak and directs actions of OATC / UO listed in the following steps. |
| | OATC UO | <p>18009-C, Steam Generator Tube Leak</p> <p>1. Initiate the Continuous Actions Page.</p> <p>NOTE to examiner: The following are the applicable continuous actions steps from the 18009-C Continuous Actions Page.</p> <p>Step 2 – Maintain PRZR at program level.</p> <p>Step 3 – Try to identify affected SG.</p> <p>Step 4 – Maintain VCT level using automatic or manual makeup control.</p> |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6

Event Description: SG 2 develops a 30 gpm tube leak requiring entry into AOP 18009-C. With SGTL > 5 gpm a rapid shutdown using AOP 18013-C is required. This event will be used for the required reactivity manipulation.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>2. Maintain PRZR level:</p> <p>a. Adjusting charging flow as necessary to maintain program level.</p> <p>b. Check PRZR – STABLE OR RISING.</p> <p>RNO</p> <p>b. Perform the following:</p> <p>1) Isolate letdown by closing:</p> <p>a. Letdown Orifice Valves.</p> <p>b. Letdown Isolation Valves.</p> <p>c. Excess Letdown Valves.</p> <p>2) Start an additional Charging Pump as necessary.</p> <p>3) IF PRZR level can NOT be maintained greater than 9%, THEN perform the following:</p> <p>a. Trip the Reactor.</p> <p>b. WHEN Reactor trip verified, THEN actuate SI.</p> <p>c. Go to 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION.</p> |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6

Event Description: SG 2 develops a 30 gpm tube leak requiring entry into AOP 18009-C. With SGTL > 5 gpm a rapid shutdown using AOP 18013-C is required. This event will be used for the required reactivity manipulation.

| Time | Position | Applicant's Action or Behavior |
|------|--------------|--|
| | SS UO | <p>3. Try to identify affected SG.</p> <p>a. Direct Chemistry to attempt to identify the leaking SG by initiating 31120-C.</p> <p>b. Check SG level indications stable or rising with relatively lower feedflow rate.</p> |
| | OATC | <p>CAUTION The NCP will NOT have miniflows when the CCP normal miniflows valves closed.</p> <p>4. Verifies VCT level maintained with automatic makeup control.</p> |
| | OATC SS | <p>5. Check leak rate < 5 gpm as determined by [(charging + seal leakoff)] mismatch.</p> <p>Note to examiner: Leak rate will be ~ 30 gpm.</p> <p>RNO</p> <p>5. Perform the following:</p> <p>a. Initiate 18013-C, RAPID POWER REDUCTION</p> <p>b. Be in Mode 3 within 1 hour.</p> <p>c. Go to Step 12.</p> |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6

Event Description: SG 2 develops a 30 gpm tube leak requiring entry into AOP 18009-C. With SGTL > 5 gpm a rapid shutdown using AOP 18013-C is required. This event will be used for the required reactivity manipulation.

| Time | Position | Applicant's Action or Behavior | | | |
|------|----------|--|---|---|-------------------------------|
| | SS | 18013-C, Rapid Power Reduction | | | |
| | | Initiates a unit shutdown per AOP-18013-C Rapid Power Reduction. | | | |
| | | Entry | Condition | Target | Approx. Time @ 3-%/min |
| | | 17015-D05 17015-E01 | MFPT High Vibrations | < 70% RTP | 5-8 minutes |
| | | 17019-B04 18025-C | Condenser Low Vacuum or Circ Water Pump Trip or Loss of Utility Water | Vacuum >22.42" Hg and STABLE or RISING | |
| | | 18009-C | SG Tube Leak (≥75 gpd with an ROC ≥ 30 gpd/hr) | <50% RTP within 1 hour | 10-17 minutes |
| | | 18009-C | SG Tube Leak (>5 Gpm) | 20% RTP within 1 hour & trip reactor | 16-27 minutes |
| | | 18039-C | Confirmed Loose Part | 20% RTP quickly | 16-27 minutes |
| | | | SS determination based on plant conditions | As determined by the SS | |
| | | | | | |

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Scenario No.: 2

Event No.: 6

Event Description: SG 2 develops a 30 gpm tube leak requiring entry into AOP 18009-C. With SGTL > 5 gpm a rapid shutdown using AOP 18013-C is required. This event will be used for the required reactivity manipulation.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | SS | <p>Performs SHUTDOWN BRIEFING</p> <p><u>METHOD</u></p> <ul style="list-style-type: none">• Auto rod control should be used.• Reduce Turbine Load at approximately 3% RTP per minute (approx. 36MWe) up to 5% RTP (approx 60 MWe).• Borate considering the calculations from the reactivity briefing sheet and BEACON.• Maintain AFD within the doghouse.• SS (or SRO designee) – Maintain supervisory oversight.• <u>All</u> rod <u>withdrawals</u> will be approved by the SS.• Approval for each reactivity manipulation is not necessary as long as manipulations are made within the boundaries established in this briefing (i.e. turbine load adjustment up to 60 MWe, etc).• A crew update should be performed at approximately every 100 MWe power change.• If manpower is available, peer checks should be used for all reactivity changes. |

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Scenario No.: 2

Event No.: 6

Event Description: SG 2 develops a 30 gpm tube leak requiring entry into AOP 18009-C. With SGTL > 5 gpm a rapid shutdown using AOP 18013-C is required. This event will be used for the required reactivity manipulation.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | SS | <p><u>OPERATIONAL LIMITS</u></p> <ul style="list-style-type: none"> Maintain TAVG within $\pm 6^{\circ}\text{F}$ of TREF. If TAVG/TREF mismatch $>6^{\circ}\text{F}$ and not trending toward a matched condition or if TAVG $\leq 551^{\circ}\text{F}$, then trip the reactor. <i>If load reduction due to a loss of vacuum</i>, every effort should be made to maintain the steam dumps closed. (Permissive C-9 $\geq 24.92''\text{ Hg}$). <p><u>INDUSTRY OE</u></p> <ul style="list-style-type: none"> Shift supervision must maintain effective oversight and exercise conservative decision making. Correction of significant RCS TAVG deviations should only be via secondary plant control manipulations and not primary plant control manipulations. (i.e., do <u>not</u> withdraw control rods or dilute). |
| | OATC | 2. Verify rods in AUTO. |
| | UO | 3. Reduce Turbine Load at the desired rate up to 5%/min (60 MWe/min). |
| | OATC | <p>NOTE to examiner: IF, the Rod Bank Lo-Lo Limit alarm illuminates, the crew will be required to emergency borate the RCS per the ARP.</p> <p>4. Borate as necessary by initiating 13009, CVCS REACTOR MAKEUP CONTROL SYSTEM.</p> <p>NOTE to examiner: Boration steps from 13009 start on Page 53, IF, crew Emergency Borates, steps from 13009 start on Page 59.</p> |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6

Event Description: SG 2 develops a 30 gpm tube leak requiring entry into AOP 18009-C. With SGTL > 5 gpm a rapid shutdown using AOP 18013-C is required. This event will be used for the required reactivity manipulation.

| Time | Position | Applicant's Action or Behavior |
|------|------------|---|
| | OATC UO | 5. Initiate the Continuous Actions Page. |
| | OATC UO | 6. Check desired ramp rate – LESS THAN OR EQUAL TO 5%/MIN. |
| | OATC | 7. Maintain Tavg within 6°F of Tref: a. Monitor Tavg/Tref deviation (UT-0495) b. Verify rods inserting as required. c. Energize Pressurizer back-up heaters as necessary. |
| | OATC UO | 8. Maintain reactor power and turbine power – MATCHED. a. Balance reactor power with secondary power reduction using boration and control rods. b. Check rate of reactor power reduction - ADEQUATE FOR PLANT CONDITIONS. c. Check RCS Tavg – GREATER THAN 551°F (TS 3.4.2) d. Check RCS Tavg – WITHIN 6°F OF TREF. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6

Event Description: SG 2 develops a 30 gpm tube leak requiring entry into AOP 18009-C. With SGTL > 5 gpm a rapid shutdown using AOP 18013-C is required. This event will be used for the required reactivity manipulation.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | 9. Maintain PRZR Pressure – AT 2235 PSIG. |
| | OATC | 10. Maintain PRZR Level – AT PROGRAM. |
| | UO | 11. Maintain SG Level – BETWEEN 60% AND 70%. |
| | SS | <p>13. Notify SM to make the following notifications as appropriate:</p> <p>Plant Management Notifications using 10000-C, CONDUCT OF OPERATIONS</p> <p>NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION</p> <p>00152-C, FEDERAL AND STATE REPORTING REQUIREMENTS</p> <p>Chemistry Technical Specification sampling for load reductions greater than 15% using 35110C, CHEMISTRY CONTROL OF THE REACTOR COOLANT SYSTEM.</p> <p>QC to perform a NOPT inspection using 84008, RPV ALLOY 600 MATERIAL INSPECTIONS AND REPORTS for reactor shutdowns.</p> |
| | NOTE | <p>Event will continue until adequate power maneuver completed as determined by the NRC Chief Examiner, at that point, the SGTR will occur and the crew will trip the plant IAW 18009-C, step 3.b RNO.</p> <p>END OF EVENT # 6, PROCEED TO EVENTS # 7-10.</p> |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6 Rapid Power Reduction boration steps

Event Description: Rapid Power Reduction boration steps from 13009.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>13009-1, Section 4.2 Boration</p> <p>4.2 BORATION</p> <p>4.2.1 Determine the existing RCS boron concentration from Boron Meter 1-AI-40134 OR by sample analysis.</p> <p>4.2.2 To determine the number of gallons of boric acid required to borate the RCS, perform the following.</p> <p>IF borating to required boron for a xenon free cool down, obtain the maximum boron concentration for the cool down range from the PTDB Tab 1.3.4-T1 and T2.</p> <p>OR</p> <p>IF borating to a desired boron concentration, determine the desired change in boron concentration by subtracting the existing concentration from the desired concentration.</p> <p>THEN</p> <p>Determine the amount of boric acid necessary to accomplish the desired change in boron concentration using PTDB Tab 2.3 and correct the obtained value using PTDB Tab 2.1.</p> <p>Note to examiner: The OATC may also use a Beacon Book calculation to obtain a boron addition target for the Rapid Power Reduction. For a power reduction to 20%, this will be a boron addition of ~ 800 gallons at 30 gpm.</p> |
| | OATC | 4.2.3 Place VCT MAKEUP CONTROL 1-HS-40001B in STOP. |
| | OATC | 4.2.4 Place VCT MAKEUP MODE SELECT 1-HS-40001A in BOR. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6 Rapid Power Reduction boration steps

Event Description: Rapid Power Reduction boration steps from 13009.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | | <p style="text-align: center;">NOTE</p> <p>If necessary, boric acid flow may be adjusted using 1-FIC-0110 with SS concurrence. Changes to pot setting should be logged in the Control Room Log and restored at completion of activity.</p> |
| | OATC | 4.2.5 Adjust potentiometer on Boric Acid Blender Flow Controller 1-FIC-0110 as desired and verify in AUTO. |
| | | <p style="text-align: center;">CAUTION</p> <p>Digital counter setting on BORIC ACID TO BLENDER integrator 1-FQI-0110 reads in tenth-gallon increments.</p> |
| | OATC | 4.2.6 Set BORIC ACID TO BLENDER integrator 1-FQI-0110 to the desired amount of Boric Acid. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6 Rapid Power Reduction boration steps

Event Description: Rapid Power Reduction boration steps from 13009.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>4.2.7 Verify the following:</p> <ul style="list-style-type: none"> • BA TO BLENDER 1-HS-0110A is in AUTO. • BLENDER OUTLET TO CHARGING PUMPS SUCT 1-HS-0110B is in AUTO. • One Boric Acid Transfer Pump in AUTO or START. • RX MU WTR TO BA BLENDER 1-FV-0111A is closed with 1HS-0111A in AUTO. • BLENDER OUTLET TO VCT 1-FV-0111B is closed with 1HS-0111B in AUTO. <p>NOTES</p> <ul style="list-style-type: none"> • Boration can be manually stopped at any time by placing 1-HS-40001B in STOP. • VCT pressure, 1-PI-115 should be maintained between 20 and 45 psig. |
| | OATC | <p>4.2.8 Place VCT MAKEUP CONTROL 1-HS-40001B in START and perform the following:</p> <ul style="list-style-type: none"> • Verify Boric Acid Transfer Pump is running. • Verify 1-FV-0110B is open. • Verify 1-FV—0110A throttles open to provide desired flow on 1-FI-0110A. • Monitor BORIC ACID TO BLENDER integrator 1-FQI-0110. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6 Rapid Power Reduction boration steps

Event Description: Rapid Power Reduction boration steps from 13009.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>4.2.9 WHEN 1-FQI-0110 BORIC ACID TO BLENDER integrator reaches its setpoint, verify boration stops and the following valves close.</p> <ul style="list-style-type: none">• 1-FV-0110A, BA TO BLENDER• 1-FV-0110B, BLENDER OUTLET TO CHARGING PUMPS SUCT |
| | OATC | <p>4.2.10 Flush approximately 15 gallons of Reactor Makeup Water through 1-FV-0110B by performing the flowing:</p> <ol style="list-style-type: none">a. Place VCT MAKEUP MODE SELECT 1-HS-40001A to ALT DIL.b. Set TOTAL MAKEUP integrator 1-FQI-0111 for 13 to 15 gallons.c. Place BLENDER OUTLET TO VCT 1-HS-0111B in CLOSE.d. Place VCT MAKEUP CONTROL 1-HS-40001B in START.e. Verify flow is indicated on 1-FI-0110B.f. WHEN TOTAL MAKEUP integrator 1-FQI reaches the desired setpoint, verify the following valves close:<ul style="list-style-type: none">• 1-FV-0111A, RX MU WTR TO BA BLENDER• 1-FV-0110B, BLENDER OUTLET TO CHARGING PUMPS SUCT |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6 Rapid Power Reduction boration steps

Event Description: Rapid Power Reduction boration steps from 13009.

| Time | Position | Applicant's Action or Behavior | | |
|------|----------|--|------------------------|-----------------|
| | OATC | 4.2.11 Verify 1-FIC-0110 potentiometer is set to setting recorded prior to boration (or as directed by SS). | | |
| | OATC | 4.2.12 Align Reactor Makeup Control system for automatic operation as follows: | | |
| | | <u>COMPONENT</u> | <u>NAME</u> | <u>POSITION</u> |
| | a. | 1-HS-110B | BLENDER OUTLET TO VCT | AUTO |
| | b. | 1HS-40001A | VCT MAKEUP MODE SELECT | AUTO |
| | c. | 1-HS-40001B | VCT MAKEUP CONTROL | START |
| | OATC | 4.2.13 IF BA TRANSFER PUMP was placed in START at Step 4.2.7, return to AUTO or as directed by SS. | | |
| | OATC | 4.2.14 Monitor RCS Tavg, source range countrate, and Reactor Power as applicable. | | |
| | OATC | 4.2.15 Operate the Pressurizer Back-up Heaters as necessary to equalize boron concentration between the RCS and the Pressurizer. | | |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6 Rapid Power Reduction boration steps

Event Description: Rapid Power Reduction boration steps from 13009.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | 4.2.16 Verify desired boration through sample analysis or from Boron Concentration Meter 1-1208-T6-006. (1-AI-40134) |
| | | Return to EVENT # 6, Rapid Power Reduction, Page # 50, Step 4. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6, Steps for Emergency Boration if crew opts to perform.

Event Description: Rapid Power Reduction Emergency Boration steps.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | | 13009-1, CVCS Reactor Makeup (Emergency Boration) NOTE: Table 1 provides a convenient tool for checking Emergency Boration flow path alternatives. |
| | OATC | 4.9.1 Emergency Boration Through 1-HV-8104 |
| | OATC | 4.9.1.1 Start one (1) Boric Acid Transfer Pump . |
| | OATC | 4.9.1.2 Verify a Charging Pump is running. |
| | OATC | 4.9.1.3 Open EMERGENCY BORATE valve 1-HV-8104 . |
| | | NOTE: The following step assumes that with 12 gpm of seal return, 30 gpm will be supplied to the RCS. |
| | OATC | 4.9.1.4 Place 1-FIC-0121 in MANUAL. |
| | OATC | 4.9.1.5 Adjust 1-FIC-0121 to maintain flow greater than 42 gpm. |
| | | NOTES: <ul style="list-style-type: none"> • IPC computer point for Boric Acid flow Rate is FO183 (GPM). • Computer point for Boric Acid Totalized Flow is UF0183 (Gallons) |
| | OATC | 4.9.1.6 Verify Emergency Boration flow 1-FI-0183 greater than 30 gpm. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6, Steps for Emergency Boration if crew opts to perform.

Event Description: Rapid Power Reduction Emergency Boration steps.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | 4.9.1.7 If flow is less than 30 gpm, start the second Boric Acid Transfer Pump. |
| | OATC | 4.9.1.8 Operate the Pressurizer Backup Heaters as necessary to equalize boron concentration between the RCS and the Pressurizer. |
| | OATC | 4.9.1.9 Check plant conditions are consistent with the boration of the RCS: RCS Tavg may be dropping. NIS may be dropping. |
| | OATC | 4.9.1.10 Determine the amount of boric acid required to allow termination of Emergency Boration. |
| | | NOTE: Monitor Boric Acid Flow Rate computer point F0183. After flow has started the totalized flow should be reset by selecting "Reset Boric Acid Flow Totalizer" from the IPC System Menu. |
| | OATC | 4.9.1.11 When the determined amount of boric acid has been added to the RCS, close 1-HV-8104. |
| | OATC | 4.9.1.12 Return the Boric Acid Transfer Pumps to the desired system configuration. |
| | OATC | 4.9.1.13 Restore 1-FIC-0121 to the AUTO position. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 6, Steps for Emergency Boration if crew opts to perform.

Event Description: Rapid Power Reduction Emergency Boration steps.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | 4.9.1.14 Direct Chemistry to sample and report the RCS boron concentration, or monitor the Boron Meter 1-AI-40134 if available. Return to EVENT # 6, Rapid Power Reduction, Page # 50, Step 4. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: A DBA SGTR will occur on SG # 2 with complications. During the OATC Initial Operator Actions, CCP "B" will not auto start requiring the OATC to manually start CCP "B". The Instrument Air valve to containment 1HV-9378 will NOT open after closing on the SI actuation requiring the OATC to use a PRZR PORV to depressurize the RCS to refill the PRZR. MDAFW pump discharge valve to SG # 2 will not shut requiring the UO to manually stop the MDAFW pump B.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | 19000-C, E-0 Reactor Trip or Safety Injection |
| | CREW | Performs Immediate Operator Actions per 19000-C, E-0 Reactor Trip or Safety Injection. |
| | SS | Makes a page announcement of Reactor Trip. |
| | OATC | 1. Check Reactor Trip: <ul style="list-style-type: none"> Rod Bottom Lights – LIT (YES) Reactor Trip and Bypass Breakers – OPEN (YES) Neutron Flux – LOWERING (YES) |
| | UO | 2. Check Turbine Trip: <ul style="list-style-type: none"> All Turbine Stop Valves – CLOSED (YES) |
| | UO | 3. Check Power to AC Emergency Buses. <ul style="list-style-type: none"> a. AC Emergency Busses – AT LEAST ONE ENERGIZED. (YES) <ul style="list-style-type: none"> 4160 AC 1E Busses b. AC Emergency Busses – ALL ENERGIZED. (YES) <ul style="list-style-type: none"> 4160V AC 1E Busses 480V AC 1E Busses |
| | OATC | 4. Check if SI is actuated. <ul style="list-style-type: none"> Any SI annunciators – LIT (YES) SI ACTUATED BPLP window – LIT (YES) |
| | SS | Go to Step 6. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: A DBA SGTR will occur on SG # 2 with complications. During the OATC Initial Operator Actions, CCP "B" will not auto start requiring the OATC to manually start CCP "B". The Instrument Air valve to containment 1HV-9378 will NOT open after closing on the SI actuation requiring the OATC to use a PRZR PORV to depressurize the RCS to refill the PRZR. MDAFW pump discharge valve to SG # 2 will not shut requiring the UO to manually stop the MDAFW pump B.

| Time | Position | Applicant's Action or Behavior |
|------|------------------|---|
| | SS CREW | 6. Initiate the Foldout Page. |
| | SS OATC UO | 7. Perform the following: <ul style="list-style-type: none">• OATC Initial Actions Page (Note to examiner, start Page 64)• UO Initial Actions Page (Note to examiner, start Page 67) NOTE: SS initiates step 8 after OATC/UO Initial Actions completed. |

Event No.: 7, 8, 9, 10

Event Description: A DBA SGTR will occur on SG # 2 with complications. During the OATC Initial Operator Actions, CCP "B" will not auto start requiring the OATC to manually start CCP "B". The Instrument Air valve to containment 1HV-9378 will NOT open after closing on the SI actuation requiring the OATC to use a PRZR PORV to depressurize the RCS to refill the PRZR. MDAFW pump discharge valve to SG # 2 will not shut requiring the UO to manually stop the MDAFW pump B.

| Time | Position | Applicant's Action or Behavior |
|------|--|---|
| | OATC | PERFORMS OATC INITIAL ACTIONS 1. Check both trains of ECCS equipment – ALIGNING FOR INJECTION PHASE: (YES) <ul style="list-style-type: none"> • MLB indication |
| | OATC | 2. Check Containment Isolation Phase A – ACTUATED. (YES) <ul style="list-style-type: none"> • CIA MLB indication |
| | <div style="display: flex; justify-content: space-between;"><div>OATC</div><div>Critical</div></div> | 3. Check ECCS Pumps and NCP status: a. CCPs RUNNING. (NO, CCP A is tripped, CCP B did not start) RNO a. Perform the following for available CCP(s): 1) Place alternate miniflow valve handswitch in ENABLE PTL: HS-8508A HS-8508B 2) Start CCP “B” b. SI Pumps – RUNNING. (YES) c. RHR pumps – RUNNING. (YES, RHR pump A is tagged out) d. NCP – TRIPPED. (YES) |
| | OATC | 4. Verify CCW Pumps – ONLY TWO RUNNING TRAIN B. (YES) |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: A DBA SGTR will occur on SG # 2 with complications. During the OATC Initial Operator Actions, CCP "B" will not auto start requiring the OATC to manually start CCP "B". The Instrument Air valve to containment 1HV-9378 will NOT open after closing on the SI actuation requiring the OATC to use a PRZR PORV to depressurize the RCS to refill the PRZR. MDAFW pump discharge valve to SG # 2 will not shut requiring the UO to manually stop the MDAFW pump B.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | PERFORMS OATC INITIAL ACTIONS 5. Verify proper NSCW system operation: (YES) a. NSCW Pumps – ONLY TWO RUNNING PER TRAIN. b. NSCW TOWER RTN HDR BYPASS BASIN hand switches – IN AUTO: <ul style="list-style-type: none"> • HS-1669A • HS-1668A |
| | OATC | 6. Verify Containment Cooling Units: (YES) a. ALL RUNNING IN LOW SPEED. (YES) <ul style="list-style-type: none"> • MLB indication b. NSCW Cooler isolation valves – OPEN. (YES) <ul style="list-style-type: none"> • MLB indication |
| | OATC | 7. Check Containment Ventilation Isolation. a. Dampers and Valves – CLOSED. (YES) |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: A DBA SGTR will occur on SG # 2 with complications. During the OATC Initial Operator Actions, CCP "B" will not auto start requiring the OATC to manually start CCP "B". The Instrument Air valve to containment 1HV-9378 will NOT open after closing on the SI actuation requiring the OATC to use a PRZR PORV to depressurize the RCS to refill the PRZR. MDAFW pump discharge valve to SG # 2 will not shut requiring the UO to manually stop the MDAFW pump B.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | PERFORMS OATC INITIAL ACTIONS 8. Check Containment pressure – REMAINED LESS THAN 21.5 PSIG. (YES) |
| | OATC | 9. Check ECCS flows: a. BIT flow (YES) b. RCS pressure – LESS THAN 1625 PSIG. (YES) c. SI Pump flow. (YES) d. RCS pressure – LESS THAN 300 PSIG. (NO) RNO d. Go to Step 10. |
| | OATC | 10. Check ECCS Valve alignment – PROPER INJECTION LINEUP INDICATED ON MLBs. (YES) |
| | OATC | 11. Check ACCW pumps – AT LEAST ONE RUNNING. (YES) |
| | OATC | 12. Adjust Seal Injection flow to all RCPs – 8 to 13 GPM. |
| | OATC | 13. Dispatch Operator to ensure one train of SPENT FUEL POOL COOLING in service per 13719, SPENT FUEL POOL COOLING AND PURIFICATION SYSTEM. END OF OATC INITIAL ACTIONS – RETURNS TO MAIN BODY OF 19000-C CONTINUING AT STEP 8, Page 70. |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: A DBA SGTR will occur on SG # 2 with complications. During the OATC Initial Operator Actions, CCP "B" will not auto start requiring the OATC to manually start CCP "B". The Instrument Air valve to containment 1HV-9378 will NOT open after closing on the SI actuation requiring the OATC to use a PRZR PORV to depressurize the RCS to refill the PRZR. MDAFW pump discharge valve to SG # 2 will not shut requiring the UO to manually stop the MDAFW pump B.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>PERFORMS UO INITIAL ACTIONS</p> <p>1. Check AFW Pumps – RUNNING. (YES)</p> <ul style="list-style-type: none"> • MDAFW Pumps • TDAFW Pump, if required. <p>Note to examiners: The UO may request to perform an Early Operator Action to isolate AFW flow to SG # 2. The MDAFW pump B discharge valve HV-5132 will NOT close from the QMCB. It is anticipated the crew will place MDAFW pump B in PTL to stop flow to SG # 2.</p> <p>Note to examiners: SG # 2 level is required to be > 10% NR before flow is isolated from AFW.</p> |
| | UO | <p>2. Check NR level in at least one SG – GREATER THAN 10%. (32% ADVERSE). (YES)</p> |
| | UO | <p>3. Check if main steamlines should be isolated: (NO)</p> <p>a. Check for one of more of the following conditions:</p> <ul style="list-style-type: none"> ___ Any steamline pressure LESS THAN OR EQUAL TO 585 PSIG. ___ Containment pressure – GREATER THAN 14.5 PSIG. ___ Low Steam Pressure SI/SLI – BLOCKED AND High Steam Pressure Rate – ON TWO OR MORE CHANNELS OF ANY STEAMLINE. <p>RNO</p> <p>a. Go to Step 4.</p> |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: A DBA SGTR will occur on SG # 2 with complications. During the OATC Initial Operator Actions, CCP "B" will not auto start requiring the OATC to manually start CCP "B". The Instrument Air valve to containment 1HV-9378 will NOT open after closing on the SI actuation requiring the OATC to use a PRZR PORV to depressurize the RCS to refill the PRZR. MDAFW pump discharge valve to SG # 2 will not shut requiring the UO to manually stop the MDAFW pump B.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | PERFORMS UO INITIAL ACTIONS 4. Verify FW Isolation Valves closed: (YES) <ul style="list-style-type: none"> • MFIVs • BFIVs • MFRVs • BFRVs |
| | UO | 5. Verify SG Blowdown isolated: (YES) <ul style="list-style-type: none"> • Place SG Blowdown Isolation Valve handswitches HS-7603A, B, C, and D in the CLOSE position. • SG Sample Isolation Valves – CLOSED. |
| | UO | 6. Verify Diesel Generators – RUNNING. (YES) |
| | UO | 7. Throttle total AFW flow as necessary to maintain SG NR levels between 10% (32% ADVERSE) and 65%. See NOTES at step 1 of UO INITIAL OPERATOR ACTIONS regarding isolation of AFW flow to SG # 2. |
| | UO | 8. Verify both MFPs – TRIPPED. (YES) |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: A DBA SGTR will occur on SG # 2 with complications. During the OATC Initial Operator Actions, CCP "B" will not auto start requiring the OATC to manually start CCP "B". The Instrument Air valve to containment 1HV-9378 will NOT open after closing on the SI actuation requiring the OATC to use a PRZR PORV to depressurize the RCS to refill the PRZR. MDAFW pump discharge valve to SG # 2 will not shut requiring the UO to manually stop the MDAFW pump B.

| Time | Position | Applicant's Action or Behavior |
|------|------------|---|
| | UO | 9. Check Main Generator Output Breakers – OPEN. (YES) |
| | OATC UO | BACK TO 19000-C PROCEDURE MAIN BODY, Page 70, Step 8. |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: A DBA SGTR will occur on SG # 2 with complications. During the OATC Initial Operator Actions, CCP "B" will not auto start requiring the OATC to manually start CCP "B". The Instrument Air valve to containment 1HV-9378 will NOT open after closing on the SI actuation requiring the OATC to use a PRZR PORV to depressurize the RCS to refill the PRZR. MDAFW pump discharge valve to SG # 2 will not shut requiring the UO to manually stop the MDAFW pump B.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | 19000-C, E-0 MAIN BODY. |
| | CREW | 8. Initiate the Continuous Actions Page. |
| | OATC | 9. Check RCS temperature stable at or trending to 557°F. |
| | | -OR- |
| | | Without RCP(s) running – RCS WR COLD LEG TEMPERATURES. |
| | | RNO (IF needed) |
| | | 9. IF temperature is less than 557°F and lowering, THEN perform the following as necessary: |
| | | a. Stop dumping steam. |
| | | b. Perform the following as appropriate: |
| | | ___ IF at least one SG NR level greater than 10% (32% ADVERSE), THEN lower total feed flow. |
| | | -OR- |
| | | ___ IF all SG NR levels less than 10% (32% ADVERSE), THEN lower total feed flow to NOT less than 570 gpm. |
| | | c. If cooldown continues, THEN close MSIVs and BSIVs. |
| | | d. If temperature greater than 557°F and rising, THEN dump steam. |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: A DBA SGTR will occur on SG # 2 with complications. During the OATC Initial Operator Actions, CCP "B" will not auto start requiring the OATC to manually start CCP "B". The Instrument Air valve to containment 1HV-9378 will NOT open after closing on the SI actuation requiring the OATC to use a PRZR PORV to depressurize the RCS to refill the PRZR. MDAFW pump discharge valve to SG # 2 will not shut requiring the UO to manually stop the MDAFW pump B.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p><u>CAUTION:</u> A PRZR PORV Block Valve which was closed to isolate an excessively leaking or open PRZR PORV should not be opened unless used to prevent challenging the PRZR Safeties.</p> <p>10. Check PRZR PORVs, Block Valves, and Spray Valves:</p> <ul style="list-style-type: none"> a. PRZR PORVs – CLOSED AND IN AUTO. (YES) b. Normal PRZR Spray Valves – CLOSED. (YES) c. Power to at least one Block Valve – AVAILABLE. (YES) d. PRZR PORV Block Valves – AT LEAST ONE OPEN. (NO) <p>RNO</p> <ul style="list-style-type: none"> d. Verify open at least one PRZR PORV Block Valve when PRZR pressure is greater than 2185 psig. |
| | OATC | <p>11. Check if RCPs should be stopped:</p> <ul style="list-style-type: none"> a. ECCS Pumps – AT LEAST ONE RUNNING: (YES) <ul style="list-style-type: none"> • CCP or SI Pump b. RCS pressure – LESS THAN 1375 PSIG. (NO) <p>RNO</p> <ul style="list-style-type: none"> b. Go to Step 12. <p>Note to examiner: It is expected RCP pressure will be above 1375 psig at this time.</p> |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: A DBA SGTR will occur on SG # 2 with complications. During the OATC Initial Operator Actions, CCP "B" will not auto start requiring the OATC to manually start CCP "B". The Instrument Air valve to containment 1HV-9378 will NOT open after closing on the SI actuation requiring the OATC to use a PRZR PORV to depressurize the RCS to refill the PRZR. MDAFW pump discharge valve to SG # 2 will not shut requiring the UO to manually stop the MDAFW pump B.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>12. Check SGs secondary pressure boundaries:</p> <p>a. SG Pressures:</p> <p>___ Any lowering in an uncontrolled manner. (NO)</p> <p>-OR-</p> <p>___ Any completely depressurized. (NO)</p> <p>RNO</p> <p>a. Go to Step 13.</p> |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: A DBA SGTR will occur on SG # 2 with complications. During the OATC Initial Operator Actions, CCP "B" will not auto start requiring the OATC to manually start CCP "B". The Instrument Air valve to containment 1HV-9378 will NOT open after closing on the SI actuation requiring the OATC to use a PRZR PORV to depressurize the RCS to refill the PRZR. MDAFW pump discharge valve to SG # 2 will not shut requiring the UO to manually stop the MDAFW pump B.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>13. Check SG Tubes intact:</p> <ul style="list-style-type: none"> a. Direct Chemistry to take periodic activity samples of all SGs one at a time. b. Secondary Radiation – NORMAL. (NO) <ul style="list-style-type: none"> • MAIN STEAM LINE MONITORS <ul style="list-style-type: none"> • RE-13120 (SG1) • RE-13121 (SG2) • RE-13122 (SG3) • RE-13119 (SG4) • CNDSR AIR EJCTR/STM RAD MONITORS: <ul style="list-style-type: none"> • RE-12839 • RE-12839D (if on scale) • RE-12839E (if on scale) • STM GEN LIQ PROCESS RAD: <ul style="list-style-type: none"> • RE-0019 (Sample) • RE-0021 (Blowdown) • SG sample radiation: <p>RNO</p> <ul style="list-style-type: none"> b. Go to 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE. <p>Note to examiner: 19030-C, E-3 SGTR actions next.</p> |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | CREW | 19030-C, E-3 Steam Generator Tube Rupture 1. Initiate the following: <ul style="list-style-type: none"> • Continuous Actions and Foldout Page. • Critical Safety Function Status Trees per 19200-C, F-O CRITICAL SAFETY FUNCTION STATUS TREE. |
| | SS | 2. Initiate NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION. |
| | OATC | 3. Maintain Seal Injection flow to all RCPs – 8 to 13 GPM. |
| | OATC | 4. Check if RCPs should be stopped: <ul style="list-style-type: none"> a. ECCS Pumps – AT LEAST ONE RUNNING: (YES) ___ CCP or Sip Pump b. RCS pressure – LESS THAN 1375 PSIG. (NO) RNO b. IF RCS pressure lowers to less than 1375 psig prior to initiation of RCS cooldown in Step 17. THEN stop all RCPs and return to Step in effect. Go to Step 5. |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|--------------------|---|
| | UO | <p>5. Identify ruptured SG(s) by any of the following conditions.</p> <p>Unexpected rise in any SG NR level.</p> <p>High radiation from any SG sample.</p> <p>High radiation from any SG steamline.</p> <p>High radiation from any SG blowdown line.</p> <p>Note to examiner: SG # 2 level will be rising with AFW flow throttled. However, this is a hard call for the candidate until the TDAFW steam supply is isolated in later steps since steam is being supplied to the TDAFW pump causing the level rise to NOT be as pronounced.</p> |
| | | <p>CAUTION: At least one SG should be maintained available for RCS cooldown.</p> |
| | UO Critical | <p>6. Isolate ruptured SG(s):</p> <p>a. Adjust ruptured SG ARV(s) controller setpoint to 1160 psig (pot setting 7.73)</p> <p>b. Check ruptured SG ARV(s) – CLOSED.</p> <p>___ PV-3000 (SG 1)</p> <p>___ PV-3010 (SG 2)</p> <p>___ PV-3020 (SG 3)</p> <p>___ PV-3030 (SG 4)</p> |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|--------------------|--|
| | | CAUTION: If TDAFW Pump is the only available AFW pump, maintain at least one steam supply OPEN. |
| | UO Critical | 7. Close affected TDAFW Pump Steam supply valve(s): HV-3009 (SG 1) LP-1 MS SPLY TO AUX FW TD PMP-1. HV-3019 (SG 2) LP-2 MS SPLY TO AUX FW TD PMP-1. |
| | UO Critical | 8. Verify SG Blowdown Isolation Valves – CLOSED WITH HANDSWITCHES IN CLOSE POSTION. Note to examiner: HV-7603B should have been close during UO Initial Operator Actions. |
| | OATC Critical | 9. Isolate flow from the ruptured SG(s) by closing its Main Steamline isolation and Bypass Valves. Note to examiner: HV-3016A / B, HV-13007A / B. |

Scenario No.: 2

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|----------------------------------|--|
| | | <p>CAUTIONS:</p> <ul style="list-style-type: none"> This procedure should be performed in a timely manner to assure that break flow in the ruptured SG(s) is terminated before water enters the SGs main steam piping. Any ruptured SG that is also faulted, should remain isolated during subsequent recovery actions unless needed for RCS cooldown or SG activity sample. |
| | <p>UO</p> <p>Critical</p> | <p>10. Check ruptured SG(s) level:</p> <ul style="list-style-type: none"> SG NR level – GREATER THAN 10% (32% ADVERSE). (YES) Step feed flow to ruptured SG(s). <p>Close the TDAFW and MDAFW valves to SG # 2.</p> <p>(Note to examiner: 1HS-5125A and 1HS-5132A)</p> <p>(Note to examiner: IF HV-5132 was NOT previously closed during performance of E-0, it is required to be closed now, since the valve will NOT shut, it is anticipated the crew will stop MDAFW pump B by placing the pump in PTL.)</p> |
| | UO | <p>11. Check ruptured SG(s) pressure – GREATER THAN 290 PSIG. (YES)</p> |
| | | <p>NOTE: When the low steamline pressure SI/SLI is blocked, main steamline isolation will occur is the high steam pressure rate setpoint is exceeded.</p> |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|------------------------|--|
| | UO OATC UO UO | 12. Check if low steamline pressure SI/SLI should be blocked: a. Steam dumps – AVAILABLE. (YES) b. PRZR pressure – LESS THAN 2000 PSIG. (YES) c. High steam pressure rate alarms – CLEAR. (YES) d. Block low steam line pressure SI/SLI using the following: <ul style="list-style-type: none"> • HS-40068 • HS-40069 |
| | UO UO UO UO | 13. Align steam Dumps for RCS cooldown: a. IF Steam Dumps are in T AVG mode, (YES) THEN 1) Match demand on SG Header Pressure Controller PIC-507 and SD demand meter UI-500. 2) Transfer Steam Dumps to STM PRESS mode using HS-500C. b. RCS temperature – GREATER THAN 550°F. c. As RCS cooldown is initiated, hold HS-0500A and HS-0500B in the BYPASS INTERLOCK position until RCS temperature is less than 550°F. |
| | UO | 14. Raise intact SG levels prior to maximum rate cooldown. |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------------|----------------------------|---|------------------------------------|----------------------------|------------------|-----|--------------|-----|--------------|-----|------------|-----|------------|-----|------------|-----|------------|-----|------------|-----|------------|-----|------------|-----|------------|-----|--|--|
| | OATC | 15. Check at least one RCP – RUNNING. (YES) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SS | <p>16. Determine required core exit temperature for cooldown.</p> <table border="1"> <thead> <tr> <th>Lowest Ruptured SG Pressure (psig)</th><th>Core Exit Temperature (°F)</th></tr> </thead> <tbody> <tr><td>1200 and greater</td><td>530</td></tr> <tr><td>1100 to 1199</td><td>518</td></tr> <tr><td>1000 to 1099</td><td>506</td></tr> <tr><td>900 to 999</td><td>493</td></tr> <tr><td>800 to 899</td><td>479</td></tr> <tr><td>700 to 799</td><td>463</td></tr> <tr><td>600 to 699</td><td>445</td></tr> <tr><td>500 to 599</td><td>424</td></tr> <tr><td>400 to 499</td><td>399</td></tr> <tr><td>300 to 399</td><td>366</td></tr> <tr><td>290 to 299</td><td>350</td></tr> <tr><td></td><td></td></tr> </tbody> </table> <p>Note to examiner: Expect to pick either 518 or 506.</p> | Lowest Ruptured SG Pressure (psig) | Core Exit Temperature (°F) | 1200 and greater | 530 | 1100 to 1199 | 518 | 1000 to 1099 | 506 | 900 to 999 | 493 | 800 to 899 | 479 | 700 to 799 | 463 | 600 to 699 | 445 | 500 to 599 | 424 | 400 to 499 | 399 | 300 to 399 | 366 | 290 to 299 | 350 | | |
| Lowest Ruptured SG Pressure (psig) | Core Exit Temperature (°F) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1200 and greater | 530 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1100 to 1199 | 518 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1000 to 1099 | 506 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 900 to 999 | 493 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 800 to 899 | 479 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 700 to 799 | 463 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 600 to 699 | 445 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 500 to 599 | 424 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400 to 499 | 399 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 300 to 399 | 366 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 290 to 299 | 350 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>17. Initiate RCS cooldown:</p> <p>a. Dump steam to Condenser from intact SG(s) at maximum rate using Steam Dumps by slowly raising demand on PIC-507.</p> |
| | OATC | <p>18. Check if RCS cooldown should be stopped:</p> <p>a. Core Exit TCs – LESS THAN REQUIRED TEMPERATURE. (NOT AT THIS TIME)</p> <p>RNO</p> <p>a. WHEN core exits are less than required, THEN perform steps 18.b and 18.c.</p> <p>Note to examiner: This will take several minutes to reach CET target temperate of either 518 or 506.</p> |
| | UO | <p>b. Stop RCS cooldown.</p> <p>c. Maintain Core Exit TCs – LESS THAN REQUIRED TEMPERATURE.</p> <p>Note to examiner: The UO will use steam dumps to maintain.</p> |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>19. Check intact SG levels:</p> <ul style="list-style-type: none"> a. NR level – AT LEAST ONE GREATER THAN 10%. (32% ADVERSE) (YES) b. Maintain NR levels between 10% (32% ADVERSE) and 65%. c. NR level – ANY RISING IN AN UNCONTROLLED MANNER. (NO) <p>RNO</p> <ul style="list-style-type: none"> c. Go to Step 20. |
| | OATC | <p>20. Check PRZR PORVs and Block Valves:</p> <ul style="list-style-type: none"> a. Power to PRZR PORV Block Valves – AVAILABLE. (YES) b. PRZR PORVs – CLOSED. (YES) c. PRZR PORV Block Valves – AT LEAST ONE OPEN. (NO) <p>RNO</p> <ul style="list-style-type: none"> c. IF Block Valve NOT closed to isolate an excessively leaking or open PRZR PORV, AND WHEN PRZR pressure is greater than 2185 psig, THEN verify open at least one PRZR PORV Block Valve. |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | | <p>CAUTIONS:</p> <p>If offsite power is lost after SI reset, action is required to restart the following ESF equipment if plant conditions require their operation.</p> <ul style="list-style-type: none"> • RHR Pumps • SI Pumps • Post-LOCA Cavity Purge Units • Containment Coolers in low speed (Started in high speed on a UV signal) • ESF Chilled Water Pumps (If CRI is reset) |
| | OATC | 21. Reset SI. |
| | | <p>CAUTION:</p> <p>Repositioning Phase A Isolation Valves may cause radiation problems throughout the plant.</p> |
| | OATC | <p>22. Reset Containment Isolation Phase A.</p> <p>Note to Sim Booth Operator: If not already performed, initiate trigger to maintain IA to CNMT isolated in next steps.</p> |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | 23. Establish Instrument Air to Containment. a. Instrument Air pressure – GREATER THAN 100 PSIG. (YES) b. Open INSTR AIR CNMT ISO VLV HV-9378. (NO, valve will NOT open) c. Verify PRZR Spray Valves operating as required. (NO) |
| | OATC | 24. Check if RHR Pumps should be stopped: a. RHR Pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST. (YES) b. RCS pressure – GREATER THAN 300 PSIG. (YES) c. Stop RHR Pumps. |
| | OATC | 25. IF RCS pressure lowers in an uncontrolled manner to less than 300 psig. THEN restart RHR Pumps. |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>26. Check if RCS cooldown should be stopped.</p> <p>a. Core Exit TCs – LESS THAN REQUIRED TEMPERATURE. (YES, depending on how fast crew is, if NO, the crew will wait until < 518 or 506 and stop the cooldown per the RNO of this step)</p> <p>RNO</p> <p>a. Do NOT proceed until core exit TCs less than required temperature.</p> <p>b. Stop RCS cooldown.</p> <p>c. Maintain Core Exit TCs – LESS THAN REQUIRED TEMPERATURE.</p> |
| | | <p>CAUTION:</p> <p>Ruptured SG pressure and RCS subcooling should begin to rise as RCS pressure recovers after the cooldown is stopped.</p> |
| | UO | 27. Check ruptured SG(s) pressure – STABLE OR RISING. (YES) |
| | OATC | 28. Check RCS Subcooling – GREATER THAN 44°F . (58°F ADVERSE) (YES) |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>29. Check all of the following:</p> <p>RCS pressure – GREATER THAN RUPTURED SG(s) PRESSURE. (YES)</p> <p>PRZR level – LESS THAN 75% (52% ADVERSE). (YES)</p> <p>30. Check Normal PRZR Spray – AVAILABLE. (NO)</p> <p>RNO</p> <p>30. Go to Step 32.</p> |

