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|---|---------------|---------------------|--|--------------|----------|
| Facility: | Sequoyah | Scenario No.: | 3 | Op Test No.: | 2016-301 |
| Examiners: | _____ | Operators: | _____ | | |
| | _____ | | _____ | | |
| Initial Conditions: 100% MOL, EOOS risk green, LI-3-93 is in MAINT BYPASS, RTS 2 hours. | | | | | |
| Turnover: Maintain 100% power. | | | | | |
| Critical Tasks Insert negative reactivity into the core by at least one of the following methods during an ATWS event. <ul style="list-style-type: none"> Manually inserting Control Rods prior to verification of Immediate Operator Actions (IOA) of FR-S.1 complete. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Establish emergency boration flow to the RCS prior to completing step 4 of FR-S.1 <p>Manually isolate the faulted S/G prior to the completion of E-2 during a Feed Line or Steam Line break by manually closing valve LCV-3-156 and LCV-3-173.</p> | | | | | |
| Event | Malf. No. | Type* | Event Description | | |
| 1 | CV01B | C-ATC/SRO TS-SRO | The 1B Charging Pump (CCP) trips resulting in a loss of letdown, the ATC will address the ARP and will start the 1A-A CCP using AOP-M.09 LOSS OF CHARGING. The SRO will address Tech Specs and determines the 1B-B CCP pump is INOPERABLE. | | |
| 2 | MS06B | C-BOP/SRO | The #2 SG develops a Steam Leak outside containment, the crew will lower Main Turbine load to maintain Reactor power less than 100%. | | |
| 3 | RX16C | C-BOP/SRO TS-SRO | Steam Gen Level Transmitter, LT 3-94 Fails low, the crew will control S/G level using AOP-S.01 MAIN FEEDWATER MALFUNCTIONS. The SRO will address Tech Specs and determines the instrument is INOPERABLE. | | |
| 4 | CV11 | C-ATC/SRO | VCT Level Channel 129 fails high. The ATC will manually control VCT level by placing 1-LCV-62-118 in VCT position using the ARP. | | |
| 5 | AN_OV_85 | R-ATC N-BOP/SRO | An EHC Low Pressure Alarm occurs, the crew will reduce power in response to the alarm using AOP-C.03 | | |
| 6 | MS14 RP01C | M-All | MSIV's fail closed resulting along with a failure of the RPS to initiate a Reactor Trip resulting in an ATWS. The crew will attempt to trip the Reactor from the control room using E-0 and transition to FR-S.1 where the ATC manually inserts control rods and the BOP initiates emergency boration. | | |
| 7 | FW09B | C-BOP | The B MDAFW pump[fails to AUTO START, the BOP manually starts the B MDAFW pump using Prudent Operator Actions. | | |
| 8 | MS06 | M-All | Following the reactor trip an unisolable steam leak will occur on Steam Generator Loop 2 outside containment upstream of the Main Steam Isolation Valve. The crew transitions to E-2 and isolates AFW flow to the #2 S/G. | | |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | | | |

2016-301 Scenario 3 Summary

EVENT 1 - Following turnover, the 1B-B CCP trips resulting in a loss of letdown, the ATC will address the ARP and start the 1A-A CCP using AOP-M.09 LOSS OF CHARGING. The SRO will enter LCO 3.5.2 Condition A.

EVENT 2 - When directed by the lead examiner the #2 SG develops a Steam Leak outside containment, the crew will lower Main Turbine load to maintain Reactor power less than 100% using AOP-S.05, STEAM OR FEEDWATER LEAK.

EVENT 3 - When directed by the lead examiner the Steam Gen Level Transmitter, LT 3-94 Fails low, the crew will control S/G level using AOP-S.01 MAIN FEEDWATER MALFUNCTIONS. The SRO will enter LCO 3.3.1 Condition A & R, LCO 3.3.2 Condition A, D, I, and LCO 3.3.3 Condition A.

EVENT 4 - When directed by the lead examiner, VCT Level Channel 129 fails high. The ATC will manually control VCT level by placing 1-LCV-62-118 in VCT position using the ARP.

EVENT 5 - When directed by the lead examiner, an EHC Low Pressure Alarm occurs; the crew will reduce power in response to the alarm using AOP-C.03, RAPID SHUTDOWN OR LOAD REDUCTION.

EVENT 6 - When directed by the lead examiner, MSIV's fail closed resulting along with a failure of the RPS to initiate a Reactor Trip resulting in an ATWS. The crew will attempt to trip the Reactor from the control room using E-0, REACTOR TRIP OR SAFETY INJECTION and transitions to FR-S.1, NUCLEAR POWER GENERATION / ATWS where the ATC and manually inserts control rods and the BOP manually trips the main turbine and initiates emergency boration. The crew will direct operators to locally trip the reactor trip breakers.

EVENT 7 - The B MDAFW pump[fails to AUTO START, the BOP manually starts the B MDAFW pump using Prudent Operator Actions.

EVENT 8 - When the reactor is tripped and at Lead Examiner direction, an unisolable steam leak will occur on Steam Generator Loop 2 outside containment upstream of the Main Steam Isolation Valve. The crew will transition to E-0, REACTOR TRIP OR SAFETY INJECTION and subsequently E-2, FAULTED STEAM GENERATOR ISOLATION to isolate the #2 Steam Generator.

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:1

Event Description: 1B Charging Pump Trip.

Time

Position

Applicant's Actions or Behavior

Direct the Simulator Operator to initiate Event 1, 1B-B CCP Trip**Indications/ Annunciators available:****Annunciators:****1-M-1**

- 1B, E-3, MOTOR TRIPOUT PNL 1-M-1 THRU 1-M-6

1-M-6

- 6C, D-3, FS-62-93A/B CHARGING LINE FLOW ABNORMAL

Indications:**1-M-5**

- 5B, C-3, FS-62-1, REAC COOL PMPS SEAL WATER FLOW LO

Panel M5-B, C-3


**FS-62-1
REAC COOL PMPS
SEAL WATER FLOW
LO**

- [1] **CHECK** seal water flow to each pump on flow indicators on 1-M-5 or locally in 690 penetration room.
- [2] **IF** all seal water supply flows are low, **THEN** **CONSIDER** the following:
- [a] **ADJUST** [1-PCV-62-89] as necessary.
- [b] **IF** [1-PCV-62-89] has failed, **THEN** **ADJUST** seal flows as necessary using the manual isolations and/or bypass valves in accordance with 1-SO-62-1.
- [c] **IF** seal water injection filter is the problem, **THEN** **CHANGE** filters in accordance with 1-SO-62-7, *Seal Injection Filters*.
- [d] **IF** loss of running CCP has occurred, **THEN** **GO TO** AOP-M.09, *Loss of Charging*.


ATC

Places HS-62-104A, Charging Pump B to STOP or PTL.

Examiner Note: Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.