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Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>32. Check at least one PRZR PORV – AVAILABLE. (YES)</p> <p>33. Check at least one PRZR PORV Block Valve – AVAILABLE (YES)</p> <p><u>NOTE:</u> The Upper Head region of the vessel may void during RCS depressurization if RCPs are not running. This will result in a rapidly rising PRZR level.</p> <p><u>CAUTIONS</u></p> <ul style="list-style-type: none">• The PRT may rupture if a PRZR PORV is used to depressurize the RCS. This may result in abnormal Containment Conditions.• Cycling of the PRZR PORV should be minimized. <p>34. Depressurize RCS using a PRZR PORV to refill PRZR.</p> <p>a. Arm one available train of COPS and check PRZR PORV Block Valve – OPEN.</p> <p>b. Open one PRZR PORV.</p> <p>a. Go to Step 37.</p> |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | 37. Check if ANY of the following conditions are satisfied. |
| | | BOTH of the following: |
| | Critical | 1) RCS pressure – LESS THAN RUPTURED SG(s) PRESSURE. |
| | | AND |
| | Critical | 2) PRZR level – GREATER THAN 9%. (37% ADVERSE) |
| | | -OR- |
| | | RCS Subcooling – LESS THAN 24°F (38°F ADVERSE) |
| | | -OR- |
| | Critical | PRZR level – GREATER THAN 75% (52% ADVERSE) |
| | | Note to examiner: Due to the nature of a DBA SGTR at Vogtle, it will be very close on whether it is BOTH RCP pressure & PRZR level as highlighted above OR PRZR level > 75% only. The OATC will close the PORV valves based on the 1 st parameter obtained. |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|-----------------------------|--|
| | OATC Critical | 38. Terminate RCS depressurization: <ul style="list-style-type: none"> a. Verify Normal PRZR Spray valve(s) – CLOSED. (YES) b. Verify PRZR PORV(s) CLOSED. (NO, OATC will shut the PORV at this time). c. Block COPS. d. Check Auxiliary Spray – IN SERVICE (NO) RNO <ul style="list-style-type: none"> d. Go to step 39. |
| | OATC | 39. Check RCS pressure – RISING. (YES) |
| | | <p style="text-align: center;">CAUTION</p> <p>ECCS FLOW SHOULD BE TERMINATED when termination criteria are satisfied to prevent overfilling of the ruptured SGs.</p> |

Op-Test No.: 2013-301

Scenario No.: 2

Event No.: 7, 8, 9, 10

Event Description: DBA SGTR actions from 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | 40. Check if ECCS flow should be terminated. |
| | | a. RCS Subcooling – GREATER THAN 24°F (38°F ADVERSE) (YES) |
| | UO | b. Secondary Heat Sink: Total feed flow to SGs – GREATER THAN 570 GPM AVAILABLE (YES) -OR- NR level in at least one intact SG – GREATER THAN 10% (32% ADVERSE) (YES) |
| | OATC | c. RCS pressure – STABLE OR RISING. (YES) d. PRZR level – GREATER THAN 9% (37% ADVERSE) (YES). |
| | OATC | 41. Stop ECCS Pumps and place in standby. <ul style="list-style-type: none"> • SI Pumps • All but one CCP <p>Note to examiner: This is the termination point for the scenario. Without Instrument Air, placing Safety Grade Charging and Letdown in service is an extended evolution involving local field operations.</p> |
| | | END OF EVENTS # 7, 8, 9, 10 END OF SCENARIO # 2. |

UNIT 1 REACTIVITY BRIEFING SHEET

Shift: Day Date: 4/9/13 Burnup: 11166.70 MWD/MTU
As of 4/9/13

Scenario
#2
Briefing
Sheet

MINIMUM SHIFT REACTIVITY INFORMATION TO BE BRIEFED

Power: 100 Rod Motion: AUTO

Current Temperature Control Strategy: DILUTION

Currently Making Up: 50.0 gal Every: 1 to 2 hrs

The desired Tav_g operating band is 585.5 +/- 0.05 degrees F

CVCS makeup system boric acid flow per 100 gal makeup: 13.0 gallons/100

CVCS makeup system pot setting(FIC-0110): 3.24

BTRS Strategy: none

AFD Strategy: Maintain on target plus/minus 1 AFD units

Reactivity System Components Degraded/OOS:

None

Activities expected that may affect core reactivity (Reactivity Focus Items):

None

CURRENT CORE REACTIVITY PARAMETERS

Boron Worth: 8.5 pcm/ppm PCM per 1% pwr change: 17.9

Current MTC value: HFP: -17.9 pcm/F HZP: -3.9 pcm/F

Current BAST Cb: 7000 ppm Current RCS Cb: 907 ppm

Boration required per:

| | | |
|-----------------|-------|---------|
| degree F: | 21.3 | gallons |
| 1% pwr change: | 21.3 | gallons |
| 10% pwr change: | 212.8 | gallons |
| 30% pwr change: | 638.5 | gallons |

Dilutions required per:

| | | |
|----------------|-------|---------|
| degree F: | 143.1 | gallons |
| 1% pwr change: | 143.1 | gallons |

Boration required for stuck rods:

| | |
|--------|--------------------------|
| 3182.2 | gallons for 2 stuck rods |
| 4837.3 | gallons for 3 stuck rods |

If more than 3 rods are stuck begin boration and calculate for actual number of stuck rods

Human Performance tools:

| | | |
|---------------|-------------------------|-----------------------|
| Peer check | Three-way communication | Placekeeping |
| Procedure Use | STAR | Time-Out |
| | | Situational Awareness |

Valid for PTDB Cycle 18 Tab 1.0 rev 29 approved 9/29/12 and Tab 16.0 rev 19 approved 10/5/12

Facility: Vogtle Scenario No.: 3 Op-Test No.: 2013-301

Examiners: _____ Operators: _____

Initial Conditions: The plant is at approximately 22% power, EOL, start-up in progress.
 (Base IC #17, snapped to IC # 172 for HL18 NRC Exam)

Equipment OOS: 'A' RHR Pump for motor repair (TS 3.5.2, Condition A), 'A' MDAFW Pump for bearing replacement (TS 3.7.5, Condition B)

Turnover: Raise reactor power and synchronize the main generator to the grid per 12004DF-1 (Power Operation, Mode 1), Section 4.1; Surveillance 14901 was completed 21 days ago. Containment mini-purge is in service in preparation for a containment entry next shift.

Preloaded Malfunctions:

TU18 – Auto Turbine Trip Failure
dfw_078a LV-5245_DOP BFRVC Primary
ES01 – Reactor Fails to Auto Trip
ES10 – Train A MSL Auto Isolation Failure
ES11 – Train B MSL Auto Isolation Failure
CS01B – Containment Spray Pump B Fails to Auto Start

Overrides:

HS-40007 Neutral ("C" panel Rx. Trip hand switch)

NOTE to SIMBOOTH: Be sure to provide signed off steps for 12004DF-1, Power Operations.

| Event No. | Malf. No. | Event Type* | Event Description |
|------------|------------|----------------|--|
| 1 | N/A | R-OATC R-SS | Raise reactor power to 25% in preparation for synchronizing Main Generator with the Grid per 12004DF-1 |
| 2 | N/A | N-UO N-SS | Synchronize Main Generator with Grid per 12004DF-1 and 13830-1 |
| T3 | GE03 | | Main Generator Exciter fails when UO raises load after synchronizing causing a Main Generator trip |
| Pre-loaded | TU18 | C-UO C-SS | Turbine fails to auto trip on generator trip |
| T4 | CV20 @ 80% | C-OATC C-SS | Seal Injection Filter Blockage requires OATC to manually adjust charging and injection flow Note to SimBooth: delete malfunction 5 minutes after being requested to shift filters. |

| Event No. | Malfunction No. | Event Type* | Event Description |
|--|--|-------------------------|---|
| T5 | SG03A1 0% | TS-SS | SG PT-514 fails low. LCO 3.3.2, Condition A, FU 1e, Condition D, Fu 4d(1) Condition D ILCO 3.3.3, Condition A, FU 8 LCO 3.3.4, FU 13, Condition A |
| 6 | OVR SPRAY= TRUE, then 455C prcv to 0.6 | C-OATC C-SS TS-SS | Pressurizer Spray Valve 1PV-455C fails open LCO 3.4.1, Condition A |
| T7 | EL07A | C-All TS-SS | Loss of 1AA02 due to faulted bus LCO 3.8.1, Condition A, B, & E LCO 3.8.9, Condition A LCO 3.7.5, Condition B (already in effect) |
| T8 | Ovation DFW | C-UO C-SS | #3 BFRV fails closed. SGWL may reach the Lo-Lo Reactor Trip setpoint unless a pre-emptive reactor trip performed. |
| T8 | FW15A 60 sec delay | C-UO C-SS | A shaft shear of the only operating MFP will require the crew to manually trip the reactor. SGWL will reach the Lo-Lo Reactor Trip setpoint unless a pre-emptive reactor trip is performed. |
| 9 Pre-loaded | ES01 | C-OATC C-SS | If the SGWL Lo-Lo Reactor Trip setpoint is reached for event 8, the reactor will not automatically trip requiring the crew to perform a manual reactor trip |
| Pre-loaded | HS-40007 Neutral | C-OATC C-SS | The first reactor trip handswitch used by the OATC will fail to trip the reactor, the second handswitch will perform a reactor trip |
| T10 | FW06C @ 20-30% | M-All | #3 SG Faulted (FLB, IRC) followed by High Containment Pressure |
| 11 Pre-loaded | ES10 ES11 | C-UO C-SS | Train 'A' Main Steam Line Auto Isolation Failure Train 'B' Main Steam Line Auto Isolation Failure |
| 12 Pre-loaded | CS01B Critical | C-OATC C-SS | Containment Spray Pump B fails to auto start |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | |



NUCLEAR SAFETY FOCUS TARGET ZERO

| | |
|--|---|
| | |
| <p><u>Protected Train:</u></p> <p><input type="checkbox"/> Alpha</p> <p><input checked="" type="checkbox"/> Bravo</p> | <p>EOOS:</p> <p><input checked="" type="checkbox"/> Green</p> <p><input type="checkbox"/> Yellow</p> <p><input type="checkbox"/> Orange</p> <p><input type="checkbox"/> Red</p> |
| | |
| <p>Plant Conditions:</p> | <p>Approximately 22 % power, EOL, power ascent in progress. Main turbine is operating at 1800 rpm. Generator gas in service and excitation established.</p> |
| | |
| <p>Major Activities:</p> | <p>Synchronize main generator to the power grid per 12004DF-1 (Power Operation, Mode1) and 13830-1 (Main Generator Operation). 12004DF-1, Step 4.1.28 is in progress.</p> |
| | |
| <p>Active LCOs:</p> | <p><input type="checkbox"/> LCO 3.5.2 Condition A is in effect due to RHR Pump 'A' tagged out.</p> <p><input type="checkbox"/> LCO 3.7.5 Condition B is in effect due to MDAFW Pump 'A' tagged out.</p> |
| | |
| <p>OOS/ Degraded CR Instruments:</p> | <p><input type="checkbox"/> None</p> |
| | |
| <p>Narrative Status:</p> | <p><input type="checkbox"/> Containment mini-purge is in service for a planned Containment Entry on next shift.</p> <p><input type="checkbox"/> RHR Pump 'A' is tagged out for motor repair, expected return-to-service time is 24 hours with 48 hours left on a shutdown LCO of 72 hours.</p> <p><input type="checkbox"/> MDAFW Pump 'A' is tagged out for bearing replacement, expected return-to-service time is 14 hours with 24 hours left on a shutdown LCO of 72 hours.</p> <p><input type="checkbox"/> A severe thunderstorm warning has been issued for Richmond, Burke, and Screven Counties in Georgia. High winds and rain, which could be heavy at times, will be in the area for the next 10-12 hours. The Severe Weather Checklist is in effect.</p> |

| | | | | | | | |
|---------------|-----|--------------|--------|----------------|----------|---------|------|
| Shift: | Day | Date: | 4/9/13 | Burnup: | 20256.77 | MWD/MTU | |
| | | | | | As of | 4/9/13 | 6:54 |

| | | | |
|--------|----|-------------|--------|
| Power: | 22 | Rod Motion: | MANUAL |
|--------|----|-------------|--------|

Currently Making Up: 50.0 gal **Every:** 1 to 2 hrs

| | | |
|--|------|-------------|
| CVCS makeup system boric acid flow per 100 gal makeup: | 6.9 | gallons/100 |
| CVCS makeup system pot setting(FIC-0110): | 1.73 | |

BTRS Strategy: none
AFD Strategy: Maintain on target plus/minus 1 AFD units

None

None

Boron Worth: 9.3 pcm/ppm **PCM per 1% pwr change:** 24.8

Current MTC value: HFP: -31.5 pcm/F HZP: -13.6 pcm/F

Current BAST Cb: 7000 ppm **Current RCS Cb:** 483 ppm

| | | | |
|-------------------------------|------------------------|--------------|----------------|
| Boration required per: | degree F: | 31.9 | gallons |
| | 1% pwr change: | 25.2 | gallons |
| | 10% pwr change: | 251.5 | gallons |
| | 30% pwr change: | 754.6 | gallons |

| | | | |
|-------------------------|----------------|-------|---------|
| Dilutions required per: | degree F: | 432.4 | gallons |
| | 1% pwr change: | 340.3 | gallons |

| | | |
|--|--------|---------------------------------|
| Boration required for stuck rods: | 2970.0 | gallons for 2 stuck rods |
| | 4510.8 | gallons for 3 stuck rods |

If more than 3 rods are stuck begin boration and calculate for actual number of stuck rods

| | | |
|---------------|-------------------------|-----------------------|
| Peer check | Three-way communication | Placekeeping |
| Procedure Use | STAR | Time-Out |
| | | Situational Awareness |

Vaild for PTDB Cycle 18 Tab 1.0 rev 29 approved 9/29/12 and Tab 16.0 rev 19 approved 10/5/12

Event 1:

Reactor power is approximately 22%. Power must be raised to 25% in order to synchronize the Main Generator to the grid per 12004DF-1 (Power Operation, Mode 1).

Verifiable Actions:

OATC – withdraw control rods and/or dilute to establish a positive SUR and raise power to 25% as read on the Power Range Nuclear Instrumentation.

Technical Specifications:

None

Event 2:

At 25% reactor power, the main generator is synchronized to the grid per 12004DF-1, and 13830-1, Main Generator Operation.

Verifiable Actions:

UO – synchronizes the main generator to the power grid.

Technical Specifications:

None

Event 3:

Main generator excitation is lost causing the generator to trip when the UO raises turbine load per 13800-1. The turbine will fail to automatically trip on the generator trip.

Verifiable Actions:

UO – Manually trip turbine.

CREW – control reactor response per AOP 18011-C, Turbine Trip Below P9.

Technical Specifications:

None

Event 4:

The reactor coolant pump seal injection filter becomes clogged/blocked reducing seal injection flow below the minimum acceptable value.

Verifiable Actions:

OATC – operate charging flow and seal injection flow control valves to restore seal injection flow to required operating band.

Technical Specifications:

None

Event 5:

Steam Generator # 1 Pressure Channel PT-514 fails low.

Verifiable Actions:

None

Technical Specifications:

LCO 3.3.2, ESFAS, Condition A, FU 1e, Condition D, LCO 3.3.2, ESFAS, FU 4d(1), Condition D, ILCO 3.3.3, PAMS, Condition A, FU 8, LCO 3.3.4, Remote Shutdown Instrumentation FU 13, Condition A

Event 6:

Pressurizer spray valve (1PV-455C) fails partially (approximately 60%) open causing an uncontrolled drop in pressurizer pressure.

Verifiable Actions:

OATC – perform IOA of AOP 18000-C and close PV-455C.

OATC – takes manual control of pressurizer heaters to restore pressure normal operating band.

Technical Specifications:

LCO 3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits – the crew may respond quickly enough to prevent violating this LCO.

Event 7:

Fault on 1E switchgear results in loss of power to 1AA02. This fault will prevent automatic and manual actuation of all Train A ECCS components. AOP 18031-C, Section A.

Verifiable Actions:

UO – Emergency trips DG-1A, reduces TDAFW pump flow, reduces turbine load as necessary.

OATC – Verifies reactor power stays below license limit by using Control Rods and RCS boron as necessary.

UO – Aligns Containment HVAC to Train B.

Technical Specifications:

LCO 3.8.1 AC Electrical Sources, Conditions A, B and E, 3.8.9 Distribution Systems Operating, Condition A & 3.7.5 Auxiliary Feedwater, Condition B.

Event 8:

#3 BFRV fails closed. SGWL may lower to the Lo-Lo Reactor Trip setpoint. If the SGWL Lo-Lo Reactor Trip setpoint is reached, the reactor will fail to automatically trip. Additionally, when the reactor is attempted to be tripped manually, the first reactor trip handswitch used will fail to cause a reactor trip.

Shaft shear of the only operating MFP causes a complete loss of feedwater flow to all steam generators. SGWL may lower to the Lo-Lo Reactor Trip setpoint. If the SGWL Lo-Lo Reactor Trip setpoint is reached, the reactor will fail to automatically trip. Additionally, when the reactor is attempted to be tripped manually, the first reactor trip handswitch used will fail to cause a reactor trip.

Verifiable Actions:

UO – Perform IOA of AOP 18016-C to restore and control feedwater flow and SGWL.

OATC – Recognize the need for a manual reactor trip, if required

OATC – Perform IOA of EOP 19000-C

UO – Perform IOA of EOP 19000-C

Technical Specifications:

None

Events 9, 10, 11, 12:

A fault occurs on Steam Generator # 3 Feed Line, IRC. The fault is non-isolable resulting in the SG blowing down into containment and rising containment pressure. Rising containment pressure will result in automatic SI, SLI, and Containment Spray actuations; additionally, CVI & CIA actuations will occur. The crew must also isolate #3 SG. Furthermore, Train A & B Auto SLI will fail to initiate and Containment Spray Pump B will fail to automatically start on Train B Containment Spray actuation.

Verifiable Actions:

OATC – Verifies proper actuation of SI, CVI and CIA functions.

UO – Manually actuate SLI.

UO – Isolate all influent sources to (MFW & AFW) and effluent loads from (Blowdown, Sampling, Main Steam, ARVs) #3 SG.

OATC – manually start Containment Spray Pump B.

Technical Specifications:

None

The scenario may be stopped after the crew transitions to E-1 or ES1.1 as required with NRC Chief Examiner approval.

CRITICAL TASKS:

1) Isolates Main Steam Lines, ARVs, Blowdown and Sampling from SG # 3 in E-0 and/or E-2 to limit Reactor power excursion, RCS uncontrolled cool down to limit positive reactivity addition and limit PTS concerns prior to receiving an Orange path on CSFST Integrity Status Tree. Automatic isolation of Main Steam Lines will NOT occur, which require an operator action to prevent a PTS condition.

- Close Main & Bypass SIVs from SG # 3 (step 3 of 19020-C)
- Close ARV from SG # 3 (step 9 of 19020-C)
- Close Blowdown & Sampling valves from SG # 3 (step 10 of 19020-C)

2) Isolates Main and Auxiliary Feedwater to # 3 SG to limit Containment Pressure rise prior to receiving an Orange path on CSFST Containment Status Tree.

- Close Main & Bypass FIVs to SG # 3 (step 5 of 19020-C)
- Close Motor & Turbine Driven AFW pump throttle valves to SG # 3 (step 6 of 19020-C)

3) Manually start Containment Spray Pump B (no later than step 5.c RNO of 19251-C.) With the failure of AA02, no Train A components will start. Leaving only one train of containment coolers operating in slow speed to mitigate the rising containment pressure. Containment Spray Pump B is required to ensure heat & iodine removal capability for Containment atmosphere in an adverse environment. Automatic isolation of Main Steam Lines will NOT occur requiring an operator action to prevent a Containment overpressure condition.

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 1

Event Description: Reactor Power Ascension from approximately 22% RTP to 25% in preparation for synchronizing the main generator to the grid.

| Time | Position | Applicant's Action or Behavior |
|------|-----------|--|
| | OATC / UO | <p>12004DF-1, "Power Operation (Mode 1)"</p> <p>Uses steam dumps in steam pressure mode to maintain Tave within 2°F of program Tave during power ascension.</p> |
| | OATC / UO | <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">CAUTION</p> <p>During power ascent, as feedwater flow is increase, Condensate Demineralizer flow must be periodically monitored and adjusted to prevent inadvertent opening of the Condensate Demineralizer bypass valve on high dP. Inadvertent valve opening may cause fuel condition power rate limits to be exceeded. Ref: 87073-C.</p> </div> <p>4.1.28 Continue with the Unit power ramp by concurrently,</p> <p style="padding-left: 40px;">a. Raising <u>REACTOR POWER</u> to 25%, <u>AND</u></p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">NOTE</p> <p>Manual adjustment of the steam dumps may be necessary during turbine rolling in order to maintain constant steam pressure.</p> </div> <p style="padding-left: 40px;">b. Rolling the Main Turbine to operating speed per 13800, "Main Turbine Operation."</p> |
| | OATC | <p>4.1.29 At 25% <u>REACTOR POWER</u> verify the RPS bistable trips for Intermediate Range and Power Range High Flux Trips activate by observing the PR HI Q Low and IR HI Q status lights illuminate at TSLB-4.</p> |
| | UO | <p>4.1.30 <u>WHEN</u> the Main Turbine reaches 1800 rpm adjust the hydrogen analyzer per 13810, "Generator Gas System."</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 1

Event Description: Reactor Power Ascension from approximately 22% RTP to 25% in preparation for synchronizing the main generator to the grid.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <div>NOTE</div> <p>Tech Spec SR 3.3.1.14 and SR 3.3.1.16 can be also satisfied by observation of energized QMCB, TSLB-2, Status Lights (TSLB-2) TURB STP VLV CLOSED and TURB, AUTO STOP lights as documented in 12006-C, section A4.3 or 12006-C, Attachment 2 step 1.1.4, following the last reactor shutdown or trip, if the observation is performed within 31 days of rolling the turbine.</p> |
| | SS | <p>4.1.31 <u>IF</u> not performed in the previous 31 days, complete 14901, "Turbine Trip Reactor Trip Actuating Device Operational Test."</p> <p>Note to examiner: as part of the turnover, the following items will have already been completed:</p> <ol style="list-style-type: none">1) Main Turbine rolling at 1800 rpm2) Hydrogen analyzer adjustment3) Operational Test 14901 on 21 days before the date of the exam at 1335. <p>END OF EVENT # 1, PROCEED TO EVENT # 2.</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 2

Event Description: Following Reactor Power Ascension to 25%, the crew synchronizes the main generator onto the power grid and raises turbine load.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>13830-1 Main Generator Operation</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">CAUTION</p> <p>Avoid operation of the Main Turbine below 100 MWe for prolonged periods (> 60 min). Low load operation will cause increased rates of moisture erosion of the latter stage buckets and may cause exhaust hood overheating and/or differential expansion problems. These parameters must be closely monitored during low load operation.</p> </div> <p>4.1.32 Notify Shift Supervisor (SS) and obtain System Operators approval from the Power Control Center (PCC) to synchronize the generator onto the power grid.</p> <p>Note to examiner: as part of the turnover, the following items have already been completed:</p> <ol style="list-style-type: none"> 1) System Operators approval has been obtained from the Power Control Center (PCC) to synchronize the generator onto the power grid. 2) Field excitation is established. 3) System Operator has previously been contacted regarding raising turbine load and has approved up to 120 MWe. |
| | UO | <p>4.1.33 Establish field excitation and synchronize the main generator to the power grid and assume 60-80 MWe load, per 13830, "Main Generator Operation."</p> <p>Note to examiner: the synchronization procedure steps start on Page 4.</p> |
| | UO | <p>4.1.34 Raise Turbine load as needed per 13800, "Main Turbine Operation." Coordinate power changes with System Operator.</p> <p>Note to examiner: the turbine loading procedure steps start on Page 9.</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 2

Event Description: Following Reactor Power Ascension to 25%, the crew synchronizes the main generator onto the power grid and raises turbine load.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <div>References 13830, "Main Generator Operation", section 4.1.3, "Synchronizing the Main Generator to the Grid".</div> <div><div>NOTES</div><div><ul style="list-style-type: none">• Phone number for the System Operator is 8-506-6965• Phone number for HVSH is 3702</div></div> <div>4.1.3.1 Perform the following:<div><div>a. Contact Switchyard Coordinator (or his designee).</div><div>b. Notify him that the Unit one Main Generator Output breaker will be closed.</div><div>c. Request Switchyard Coordinator (or his designee) to alert personnel working in the HVSW to stand clear.</div><div>d. Switchyard Coordinator (or his designee) has verified that personnel in HVSW are clear of area.</div></div></div> |
| | UO | <div>4.1.3.2 Select one PCB for synchronizing:</div> <div>230 kV PCB NORM SPLY TO BUS-1 161710</div> <div>230 kV PCB NORM SPLY TO GOS-WHT (3) 161810</div> |
| | UO | <div>4.1.3.3 Place the Synchronize Switch for the selected PCB in the R (running) position:</div> <div><div><div>PCB 161710</div><div>1-SS-BUS 1</div></div><div><div>PCB 161810</div><div>1-SS-GOS WHT (3)</div></div></div> |
| | UO | <div>4.1.3.4 Place Unit 1 Synchronize Switch 1-SS-U1 in the I (incoming) position.</div> |
| | UO | <div>4.1.3.5 Verify rotation of 230kV System Synchroscope 1SI-40125.</div> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 2

Event Description: Following Reactor Power Ascension to 25%, the crew synchronizes the main generator onto the power grid and raises turbine load.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>4.1.3.6 Using the 230kV Voltage/Frequency Selector Switch 1-VS-US1:</p> <p>a. Select the PCB to be CLOSED <u>AND</u> note the 230 kV System voltage (1EI-40124).</p> <p>PCB-161710 BUS-1 PCB-161810 GOS-WHT (3)</p> <p>b. Select Unit 1 position <u>AND</u> note the Unit 1 230 kV voltage (1EI-40124).</p> |
| | UO | <p>4.1.3.7 Use the Volts/VARs RAISE/LOWER Pushbutton on the COI display to slowly adjust Unit 1 230 kV voltage to read between zero <u>AND</u> 1.0 kV higher than 230 kV System voltage for selected PCB.</p> |
| | UO | <p>4.1.3.8 Adjust Turbine speed using the INCREASE LOAD <u>AND</u> DECREASE LOAD Pushbuttons until 1SI-40125 Pointer is rotating very slowly in FAST (clockwise) direction.</p> |
| | SS | <p>4.1.3.9 Make plant page announcement that the Unit One Main Generator Output breaker will be closed and to stand clear.</p> |

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Scenario No.: 3

Event No.: 2

Event Description: Following Reactor Power Ascension to 25%, the crew synchronizes the main generator onto the power grid and raises turbine load.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>4.1.3.10 <u>IF</u> automatic synchronizing is required:</p> <ol style="list-style-type: none"> Position Synch Mode Sel Switch 1-TS-US1 to the PCB selected for synchronizing: PCB-161710 PCB-161810 Monitor 230 kV System Synchroscope 1SI-40125. Verify the Synchroscope Pointer is rotating very slowly (approximately 10 to 15 second rotation) in the FAST (clockwise) direction. <u>WHEN</u> the Synchroscope Pointer nears the 12 o'clock (straight up) position, observe the red AUTO SYNC PERMISSIVE light illuminates. <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">NOTE</p> <p>Pushbutton should be depressed and held for several seconds until the PCB closes.</p> </div> <ol style="list-style-type: none"> As the Synchroscope Pointer passes the 11 o'clock position, depress and release the Automatic Synchronizing Pushbutton for the selected PCB: <div style="display: flex; justify-content: space-between;"> BUS-1 AUTO SYNC PERMISSIVE PCB 161710 </div> <div style="display: flex; justify-content: space-between;"> GOS-WHT (3) AUTO SYNC PERMISSIVE PCB 161810 </div> Verify the selected PCB CLOSES by observing the following: <ul style="list-style-type: none"> Red light indication on the selected PCB handswitch Current indicated on amp meter on each phase of Main Generator output <u>OR</u> on IPC Computer Points: |

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Scenario No.: 3

Event No.: 2

Event Description: Following Reactor Power Ascension to 25%, the crew synchronizes the main generator onto the power grid and raises turbine load.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <p><u>IPC Point</u> <u>Amp Meter</u></p> <p>J2832 1II-40127</p> <p>J2833 1II-40128</p> <p>J2834 1II-40129</p> <p>g. IF current is <u>NOT</u> indicated on all three phases, <u>THEN</u> trip the Turbine <u>AND</u> initiate 18011-C, "Turbine Trip Below P-9."</p> <p>h. Verify 52G Breaker CLOSED on the COI display for the exciter to operate in the online mode.</p> <p>i. Select "1/2%/Min" Loading Rate Limit pushbutton.</p> <p>j. Raise load to between 60 MWe <u>AND</u> 80 MWe using the LOAD INCREASE Pushbutton per 13800-1, "Main Turbine Operation."</p> <p>k. Use the Volts/VARs RAISE/LOWER Pushbutton on the COI display to maintain kVAR loading in accordance with section 4.2.1.</p> <p>l. Match Control Switch status to the status of the PCB that was just CLOSED by placing its Control Switch to CLOSE:</p> <p>PCB-161710 1-HS-161710</p> <p>PCB-161810 1-HS-161810</p> <p>m. Place the Synchronize Switch for the PCB that was just CLOSED in the OFF position:</p> <p>PCB-161710 1-SS-BUS 1</p> <p>PCB-161810 1-SS-GOS WHT (3)</p> <p>n. Place Synch Mode Sel Switch 1-TS-US1 in NORMAL.</p> <p>o. Proceed to Step 4.1.3.12</p> |

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Scenario No.: 3

Event No.: 2

Event Description: Following Reactor Power Ascension to 25%, the crew synchronizes the main generator onto the power grid and raises turbine load.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>4.1.3.12 Close the other PCB as follows:</p> <ol style="list-style-type: none"> Place the Synch Mode Selector Switch 1-TS-US1 in the NORMAL position. Place the Unit 1 Synchronize Switch 1-SS-U1 in the I (incoming) position. Place the Synchronize Switch for the PCB that is still OPEN in the R (running) position: <ul style="list-style-type: none"> PCB-161710 1-SS-BUS 1 PCB-161810 1-SS-GOS WHT (3) Verify 230kV System Synchroscope 1SI-40125 Pointer is stationary in the straight up position. Place the Control Switch for the selected PCB to the CLOSE position: <ul style="list-style-type: none"> PCB-161710 1-HS-161710 PCB-161810 1-HS-161810 Check the selected PCB CLOSES by red light indication on the selected PCB handswitch. Place the following Synchronize Switches in the OFF position: <ul style="list-style-type: none"> • 1-SS-U1 • 1-SS-BUS 1 • 1-SS-GOS WHT (3) |
| | SS | <p>4.1.3.13 Verify the Stator Leak Monitoring System in service per 13820-1, "Stator Cooling System Operation."</p> <p>Note to examiner: Stator Leak Monitoring System operation is verified locally</p> |
| | UO | <p>4.1.3.14 On EX2100 Exciter Control Room COI Control Panel Touchscreen Commands, press DISABLE.</p> |

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Scenario No.: 3

Event No.: 2

Event Description: Following Reactor Power Ascension to 25%, the crew synchronizes the main generator onto the power grid and raises turbine load.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>References 13800, "Main Turbine Operation", Section 4.2, "Loading"</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">NOTES</p> <ul style="list-style-type: none"> After Extraction Steam is placed in service, Turbine load changes between 100 MWe and 200 MWe results in rapid temperature changes in the 6th stage Feedwater Heaters. Loading and Extraction Steam isolation valve position changes in this MWe range should be performed slowly while monitoring Feedwater Heater temperatures. Generator Hydrogen (H2) Cold Gas temperature 1TI-7097 should be monitored as the unit is loaded. The desired temperature is 100°F with a minimum temperature of 86°F and maximum of 115°F. H2 Cold Gas temperature is controlled by 1-TV-7097. H2 Cold Gas temperature differential between the exciter end (T2815) and Turbine end (T2814) should be maintained below 5°F, per 13721-1, "TPCW System", Section 4.2.4. </div> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">CAUTION</p> <p>To reduce wear and minimize vibration on the Low Pressure Turbine blades:</p> <ol style="list-style-type: none"> While the Turbine is operating at less than 30% (340 MWe) the Condenser Vacuum shall be greater than 26 in. Hg. With Turbine load above 30% (340 MWe), the Condenser Vacuum shall be greater than 25 in. Hg. If during plant operation, Condenser Vacuum is less than 25 in. Hg., plant load should be reduced until proper Condenser Vacuum is obtained. If load reduction to the 30% level does not improve vacuum to greater than the 25 in. Hg. limit, the unit should be tripped. </div> <p>4.2.1 Main Turbine Loading</p> <p>4.2.1.1 Trend first stage shell and reheat temperatures on Plant Computer Points UR0229 and UR0230 and monitor for alarms (points will alarm red) based on the following heatup rate limits being exceeded:</p> <ul style="list-style-type: none"> 150°F/hr for UR0229 125°F/hr for UR0230 |

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Scenario No.: 3

Event No.: 2

Event Description: Following Reactor Power Ascension to 25%, the crew synchronizes the main generator onto the power grid and raises turbine load.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | 4.2.1.2 Depress the '1/2' LOADING RATE LIMIT %/MIN pushbutton to select the initial Loading Rate. |
| | | <p style="text-align: center;">NOTES</p> <ul style="list-style-type: none"> • The slowest available fixed Turbine loading rate is 1/2%/min (30%/hr). If a more restrictive loading rate limit is in effect, load should be raised by a "bump and wait" method. • To stop Turbine loading during a ramp increase, slowly bump the Load Set down until the AT SET LOAD light is LIT and the LOAD INCREASING light is <u>NOT</u> LIT. • If Turbine loading with the Load Limit active (set a few percent higher than actual load) is desired, its potentiometer setting must be raised (turned clockwise) as load increases to maintain the Turbine under Load Set control. <p style="text-align: center;">CAUTIONS</p> <p>The most restrictive of the following loading rate limits should be adhered to by adjusting the Load Set or Loading Rate as required:</p> <ol style="list-style-type: none"> a. Core power escalation limits per 87073-C, "Limitations And Conditions For Fuel Operation", applicable above 30% Reactor power, b. Turbine heatup rate limits of: <ol style="list-style-type: none"> (1) First stage temperature (UR0229) rise of 150°F/hr or less, and (2) Reheat Steam temperature (UR0230) rise of 125°F/hr or less. <p>Avoid operation of the Main Turbine below 100 MWe for prolonged periods (>60 min). Low load operation will cause increased rates of moisture erosion of the latter stage buckets and may cause Exhaust Hood overheating and/or differential expansion problems. These parameters must be closely monitored during low load operation.</p> |
| | UO | 4.2.1.3 Raise load using the LOAD INCREASE pushbutton. |

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Scenario No.: 3

Event No.: 2

Event Description: Following Reactor Power Ascension to 25%, the crew synchronizes the main generator onto the power grid and raises turbine load.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;">NOTES</p> <p>As Turbine loading is increased and during load conditions, H2 Cold Gas Temperature Controller 1TIC-7097 should be controlling H2 Cold Gas at approximately 100°F in AUTO or MANUAL.</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;">CAUTIONS</p> <p>Exhaust Hood temperatures should be maintained less than 175°F by Automatic spray.</p> </div> <p>4.2.1.4 At or above 5% load (about 60 MWe), initiate closure of the Group A Turbine Drains:</p> <ol style="list-style-type: none"> a. Place the Main Steam Drain Pot handswitches in AUTO (QMCB near Steam Dump Controls): <ul style="list-style-type: none"> - MN STM SV-1 & 2 DRN POT VLV 1HS-6288 - MN STM SV-3 & 4 DRN POT VLV 1HS-6287 b. Hold TURB DRN STOP VLV 1HS-6121 in CLOSE for 10 seconds after the handswitch lights indicate fully closed. c. Hold TURBINE CONTROL VALVE BEFORE SEAT DRN 1HS-6021 in CLOSE for 10 seconds after the handswitch lights indicate fully closed. <p>Note to examiner: shortly after load increased following synchronizing the generator to the grid, the next event will proceed.</p> <p>END OF EVENT # 2, PROCEED TO EVENT # 3.</p> |

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Scenario No.: 3

Event No.: 3

Event Description: A main generator exciter failure leads to a generator trip after the main generator has been synchronized to the grid. The turbine fails to trip on the generator trip and the UO will have to manually trip the main turbine. The crew will enter AOP 18011-C for turbine trip below P-9.

| Time | Position | Applicant's Action or Behavior |
|------|-----------------|---|
| | Simbooth | The malfunction should be triggered no later than approximately 10% turbine power. |
| | CREW | <p>Diagnoses loss of the main generator and that a loss of the main turbine should have followed.</p> <p>Symptoms / alarms:</p> <ul style="list-style-type: none"> • ALB20-D01 LOW ETS PRESS TURB TRIP • ALB30-C05 230KV PCB TRIPPED • ALB31-A01 GEN LOSS OF FLD LOR TRIP • ALB31-D03 EX2100 EXCITER ALARM/GAS MONITOR TROUBLE • ALB31-F05 GEN VOLT REG PT SIGNAL FAILED <p>Indications:</p> <ul style="list-style-type: none"> • Main generator output breakers (PCB16710 and 16810) are open • Main generator field excitation voltage and current read 0 volts/amps, respectively • Turbine stop valves are open <p>Note to examiner: The crew may go directly to 18011-C, "TURBINE TRIP BELOW P-9" OR may use the guidance from ABL20-D01 or ALB31-A01 to reference them to the AOP, then transition to 18011-C.</p> |

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Scenario No.: 3

Event No.: 3

Event Description: A main generator exciter failure leads to a generator trip after the main generator has been synchronized to the grid. The turbine fails to trip on the generator trip and the UO will have to manually trip the main turbine. The crew will enter AOP 18011-C for turbine trip below P-9.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>References 17020-1, Window D01 Response</p> <p>1.0 <u>PROBABLE CAUSE</u></p> <p>Malfunction in the Emergency Trip System (ETS) portion of the Electrohydraulic Control (EHC) System due to:</p> <ul style="list-style-type: none"> a. Valve failure or orifice blockage. b. System leakage. c. Normal post turbine trip alarm. <p>2.0 <u>AUTOMATIC ACTIONS</u></p> <p>Turbine trip is initiated.</p> <p>3.0 <u>INITIAL OPERATOR ACTIONS</u></p> <p style="text-align: center;">CAUTION</p> <p>EHC fluid is a fire resistant fluid that may be harmful to personnel. Observe proper safety precautions when in contact with this fluid.</p> <ul style="list-style-type: none"> 1. <u>IF</u> a reactor trip has occurred, Go To 19000-C, "E-0 Reactor Trip Or Safety Injection." 2. <u>IF</u> reactor trip has not occurred Go To 18011-C, "Turbine Trip Below P-9." <p>4.0 <u>SUBSEQUENT OPERATOR ACTIONS</u> NONE</p> <p>5.0 <u>COMPENSATORY OPERATOR ACTIONS</u> NONE</p> |

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Scenario No.: 3

Event No.: 3

Event Description: A main generator exciter failure leads to a generator trip after the main generator has been synchronized to the grid. The turbine fails to trip on the generator trip and the UO will have to manually trip the main turbine. The crew will enter AOP 18011-C for turbine trip below P-9.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>References 17031-1, Window A01 Response</p> <p>NOTE</p> <p>Loss of either Main Generator PTs or bus 1NAA PTs into EX2100 PT inputs initiates EX2100 2PT alarm which actuates the 374 relay.</p> <p>1.0 <u>PROBABLE CAUSE</u></p> <p>Loss of Excitation System</p> <p>2.0 <u>AUTOMATIC ACTIONS</u></p> <ol style="list-style-type: none"> 1. Turbine/Generator trip. 2. Trip, lock-out and initiate breaker failure scheme for the following: <ol style="list-style-type: none"> a. PCB 161710 b. PCB 161810 3. Trip and lock-out the following: <ol style="list-style-type: none"> a. Switchgear 1NAA NORM INCM BRKR 1NAA03 b. Switchgear 1NAB NORM INCM BRKR 1NAB03 c. Switchgear 1NA01 NORM INCM BRKR 1NA0103 d. Switchgear 1NA04 NORM INCM BRKR 1NA0403 e. Switchgear 1NA05 NORM INCM BRKR 1NA0503 4. Initiate an auto-transfer of auxiliary load at the 13.8 and 4.16kV busses. |

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Event No.: 3

Event Description: A main generator exciter failure leads to a generator trip after the main generator has been synchronized to the grid. The turbine fails to trip on the generator trip and the UO will have to manually trip the main turbine. The crew will enter AOP 18011-C for turbine trip below P-9.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <p>3.0 <u>INITIAL OPERATOR ACTIONS</u></p> <p>1. <u>IF</u> a reactor trip has occurred, Go To 19000-C, "E-0 Reactor Trip Or Safety Injection."</p> <p>2. <u>IF</u> a reactor trip has <u>NOT</u> occurred, Go To 18011-C, "Turbine Trip Below P-9".</p> <p>4.0 <u>SUBSEQUENT OPERATOR ACTIONS</u></p> <p>NONE</p> <p>5.0 <u>COMPENSATORY OPERATOR ACTIONS</u></p> <p>NONE</p> |

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Scenario No.: 3

Event No.: 3

Event Description: A main generator exciter failure leads to a generator trip after the main generator has been synchronized to the grid. The turbine fails to trip on the generator trip and the UO will have to manually trip the main turbine. The crew will enter AOP 18011-C for turbine trip below P-9.

| Time | Position | Applicant's Action or Behavior |
|------|--------------|---|
| | SS | 18011-C Turbine Trip Below P-9 Enters 18011-C, "TURBINE TRIP BELOW P-9" |
| | UO | 1. Verify turbine trip <ul style="list-style-type: none"> All turbine stop valves – CLOSED (NO) RNO 1. Perform the following: <ul style="list-style-type: none"> a. Trip the turbine |
| | OATC / UO | 2. Initiate Continuous Actions Page. |
| | OATC / SS | 3. Control reactor power: <ul style="list-style-type: none"> a. Place control rods in manual b. Adjust control rods to control reactor power and RCS temperature c. Check reactor power within capacity of steam dumps (YES) d. Maintain Tavg at program |
| | UO | 4. Verify steam dumps – OPERATING (YES) |

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Event No.: 3

Event Description: A main generator exciter failure leads to a generator trip after the main generator has been synchronized to the grid. The turbine fails to trip on the generator trip and the UO will have to manually trip the main turbine. The crew will enter AOP 18011-C for turbine trip below P-9.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | 5. Check TURB BRG OIL pressure (PI-6315) – GREATER THAN 31 PSIG (YES) |
| | UO | <p style="text-align: center;"><u>NOTE</u></p> <p>Post-trip response of the steam dumps will cause RCS Tavg to be lower than normal due to the setpoint that is dialed into PIC-507 when it is matched with UI-500 STEAM DUMP DEMAND in the next step.</p> <p>6. Transfer steam dumps to STEAM PRESSURE mode:</p> <ul style="list-style-type: none"> a. Check Condenser – AVAILABLE (YES) b. Place PIC-507 STEAM DUMP CONTROL in MAN c. Match demand on PIC-507 and UI-500 STEAM DUMP DEMAND d. Place HS-500C STEAM DUMP CONTROL MODE SELECT in STM PRESS e. Control Tavg for current power level: <p style="padding-left: 40px;">Manual control</p> <p style="text-align: center;">-OR-</p> <p style="padding-left: 40px;">Place PIC-507 in AUTO at desired setpoint</p> |

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Scenario No.: 3

Event No.: 3

Event Description: A main generator exciter failure leads to a generator trip after the main generator has been synchronized to the grid. The turbine fails to trip on the generator trip and the UO will have to manually trip the main turbine. The crew will enter AOP 18011-C for turbine trip below P-9.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | 7. Check Main Generator Output Breakers – OPEN. (YES) |
| | UO | 8. Check the following on all SG's: <ul style="list-style-type: none"> • Steam and feed flow MATCHED. (YES) • NR level – STABLE AT <u>OR</u> TRENDING TO 65%. (YES) |
| | OATC | 9. Check PRZR Pressure: <ul style="list-style-type: none"> a. PRZR Pressure – STABLE AT <u>OR</u> TRENDING TO 2235 PSIG. (YES) b. Go to Step 11. |
| | OATC | 11. Check PRZR level control: <ul style="list-style-type: none"> a. Check level – GREATER THAN 17%. (YES) b. Check charging and letdown – IN SERVICE. (YES) c. Verify PRZR level – TRENDING TO PROGRAM. (YES) |
| | SS | 12. Dispatch an operator to lower SGBD condensate cooling return Temperature controller setpoints to 80°F. |

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Scenario No.: 3

Event No.: 3

Event Description: A main generator exciter failure leads to a generator trip after the main generator has been synchronized to the grid. The turbine fails to trip on the generator trip and the UO will have to manually trip the main turbine. The crew will enter AOP 18011-C for turbine trip below P-9.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | 13. Check non-1E 4.16kV buses – ENERGIZED: <ul style="list-style-type: none"> • NA01 (YES) • NA04 (YES) • NA05 (YES) |
| | OATC | 14. Check reactor power change – LESS THAN 15%. (YES) |
| | SS | 15. Identify and correct cause of turbine trip. (NO) RNO 15. Consult SM to determine if unit should hold at present status or shutdown. |
| | SS | 16. Initiate 12004-C, POWER OPERATION (MODE 1) for further actions. Note to Examiner: Call to C & T for notification to OPS for AOP entry, write a Condition Report, notify Maintenance. END OF EVENT # 3, PROCEED TO EVENT # 4. |

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Scenario No.: 3

Event No.: 4

Event Description: The RCP seal injection filter becomes clogged reducing seal injection flow below the minimum acceptable value.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>Diagnose degraded seal injection flow:</p> <p><u>Alarms:</u></p> <p>ALB63-A06, FILTERS BACKFLUSH PNL ALARM (First alarm)</p> <p>(The following alarms come in with a 2 minute time delay)</p> <p>ALB08-E06, RCP SEAL WATER INJ FILTER HI ΔP</p> <p>ALB08-F06, RCP SEAL WATER INJ LO FLOW</p> <p><u>Indications:</u></p> <ul style="list-style-type: none"> Significantly lowered seal injection flow (approximately 4 gpm/RCP) |
| | OATC | <p>References ALB63-A06</p> <p>1.0 <u>PROBABLE CAUSE</u></p> <p>Malfunction of a process channel on the Backflushable Filters Panel 1-1224-P5-FBP.</p> <p>2.0 <u>AUTOMATIC ACTIONS</u></p> <p>None</p> <p>3.0 <u>INITIAL OPERATOR ACTIONS</u></p> <p>NONE</p> |

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Scenario No.: 3

Event No.: 4

Event Description: The RCP seal injection filter becomes clogged reducing seal injection flow below the minimum acceptable value.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <p>4.0 <u>SUBSEQUENT OPERATOR ACTIONS</u></p> <p>1. Dispatch an operator to the Backflushable Filters Panel to determine the specific channel causing the alarm.</p> <p>NOTE to SIMBOOTH: Report back that seal injection filter # 1-1208-F4-004 is reading > 20 psid.</p> <p>2. Perform the appropriate portion of 17218-1, "Annunciator Response Procedures for ALB On Backflushable Filter Control Panel</p> <p>5.0 <u>COMPENSATORY OPERATOR ACTIONS</u></p> <p>NONE</p> <p><u>Alarms:</u></p> <p>ALB63-A06, FILTERS BACKFLUSH PNL ALARM ALB08-E06, RCP SEAL WATER INJ FILTER HI ΔP ALB08-F06, RCP SEAL WATER INJ LO FLOW</p> <p><u>Indications:</u></p> <ul style="list-style-type: none">Significantly lowered seal injection flow (approximately 4 gpm/RCP) |

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Scenario No.: 3

Event No.: 4

Event Description: The RCP seal injection filter becomes clogged reducing seal injection flow below the minimum acceptable value.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>References 17008-1, Window E06:</p> <p>1.0 <u>PROBABLE CAUSE</u></p> <ol style="list-style-type: none"> 1. End of filter service life. 2. Excessive seal injection flowrate. <p>2.0 <u>AUTOMATIC ACTIONS</u></p> <p>NONE</p> <p>3.0 <u>INITIAL OPERATOR ACTIONS</u></p> <p>NONE</p> <p>4.0 <u>SUBSEQUENT OPERATOR ACTIONS</u></p> <ol style="list-style-type: none"> 1. Adjust Charging Flow Control Valve 1-HV-182 for minimum seal injection flow. 2. <u>IF</u> the alarm does not clear, place the Standby Seal Injection Filter in service per 13213-1, "Backflushable Filters System". 3. Adjust 1-HV-182 for normal seal injection flow. 4. Backflush the dirty filter per 13213-1, "Backflushable Filters System". <p>5.0 <u>COMPENSATORY ACTIONS</u></p> <p>NONE</p> |

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Scenario No.: 3

Event No.: 4

Event Description: The RCP seal injection filter becomes clogged reducing seal injection flow below the minimum acceptable value.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>References 17008-1, Window F06:</p> <p>1.0 PROBABLE CAUSE</p> <ol style="list-style-type: none">1. Improper setting for Charging Flow Control 1-FV-0121 or Throttle 1-HV-0182.2. Loss of charging flow.3. Seal Injection Isolation Valve closed:<ol style="list-style-type: none">a. RCP 1: HV-8103A,b. RCP 2: HV-8103B,c. RCP 3: HV-8103C,d. RCP 4: HV-8103D.4. High differential pressure at Seal Injection Filter. <p>2.0 AUTOMATIC ACTIONS</p> <p>NONE</p> <p>3.0 INITIAL OPERATOR ACTIONS</p> <p>NONE</p> <p>4.0 SUBSEQUENT OPERATOR ACTIONS</p> <ol style="list-style-type: none">1. Verify proper operation of 1-FV-0121.2. Adjust 1-HV-0182 and attempt to raise seal injection flow. |

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Scenario No.: 3

Event No.: 4

Event Description: The RCP seal injection filter becomes clogged reducing seal injection flow below the minimum acceptable value.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <ol style="list-style-type: none">3. Check Seal Injection Filter differential pressure and take action per ALB08-E06 if necessary.4. Implement 18007-C, Section B, if a loss of charging or seal injection control has caused the alarm.5. Go To 13003-1, "Reactor Coolant Pump Operation" for instructions covering Reactor Coolant Pump operation with seal malfunctions. <p>5.0 <u>COMPENSATORY ACTIONS</u></p> <p>NONE</p> <p>END OF EVENT # 4, PROCEED TO EVENT # 5.</p> |

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Scenario No.: 3

Event No.: 5

Event Description: Steam Generator Loop 1 Pressure Channel PT-514 Fails Low.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>Diagnose failure of main steam pressure channel:</p> <p><u>Alarms:</u></p> <p>ALB13-A04 STM GEN 1 LO STEAMLINE PRESS ALERT ALB13-F03 STM GEN 1 DIGITAL FW SYS TROUBLE ALB14-A02 STM GEN 1 HI STM PRESS RATE ALERT</p> <p><u>Indications:</u></p> <ul style="list-style-type: none"> 1PI-514A indicates 0% steam flow <p>Note to examiner: The crew may go directly to 18001-C, "SYSTEMS INSTRUMENTATION MALFUNCTION" OR may use the guidance from ALB13-A04 and/or ALB14-A02 to reference them to the AOP, then transition to 18001-C.</p> |
| | UO | <p>IMMEDIATE ACTIONS:</p> <p>AOP 18001-C, Section F, Failure of Steam Generator Pressure Instrumentation</p> <p>F1. Check steam and feed flows MATCHED on ALL SGs (YES)</p> |
| | SS | <p>Directs actions of UO / OATC using AOP 18001-C, Section F, Failure of Steam Generator Pressure Instrumentation (Crew Update)</p> |
| | | <p>F2-F5. <u>Unit 2 only</u></p> |
| | SS/UO | <p>F6. <u>On Unit 1 only</u>, at the OWS bypass the affected channel using the signal bypass button on the affected loop's graphical display.</p> |
| | OATC/UO | <p>F7. Initiate the Continuous Actions Page.</p> |
| | UO | <p>F8. Check SG level control maintains NR level – AT 65%. (YES)</p> |
| | SS | <p>F9. Notify I&C to initiate repairs.</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 5

Event Description: Steam Generator Loop 1 Pressure Channel PT-514 Fails Low.

| Time | Position | Applicant's Action or Behavior | | |
|------|----------|---|---|--|
| | SS | F10. Bypass the affected instrument channel using 13509-C, Bypass Test Instrumentation (BTI) Panel Operation, if desired. NOTE: Not Desired | | |
| | SS | F11. Trip affected channel bistable and place associated MASTER TEST switch in TEST position per Table F2 within 72 hours (TS 3.3.2) NOTE: NOT EXPECTED. | | |
| | SS | F12. Initiate the applicable actions of Technical Specification 3.3.2, 3.3.3, and 3.3.4. (3.3.3 FU 8 INFO LCO ONLY) | | |
| | | LCO 3.3.2 FU 1e Condition D | | |
| | | LCO 3.3.2 FU 4d(1) Condition D | | |
| | | <u>CONDITION</u> | <u>REQUIRED ACTION</u> | <u>COMPLETION TIME</u> |
| | | D. One channel inoperable | D.1 Place channel in trip. <u>OR</u> D.2.1 Be in MODE 3. <u>AND</u> D.2.2 Be in MODE 4. | 72 hours 78 hours 84 hours |
| | | LCO 3.3.4 FU 13 Condition A | | |
| | | <u>CONDITION</u> | <u>REQUIRED ACTION</u> | <u>COMPLETION TIME</u> |
| | | A. One or more required Functions inoperable | A.1 Restore required Function to OPERABLE status | 30 days |
| | SS | *F13. Check repairs and surveillances complete. (NO) RNO. Perform the following: <ul style="list-style-type: none"> a. <u>WHEN</u> repairs and surveillances are complete, <u>THEN</u> perform Step F13. b. Return to procedure and step in effect. c. Note to examiner: Call to C & T for Condition Report, Notify Ops Duty person and notify Maintenance. END OF EVENT # 5, PROCEED TO EVENT # 6. | | |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 5

Event Description: Steam Generator Loop 1 Pressure Channel PT-514 Fails Low.

| Time | Position | Applicant's Action or Behavior |
|-------------|-----------------|---------------------------------------|
| | | |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 6

Event Description: An auto failure of 1PC-455C will cause 1PV-455C to open. This failure will cause an uncontrolled lowering of Pressurizer and RCS pressure. The OATC will be required to place 1PC-455C in manual (to regain control of 1PV-455C) and shut 1PV-455C per AOP 18000-C. The OATC will also need to energize pressurizer heaters to restore Pressurizer and RCS pressure to their normal values. The OATC actions must be timely to avert a reactor trip and SI.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>Diagnose Loop 1 Spray Valve (1PV-455C) has failed open:</p> <p>Symptoms / alarms:</p> <ul style="list-style-type: none"> • ALB11-D02 PRZR CONTROL LO PRESS AND HEATERS ON • ALB12-D03 PRZR PRESS LO PORV BLOCK <p>Indications:</p> <ul style="list-style-type: none"> • PRZR pressure lowering rapidly • Spray Valve Loop 1 red and green lights lit • Spray Valve Loop 4 green light lit, red light out • Spray Valve Loop 1 controller red light lit, demand at 60% • PORV Block Valves 1HV-8000A and 1HV-8000B close <p>Note to examiner: The crew should go directly to 18000-C, "Pressurizer Spray, Safety Or Relief Valve Malfunction". The guidance from ALB11-D02 may be used as a follow-up procedure.</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 6

Event Description: An auto failure of 1PC-455C will cause 1PV-455C to open. This failure will cause an uncontrolled lowering of Pressurizer and RCS pressure. The OATC will be required to place 1PC-455C in manual (to regain control of 1PV-455C) and shut 1PV-455C per AOP 18000-C. The OATC will also need to energize pressurizer heaters to restore Pressurizer and RCS pressure to their normal values. The OATC actions must be timely to avert a reactor trip and SI.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>18000-C, "Pressurizer Spray, Safety Or Relief Valve Malfunction".</p> <p><u>IMMEDIATE OPERATOR ACTIONS</u></p> <p>1. Verify PRZR Spray Valves – CLOSED.</p> <p>Note to examiner: The OATC will manually close the Loop 1 PRZR Spray Valve by taking the controller and depressing the down arrow until the green light is lit, demand is 0, and PRZR Spray Valve has only a green light lit.</p> |
| | SS | Enters 18000-C, "PRESSURIZER SPRAY, SAFETY OR RELIEF VALVE MALFUNCTION" (Crew Update) |
| | OATC | 2. Operate PRZR Heaters as necessary. |
| | OATC | 3. Verify PRZR PORVs – CLOSED. (YES) |
| | OATC | 4. Check PRZR Safety Valves – CLOSED (YES) |
| | OATC | <p>5. Check PIC-455A Pressurizer Master Controller – OPERATING PROPERLY: (YES)</p> <ul style="list-style-type: none"> Reference FIGURE 1. <p>Note to examiner: FIGURE 1 is located on Page 30.</p> |
| | OATC | 6. Check associated instrumentation – OPERATING PROPERLY. (YES) |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 6

Event Description: An auto failure of 1PC-455C will cause 1PV-455C to open. This failure will cause an uncontrolled lowering of Pressurizer and RCS pressure. The OATC will be required to place 1PC-455C in manual (to regain control of 1PV-455C) and shut 1PV-455C per AOP 18000-C. The OATC will also need to energize pressurizer heaters to restore Pressurizer and RCS pressure to their normal values. The OATC actions must be timely to avert a reactor trip and SI.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | | |
| | SS | <p>7. Comply with applicable Technical Specifications:</p> <p>3.4.1 (DNB-only one applicable for this event, if setpoint is reached)</p> <p>3.4.10</p> <p>3.4.11</p> <p>3.4.12</p> <p>3.4.13</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 6

Event Description: An auto failure of 1PC-455C will cause 1PV-455C to open. This failure will cause an uncontrolled lowering of Pressurizer and RCS pressure. The OATC will be required to place 1PC-455C in manual (to regain control of 1PV-455C) and shut 1PV-455C per AOP 18000-C. The OATC will also need to energize pressurizer heaters to restore Pressurizer and RCS pressure to their normal values. The OATC actions must be timely to avert a reactor trip and SI.

| Time | Position | Applicant's Action or Behavior | | | | | | | | | |
|---|--|---|-----------|-----------------|-----------------|---|--|---------|---|------------------|---------|
| | SS | <p>Refers to Technical Specifications</p> <p>LCO 3.4.1 RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified below:</p> <ul style="list-style-type: none"> a. Pressurizer pressure \geq 2199 psig; b. RCS average temperature \leq 592.5°F; and c. RCS total flow rate \geq 384,509 gpm. <p>APPLICABILITY: MODE 1</p> <p>Note to examiner: The NOTE does not apply during this event.</p> <p>ACTIONS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">CONDITION</th><th style="width: 33%;">REQUIRED ACTION</th><th style="width: 33%;">COMPLETION TIME</th></tr> </thead> <tbody> <tr> <td>A. One or more RCS DNB parameters not within limits</td><td>A.1 Restore RCS DNB parameter(s) to within limit</td><td>2 hours</td></tr> <tr> <td>C. Required Action and associated Completion Time not met</td><td>C.1 Be in Mode 2</td><td>6 hours</td></tr> </tbody> </table> | 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 | C. Required Action and associated Completion Time not met | C.1 Be in Mode 2 | 6 hours |
| 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 | | | | | | | | | |
| C. Required Action and associated Completion Time not met | C.1 Be in Mode 2 | 6 hours | | | | | | | | | |
| | SS | <p>8. Return to procedure and step in effect.</p> | | | | | | | | | |

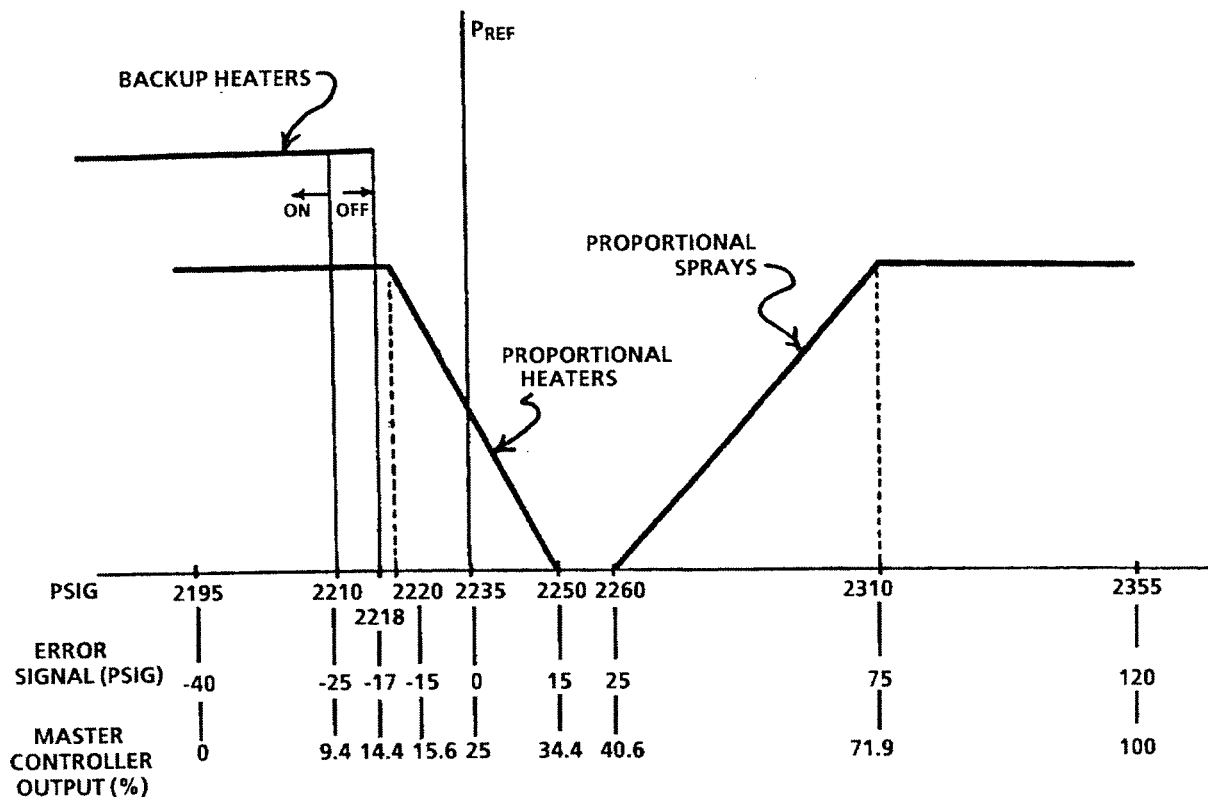
Event No.: 6

Event Description: An auto failure of 1PC-455C will cause 1PV-455C to open. This failure will cause an uncontrolled lowering of Pressurizer and RCS pressure. The OATC will be required to place 1PC-455C in manual (to regain control of 1PV-455C) and shut 1PV-455C per AOP 18000-C. The OATC will also need to energize pressurizer heaters to restore Pressurizer and RCS pressure to their normal values. The OATC actions must be timely to avert a reactor trip and SI.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--------------------------------|
|------|----------|--------------------------------|

AOP 18000-C, FIGURE 1

PRESSURIZER PRESSURE CONTROLLER BAND



Event No.: 6

Event Description: An auto failure of 1PC-455C will cause 1PV-455C to open. This failure will cause an uncontrolled lowering of Pressurizer and RCS pressure. The OATC will be required to place 1PC-455C in manual (to regain control of 1PV-455C) and shut 1PV-455C per AOP 18000-C. The OATC will also need to energize pressurizer heaters to restore Pressurizer and RCS pressure to their normal values. The OATC actions must be timely to avert a reactor trip and SI.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>References <u>17011-1, Window D02</u> Response</p> <p>1.0 <u>PROBABLE CAUSE</u></p> <ol style="list-style-type: none"> 1. Pressurizer Pressure Control System malfunction 2. Pressurizer Spray or Relief Valve Malfunction <p>2.0 <u>AUTOMATIC ACTIONS</u></p> <p>Pressurizer backup heaters will energize</p> <p>3.0 <u>INITIAL OPERATOR ACTIONS</u></p> <p>Check pressurizer pressure indications:</p> <ul style="list-style-type: none"> • If an instrument failure is indicated, initiate 18001-C, "Systems Instrumentation Malfunction" • IF a failed PRZR Spray Valve, Safety Valve, or PORV is indicated, initiate 18000-C, "Pressurizer Spray, Safety Or Relief Valve Malfunction" • AT 1965 psig and lowering trip RX and go to 19000-C, "E-0 REACTOR TRIP OR SAFETY INJECTION" |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 7

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include shifting electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | CREW | <p>Diagnose loss of power to 1AA02:</p> <p><u>Alarms:</u></p> <p>DG1A EMERGENCY START</p> <p>ALB36-A01, 4160V SWGR 1AA02 TROUBLE</p> <p><u>Indications:</u></p> <p>Electric fault on 1AA02</p> <p>Control room lighting dims due to loss of ½ of the lights</p> <p>1AA02 white bus potential lights go out</p> <p>DG-1A starts but fails to tie to bus</p> |
| | SS | <p>18031-C, Loss of Class 1E Electrical Systems</p> <p>Enters AOP 18031-C, "Loss of Class 1E Electrical Systems" (Crew Update)</p> |
| | UO | <p>*1. Check power to 1E 4160V Emergency busses –AT LEAST ONE ENERGIZED:</p> <ul style="list-style-type: none"> 4160V AC 1E Busses. (YES, 1BA03) |
| | OATC | <p>*2. Check Reactor power - LESS THAN 100%:</p> <ul style="list-style-type: none"> UQ1118 - LESS THAN OR EQUAL TO 100% MWT for the applicable unit. (YES) NIs - LESS THAN OR EQUAL TO 100%. (YES) ΔT - LESS THAN OR EQUAL TO 100%. (YES) |
| | UO | <p>3. Check affected train Diesel Generator – RUNNING. (YES)</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 7

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include shifting electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | 4. Verify NSCW status on affected train: a. PUMPS – TWO RUNNING (NO) RNO 4. Perform the following 1) Trip affected DG by depressing both EMERGENCY STOP pushbuttons. 2) Then Go to Section A. LOSS OF POWER WITH DG FAILING TO TIE TO BUS. |
| | UO | 18031-C, SECTION A: LOSS OF POWER WITH DG FAILING TO TIE TO BUS A1. Verify NSCW pumps on unaffected train (B) –TWO RUNNING. (YES) |
| | OATC | A2. Verify charging pump – RUNNING: ___ NCP. (Yes-expected) -OR- ___ Unaffected train CCP. (CCP-B) |
| | UO | A3. Verify CCW pumps on unaffected train – TWO RUNNING. (YES) Note to examiner: While the unaffected train pumps will not initially be running, the word "verify" implies the action to start the pumps before executing the RNO. Therefore, it is expected that the crew will start the unaffected CCW pumps and verify their operation before moving on to the next step or executing the RNO. |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 7

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include shifting electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

| Time | Position | Applicant's Action or Behavior |
|------|-----------|--|
| | SS / OATC | <p>A4. Check RHR status:</p> <p>a. Check RHR - REQUIRED FOR SHUTDOWN COOLING. (NO)</p> <p>RNO A4. Go to Step A5.</p> |
| | OATC / UO | A5. Initiate the Continuous Actions Page. |
| | UO | <p>*A6. Check AFW status:</p> <p>a. Check AFW system - NEEDED TO MAINTAIN SG LEVELS. (NO)</p> <p>RNO A6.a. Perform the following:</p> <ol style="list-style-type: none"> 1) Reduce TDAFW pump speed to not less than 1535 rpm. 2) Go to Step A7. |
| | UO | A7. Verify ACCW pump on unaffected train – RUNNING. (YES) |
| | UO | <p><u>13120-1, Containment Building Cooling System</u></p> <p>A8. Verify four CNMT cooling units on unaffected train running in high speed using 13120, CONTAINMENT BUILDING COOLING SYSTEM.</p> <p>NOTE: Will start Train B CNMT Coolers 3,4,7,8 on high speed using step 4.2.3 or 4.8.5 of SOP 13120-1:</p> <p>Step 4.2.3 Select one of the following four combinations and start the Containment Coolers one pair at a time, in high speed, by Simultaneously placing both handswitches to the start position.</p> <p>Fan 3, 1 HS 12583D Fan 7, 1 HS 12585D</p> <p>Fan 4, 1 HS 2583D Fan 8, 1 HS 2585D</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 7

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include shifting electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>A9. Verify CRDM fans on unaffected train – TWO RUNNING.</p> <p>NOTE: STARTS CRDM FAN #4 by placing 1HS-12276A to Start.</p> |
| | UO | <p>A10. Verify reactor cavity cooling unit on unaffected train – ONE RUNNING.</p> <p>NOTE: STARTS REACTOR CAVITY COOLING Fan # 2 by placing 1HS-2651 to Start. Fan # 1 red light will be LIT ('A' Train) even though not actually operating.</p> |
| | UO | <p>A11. Verify SFP cooling pump on unaffected train running using 13719, SPENT FUEL POOL COOLING AND PURIFICATION SYSTEM</p> <p>IPC Points:</p> <p>ZD3405 ZD3411</p> |
| | UO | <p>A12. Verify the following unaffected train Class 1E 480V load centers - ENERGIZED:</p> <p><u>Train B</u></p> <ul style="list-style-type: none"> • BB06 (YES) • BB07 (YES) • BB16 (YES) • NB10 (YES) |
| | UO | <p>A13. Verify unaffected MCCs energized by observing - NO TROUBLE ALARMS. (NONE)</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 7

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include shifting electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | SS | <p>A14. Open doors that have installed door stops in the following <u>AFFECTED</u> Control Building rooms:</p> <p>UNIT 1</p> <ul style="list-style-type: none"> • TR A B52, B55, B76 <p>NOTE: Phones SSS to dispatch CBO to open Doors.</p> |
| | SS | <p>A15. Initiate the following:</p> <ol style="list-style-type: none"> 14230, OFFSITE AC CIRCUIT VERIFICATION AND CAPACITY / CAPABILITY EVALUATION. Verify SAT energized using 13418 C, STANDBY AUXILIARY TRANSFORMER. <p>NOTE: THIS STEP PERFORMS THE 1 HOUR ACTIONS FOR LCO 3.8.1 FOR OFF-SITE SOURCES AND THE SAT.</p> |
| | OATC | A16. Verify DRPI - ENERGIZED. (YES) |
| | UO | <p>*A17. Check DC bus loads:</p> <ol style="list-style-type: none"> Verify 125V DC battery loads - LESS THAN THE FOLLOWING LIMITS: <ul style="list-style-type: none"> • AD1B 300 AMPS – expect ~ 200 amps • BD1B 300 AMPS – expect 0 amps • CD1B 100 AMPS – expect ~ 80 amps • DD1B 80 AMPS - expect 0 amps Monitor all 1E battery bus voltages - REMAIN GREATER THAN 105V DC. |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 7

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include shifting electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

| Time | Position | Applicant's Action or Behavior |
|------|-----------|--|
| | | |
| | OATC / UO | <p>A18. Check Reactor Makeup System:</p> <p>a. Unaffected boric acid transfer pump – RUNNING OR SELECTED TO AUTO. (NO)</p> <p>RNO a. Perform the following:</p> <ul style="list-style-type: none"> Manually start unaffected boric acid transfer pump as necessary. <p style="text-align: center;">-OR-</p> <p>___ Place unaffected pump handswitch in AUTO Places 1HS-277A in AUTO.</p> |
| | OATC / UO | <p>A18 cont.</p> <p>b. Unaffected reactor makeup water pump – RUNNING <u>OR</u> SELECTED TO AUTO. (NO)</p> <p>RNO b. Perform the following:</p> <ul style="list-style-type: none"> Manually start unaffected reactor make-up water pump, as necessary. <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> Place unaffected pump handswitch in AUTO. Places 1HS-7763 in AUTO. |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 7

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include shifting electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>*A19. Verify battery charger in service for non-1E batteries:</p> <ul style="list-style-type: none"> • ND1 (NO) • ND2 (YES) • ND3A (NO) • ND3B (YES) <p>NOTE: WILL DIRECT CONTROL BUILDING OPERATOR TO PLACE BATTERY CHARGERS IN SERVICE FOR 1ND1 AND 1ND3A USING 13406-1, "125V DC NON 1E ELECTRICAL DISTRIBUTION SYSTEM" USING SECTION 4.1.3</p> |
| | UO | <p>A20. Transfer any de-energized NYS, NYRS, and NYR busses to alternate sources by initiating 13432, 120V AC NON 1E INSTRUMENT DISTRIBUTION SYSTEM.</p> <p>NOTE: 1NYRS AND 1NYR WILL NEED TO BE TRANSFERRED TO ALTERNATE POWER SOURCES.</p> |
| | SS | <p>A21. Check Control Room Emergency Lighting:</p> <ol style="list-style-type: none"> Check bus loss of power expected duration - GREATER THAN 90 MINUTES. (YES) Transfer emergency lighting to the unaffected unit by placing MAIN CONTROL ROOM LIGHTING LOSEP TRANSFER SWITCH on <u>AFFECTED</u> unit to LOSEP position: <p>NOTE: STEP A21.b. IS PERFORMED LOCALLY.</p> |
| | SS | <p>A22. Initiate applicable Technical Specification requirements listed in ATTACHMENT A.</p> <p>NOTE: THE FOLLOWING APPLICABLE TS FROM ATTACHMENT A ARE LISTED STARTING ON NEXT PAGE.</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 7

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include shifting electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

| Time | Position | Applicant's Action or Behavior | | |
|------|----------|--|---|--|
| | SS | EXAMINER MAY PROCEED TO NEXT EVENT DUE TO TIME REQUIREMENTS FOR IDENTIFYING ALL REQUIRED TECHNICAL SPECIFICATIONS FOR THIS FAILURE AND HAVE EXAMINEE IDENTIFY TS LATER. | | |
| | | LCO | 3.7.5 | CONDITION C |
| | | AFW | | |
| | | <u>CONDITION</u> C. Two AFW trains inoperable | <u>REQUIRED ACTION</u> C.1 Be in MODE 3 <u>AND</u> C.2 Be in MODE 4. | <u>COMPLETION TIME</u> 6 hours 12 hours |
| | | LCO | 3.8.1 | CONDITIONS A, B, and E |
| | | <u>CONDITION</u> A. One required offsite circuit inoperable | <u>REQUIRED ACTION</u> A.1 Perform SR 3.8.1.1 for required OPERABLE offsite circuit. <u>AND</u> A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable. <u>AND</u> A.3 Restore required offsite circuit to OPERABLE status. | <u>COMPLETION TIME</u> 1 hours <u>AND</u> Once per 8 hours thereafter 24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s) 72 hours <u>AND</u> 14 days from discovery of failure to meet LCO |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 7

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include shifting electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

| Time | Position | Applicant's Action or Behavior | | |
|------|----------|--------------------------------|--|--|
| | | <u>CONDITION</u> | <u>REQUIRED ACTION</u> | <u>COMPLETION TIME</u> |
| | | B. One DG inoperable | B.1 Perform SR 3.8.1.1 for the required offsite circuit(s). | 1 hour |
| | | | | <u>AND</u> |
| | | | | Once per 8 hours Thereafter |
| | | | <u>AND</u> | 1 hour |
| | | | B.2 Verify SAT available. | <u>AND</u> |
| | | | | Once per 12 hours thereafter |
| | | | <u>AND</u> | 4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s) |
| | | | B.3 Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable. | 24 hours |
| | | | <u>AND</u> | |
| | | | B.4.1 Determine OPERABLE DG is not inoperable due to common cause failure. | 24 hours |
| | | | <u>OR</u> | |
| | | | B.4.2 Perform SR 3.8.1.2 for OPERABLE DG. | 24 hours |
| | | | <u>AND</u> | |
| | | | -----NOTE----- Required Action B.5.1 is only applicable if the combined reliability of the enhanced black-start combustion turbine generators (CTG) and the black-start diesel generator is ≥ 95%. Otherwise, Required Action B.5.2 applies. ----- | |
| | | | B.5.1 Verify an enhanced blackstart CTG is functional by verifying the CTG and the black-start diesel generator starts and achieves steady state voltage and frequency. | 72 hours |
| | | | | <u>OR</u> |
| | | | | Within 72 hours prior to entry into Condition B |

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Scenario No.: 3

Event No.: 7

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include shifting electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--------------------------------|
|------|----------|--------------------------------|

| | | <u>CONDITION</u> | <u>REQUIRED ACTION</u> | <u>COMPLETION TIME</u> |
|--|----|---|---|--|
| | | B. One DG inoperable (continuation) | <u>OR</u> B.5.2 Start and run at least one CTG while in Condition B. <u>AND</u> B.6 Restore DG to OPERABLE status. | 72 hours <u>OR</u> Prior to entry into Condition B for preplanned maintenance 14 days from discovery of failure to meet LCO |
| | | E. One required offsite circuit inoperable <u>AND</u> One DG inoperable | -----NOTE----- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating," when Condition E is entered with no AC power source to one or more trains. ----- E.1 Restore required offsite circuit to OPERABLE status. <u>OR</u> E.2 Restore DG to OPERABLE status. | 12 hours 12 hours |
| | SS | LCO | 3.8.9 CONDITIONS A | Distribution Systems |
| | | <u>CONDITION</u> | <u>REQUIRED ACTION</u> | <u>COMPLETION TIME</u> |
| | | A. One or more AC electrical power distribution subsystems | A.1 Restore AC electrical power distribution subsystems to OPERABLE status. | 8 hours <u>AND</u> 16 hours from |

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Scenario No.: 3

Event No.: 7

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include shifting electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

| Time | Position | Applicant's Action or Behavior | | |
|------|----------|---|--|----------------------------------|
| | | inoperable | | discovery of failure to meet LCO |
| | | Note: No loss of safety function exists. | | |

| | | | | |
|--|----|---|--|--|
| | SS | A23. Check the fault condition cleared. (NO) | | |
| | | RNO A23. Return to Step A1 | | |
| | | END OF EVENT # 7, PROCEED TO EVENT # 8. | | |

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Scenario No.: 3

Event No.: 7

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

ATTACHMENT A

Potential Applicable LCOs & TRs Requiring Short Term Response

| <u>LCO/TR</u> | <u>Mode</u> | <u>Limiting Condition</u> | <u>Required Actions</u> |
|----------------------------|-------------|---|---|
| 3.1.7 | 1-2 | Lost Rod Pos Ind | Immediately enter TS 3.0.3 |
| 3.4.15 | 1-4 | All RCS leak detection instrumentation inop | Immediately enter TS 3.0.3 |
| 3.7.10 3.7.11 3.7.12 | All | Both CREFS trains in one unit inop | Immediately place other unit trains in emergency mode |
| 3.4.6 3.4.7 3.4.8 | 4 5 5 | Required RCS loops and/or RHR trains | Immediately restore req'd loops/trains to service |
| 3.5.3 | 4 | Required ECCS train inop | Immediately initiate restoration |
| 3.8.2 | 5,6 | Loss of required AC Source | Immediately declare required systems w/o offsite power inop or suspend fuel movement |
| 3.8.5 | 5,6 | Loss of required DC Sources | Immediately declare affected features inop or suspend fuel movement activities |
| 3.9.5 3.9.6 | 6 | RHR train requirements are not met for refueling | Immediately stop fuel movement and dilutions and restore required trains and/or water level |
| 13.9.5 | All | One or both FHB HVAC trains inop | Immediately verify remaining train operable or suspend fuel movement activities |
| 13.1.8 13.1.9 | 3-5 | Lost required DRPI | Immediately open RTBs |
| 13.1.2 13.1.4 | 5,6 | Required boric acid injection source and/or pump inop | Immediately suspend fuel movement and/or reactivity changes |
| 3.6.3 | 1-4 | Both CNMT pen iso valves are inop | 1 hr: Isolate affected penetrations |
| 3.8.1 | 1-4 | Loss of offsite source Loss of DG | 1 hr: Complete 14230 1 hr: Verify SAT Operable 4 hr: Determine redundant safety features operable |
| 3.4.5 | 3 | Required RCS loops inop with RTBs closed | 1 hr: Restore loop or open RTBs |
| 3.8.4 | 1-4 | Loss of DC source due to other than inop battery | 2 hrs: Restore all 4 DC sources to operable |

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Scenario No.: 3

Event No.: 7

Event Description: RAT (1NXRA) supply breaker to 1AA02 will trip open due to a fault on the bus. DG-1A will start, but will not re-energize 1AA02 due to a Bus Fault. This will require the crew to complete the actions of AOP 18031-C, "Loss of Class 1E Electrical Systems". Corrective actions include reducing AFW flow to return reactor power to less than 100%, and shift electrical loads to Train "B" 1E bus 1BA03, as well as implement tech specs for loss of AC power.