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|---|----------|--|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:1 |
| Event Description: 1B Charging Pump Trip. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | SRO | Transitions to AOP M.09, LOSS OF CHARGING | |
| | SRO | Directs actions from AOP M.09, LOSS OF CHARGING | |
| | ATC | 1. CHECK any CCP RUNNING. GO TO Step 4.  | |
| <p>CAUTION If both RCP thermal barrier cooling flow and seal injection flow have been lost, RCP seals will overheat rapidly.</p> <p>NOTE If all RCP seal cooling has been lost, this AOP takes precedence over AOP-R.04, <i>RCP Malfunctions</i>, and AOP-M.03, <i>Loss of Component Cooling Water</i>.</p> | | | |
| Communication: If AUO dispatched, wait ~ 3 minutes and report, “Pump motor is hot to the touch.” | | | |
| Communication: If AUO dispatched, wait ~ 1 minute and report “Breaker is tripped on Instantaneous over current.” | | | |
| Communication: If AUO dispatched, wait ~ 3 minutes and report, “1A-A Charging pump ready for start.” | | | |
| | ATC | 4. MONITOR adequate RCP seal cooling: <ul style="list-style-type: none"> CCS flow established to RCP thermal barriers [0-M-27] Thermal barrier isolation valves (FCV-70-133, -134, -87, and -90) OPEN RCP lower bearing and seal water temperatures less than 230°F. | |
| | ATC | 5. ENSURE normal letdown ISOLATED: <ul style="list-style-type: none"> FCV-62-72 CLOSED FCV-62-73 CLOSED FCV-62-74 CLOSED. | |
| | ATC | 6. ENSURE excess letdown ISOLATED: <ul style="list-style-type: none"> FCV-62-54 CLOSED FCV-62-55 CLOSED. | |
| | ATC | 7. CHECK charging/seal injection header INTACT. (NO indication of rupture) | |

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| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:1 |
| Event Description: 1B Charging Pump Trip. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ATC | <p>8. ENSURE CCP suction path established:</p> <p style="margin-left: 20px;">a. CHECK SI signal NOT actuated.</p> <p style="margin-left: 20px;">b. ENSURE suction from VCT established:</p> <ul style="list-style-type: none"> • VCT level greater than 13% • LCV-62-132 and LCV-62-133 VCT Outlet to CCP OPEN. | |
| <p>CAUTION If gas intrusion is suspected, NO CCP should be started UNTIL CCP has been vented (addressed in later steps).</p> | | | |
| | ATC | <p>9. CHECK if any CCP available for immediate start:</p> <ul style="list-style-type: none"> • CCP available <p style="text-align: center; margin-left: 40px;">AND</p> <ul style="list-style-type: none"> • gas intrusion is NOT suspected. | |
| | CREW | <p>10. DISPATCH AUO to locally verify CCP is ready to be started.</p> | |
| <p>NOTE If RCP thermal barrier cooling is established and sufficient time exists for local inspection of the standby pump, then CCP start in Step 11 should be delayed until after inspection is completed.</p> | | | |
| | ATC | <p>11. START available CCP.</p> | |
| | ATC | <p>Places HS-62-108A, 1A Charging Pump to START</p> | |
| | ATC | <p>12. CHECK SI signal NOT actuated.</p> | |
| | ATC | <p>13. MONITOR CCP suction aligned to VCT.</p> | |
| | ATC | <p>14. ENSURE normal charging and letdown established USING EA-62-5, <i>Establishing Normal Charging and Letdown</i>.</p> | |
| | ATC | <p>Transitions to EA-62-5, ESTABLISHING NORMAL CHARGING AND LETDOWN</p> | |
| <p>Examiner note: The following are from EA-62-5. SRO continues the performance of AOP-M.09 actions on page 6.</p> | | | |

| Op-Test No.: 2016-301 | Scenario No.: 3 | Event No.:1 | | | | | | | | |
|---|--------------------------|--|----------------------------------|-------------|-----------|--------------------------|-----------|--------------------------|-----------|--------------------------|
| Event Description: 1B Charging Pump Trip. | | | | | | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | | | | | | |
| | ATC | <p>2. IF normal letdown flow is to be established, THEN GO TO Section 4.3.</p>  | | | | | | | | |
| <p>NOTE EA-62-3, Establishing Excess Letdown, may be utilized if Normal Letdown cannot be established.</p> | | | | | | | | | | |
| | ATC | <p>1. IF charging flow NOT established, THEN PERFORM Section 4.2.</p> | | | | | | | | |
| | ATC | <p>2. VERIFY pressurizer level greater than 17%.</p> | | | | | | | | |
| | ATC | <p>3. ENSURE letdown orifice isolation valves CLOSED:</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">LETDOWN ORIFICE ISOLATION VALVES</th> <th style="padding: 5px;">CLOSED √</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">FCV-62-72</td> <td style="padding: 5px;"><input type="checkbox"/></td> </tr> <tr> <td style="padding: 5px;">FCV-62-73</td> <td style="padding: 5px;"><input type="checkbox"/></td> </tr> <tr> <td style="padding: 5px;">FCV-62-74</td> <td style="padding: 5px;"><input type="checkbox"/></td> </tr> </tbody> </table> | LETDOWN ORIFICE ISOLATION VALVES | CLOSED √ | FCV-62-72 | <input type="checkbox"/> | FCV-62-73 | <input type="checkbox"/> | FCV-62-74 | <input type="checkbox"/> |
| LETDOWN ORIFICE ISOLATION VALVES | CLOSED √ | | | | | | | | | |
| FCV-62-72 | <input type="checkbox"/> | | | | | | | | | |
| FCV-62-73 | <input type="checkbox"/> | | | | | | | | | |
| FCV-62-74 | <input type="checkbox"/> | | | | | | | | | |
| | ATC | <p>4. OPEN letdown isolation valves:</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">LETDOWN ISOLATION VALVES</th> <th style="padding: 5px;">OPEN √</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">FCV-62-69</td> <td style="padding: 5px;"><input type="checkbox"/></td> </tr> <tr> <td style="padding: 5px;">FCV-62-70</td> <td style="padding: 5px;"><input type="checkbox"/></td> </tr> <tr> <td style="padding: 5px;">FCV-62-77</td> <td style="padding: 5px;"><input type="checkbox"/></td> </tr> </tbody> </table> | LETDOWN ISOLATION VALVES | OPEN √ | FCV-62-69 | <input type="checkbox"/> | FCV-62-70 | <input type="checkbox"/> | FCV-62-77 | <input type="checkbox"/> |
| LETDOWN ISOLATION VALVES | OPEN √ | | | | | | | | | |
| FCV-62-69 | <input type="checkbox"/> | | | | | | | | | |
| FCV-62-70 | <input type="checkbox"/> | | | | | | | | | |
| FCV-62-77 | <input type="checkbox"/> | | | | | | | | | |
| <p>NOTE Placing cooling water on the Letdown Heat Exchanger prior to restoring letdown flow should prevent TIS-62-79B/A from actuating and fully opening TCV-70-192.</p> | | | | | | | | | | |

| Op-Test No.: 2016-301 | Scenario No.: 3 | Event No.: 1 | | | | | | | | |
|--|--------------------------|---|----------------------------------|-----------|-----------|--------------------------|-----------|--------------------------|-----------|--------------------------|
| Event Description: 1B Charging Pump Trip. | | | | | | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | | | | | | |
| | ATC | 5. PLACE [HIC-62-78] in MANUAL, AND OPEN [TCV-70-192] to ~ 50%. | | | | | | | | |
| | ATC | Places HIC-62-78 LD HX Outlet Temp to MANUAL, and adjusts output to open TCV-70-192 to ~ 50%. | | | | | | | | |
| | ATC | 6. PLACE letdown pressure controller [PCV-62-81] in MANUAL and ADJUST output between 40% and 50%, (50%-60% open). | | | | | | | | |
| | ATC | Places letdown pressure controller PCV-62-81 to MANUAL and ADJUST output between 40 and 50%, (50%-60% open). | | | | | | | | |
| | ATC | 7. ADJUST charging flow as necessary to prevent flashing in the letdown line. | | | | | | | | |
| | ATC | 8. OPEN letdown orifice isolation valves as needed: <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">LETDOWN ORIFICE ISOLATION VALVES</th> <th style="padding: 5px;">OPEN √</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">FCV-62-72</td> <td style="padding: 5px;"><input type="checkbox"/></td> </tr> <tr> <td style="padding: 5px;">FCV-62-73</td> <td style="padding: 5px;"><input type="checkbox"/></td> </tr> <tr> <td style="padding: 5px;">FCV-62-74</td> <td style="padding: 5px;"><input type="checkbox"/></td> </tr> </tbody> </table> | LETDOWN ORIFICE ISOLATION VALVES | OPEN √ | FCV-62-72 | <input type="checkbox"/> | FCV-62-73 | <input type="checkbox"/> | FCV-62-74 | <input type="checkbox"/> |
| LETDOWN ORIFICE ISOLATION VALVES | OPEN √ | | | | | | | | | |
| FCV-62-72 | <input type="checkbox"/> | | | | | | | | | |
| FCV-62-73 | <input type="checkbox"/> | | | | | | | | | |
| FCV-62-74 | <input type="checkbox"/> | | | | | | | | | |
| | ATC | Places HS-62-73 (or 74) Letdown Orifice B (or C) Isol 75 gpm to OPEN. | | | | | | | | |
| NOTE Normal letdown pressure is 325 psig at normal operating temperature. | | | | | | | | | | |
| | ATC | 9. ADJUST letdown pressure controller [PCV-62-81] output to obtain desired pressure. | | | | | | | | |
| | ATC | Adjusts letdown pressure controller PCV-62-81 output to obtain desired pressure. | | | | | | | | |
| | ATC | 10. ADJUST letdown pressure controller [PCV-62-81] setpoint to match existing pressure. | | | | | | | | |
| | ATC | Adjusts letdown pressure controller PCV-62-81 setpoint to match existing pressure. | | | | | | | | |
| | ATC | 11. PLACE letdown pressure controller [PCV-62-81] in AUTO. | | | | | | | | |
| | ATC | Places letdown pressure controller PCV-62-81 in AUTO. | | | | | | | | |

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| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:1 |
| Event Description: 1B Charging Pump Trip. | | | |
| Time | Position | Applicant's Actions or Behavior | |

| | | |
|---|-----|---|
| NOTE Normal letdown temperature is ~100°F. | | |
| | ATC | 12. ADJUST [HIC-62-78A] to obtain desired letdown temperature, as indicated on [TI-62-78] . |
| | ATC | Adjusts HIC-62-78A Letdown Controller to obtain desired letdown temperature, as indicated on TI-62-78 . |
| | ATC | 13. PLACE [HIC-62-78A] in AUTO . |
| | ATC | Places Letdown Controller HIC-62-78A in AUTO. |
| Examiner Note: Several steps, notes, and cautions in the procedure do not apply to this failure. Only those that are applicable are listed in this event guide. | | |
| Examiner Note: Letdown temperature may swing due to repeated actuation of TIS-62-79B/A, which causes letdown temperature control valve TCV-70-192 to fully open. | | |
| Examiner Note: SRO continues the performance of AOP-M.09 actions here | | |
| | SRO | 15. NOTIFY STA or other available licensed operator to refer to App. A, Tech Spec Impacts. |
| | SRO | Enters LCO 3.5.2 Condition A |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:1

Event Description: 1B Charging Pump Trip.

| Time | Position | Applicant's Actions or Behavior | | | | | | |
|--|--|---|-----------|-----------------|-----------------|-----------------------------------|--|----------|
| | | <p>3.5.2 ECCS - Operating</p> <p>LCO 3.5.2 Two ECCS trains shall be OPERABLE.</p> <hr/> <p style="text-align: center;">NOTES</p> <ol style="list-style-type: none"> In MODE 3, both safety injection (SI) pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve testing per SR 3.4.14.1. In MODE 3, ECCS pumps may be made incapable of injecting to support transition into or from the Applicability of LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," for up to 4 hours or until the temperature of all RCS cold legs exceeds Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR plus 25°F, whichever comes first. <hr/> <p>APPLICABILITY: MODES 1, 2, and 3.</p> <p>ACTIONS</p> <table border="1"> <thead> <tr> <th>CONDITION</th> <th>REQUIRED ACTION</th> <th>COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td>A. One or more trains inoperable.</td> <td>A.1 Restore train(s) to OPERABLE status.</td> <td>72 hours</td> </tr> </tbody> </table> | CONDITION | REQUIRED ACTION | COMPLETION TIME | A. One or more trains inoperable. | A.1 Restore train(s) to OPERABLE status. | 72 hours |
| CONDITION | REQUIRED ACTION | COMPLETION TIME | | | | | | |
| A. One or more trains inoperable. | A.1 Restore train(s) to OPERABLE status. | 72 hours | | | | | | |
| | Crew | Performs a Crew Brief as time allows. | | | | | | |
| | Crew | <p>Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.</p> <p>Operations Management - Typically Shift Manager.</p> <p>Maintenance Personnel – Typically Work Control Center</p> | | | | | | |
| Lead Examiner may cue next event when the SRO has addresses Tech Specs. | | | | | | | | |

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| Op-Test No.: 2016-301 | Scenario No.: 3 | Event No.:2 |
| Event Description: Small Steam Leak | | |
| Time | Position | Applicant's Actions or Behavior |

Indications/Alarms

Significant Resultant Alarms/Indications:

1-M-1

- **Generator Megawatts decreasing.**

1-M-4

- **Reactor Power Increasing**


1-M-5


- **RCS Temperature decreasing**


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| | SRO | Transitions to AOP-S.05, STEAM OR FEEDWATER LEAK. |
| | SRO | Directs actions from AOP-S.05, STEAM OR FEEDWATER LEAK. |

Communication: If AUO dispatched, wait 5 minutes report **“Steam coming from the side of the east valve vault room.”**