The above Technical Specifications and the following additional Specifications should be referenced for long term required actions:

| | | | |
|--------|-----|---|---|
| 3.3.2 | 1-2 | ESFAS instrumentation | FU 6d: Loss of AFWAS from trip of both MFPs |
| 3.3.3 | 1-3 | PAMS instrumentation | FU 19: Loss of CNMT H2 monitor heat tracing. (Note cross train relationship; Train A heat tracing fed from Train B power. Train B heat tracing fed from Train A power. |
| 3.3.4 | 1-3 | Remote shutdown system | |
| 3.4.9 | 1-3 | Pressurizer | 2 heater groups each with 150 kw capacity and capable of being powered from emergency source |
| 3.4.16 | All | RCS activity | Chemistry notified if power changed more than 15% in one hour (SR 3.4.16.2) |
| 3.5.2 | 1-3 | ECCS | |
| 3.6.6 | 1-4 | CNMT spray and CNMT clrs | |
| 3.7.4 | 1-3 | SG ARVs | Also affects 3.3.4 |
| 3.7.5 | 1-3 | AFW pumps & disch vlvs | 2 or more trains may be inop |
| 3.7.7 | 1-4 | CCW system | |
| 3.7.8 | 1-4 | NSCW system | |
| 3.7.9 | 1-4 | Ultimate heat sink | |
| 3.7.13 | 1-4 | Piping pen units | |
| 3.7.14 | 1-4 | ESF chillers | |
| 3.8.9 | 1-4 | Distribution Systems - OPERATING | Condition A 8 hours |
| 13.1.3 | 1-4 | Boration flow paths | |
| 13.1.5 | 1-4 | Charging pumps - operating | |
| 13.7.4 | All | Thermal barriers | |
| 3.4.12 | 4-6 | COPS | |
| ODCM | All | RE-12444, RE-12442, RE-2565, RE-2562 are affected by loss of heat tracing for sample lines. | |

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Scenario No.: 3

Event No.: 8

Event Description: BFRV # 3 fails shut with inability of UO to manually control. The UO can take manual control of MFRV # 3. Shortly after the #3 SG BFRV fails (approx 1 min), the A-MFPT shaft will shear resulting in a loss of all FW flow.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | CREW | <p>Diagnoses shut BFRV on #3 SG</p> <p>Alarm(s):</p> <ul style="list-style-type: none">• ALB13-C01 STM GEN 3 FLOW MISMATCH• ALB13-F05 STM GEN 3 DIGITAL FW SYS TROUBLE <p>Indication(s):</p> <ul style="list-style-type: none">• BFRV demand at 0.• BFRV green light lit, red light out on ZLB.• MFRV green & red light lit (green light may be out if DFW system as completely opened the valve.)• SG # 3 FW flow at 0 MPPH. <p>Note to examiner: The crew should go directly to 18016-C, "CONDENSATE AND FEEDWATER MALFUNCTION". ARP13-C01 may be referenced afterwards.</p> |

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Scenario No.: 3

Event No.: 8

Event Description: BFRV # 3 fails shut with inability of UO to manually control. The UO can take manual control of MFRV # 3. Shortly after the #3 SG BFRV fails (approx 1 min), the A-MFPT shaft will shear resulting in a loss of all FW flow.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p><u>18016-C IMMEDIATE OPERATOR ACTIONS</u></p> <p>D1. Check proper operation of BFRVs and MFRVs. (NO)</p> <p>RNO D1. Perform the following:</p> <ul style="list-style-type: none">• Take manual control of affected SG MFRVs and/or BFRVs to match steam and feed flows.• Control SG levels between 60% and 70%.• <u>IF</u> SG levels cannot be maintained greater than 41% <p>-OR-</p> <p>Less than 79%, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none">1) Trip the reactor.2) Go to 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION |

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Scenario No.: 3

Event No.: 8

Event Description: BFRV # 3 fails shut with inability of UO to manually control. The UO can take manual control of MFRV # 3. Shortly after the #3 SG BFRV fails (approx 1 min), the A-MFPT shaft will shear resulting in a loss of all FW flow.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <u>18016-C IMMEDIATE OPERATOR ACTIONS (cont'd)</u> D2. Verify feed water isolation valves open. (YES) <ol style="list-style-type: none"> BFIVs (YES) MFIVs (YES) |
| | SS | Enters 18016-C, "CONDENSATE AND FEEDWATER MALFUNCTION", Section D for Main Feedwater Valve Malfunction. (Crew Update) |
| | CREW | D3. Initiate the Continuous Actions Page. |
| | UO | D4. Perform channel check of instrumentation – NORMAL: (YES) <ul style="list-style-type: none"> SG levels SG pressure SG Steam Flows SG Feed Flows |
| | OATC | D5. Check Rated Thermal Power – NOT BEING EXCEEDED: (YES) <ul style="list-style-type: none"> Delta T < 100% Nis < 100% UQ 1118 < 100% MWt. |

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Scenario No.: 3

Event No.: 8

Event Description: BFRV # 3 fails shut with inability of UO to manually control. The UO can take manual control of MFRV # 3. Shortly after the #3 SG BFRV fails (approx 1 min), the A-MFPT shaft will shear resulting in a loss of all FW flow.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | D6. Check SGs NR levels – AT 65%. (# 3 is not) RNO D6. Take manual control of affected SG MFRVs and/or BFRVs to Control SGs levels between 60% and 70%. |
| | SS | D7. Refer to Technical Specification 3.7.3 for required action. |
| | SS | D8. Notify Maintenance to initiate repairs. |
| | SS | D9. Return to procedure and step in effect. |

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Scenario No.: 3

Event No.: 8

Event Description: BFRV # 3 fails shut with inability of UO to manually control. The UO can take manual control of MFRV # 3. Shortly after the #3 SG BFRV fails (approx 1 min), the A-MFPT shaft will shear resulting in a loss of all FW flow.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | CREW | <p>Diagnoses Loss of Feedwater Flow:</p> <p>Alarm(s):</p> <ul style="list-style-type: none"> • ALB13-A06(B06, C06, D06) STM GEN 1 (2,3,4) HI/LO LVL DEVIATION • ALB15-B05 MFPT DISCH HDR LO PRESS <p>Indication(s):</p> <ul style="list-style-type: none"> • Unexpected Change in MFP Speed or ΔP • Uncontrolled lowering of SG water levels <p>Note to examiner: The crew should transition to Section "A" of 18016-C, "CONDENSATE AND FEEDWATER MALFUNCTION" for a Loss of Main Feed Pump.</p> |
| | OATC/UO | <p><u>18016-C IMMEDIATE OPERATOR ACTIONS</u></p> <p>A1. Check reactor power – LESS THAN OR EQUAL TO 70%. (YES)</p> |
| | OATC/UO | <p>A2. Check at least on MFP – RUNNING <u>AND</u> PROVIDING FLOW. (NO)</p> <p>RNO A2. Perform the following:</p> <ul style="list-style-type: none"> a. Trip the reactor b. Got to 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION <p>END OF EVENT # 8, PROCEED TO EVENT # 9.</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 9

Event Description: If the Lo-Lo SGWL Reactor Trip setpoint is reached for Event 8, the reactor will not automatically trip requiring the crew to perform a manual reactor trip. The 'C' panel Rx Trip switch will not trip the Rx, however the 'A' panel Rx Trip switch will function normally.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | | 19000-C E-0 Reactor Trip or Safety Injection |
| | CREW | Performs Immediate Operator Actions per 19000-C, E-0 Reactor Trip or Safety Injection. (NOTE: IOAs are steps 1 through 4) |
| | SS | Makes a page announcement of Reactor Trip (and SI if appropriate). |
| | OATC | 1. Check Reactor Trip: <ul style="list-style-type: none"> Rod Bottom Lights – LIT (NO) Reactor Trip and Bypass Breakers – OPEN (NO) Neutron Flux – LOWERING (NO) RNO 1. Trip Reactor using both Reactor trip handswitches. (YES) |
| | UO | 2. Check Turbine Trip: <ul style="list-style-type: none"> All Turbine Stop Valves – CLOSED (YES) |
| | UO | 3. Check Power to AC Emergency Buses: <ul style="list-style-type: none"> a. AC Emergency Busses – AT LEAST ONE ENERGIZED. <ul style="list-style-type: none"> 4160 AC 1E Busses (YES, 1BA03) b. AC Emergency Busses – ALL ENERGIZED. <ul style="list-style-type: none"> 4160V AC 1E Busses (NO) 480V AC 1E Busses (NO) RNO 3.b. Try to restore power to de-energized AC Emergency Bus while continuing with Step 4. |

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Scenario No.: 3

Event No.: 9

Event Description: If the Lo-Lo SGWL Reactor Trip setpoint is reached for Event 8, the reactor will not automatically trip requiring the crew to perform a manual reactor trip. The 'C' panel Rx Trip switch will not trip the Rx, however the 'A' panel Rx Trip switch will function normally.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>4. Check if SI is actuated:</p> <ul style="list-style-type: none">Any SI annunciator – LIT (NO)SI ACTUATED BPLP window – LIT (NO) <p>RNO 4. Check if SI is required:</p> <p><u>IF</u> one or more of the following conditions has occurred:</p> <ul style="list-style-type: none">PRZR pressure less than or equal to 1870 psig. (NO)Steam line pressure less than or equal to 585 psig. (NO)Containment pressure greater than or equal to 3.8 psig. (NO)Automatic alignment of ECCS equipment to injection phase. (NO) <p><u>THEN</u> actuate SI and go to Step 6.</p> |
| | UO | <p>5. Perform the following to limit RCS cooldown:</p> <ol style="list-style-type: none">Check NR level in at least one SG greater than 10%. (YES)Reduce AFW flow.Go to 19001-C, ES-0.1 REACTOR TRIP RESPONSE |

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Scenario No.: 3

Event No.: 9

Event Description: If the Lo-Lo SGWL Reactor Trip setpoint is reached for Event 8, the reactor will not automatically trip requiring the crew to perform a manual reactor trip. The 'C' panel Rx Trip switch will not trip the Rx, however the 'A' panel Rx Trip switch will function normally.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | SS | <p>Enters 19001-C, ES-0.1 REACTOR TRIP RESPONSE from 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION (Crew Update).</p> <p>Note to examiner: the feedline break malfunction will be inserted after the crew completes step 8. When the crew recognizes the conditions to transition back to 19000-C, go to Page 56.</p> |
| | SS | Directs actions of OATC and UO. |
| | CREW | <p>1. Initiate the following:</p> <ul style="list-style-type: none"> Continuous Actions and Foldout Page. Critical Safety Function Status Trees per 19200-C, F-0 CRITICAL SAFETY FUNCTION STATUS TREE. |
| | SS | 2. IF SI actuation occurs during this procedure, THEN go to 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION. |
| | UO | <p>3. Limit RCS cooldown:</p> <ol style="list-style-type: none"> Verify AFW flow to SGs. (YES) Trip both MFPs. Check SGs NR level – AT LEAST ONE GREATER THEN 10%. (YES) Throttle AFW flow as necessary Verify SG Blowdown Isolation Valves – CLOSED WITH HANDSWITCHES IN CLOSE. (YES) |

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Scenario No.: 3

Event No.: 9

Event Description: If the Lo-Lo SGWL Reactor Trip setpoint is reached for Event 8, the reactor will not automatically trip requiring the crew to perform a manual reactor trip. The 'C' panel Rx Trip switch will not trip the Rx, however the 'A' panel Rx Trip switch will function normally.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | 4. Check RCS temperature stable at or trending to 557°F With RCP(s) running – RCS AVERAGE TEMPERATURE. (YES) |
| | UO | 5. Check FW status: a. Average RCS temperature – LESS THAN 564°F. (NO) RNO 5.a. WHEN average RCS temperature is less than 564F, THEN perform Step 5.b Go to Step 6. |
| | UO | 6. Check total feed flow capability to SGs – GREATER THEN 570 GPM AVAILABLE. (YES) |
| | OATC | 7. Check all Rods – FULLY INSERTED. (YES) |
| | UO | 8. Check Main Generator Output Breakers – OPEN. (YES) END OF EVENT 9, PROCEED TO EVENTS # 10, 11, & 12 |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11, & 12

Event Description: Following a loss of all feedwater flow and a reactor trip the crew transitioned to 19001-C ES-0.1 REACTOR TRIP RESPONSE from 19000-C E-0 REACTOR TRIP OR SAFETY INJECTION. While performing 19001-C, a feedwater line break occurs on Steam Generator #3 IRC with complications. CS pump B will fail to auto start but may be manually started by the crew (OATC) - CS pump A will not operate due to previous fault on 1AA02. Both trains of Main Steam Line Auto Isolation will fail to actuate but may be manually actuated by the crew (UO).

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | SS | <p>NOTE to SIMBOOTH: Insert FW Line Break at this point.</p> <p>9. Perform the following:</p> <p>a. Check 18009-C, STEAM GENERATOR TUBE LEAK – IN EFFECT. (NO)</p> <p>RNO 9.a Go to Step 9.d.</p> |
| | SS | <p>9.d Check other AOPs – IN EFFECT. (NO)</p> <p>RNO 9.d. Go to Step 10.</p> |
| | OATC | <p>10. Check PRZR level control:</p> <p>a. Instrument Air – AVAILABLE. (YES)</p> <p>b. PRZR Level – GREATER THAN 17%. (YES)</p> <p>c. Charging and letdown – IN SERVICE. (YES)</p> <p>d. Maintain PRZR level at 25%. (YES)</p> |
| | OATC | <p>11. Check PRZR pressure:</p> <p>a. Pressure – GREATER THAN 1870 PSIG. (YES)</p> <p>b. Pressure – STABLE AT OR TRENDING TO 2235 PSIG. (YES)</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11, & 12

Event Description: Following a loss of all feedwater flow and a reactor trip the crew transitioned to 19001-C ES-0.1 REACTOR TRIP RESPONSE from 19000-C E-0 REACTOR TRIP OR SAFETY INJECTION. While performing 19001-C, a feedwater line break occurs on Steam Generator #3 IRC with complications. CS pump B will fail to auto start but may be manually started by the crew (OATC) - CS pump A will not operate due to previous fault on 1AA02. Both trains of Main Steam Line Auto Isolation will fail to actuate but may be manually actuated by the crew (UO).

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>12. Check SG levels:</p> <ul style="list-style-type: none"> a. NR level – AT LEAST ONE GREATER THAN 10%. (YES) b. Maintain NR level between 10% <u>AND</u> 65%. c. NR level – ANY RISING IN AN UNCONTROLLED MANNER. (NO) <p>RNO 12.c. Go to Step 13.</p> |
| | UO | <p>13. Check AC Busses:</p> <ul style="list-style-type: none"> a. Emergency Buses – ENERGIZED BY OFFSITE POWER. (NO-“A” Train lost previously) b. All Non-1E 4160/480V Busses – ENERGIZED BY OFFSITE POWER. (YES) <p>Note to examiner: by this point the crew is expected to have identified a Hi Containment Pressure SI actuation and transitioned back to 19000-C, “E-0, REACTOR TRIP OR SAFETY INJECTION”.</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11, & 12

Event Description: Following a loss of all feedwater flow and a reactor trip the crew transitioned to 19001-C ES-0.1 REACTOR TRIP RESPONSE from 19000-C E-0 REACTOR TRIP OR SAFETY INJECTION. While performing 19001-C, a feedwater line break occurs on Steam Generator #3 IRC with complications. CS pump B will fail to auto start but may be manually started by the crew (OATC) - CS pump A will not operate due to previous fault on 1AA02. Both trains of Main Steam Line Auto Isolation will fail to actuate but may be manually actuated by the crew (UO).

| Time | Position | Applicant's Action or Behavior |
|------|--------------------------|--|
| | UO OATC | <p>Diagnose Main Feed Line # 3 faulted IRC.</p> <p>Symptoms / alarms:</p> <p>ALB01-E06 CNMT HI TEMP ALB01-F06 CNMT HI MSTR</p> <p>Indications:</p> <ul style="list-style-type: none"> Containment pressure indications rapidly rising. |
| | OATC SS | <p>Recognize High Containment Pressure SI at 3.8 psig on Containment Pressure.</p> <p>Note to examiner: Containment pressure rises rapidly and the crew may attempt to enter 18008-C, SECONDARY COOLANT LEAKAGE but will not have time to take significant actions.</p> |
| | SS CREW SS | <p>Transitions from 19001-C to 19000-C due to auto safety injection on Hi Containment Pressure. (Crew Update)</p> <p>Performs Immediate Operator Actions per 19000-C, "E-0 REACTOR TRIP or SAFETY INJECTION".</p> <p>Makes a page announcement of Safety Injection.</p> |
| | OATC | <p>1. Check Reactor Trip:</p> <ul style="list-style-type: none"> Rod Bottom Lights – LIT (YES) Reactor Trip and Bypass Breakers – OPEN (YES) Neutron Flux – LOWERING (YES) |
| | UO | <p>2. Check Turbine Trip:</p> <ul style="list-style-type: none"> All Turbine Stop Valves – CLOSED (YES) |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11, & 12

Event Description: Following a loss of all feedwater flow and a reactor trip the crew transitioned to 19001-C ES-0.1 REACTOR TRIP RESPONSE from 19000-C E-0 REACTOR TRIP OR SAFETY INJECTION. While performing 19001-C, a feedwater line break occurs on Steam Generator #3 IRC with complications. CS pump B will fail to auto start but may be manually started by the crew (OATC) - CS pump A will not operate due to previous fault on 1AA02. Both trains of Main Steam Line Auto Isolation will fail to actuate but may be manually actuated by the crew (UO).

| Time | Position | Applicant's Action or Behavior |
|------|------------------|---|
| | UO | 3. Check Power to AC Emergency Buses: <ul style="list-style-type: none"> a. AC Emergency Busses – AT LEAST ONE ENERGIZED. <ul style="list-style-type: none"> • 4160 AC 1E Busses (YES, 1BA03 only) b. AC Emergency Busses – ALL ENERGIZED. <ul style="list-style-type: none"> • 4160V AC 1E Busses (NO) • 480V AC 1E Busses (NO) RNO 3.b. Try to restore power to de-energized AC Emergency Bus while continuing with Step 4. |
| | OATC | 4. Check if SI is actuated: <ul style="list-style-type: none"> • Any SI annunciators – LIT (YES) • SI ACTUATED BPLP window – LIT (YES) |
| | SS | Go to Step 6. |
| | SS CREW | 6. Initiate the Foldout Page. |
| | SS OATC UO | 7. Perform the following: <ul style="list-style-type: none"> • OATC Initial Actions (Page 58) • UO Initial Actions (Page 62) NOTE: SS initiates Step 8 after OATC/UO Initial Actions completed. |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11, & 12

Event Description: Following a loss of all feedwater flow and a reactor trip the crew transitioned to 19001-C ES-0.1 REACTOR TRIP RESPONSE from 19000-C E-0 REACTOR TRIP OR SAFETY INJECTION. While performing 19001-C, a feedwater line break occurs on Steam Generator #3 IRC with complications. CS pump B will fail to auto start but may be manually started by the crew (OATC) - CS pump A will not operate due to previous fault on 1AA02. Both trains of Main Steam Line Auto Isolation will fail to actuate but may be manually actuated by the crew (UO).

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | PERFORMS OATC INITIAL ACTIONS of E-O, 19000 1. Check both trains of ECCS equipment – ALIGNING FOR INJECTION PHASE: <ul style="list-style-type: none"> MLB indication (NO) RNO 1. Actuate SI. ('A' train will not actuate due to loss of 1AA02). |
| | OATC | 2. Check Containment Isolation Phase A – ACTUATED: <ul style="list-style-type: none"> CIA MLB indication (YES) |
| | OATC | 3. Check ECCS Pumps and NCP status: <ul style="list-style-type: none"> a. CCPs RUNNING. (YES) b. SI Pumps – RUNNING. (YES) c. RHR pumps – RUNNING. (YES, 'B' only, 'A' DTO) d. NCP – TRIPPED. (YES) |
| | OATC | 4. Verify CCW Pumps – ONLY TWO RUNNING EACH TRAIN. (YES, Train B only) |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11, & 12

Event Description: Following a loss of all feedwater flow and a reactor trip the crew transitioned to 19001-C ES-0.1 REACTOR TRIP RESPONSE from 19000-C E-0 REACTOR TRIP OR SAFETY INJECTION. While performing 19001-C, a feedwater line break occurs on Steam Generator #3 IRC with complications. CS pump B will fail to auto start but may be manually started by the crew (OATC) - CS pump A will not operate due to previous fault on 1AA02. Both trains of Main Steam Line Auto Isolation will fail to actuate but may be manually actuated by the crew (UO).

| Time | Position | Applicant's Action or Behavior |
|------|------------|--|
| | OATC | PERFORMS OATC INITIAL ACTIONS 5. Verify proper NSCW system operation: <ul style="list-style-type: none"> a. NSCW Pumps – ONLY TWO RUNNING EACH TRAIN. (YES, Train 'B' only) b. NSCW TOWER RTN HDR BYPASS BASIN hand switches – IN AUTO: <ul style="list-style-type: none"> • HS-1668A • HS-1669A |
| | OATC UO | 6. Verify Containment Cooling Units: <ul style="list-style-type: none"> a. ALL RUNNING IN LOW SPEED <ul style="list-style-type: none"> • MLB indication (NO, Train B only) b. NSCW Cooler isolation valves – OPEN <ul style="list-style-type: none"> • MLB indication (YES) |
| | OATC | 7. Check Containment Ventilation Isolation: <ul style="list-style-type: none"> a. Dampers and Valves – CLOSED <ul style="list-style-type: none"> • CVI MLB indication (YES) |

Scenario No.: 3

Event No.: 10, 11, & 12

Event Description: Following a loss of all feedwater flow and a reactor trip the crew transitioned to 19001-C ES-0.1 REACTOR TRIP RESPONSE from 19000-C E-0 REACTOR TRIP OR SAFETY INJECTION. While performing 19001-C, a feedwater line break occurs on Steam Generator #3 IRC with complications. CS pump B will fail to auto start but may be manually started by the crew (OATC) - CS pump A will not operate due to previous fault on 1AA02. Both trains of Main Steam Line Auto Isolation will fail to actuate but may be manually actuated by the crew (UO).

| Time | Position | Applicant's Action or Behavior |
|-------------|----------------------|--|
| | OATC Critical | <p>PERFORMS OATC INITIAL ACTIONS</p> <p>8. Check Containment pressure – REMAINED LESS THAN 21.5 PSIG. (NO)</p> <p>RNO 8. Verify the following:</p> <ul style="list-style-type: none"> a. Containment Spray actuated. (YES) b. Containment Spray Pump discharge valves open. (YES) c. Containment Spray Pumps running. (NO) <p>Note to examiner: The OATC will start Containment Spray Pump B to satisfy the <i>Critical Step.</i></p> |
| | OATC | <p>9. Check ECCS flows:</p> <ul style="list-style-type: none"> a. BIT flow. (YES) b. RCS pressure – LESS THAN 1625 PSIG. (YES) c. SI Pump flow. (YES) d. RCS pressure – LESS THAN 300 PSIG. (NO) <p>RNO 9.d. Go to Step 10.</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11, & 12

Event Description: Following a loss of all feedwater flow and a reactor trip the crew transitioned to 19001-C ES-0.1 REACTOR TRIP RESPONSE from 19000-C E-0 REACTOR TRIP OR SAFETY INJECTION. While performing 19001-C, a feedwater line break occurs on Steam Generator #3 IRC with complications. CS pump B will fail to auto start but may be manually started by the crew (OATC) - CS pump A will not operate due to previous fault on 1AA02. Both trains of Main Steam Line Auto Isolation will fail to actuate but may be manually actuated by the crew (UO).

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | PERFORMS OATC INITIAL ACTIONS 10. Check ECCS Valve alignment – PROPER INJECTION LINEUP INDICATED ON MLBs. (YES) |
| | OATC | 11. Check ACCW Pumps – AT LEAST ONE RUNNING. (YES) |
| | OATC | 12. Adjust Seal Injection flow to all RCPs 8 TO 13 GPM. |
| | OATC | 13. Dispatch Operator to ensure one train of SPENT FUEL POOL COOLING in service per 13719, SPENT FUEL POOL COOLING AND PURIFICATION SYSTEM. END OF OATC INITIAL OPERATOR ACTIONS, return to E-0 Step 8 (Page 65) |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11, & 12

Event Description: Following a loss of all feedwater flow and a reactor trip the crew transitioned to 19001-C ES-0.1 REACTOR TRIP RESPONSE from 19000-C E-0 REACTOR TRIP OR SAFETY INJECTION. While performing 19001-C, a feedwater line break occurs on Steam Generator #3 IRC with complications. CS pump B will fail to auto start but may be manually started by the crew (OATC) - CS pump A will not operate due to previous fault on 1AA02. Both trains of Main Steam Line Auto Isolation will fail to actuate but may be manually actuated by the crew (UO).

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | UO INITIAL ACTIONS 1. Check AFW Pumps – RUNNING. <ul style="list-style-type: none"> MDAFW Pumps. (YES, 'B' only, 'A' Danger Tagged) TDAFW Pump, if required. (YES) |
| | UO | 2. Check NR level in at least one SG – GREATER THAN 10%. (32% ADVERSE). (NO) RNO 2. Establish AFW flow greater than 570 gpm by starting pumps and aligning valves as necessary. |
| | UO | 3. Check if main steamlines should be isolated: (YES) <ol style="list-style-type: none"> Check for one or more of the following conditions: <p>Any steamline pressure – LESS THAN OR EQUAL TO 585 PSIG.</p> <p>Containment pressure – GREATER THAN 14.5 PSIG.</p> <p>Low Steam Pressure SI/SLI – BLOCKED AND High Steam Pressure Rate – ONE TWO OR MORE CHANNELS OF ANY STEAMLINE.</p> Verify Main Steamline Isolation and Bypass Valves – CLOSED. (YES) <p>Note to examiner: on first verification, the UO will recognize that automatic SLI has failed for both trains. The UO will then manually actuate Main Steamline Isolation and then re-verify Main & Bypass Steam Isolation Valves – CLOSED.</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11, & 12

Event Description: Following a loss of all feedwater flow and a reactor trip the crew transitioned to 19001-C ES-0.1 REACTOR TRIP RESPONSE from 19000-C E-0 REACTOR TRIP OR SAFETY INJECTION. While performing 19001-C, a feedwater line break occurs on Steam Generator #3 IRC with complications. CS pump B will fail to auto start but may be manually started by the crew (OATC) - CS pump A will not operate due to previous fault on 1AA02. Both trains of Main Steam Line Auto Isolation will fail to actuate but may be manually actuated by the crew (UO).

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | UO INITIAL ACTIONS 4. Verify FW Isolation Valves closed: <ul style="list-style-type: none"> • MFIVs (YES) • BFIVs (YES) • MFRVs (YES) • BFRVs (YES) |
| | UO | 5. Verify SG Blowdown isolated: <ul style="list-style-type: none"> • Place SG Blowdown isolation Valve handswitches HS-7603A, B, C, and D in the CLOSE position. (YES) <p>Note to examiner: The UO will place the HS-7603 valves in the hard closed position.</p> <ul style="list-style-type: none"> • SG Sample Isolation Valves – CLOSED. (YES) |
| | UO | 6. Verify Diesel Generators – RUNNING. (YES, 'B' only) |
| | UO | 7. Throttle total AFW flow as necessary to maintain SG NR levels between 10% (32% ADVERSE) and 65%. |
| | UO | 8. Verify both MFPs – TRIPPED. (YES) |
| | UO | 9. Check Main Generator Output Breakers – OPEN. (YES) END OF UO INITIAL ACTIONS , return to step 8 of E-0. (Page 65) |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11, & 12

Event Description: Following a loss of all feedwater flow and a reactor trip the crew transitioned to 19001-C ES-0.1 REACTOR TRIP RESPONSE from 19000-C E-0 REACTOR TRIP OR SAFETY INJECTION. While performing 19001-C, a feedwater line break occurs on Steam Generator #3 IRC with complications. CS pump B will fail to auto start but may be manually started by the crew (OATC) - CS pump A will not operate due to previous fault on 1AA02. Both trains of Main Steam Line Auto Isolation will fail to actuate but may be manually actuated by the crew (UO).

| Time | Position | Applicant's Action or Behavior |
|------|------------|--|
| | OATC UO | <p>19000-C, E-0 actions beginning with step 8.</p> <p>8. Initiate the Continuous Actions Page.</p> |
| | OATC | <p>9. Check RCS temperature stable at or trending to 557°F:</p> <p>With RCP(s) running – RCS AVERAGE TEMPERATURE. (NO)</p> <p>RNO 9. IF temperature is less than 557°F and lowering, (it is) THEN perform the following as necessary:</p> <ul style="list-style-type: none"> a. Stop dumping steam. b. Perform the following as appropriate: <p>IF at least one SG NR level greater than 10%. (32% ADVERSE), THEN lower total feed flow.</p> <p style="text-align: center;">-OR-</p> <p>If all SG NR levels less than 10% (32% ADVERSE), THEN lower total feed flow to NOT less than 570 gpm.</p> c. If cooldown continues, THEN close MSIVs and BSIVs. d. If temperature greater than 557°F and rising, THEN dump steam. |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11, & 12

Event Description: Following a loss of all feedwater flow and a reactor trip the crew transitioned to 19001-C ES-0.1 REACTOR TRIP RESPONSE from 19000-C E-0 REACTOR TRIP OR SAFETY INJECTION. While performing 19001-C, a feedwater line break occurs on Steam Generator #3 IRC with complications. CS pump B will fail to auto start but may be manually started by the crew (OATC) - CS pump A will not operate due to previous fault on 1AA02. Both trains of Main Steam Line Auto Isolation will fail to actuate but may be manually actuated by the crew (UO).

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p><u>CAUTION:</u> A PRZR PORV Block Valve which was closed to isolate an excessively leaking or open PRZR PORV should not be opened unless used to prevent challenging the PRZR Safeties.</p> <p>10. Check PRZR PORVs, Block Valves, and Spray Valves:</p> <ul style="list-style-type: none"> a. PRZR PORVs – CLOSED AND IN AUTO. (YES) b. Normal PRZR Spray Valves – CLOSED. (YES) c. Power to at least one Block Valve – AVAILABLE. (YES) d. PRZR PORV Block Valves – AT LEAST ONE OPEN. (NO) <p>RNO 10.d. Verify open at least one PRZR PORV Block Valve when PRZR pressure is greater than 2185 psig.</p> |
| | OATC | <p>11. Check if RCPs should be stopped.</p> <ul style="list-style-type: none"> a. ECCS Pumps – AT LEAST ONE RUNNING: (YES) <ul style="list-style-type: none"> • CCP or SI Pump b. RCS pressure – LESS THAN 1375 PSIG. (YES) c. Stop all RCPs. |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11, & 12

Event Description: Following a loss of all feedwater flow and a reactor trip the crew transitioned to 19001-C ES-0.1 REACTOR TRIP RESPONSE from 19000-C E-0 REACTOR TRIP OR SAFETY INJECTION. While performing 19001-C, a feedwater line break occurs on Steam Generator #3 IRC with complications. CS pump B will fail to auto start but may be manually started by the crew (OATC) - CS pump A will not operate due to previous fault on 1AA02. Both trains of Main Steam Line Auto Isolation will fail to actuate but may be manually actuated by the crew (UO).

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | 12. Check SGs secondary pressure boundaries: a. SG Pressures: Any lowering in an uncontrolled manner. (YES) -OR- Any completely depressurized. b. Go to 19020-C, E-2 FAULTED STEAM GENERATOR ISOLATION. |
| | SS | Transitions to 19020-C, E-2 FAULTED STEAM GENERATOR ISOLATION. |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11 & 12 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

| Time | Position | Applicant's Action or Behavior |
|------|----------------|---|
| | CREW SS | <p>1. Initiate critical safety function status trees per 19200-C, F-O CRITICAL SAFETY FUNCTION STATUS TREE.</p> <p>2. Initiate NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION.</p> <p>Note to examiner:</p> <p>1) The SS will call the Simbooth to have the Shift Manager implement NMP-EP-110.</p> <p>2) Once CSFST monitoring has begun, the crew may transition to 19251-C, FR-Z.1 RESPONSE TO HIGH CONTAINMENT PRESSURE once a valid orange or red condition exists. In this case, go to Page 72 for 19251-C procedure. When that procedure is completed, return to the applicable page/step in this procedure.</p> |
| | OATC | CAUTION: At least one SG should be available for RCS cooldown. |
| | UO | 3. Verify Main Steamline Isolation and Bypass Valves – CLOSED. (YES) |
| | UO | <p>4. Check SGs secondary pressure boundaries:</p> <p>a. Identify intact SG(s): (# 1, 2, and 4 are intact)</p> <ul style="list-style-type: none"> SG pressures – ANY STABLE OR RISING (YES) <p>b. Identify faulted SG(s).</p> <p>ANY SG PRESSURE LOWERING IN AN UNCONTROLLED MANNER. (YES, SG # 3)</p> <p>-OR-</p> <p>ANY SG COMPLETELY DEPRESSURIZED. (maybe by now, SG # 3)</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11 & 12 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

| Time | Position | Applicant's Action or Behavior |
|------|---|--|
| | UO | <p>5. Isolate Main Feedwater to the faulted SG(s):</p> <ul style="list-style-type: none"> Close affected MFIVs: HV-5227 (SG 1) HV-5228 (SG 2) HV-5229 (SG 3) HV-5230 (SG 4) Close affected BFIVs: HV-15196 (SG 1) HV-15197 (SG 2) HV-15198 (SG 3) HV 15199 (SG 4) |
| | <p>UO</p> <p><i>Critical</i></p> <p><i>Critical</i></p> | <p>6. Isolate Auxiliary Feedwater to the faulted SG(s):</p> <ul style="list-style-type: none"> Close affected MDAFW Pump Throttle Valves: HV-5139 – SG 1 FROM MDAFW PMP-A HV-5132 – SG 2 FROM MDAFW PMP-B HV-5134 – SG 3 FROM MDAFW PMP-B HV-5137 – SG 3 FROM MDAFW PMP-A Close affected TDAFW Pump Throttle Valves: HV-5122 – SG 1 FROM TDAFW HV-5125 – SG 2 FROM TDAFW HV-5127 – SG 3 FROM TDAFW HV-5120 – SG 3 FROM TDAFW <p>Note to examiner: The valves bolded above are critical at this time IF not already previously closed.</p> |
| | UO | <p>7. Check at least one MDAFW Pump – RUNNING AND CAPABLE OF FEEDING SG(s) NEEDED FOR RCS COOLDOWN. (YES)</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11 & 12 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

| Time | Position | Applicant's Action or Behavior |
|------|-----------------------------------|--|
| | UO | 8. Close affected TDAFW Pump Steam Supply Valve(s): (Not Applicable) |
| | UO Critical | 9. Verify affected SG ARV(s) – CLOSED: PV-3000 (SG 1) PV-3010 (SG 2) PV-3020 (SG 3) PV-3030 (SG 4) |
| | UO Critical | 10. Align SGBD valves: <ul style="list-style-type: none"> Place SG Blowdown Isolation Valve handswitches in CLOSE position. Close sample valves. HV-9451 (SG 1) HV-9452 (SG 2) HV-9453 (SG 3) HV-9454 (SG 4) |
| | UO | 11. Verify faulted SG(s) remains isolated during subsequent recovery actions unless needed for RCS cooldown or SG activity sampling. |
| | UO | 12. Check CST level – GREATER THAN 15%. (YES) |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11 & 12 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>13. Initiate checking if SG Tubes intact:</p> <p>a. Direct Chemistry to take periodic activity samples of all SGs one at a time.</p> <p>b. Secondary radiation – NORMAL. (YES)</p> <ul style="list-style-type: none"> • MAIN STM LINE MONITORS <ul style="list-style-type: none"> • RE-13120 (SG 1) • RE-13121 (SG 2) • RE-13122 (SG 3) • RE-13119 (SG 4) • CND SR AIR EJCTR/STM RAD MONITORS: <ul style="list-style-type: none"> • RE-12839C • RE-12839D (if on scale) • RE-12839E (if on scale) • STM GEN LIQ PROCESS RAD: <ul style="list-style-type: none"> • RE-0019 (Sample) • RE-0021 (Blowdown) • SG sample radiation. <p>c. Check SG levels – ANY RISING IN AN UNCONTROLLED MANNER (NO)</p> <p>RNO 13.c. Go to Step 14.</p> <p>NOTE to SIMBOOTH OPERATOR: If faulted SG # 3 has blown down at this time, report back "Chemistry has no pressure or sample flow from SG # 3."</p> |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11 & 12 (E-2 Actions)

Event Description: 19020-C E-2 actions for Faulted Steam Generator.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>14. Check if ECCS flow should be reduced:</p> <ul style="list-style-type: none"> a. RCS Subcooling – GREATER THAN 24°F. (38°F ADVERSE) (YES) b. Secondary Heat Sink: (YES) <p>Total feed flow to intact SGs – GREATER THAN 570 GPM.</p> <p>-OR-</p> <p>Narrow range level in at least one intact SG – GREATER THAN 10%. (32% ADVERSE)</p> <ul style="list-style-type: none"> c. RCS pressure – STABLE or RISING. (YES) d. PRZR level – GREATER THAN 9%. (37% ADVERSE) (Maybe) e. Go to 19011-C, ES-1.1 SI TERMINATION. <p>RNO 14.e. Go to Step 15.</p> <p>Note to examiner: Depending on the timing and how fast the crew makes it through the procedures, PRZR level may be above 37% ADVERSE or NOT. IF > 37%, the crew will go to 19011-C, SI TERMINATION.</p> <p>IF < 37% ADVERSE, the crew will transition to 19010-C, E-1 LOSS OF REACTOR OR SECONDARY COOLANT.</p> |
| | | 15. Go to 19010-C, E-1 LOSS OF REACTOR OR SECONDARY COOLANT. |
| | | END OF SCENARIO, freeze the simulator if a NRC Chief Examiner concurs. |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11 & 12 (FR-Z.1 Actions)

Event Description: 19251-C FR-Z.1 actions for Hi Containment Pressure.

| Time | Position | Applicant's Action or Behavior |
|------|----------------|--|
| | SS | Transition to 19251-C due to a Yellow, Orange or Red condition on CSFST. (Crew Update) |
| | CREW SS | 1. Initiate the following: <ul style="list-style-type: none"> Continuous Actions Page. NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION. Note to examiner: The SS will call the Simbooth to have the Shift Manager implement NMP-EP-110. |
| | OATC | 2. Check RWST level – GREATER THAN 29%. (YES) |
| | OATC | 3. Check Containment Isolation Phase A – ACTUATED. <ul style="list-style-type: none"> CIA MLB indication (YES) |
| | UO | 4. Check Containment Ventilation Isolation: <ul style="list-style-type: none"> a. Dampers and Valves - CLOSED: <ul style="list-style-type: none"> CVI MLB indication (YES) |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11 & 12 (FR-Z.1 Actions)

Event Description: 19251-C FR-Z.1 actions for Hi Containment Pressure.

| Time | Position | Applicant's Action or Behavior |
|------|-----------------|--|
| | OATC | 5. Check if Containment Spray is required: <ul style="list-style-type: none"> a. Containment pressure – HAS RISEN TO GREATER THAN 21.5 PSIG. (YES) b. CS- ACTUATED. (YES) c. CS Pumps – RUNNING. (NO) |
| | Critical | RNO 5.c. Start pumps (Only CS Pump 'B' is capable of being run.) Note to examiner: the above bolded step is a critical step IF pump not previously started. |
| | OATC/UO | 6. Check containment spray valve alignment: <ul style="list-style-type: none"> a. Check RWST level – GREATER THAN 8%. (YES) b. Check Containment Spray injection phase alignment: <ul style="list-style-type: none"> 1) CS Pump RWST suction valves – OPEN <ul style="list-style-type: none"> • HV-9017A – CNMT SPRAY PUMP A RWST SUCT ISO VLV. (YES) • HV-9017B – CNMT SPRAY PUMP B RWST SUCT ISO VLV. (YES) 2) CNMT SPRAY ISO VLV – OPEN <ul style="list-style-type: none"> • HV-9001A (YES) • HV-9001B (YES) c. Go to Step 8 |

Scenario No.: 3

Event Description: 19251-C FR-Z.1 actions for Hi Containment Pressure.

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Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11 & 12 (FR-Z.1 Actions)

Event Description: 19251-C FR-Z.1 actions for Hi Containment Pressure.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>11. Check if feed flow should be isolated to any SG:</p> <p>a. Pressure in all SGs:</p> <p>ANY SG PRESSURE LOWERING IN AN UNCONTROLLED MANNER. (YES, SG # 3)</p> <p>-OR-</p> <p>ANY SG COMPLETELY DEPRESSURIZED. (maybe, SG # 3)</p> |
| | UO | <p>12. Isolate Main Feedwater to the faulted SG(s):</p> <ul style="list-style-type: none">Close affected MFIVs: HV-5227 (SG 1) HV-5228 (SG 2) HV-5229 (SG3) HV-5230 (SG 4)Close affected BFIVs: HV-15196 (SG 1) HV-15197 (SG 2) HV-15198 (SG 3) HV-15199 (SG 4) |

Op-Test No.: 2013-301

Scenario No.: 3

Event No.: 10, 11 & 12 (FR-Z.1 Actions)

Event Description: 19251-C FR-Z.1 actions for Hi Containment Pressure.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>13. Isolate Auxiliary Feedwater to the faulted SG(s):</p> <ul style="list-style-type: none">• Close affected MDAFW Pump Throttle Valves:<ul style="list-style-type: none">• HV-5139 – SG 1 FROM MDAFW PMP-A• HV-5132 – SG 2 FROM MDAFW PMP-B• HV-5134 – SG 3 FROM MDAFW PMP- B• HV-5137 – SG 4 FROM MDAFW PMP-A• Close affected TDAFW Pump Throttle Valves:<ul style="list-style-type: none">• HV-5122 – SG 1 FROM TDAFW• HV-5125 – SG 2 FROM TDAFW• HV-5127 – SG 3 FROM TDAFW• HV-5120 – SG 4 FROM TDAFW |
| | SS | <p>14. Return to procedure and step in effect.</p> |

Facility: Vogtle Scenario No.: 4 Op-Test No.: 2013-301

Examiners: _____ Operators: _____

Initial Conditions: The plant is at 100% power, EOL, steady state operations.
 (Base IC # 19, snapped to IC # 173 for HL18 NRC Exam)

Equipment OOS: 'A' RHR Pump for motor repair (TS 3.5.2, Condition A), 'A' MDAFW Pump for bearing replacement (TS 3.7.5, Condition B)

Turnover: Maintain power operations per 12004DF-1 (Power Operation, Mode 1) section 4.3.
 Containment Mini-Purge in service for containment entry next shift.

Preloaded Malfunctions:

ES01 – Failure of Automatic Reactor Trip

ES02 – Failure of Manual Reactor Trip

SI08A/B – RWST Sludge Mixing Valve 10957/10958 Auto Closure Failure

ES19A – CVI Train A Auto Actuation Failure

ES19B – CVI Train B Auto Actuation Failure

Overrides

HS0456A – 'B' Train PORV – CLOSE

HV-8104 – Emergency Borate valve to CLOSE

| Event No. | Malf. No. | Event Type* | Event Description |
|---------------------|---|-------------------------------------|---|
| T1 | NI10B @ 100% | I-OATC I-SS N-UO TS-SS | PRNI-42 fails high causing automatic inward rod motion. Following completion of IOA, switches are repositioned at NI Cab to remove failed detector from service. LCO 3.3.1-1, Condition A (immediately); Function 2.a, Condition D; Function 2.b, Condition E; Function 3, Condition E; Function 6, Condition E; Function 16.b/c/d, Condition S (1 hour); Function 16.e, Condition R (1 hour). |
| T2 | CV13 @ 100% | I-OATC I-SS | CVCS VCT level transmitter LT-112 fails high |
| 3 Pre-loaded | RFTK02 (95%-88% 20 minute ramp) SI08A SI08B | C-UO C-SS TS-SS | RWST sludge mixing line pipe break with valve auto closure failure. Malfunction will be deleted when candidate manually closes Sludge mixing valves. LCO 3.5.4, Condition 'B' & Condition 'D' (1 hour) TR 13.1.7, Condition 'D' (Immediate) |

| Event No. | Malf. No. | Event Type* | Event Description |
|--|---|--|--|
| T4 Pre-loaded | RM0002 @ 100% ES19A ES19B | C-UO C-SS TS-SS | Cnmt Area Lo Range – RE-0002 fails high, CVI fails to actuate. LCO 3.3.6, FU3.d, Condition 'A' |
| 5 | MFP A hi vib=TRUE MFP A Hi Vibes=6.0 | R-OATC N-UO R-SS | Rapid power reduction due to MFPT A high vibrations |
| T6 T7 | FW01B RD07 (1:10 min delay) | M-ALL C-OATC C-SS Critical | Trip of B MFPT due to remote switch failure requiring a reactor trip. The reactor will fail to trip leading to an ATWT condition. (~ 90% P _{RX}) ATWT – Auto rod motion fails after ~ 1 minute (Manual rod insertion or establishment of Emergency Boration flow is a critical step). |
| T8 T8 T8 | AF02A AF03B FW01A | NOTE M M M | These malfunctions are to force crew to LOHS and are part of the overall MAJOR event. (~ 50% P _{RX}) TDAFW trips on overspeed 'B' MDAFW pump coupling shears Trip of A MFPT due to excessive vibrations from increased speed following trip of B MFPT |
| 9 Pre load | HS0456A | C-OATC C-SS Critical | 'B' Train PORV fails to open automatically or manually, requires use of Reactor Vessel Head Vents during Feed and Bleed of LOHS. |
| 10 | Delete AF02A | | TDAFW mechanical over speed trip is repaired allowing restart of the pump to feed the SGs. |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | |



NUCLEAR SAFETY FOCUS TARGET ZERO

| | |
|--|--|
| | |
| Protected Train: <input type="checkbox"/> Alpha <input checked="" type="checkbox"/> Bravo | EOOS: <input checked="" type="checkbox"/> Green <input type="checkbox"/> Yellow <input type="checkbox"/> Orange <input type="checkbox"/> Red |
| | |
| Plant Conditions: | 100 % power, EOL. |
| | |
| Major Activities: | Maintain power operations per 12004DF-1 (Power Operation, Mode 1) section 4.3. |
| | |
| Active LCOs: | <input type="checkbox"/> LCO 3.5.2 Condition A is in effect due to RHR Pump 'A' tagged out. <input type="checkbox"/> LCO 3.7.5 Condition B is in effect due to MDAFW Pump 'A' tagged out. |
| | |
| OOS/ Degraded CR Instruments: | <input type="checkbox"/> None |
| | |
| Narrative Status: | <input type="checkbox"/> Containment mini-purge is in service for a planned Containment Entry on next shift. <input type="checkbox"/> RHR Pump 'A' is tagged out for motor repair, expected return-to-service time is 24 hours with 48 hours left on a shutdown LCO of 72 hours. <input type="checkbox"/> MDAFW Pump 'A' is tagged out for bearing replacement, expected return-to-service time is 14 hours with 24 hours left on a shutdown LCO of 72 hours. <input type="checkbox"/> A severe thunderstorm warning has been issued for Richmond, Burke, and Screven Counties in Georgia. High winds and rain, which could be heavy at times, will be in the area for the next 10-12 hours. The Severe Weather Checklist is in effect. |

UNIT 1 REACTIVITY BRIEFING SHEET

| | | | | | | | |
|---------------|-----|--------------|--------|----------------|------------------|------|--|
| Shift: | Day | Date: | 4/9/13 | Burnup: | 21167.69 MWD/MTU | | |
| | | | | | As of 4/9/13 | 7:12 | |

MINIMUM SHIFT REACTIVITY INFORMATION TO BE BRIEFED

Power: 100 **Rod Motion:** AUTO

Current Temperature Control Strategy: DILUTION

Currently Making Up: 50.0 gal **Every:** 1 to 2 hrs

The desired Tavg operating band is 585.5 +/- 0.05 degrees F

| | | |
|--|------|-------------|
| CVCS makeup system boric acid flow per 100 gal makeup: | 2.3 | gallons/100 |
| CVCS makeup system pot setting(FIC-0110): | 0.59 | |

BTRS Strategy: none

AFD Strategy: Maintain on target plus/minus 1 AFD units

Reactivity System Components Degraded/OOS:

None

Activities expected that may affect core reactivity (Reactivity Focus Items):

None

CURRENT CORE REACTIVITY PARAMETERS

Boron Worth: 9.5 pcm/ppm **PCM per 1% pwr change:** 26.6

Current MTC value: HFP: -33.0 pcm/F HZP: -14.7 pcm/F

Current BAST Cb: 7000 ppm **Current RCS Cb:** 164 ppm

| | | | |
|-------------------------------|------------------------|-------|----------------|
| Boration required per: | degree F: | 31.4 | gallons |
| | 1% pwr change: | 25.2 | gallons |
| | 10% pwr change: | 252.5 | gallons |
| | 30% pwr change: | 757.5 | gallons |

| | | | |
|-------------------------|----------------|--------|---------|
| Dilutions required per: | degree F: | 1322.2 | gallons |
| | 1% pwr change: | 1061.3 | gallons |

| | | |
|--|--------|---------------------------------|
| Boration required for stuck rods: | 2828.2 | gallons for 2 stuck rods |
| | 4292.7 | gallons for 3 stuck rods |

If more than 3 rods are stuck begin boration and calculate for actual number of stuck rods

Human Performance tools:

| | | |
|---------------|-------------------------|-----------------------|
| Peer check | Three-way communication | Placekeeping |
| Procedure Use | STAR | Time-Out |
| | | Situational Awareness |

Vaild for PTDB Cycle 18 Tab 1.0 rev 29 approved 9/29/12 and Tab 16.0 rev 19 approved 10/5/12

Event 1:

PRNI-42 fails high causing automatic inward rod motion. Following completion of IOA, switches are repositioned at NI Cab to remove failed detector from service.

Verifiable Actions:

OATC – Recognize failure of PRNI

OATC – Perform IOA of AOP 18002-C.

UO – Perform subsequent operator actions for failed PRNI at NI Cabinet

Technical Specifications:

3.3.1-1, Condition A (immediately)

Function 2.a, Condition D

Function 2.b, Condition E

Function 3, Condition E

Function 6, Condition E

Function 16.b/c/d, Condition S (1 hour)

Function 16.e, Condition R (1 hour).

Event 2:

CVCS VCT level transmitter LT-112 fails high.

Verifiable Actions:

OATC – Manually places VCT divert valve LV-112A in the VCT position to stop letdown diversion to the RHUT and loss of VCT inventory.

OATC – Aligns VCT for manual makeup to maintain VCT level when makeup is necessary.

Technical Specifications:

None

Event 3:

An RWST sludge mixing line pipe break will occur with auto closure failure of the sludge mixing line isolation valves LV-10957/LV-10958.

Verifiable Actions:

UO – Manually closes either LV-10957 or LV-10958 to isolate the sludge mixing line break. The valve hand switches are located on the QPCP.

Technical Specifications:

LCO 3.5.4, ECCS, Condition B and Condition D (1 hour action)

TL LCO 13.1.7, (Condition D – Immediate Action)

Event 4:

Containment High Range Radiation monitor RE-0002 fails high.

Verifiable Actions:

UO – Manually closes CVI dampers and starts the Piping Penetration Area Filtration Units.

Technical Specifications:

LCO 3.3.6, FU3.d, Condition A

Event 5:

MFPT “A” will develop high vibrations requiring a rapid power reduction to < 70% power to remove MFPT “A” from service.

Verifiable Actions:

OATC – Inserts control rods and adjusts RCS boron concentration to facilitate the down power.

UO – Reduces Turbine load per direction of 18013-C, Rapid Power Reduction.

Technical Specifications:

None

Event 6, 7:

During rapid power reduction, B MFPT trips due to remote switch failure requiring a reactor trip. The reactor will fail to trip leading to an ATWT condition. ($\sim 90\% P_{RX}$)

Verifiable Actions:

OATC – Initiates a rapid control rod insertion to reduce reactor power. After about 1 minute, auto rod motion will fail requiring the OATC to manually insert control rods.

OATC – Initiates an emergency boration of the RCS through LV-110A and LV-110B since HV-8104 Emergency Boration valve will not open.

UO – Manually trips the turbine which will not automatically trip. This will preserve SG levels during the ATWT event.

Technical Specifications:

None

Event 8, 9:

TDAFW will trip on over speed coincident with a coupling shear of B MDAFW pump. MDAFW pump A is tagged out and no AFW flow will be available, leading to a Loss of Secondary Heat Sink condition. PORV 456 will fail to open in auto or manual requiring the UO to open the reactor vessel head vents for improved heat removal capability. Additionally, A MFPT will trip from increased vibrations due to increased speed following the trip of B MFPT. (~ 50% P_{RX})

Verifiable Actions:

OATC – Stops all running RCPs.

OATC – Manually actuates SI (if not actuated on the Turbine Trip failure)

OATC – Manually arms COPS and opens PORV-455.

UO – Manually opens all Reactor Vessel Head Vent Isolation and Throttle valves.

Technical Specifications:

None

Event 10:

A report from the field will indicate the TDAFW mechanical overspeed trip linkage has been repaired and the TDAFW pump may be used to regain AFW flow.

Verifiable Actions:

UO – Closes TDAFW pump discharge throttle valves.

UO – Holds HV-5106 TDAFW Steam Admission valve closed to reset governor ramp circuit while closing HV-15129 the TDAFW Trip and Throttle Valve.

UO – Opens HV-15129 and HV-5106 to start the TDAFW pump.

UO – Opens desired TDAFW throttle valves to re-establish AFW flow.

The scenario may be stopped after the TDAFW pump is started and AFW flow is established with NRC Chief Examiner approval.

CRITICAL TASKS:**1) Either of the following:**

- a. Manually insert control rods following automatic & manual reactor trip per step 1 RNO of 19211-C, or
- b. Emergency borate the RCS per step 4 of 19211-C

2) Arms COPS and opens PORV-455 to establish bleed path.**3) Establishment of reactor vessel head vent path for reactor bleed on loss of heat sink per step 38 RNO of 19231-C.**

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 1

Event Description: PR N42 fails high resulting in inward rod motion, OATC will be required to place rods in Manual per IOAs of 18002, Nuclear Instrumentation System Malfunction.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>Diagnoses the failure of N42 Power Range NIS.</p> <p>Symptoms / alarms:</p> <ul style="list-style-type: none"> • ALB10-A03 POWER RANGE HI NEUTRON FLX HI SETPOINT ALERT • ALB10-C02 POWER RANGE CHANNEL DEVIATION • ALB10-D03 OVERPOWER ROD STOP • ALB10-F02 POWER RANGE NEUTRON FLX RATE ALERT • ALB10-E06 RADIAL TILT (after a short delay) • ALB12-A05 TAVG / TREF DEVIATION (may or may not come in depending on how far rods insert). <p>Indications:</p> <ul style="list-style-type: none"> • Rapid inward motion of control rods in automatic control. • Green RODS IN light illuminated on vertical section of QMCB • Power Range Trip Status lights illuminated. • Erratic, inconsistent or divergent indication between PR channels. |
| | OATC | <p><u>18002-C, Nuclear Instrumentation System Malfunction</u></p> <p><u>IMMEDIATE OPERATOR ACTIONS</u></p> <p>B1. Place <u>ROD BANK SELECTOR SWITCH</u> in <u>MAN</u> position.</p> |
| | SS | Enters 18002-C, NUCLEAR INSTRUMENTATION SYSTEM MALFUNCTION, section B POWER RANGE DRAWER N41, N42, N43, N44 MALFUNCTION. |
| | UO | B2. Terminates any load change in progress. |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 1

Event Description: PR N42 fails high resulting in inward rod motion, OATC will be required to place rods in Manual per IOAs of 18002, Nuclear Instrumentation System Malfunction.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>B3. Checks THERMAL POWER – GREATER THAN OR EQUAL TO 75%.</p> <p>RNO</p> <p>B3. Go to Step B5.</p> |
| | SS | <p>B4. Direct Engineers to perform 88015-C, QUADRANT POWER TILT MEASUREMENT USING MOVEABLE INCORE DETECTOR SYSTEM as required by Tech Spec SR 3.2.4.2.</p> |
| | UO | <p>B5. Perform the following:</p> <p>a. Select the affected channel on:</p> <ul style="list-style-type: none"> • ROD STOP BYPASS switch. (BPLP light 3-3 lights up) • COMPARATOR CHANNEL DEFEAT switch. • POWER MISMATCH BYPASS switch. • UPPER SECTION switch. • LOWER SECTION switch. <p>b. Reset Rate Trip.</p> <p>NOTE: The UO will receive credit for a normal evolution for performance of step B5.</p> |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 1

Event Description: PR N42 fails high resulting in inward rod motion, OATC will be required to place rods in Manual per IOAs of 18002, Nuclear Instrumentation System Malfunction.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>B6. Restore Tavc to program.</p> <p>Note to examiner: It is expected the OATC will withdraw rods to restore Tavc to program.</p> |
| | OATC | B7. Place rods in AUTO if desired. |
| | OATC | <p>Cue to Simbooth: IF asked, the Shift Manager has given permission to place the rods in auto.</p> <p>B8. Check the operable Power Range Channel(s) indicating properly on NR-45. (they are)</p> |
| | SS | <p>B9. Notify I & C to initiate repairs.</p> <p>Note to examiner: It is expected a crew member will call C & T for a work order, duty manager notification, and to contact I & C.</p> |
| | SS | <p>B10. Bypass affected channel NIS and NSSS grouping using 13509-C, BYPASS TEST INSTRUMENTATION (BTI) PANEL OPERATION.</p> <p>Note to examiner: It is NOT expected the SS will BTI the channel, I & C usually likes to leave the channel as is for troubleshooting and it will be bypassed at their request.</p> |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 1

Event Description: PR N42 fails high resulting in inward rod motion, OATC will be required to place rods in Manual per IOAs of 18002, Nuclear Instrumentation System Malfunction.

| Time | Position | Applicant's Action or Behavior | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|----------|--|---------|----------|-------------|-----|----------|------|---|------|---|---------|---|------|---|---------|------|---|------|---|---------|---|------|---|---------|------|---|------|---|---------|---|------|---|---------|------|---|------|---|---------|---|------|---|---------|
| | OATC | <p>B11. Within one hour, check the following interlocks are in required state for existing unit conditions: (TS 3.3.1) (they are)</p> <ul style="list-style-type: none">• P-7• P-8• P-9• P-10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SS | <p>B12. Within 72 hours, place the inoperable Power Range Channel in trip by performing the following: (TS 3.3.1)</p> <p>a. Remove the AC Control Power Fuses on the affected drawer.</p> <p>b. Trip Overtemperature bistables for the affected channel.</p> <table><tr><th>CHANNEL</th><th>CAB</th><th>FRAME /CARD</th><th>B/S</th><th>SWITCHES</th></tr><tr><td rowspan="2">N-41</td><td>1</td><td>8/22</td><td>3</td><td>TS-411C</td></tr><tr><td>1</td><td>8/22</td><td>4</td><td>TS-411D</td></tr><tr><td rowspan="2">N-42</td><td>2</td><td>8/22</td><td>3</td><td>TS-421C</td></tr><tr><td>2</td><td>8/22</td><td>4</td><td>TS-421D</td></tr><tr><td rowspan="2">N-43</td><td>3</td><td>8/22</td><td>3</td><td>TS-431C</td></tr><tr><td>3</td><td>8/22</td><td>4</td><td>TS-431D</td></tr><tr><td rowspan="2">N-44</td><td>4</td><td>8/22</td><td>3</td><td>TS-441C</td></tr><tr><td>4</td><td>8/22</td><td>4</td><td>TS-441D</td></tr></table> | CHANNEL | CAB | FRAME /CARD | B/S | SWITCHES | N-41 | 1 | 8/22 | 3 | TS-411C | 1 | 8/22 | 4 | TS-411D | N-42 | 2 | 8/22 | 3 | TS-421C | 2 | 8/22 | 4 | TS-421D | N-43 | 3 | 8/22 | 3 | TS-431C | 3 | 8/22 | 4 | TS-431D | N-44 | 4 | 8/22 | 3 | TS-441C | 4 | 8/22 | 4 | TS-441D |
| CHANNEL | CAB | FRAME /CARD | B/S | SWITCHES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N-41 | 1 | 8/22 | 3 | TS-411C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 8/22 | 4 | TS-411D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N-42 | 2 | 8/22 | 3 | TS-421C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2 | 8/22 | 4 | TS-421D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N-43 | 3 | 8/22 | 3 | TS-431C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | 8/22 | 4 | TS-431D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N-44 | 4 | 8/22 | 3 | TS-441C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4 | 8/22 | 4 | TS-441D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SS | <p>B13. Initiate 14915, SPECIAL CONDITIONS SURVEILLANCE LOGS.</p> <p>Note to examiner: The crew will call C & T to perform this. This will be data sheet 7 for One Power Range NI Channel Inoperable.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 1

Event Description: PR N42 fails high resulting in inward rod motion, OATC will be required to place rods in Manual per IOAs of 18002, Nuclear Instrumentation System Malfunction.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | SS | <p>B14. Initiate the applicable actions of the following Technical Specifications:</p> <p>Table 3.3.1-1 Function 2a, Cond D, Function 2b INFO Table 3.3.1-1 Function 3 Table 3.3.1-1 Function 6 Table 3.3.1-1 Function 16b (INFO), c, d, e, Cond R & S SR 3.2.4.2 Quadrant Power Tilt Ratio</p> <p>Note to examiner:</p> <ul style="list-style-type: none"> • FU 2a and 2b, Conditions D, 72 hour action. • FU 3, Condition E, 72 hour action. • FU 6, Condition E, 72 hour action. • FU 16b, c, d, e, Conditions S and R, both 1 hour actions. |
| | SS | B15. This step is N/A at this time. |
| | SS | B16. Initiate 13501, NUCLEAR INSTRUMENTATION SYSTEM when repairs and surveillances are complete. |
| | SS | <p>B17. Return to procedure and step in effect.</p> <p>End of EVENT # 1, Proceed to EVENT # 2.</p> |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 2

Event Description: CVCS VCT Level Transmitter 1LT-112 Fails HIGH causing VCT Level Control Divert Valve (LV-112A) to divert to RHUT and disabling auto make-up to the VCT.

| ime | Position | Applicant's Action or Behavior | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|---------------|--|---------|-----------|---------|----------------|-----|---|----------------|-----|--|------------------------------|-----|---|-------------------|-----|--|--------------------|-----|--|-----------------|-----|-----------------|--------------------|---------------|--------------------|
| | CREW | <p>Diagnoses that CVCS VCT level transmitter 1LT-112 failed high.</p> <p><u>Indications:</u></p> <p>ALB07-E05 "VCT HI/LO LEVEL" Annunciator Automatic makeup initiates.</p> | | | | | | | | | | | | | | | | | | | | | | | | |
| | OATC | <p>References ARP 17007-1 Window E05, "VCT HI/LO LEVEL"</p> <p><u>AUTOMATIC ACTIONS:</u></p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">NOTE</p> <p>VCT automatic makeup should have started at 30 percent or stopped at 50 percent.</p> </div> <ol style="list-style-type: none"> Letdown flow diverts to the HUT <u>WHEN</u> 1-HS-0112A is in AUTO with VCT high level of 97 percent. Charging Pump suction auto swaps to the Refueling Water Storage Tank (RWST) upon a Lo-Lo VCT level of 5.7 percent. A summary of instrument setpoints associated with the VCT levels include: | | | | | | | | | | | | | | | | | | | | | | | | |
| | OATC | <table border="1"> <thead> <tr> <th>LI-0112</th><th>VCT LEVEL</th><th>LI-0185</th></tr> </thead> <tbody> <tr> <td>Trip open 112A</td><td>97%</td><td>Modulate 112A full divert (if LIC-0185 pot @8.70)</td></tr> <tr> <td>Hi level alarm</td><td>92%</td><td></td></tr> <tr> <td>112A Trip Open signal Resets</td><td>87%</td><td>112A starts to divert (if LIC-0185 pot @8.70)</td></tr> <tr> <td>Auto Makeup stops</td><td>50%</td><td></td></tr> <tr> <td>Auto Makeup starts</td><td>30%</td><td></td></tr> <tr> <td>Low level alarm</td><td>20%</td><td>Low level alarm</td></tr> <tr> <td>RWST auto swapover</td><td>5.7% (2 of 2)</td><td>RWST auto swapover</td></tr> </tbody> </table> | LI-0112 | VCT LEVEL | LI-0185 | Trip open 112A | 97% | Modulate 112A full divert (if LIC-0185 pot @8.70) | Hi level alarm | 92% | | 112A Trip Open signal Resets | 87% | 112A starts to divert (if LIC-0185 pot @8.70) | Auto Makeup stops | 50% | | Auto Makeup starts | 30% | | Low level alarm | 20% | Low level alarm | RWST auto swapover | 5.7% (2 of 2) | RWST auto swapover |
| LI-0112 | VCT LEVEL | LI-0185 | | | | | | | | | | | | | | | | | | | | | | | | |
| Trip open 112A | 97% | Modulate 112A full divert (if LIC-0185 pot @8.70) | | | | | | | | | | | | | | | | | | | | | | | | |
| Hi level alarm | 92% | | | | | | | | | | | | | | | | | | | | | | | | | |
| 112A Trip Open signal Resets | 87% | 112A starts to divert (if LIC-0185 pot @8.70) | | | | | | | | | | | | | | | | | | | | | | | | |
| Auto Makeup stops | 50% | | | | | | | | | | | | | | | | | | | | | | | | | |
| Auto Makeup starts | 30% | | | | | | | | | | | | | | | | | | | | | | | | | |
| Low level alarm | 20% | Low level alarm | | | | | | | | | | | | | | | | | | | | | | | | |
| RWST auto swapover | 5.7% (2 of 2) | RWST auto swapover | | | | | | | | | | | | | | | | | | | | | | | | |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 2

Event Description: CVCS VCT Level Transmitter 1LT-112 Fails HIGH causing VCT Level Control Divert Valve (LV-112A) to divert to RHUT and disabling auto make-up to the VCT.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>3.0 <u>INITIAL OPERATOR ACTIONS ALB07-E05:</u></p> <p>1. Check VCT level using 1-LI-0185 on the QMCB AND compare to 1-LI-0112 on the IPC OR on Trend Recorder XR-40053.</p> |
| | OATC | <p>2. <u>IF</u> equipment failure is indicated by <u>EITHER</u> LT-0185 <u>OR</u> LT-0112 failed high, perform the following: (YES)</p> <p>a. Place 1HS-112A to the VCT position</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">NOTE</p> <p>Pump cavitation may be indicated by fluctuating discharge pressure and/or erratic flow.</p> </div> <p>b. Monitor charging pump(s) for signs of cavitation. <u>IF</u> cavitation is observed: (NO)</p> <p style="padding-left: 40px;">(1) Isolate letdown,</p> <p style="padding-left: 40px;">(2) Stop any running charging pumps,</p> <p style="padding-left: 40px;">(3) Initiate 18007-C Section B.</p> <p>c. Initiate Manual VCT Makeup per 13009-C.</p> <p>d. Contact maintenance to initiate repairs.</p> <p>NOTE: 18007-C, CVCS, Loss of VCT Makeup actions start on page 9</p> <p>NOTE: 13009-1, CVCS MU System Actions begin on page 12.</p> |
| | OATC | <p>3. <u>IF</u> level is low <u>AND</u> makeup is lost, initiate 18007-C, "Chemical And Volume Control System Malfunction." (see tab 1 for actions of procedure 18007-C)</p> |
| | OATC | <p>4. IF level is low due to system leakage, initiate 18004-C, "Reactor Coolant System Leakage." (N/A)</p> |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 2

Event Description: CVCS VCT Level Transmitter 1LT-112 Fails HIGH causing VCT Level Control Divert Valve (LV-112A) to divert to RHUT and disabling auto make-up to the VCT.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>4.0 <u>SUBSEQUENT OPERATOR ACTIONS ALB07-E05:</u></p> <p>Step 1: <u>IF</u> VCT level is high:</p> <ol style="list-style-type: none"> Stop Makeup. Divert letdown flow to the Recycle Holdup Tank (HUT position) using 1-HS-0112A on the QMCB. Operate makeup per 13009-1, "CVCS. Reactor Makeup Control System." |
| | SS | <p>Step 2: <u>IF</u> equipment failure is indicated, initiate maintenance as required.</p> <p>Contacts SSS to perform the following:</p> <ul style="list-style-type: none"> • Notify I&C to initiate repairs • Write a Condition Report • Notify OPS Duty Manager |
| | OATC | <p>Step 3: <u>IF</u> an operating charging pump fails due to suspected gas binding (fluctuating discharge pressure <u>AND</u> flow), <u>THEN</u> the standby pump <u>SHALL NOT</u> be started <u>UNTIL</u> the cause of the gas binding is understood <u>AND</u> all effected piping and components have been vented.</p> <p>NOTE: This Step Does Not Apply</p> |
| | SS | <p>Directs OATC to Initiate Manual VCT Makeup per 13009-1 as Required to Maintain VCT Level Between 30 and 50%.</p> |

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Scenario No.: 4

Event No.: 2

Event Description: CVCS VCT Level Transmitter 1LT-112 Fails HIGH causing VCT Level Control Divert Valve (LV-112A) to divert to RHUT and disabling auto make-up to the VCT.

| Time | Position | Applicant's Action or Behavior |
|------|------------|---|
| | SS OATC | <p><u>18007-C, Section C. LOSS OF VCT MAKEUP</u></p> <p>C1. Stabilize plant conditions: Reactor Power RCS Temperature PRZR Pressure</p> |
| | SS | <p><u>NOTE</u></p> <p>Charging Pump suction shifts to RWST when VCT level lowers to less than 6%</p> |
| | OATC | <p>C2. Check the following:</p> <ul style="list-style-type: none"> a. At least one Boric Acid Transfer Pump – RUNNING. b. At least one Reactor Makeup Water Pump – RUNNING. c. VCT makeup valve alignment - CORRECT FOR SELECTED MODE. d. Letdown divert valve LV-112A - ALIGNED TO VCT. <p>RNO</p> <ul style="list-style-type: none"> a. Start standby Boric Acid Transfer Pump. b. Start standby Reactor Makeup Water Pump. c. Align valves to establish VCT makeup using 13009, CVCS REACTOR MAKEUP CONTROL SYSTEM. d. Align LV-112A to VCT. |
| | OATC | <p>C3. Initiate the Continuous Actions Page.</p> |

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Scenario No.: 4

Event No.: 2

Event Description: CVCS VCT Level Transmitter 1LT-112 Fails HIGH causing VCT Level Control Divert Valve (LV-112A) to divert to RHUT and disabling auto make-up to the VCT.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>C4. Check VCT makeup flow – RESTORED.</p> <p>RNO</p> <p>Perform the following:</p> <p>a. <u>WHEN</u> VCT makeup is restored, <u>THEN</u> perform the following:</p> <ol style="list-style-type: none"> 1) Verify charging pump suction aligned to VCT. 2) Place LV-112A in AUTO. 3) Return to procedure and step in effect. <p>b. Go to Step C6.</p> |
| | SS | C5. Return to procedure and step in effect. |
| | OATC | C6. Maintain seal injection flow to all RCPs - 8 TO 13 GPM. |
| | OATC | <p>C7. Check VCT level - LESS THAN 20%.</p> <p>RNO</p> <p>C7. Return to Step C1.</p> |
| | OATC | <p>C8. Makeup to RCS using RWST:</p> <p>a. Open one RWST TO CCP A&B SUCTION valve:</p> <p style="padding-left: 40px;">LV-112D</p> <p style="padding-left: 40px;">-OR -</p> <p style="padding-left: 40px;">LV-112E</p> <p>b. Turn on PRZR Backup Heaters.</p> <p>c. Commence power reduction as necessary to maintain Tavg at program by initiating 12004-C, POWER OPERATION (MODE 1).</p> |

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Scenario No.: 4

Event No.: 2

Event Description: CVCS VCT Level Transmitter 1LT-112 Fails HIGH causing VCT Level Control Divert Valve (LV-112A) to divert to RHUT and disabling auto make-up to the VCT.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | C9. Check VCT level - GREATER THAN 30%. RNO C9. Return to Step C8. |
| | OATC | C10. Realign charging pump suction to the VCT: a. Verify VCT OUTLET ISOLATION valves - OPEN: LV-0112B LV-0112C b. Close any open RWST TO CCP A&B SUCTION valve(s): LV-112D LV-112E |
| | SS | C11. Return to Step C2. |
| | | End of 18007-C, Loss of VCT Makeup |

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Scenario No.: 4

Event No.: 2

Event Description: CVCS VCT Level Transmitter 1LT-112 Fails HIGH causing VCT Level Control Divert Valve (LV-112A) to divert to RHUT and disabling auto make-up to the VCT.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <u>13009-1, CVCS REACTOR MAKEUP CONTROL SYSTEM</u> |
| | | <u>13009-1 Section 4.6 Manual Makeup</u> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">CAUTIONS</p> <ul style="list-style-type: none"> • If Manual Makeup is being performed to maintain VCT level when letdown is being diverted, letdown should not exceed 75 gpm. • BAST concentration is inaccurate until sampled following batching. Temperature and power should be closely monitored following manual makeup to the VCT with the BAST concentration inaccurate. </div> |
| | OATC | Step 4.6.1 Manual Makeup At 100 GPM Total Flow |
| | | <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">NOTE</p> <p>Volumetric change in VCT is equal to 19.2 gallons per percent change in level.</p> </div> |
| | OATC | Step 4.6.1.1 Set TOTAL MAKEUP Integrator 1-FQI-0111 to the desired amount of Total Makeup Water. |
| | | <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;"><u>CAUTION</u></p> <p>Digital counters and thumbwheel settings on BORIC ACID TO BLENDER integrator 1-FQ-0110 read in tenth-gallon increments.</p> </div> |
| | OATC | Step 4.6.1.2 Set BORIC ACID TO BLENDER Integrator 1-FQI-0110 to the amount of boric acid as follows: <ol style="list-style-type: none"> Calculate estimated volume of Boric Acid using the following calculation. $\text{Gallons of Boric Acid} = \frac{\text{Total M/U} \times \text{RCS } C_b}{\text{BAST } C_b}$ |

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Scenario No.: 4

Event No.: 2

Event Description: CVCS VCT Level Transmitter 1LT-112 Fails HIGH causing VCT Level Control Divert Valve (LV-112A) to divert to RHUT and disabling auto make-up to the VCT.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <p>4.6.1.2 continued:</p> <p>b. Review logs for recent makeups to confirm calculated volume of Boric Acid is appropriate.</p> <p style="text-align: center;">NOTE</p> <p>Minor adjustments from the calculated boric acid volume and recent makeup data may be required based on burnup, plant conditions, and desired RCS temperature response.</p> <p>c. Adjust Boric Acid to Blender Integrator 1-FQI-0110 to the desired volume based on plant conditions and desired reactivity response.</p> |
| | OATC | <p>Step 4.6.1.3 Adjust BORIC ACID Flow Controller 1-FIC-0110 pot setting using the following formula and verify controller is in AUTO:</p> $1\text{-FIC-0110 pot setting} = \frac{\text{RCS } C_b \times 25}{\text{BAST } C_b}$ |
| | OATC | Step 4.6.1.4 Place VCT MAKEUP CONTROL 1-HS-40001B in STOP. |
| | OATC | Step 4.6.1.5 Place VCT MAKEUP MODE SELECT 1-HS-40001A in MAN. |
| | OATC | <p>Step 4.6.1.6 Verify the following:</p> <ul style="list-style-type: none"> • BA TO BLENDER 1-HS-0110A in AUTO. • RX MU WTR TO BA BLENDER 1-HS-0111A in AUTO. • One Boric Acid Transfer Pump in AUTO or START. • One Reactor Makeup Water Pump in AUTO or START. • Verify TOTAL MAKEUP Flow controller 1-FIC-0111 is in AUTO with pot is set for 100 gpm (approximately 6.25) total flowrate. |

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Scenario No.: 4

Event No.: 2

Event Description: CVCS VCT Level Transmitter 1LT-112 Fails HIGH causing VCT Level Control Divert Valve (LV-112A) to divert to RHUT and disabling auto make-up to the VCT.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | | <p style="text-align: center;">NOTE</p> <p>While letdown is configured for 120 gpm, the preferred flow path for Manual Makeup is through 1-FV-0110B BLENDER OUTLET TO CHARGING PUMPS SUCT. The design capacity of the VCT spray nozzles would be challenged with 120 gpm letdown in service and the addition of the makeup flow upstream of the VCT (1X6AH04-00024). This could prevent makeup from reaching the desired flow rate. Thus, 1-FV-0111B should only be used if 1-FV-0110B is not available.</p> |
| | OATC | <p style="text-align: center;">CAUTION</p> <p>With either Blender Outlet valve handswitch in the open position, an automatic isolation will not occur due to a Boric Acid and/or Total Makeup Flow Deviations</p> <p>Step 4.6.1.7 Open one of the following valves:</p> <p style="padding-left: 40px;">BLENDER OUTLET TO CHARGING PUMPS SUCT 1-FV-0110B</p> <p style="text-align: center;">-OR-</p> <p style="padding-left: 40px;">BLENDER OUTLET TO VCT 1-FV-0111B</p> |
| | OATC | <p style="text-align: center;">NOTES</p> <ul style="list-style-type: none"> • Manual makeup can be stopped at any time by placing 1-HS-40001B in STOP. • VCT level should be maintained between 30 and 87 percent. (1-LIC-0185 controller pot should normally be set to 8.7.) • VCT Pressure 1-PI-115 should be maintained between 20 and 45 psig. <p>Step 4.6.1.8 Place VCT MAKEUP CONTROL 1-HS-40001B in START and perform the following:</p> <ul style="list-style-type: none"> • Verify Boric Acid Transfer Pump is running. • Verify Reactor Makeup Water Pump is running. |

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Scenario No.: 4

Event No.: 2

Event Description: CVCS VCT Level Transmitter 1LT-112 Fails HIGH causing VCT Level Control Divert Valve (LV-112A) to divert to RHUT and disabling auto make-up to the VCT.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <ul style="list-style-type: none"> Verify BORIC ACID TO BLENDER 1-FV-0110A throttles open to provide the correct flow of boric acid. Verify REACTOR MU WTR TO BLENDER 1-FV-0111A throttles open to provide correct total flow. If desired, control Boric Acid Flow controller 1-FIC-0110 by adjusting pot <u>OR</u> using up/down pushbuttons to control boric acid at the desired flowrate. |
| | OATC | <p>Step 4.6.1.9 Monitor counters on BORIC ACID TO BLENDER Integrator 1-FQI-0110 and TOTAL MAKEUP Integrator 1-FQI-0111 and perform the following:</p> <ul style="list-style-type: none"> <u>WHEN</u> counter on 1-FQI-0110 BORIC ACID TO BLENDER Integrator reaches its setpoint, verify 1-FV-0110A BORIC ACID TO BLENDER is closed. <u>WHEN</u> counter on 1-FQI-0111 TOTAL MAKEUP Integrator reaches its setpoint, verify 1-FV-0111A REACTOR MAKEUP WATER TO BLENDER is closed. |
| | OATC | <p>Step 4.6.1.10 If desired, flush approximately 15 gallons of Reactor Makeup Water through 1-FV-0110B by performing the following:</p> <ol style="list-style-type: none"> Place VCT MAKEUP MODE SELECT 1-HS-40001A to ALT DIL. Set TOTAL MAKEUP Integrator 1-FQI-0111 for 13 to 15 gals. Place BLENDER OUTLET TO VCT 1-HS-0111B in CLOSE. Place VCT MAKEUP CONTROL 1-HS-40001B in START. Verify flow is indicated on 1-FI-0110B. <u>WHEN</u> TOTAL MAKEUP Integrator 1-FQI-0111 reaches the desired setpoint, verify 1-FV-0111A RX MU WTR TO BA BLENDER is closed. |

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Scenario No.: 4

Event No.: 2

Event Description: CVCS VCT Level Transmitter 1LT-112 Fails HIGH causing VCT Level Control Divert Valve (LV-112A) to divert to RHUT and disabling auto make-up to the VCT.