If asked report, **“There is no immediate personnel safety hazard.”**

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| | BOP | <p>1. MONITOR personnel safety:</p> <p style="margin-left: 20px;">a. IF steam or feedwater lines need to be immediately isolated to protect personnel, THEN PERFORM the following:</p> <ol style="list-style-type: none"> 1) TRIP the reactor. 2) IF leak is on steam lines OR source is unknown, THEN CLOSE MSIVs. 3) IF leak is on feedwater lines OR source is unknown, THEN PERFORM the following: <ol style="list-style-type: none"> a) TRIP MFW pumps. b) CLOSE Feed Reg Valves. 4) GO TO E-0, Reactor Trip or Safety Injection. <div style="text-align: center; margin-top: 10px;">  </div> |
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| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:2 |
|-------------------------------------|----------|---|-------------|
| Event Description: Small Steam Leak | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP | 2. MONITOR steam generator levels STABLE on program. | |
| | BOP | 3. CHECK the following: <ul style="list-style-type: none"> • S/G atmospheric relief valves CLOSED • steam dumps CLOSED. | |
| | BOP | 4. CHECK main turbine on line. | |
| | BOP | 5. MONITOR reactor power: <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> a. CHECK the following: <ul style="list-style-type: none"> • reactor power STABLE • reactor power less than or equal to 100% on power range NIS. </div> <div style="width: 48%;"> a. REDUCE turbine load as necessary to maintain reactor power less than or equal to 100%. <p>IF any of the following conditions exist:</p> <ul style="list-style-type: none"> • greater than 35 MWe load drop is required to maintain reactor power less than or equal to 100% <p>OR</p> <ul style="list-style-type: none"> • steam leak results in reactor power rising by 3% or more <p>OR</p> <ul style="list-style-type: none"> • reactor power CANNOT be controlled by turbine load reduction <p>THEN PERFORM the following:</p> <ol style="list-style-type: none"> 1) TRIP the reactor. 2) WHEN reactor is tripped, THEN CLOSE MSIVs. 3) GO TO E-0, Reactor Trip or Safety Injection. <div style="text-align: right;">  </div> </div> </div> | |
| | BOP | Reduces turbine load as necessary to maintain NI power less than 100%. | |

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|---|----------|---|--|-------------|--|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | | Event No.:2 | |
| Event Description: Small Steam Leak | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | |
| | BOP | 5. b. CHECK ICS thermal power indication AVAILABLE. | | | |
| | BOP | <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p>c. VERIFY 10 minute average power less than applicable limit:</p> <ul style="list-style-type: none"> • IF LEFM is operable, THEN VERIFY ICS point U2118RA is less than 3455 MWt. • IF LEFM is NOT operable, THEN VERIFY ICS point U1118RA is less than 3411 MWt. </div> <div style="width: 48%;"> <p>c. IF <u>instantaneous</u> thermal power (U2118 or U1118) is greater than applicable limit, REDUCE turbine load as necessary to maintain thermal power less than applicable limit.</p> <p>IF any of the following conditions exist:</p> <ul style="list-style-type: none"> • greater than 35 MWe load drop is required to maintain thermal power within the applicable limit <p>OR</p> <ul style="list-style-type: none"> • thermal power CANNOT be restored to within applicable limit, <p>THEN PERFORM the following:</p> <ol style="list-style-type: none"> 1) TRIP the reactor. 2) WHEN reactor is tripped, THEN CLOSE MSIVs. 3) GO TO E-0, Reactor Trip or Safety Injection.  </div> </div> | | | |
| | BOP | Reduces turbine load as necessary to maintain 10 minute average power less than applicable limit (3455 MWt) as required. | | | |
| | BOP | 6. MONITOR T-avg within 3°F of T-ref. | | | |
| NOTE Tech Spec [CTS] LCO 3.6.1.4 [ITS] LCO 3.6.4 is applicable if containment pressure exceeds 0.3 psig. | | | | | |
| | BOP | 7. MONITOR containment pressure STABLE. | | | |

| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:2 |
|---|----------|--|-------------|
| Event Description: Small Steam Leak | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP | <p>8. MONITOR hotwell level STABLE:</p> <ul style="list-style-type: none"> • VERIFY LCV-2-9 maintaining hotwell level in AUTO. | |
| Lead Examiner may cue next event when the BOP has reduced Main Turbine load. | | | |
| | Crew | Performs a Crew Brief as time allows. | |
| | Crew | <p>Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.</p> <p>Operations Management - Typically Shift Manager.</p> <p>Maintenance Personnel – Typically Work Control Center</p> | |
| | | | |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:3

Event Description: Steam Gen Level Transmitter, LT 3-94 Fails Low

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
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Direct the Simulator Operator to initiate Event 3, Steam Gen Level Transmitter, LT 3-94 Fails low.

Indications available:

Annunciator:

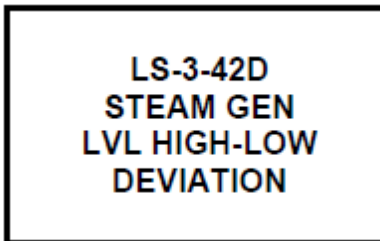
1-M-6

- 1-XA-55-6B C-1 "LS-3-94D STM GEN LOOP 3 LOW FW FLOW LOW WATER LEVEL."
- 1-XA-55-6B C-4 "LS-3-93B STM GEN LOOP 3 LOW LOW WATER LEVEL."

Indicator:

- 1-LI-3-94 indicates 0% gpm [M-4]

Panel M5-A B-7



[1] CHECK steam generator levels to see which has level deviation.

[2] IF automatic level control is NOT controlling to maintain S/G level, THEN

GO TO AOP-S.01, *Loss of Normal Feedwater.*


Examiner Note: Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.

| | | |
|--|-----|---|
| | BOP | Controls FIC-3-90, #3 S/G Feed Regulating Valve output to maintain S/G levels on program level based on Immediate Operator Actions. |
| | SRO | Transitions to AOP-S.01, MAIN FEEDWATER MALFUNCTIONS. |
| | SRO | Directs actions from AOP-S.01, MAIN FEEDWATER MALFUNCTIONS. |

1. DIAGNOSE the failure:

| IF... | GO TO SECTION | PAGE |
|--|---------------|------|
| Failure of Automatic S/G Level Control | 2.1 | 4 |