| Time | Position | Applicant's Action or Behavior | | | | | | | | | | | | | | | |
|------------------|--|---|------------------|-------------|-----------------|---------------|-----------------------|------|---------------|--|------|----------------|------------------------|------|----------------|--------------------|-------|
| | OATC | Step 4.6.1.11 Verify Boric Acid Flow controller 1-FIC-0110 is in AUTO and potentiometer is set for current RCS C_b . | | | | | | | | | | | | | | | |
| | OATC | <p>Step 4.6.1.12 Align Reactor Makeup Control system for automatic operation as follows: <i>(Not until repaired)</i></p> <table> <tr> <th><u>COMPONENT</u></th><th><u>NAME</u></th><th><u>POSITION</u></th></tr> <tr> <td>a. 1-HS-0111B</td><td>BLENDER OUTLET TO VCT</td><td>AUTO</td></tr> <tr> <td>b. 1-HS-0110B</td><td>BLENDER OUTLET TO CHARGING PUMPS SUCTION</td><td>AUTO</td></tr> <tr> <td>c. 1-HS-40001A</td><td>VCT MAKEUP MODE SELECT</td><td>AUTO</td></tr> <tr> <td>d. 1-HS-40001B</td><td>VCT MAKEUP CONTROL</td><td>START</td></tr> </table> | <u>COMPONENT</u> | <u>NAME</u> | <u>POSITION</u> | a. 1-HS-0111B | BLENDER OUTLET TO VCT | AUTO | b. 1-HS-0110B | BLENDER OUTLET TO CHARGING PUMPS SUCTION | AUTO | c. 1-HS-40001A | VCT MAKEUP MODE SELECT | AUTO | d. 1-HS-40001B | VCT MAKEUP CONTROL | START |
| <u>COMPONENT</u> | <u>NAME</u> | <u>POSITION</u> | | | | | | | | | | | | | | | |
| a. 1-HS-0111B | BLENDER OUTLET TO VCT | AUTO | | | | | | | | | | | | | | | |
| b. 1-HS-0110B | BLENDER OUTLET TO CHARGING PUMPS SUCTION | AUTO | | | | | | | | | | | | | | | |
| c. 1-HS-40001A | VCT MAKEUP MODE SELECT | AUTO | | | | | | | | | | | | | | | |
| d. 1-HS-40001B | VCT MAKEUP CONTROL | START | | | | | | | | | | | | | | | |
| | OATC | <p>Step 4.6.1.13 Verify the following valves are closed:</p> <ul style="list-style-type: none"> 1-FV-0111B BLENDER OUTLET TO VCT. 1-FV-0110B BLENDER OUTLET TO CHARGING PUMPS SUCT. | | | | | | | | | | | | | | | |
| | OATC | Step 4.6.1.14 <u>IF</u> Boric Acid Transfer Pump was placed in START at Step 4.6.1.6, return to AUTO or as directed by SS. | | | | | | | | | | | | | | | |
| | OATC | Step 4.6.1.15 <u>IF</u> Reactor Makeup Water Pump was placed in START at Step 4.6.1.6, return to AUTO or as directed by SS. | | | | | | | | | | | | | | | |
| | OATC | Step 4.6.1.16 Operate the Pressurizer Back-up Heaters as necessary to equalize C_b between the RCS and the Pressurizer. | | | | | | | | | | | | | | | |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 2

Event Description: CVCS VCT Level Transmitter 1LT-112 Fails HIGH causing VCT Level Control Divert Valve (LV-112A) to divert to RHUT and disabling auto make-up to the VCT.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | | <div>NOTE</div> <p>Automatic Control Rod withdrawal function has been disabled. The only function enabled when Control Rod handswitch is placed in AUTO is automatic insertion when Tavg is at least 1.5 degrees above Tref.</p> |
| | OATC | Step 4.6.1.17 Monitor RCS Tavg, control bank position, or power level as applicable. |
| | SS | <p>Return to step and procedure in effect, UOP 12004-C.</p> <p>End of 13009-1, Manual Makeup</p> <p>End of Event # 2, Proceed to Event # 3.</p> |

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Scenario No.: 4

Event No.: 3

Event Description: The RWST will develop a leak from the sludge mixing line resulting in lowering RWST level below the Tech Spec limit. After receipt of a QMCB annunciators, the UO will find the RWST Sludge Mixing Isolation Valves have failed to automatically close. The UO will close the valves on the QPCP and the leak will be terminated.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>Diagnose RWST level is actually lowering on all channels.</p> <p>Symptoms / alarms:</p> <p>ALB06-E04 RWST LO LEVEL</p> <p>Indications:</p> <ul style="list-style-type: none"> • RWST level lowering on LI-0990, 0991, 0992, and 0993 to less than 95%. |
| | OATC | <p>ALB06-E04 17006 actions.</p> <p><u>PROBABLE CAUSE</u></p> <ol style="list-style-type: none"> 1. Filling of Accumulators. 2. Adding water to the Spent Fuel Pool. 3. Safety Injection (SI) actuation. 4. System leakage. |
| | UO | <p><u>AUTOMATIC ACTIONS</u></p> <p>RWST Sludge Mixing Isolation Valves 1-HV-10957 (Train B, 1-LT-0991) and 1-HV-10958 (Train A, 1-LT-0990) close.</p> <p>Note to examiner: These valves are located on the QPCP and will NOT automatically close for this event. The UO will have to manually close the valves to isolate the leak.</p> |

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Scenario No.: 4

Event No.: 3

Event Description: The RWST will develop a leak from the sludge mixing line resulting in lowering RWST level below the Tech Spec limit. After receipt of a QMCB annunciators, the UO will find the RWST Sludge Mixing Isolation Valves have failed to automatically close. The UO will close the valves on the QPCP and the leak will be terminated.

| Time | Position | Applicant's Action or Behavior |
|------|------------|--|
| | OATC UO | <p>ALB06-E04 actions continued.</p> <p><u>INITIAL OPERATOR ACTIONS</u></p> <p>NONE</p> |
| | UO | <p><u>SUBSEQUENT OPERATOR ACTIONS</u></p> <p>1. IF in Modes 1, 2, 3, or 4, and SI is not in progress, stop any operation that could be removing water from the RWST.</p> <p>2. IF a system leak is indicated, dispatch personnel to locate and isolate the leak.</p> <p>Note to examiner. The UO closing either HV-10957 or HV-10958 will isolate the leak for this event.</p> <p>Note to SimBooth: Delete malfunction when candidate manually closes either HV-10957 or HV-10958.</p> |
| | SS | <p>3. Restore RWST level to normal per 13701-1, "Boric Acid System".</p> <p>4. Refer to Technical Specification LCO 3.5.4 and TR 13.1.7.</p> <p><u>COMPENSATORY OPERATOR ACTIONS</u></p> <p>NONE</p> |

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Scenario No.: 4

Event No.: 3

Event Description: The RWST will develop a leak from the sludge mixing line resulting in lowering RWST level below the Tech Spec limit. After receipt of a QMCB annunciators, the UO will find the RWST Sludge Mixing Isolation Valves have failed to automatically close. The UO will close the valves on the QPCP and the leak will be terminated.

| Time | Position | Applicant's Action or Behavior | | | | | | | | | | | | |
|--|--|---|-----------|-----------------|-----------------|--|--|----------|---|--------------------------------------|--------|--|--|--------------------------|
| | SS | <p>3.5.4 Refueling Water Storage Tank (RWST).</p> <p>LCO 3.5.4 The RWST shall be OPERABLE.</p> <p>APPLICABILITY: MODES 1, 2, 3, and 4.</p> <p>ACTIONS</p> <table> <tr> <th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr> <tr> <td>B. One or more sludge mixing pump isolation valves inoperable.</td><td>B.1 Restore the valve(s) to OPERABLE status.</td><td>24 hours</td></tr> <tr> <td>D. RWST inoperable for reasons other than Condition A or B.</td><td>D.1 Restore RWST to OPERABLE status.</td><td>1 hour</td></tr> <tr> <td>E. Required Action and associated Completion Time of Condition A or D not met.</td><td>E.1 Be in MODE 3. AND E.2 Be in MODE 5</td><td>6 hours 36 hours.</td></tr> </table> <p>Note to examiner: Closing the RWST sludge mixing isolations HV-10957 and HV-10958 satisfies Condition B.</p> | CONDITION | REQUIRED ACTION | COMPLETION TIME | B. One or more sludge mixing pump isolation valves inoperable. | B.1 Restore the valve(s) to OPERABLE status. | 24 hours | D. RWST inoperable for reasons other than Condition A or B. | D.1 Restore RWST to OPERABLE status. | 1 hour | E. Required Action and associated Completion Time of Condition A or D not met. | E.1 Be in MODE 3. AND E.2 Be in MODE 5 | 6 hours 36 hours. |
| CONDITION | REQUIRED ACTION | COMPLETION TIME | | | | | | | | | | | | |
| B. One or more sludge mixing pump isolation valves inoperable. | B.1 Restore the valve(s) to OPERABLE status. | 24 hours | | | | | | | | | | | | |
| D. RWST inoperable for reasons other than Condition A or B. | D.1 Restore RWST to OPERABLE status. | 1 hour | | | | | | | | | | | | |
| E. Required Action and associated Completion Time of Condition A or D not met. | E.1 Be in MODE 3. AND E.2 Be in MODE 5 | 6 hours 36 hours. | | | | | | | | | | | | |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 3

Event Description: The RWST will develop a leak from the sludge mixing line resulting in lowering RWST level below the Tech Spec limit. After receipt of a QMCB annunciators, the UO will find the RWST Sludge Mixing Isolation Valves have failed to automatically close. The UO will close the valves on the QPCP and the leak will be terminated.

| Time | Position | Applicant's Action or Behavior | | | | | | |
|---------------------|--|---|-----------|-----------------|-----------------|---------------------|--|--------------|
| | SS | <p>TR 13.1.7 Borated Water Sources – Operating.</p> <p>TR 13.1.7 The following borated water source(s) shall be OPERABLE as required by TR-13.1.3:</p> <ul style="list-style-type: none"> a. Boric acid storage tank. b. The refueling water storage tank (RWST). <p>APPLICABILITY: MODES 1, 2, 3, and 4.</p> <p>ACTIONS</p> <table> <tr> <th>CONDITION</th><th>REQUIRED ACTION</th><th>COMPLETION TIME</th></tr> <tr> <td>D. RWST inoperable.</td><td>D.1 Enter applicable Conditions of RWST Technical Specification 3.5.4.</td><td>Immediately.</td></tr> </table> | CONDITION | REQUIRED ACTION | COMPLETION TIME | D. RWST inoperable. | D.1 Enter applicable Conditions of RWST Technical Specification 3.5.4. | Immediately. |
| CONDITION | REQUIRED ACTION | COMPLETION TIME | | | | | | |
| D. RWST inoperable. | D.1 Enter applicable Conditions of RWST Technical Specification 3.5.4. | Immediately. | | | | | | |
| | | End of EVENT # 3, Proceed to EVENT # 4. | | | | | | |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 4

Event Description: Containment Area Lo Range Rad Monitor RE-0002 Fails High. **CVI Fails to Actuate**

| Time | Position | Applicant's Action or Behavior |
|------|------------------|--|
| | OATC UO SS | Alarm/Indications ALB05-B03 INTMD RADIATION ALARM ALB05-C03 HIGH RADIATION ALARM Safety Related Display Consol (SRDC)-RE-002, Intermediate & High Alarm IPC RE-002 Step Change to High Rad |
| | UO OATC | <p><u>17005-1 B03 INTMD RADIATION ALARM</u></p> <p><u>PROBABLE CAUSE</u></p> <p>An alert condition on one or more of the Radiation Monitor Channels.</p> <p><u>AUTOMATIC ACTIONS</u></p> <p>NONE</p> <p><u>INITIAL OPERATOR ACTIONS</u></p> <p>NONE</p> <p><u>SUBSEQUENT OPERATOR ACTIONS</u></p> <p>1. Check the Safety Related Display Console (QRM2), the RMS Communications Console (QRM1) and the Plant Computer to determine the monitor in alarm and Go To 17100-1, "Annunciator Response Procedure For The Process And Effluent Radiation Monitor System (RMS)" or 17102-1, "Annunciator Response Procedure For The Safety Related Display Control QRM2" as appropriate.</p> <p>Note to examiner: The Communications Console (COMS) QRM1 is NOT modeled in the Vogtle simulator.</p> |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 4

Event Description: Containment Area Lo Range Rad Monitor RE-0002 Fails High. **CVI Fails to Actuate**

| Time | Position | Applicant's Action or Behavior |
|------|------------|--|
| | OATC UO | <p><u>17005-1 C03 HIGH RADIATION ALARM</u></p> <p><u>PROBABLE CAUSE</u></p> <p>A high alarm on one or more of the Radiation Monitor Channels.</p> <p><u>AUTOMATIC ACTIONS</u></p> <p>The following actions will occur if a High Level Radiation Alarm is actuated on the associated monitor:</p> <p>1-RE-0002 or 1-RE-0003, Containment Low Range Area Monitor: Containment Ventilation Isolation (CVI). (Will not actuate)</p> <p><u>INITIAL OPERATOR ACTIONS</u></p> <p>NONE</p> <p><u>SUBSEQUENT OPERATOR ACTIONS</u></p> <ol style="list-style-type: none"> 1. Check the Safety Related Display Console (QRM2), the RMS Communications Console (QRM1) and the Plant Computer to determine the monitor in alarm and Go To 17100-1, "Annunciator Response Procedure For The Process And Effluent Radiation Monitor System (RMS)" or 17102-1, "Annunciator Response Procedure For The Safety Related Display Console QRM2" as appropriate <p>Note to examiner: The Communications Console (COMS) QRM1 is NOT modeled in the Vogtle simulator.</p> |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 4

Event Description: Containment Area Lo Range Rad Monitor RE-0002 Fails High. **CVI Fails to Actuate**

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | 17102-1 Safety Related Display Console RE-0002 (RED LAMP LIT) (HIGH) |
| | UO SS | <p><u>PROBABLE CAUSE</u></p> <p>NOTE</p> <p>During refueling operations indicates a fuel drop accident. During power operation indicates possible loss of coolant accident.</p> <p>High radiation in the Containment Building.</p> <p><u>AUTOMATIC ACTIONS</u></p> <p>Initiates Containment Building Ventilation Isolation. (NO)</p> <p><u>INITIAL OPERATOR ACTIONS</u></p> <p>1. Initiate evacuation of Containment <u>IF</u> the alarm is due to unexpected or unexplained radiation increases, <u>OR IF</u> appropriate HP controls are <u>NOT</u> in place for the radiological conditions indicated.</p> <p>2. <u>IF</u> the alarm is due to expected radiation increases from preplanned evolutions <u>AND</u> appropriate HP controls are in place, <u>THEN</u> request HP and Chemistry to investigate the cause of alarm. If required, initiate evacuation of Containment.</p> <p><u>SUBSEQUENT OPERATOR ACTIONS</u></p> <p>1. Verify Containment Ventilation Isolation.</p> <p>UO will manually start the piping pen units and close all Dampers on the CVI MLBs.</p> <p>2. If required, verify that Containment has been evacuated and all personnel accounted for.</p> <p>3. Notify Chemistry to independently determine radiation level in the Containment.</p> <p>4. <u>IF</u> the channel has malfunctioned:</p> |

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Scenario No.: 4

Event No.: 4

Event Description: Containment Area Lo Range Rad Monitor RE-0002 Fails High. **CVI Fails to Actuate**

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <p>a. Comply with Technical Specifications LCO 3.3.6.</p> <p>b. Unlock panel and place 1-HS-13259 on CVI BLOCK PANEL 1-1609-P5-CB1 to BLOCK (Cont. Bldg RB-70).</p> <p>c. Request Chemistry to investigate and take corrective action.</p> <p>d. Reset CVI per 11886-1, "Recovery From ESF Actuations."</p> <p>5. <u>IF</u> the alarm is an actuation resulting from Fuel Handling, initiate 18006-C, "Fuel Handling Event," as appropriate.</p> <p>6. <u>IF</u> the channel has not malfunctioned, initiate 18004-C, "RCS Leakage."</p> <p><u>COMPENSATORY OPERATOR ACTIONS</u></p> <p>NONE</p> |
| | SS | <p>Initiate the applicable actions of:</p> <p>TS: 3.3.6 Containment Ventilation Isolation Instrumentation</p> |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 4

Event Description: Containment Area Lo Range Rad Monitor RE-0002 Fails High. **CVI Fails to Actuate**

| Time | Position | Applicant's Action or Behavior | | |
|------|----------|---|--|------------------------|
| | SS | LCO 3.3.6 CVI FU 2 CONDITION B | | |
| | | CONDITION | REQUIRED ACTION | COMPLETION TIME |
| | | B. -----NOTE----- Only applicable in MODE 1, 2, 3, or 4. ----- One or more Functions with one or more manual or automatic actuation channels inoperable. OR No radiation monitoring channels OPERABLE. OR Required Action and associated Completion Time of Condition A not met. | B.1 Enter applicable Conditions and Required Actions of LCO 3.6.3, "Containment Isolation Valves," for containment purge supply and exhaust isolation valves made inoperable by isolation instrumentation. | Immediately |
| | SS | LCO 3.6.3 Condition B | | |
| | | CONDITION | REQUIRED ACTION | COMPLETION TIME |
| | | B. One or more penetration flow paths with two containment isolation valves inoperable except for purge valve leakage not within limit. | B.1 Isolate the affected penetration flow path by use of at least one closed and de- activated automatic valve, closed manual valve, or blind flange. | 1 hour |
| | | End of Event # 4. Go to Event # 5 | | |

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Scenario No.: 4

Event No.: 5

Event Description: MFPT "A" High Vibration Alarm Causes Crew To Enter 18013-C, "RAPID POWER REDUCTION".

| Time | Position | Applicant's Action or Behavior | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------|------------|---|--|------------|-----------------------|---------------------------------|------------|----------------|--|------------|----------------|---------------------------------|------------|----------------|--|------------|----------------|--------------------------------|------------|----------------|--|------------|----------------|---------------------------------|------------|----------------|--|------------|----------------|
| | SS / UO | <p>Responds to MFPT A HI VIB Annunciator ALB15-E01 by Referencing ARP 17015-1 Window E01 "MFPT A HI VIB"</p> <p><u>17015-1 E01</u></p> <p>NOTE</p> <p>Turbine and pump bearing vibration may be monitored on the following Plant Computer points, or at the Bentley Nevada cabinet next to MFP B:</p> <table> <tr> <td></td><td><u>IPC</u></td><td><u>Bentley Nevada</u></td></tr> <tr> <td>1A MFPT H.P. Bearing Vibration:</td><td>"X": X0219</td><td>"X" 1XIS-5308X</td></tr> <tr> <td></td><td>"Y": X0249</td><td>"Y" 1XIS-5308Y</td></tr> <tr> <td>1A MFPT L.P. Bearing Vibration:</td><td>"X": X0220</td><td>"X" 1XIS-5309X</td></tr> <tr> <td></td><td>"Y": X0250</td><td>"Y" 1XIS-5309Y</td></tr> <tr> <td>1A MFP INBD Bearing Vibration:</td><td>"X": X0253</td><td>"X" 1XIS-4918X</td></tr> <tr> <td></td><td>"Y": X0254</td><td>"Y" 1XIS-4918Y</td></tr> <tr> <td>1A MFP OUTBD Bearing Vibration:</td><td>"X": X0255</td><td>"X" 1XIS-4919X</td></tr> <tr> <td></td><td>"Y": X0256</td><td>"Y" 1XIS-4919Y</td></tr> </table> <p>1.0 <u>PROBABLE CAUSE</u></p> <ol style="list-style-type: none"> 1. Bearing malfunction due to loss of oil or improper cooling. 2. Bowed shaft. <p>2.0 <u>AUTOMATIC ACTIONS</u></p> <p>NONE</p> <p>3.0 <u>INITIAL OPERATOR ACTIONS</u></p> <p>NONE</p> | | <u>IPC</u> | <u>Bentley Nevada</u> | 1A MFPT H.P. Bearing Vibration: | "X": X0219 | "X" 1XIS-5308X | | "Y": X0249 | "Y" 1XIS-5308Y | 1A MFPT L.P. Bearing Vibration: | "X": X0220 | "X" 1XIS-5309X | | "Y": X0250 | "Y" 1XIS-5309Y | 1A MFP INBD Bearing Vibration: | "X": X0253 | "X" 1XIS-4918X | | "Y": X0254 | "Y" 1XIS-4918Y | 1A MFP OUTBD Bearing Vibration: | "X": X0255 | "X" 1XIS-4919X | | "Y": X0256 | "Y" 1XIS-4919Y |
| | <u>IPC</u> | <u>Bentley Nevada</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1A MFPT H.P. Bearing Vibration: | "X": X0219 | "X" 1XIS-5308X | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | "Y": X0249 | "Y" 1XIS-5308Y | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1A MFPT L.P. Bearing Vibration: | "X": X0220 | "X" 1XIS-5309X | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | "Y": X0250 | "Y" 1XIS-5309Y | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1A MFP INBD Bearing Vibration: | "X": X0253 | "X" 1XIS-4918X | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | "Y": X0254 | "Y" 1XIS-4918Y | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1A MFP OUTBD Bearing Vibration: | "X": X0255 | "X" 1XIS-4919X | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | "Y": X0256 | "Y" 1XIS-4919Y | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 5

Event Description: MFPT "A" High Vibration Alarm Causes Crew To Enter 18013-C, "RAPID POWER REDUCTION".

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <p>4.0 <u>SUBSEQUENT OPERATOR ACTIONS</u></p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">NOTE</p> <p>A handheld vibration instrument may be used to determine vibration levels locally.</p> </div> <ol style="list-style-type: none"> 1. Dispatch an operator to MFPT A to investigate. 2. On the Plant Computer, perform the following: <ol style="list-style-type: none"> a. Select the ATSI CRT Trend Display and print out a trend of the desired current Turbine parameters to determine the alarm condition. <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">NOTES</p> <ul style="list-style-type: none"> Elevated or fluctuating bearing drain temperatures may be an indication of bearing loading and can indicate a bearing is failing. Engineering and Maintenance should be promptly notified if any bearing drain temperatures are elevated. Bearing oil temperatures should be maintained between 110°F and 125°F. </div> <ol style="list-style-type: none"> <ol style="list-style-type: none"> b. Monitor lube oil and bearing oil temperatures of pump and turbine. 3. <u>IF MFP TURBINE</u> bearing vibration rises to 5 mils or greater, immediately reduce power and trip MFPT A per the following: <ul style="list-style-type: none"> 18013-C "Rapid Power Reduction." 18016-C, "Condensate And Feedwater Malfunction" <p>Note to examiner: MFP Turbine Vibrations will be approximately 6-8 mils.</p> |
| | SS | Initiates 18013-C, "RAPID POWER REDUCTION" (Crew Update) |
| | | Note to examiner: Rapid power reduction steps begin on Page 29. |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 5

Event Description: MFPT A turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT A.

| Time | Position | Applicant's Action or Behavior | | | | | | | | |
|------------------------|----------------------|--|-------------------------|-----------|--------|-------------------------|------------------------|----------------------|----------|----------------|
| | SS | <div>18013-C, RAPID POWER REDUCTION actions.</div> <table><tr><td>Entry</td><td>Condition</td><td>Target</td><td>Approx. Time @ 3-5% min</td></tr><tr><td>17015-D05 17015-E01</td><td>MFPT High Vibrations</td><td><70% RTP</td><td>6 – 10 minutes</td></tr></table> <div>1. Perform SHUTDOWN BRIEFING.</div> | Entry | Condition | Target | Approx. Time @ 3-5% min | 17015-D05 17015-E01 | MFPT High Vibrations | <70% RTP | 6 – 10 minutes |
| Entry | Condition | Target | Approx. Time @ 3-5% min | | | | | | | |
| 17015-D05 17015-E01 | MFPT High Vibrations | <70% RTP | 6 – 10 minutes | | | | | | | |
| | SS | <div>SHUTDOWN BRIEFING</div> <div>METHOD</div> <div><ul style="list-style-type: none">Auto rod control should be used.Reduce Turbine Load at approximately 3% RTP per minute (approx 36 MWe) up to 5% RTP (approx 60 MWe).Borate considering the calculations from the reactivity briefing sheet and BEACON.Maintain AFD within the doghouse.SS (or SRO designee) – Maintain supervisory oversight.All rod withdrawals will be approved by the SS.Approval for each reactivity is not necessary as long as manipulations are made within the boundaries established in this briefing (i.e. turbine load adjustment up to 60 MWe, etc.A crew update should be performed at approximately every 100 MWe power change.If manpower is available, peer checks should be used for all reactivity changes.</div> <div>OPERATIONAL LIMITS</div> <div><ul style="list-style-type: none">Maintain Tav_g within ± 6°F of Tref. IF TAVG/TREF mismatch >6°F and not trending toward a matched condition or if Tav_g ≤ 551°F, then trip the reactor.If load reduction due to a loss of vacuum, every effort should be made to maintain the steam dumps closed. (Permissive C-9 ≥24.92" Hg).</div> <div>INDUSTRY OE</div> <div><ul style="list-style-type: none">Shift supervision must maintain effective oversight and exercise conservative decision making.Correction of significant RCS Tav_g deviations should only be via secondary plant control manipulations and not primary plant control manipulations (i.e., do not withdraw control rods or dilute).</div> | | | | | | | | |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 5

Event Description: MFPT A turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT A.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | 2. Verify rods in AUTO. |
| | UO | 3. Reduce Turbine Load at the desired rate up to 5% min. (60 MWe/min). |
| | OATC | 4. Borate as necessary by initiating 13009, CVCS REACTOR MAKEUP CONTROL SYSTEM. Note to examiner: Steps from 13009-C for boration are at the end of this event starting on page # 34 |
| | OATC | 5. Initiate the Continuous Actions Page. |
| | OATC | 6. Check desired ramp rate – LESS THAN OR EQUAL TO 5%/MIN. RNO If conditions warrant a turbine load rate greater than 5%/min, THEN perform the following: a. Trip the reactor. b. Go to 19000-C, Reactor Trip or Safety Injection |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 5

Event Description: MFPT A turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT A.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>7. Maintain Tavg within 6oF of Tref:</p> <ul style="list-style-type: none"> a. Monitor Tavg/Tref deviation (UT-0495). b. Verify rods inserting as required. <p>RNO 7b. Manual rod control should be used with insertions of up to 5 steps at a time.</p> <ul style="list-style-type: none"> c. Energize Pressurizer back-up heaters as necessary. |
| | OATC | <p>8. Maintain reactor power and turbine power – MATCHED.</p> <ul style="list-style-type: none"> a. Balance reactor power with secondary power reduction using boration and control rods. b. Check rate of power reduction – ADEQUATE FOR PLANT CONDITIONS. c. Check RCS Tavg – GREATER THAN 551°F (TS 3.4.2). d. Check RCS Tavg – WITHIN 6oF OF TREF. <p>RNO for all of the above:</p> <ul style="list-style-type: none"> a. Trip the reactor. b. Go to 19000-C, Reactor Trip or Safety Injection |
| | OATC | 9. Maintain PRZR Pressure – AT 2235 PSIG. |
| | OATC | 10. Maintain PRZR Level at – PROGRAM. |

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Scenario No.: 4

Event No.: 5

Event Description: MFPT A turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT A.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | 11. Maintain SG Level – BETWEEN 60% AND 70%. |
| | OATC | 12. Notify the System Operator that a load reduction is in progress. |
| | SS | 13. Notify SM to make the following notifications as appropriate: |
| | | ___ Plant Management Notifications using 10000-C, CONDUCT OF OPERATIONS. |
| | | ___ NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION. |
| | | ___ 00152, FEDERAL AND STATE REPORTING REQUIREMENTS. |
| | | ___ Chemistry Technical Specification sampling for load reductions greater than 15% using 35110-C, CHEMISTRY CONTROL OF THE REACTOR COOLANT SYSTEM. |
| | | ___ QC to perform a NOPT inspection using 84008, RPV ALLOY 600 MATERIAL INSPECTIONS AND REPORTS for reactor shutdowns. |
| | UO | NOTE Attempts should be made to keep steam dumps closed if power reduction is required for Condenser problem. |
| | UO | 14. Check Steam Dumps – CLOSED. |
| | UO | 15. Check Turb/Gen to remain online. (YES) |

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Scenario No.: 4

Event No.: 5

Event Description: MFPT A turbine vibration will rise to > 5 mils requiring entry into 18013-C Rapid Power Reduction and trip of MFPT A.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | SS | <p>16. Check desired plant conditions achieved.</p> <p>Adequate load reduction.</p> <p>-OR-</p> <p>Plant conditions no longer required shutdown.</p> <p>RNO</p> <p>16. WHEN desired plant conditions are achieved, THEN Go to Step 17.</p> |
| | UO | <p>17. Perform the following:</p> <p>a. Stabilize power level.</p> <p>b. Place rods in MANUAL and match Tavg with Tref.</p> <p>c. Maintain stable plant conditions.</p> <p>d. Go to 12004-C, POWER OPERATION (MODE 1) Section 4.2 and perform actions from the starting power level to ending power level.</p> |
| | | <p>If not ended previously, End of EVENT # 5, Proceed to EVENT # 6.</p> |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 5 Rapid Power Reduction boration steps.

Event Description: Rapid Power Reduction boration steps from 13009.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>13009-1, CVCS Reactor Makeup Control System</p> <p>4.2 BORATION</p> <p>4.2.1 Determine the existing RCS boron concentration from Boron Meter 1-AI-40134 OR by sample analysis.</p> <p>4.2.2 To determine the number of gallons of boric acid required to borate the RCS, perform the following.</p> <p>IF borating to required boron for a xenon free cool down, obtain the maximum boron concentration for the cool down range from the PTDB Tab 1.3.4-T1 and T2.</p> <p>OR</p> <p>IF borating to a desired boron concentration, determine the desired change in boron concentration by subtracting the existing concentration from the desired concentration.</p> <p>THEN</p> <p>Determine the amount of boric acid necessary to accomplish the desired change in boron concentration using PTDB Tab 2.3 and correct the obtained value using PTDB Tab 2.1.</p> <p>Note to examiner: The OATC may also use a Beacon Book calculation to obtain a boron addition target for the Rapid Power Reduction. For a power reduction to 70%, this will be a boron addition of 230 gallons at 30 gpm.</p> |
| | OATC | 4.2.3 Place VCT MAKEUP CONTROL 1-HS-40001B in STOP. |
| | OATC | 4.2.4 Place VCT MAKEUP MODE SELECT 1-HS-40001A in BOR. |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 5 Rapid Power Reduction boration steps.

Event Description: Rapid Power Reduction boration steps from 13009.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | | <p style="text-align: center;">NOTE</p> <p>If necessary, boric acid flow may be adjusted using 1-FIC-0110 with SS concurrence. Changes to pot setting should be logged in the Control Room Log and restored at completion of activity.</p> |
| | OATC | 4.2.5 Adjust potentiometer on Boric Acid Blender Flow Controller 1-FIC-0110 as desired and verify in AUTO. |
| | | <p style="text-align: center;">CAUTION</p> <p>Digital counter setting on BORIC ACID TO BLENDER integrator 1-FQI-0110 reads in tenth-gallon increments.</p> |
| | OATC | 4.2.6 Set BORIC ACID TO BLENDER integrator 1-FQI-0110 to the desired amount of Boric Acid. |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 5 Rapid Power Reduction boration steps.

Event Description: Rapid Power Reduction boration steps from 13009.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>4.2.7 Verify the following:</p> <ul style="list-style-type: none"> • BA TO BLENDER 1-HS-0110A is in AUTO. • BLENDER OUTLET TO CHARGING PUMPS SUCT 1-HS-0110B is in AUTO. • One Boric Acid Transfer Pump in AUTO or START. • RX MU WTR TO BA BLENDER 1-FV-0111A is closed with 1HS-0111A in AUTO. • BLENDER OUTLET TO VCT 1-FV-0111B is closed with 1HS-0111B in AUTO. <p>NOTES</p> <ul style="list-style-type: none"> • Boration can be manually stopped at any time by placing 1-HS-40001B in STOP. • VCT pressure, 1-PI-115 should be maintained between 20 and 45 psig. |
| | OATC | <p>4.2.8 Place VCT MAKEUP CONTROL 1-HS-40001B in START and perform the following:</p> <ul style="list-style-type: none"> • Verify Boric Acid Transfer Pump is running. • Verify 1-FV-0110B is open. • Verify 1-FV—0110A throttles open to provide desired flow on 1-FI-0110A. • Monitor BORIC ACID TO BLENDER integrator 1-FQI-0110. |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 5 Rapid Power Reduction boration steps.

Event Description: Rapid Power Reduction boration steps from 13009.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>4.2.9 WHEN 1-FQI-0110 BORIC ACID TO BLENDER integrator reaches its setpoint, verify boration stops and the following valves close.</p> <ul style="list-style-type: none">• 1-FV-0110A, BA TO BLENDER• 1-FV-0110B, BLENDER OUTLET TO CHARGING PUMPS SUCT |
| | OATC | <p>4.2.10 Flush approximately 15 gallons of Reactor Makeup Water through 1-FV-0110B by performing the flowing:</p> <ol style="list-style-type: none">a. Place VCT MAKEUP MODE SELECT 1-HS-40001A to ALT DIL.b. Set TOTAL MAKEUP integrator 1-FQI-0111 for 13 to 15 gallons.c. Place BLENDER OUTLET TO VCT 1-HS-0111B in CLOSE.d. Place VCT MAKEUP CONTROL 1-HS-40001B in START.e. Verify flow is indicated on 1-FI-0110B.f. WHEN TOTAL MAKEUP integrator 1-FQI reaches the desired setpoint, verify the following valves close:<ul style="list-style-type: none">• 1-FV-0111A, RX MU WTR TO BA BLENDER• 1-FV-0110B, BLENDER OUTLET TO CHARGING PUMPS SUCT |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 5 Rapid Power Reduction boration steps.

Event Description: Rapid Power Reduction boration steps from 13009.

| Time | Position | Applicant's Action or Behavior | | |
|------|----------|--|------------------------|-----------------|
| | OATC | 4.2.11 Verify 1-FIC-0110 potentiometer is set to setting recorded prior to boration (or as directed by SS). | | |
| | OATC | 4.2.12 Align Reactor Makeup Control system for automatic operation as follows: | | |
| | | <u>COMPONENT</u> | <u>NAME</u> | <u>POSITION</u> |
| | a. | 1-HS-110B | BLENDER OUTLET TO VCT | AUTO |
| | b. | 1HS-40001A | VCT MAKEUP MODE SELECT | AUTO |
| | c. | 1-HS-40001B | VCT MAKEUP CONTROL | START |
| | OATC | 4.2.13 IF BA TRANSFER PUMP was placed in START at Step 4.2.7, return to AUTO or as directed by SS. | | |
| | OATC | 4.2.14 Monitor RCS Tavg, source range count rate, and Reactor Power as applicable. | | |
| | OATC | 4.2.15 Operate the Pressurizer Back-up Heaters as necessary to equalize boron concentration between the RCS and the Pressurizer. | | |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 5 Rapid Power Reduction boration steps.

Event Description: Rapid Power Reduction boration steps from 13009.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | 4.2.16 Verify desired boration through sample analysis or from Boron Concentration Meter 1-1208-T6-006. (1-AI-40134). |
| | | End of 13009-1, Boration steps |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>Diagnoses loss of B MFP</p> <p>Alarms:</p> <ul style="list-style-type: none"> • ALB16-D01 MFPT B TRIPPED <p>Indications:</p> <ul style="list-style-type: none"> • Lowering MFP B Speed • Rising MFP B Deviation <p>Note to examiner: the crew may reference the ARP for the annunciator or may go directly to AOP 18016-C, "Condensate And Feedwater Malfunction".</p> |
| | | <p><u>ARP 17016-1, WINDOW D01</u></p> <p>1.0 <u>PROBABLE CAUSE</u></p> <ol style="list-style-type: none"> Manual trip using 1-HS-3170 on QMCB Low oil pressure to MFPT Bearings Low oil pressure to Main Feedwater Pump (MFP) Bearings Low suction pressure to MFP Low vacuum in condenser MFPT Steam Exhaust Valve has closed MFPT Thrust Bearing wear Steam Generator Hi-Hi level or safety injection actuation Manual operation of local trip lever Turbine overspeed |
| | | <p>2.0 <u>AUTOMATIC ACTIONS</u></p> <p>NONE</p> |
| | SS | <p>3.0 <u>INITIAL OPERATOR ACTIONS</u></p> <p>Initiate 18016-C, "Condensate And Feedwater Malfunction"</p> |
| | | <p>4.0 <u>SUBSEQUENT OPERATOR ACTIONS</u></p> <p>NONE</p> |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | 5.0 <u>COMPENSATORY ACTIONS</u> NONE |
| | SS | Initiates AOP 18016-C, "Condensate And Feedwater Malfunction" |
| | OATC | <u>AOP 18016-C, CONDENSATE AND FEEDWATER MALFUNCTION, SECTION A – LOSS OF MAIN FEED PUMP</u> <u>IMMEDIATE OPERATOR ACTIONS</u> A1. Check reactor power – LESS THAN <u>OR</u> EQUAL TO 70%. RNO A1. Perform the following: <ol style="list-style-type: none"> Trip the reactor Go to 19000-C, E-0 REACTOR TRIP OR SAFETY INJECTION |
| | SS | <u>E-0, 19000-C, REACTOR TRIP OR SAFETY INJECTION</u> <u>IMMEDIATE OPERATOR ACTIONS</u> |
| | OATC | 1. Check Reactor Trip. (NO) <ul style="list-style-type: none"> Rod Bottom Lights – LIT (NO) Reactor Trip and Bypass Breakers – OPEN. (NO) Neutron Flux – LOWERING. (NO) RNO 1. Trip Reactor using both Reactor trip handswitches. IF Reactor NOT tripped, THEN go to 19211-C, FR-S.1 RESPONSE TO NUCLEAR POWER GENERATION / ATWT. |
| | SS | Transitions to <u>19211-C, FR-S.1 RESPONSE TO NUCLEAR POWER GENERATION / ATWT.</u> |

Scenario No.: 4

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

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Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>3. Check AFW Pumps – RUNNING: (NO)</p> <ul style="list-style-type: none">• MDAFW pumps (NO)• TDAFW Pump, if required. (NO) <p>Note to examiner: The TDAFW pump is required to be started if at least 2 SG levels are be < 10% NR.</p> |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

| Time | Position | Applicant's Action or Behavior |
|------|------------|--|
| | OATC UO | <p>4. Emergency borate the RCS:</p> <ol style="list-style-type: none"> Start at least one Boric Acid Transfer Pump. (may already be running) Verify a Charging Pump is running. Open EMERGENCY BORATE valve HV-8104. (NO) <p>RNO</p> <ol style="list-style-type: none"> IF HV-8104 will <u>NOT</u> open, <u>THEN</u> open the following: <ul style="list-style-type: none"> FV-110A, BA TO BLENDER FV-110B, BLENDER OUTLET TO CHARGING PUMPS SUCT. <p>Note to examiner:</p> <ol style="list-style-type: none"> Either the OATC or UO may be asked to perform this step HV-8104 will fail to open (pre-loaded malfunction) FV-110A/B may already be partially open from LT-112 failure, however this step requires them to be fully open which will necessitate deliberate action on the part of the crew <ol style="list-style-type: none"> Verify charging flow – GREATER THAN 42 GPM. (may not) Verify boric acid flow – GREATER THAN 30 GPM. <p>Note to examiner: Due to high RCS pressure during the ATWT, it may be necessary to take control of FIC-0121 to raise charging flow to > 42 gpm.</p> <ol style="list-style-type: none"> Check RCS pressure – LESS THAN 2335 PSIG. (YES) <p>RNO (just in case)</p> <ol style="list-style-type: none"> Check PRZR PORVs and Block Valves open. <p>IF valves NOT open, THEN reduce RCS pressure to less than 2135 psig by performing the following:</p> <ol style="list-style-type: none"> Arm COPS. Open PRZR PORVs and Block Valves as necessary. |

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Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

| Time | Position | Applicant's Action or Behavior |
|------|----------------|---|
| | OATC UO | <p>5. Check Containment Ventilation Isolation:</p> <ul style="list-style-type: none"> a. Dampers and Valves – CLOSED. <ul style="list-style-type: none"> • CVI MLB indication. (may be) <p>RNO (just in case)</p> <ul style="list-style-type: none"> a. Perform the following: <ul style="list-style-type: none"> 1) Close Dampers and Valves. 2) Start Piping Pen Units. <p>Note to examiner: If SI has occurred, the RNO will be unnecessary, if SI has NOT occurred, the UO will perform the RNO steps at the HVAC panel. CVI dampers / valves are listed on page # 50 & 51.</p> |
| | OATC UO | <p>6. Initiate the following:</p> <ul style="list-style-type: none"> • Continuous Action Page. • NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION. |
| | OATC | <p>7. Check for SI:</p> <ul style="list-style-type: none"> a. SI signal EXISTS OR ACTUATED. (Maybe, depends on timing) b. Initiate ATTACHMENT A. (If, YES) <p>Note to examiner: ATTACHMENT A starts on page 52.</p> |

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Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>8. Check the following trips have occurred:</p> <p>a. Reactor trip. (NO)</p> <p>RNO</p> <p>a. Locally trip the Reactor trip and Bypass breakers.</p> <p>IF the trip breakers will NOT open, THEN tri the Control Rod Drive MG Set output breakers at the Reactor Trip Switchgear.</p> <p>Note to examiner: The crew is expected to call someone to perform this action: The Simbooth Operator will open the trip breakers two minutes after receiving the request.</p> <p>a. Turbine Trip. (YES)</p> |
| | OATC | <p>9. Check Reactor power:</p> <p>a. LESS THAN 5%. (YES)</p> <p>b. IR SUR – LESS THAN 0 DPM. (YES)</p> <p>c. Go to Step 24.</p> <p>Note to examiner: This step is a continuous action, when the trip breakers open, the crew should go to step 24 to exit this procedure.</p> |
| | UO | <p>10. Check Main Generator Output Breakers – OPEN. (YES)</p> |

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Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>11. Check SG levels:</p> <p>a. NR level- AT LEAST ONE GREATER THAN 10%. (32% ADVERSE)</p> <p>RNO</p> <p>a. Verify total feed flow greater than 1260 gpm. (NO)</p> <p>IF NOT, THEN start pumps and align valves as necessary.</p> <p>IF all SG(s) NR levels less than 10% (32% ADVERSE) THEN maintain total feed flow greater than 1260 gpm.</p> <p>b. Maintain NR levels between 10% (32% ADVERSE) and 65%.</p> <p>Note to examiner: At this point they should have the LOHS with no feedwater available.</p> |
| | UO | 12. Check CST level – GREATER THAN 15%. (YES) |

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Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>13. Verify all dilution paths – ISOLATED.</p> <ul style="list-style-type: none"> • RX MU WTR TO BA BLENDER, FV-111A – CLOSED. • Dispatch operator to verify CVCS RX MU WTR TO CCP A ISO, 1208-U4-183 – LOCKED CLOSED. <p><u>UNIT 1</u> (AB-A47) <u>UNIT 2</u> (AB-A82)</p> <p>RNO</p> <p>13. Dispatch operator to close:</p> <ul style="list-style-type: none"> • CVCS RX M/U WTR SUPPLY TO CVCS ISO, 1208-U4-177. <p><u>UNIT 1</u> (AB-A47) <u>UNIT 2</u> (AB-A82)</p> |
| | | <p>Note to examiner: The Simbooth Operator will open the trip breakers as requested after 2 minutes or after step 13, whichever comes first. This is to ensure scenario progresses as expected.</p> |
| | | <p>14. Check for reactivity insertion from uncontrolled cooldown:</p> <p>RCS Temperature – LOWERING IN AN UNCONTROLLED MANNER (NO)</p> <p>-OR-</p> <p>Any SG pressure – LOWERING IN AN UNCONTROLLED MANNER (NO)</p> <p>RNO</p> <p>14. Stop any controlled cooldown:</p> <ul style="list-style-type: none"> • Operate Steam Dumps or ARVs as necessary • Lower total feed flow • <u>IF</u> all SG NR level less than 10% [32% ADVERSE], <u>THEN</u> maintain total feed flow greater than 570 gpm • Go to Step 22 |

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Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | 22. Check Core Exit TCs – LESS THAN 1200°F (YES) |
| | | <p style="text-align: center;"><u>NOTE</u></p> <p>The Moderator Temperature Coefficient (MTC) value is located in the PTDB, TAB 16.0.</p> |
| | OATC | 23. Check Reactor power: <ul style="list-style-type: none"> a. LESS THAN 5%. (YES) b. IR SUR – LESS THAN 0 DPM. (YES) |
| | OATC | 24. Maintain emergency boration to provide adequate shutdown margin for subsequent conditions. |
| | SS | 25. Initiate Critical Safety Function Status Tress per 19200-C, F-O CRITICAL SAFETY FUNCTION STATUS TREE. <p>Crew should recognize red path on heat sink and transition to 19231-C (Page # 56)</p> |
| | SS | 26. Return to procedure and step in effect. |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

CVI Dampers and Valves

| VALVE # | DESCRIPTION | LOCATION |
|----------|---|-------------|
| HV-12975 | CNMT AIR RAD MON SPLY ISO IRC | QPCP |
| HV-12976 | CNMT AIR RAD MON SPLY ISO ORC | QPCP |
| HV-12977 | CNMT AIR RAD MON RTN ISO ORC | QPCP |
| HV-12978 | CNMT AIR RAD MON RTN ISO IRC | QPCP |
| HV-2626A | CTB NORM PURGE SPLY IRC ISO VLV- MAIN (Normally de-energized shut) | QHVC (C31) |
| HV-2626B | CTB NORM PURGE SPLY IRC ISO VLV-MINI | QHVC ((C32) |
| HV-2627A | CTB NORM PURGE SPLY ORC ISO VLV- MAIN (Normally de-energized shut) | QHVC (D31) |
| HV-2627B | CTB NORM PURGE SPLY ORC ISO VLV-MINI | QHVC (D32) |
| HV-2628A | CTB NORM PURGE EXH IRC ISO VLV- MAIN (Normally de-energized shut) | QHVC (A33) |
| HV-2628B | CTB NORM PURGE EXH IRC ISO VLV-MINI | QHVC ((A34) |
| HV-2629A | CTB NORM PURGE EXH ORC ISO VLV- MAIN (Normally de-energized shut) | QHVC (B33) |
| HV-2629B | CTB MINI PURGE EXH ORC ISO VLV-MINI | QHVC (B34) |
| HV-2624A | CTB POST LOCA PURGE EXH IRC ISO VLV | QHVC (A35) |
| HV-2624B | CTB POST LOCA PURGE EXH IRC ISO VLV | QHVC (B35) |

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Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

| | | |
|----------|-----------------------------------|------------|
| HV-12604 | PIPING PEN RM OUTLET ISO DMPR | QHVC (C22) |
| HV-12605 | PIPING PEN RM INLET ISO DMPT | QHVC (B22) |
| HV-12606 | PIPING PEN RM INLET ISO DMPR | QHVC (B23) |
| HV-12607 | PIPING PEN RM OUTLET ISO DMPR | QHVC (C23) |
| HV-12596 | RECYCLE HOLD-UP TK-1 ISO VENT VLV | QHVC (E22) |
| HV-12597 | RECYCLE HOLD-UP TK-1 ISO VENT VLV | QHVC (E23) |
| HS-2548 | PIPING PEN RM FLTR & EXH FAN 1 | QHVC (A22) |
| HV-2549 | PIPING PEN RM FLTR & EXH FAN 2 | QHVC (A23) |

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Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

Attachment A, Safety Injection Verification

1. Verify FW isolation valves closed:

- ___ • MFIVs
- ___ • BFIVs
- ___ • MFRVs
- ___ • BFRVs

2. Check both trains of ECCS equipment - ALIGNING FOR INJECTION PHASE:

- MLB indication

3. Check Containment Isolation Phase A - ACTUATED:

- ___ • CIA MLB indication

4. Check AFW Pumps - RUNNING:

- ___ • MDAFW Pumps
- ___ • TDAFW Pump, if required

2. Actuate SI.

3. Actuate CIA.

IF valves do NOT close,
THEN close valves.