NOTE Step 1 is an IMMEDIATE ACTION

| Op-Test No.: 2016-301 | Scenario No.: 3 | Event No.:3 |
|--|-----------------|--|
| Event Description: Steam Gen Level Transmitter, LT 3-94 Fails Low | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <p>1. RESTORE steam generator level(s):</p> <p style="margin-left: 40px;">a. PLACE affected feedwater reg valve controller(s) and/or bypass reg valve controller(s) in MANUAL.</p> <p style="margin-left: 40px;">b. CONTROL feedwater flow on affected S/G(s) to restore level to program.</p> |
| | BOP | Controls FIC-3-90, #3 S/G Feed Regulating Valve output to maintain S/G levels on program level. |
| | BOP | <p>2. CHECK the following:</p> <ul style="list-style-type: none"> • S/G pressure instruments NORMAL • S/G level instruments NORMAL. <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 60%;"> <p>IF any S/G pressure or level instrument has failed, THEN GO TO AOP-I.06, <i>Steam Generator Instrument Malfunction.</i></p>  </div> <div style="width: 35%;"></div> </div> |
| <p>Panel M6-B C-4</p> <div style="border: 1px solid black; width: 150px; height: 100px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <p>LS-3-93B STEAM GENERATOR LOOP 3 LOW LOW WATER LEVEL</p> </div> <p>[1] CHECK steam generator level, indications [1-LI-3-97], [1-LI-3-94] and [1-LI-3-93].</p> <p>[2] IF level channel failed, THEN GO TO AOP-I.06, <i>Steam Generator Instrument Malfunction.</i></p> | | |
| <p>Examiner Note: Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.</p> | | |

| | | | | | |
|---|----------|---------------------------------|--|-------------|--|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | | Event No.:3 | |
| Event Description: Steam Gen Level Transmitter, LT 3-94 Fails Low | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | |


| | | |
|--|-----|--|
| | SRO | Transitions to AOP-I.06 STEAM GENERATOR INSTRUMENT MALFUNCTION. |
| | SRO | Directs actions from AOP-I.06 STEAM GENERATOR INSTRUMENT MALFUNCTION. |

1. **DIAGNOSE** the failure:

| | | |
|----------------------------------|--------------------------|-------------|
| IF... | GO TO SECTION | PAGE |
| S/G level instrument malfunction | 2.2 | 8 |

Communication: **If directed to inspect LT-3-94, respond as the AUO, wait ~3 minutes and report no abnormal conditions noted.**

Communication: If contacted, report “I&C will report to the MCR in ~ 45 minutes.”

| | | |
|--|-----|--|
| | BOP | <p>1. VERIFY DCS is maintaining S/G level on program.</p> <p>PERFORM the following:</p> <ul style="list-style-type: none"> a. PLACE affected MFW controller in MANUAL. b. CONTROL feedwater flow on affected S/G(s) to restore level to program. c. IF reactor/turbine trip is imminent due to high or low S/G level, THEN TRIP the reactor and GO TO E-0, Reactor Trip or Safety Injection. <div style="text-align: center; margin-top: 10px;">  </div> |
|--|-----|--|

| | | |
|-----------|-----|--|
| CT | BOP | Places FIC-3-90, #3 S/G Feed Regulating Valve to MANUAL and controls output to maintain S/G levels on program level. (If not already performed.) |
|-----------|-----|--|

| Op-Test No.: 2016-301 | Scenario No.: 3 | Event No.:3 | | | | | | |
|---|---|--|-----------|-----------------|-----------------|---|---|-------------|
| Event Description: Steam Gen Level Transmitter, LT 3-94 Fails Low | | | | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | | | | |
| | SRO | <p>2. EVALUATE the following Tech Specs for applicability:</p> <ul style="list-style-type: none"> • 3.3.1.1 (3.3.1), Reactor Trip System Instrumentation • 3.3.2.1 (3.3.2), Engineered Safety Feature Actuation System Instrumentation • 3.3.3.5, Remote Shutdown Instrumentation • 3.3.3.7, Accident Monitoring Instrumentation | | | | | | |
| | SRO | <p>Enters LCO 3.3.1 Condition A & R.</p> <p>Enters LCO 3.3.2 Condition A, D & I</p> <p>Enters LCO 3.3.3 Condition A.</p> | | | | | | |
| | SRO | <p>3.3 INSTRUMENTATION</p> <p>3.3.1 Reactor Trip System (RTS) Instrumentation</p> <p>LCO 3.3.1 The RTS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.</p> <p>APPLICABILITY: According to Table 3.3.1-1.</p> <p>ACTIONS _____</p> <p style="text-align: right;">NOTE _____</p> <p>Separate Condition entry is allowed for each Function.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <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 Functions with one or more required channels or trains inoperable.</td> <td>A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s).</td> <td>Immediately</td> </tr> </tbody> </table> | CONDITION | REQUIRED ACTION | COMPLETION TIME | A. One or more Functions with one or more required channels or trains inoperable. | A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s). | Immediately |
| CONDITION | REQUIRED ACTION | COMPLETION TIME | | | | | | |
| A. One or more Functions with one or more required channels or trains inoperable. | A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s). | Immediately | | | | | | |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:3

Event Description: Steam Gen Level Transmitter, LT 3-94 Fails Low

| Time | Position | Applicant's Actions or Behavior | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------------|---|---|------------|--|--------------------|-----------------------------|---------|--|----------------------------|---|----------------------|------------|------------------------------|--------------------|-----------------------------|--------------------------------------|---|--|--|--|--|---------|----------------------|-----|----------|---|--|--------------------|------------------|------------------------|-----|----------|---|--|--------------------|------------------|
| | | <table><tr><td rowspan="3">R. One channel inoperable.</td><td colspan="5"><div>NOTE</div><div>The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.</div></td><td></td></tr><tr><td>R.1</td><td colspan="5">For the affected protection set, adjust the Trip Time Delay for one affected steam generator (T_s) to match the Trip Time Delay for multiple affected steam generators (T_M).</td><td>4 hours</td></tr><tr><td colspan="6"><div>AND</div></td></tr><tr><td>R.2</td><td colspan="5">Place channel in trip.</td><td>6 hours</td></tr></table> | | | | | | | R. One channel inoperable. | <div>NOTE</div> <div>The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.</div> | | | | | | R.1 | For the affected protection set, adjust the Trip Time Delay for one affected steam generator (T_s) to match the Trip Time Delay for multiple affected steam generators (T_M). | | | | | 4 hours | <div>AND</div> | | | | | | R.2 | Place channel in trip. | | | | | 6 hours | |
| R. One channel inoperable. | <div>NOTE</div> <div>The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | R.1 | For the affected protection set, adjust the Trip Time Delay for one affected steam generator (T_s) to match the Trip Time Delay for multiple affected steam generators (T_M). | | | | | 4 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <div>AND</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R.2 | Place channel in trip. | | | | | 6 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <table><tr><th>FUNCTION</th><th>APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS</th><th>REQUIRED CHANNELS</th><th>CONDITIONS</th><th>SURVEILLANCE REQUIREMENTS</th><th>ALLOWABLE VALUE</th><th>NOMINAL TRIP SETPOINT</th></tr><tr><td colspan="7">13. Steam Generator (SG) Water Level</td></tr><tr><td>a. Low-Low (Adverse)</td><td>1,2</td><td>3 per SG</td><td>R</td><td>SR 3.3.1.1 SR 3.3.1.7^{(b)(c)} SR 3.3.1.10^{(b)(c)} SR 3.3.1.14</td><td>≥ 14.4% NR Span</td><td>15.0% NR Span</td></tr><tr><td>b. Low-Low (EAM)</td><td>1,2</td><td>3 per SG</td><td>R</td><td>SR 3.3.1.1 SR 3.3.1.7^{(b)(c)} SR 3.3.1.10^{(b)(c)} SR 3.3.1.14</td><td>≥ 10.1% NR Span</td><td>10.7% NR Span</td></tr></table> | | | | | | | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | 13. Steam Generator (SG) Water Level | | | | | | | a. Low-Low (Adverse) | 1,2 | 3 per SG | R | SR 3.3.1.1 SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 | ≥ 14.4% NR Span | 15.0% NR Span | b. Low-Low (EAM) | 1,2 | 3 per SG | R | SR 3.3.1.1 SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 | ≥ 10.1% NR Span | 10.7% NR Span |
| FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13. Steam Generator (SG) Water Level | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a. Low-Low (Adverse) | 1,2 | 3 per SG | R | SR 3.3.1.1 SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 | ≥ 14.4% NR Span | 15.0% NR Span | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b. Low-Low (EAM) | 1,2 | 3 per SG | R | SR 3.3.1.1 SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 | ≥ 10.1% NR Span | 10.7% NR Span | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:3

Event Description: Steam Gen Level Transmitter, LT 3-94 Fails Low

| Time | Position | Applicant's Actions or Behavior | | | | | | | | | |
|---|--|--|-----------|-----------------|-----------------|---|---|-------------|----------------------------|--|---|
| | | <p>3.3 INSTRUMENTATION</p> <p>3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation</p> <p>LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.</p> <p>APPLICABILITY: According to Table 3.3.2-1.</p> <p>ACTIONS</p> <p style="text-align: center;">NOTE</p> <p>Separate Condition entry is allowed for each Function.</p> <table border="1"> <thead> <tr> <th>CONDITION</th> <th>REQUIRED ACTION</th> <th>COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td>A. One or more Functions with one or more required channels or trains inoperable.</td> <td>A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s).</td> <td>Immediately</td> </tr> <tr> <td>D. One channel inoperable.</td> <td> <p style="text-align: center;">NOTE</p> <p>The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels.</p> <p>D.1 Place channel in trip.</p> <p><u>OR</u></p> <p>D.2.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>D.2.2 Be in MODE 4.</p> </td> <td> <p>72 hours</p> <p>78 hours</p> <p>84 hours</p> </td> </tr> </tbody> </table> | CONDITION | REQUIRED ACTION | COMPLETION TIME | A. One or more Functions with one or more required channels or trains inoperable. | A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s). | Immediately | D. One channel inoperable. | <p style="text-align: center;">NOTE</p> <p>The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels.</p> <p>D.1 Place channel in trip.</p> <p><u>OR</u></p> <p>D.2.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>D.2.2 Be in MODE 4.</p> | <p>72 hours</p> <p>78 hours</p> <p>84 hours</p> |
| CONDITION | REQUIRED ACTION | COMPLETION TIME | | | | | | | | | |
| A. One or more Functions with one or more required channels or trains inoperable. | A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s). | Immediately | | | | | | | | | |
| D. One channel inoperable. | <p style="text-align: center;">NOTE</p> <p>The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels.</p> <p>D.1 Place channel in trip.</p> <p><u>OR</u></p> <p>D.2.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>D.2.2 Be in MODE 4.</p> | <p>72 hours</p> <p>78 hours</p> <p>84 hours</p> | | | | | | | | | |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:3

Event Description: Steam Gen Level Transmitter, LT 3-94 Fails Low

| Time | Position | Applicant's Actions or Behavior | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|------------|--|--------------------|-----------------------------|----------------------------|---|----------------------|------------|------------------------------|--------------------|-----------------------------|--|--|--|---------|--|----------------|--|--------------------------------------|--------------------------------------|----------|---|--|------------------------|-----|------------------------|---------|--|--|--|--|--|-----------------------------|--|--|--|--|--|--|-------------|-------|----------|---|--|--------------------|------------------|-----------------------------|--|--|--|--|--|--|-------------|-------|----------|---|--|--------------------|------------------|
| | | <table><tr><td>I. One channel inoperable.</td><td colspan="3"><div>NOTE</div><div>The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.</div></td><td></td><td></td></tr><tr><td>I.1</td><td>For the affected protection set, the Trip Time Delay for one affected steam generator (T_s) is adjusted to match the Trip Time Delay for multiple affected steam generators (T_M).</td><td></td><td></td><td>4 hours</td><td></td></tr><tr><td colspan="6"><div>AND</div></td></tr><tr><td>I.2</td><td>Place channel in trip.</td><td></td><td></td><td>6 hours</td><td></td></tr></table> | | | | | I. One channel inoperable. | <div>NOTE</div> <div>The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.</div> | | | | | I.1 | For the affected protection set, the Trip Time Delay for one affected steam generator (T_s) is adjusted to match the Trip Time Delay for multiple affected steam generators (T_M). | | | 4 hours | | <div>AND</div> | | | | | | I.2 | Place channel in trip. | | | 6 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I. One channel inoperable. | <div>NOTE</div> <div>The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I.1 | For the affected protection set, the Trip Time Delay for one affected steam generator (T_s) is adjusted to match the Trip Time Delay for multiple affected steam generators (T_M). | | | 4 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>AND</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I.2 | Place channel in trip. | | | 6 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>Table 3.3.2-1 (page 1 of 9)</div> <div>Engineered Safety Feature Actuation System Instrumentation</div> <table><tr><th>FUNCTION</th><th>APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS</th><th>REQUIRED CHANNELS</th><th>CONDITIONS</th><th>SURVEILLANCE REQUIREMENTS</th><th>ALLOWABLE VALUE</th><th>NOMINAL TRIP SETPOINT</th></tr><tr><td>5. Turbine Trip and Feedwater Isolation</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>b. SG Water Level - High High (P-14)</td><td>1,2⁽¹⁾,3⁽¹⁾</td><td>3 per SG</td><td>D</td><td>SR 3.3.2.1 SR 3.3.2.4^{(b)(c)} SR 3.3.2.8^{(b)(c)} SR 3.3.2.9</td><td>≤ 81.7%</td><td>81%</td></tr><tr><td>6. Auxiliary Feedwater</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>b. SG Water Level - Low Low</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>(1) Adverse</td><td>1,2,3</td><td>3 per SG</td><td>I</td><td>SR 3.3.2.1 SR 3.3.2.4^{(b)(c)} SR 3.3.2.8^{(b)(c)} SR 3.3.2.9</td><td>≥ 14.4% NR Span</td><td>15.0% NR Span</td></tr><tr><td>b. SG Water Level - Low Low</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>(1) Adverse</td><td>1,2,3</td><td>3 per SG</td><td>I</td><td>SR 3.3.2.1 SR 3.3.2.4^{(b)(c)} SR 3.3.2.8^{(b)(c)} SR 3.3.2.9</td><td>≥ 14.4% NR Span</td><td>15.0% NR Span</td></tr></table> | | | | | | | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | 5. Turbine Trip and Feedwater Isolation | | | | | | | b. SG Water Level - High High (P-14) | 1,2 ⁽¹⁾ ,3 ⁽¹⁾ | 3 per SG | D | SR 3.3.2.1 SR 3.3.2.4 ^{(b)(c)} SR 3.3.2.8 ^{(b)(c)} SR 3.3.2.9 | ≤ 81.7% | 81% | 6. Auxiliary Feedwater | | | | | | | b. SG Water Level - Low Low | | | | | | | (1) Adverse | 1,2,3 | 3 per SG | I | SR 3.3.2.1 SR 3.3.2.4 ^{(b)(c)} SR 3.3.2.8 ^{(b)(c)} SR 3.3.2.9 | ≥ 14.4% NR Span | 15.0% NR Span | b. SG Water Level - Low Low | | | | | | | (1) Adverse | 1,2,3 | 3 per SG | I | SR 3.3.2.1 SR 3.3.2.4 ^{(b)(c)} SR 3.3.2.8 ^{(b)(c)} SR 3.3.2.9 | ≥ 14.4% NR Span | 15.0% NR Span |
| FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. Turbine Trip and Feedwater Isolation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b. SG Water Level - High High (P-14) | 1,2 ⁽¹⁾ ,3 ⁽¹⁾ | 3 per SG | D | SR 3.3.2.1 SR 3.3.2.4 ^{(b)(c)} SR 3.3.2.8 ^{(b)(c)} SR 3.3.2.9 | ≤ 81.7% | 81% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. Auxiliary Feedwater | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b. SG Water Level - Low Low | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (1) Adverse | 1,2,3 | 3 per SG | I | SR 3.3.2.1 SR 3.3.2.4 ^{(b)(c)} SR 3.3.2.8 ^{(b)(c)} SR 3.3.2.9 | ≥ 14.4% NR Span | 15.0% NR Span | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b. SG Water Level - Low Low | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (1) Adverse | 1,2,3 | 3 per SG | I | SR 3.3.2.1 SR 3.3.2.4 ^{(b)(c)} SR 3.3.2.8 ^{(b)(c)} SR 3.3.2.9 | ≥ 14.4% NR Span | 15.0% NR Span | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:3