- ___ • Start Pumps.

Open Steam Supply valve:

- HV-5106

5. Verify SG Blowdown isolated:

- ___ • Place SG Blowdown Isolation Valve handswitches HS-7603A, B, C, and D in the CLOSE position.

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Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

- ___ • SG Sample Isolation Valves - CLOSED.

6. Check ECCS Pumps and NCP status:

- ___a. CCPs - RUNNING.

a. Perform the following for
available CCP(s):

- 1) Place alternate miniflow
valve handswitch in
ENABLE PTL:

___ HS-8508A

___ HS-8508B

- 2) Start CCP(s):

- ___b. SI Pumps - RUNNING.

- ___b. Start Pumps.

- ___c. RHR Pumps - RUNNING.

- ___c. Start Pumps.

- ___d. NCP - TRIPPED.

- ___d. Stop the NCP.

___7. Verify CCW Pumps - ONLY TWO RUNNING EACH
TRAIN.

8. Verify proper NSCW system operation:

- ___a. NSCW Pumps - ONLY TWO RUNNING EACH
TRAIN

- b. NSCW TOWER RTN HDR BYPASS BASIN
handswitches - IN AUTO:

- ___ • HS-1668A
- HS-1669A

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Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

9. Verify Containment Cooling Units:

a. ALL RUNNING IN LOW SPEED:

☐ • MLB indication

b. NSCW Cooler isolation valves - OPEN:

☐ • MLB indication

10. Check Containment Ventilation Isolation:

a. Dampers and Valves - CLOSED:

☐ • CVI MLB indication

a. Perform the following:

1) Close Dampers and Valves.

2) Start Piping Pen Units.

11. Check if main steamlines should be isolated:

a. Check one or more of the following conditions:

☐ a. Go to Step 12.☐ Any steamline pressure - LESS THAN OR
EQUAL TO 585 PSIG.☐ Containment pressure by recording -
GREATER THAN 14.5 PSIG.☐ Low Steam Pressure SI/SLI - BLOCKED
AND High Steam Pressure Rate - ON
TWO OR MORE CHANNELS OF ANY
STEAMLINE.☐ b. Verify main steamline isolation and bypass
valves – CLOSED.

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Scenario No.: 4

Event No.: 6, 7

Event Description: ATWT due to loss of B MFP with failure of auto rod motion.

___12. Check Containment pressure - REMAINED LESS THAN 21.5 PSIG.

12. Verify the following:

- a. Containment Spray actuated.
- b. Containment Spray Pump discharge valves open.
- c. Containment Spray Pumps running.

___13. Verify Diesel Generators – RUNNING.

END OF ATTACHMENT A

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Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|------|----------------------|--|
| | | NOTE to examiner: It is expected the crew will transition to 19231-C, FR-H.1 Response to Loss of Secondary Heat Sink about this time if they have not already transitioned. |
| | SS | Transitions to 19231-C, FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK. |
| | | CAUTION: Feed flow should NOT be re-established to any faulted SG if a non-faulted SG is available. |
| | UO | <p>1. Check total feed flow capability to SG(s):</p> <ul style="list-style-type: none"> Greater than 570 gpm available. (NO) <p>-AND-</p> <ul style="list-style-type: none"> Less than 570 gpm due to Operator action. (NO) <p>RNO</p> <p>1. Go to Step 3.</p> |
| | OATC UO SS | <p>3. Initiate the following:</p> <ul style="list-style-type: none"> Continuous Actions Page For Prior to Establishing Bleed and Feed. (Next Page) NMP-EP-110, EMERGENCY CLASSIFICATION DETERMINATION AND INITIAL ACTION. |

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Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--------------------------------|
|------|----------|--------------------------------|

CONTINUOUS ACTIONS PRIOR TO ESTABLISHING BLEED AND FEED

**ERROR!
REFERENCE
SOURCE
NOT
FOUND.**

– Monitor CCP status - AT LEAST ONE AVAILABLE.

**ERROR!
REFERENCE
SOURCE
NOT
FOUND.**

– Monitor for RCS bleed and feed requirements:

- WR level in any 3 SGs - LESS THAN 29% [44% ADVERSE]
-OR-
- RCS pressure - GREATER THAN 2335 PSIG DUE TO LOSS OF SECONDARY HEAT SINK

**ERROR!
REFERENCE
SOURCE
NOT
FOUND.**

– Monitor CST level less than 15% for swap to alternate CST.

**ERROR!
REFERENCE
SOURCE
NOT
FOUND.**

– Try to establish MDAFW feed flow.

**ERROR!
REFERENCE
SOURCE
NOT
FOUND.**

– Try to establish TDAFW feed flow.

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Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|--|----------|---|
| ERROR! REFERENCE SOURCE NOT FOUND. | | – Monitor for SI actuation/reset requirement: |
| | | PRZR level - CANNOT BE MAINTAINED GREATER THAN 9% [37% ADVERSE] |
| | | -OR- |
| | | RCS subcooling - CANNOT BE MAINTAINED GREATER THAN 24°F [38°F ADVERSE] |
| | | |
| ERROR! REFERENCE SOURCE NOT FOUND. | | – Try to establish main feedwater flow. |
| | | |
| | | |
| | | |
| | | |
| ERROR! REFERENCE SOURCE NOT FOUND. | | – Maintain PRZR pressure less than 2000 psig (P-11). |
| | | |
| | | |
| | | |
| | | |
| ERROR! REFERENCE SOURCE NOT FOUND. | | – Monitor 4160V AC Emergency Busses to restart ESF equipment. |
| | | |
| | | |
| | | |
| | | |
| ERROR! REFERENCE SOURCE NOT FOUND. | | – Try to establish feed flow from condensate system. |
| | | |
| | | |
| | | |
| | | |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | 4. Check if secondary heat sink is required: <ul style="list-style-type: none"> a. RCS pressure – GREATER THAN ANY NON-FAULTED SG PRESSURE. (YES) b. RCS WR temperature – GREATER THAN 350°F. (YES) |
| | OATC | 5. Check CCP status – AT LEAST ONE AVAILABLE. (YES) |
| | SS | 6. Check if RCS bleed and feed is required: |
| | UO | a. Check the following: <ul style="list-style-type: none"> WR level in any 3 SGs – LESS THAN 29% [44% ADVERSE] (YES) -OR- RCS pressure – GREATER THAN 2335 PSIG DUE TO LOSS OF SECONDARY HEAT SINK (Possibly) |
| | OATC | |
| | OATC | b. Trip all RCPs |
| | SS | c. Go to Step 35 and perform bleed and feed actions |

Scenario No.: 4

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

[illegible]

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Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | 38. Verify adequate RCS bleed path: <ul style="list-style-type: none"> • COPS – ARMED • PRZR PORV Block Valves – BOTH OPEN • PRZR PORVs – BOTH OPEN (NO) |
| | Critical | RNO 38. Perform the following: <ol style="list-style-type: none"> Open Reactor Vessel Head Vent Valves: <ul style="list-style-type: none"> • HV-8095A – RX HEAD VENT TO LETDOWN ISOLATION VLV • HV-8095B – RX HEAD VENT TO LETDOWN ISOLATION VLV • HV-8096A – RX HEAD VENT TO LETDOWN ISOLATION VLV • HV-8096B – RX HEAD VENT TO LETDOWN ISOLATION VLV • HV-0442A – REACTOR HEAD VENT TO PRT • HV-0442B – REACTOR HEAD VENT TO PRT Align an available low pressure water source to at least one intact SG by initiating ATTACHMENT C. <p>Note to examiner: Once an adequate bleed path has been established by opening one PORV with the Rx Vessel Head Vents, the TDAFW overspeed trip will be reset allowing them to feed SGs.</p> |
| | SS | 39. Initiate ATTACHMENT D while continuing with this procedure. |

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Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | CREW | <p>40. Initiate <u>CONTINUOUS ACTIONS AFTER ESTABLISHING BLEED AND FEED</u></p> <p><u>The following steps are the continuous actions AFTER feed and bleed.</u></p> <p>41 - Maintain ECCS flow and PORVs open (Head Vents if used). 42 - Monitor 4160V AC Emergency Busses to restart ESF equipment. 46 - Monitor for CNMT pressure rise greater than 21.5 psig to actuate CNMT Spray. 47 - Monitor CNMT conditions to secure CNMT Spray. 48 - Monitor RWST level less than 29% to establish Cold Leg Recirculation. 49 - Try to establish MDAFW flow. 53 - Try to establish TDAFW flow.</p> |
| | CREW | <p>41. Maintain RCS heat removal:</p> <ul style="list-style-type: none"> ECCS flow (YES) PRZR PORVs – BOTH OPEN (NO) <p>RNO</p> <ul style="list-style-type: none"> Maintain Reactor Vessel Head Vent Valves open. |
| | | <p><u>CAUTIONS</u></p> <ul style="list-style-type: none"> If offsite power is lost after SI reset, action is required to restart the following ESF equipment if plant conditions require their operation: RHR Pumps SI Pumps Post-LOCA Cavity Purge Units Containment Coolers in low speed (Started in high speed on UV signal). ESF Chilled Water Pumps (If CRI is reset). |
| | OATC | 42. Reset SI. |

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Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|------|------------|--|
| | | <p style="text-align: center;"><u>CAUTION</u></p> <p>Repositioning Phase A Isolation Valves may cause radiation problems throughout the plant.</p> |
| | OATC | 43. Reset Containment Isolation Phase A. |
| | UO | 44. Establish Instrument Air to Containment: <ul style="list-style-type: none"> a. Instrument Air Pressure – GREATER THAN 100 PSIG. (YES) b. Open INSTR AIR CNMT ISO VLV HV-9378. c. Verify PRZR Spray Valves operating as required. |
| | UO | 45. Place Containment Hydrogen Monitors in service by initiating 13120, POST-ACCIDENT HYDROGEN CONTROL |
| | OATC UO | 46. Check Containment Pressure – REMAINED LESS THAN 21.5 PSIG BY PRESSURE RECORDING (YES) Go to Step 48. |
| | OATC UO | 48. Check RWST level – GREATER THAN 29%. (YES) |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <p style="text-align: center;"><u>CAUTION</u></p> <p>Feed flow rates should be controlled to prevent excessive RCS cooldown.</p> |
| | | <p>49. Try to establish MDAFW flow to at least one SG:</p> <ul style="list-style-type: none"> a. Check MDAFW Pump – AVAILABLE <ul style="list-style-type: none"> • Power available (YES) • Suction pressure (NO) • Discharge pressure (NO) <p>Note to examiner: No MDAFW Pumps will be available.</p> <p>RNO</p> <ul style="list-style-type: none"> a. Perform the following: <ul style="list-style-type: none"> • Initiate actions to restore an MDAFW Pump: <ul style="list-style-type: none"> a) Reference 13610, AUXILIARY FEEDWATER SYSTEM b) Verify MDAFW Pump discharge throttle valves are closed. • <u>WHEN</u> MDAFW Pump is started, <u>THEN</u> go to Step 49.b. • Go to Step 53 |

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Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | | <p style="text-align: center;"><u>CAUTION</u></p> <p>Feed flow rates should be controlled to prevent excessive RCS cooldown.</p> |
| | | <p>53. Try to establish TDAFW flow to at least one SG:</p> <p>a. Check TDAFW Pump – AVAILABLE</p> <ul style="list-style-type: none"> • Steam admission valve HV-5106 – OPEN (YES) • Trip & Throttle valve PV-15129 – OPEN (NO) (HS-15111) • Governor valve SV-15133 – OPERATING PROPERLY (YES) (PDIC-5180A). <p>RNO</p> <p>a. Perform the following:</p> <ul style="list-style-type: none"> • Initiate 13610, AUXILIARY FEEDWATER SYSTEM to operate TDAFW Pump as necessary. (Page 66) • <u>WHEN</u> TDAFW Pump is started, <u>THEN</u> go to Step 53.b. • Go to Step 57 |
| | | <p>b. Select SG(s) to feed:</p> <p>1) All SG WR levels – LESS THAN 9% [31% ADVERSE] (NO)</p> <p>RNO</p> <p>b. Go to Step 54.</p> |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | 54. Verify TDAFW pump throttle valves open for selected SG(s): HV-5122 TDAFW Pump to SG 1 HV-5125 TDAFW Pump to SG 2 HV-5127 TDAFW Pump to SG 3 HV-5120 TDAFW Pump to SG 4 |
| | | 55. Verify adequate feed flow to raise SG levels. (YES) |
| | | 56. Go to Step 70. |
| | | 70. Check for adequate secondary heat sink: a. NR level in at least one SG – GREATER THAN 10% [32% ADVERSE] RNO a. <u>IF</u> feed flow to at least one SG verified, <u>THEN</u> do <u>NOT</u> continue until NR level is restored to greater than 10% [32% ADVERSE]. |
| | | 71. Check RCS temperatures: • Core exit TCs – LOWERING • RCS WR hot leg temperatures – LOWERING |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <p>72. Verify Reactor Head Vent Valves – CLOSED:</p> <ul style="list-style-type: none"> • HV-8095A – RX HEAD VENT TO LETDOWN ISOLATION VLV • HV-8095B – RX HEAD VENT TO LETDOWN ISOLATION VLV • HV-8096A – RX HEAD VENT TO LETDOWN ISOLATION VLV • HV-8096B – RX HEAD VENT TO LETDOWN ISOLATION VLV • HV-0442A – REACTOR HEAD VENT TO PRT • HV-0442B – REACTOR HEAD VENT TO PRT |
| | | 73. Check SG pressures – GREATER THAN 585 PSIG. |
| | | <p style="text-align: center;"><u>NOTE</u></p> <p>After closing a PRZR PORV, it may be necessary to wait for RCS pressure to rise before determining if ECCS flow can be terminated.</p> |
| | | <p>74. Check if ECCS flow can be terminated:</p> <ul style="list-style-type: none"> a. RCS Subcooling – GREATER THAN 24°F. b. Check RVLIS full range indication – GREATER THAN 63%. c. Go to Step 76. |
| | | END OF THE SCENARIO – FREEZE THE SIMULATOR WITH NRC CHIEF EXAMINER CONCURRENCE. |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <p>57. Try to establish main FW flow to at least on SG:</p> <p>a. Check condensate system – IN SERVICE. (NO)</p> <p>RNO</p> <p>a. Place condensate system in service by initiating 13615, CONDENSATE AND FEEDWATER SYSTEMS.</p> <p><u>WHEN</u> Condensate system in service, <u>THEN</u> go to Step 58.</p> <p>Return to Step 49. (Page 61)</p> <p>Note to examiner: Condensate system will not be available as neither MFP is available.</p> |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <p>Note to examiner: it is expected that the SS will call C&T asking for the Outside Operator and a representative from Mechanical Maintenance to investigate the cause, and reset as applicable, the overspeed trip for the TDAFW pump.</p> <p>These are the steps from the AFW System procedure for resetting the overspeed trip.</p> |
| | | <p><u>SOP 13610, AUXILIARY FEEDWATER SYSTEM, Section 4.4.7</u></p> <p>CAUTION</p> <p>If this reset of the Trip & Throttle valve is following an actual overspeed trip and the potential exists to initiate AFW flow to a "hot dry S/G", closing of the TDAFW discharge valves should be considered prior to reset of the Trip & Throttle valve.</p> |
| | | 4.4.7.1 – 4.4.7.7 Performed in the TDAFW Pump House |
| | | 4.4.7.8 Place the TDAFW Pump Steam Admission Valve 1-HV-5106 handswitch 1HS-5106A (QMCB) in CLOSE. |
| | | <p>NOTE</p> <p>Holding 1HS-5106A in the CLOSE position allows the speed controller startup logic to reset when the T&T valve is electrically opened</p> |
| | | 4.4.7.9 <u>IF</u> AFW Actuation signal is present, hold 1HS-5106A in the CLOSE position until completion of Step 4.4.7.10. |
| | | <p>NOTE</p> <p>When Handswitch 1HS-15111 is placed in OPEN, the Trip & Throttle Valve latches and then opens.</p> |
| | | 4.4.7.10 Place Handswitch 1HS-15111 (QMCB) in OPEN, THEN release. |

Op-Test No.: 2013-301

Scenario No.: 4

Event No.: 8, 9, 10

Event Description: LOHS after ATWT from overspeed of the TDAFW pump, MDAFW pump B coupling failure, and trip of A MFPT. Additionally, failure of B Train PORV will require the use of Rx Vessel head vents during LOHS feed and bleed.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <p style="text-align: center;">CAUTIONS</p> <ul style="list-style-type: none">• Steam Admission Valve 1-HV-5106 will open when 1HS-5106A is released if an open signal is present.• If pump speed cannot be controlled or overspeed condition occurs again, when 1HS-5106 is released in the next step, do not attempt to reset again until the speed control problem has been corrected. |
| | | 4.4.7.11 Performed in the TDAFW Pump House |
| | | 4.4.7.12 <u>WHEN</u> the Trip and Throttle Valve is fully open as indicated at MLB13-4 <u>OR</u> 1HS-15111 (QMCB), release 1HS-5106A <u>IF</u> applicable. |
| | | At this point the TDAFW pump should be started, this will return the crew to Step 53.b of 19231-C. (Page 63). |

Facility: Vogtle Scenario No.: 5 Op-Test No.: 2013-301

Examiners: _____ Operators: _____

Initial Conditions: The plant is at 100% power, MOL, steady state operations.
 (Base IC # 14, snapped to IC # 177 for HL18 NRC Exam)

Equipment OOS: 'A' RHR Pump for motor repair (TS 3.5.2, Condition A), 'A' MDAFW Pump for bearing replacement (TS 3.7.5, Condition B)

Turnover: AMSAC Trouble annunciator is ON due to instrument malfunction. Engineering & Maintenance are investigating.

Preloaded Malfunctions:

ES11 – Train 'B' MSL Auto Isolation Failure

ES20A/B – Block CIA Actuation Trn A/B

9001A FAIL = TRUE

9001B FAIL = TRUE

C CLR A LO FAIL = TRUE

C CLR B LO FAIL = TRUE

IA09b – Instrument Air Compressor # 2 auto start failure.

IA09d – Instrument Air Compressor # 4 auto start failure.

RH04B – Failure of RHR pump B to auto start

Overrides

HS3007B – Train 'B' SLI Handswitch Failure – NORMAL

HS13006A – Train 'A' SG#1 BSIV Fail to Close on SLI or Manually - OPEN

| Event No. | Malf. No. | Event Type* | Event Description |
|-----------|-------------|-------------------------|--|
| T1 | RC10A @100% | I-OATC I-SS TS-SS | NR Tc Loop # 1 fails high. LCO 3.3.1-1, Function 6, 7 Condition E, LCO 3.3.2, FU5b, Condition I |
| T2 | TU07 | C-UO C-SS | Inadvertent Main Turbine Runback. Decreasing reactor power from the turbine runback |
| T3 | CV07 | C-OATC C-SS TS-SS | Normal Charging Pump (NCP) trips. INFO LCOs TR 13.1.5 Condition 'A' and LCO TR 13.1.3 Condition 'A' |
| 4 | | N-OATC N-SS | Restore normal charging & letdown |

| Event No. | Malf. No. | Event Type* | Event Description |
|--|---|-----------------------------------|--|
| T5 | RC09C @0% | TS-SS | Wide range Tc on loop 3 fails low. LCO 3.3.3, PAMS, Condition A, FU 3, Condition D LCO 3.3.4, Remote Shutdown, Condition A, FU 3, Condition D |
| 6 | AC 3 TRIP = TRUE | C-UO C-SS | Air compressor # 3 trips with failure of AC # 2 and AC # 4 to automatically start. |
| T7 | ES07 | M-All | Spurious AMSAC Actuation due to technician error while investigating spurious AMSAC TROUBLE annunciator. This will result in a reactor - turbine trip. |
| T8 | RC03C | M-All | DBA LOCA on RCS Loop # 3 |
| 9 Pre-loaded | ES11 HS3007B HS13006A | C-UO C-SS | Train 'B' MSL Auto Isolation Failure. Train 'B' SLI Hand switch Fails to operate Train 'A' Bypass Steam Line Isolation Valve fail to close on SLI or from QMCB |
| 10 Pre-loaded | RH04B | C-OATC C-SS Critical | RHR pump Train B fails to automatically start on an SI signal. |
| 11 Pre-loaded | Cnmt Spray Discharge valves auto open failures | C-OATC C-SS Critical | Both Containment Spray discharge valves fail to open automatically on CS signal. |
| 12 Pre-loaded | Cnmt Coolers fail to auto start on LOW speed | C-UO C-SS Critical | All Containment Coolers fail to automatically start on LOW speed on an SI signal. |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | |

Event 1:

Loop # 1 NR Tcold fails high.

Verifiable Actions:

OATC – Perform IOA of AOP 18001-C and places control rods in manual.
Defeats the failed channel using the Tave and Delta T defeat switches.

Technical Specifications:

LCO 3.3.1-1, Function 6, Condition E
LCO 3.3.1-1, Function 7, Condition E
LCO 3.3.1-1, Function 5b, Condition I

Event 2:

Inadvertent Main Turbine Runback occurs.

Verifiable Actions:

OATC – Check turbine runback required per IOA of AOP 18012-C.

UO – Stabilize turbine load per IOA of AOP 18012-C.

Technical Specifications:

None

Event 3, 4:

The Normal Charging Pump will trip. CVCS Charging and Letdown will be returned to service.
(**NOTE:** The Chief Examiner may decide to go to the next event after a charging pump is started and prior to placing Letdown in service).

Verifiable Actions:

OATC – Manually closes the Letdown Orifices and the Letdown Isolation valves to stop flashing in the Letdown system.

OATC / UO – Trends the RCP operating parameters on the IPC computer.

OATC – Adjusts HC-182 Seal Flow Controller to maximum seal flow and adjusts Charging Flow Controller FC-121 to minimum.

OATC – Starts a charging pump. (CCP)

OATC - Adjusts HC-182 to obtain 8 -13 gpm seal injection and adjusts Charging Flow Controller FC-121 to obtain desired charging flow.

NOTE: The next malfunction may be entered at this point with NRC Chief Examiner discretion. The following steps may not be completed in its entirety prior to subsequent events and completion of scenario.

OATC – Places Letdown Pressure Controller PIC-131 to 50 – 75% demand.

OATC – Places Letdown Temperature Controller TIC-130 in manual and adjusts to the recorded control room rounds position.

OATC – Opens letdown isolations and letdown orifices.

OATC – Adjusts PIC-131 and places in AUTO and places TIC-130 in AUTO.

OATC – Adjusts FIC-121, HC-182 to maintain PRZR level and seal injection.

Technical Specifications:

LCO TR 13.1.5 – Charging Pumps – Operating

LCO TR 13.1.3 – Boration Flow Paths - Operating

Event 5:

The WR Tcold for loop # 3 will fail low. This will require a Tech Spec entry by the SS but no operator actions are required.

Verifiable Actions:

None

Technical Specifications:

LCO 3.3.3, PAMS, Condition A, FU 3, Condition D

LCO 3.3.4, Remote Shutdown, Condition A, FU 3, Condition D

Event 6:

Air compressor # 3 trips with failure of Air compressors # 2 and # 4 to automatically start.

Verifiable actions:

UO – Manually starts Air compressor # 2 or # 4.

Technical Specifications:

None

Event 7:

Spurious AMSAC Actuation due to technician error while investigating spurious AMSAC TROUBLE annunciator. Reactor trips on Turbine Trip.

Verifiable Actions:

OATC – Performs IOAs of E-0.

UO – Performs IOAs of E-0.

SS-Performs IOAs of E-0, transitions to ES-0.1 and directs crew in actions to stabilize the plant.

Technical Specifications:

None

Event 8, 10, 11, 12:

RCS DBA LOCA.

Verifiable Actions:

OATC – Manually starts RHR pump B which fails to automatically start.

OATC – Manually opens Containment Spray discharge isolation valves which fail to automatically open.

UO – Manually starts Containment Coolers in LOW speed which fail to automatically start LOW speed.

Technical Specifications:

None

Event 9:

Train 'B' MSL Auto Isolation Failure.

Verifiable Actions:

UO – Recognizes Train 'B' SLI auto actuation failure.

UO – Manually actuates SLI.

Technical Specifications:

None

The scenario may be stopped during the performance of 19010-C, E-1 Response to Reactor or Secondary Coolant Leakage

CRITICAL TASKS:

1) Manually starts RHR pump B to provide ECCS injection flow to prevent an inadequate core cooling event. RHR pump B is required to be started by the end of the OATC Initial Operator Actions.

2) Manually opens either Containment Spray discharge isolation valve (HV-9001A or B) to cooldown and depressurize Containment to prevent a challenge to the Containment barrier which could result in an uncontrolled release to the environment per Foldout Page or 19000-C (E-0) or step 8 of the OATC Operator Initial Actions (if CNMT is > 21.5 psig).

OR

Manually starts at least 4 Containment Coolers in LOW speed to cooldown and depressurize Containment to prevent a challenge to the Containment barrier which could result in an uncontrolled release to the environment by completion of Operator Initial Actions of 19000-C (E-0).



NUCLEAR SAFETY FOCUS TARGET ZERO

| | |
|--|--|
| | |
| Protected Train: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> <input type="checkbox"/> Alpha <input checked="" type="checkbox"/> Bravo </div> <div> EOOS: <input checked="" type="checkbox"/> Green <input type="checkbox"/> Yellow <input type="checkbox"/> Orange <input type="checkbox"/> Red </div> </div> | |
| | |
| Plant Conditions: | 100 % power, MOL. |
| | |
| Major Activities: | Maintain power operations per 12004DF-1, section 4.3 for power operation. |
| | |
| Active LCOs: | <input type="checkbox"/> LCO 3.5.2 Condition A is in effect due to RHR Pump 'A' tagged out. <input type="checkbox"/> LCO 3.7.5 Condition B is in effect due to MDAFW Pump 'A' tagged out. |
| | |
| OOS/ Degraded CR Instruments: | <input type="checkbox"/> ALB05-E04 AMSAC TROUBLE is actuated; Engineering & Maintenance are currently investigating. |
| | |
| Narrative Status: | <input type="checkbox"/> Containment mini-purge is in service for a planned Containment Entry on next shift. <input type="checkbox"/> RHR Pump 'A' is tagged out for motor repair, expected return-to-service time is 24 hours with 48 hours left on a shutdown LCO of 72 hours. <input type="checkbox"/> MDAFW Pump 'A' is tagged out for bearing replacement, expected return-to-service time is 14 hours with 24 hours left on a shutdown LCO of 72 hours. <input type="checkbox"/> The remnants of Hurricane Sawyer are in the area. A severe thunderstorm warning has been issued for Richmond, Burke, and Screven Counties in Georgia. High winds and rain, which could be heavy at times, will be in the area for the next 10-12 hours. The Severe Weather Checklist is in effect. |

UNIT 1 REACTIVITY BRIEFING SHEET

| | | | | | | |
|---------------|-----|--------------|--------|----------------|------------------|------|
| Shift: | Day | Date: | 4/9/13 | Burnup: | 11168.03 MWD/MTU | |
| | | | | | As of 4/9/13 | 7:23 |

MINIMUM SHIFT REACTIVITY INFORMATION TO BE BRIEFED

Power: 100 **Rod Motion:** AUTO

Current Temperature Control Strategy: DILUTION

Currently Making Up: 50.0 gal **Every:** 1 to 2 hrs

The desired Tavg operating band is 585.5 +/- 0.05 degrees F

CVCS makeup system boric acid flow per 100 gal makeup: 13.0 gallons/100

| | |
|---|------|
| CVCS makeup system pot setting(FIC-0110): | 3.24 |
|---|------|

BTRS Strategy: none

AFD Strategy: Maintain on target plus/minus 1 AFD units

Reactivity System Components Degraded/OOS:

None

Activities expected that may affect core reactivity (Reactivity Focus Items):

None

CURRENT CORE REACTIVITY PARAMETERS

| | | | | |
|---------------------|-----|---------|-------------------------------|------|
| Boron Worth: | 8.5 | pcm/ppm | PCM per 1% pwr change: | 17.9 |
|---------------------|-----|---------|-------------------------------|------|

Current MTC value: HFP: -17.9 pcm/F HZP: -3.9 pcm/F

Current BAST Cb: 7000 ppm **Current RCS Cb:** 907 ppm

| | | | |
|-------------------------------|------------------------|--------------|----------------|
| Boration required per: | degree F: | 21.3 | gallons |
| | 1% pwr change: | 21.3 | gallons |
| | 10% pwr change: | 212.8 | gallons |
| | 30% pwr change: | 638.5 | gallons |

| | | | |
|-------------------------|----------------|-------|---------|
| Dilutions required per: | degree F: | 143.1 | gallons |
| | 1% pwr change: | 143.1 | gallons |

| | | |
|--|--------|---------------------------------|
| Boration required for stuck rods: | 3182.2 | gallons for 2 stuck rods |
| | 4837.3 | gallons for 3 stuck rods |

If more than 3 rods are stuck begin boration and calculate for actual number of stuck rods

Human Performance tools:

| | | |
|---------------|-------------------------|-----------------------|
| Peer check | Three-way communication | Placekeeping |
| Procedure Use | STAR | Time-Out |
| | | Situational Awareness |

Valid for PTDB Cycle 18 Tab 1.0 rev 29 approved 9/29/12 and Tab 16.0 rev 19 approved 10/5/12

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 1

Event Description: Loop 1 Tcold fails high.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>Diagnoses NR Temperature Instrument Failure. (Loop 1 Tcold TE-411A fails high)</p> <p>Symptoms / alarms:</p> <ul style="list-style-type: none"> • ALB12-A03 RC LOOP ΔT/AUCTION ΔT HI-LO DEV • ALB12-A04 RC LOOP TAVE/AUCTION TAVE HI-LO DEV • ALB12-A05 TAVG/TREF DEVIATION • ALB12-A06 OVERTEMP ΔT ALERT • ALB12-B04 AUCTION TAVG HIGH • ALB12-B06 OVERPOWER ΔT ALERT • ALB10-E03 OVERTEMP ΔT ROD BLOCK AND RUNBACK ALERT • ALB10-C03 OVERPOWER ΔT ROD BLOCK AND RUNBACK ALERT <p>Indications:</p> <ul style="list-style-type: none"> • Control rods rapidly inserting. • Loop 1 Tavg / Delta T indications deviating from other loops. • 1FIC-0121 Charging Flow Controller rises to maximum demand. |
| | OATC | <p><u>AOP 18001-C, Section B, SYSTEMS INSTRUMENTATION MALFUNCTION</u></p> <p><u>IMMEDIATE OPERATOR ACTION</u></p> <p>B1. Verify ROD BANK SELECTOR SWITCH in MAN position.</p> |
| | SS | Enters AOP 18001-C, Section B. |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 1

Event Description: Loop 1 Tcold fails high.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>B2. Restore TAVG to program band.</p> <p>Note to examiner: It is expected the OATC will pull rods out to the original rod height in 3 step increments with SS concurrence.</p> |
| | OATC | <p>B3. Check NR Temp failed LOW. (NO)</p> <p>RNO</p> <p>B3. IF NR Temp has failed HIGH, THEN</p> <p>a. Place FIC-121 in MANUAL.</p> <p>b. Control charging flow to maintain Pressurizer Level at Program Level.</p> |
| | OATC | <p>B4. Select affected loop on TS-412T TAVG DEFEAT SEL.</p> <p>Defeat 412</p> |
| | OATC | <p>B5. Select affected loop on TS-411F DELTA T DEFEAT SEL.</p> <p>Defeat 411</p> |
| | UO | <p>B6. Check FIC-121 in AUTO (NO)</p> <p>RNO</p> <p>B6. Restore FIC-121 to AUTO as follows:</p> |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 1

Event Description: Loop 1 Tcold fails high.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | | <p>a. AFTER Pressurizer level has been stable within 1% of setpoint for approximately 3 minutes, place FIC-121 in AUTO.</p> <p><u>Cue to Simbooth:</u> IF asked, the Shift Manager has given permission to place the charging flow controller in auto.</p> |
| | OATC | B7. Place ROD BANK SELECTOR SWITCH in AUTO position if desired. |
| | SS | <p>B8. Notify I & C to initiate repairs.</p> <p>Calls C & T to perform the following:</p> <ul style="list-style-type: none"> • Notify Operations Duty of AOP entry. • Write a Condition Report. • Notify Maintenance of the failure. |
| | SS | <p>B9. Bypass the affected instrument channel using 13509-C, BYPASS TEST INSTRUMENTATION (BTI) PANEL OPERATION, if desired.</p> <p>NOTE: Expect the SS will NOT bypass the channel.</p> |
| | SS | <p>B10. Trip the affected channel bistables and place the associated MASTER TEST switches in TEST position per TABLE B1 within 72 hours. (TS 3.3.1 & 3.3.2)</p> <p>NOTE: The SS is expected to leave bistables untripped during the allowed out of service time to facilitate I & C trouble shooting of the failed channel.</p> |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 1

Event Description: Loop 1 Tcold fails high.

| Time | Position | Applicant's Action or Behavior | | |
|------|----------|---|---|---|
| | SS | B11. Initiate the applicable actions of: <ul style="list-style-type: none"> • TS 3.3.1 • TS 3.3.2 | | |
| | SS | LCO 3.3.1 Function 6, 7 Condition E OT ΔT, OP ΔT | | |
| | SS | <u>CONDITION</u> A. One or more Functions with one or more required channels inoperable. E. One channel Inoperable. | <u>REQUIRED ACTION</u> A .1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s). E.1 Place channel in trip OR E.2 Be in MODE 3 | <u>COMPLETION TIME</u> Immediately 72 hours 78 hours |
| | SS | LCO 3.3.2 Function 5b Condition I FWI | | |
| | SS | <u>CONDITION</u> A. One or more Functions with one or more required channels inoperable. I. One channel Inoperable. | <u>REQUIRED ACTION</u> A .1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or Train(s). I.1 Place channel in trip OR I.2 Be in MODE 3 | <u>COMPLETION TIME</u> Immediately 72 hours 78 hours |
| | SS | B12. Initiate the Continuous Actions Page. | | |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 1

Event Description: Loop 1 Tcold fails high.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | SS | <p>B13. Check repairs and surveillances – complete. (NO)</p> <p>RNO</p> <p>B13. Perform the following:</p> <ul style="list-style-type: none">a. WHEN repairs and surveillances are complete, THEN perform Step B14.b. Return to procedure and step in effect. <p>End of EVENT # 1, Proceed to EVENT # 2 once control rods have been placed in AUTO. Control rods in auto is required for the next event.</p> |

Event Description: Inadvertent Turbine Runback

6

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 2

Event Description: Inadvertent Turbine Runback

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | SS | Enters AOP 18012-C, Turbine Runback and verifies completion of Immediate Operator Actions. |
| | UO | 16. Check Turbine load – STABLE. |
| | SS | 17. Initiate the Continuous Actions Page. |
| | UO | 18. Control Turbine load using the STANDBY LOAD SET potentiometer. |
| | OATC | <p style="text-align: center;"><u>NOTES</u></p> <ul style="list-style-type: none"> Control Rods should not be withdrawn during a transient. Turbine load reduction or dilution should be used if needed to raise Tav_g. <p>19. Check Tav_g – TRENDING TO TREF.</p> <p>RNO</p> <p>19. Match Tav_g and Tref and control delta I to $\pm 3\%$ of target by performing the following as necessary:</p> <ul style="list-style-type: none"> Adjust turbine load. Borate by initiating 13009, CVCS REACTOR MAKEUP CONTROL SYSTEM. Use Rods. |
| | UO | <p>20. Check Steam Dump System</p> <p>a. ARMED</p> <p>b. RESPONDING TO TAVG/TREF DEVIATION</p> |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 2

Event Description: Inadvertent Turbine Runback

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>21. Control PRZR level – IN PROGRAM BAND.</p> <p>22. Maintain Seal Injection flow to all RCPs – 8 TO 13 GPM.</p> <p>23. Check PRZR Pressure – TRENDING TO 2235 PSIG.</p> |
| | UO | 24. Check SG NR level – TRENDING TO 65%. |
| | UO | <p>25. Check Steam Dumps:</p> <p>a. Check all Steam Dump valves – CLOSED.</p> <p>RNO</p> <p>a. WHEN all Steam Dump valves are closed, THEN reset C-7, if present, by momentarily placing STM DUMP CONTROL MODE SELECT HS-500C in RESET.</p> <p>AER</p> <p>b. Reset C-7, if present, by momentarily placing STM DUMP CONTROL MODE SELECT HS-500C in RESET.</p> |
| | UO | <p>26. Test the Backup and Mechanical Overspeed Trips by initiating 14286, TURBINE TRIP DEVICE OPERABILITY TEST.</p> <p>NOTE: The SS may call C & T to dispatch personnel to perform this surveillance test.</p> |
| | OATC | 27. Check reactor power change – LESS THAN 15%. |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 2

Event Description: Inadvertent Turbine Runback

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | SS | <p>28. Check cause of runback – CORRECTED. (NO)</p> <p>RNO</p> <p>28. Perform the following:</p> <p>a. Restore turbine control to normal using 13800, MAIN TURBINE OPERATION when the cause is corrected.</p> <p>b. Return to procedure and step in effect.</p> <p>Calls C & T to perform the following:</p> <ul style="list-style-type: none">• Notify Operations Duty of AOP entry.• Write a Condition Report.• Notify Maintenance of the failure.• Crew may perform a Brief at this time. <p>End of EVENT # 2, Proceed to EVENT # 3.</p> |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 3

Event Description: Normal Charging Pump (NCP) trips, Loss of Charging flow.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | 18007-C, Section B, Loss of Charging Diagnose Normal Charging Pump (NCP) has tripped: Symptoms / alarms: ALB07-A05 REGEN HX LTDN HI TEMP ALB07-B06 CHARGING LINE HI/LO FLOW ALB07-C06 CHARGING PUMP OVERLOAD TRIP ALB08-F06 RCP SEAL WATER INJ LO FLOW ALB33-A05 4160V SWGR 1NA05 TROUBLE Indications: <ul style="list-style-type: none"> • NCP hand switch green and amber light lit. • Charging flow indicates 0 gpm on 1FI-0121A or 1FI-0121C. • Letdown flashing on 1FI-132C. |
| | SS | Enters 18007-C, section B Loss of Charging. |
| | OATC | <u>AOP 18007-C, CVCS MALFUNCTION, SECTION B, LOSS OF CHARGING</u> <u>IMMEDIATE OPERATOR ACTIONS</u> B1. Isolate letdown: <ol style="list-style-type: none"> Close letdown orifice isolation valves: <ul style="list-style-type: none"> • HV-8149A • HV-8149B • HV-8149C Close letdown orifice isolation valves: <ul style="list-style-type: none"> • HV-0459 • HV-0460 |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 3

Event Description: Normal Charging Pump (NCP) trips, Loss of Charging flow.

| Time | Position | Applicant's Action or Behavior | | | | | | | | | | |
|---|--|---|-----------|-----------|---|--|--|-------|---|--------------------------------------|---|--|
| | SS | 18007-C, Section B, Loss of Charging Enters AOP 18007-C, Section B, LOSS OF CHARGING FLOW. | | | | | | | | | | |
| | OATC UO | B2. Initiate the Continuous Actions Page. | | | | | | | | | | |
| | OATC | B3. Trend RCP Seal Parameters listed in ATTACHMENT A. | | | | | | | | | | |
| | OATC UO | ATTACHMENT A - RCP SEAL PARAMETER INDICATION NOTE: The following points are accessible under IPC Group 62. <table><tr><th>PARAMETER</th><th>IPC POINT</th></tr><tr><td>RCP Seal Injection Flow RCP 1 RCP 2 RCP 3 RCP 4</td><td> F0131 F0129 F0127 F0125</td></tr><tr><td>RCP Seal Injection Temperature (Measured at VCT Outlet)</td><td>T0140</td></tr><tr><td>Number 1 Seal Leakoff High Flow RCP 1 RCP 2 RCP 3 RCP 4</td><td> F0161 F0160 F0159 F0158</td></tr><tr><td>Number 1 Seal Inlet Temperature RCP 1 RCP 2 RCP 3 RCP 4</td><td> T0181 / T0417 T0182 / T0437 T0183 / T0457 T0184 / T0477</td></tr></table> | PARAMETER | IPC POINT | RCP Seal Injection Flow RCP 1 RCP 2 RCP 3 RCP 4 | F0131 F0129 F0127 F0125 | RCP Seal Injection Temperature (Measured at VCT Outlet) | T0140 | Number 1 Seal Leakoff High Flow RCP 1 RCP 2 RCP 3 RCP 4 | F0161 F0160 F0159 F0158 | Number 1 Seal Inlet Temperature RCP 1 RCP 2 RCP 3 RCP 4 | T0181 / T0417 T0182 / T0437 T0183 / T0457 T0184 / T0477 |
| PARAMETER | IPC POINT | | | | | | | | | | | |
| RCP Seal Injection Flow RCP 1 RCP 2 RCP 3 RCP 4 | F0131 F0129 F0127 F0125 | | | | | | | | | | | |
| RCP Seal Injection Temperature (Measured at VCT Outlet) | T0140 | | | | | | | | | | | |
| Number 1 Seal Leakoff High Flow RCP 1 RCP 2 RCP 3 RCP 4 | F0161 F0160 F0159 F0158 | | | | | | | | | | | |
| Number 1 Seal Inlet Temperature RCP 1 RCP 2 RCP 3 RCP 4 | T0181 / T0417 T0182 / T0437 T0183 / T0457 T0184 / T0477 | | | | | | | | | | | |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 3

Event Description: Normal Charging Pump (NCP) trips, Loss of Charging flow.

| Time | Position | Applicant's Action or Behavior |
|------|------------|--|
| | OATC | <p>18007-C, Section B, Loss of Charging</p> <p>B4. Check charging pumps(s) – OPERATING NORMALLY:</p> <ul style="list-style-type: none"> • Discharge flow trend – STABLE. • Discharge pressure trend – STABLE. • VCT level – IN NORMAL BAND. • Bus current – STABLE. • Suction pressure – STABLE. <p><u>Crew is expected to dispatch an SO to the NCP and its breaker, the SO will report back as follows:</u></p> <p><u>“NCP pump bearings hot and over current relays tripped for breaker 1NA05-08”.</u></p> |
| | OATC | B5. Locate and isolate any charging system leakage. (N/A) |
| | OATC UO | B6. Check ACCW system – IN SERVICE. (YES) |
| | OATC | <p>B7. Check normal charging valves – OPEN: (YES)</p> <ul style="list-style-type: none"> • HV-8105 • HV-8106 • HV-8146 or HV-8147 • HV-8485A and B • FV-121 • HV-0182 |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 3

Event Description: Normal Charging Pump (NCP) trips, Loss of Charging flow.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>18007-C, Section B, Loss of Charging</p> <p>B8. Check normal charging flow – ESTABLISHED. (NO)</p> <p>RNO</p> <p>B8. Perform the following:</p> <p>a. WHEN normal charging flowpath can be established, THEN place normal charging and letdown in service by initiating 13006, CHEMICAL AND VOLUME CONTROL SYSTEM.</p> <p>NOTE to examiner: Step B10 will be performed AFTER the OATC places Normal Charging and Letdown in service per EVENT 4. Once Event 4 is complete, return to this page for completion of the AOP for Loss of Charging actions continuing with B10</p> <p>Steps for normal charging and letdown are on page # 15.</p> <p>b. Go to Step B10.</p> |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 3

Event Description: Normal Charging Pump (NCP) trips, Loss of Charging flow.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>18007-C, Section B, Loss of Charging</p> <p>B15. Return to procedure and step in effect.</p> <p>Calls C & T to perform the following:</p> <ul style="list-style-type: none">• Notify Operations Duty of AOP entry.• Write a Condition Report.• Notify Maintenance of the failure. <p>End of EVENTS # 3 and # 4, Proceed to EVENT # 5.</p> |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 4

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>13006-1, Chemical and Volume Control System</p> <p><i>NOTE to Examiner: Student may go to Section 4.4.2 first, but it will direct him to the following section with no Charging Pump running.</i></p> <p>13006-1, CVCS Section 4.4.13, Restart of CCP or NCP following Loss of a Charging Pump.</p> <p>CAUTIONS</p> <p>At BOL, while borating to maintain Tavg, the calculated delta boron concentration between the RCS and the last time the CCP/NCP was placed in service may be incorrect. Experience has shown that high concentrations of borated water tend to collect in the suction piping of the idle pumps, resulting in a higher boron concentration in the CCP/NCP than the RCS. This may cause an unexpected boration and temperature reduction, when the pump is placed in service or tested.</p> <p>Restart of a charging pump should not be delayed in order to flush the pump prior to start.</p> |
| | OATC | <p>4.4.13.1 PRIOR to starting the pump and based on the conditions described in the first caution above, a slight boration should be anticipated and a briefing on compensatory actions to offset the boration should be conducted.</p> |
| | CREW | <p>CAUTION: A determination should be made that loss of the Charging Pump was not due to air/gas binding before starting the same or another pump.</p> |
| | OATC | <p>4.4.13.2 Dispatch an Operator to perform pump pre-start checks.</p> <p>Note to examiner: Simbooth cue operators a CCP is ready to start.</p> |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 4

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | | |
| | OATC | 13006-1, Chemical and Volume Control System 4.4.13.3 Verify VCT LEVEL 1LI-185 indicates between 30 and 80%. |
| | OATC | 4.4.13.4 Verify OPEN VCT OUTLET ISOLATION Valves: <ul style="list-style-type: none"> • 1-LV-0112B • 1-LV-0112C |
| | OATC | 4.4.13.5 Verify OPEN CCP-A & B COMMON MINIFLOW 1-HV-8110. |
| | OATC | 4.4.13.6 IF starting a CCP perform the following: <p>IF starting CCP-A:</p> <ol style="list-style-type: none"> Open CCP-B SUCTION 1-HV-8471A. Open CCP-B MINIFLOW 1-HV-8111A. Verify OPEN CCP-A & B COMMON MINIFLOW 1-HV-8110 Close CCP-B SAFETY GRADE CHG 1-HV-0190A. Open CCP-B DISCHARGE ISOLATION 1-HV-8485A. |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 4

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>13006-1, Chemical and Volume Control System</p> <p>IF starting CCP-B:</p> <ul style="list-style-type: none"> a. Open CCP-B SUCTION 1-HV-8471B. b. Open CCP-B MINIFLOW 1-HV-8111B. c. Verify OPEN CCP-A & B COMMON MINIFLOW 1-HV-8110 d. Close CCP-B SAFETY GRADE CHG 1-HV-0190B. e. Open CCP-B DISCHARGE ISOLATION 1-HV-8485B. f. Open CCP DISCHARGE HEADER CROSSCONNECT 1-HV-8438 |
| | | NOTE and step 4.4.13.7 are N/A. |
| | OATC | 4.4.13.8 Set <u>1HC-182</u> for Maximum Seal Flow (0% demand). |
| | OATC | 4.4.13.9 Verify Charging Flow Control <u>1FIC-121 in MAN</u> and set to minimum. |
| | | <p style="text-align: center;">NOTE</p> <p>Normal and Alternate charging paths should be alternated over plant life to equalize thermal stress. The transfer should be performed at cold shutdown conditions to avoid thermal transients. Normal charging should be in service during even-numbered fuel cycles. Alternate charging should be in service during odd-numbered fuel cycles. Swapping nozzles at NOPT should be avoided.</p> |

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Scenario No.: 5

Event No.: 4

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | 13006-1, Chemical and Volume Control System 4.4.13.10 Verify OPEN one of the following: NORMAL CHARGING TO LOOP 1 1-HV-8146 -OR- ALTERNATE CHARGING TO LOOP 4 1-HV-8147 |
| | OATC | 4.4.13.11 Verify OPEN CHARGING TO RCS ISOLATION Valves: • 1-HV-8105 • 1-HV-8106 |
| | OATC | 4.4.13.12 Verify the ALOP of the CCP to be started is running as indicated by the QMCB red indicating lamp lit. |
| | OATC | 4.4.13.13 Start the desired CCP or NCP. CCP-A 1HS-273A OR CCP-B 1HS-274A |

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Scenario No.: 5

Event No.: 4

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>13006-1, Chemical and Volume Control System</p> <p>4.4.13.14 IF a CCP was started, verify the selected CCP ALOP red indicating lamp goes off (on QMCB) shortly after the pump is started.</p> <p>4.4.13.15 is N/A.</p> |
| | OATC | <p>4.4.13.16 Simultaneously perform the following:</p> <ul style="list-style-type: none"> Adjust Seal Flow Control 1HC-182 to obtain between 8 and 13 gpm to each RCP. Adjust Charging Flow Control 1FIC-121 to obtain the desired charging flow. |
| | OATC | 4.4.13.17 Return to Section 4.4.2 to establish Normal Letdown and Charging. |
| | OATC | 13006-1, CVCS Section 4.4.2 Returning Normal Charging and Letdown to Service. |
| | OATC | 4.4.2.1 IF a Charging Pump is NOT in service, Go To Section 4.4.13 to start the NCP OR an available Centrifugal Charging Pump, THEN Return To this section. |

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Scenario No.: 5

Event No.: 4

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>13006-1, Chemical and Volume Control System Section 4.4.2, Returning Normal Charging and Letdown to Service</p> <p>NOTES: This section also applies to returning normal charging and letdown to service following termination of safety injection.</p> <p>In the event letdown was isolated from the shutdown panel, a walk down of letdown components and piping shall be performed prior to restoring normal letdown to service.</p> <p>Letdown is to be established as soon as possible after initiating flow through a Charging Nozzle.</p> |
| | OATC | 4.4.2.2 This step is N/A. |
| | OATC | <p>4.4.2.3 Perform the following:</p> <p>a. Close LETDOWN ORIFICE Isolation Valves:</p> <ul style="list-style-type: none"> • 1-HV-8149A • 1-HV-8149B • 1-HV-8149C <p>b. Close LETDOWN ISOLATION VLV UPSTREAM AND DOWNSTREAM Valves:</p> <ul style="list-style-type: none"> • 1-LV-460 • 1-LV-459 <p>c. Close PZR AUX SPRAY VALVE 1-HV-8145.</p> <p>d. Open CVCS LETDOWN PIPE BREAK PROT ISOLATION 1-HV-15214.</p> |

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Scenario No.: 5

Event No.: 4

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>13006-1, Chemical and Volume Control System</p> <p>4.4.2.3 Continued</p> <ul style="list-style-type: none"> e. Open RCS LETDOWN LINE ISO VLV IRC 1-HV-8160. f. Open RCS LETDOWN LINE ISO VLV ORC 1-HV-8152. g. Place Letdown Pressure Controller 1PIC-131 in MAN and adjust output to between 50% and 75%. h. Place LETDOWN HX OUTLET TEMP 1TIC-130 in MAN and adjust output to the most current position as recorded on the Control Room Rounds Sheets. i. Verify PRESSURIZER LEVEL 1LR-459 greater than 17%. <p>NOTE: If Normal Charging and Letdown are being returned to service as directed from Section 4.4.15, one of the valves in Substep j. and both valves in Step 4.4.2.4 will already be open.</p> <ul style="list-style-type: none"> j. Verify one of the following are OPEN: <ul style="list-style-type: none"> NORMAL CHARGING TO LOOP 1 1-HV-8146 (even-numbered fuel cycle) -OR- ALTERNATE CHARGING TO LOOP 4 1-HV- 8147 (odd-numbered fuel cycle) |

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Scenario No.: 5

Event No.: 4

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>13006-1, Chemical and Volume Control System</p> <p>4.4.2.4 Verify CHARGING TO RCS ISOLATION Valves are OPEN:</p> <ul style="list-style-type: none"> • 1-HV-8106 • 1-HV-8105 |
| | OATC | <p>4.4.2.5 Simultaneously perform the following:</p> <ul style="list-style-type: none"> • Adjust 1HC-182 output to maintain between 8 and 13 gpm to each RCP. • Adjust 1FIC-121 to raise CHG FLOW 1FI-121A to between 80 and 90 gpm. |
| | OATC | <p>4.4.2.6 Open LETDOWN ISOLATION VLV UPSTREAM AND DOWNSTREAM Valves by holding their handswitches in OPEN UNTIL the valves are fully open:</p> <ul style="list-style-type: none"> • 1-LV-460 1HS-460 • 1-LV-459 1HS-459 |

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Scenario No.: 5

Event No.: 4

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>13006-1, Chemical and Volume Control System</p> <p>4.4.2.7 Establish Letdown flow:</p> <p>a. Simultaneously open a Letdown Orifice and maintain pressure by performing the following:</p> <ul style="list-style-type: none"> Open one LETDOWN ORIFICE Isolation Valve by holding its handswitch in the OPEN position until fully open: <ul style="list-style-type: none"> 1HS-8149B (75 gpm – odd fuel cycles) OR 1HS-8149C (75 gpm – even fuel cycles) OR 1HS-8149A (45 gpm) Adjust 1PIC-131A to maintain LETDOWN PRESS 1PI-131A between 360 and 380 psig. <p>b. Record the letdown orifice that was placed in service in the Unit Control Log.</p> |
| | OATC | <p>4.4.2.8 WHEN LETDOWN PRESS 1PI-131A stabilizes between 360 psig, place 1PIC-131 in AUTO.</p> |
| | OATC | <p>4.4.2.9 Place LETDOWN HX OUTLET TEMP 1TIC-130 in AUTO and verify it maintains temperature less than or equal to 115°F.</p> |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 4

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>13006-1, Chemical and Volume Control System</p> <p>4.4.2.10 Verify LETDOWN REGEN HX OUT 1TI-127 indicates less than 380°F.</p> |
| | OATC | 4.4.2.11 Monitor 1LR-459 Pressurizer Level and Pressurizer Level Setpoint. |
| | OATC | 4.4.2.12 Maintain Pressurizer Level within 1% of Level Setpoint using 1FIC-121. |
| | OATC | <p>4.4.2.13 Place Pressurizer Level Control in automatic UNLESS it is to remain in Manual under Tagout or Caution tag:</p> <p>a. Verify PRZR Level Controller 1LIC-459 in AUTO.</p> <p>b. AFTER level has been stable within 1% of setpoint for approximately 3 minutes, place 1FIC-121 in AUTO.</p> |
| | OATC | 4.4.2.14 This step is N/A. |
| | OATC | <p>18007-C, Section A, Loss of Charging</p> <p>B10. Establish Seal Injection flow to all RCPs – 8 to 13 GPM.</p> <p>B11. Check RCP seal injection flow – ESTABLISHED. (YES)</p> |
| | OATC | B12. Control PRZR level – IN PROGRAM BAND. |

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Scenario No.: 5

Event No.: 4

Event Description: Return Normal Charging and Letdown to service after Normal Charging Pump (NCP) trip.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | SS | <p>18007-C, Section B, Loss of Charging</p> <p>B13. Initiate the following Technical Specifications and/or Technical Requirements as necessary:</p> <p>LCO 3.5.2 LCO 3.5.3 LCO 3.5.5 TR 13.1.2 TR 13.1.3 (NCP tripped, ILCO) TR 13.1.4 TR 13.1.5 (NCP tripped, ILCO)</p> |
| | OATC | <p>B14. Check normal charging flow – ESTABLISHED.</p> |
| | OATC | <p>B15. Return to procedure and step in effect.</p> <p>Calls C & T to perform the following:</p> <ul style="list-style-type: none">• Notify Operations Duty of AOP entry.• Write a Condition Report.• Notify Maintenance of the failure. <p>End of EVENTS # 3 and # 4, Proceed to EVENT # 5.</p> |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 5

Event Description: Wide Range Tcold on Loop # 3 fails low.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>Diagnoses WR Tcold Loop # 3 fails low.</p> <p>Alarms:</p> <ul style="list-style-type: none"> ALB12-C05 B COLD OP LOW AUCTION RCS TEMP ALB12-D05 B RCS PRESS APPROACHES COLD OP LIMIT <p>Indications:</p> <ul style="list-style-type: none"> Loop # 3 WR Tcold fails low. <p><u>ARP 17012-1, WINDOW C05</u></p> <p><u>PROBABLE CAUSE</u></p> <p>Plant Cooldown in progress.</p> <p><u>AUTOMATIC ACTIONS</u></p> <p>NONE</p> <p><u>INITIAL OPERATOR ACTIONS</u></p> <p>NONE</p> <p><u>SUBSEQUENT OPERATOR ACTIONS</u></p> <ol style="list-style-type: none"> 1. Check Reactor Coolant System Wide Range Temperatures less than 220°F. 2. Verify Cold Overpressure Protection System is in service per 12006-C, "Unit Cooldown To Cold Shutdown". 3. Refer to Technical Specification LCO 3.4.12 <p><u>COMPENSATORY OPERATOR ACTIONS</u></p> <p>NONE</p> |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 5

Event Description: Wide Range Tcold on Loop # 3 fails low.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p><u>ARP 17012-1, WINDOW D05</u></p> <p><u>PROBABLE CAUSE</u></p> <p>Reactor Coolant System (RCS) pressure rise due to:</p> <ol style="list-style-type: none"> Loss of Letdown, Pressurizer Sprays not sufficient, Excessive Pressurizer Heaters in service. <p><u>AUTOMATIC ACTIONS</u></p> <p>NONE</p> <p><u>INITIAL OPERATOR ACTIONS</u></p> <ol style="list-style-type: none"> <u>IF</u> RCS is water solid, check RCS temperatures stable or lowering. Control RCS temperatures to maintain them stable. <p><u>SUBSEQUENT OPERATOR ACTIONS</u></p> <p>CAUTION</p> <p>With Residual Heat Removal in service, RCS pressure must be maintained below 425 psig.</p> <ol style="list-style-type: none"> Check Pressurizer Sprays and Heaters and adjust as necessary to reduce RCS pressure. Check letdown and if isolated, reduce charging flow and re-establish letdown. <u>IF</u> Pressurizer Sprays are <u>NOT</u> available, reduce RCS pressure using 1-PIC-0131 on the QMCB. |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 5

Event Description: Wide Range Tcold on Loop # 3 fails low.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <u>COMPENSATORY OPERATOR ACTIONS</u> NONE |
| | SS | Refers to Technical Specifications LCO 3.3.3, Post Accident Monitoring Instrumentation Condition A, Enters applicable condition listed in Table 3.3.3-1 FU 3, RCS Tcold (wide range), Condition D LCO 3.3.4, Remote Shutdown Instrumentation FU 3, RCS Cold Leg Temperature, Condition A ILCO 3.4.12, Cold Overpressure Protection Systems (COPS) N/A – Applicable in Mode 4, 5, or 6 End of Event # 5, proceed to Event # 6. |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 6

Event Description: Air compressor # 3 trips with failure of air compressors # 2 or # 4 to automatically start.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>Diagnose Air Compressor # 3 has tripped:</p> <p>Symptoms / alarms:</p> <p>ALB32-F03 480V SWGR 1NB19 TROUBLE ALB01-B05 SERVICE AIR CMPSR TROUBLE ALB01-C06 SERVICE AIR HDR LO PRESS (delayed)</p> <p>Indications:</p> <ul style="list-style-type: none"> Green and amber light lit on AC # 3 handswitch. <p>Note to examiners: It is possible the candidate may directly enter AOP-18028-C, Loss of Instrument Air.</p> |
| | UO | <p>Response to ALB01-B05</p> <p>Dispatches an operator to Panel P MEC to implement the appropriate alarm response procedure per 17210-1, "Annunciator Response Procedures for ALB on P MEC Air Compressors Control Panel".</p> |
| | UO | <p>Response to ALB32-F03</p> <p>1. Attempt to determine cause of alarm:</p> <ol style="list-style-type: none"> Check system indications on QEAB. Check for associated alarms. <p>Note to examiner: It is obvious AC # 3 has tripped, the UO may dispatch an electrician or maintenance to troubleshoot the breaker.</p> |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 6

Event Description: Air compressor # 3 trips with failure of air compressors # 2 or # 4 to automatically start.

| Time | Position | Applicant's Action or Behavior |
|------|------------|--|
| | | <p>Note to Simbooth Operator: Report back that window D03 is illuminated on the P MEC panel for 1.2401.C4.503 NO. 3.</p> <p>COMPRESSOR LO OIL PRESS and per the ARP the compressor motor trips at 12 psig oil pressure and there is lots of oil on the compressor skid from an apparent oil leak.</p> |
| | UO OATC | <p>A crew member will call up air pressure trend on IPC computer.</p> <p>Note to examiner: The standby compressors should start at 100 psig prior to receipt of the ALB01-C06 alarm. It is possible the crew may start a standby compressor once instrument air pressure drops under 100 psig and ALB01-C06 will never alarm.</p> |
| | UO | <p>Response to ALB01-C06</p> <p><u>AUTOMATIC ACTIONS</u></p> <ol style="list-style-type: none"> 1. Service Air Dryer Inlet Isolation Valve 1-PV-9375 closes at a service air pressure of 80 psig. 2. Any standby compressor with its hand switch in AUTO-PTL position will auto start at a discharge pressure of 100 psig decreasing. |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 6

Event Description: Air compressor # 3 trips with failure of air compressors # 2 or # 4 to automatically start.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | | <p>Response to ALB01-C06 continued.</p> <p><u>SUBSEQUENT OPERATOR ACTIONS</u></p> <ol style="list-style-type: none"> 1. Check QMCB indications AND start a standby Air Compressor if necessary to maintain service air header pressure above 100 psig. 2. Dispatch an operator to check for system leaks OR excessive air usage. 3. IF pressure continues to fall AND CANNOT be restored, refer to 18028-C, "Loss of Instrument Air". 4. Refer to 13710-1, "Service Air System" and verify Air Compressors are operating properly. 5. IF equipment failure is indicated, initiate maintenance as required. <p>CAUTION: Procedure 13710-1 "Service Air System" should be referenced prior to performing the following step if service air has isolated due to low pressure.</p> <ol style="list-style-type: none"> 6. WHEN service air pressure is greater than 97 psig as read on 1-PI-19380 on panel P MEC, reset 1-PSL-9375. Switch is located on instrument rack 15 (1-1624-P5-R15) on Turbine Building level 1 near Powdex vessels. <p>Note to SimBooth: Remote Function (RF) IA01.</p> <p>Note to examiner: ALB01-C06 will clear when step 6 is performed.</p> |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 6

Event Description: Air compressor # 3 trips with failure of air compressors # 2 or # 4 to automatically start.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | CREW | Monitors air pressure returns to normal. End of EVENT # 6, Proceed to EVENT # 7. |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | CREW | Performs Immediate Operator Actions per 19000-C, E-0 Reactor Trip or Safety Injection. (NOTE: IOAs are steps 1 through 4) |
| | SS | Makes a page announcement of Reactor Trip (and SI if appropriate).. |
| | OATC | 1. Check Reactor Trip: (YES) <ul style="list-style-type: none"> Rod Bottom Lights – LIT Reactor Trip and Bypass Breakers – OPEN Neutron Flux – LOWERING Note to Simbooth Operator: Insert T8 for DBA LOCA at this time. |
| | UO | 2. Check Turbine Trip: (YES) <ul style="list-style-type: none"> All Turbine Stop Valves – CLOSED |
| | UO | 3. Check Power to AC Emergency Buses. (YES) <ol style="list-style-type: none"> AC Emergency Busses – AT LEAST ONE ENERGIZED. <ul style="list-style-type: none"> 4160 AC 1E Busses AC Emergency Busses – ALL ENERGIZED. <ul style="list-style-type: none"> 4160V AC 1E Busses 480V AC 1E Busses |
| | OATC | 4. Check if SI is actuated. (YES) <ul style="list-style-type: none"> Any SI annunciators – LIT SI ACTUATED BPLP window – LIT |
| | SS | Go to Step 6. |

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Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|------------------|---|
| | SS CREW | 6. Initiate the Foldout Page. |
| | SS OATC UO | 7. Perform the following: <ul style="list-style-type: none">• OATC Initial Actions Page• UO Initial Actions Page NOTE: SS initiates step 8 after OATC/UO Initial Actions completed. |

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Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|------------|---|
| | SS CREW | <p style="text-align: center;">FOLDOUT</p> <ol style="list-style-type: none"> 1. <u>RCP TRIP CRITERIA</u> Trip all RCPs if BOTH conditions listed below occur. <ol style="list-style-type: none"> a. CCPs or SI pumps – AT LEAST ONE RUNNING. RCP Trip Parameter – RCS PRESSURE LESS THAN 1375 PSIG. 2. <u>AFW SUPPLY SWITCHOVER CRITERIA</u> Switch to alternate CST by initiating 13610, AUXILIARY FEEDWATER SYSTEM when CST level lowers to less than 15%. 3. <u>CNMT SPRAY ACTUATION CRITERION</u> Verify the following when CNMT pressure is greater than or equal to 21.5 psig. <ol style="list-style-type: none"> a. CNMT Spray actuated. b. CNMT Spray discharge valves open. c. CNMT Spray Pumps running. 4. <u>Monitor SPENT FUEL POOL COOLING conditions:</u> <ul style="list-style-type: none"> • Verify annunciators 17005-A6, SPENT FUEL PIT HI TEMP and 17005-E2, SPENT FUEL PIT LOW LEVEL are both clear. <u>IF</u> alarms are NOT CLEAR, <u>THEN</u> initiate 18030-C, LOSS OF SPENT FUEL POOL LEVEL OR COOLING. • <u>IF</u> SPENT FUEL POOL LEVEL OR COOLING ALARMS are not available, <u>THEN</u> dispatch operator to start 2 HR interval local checking that level > 217 ft and temperature < 130°F. <u>IF</u> either parameter is exceeded, <u>THEN</u> initiate 18030-C, LOSS OF SPENT FUEL POOL LEVEL OR COOLING • <u>IF</u> applicable, Using PRDT TAB 26, determine time to restore SFP LEVEL OR COOLING < time to reach 200°F in Spent Fuel Pool. <u>IF NOT</u> initiate 18030-C, LOSS OF SPENT FUEL POOL LEVEL_OR COOLING |

Op-Test No.: 2013-301

Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | OATC | <p>PERFORMS OATC INITIAL ACTIONS</p> <p>1. Check both trains of ECCS equipment – ALIGNING FOR INJECTION PHASE: (YES)</p> <ul style="list-style-type: none"> • MLB indication |
| | OATC | <p>2. Check Containment Isolation Phase A – ACTUATED. (NO)</p> <ul style="list-style-type: none"> • CIA MLB indication <p>RNO</p> <p>2. Actuate CIA</p> <p><u>IF</u> valves do <u>NOT</u> close, <u>THEN</u> close valves.</p> <p>CIA valves list which are required closed on the QMCB:</p> <ul style="list-style-type: none"> • HV-9378 Instr. Air to Containment (QMCB panel 1A1) • HV-7699 RCDT pump discharge isolation (QMCB panel 1A2) • HV-7126 RCDT Vent isol valve to WGAS (QMCB panel 1A2) • HV-7136 RCDT pump discharge isolation (QMCB panel 1A2) • HV-7150 RCDT vent isol valve to WGAS (QMCB panel 1A2) • HV-8100 RCP seal leakoff ORC isolation (QMCB panel 1A2) • HV-8112 RCP seal leakoff IRC isolation (QMCB panel 1A2) • HV-8152 RCS letdown line isol valve ORC (QMCB panel 1A2) • HV-8160 RCS letdown line isol valve IRC (QMCB panel 1A2) • HV-8028 PRT fill isol valve (QMCB panel 1A2) <p>CIA valves list which are required to be closed on the QPCP.</p> <ul style="list-style-type: none"> • HV-0780 Rx Cavity and CNMT sump discharge (QPCP) • HV-0781 Rx Cavity and CNMT sump discharge (QPCP) • HV-3548 RCS Hot Leg 1 & 3 sample isol (QPCP) |

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Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|-----------------|--|
| | OATC | PERFORMS OATC INITIAL ACTIONS |
| | | 3. Check ECCS Pumps and NCP status: |
| | | a. CCPs RUNNING. (YES) |
| | | b. SI Pumps – RUNNING. (YES) |
| | | c. RHR pumps – RUNNING. (NO) |
| | Critical | RNO |
| | | c. Start Pumps. |
| | | d. NCP – TRIPPED. (YES) |
| | OATC | 4. Verify CCW Pumps – ONLY TWO RUNNING TRAIN B. (YES) |

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Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|------------------|---|
| | OATC | <p>PERFORMS OATC INITIAL ACTIONS</p> <p>5. Verify proper NSCW system operation: (YES)</p> <p>a. NSCW Pumps – ONLY TWO RUNNING PER TRAIN.</p> <p>b. NSCW TOWER RTN HDR BYPASS BASIN hand switches – IN AUTO:</p> <ul style="list-style-type: none"> • HS-1669A • HS-1668A |
| | OATC Critical | <p>6. Verify Containment Cooling Units:</p> <p>a. ALL RUNNING IN LOW SPEED. (NO)</p> <ul style="list-style-type: none"> • MLB indication <p>NOTE: The UO will have to start the Containment Coolers in LOW speed at the QHVC panel by operating the following handswitches.</p> <p><u>Train A:</u></p> <p>Fan 1, 1-HS-12582A (A24) Fan 2, 1-HS-2582A (A25) Fan 5, 1-HS-12584A (C24) Fan 6, 1-HS-2584A (C25)</p> <p><u>Train B:</u></p> <p>Fan 3, 1-HS-12583A (A26) Fan 4, 1-HS-2583A (A27) Fan 7, 1-HS-12585A (C26) Fan 8, 1-HS-2585A (C27)</p> <p>b. NSCW Cooler isolation valves – OPEN. (YES)</p> <ul style="list-style-type: none"> • MLB indication |

Scenario No.: 5

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

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Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | PERFORMS OATC INITIAL ACTIONS 10. Check ECCS Valve alignment – PROPER INJECTION LINEUP INDICATED ON MLBs. (YES) |
| | OATC | 11. Check ACCW pumps – AT LEAST ONE RUNNING. (YES) |
| | OATC | 12. Adjust Seal Injection flow to all RCPs – 8 to 13 GPM. |
| | OATC | 13. Dispatch Operator to ensure one train of SPENT FUEL POOL COOLING in service per 13719, SPENT FUEL POOL COOLING AND PURIFICATION SYSTEM. END OF OATC INITIAL ACTIONS – RETURNS TO MAIN BODY OF 19000-C CONTINUING AT STEP 8. |

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Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | PERFORMS UO INITIAL ACTIONS 1. Check AFW Pumps – RUNNING. (YES) <ul style="list-style-type: none"> MDAFW Pumps TDAFW Pump, if required. |
| | UO | 2. Check NR level in at least one SG – GREATER THAN 10%. (32% ADVERSE). (YES) |
| | UO | 3. Check if main steamlines should be isolated: (YES) a. Check for one of more of the following conditions: ___ Any steamline pressure LESS THAN OR EQUAL TO 585 PSIG. ___ Containment pressure – GREATER THAN 14.5 PSIG. (YES) ___ Low Steam Pressure SI/SLI – BLOCKED AND High Steam Pressure Rate – ON TWO OR MORE CHANNELS OF ANY STEAMLINE. b. Verify Main Steamline Isolation and Bypass Valves – CLOSED. NOTE: Train B MSIVs and Bypasses will fail to automatically close and the Train A MSIV Bypass for Loop 4 will fail to close. The UO will be required to actuate SLI from the Train A SLI handswitch only to prevent a steam release to the secondary plant. This step is NOT critical. |

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Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | PERFORMS UO INITIAL ACTIONS 4. Verify FW Isolation Valves closed: (YES) <ul style="list-style-type: none"> • MFIVs • BFIVs • MFRVs • BFRVs |
| | UO | 5. Verify SG Blowdown isolated: (YES) <ul style="list-style-type: none"> • Place SG Blowdown Isolation Valve handswitches HS-7603A, B, C, and D in the CLOSE position. • SG Sample Isolation Valves – CLOSED. |
| | UO | 6. Verify Diesel Generators – RUNNING. (YES) |
| | UO | 7. Throttle total AFW flow as necessary to maintain SG NR levels between 10% (32% ADVERSE) and 65%. |
| | UO | 8. Verify both MFPs – TRIPPED. (YES) |

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Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|------------|--|
| | UO | PERFORMS UO INITIAL ACTIONS 9. Check Main Generator Output Breakers – OPEN. (YES) |
| | OATC UO | BACK TO 19000-C PROCEDURE MAIN BODY, step # 8. |

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Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | CREW | 8. Initiate the Continuous Actions Page. |
| | OATC | 9. Check RCS temperature stable at or trending to 557°F. -OR- Without RCP(s) running – RCS WR COLD LEG TEMPERATURES. RNO (IF needed) 9. IF temperature is less than 557°F and lowering, THEN perform the following as necessary: a. Stop dumping steam. b. Perform the following as appropriate: ___ IF at least one SG NR level greater than 10% (32% ADVERSE), THEN lower total feed flow. -OR- ___ IF all SG NR levels less than 10% (32% ADVERSE), THEN lower total feed flow to NOT less than 570 gpm. c. If cooldown continues, THEN close MSIVs and BSIVs. d. If temperature greater than 557°F and rising, THEN dump steam. |

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Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | OATC | <p>CAUTION: A PRZR PORV Block Valve which was closed to isolate an excessively leaking or open PRZR PORV should not be opened unless used to prevent challenging the PRZR Safeties.</p> <p>10. Check PRZR PORVs, Block Valves, and Spray Valves:</p> <ul style="list-style-type: none"> a. PRZR PORVs – CLOSED AND IN AUTO. (YES) b. Normal PRZR Spray Valves – CLOSED. (YES) c. Power to at least one Block Valve – AVAILABLE. (YES) d. PRZR PORV Block Valves – AT LEAST ONE OPEN. (NO) <p>RNO</p> <ul style="list-style-type: none"> d. Verify open at least one PRZR PORV Block Valve when PRZR pressure is greater than 2185 psig. |
| | OATC | <p>11. Check if RCPs should be stopped:</p> <ul style="list-style-type: none"> a. ECCS Pumps – AT LEAST ONE RUNNING: (YES) <ul style="list-style-type: none"> • CCP or SI Pump b. RCS pressure – LESS THAN 1375 PSIG. (YES) c. Stop all RCPs. <p>Note to examiner: RCS pressure will be < 1375 psig at this time.</p> |

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Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|----------|---|
| | UO | <p>12. Check SGs secondary pressure boundaries:</p> <p>a. SG Pressures:</p> <p>___ Any lowering in an uncontrolled manner. (NO)</p> <p>-OR-</p> <p>___ Any completely depressurized. (NO)</p> <p>RNO</p> <p>a. Go to Step 13.</p> <p>b. Go to 19020-C, E-2 FAULTED STEAM GENERATOR ISOLATION.</p> |

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Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | UO | <p>13. Check SG Tubes intact:</p> <ul style="list-style-type: none"> a. Direct Chemistry to take periodic activity samples of all SGs one at a time. b. Secondary Radiation – NORMAL. (YES) <ul style="list-style-type: none"> • MAIN STEAM LINE MONITORS <ul style="list-style-type: none"> • RE-13120 (SG1) • RE-13121 (SG2) • RE-13122 (SG3) • RE-13119 (SG4) • CNDSR AIR EJCTR/STM RAD MONITORS: <ul style="list-style-type: none"> • RE-12839 • RE-12839D (if on scale) • RE-12839E (if on scale) • STM GEN LIQ PROCESS RAD: <ul style="list-style-type: none"> • RE-0019 (Sample) • RE-0021 (Blowdown) • SG sample radiation. <p>RNO</p> <ul style="list-style-type: none"> b. Go to 19030-C, E-3 STEAM GENERATOR TUBE RUPTURE c. Check SG levels – ANY RISING IN AN UNCONTROLLED MANNER. <p>RNO</p> <ul style="list-style-type: none"> c. Go to Step 14. |

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Scenario No.: 5

Event No.: 7, 8, 9, 10, 11, 12

Event Description: The main turbine will trip on a spurious AMSAC Actuation followed by a DBA LOCA on RCS CL # 3. During the event, RHR pump B will fail to auto start, the CS discharge valves will fail to auto open, all CNMT Coolers will fail to shift or start in LOW speed. The Train B MSIVs will fail to auto close with other complications requiring the UO to manually isolate the MSIV and Bypasses.

| Time | Position | Applicant's Action or Behavior |
|------|----------|--|
| | CREW | <p>14. Check if RCS is intact inside Containment:</p> <ul style="list-style-type: none">• Containment radiation – NORMAL. (NO)• Containment pressure – NORMAL. (NO)• Containment Emergency Recirculation Sump levels – NORMAL. (NO) <p>RNO</p> <p>14. Go to 19010-C, E-1 LOSS OF REACTOR OR SECONDARY COOLANT.</p> <p>NOTE: The NRC Chief Examiner may stop the scenario at this point if desired.</p> |