Event Description: Steam Gen Level Transmitter, LT 3-94 Fails Low

| Time | Position | Applicant's Actions or Behavior | | | | | | |
|---|--|--|-----------|-----------------|-----------------|---|--|---------|
| | | <p>3.3 INSTRUMENTATION</p> <p>3.3.3 Post Accident Monitoring (PAM) Instrumentation</p> <p>LCO 3.3.3 The PAM instrumentation for each Function in Table 3.3.3-1 shall be OPERABLE.</p> <p>APPLICABILITY: MODES 1, 2, and 3.</p> <p>ACTIONS</p> <p style="text-align: center;">NOTE</p> <p>Separate Condition entry is allowed for each Function.</p> <table border="1"> <thead> <tr> <th>CONDITION</th> <th>REQUIRED ACTION</th> <th>COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td> <p>A. NOTE</p> <p>Not applicable to Function 16.</p> <p>One or more Functions with one required channel inoperable.</p> </td> <td> <p>A.1 Restore required channel to OPERABLE status.</p> </td> <td>30 days</td> </tr> </tbody> </table> <p>10. Steam Generator Level - (Narrow Range) 2 per steam generator</p> | CONDITION | REQUIRED ACTION | COMPLETION TIME | <p>A. NOTE</p> <p>Not applicable to Function 16.</p> <p>One or more Functions with one required channel inoperable.</p> | <p>A.1 Restore required channel to OPERABLE status.</p> | 30 days |
| CONDITION | REQUIRED ACTION | COMPLETION TIME | | | | | | |
| <p>A. NOTE</p> <p>Not applicable to Function 16.</p> <p>One or more Functions with one required channel inoperable.</p> | <p>A.1 Restore required channel to OPERABLE status.</p> | 30 days | | | | | | |
| <p>NOTE 1: Failure of ONE out of three narrow range level channels will result in DCS averaging the two remaining good signals.</p> <p>NOTE 2: Failure of TWO level channels on any S/G will result in associated loop MFW reg valve and bypass valve control transferring to MANUAL.</p> | | | | | | | | |


| Op-Test No.: 2016-301 | Scenario No.: 3 | Event No.:3 |
|---|-----------------|--|
| Event Description: Steam Gen Level Transmitter, LT 3-94 Fails Low | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <p>3. VERIFY failed channel bypassed for affected loop:</p> <ul style="list-style-type: none"> "S/G # Detail" screen on DCS indicates failed transmitter bypassed. <p style="margin-left: 40px;">IF DCS has NOT bypassed failed channel, THEN PERFORM the following:</p> <ol style="list-style-type: none"> a. SELECT "S/G Level Overlay" by clicking on "Narrow Range Level" window on DCS Operator Display monitor for affected loop. b. IDENTIFY level channel to be bypassed. c. SELECT appropriate "MAINT BYP SIGNAL" button. d. CONFIRM "MAINT BYP SIGNAL" button changes from gray to red. e. VERIFY appropriate narrow range level column has yellow "BYP" displayed. f. IF affected S/G level control in AUTO, THEN MONITOR feed flow and S/G level. |
| | BOP | Bypasses LT-3-94 on DCS. |
| <p>NOTE: If performing AOP in conjunction with AOP-I.11 for Eagle LCP failure, then actions to hard trip bistables should be delayed until Eagle system reset is attempted. Actions to hard trip bistables must be completed within 6 hours UNLESS affected loop is restored to operable status by resetting Eagle rack.</p> | | |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:3

Event Description: Steam Gen Level Transmitter, LT 3-94 Fails Low

| Time | Position | Applicant's Actions or Behavior | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|-------------------|--|----------|-------------------|---------|----------|---|----------------|----|---|----------------|-----|---|----------------|----|---|---|----------------|---|---|----------------|-----|---|----------------|----|---|---|----------------|---|---|----------------|-----|---|----------------|----|---|---|-----------------|----|---|-----------------|-----|---|-----------------|----|---|
| | BOP | <p>4. NOTIFY I&C to remove failed S/G level instrument from service USING appropriate Appendix:</p> <table border="1"> <thead> <tr> <th>S/G</th> <th>INSTRUMENT NUMBER</th> <th>PROT CH</th> <th>APPENDIX</th> </tr> </thead> <tbody> <tr> <td rowspan="3">1</td> <td>L-3-38 (L-519)</td> <td>II</td> <td>M</td> </tr> <tr> <td>L-3-39 (L-518)</td> <td>III</td> <td>N</td> </tr> <tr> <td>L-3-42 (L-517)</td> <td>IV</td> <td>O</td> </tr> <tr> <td rowspan="3">2</td> <td>L-3-51 (L-529)</td> <td>I</td> <td>P</td> </tr> <tr> <td>L-3-52 (L-528)</td> <td>III</td> <td>Q</td> </tr> <tr> <td>L-3-55 (L-527)</td> <td>IV</td> <td>R</td> </tr> <tr> <td rowspan="3">3</td> <td>L-3-93 (L-539)</td> <td>I</td> <td>S</td> </tr> <tr> <td>L-3-94 (L-538)</td> <td>III</td> <td>T</td> </tr> <tr> <td>L-3-97 (L-537)</td> <td>IV</td> <td>U</td> </tr> <tr> <td rowspan="3">4</td> <td>L-3-106 (L-549)</td> <td>II</td> <td>V</td> </tr> <tr> <td>L-3-107 (L-548)</td> <td>III</td> <td>W</td> </tr> <tr> <td>L-3-110 (L-547)</td> <td>IV</td> <td>X</td> </tr> </tbody> </table> | S/G | INSTRUMENT NUMBER | PROT CH | APPENDIX | 1 | L-3-38 (L-519) | II | M | L-3-39 (L-518) | III | N | L-3-42 (L-517) | IV | O | 2 | L-3-51 (L-529) | I | P | L-3-52 (L-528) | III | Q | L-3-55 (L-527) | IV | R | 3 | L-3-93 (L-539) | I | S | L-3-94 (L-538) | III | T | L-3-97 (L-537) | IV | U | 4 | L-3-106 (L-549) | II | V | L-3-107 (L-548) | III | W | L-3-110 (L-547) | IV | X |
| S/G | INSTRUMENT NUMBER | PROT CH | APPENDIX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | L-3-38 (L-519) | II | M | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | L-3-39 (L-518) | III | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | L-3-42 (L-517) | IV | O | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | L-3-51 (L-529) | I | P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | L-3-52 (L-528) | III | Q | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | L-3-55 (L-527) | IV | R | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | L-3-93 (L-539) | I | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | L-3-94 (L-538) | III | T | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | L-3-97 (L-537) | IV | U | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | L-3-106 (L-549) | II | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | L-3-107 (L-548) | III | W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | L-3-110 (L-547) | IV | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <p>NOTE: 1,2-SO-98-1 contains instructions for restoration of bypassed instrument loop when repairs are complete.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BOP | <p>5. INITIATE maintenance on failed instrument.</p> <p>6. CHECK affected loop S/G level control in AUTO.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SRO | <p>7. GO TO appropriate plant procedure.</p> <p style="text-align: center;"></p> <p style="text-align: right;">END OF SECTION</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | |
|--|----------|---|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:3 |
| Event Description: Steam Gen Level Transmitter, LT 3-94 Fails Low | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | Crew | Performs a Crew Brief as time allows. | |
| | Crew | Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief. Operations Management - Typically Shift Manager. Maintenance Personnel – Typically Work Control Center | |
| Lead Examiner may cue the next event when the SRO has addressed Tech Specs. | | | |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:4

Event Description: VCT Level Transmitter LT-62-129 Fails High

Time

Position

Applicant's Actions or Behavior

Direct the Simulator Operator to initiate Event 4, VCT Level Transmitter LT-62-129 Fails High.**Indications/Alarms****Annunciator:****1-M-6C**

- A-3, "LS-62-129A/B VOLUME CONTROL TANK LEVEL HI-LOW" (If actual VCT level gets to the low level alarm setpoint.

Indications:**1-M-6**

- 1-LT-62-129 Indication failing high (ICS or M-6 Trend Recorder)

ICS

- VCT Low Pressure alarm
- LT-62-130 decreasing

Panel M6-C A-3

**LS-62-129A/B
VOLUME
CONTROL TANK
LEVEL HI-LOW**

**Probable
Causes**

1. High Level
 - [a] VCT divert valve malfunction or misaligned.
 - [b] Letdown flow rate greater than makeup flow rate.
 - [c] 1-LT-62-130A failing high.

NOTES

- 1) High failure of 1-LT-62-129A or 1-LT-62-130A defeats auto switch over to RWST on low level.
- 2) High failure of 1-LT-62-129A will divert letdown flow with **NO** affect on Auto makeup.
- 3) High failure of 1-LT-62-130A will divert letdown and prevent Auto makeup. 1-LI-62-129 will indicate actual level.
- 4) Symptom of partial loss of reference leg 1-LT-62-129A and -129C. 1-LI-62-129 (1-M-6) and 1-LI-62-129C (1-L-10) both indicating the same and higher than log point L0112A (1-LT-62-130A). [C.5]
- 5) Symptom of partial loss of reference leg 1-LT-62-130A and -130C. Log point L0112A (1-LT-62-130A) indicating higher than 1-LI-62-129 (1-M-6) and 1-LI-62-129C (1-L-10). [C.5]

| | | |
|---|-----------------|---|
| Op-Test No.: 2016-301 | Scenario No.: 3 | Event No.: 4 |
| Event Description: VCT Level Transmitter LT-62-129 Fails High | | |
| Time | Position | Applicant's Actions or Behavior |
| Examiner Note: Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide. | | |
| Communication: If AUO dispatched to look for a leak on VCT Transmitter 62-129 wait 3 minutes "Report no leak found." | | |
| Communication: If AUO dispatched to inspect VCT Transmitter 62-129-C on the Aux Control Panel wait 3 minutes "Report (indicated VCT level from ICS)." | | |
| Communication: If contacted, report "I&C will report to the MCR in ~ 45 minutes." | | |
| | ATC | [1] COMPARE indicated level between [1-LI-62-129] (1-M-6) and ICS computer point L0112A (1-LT-62-130). |
| | ATC | [3] IF 1-LT-62-129A or 130A failed high, THEN ENSURE [1-LCV-62-118] in VCT position USING [1-HS-62-118A] AND manually operate as required to maintain VCT level. Low failure of 1-LT-62-130A will initiate Auto makeup. |
| | ATC | Places HS-62-118A in VCT position and controls VCT level |
| | | [6] IF HIGH level, THEN [a] ENSURE [1-LCV-62-118] aligned to HUT. [b] STOP VCT makeup. |
| Examiner Note: SRO may discuss effect of failure as per Notes 1 and 2 above. | | |
| | Crew | Performs a Crew Brief as time allows. |
| | Crew | Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief. Operations Management - Typically Shift Manager. Maintenance Personnel – Typically Work Control Center |
| Lead Examiner may cue the next event when desired. | | |

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

| | | |
|---|-----|--|
| Direct the Simulator Operator to initiate Event 5, EHC Low Pressure Alarm. | | |
| Indications/Alarms Annunciator: 1-M-2A <ul style="list-style-type: none"> • B-1, PS-47-23 ELECTRO-HYD FLUID PRESS LOW • C-3, PS-47-21 RESERVE E-H FLUID PUMP RUNNING • C-1, PS-47-20 ELEC-HYD FLUID SYSTEM PRESSURE LOW-LOW | | |
| Examiner Note: Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide. | | |
| | BOP | <p align="center">Panel M2-A C-1</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p align="center">PS-47-20 ELEC-HYD FLUID SYSTEM PRESSURE LOW-LOW</p> </div> <p>[1] DISPATCH operator to EHC tank to perform the following:</p> <p>[1.1] ENSURE standby EHC pump running (refer to 1-SO-47-2, Electrohydraulic Control System)</p> <p>[1.2] CHECK for system leaks.</p> <p>[1.3] MONITOR pressure.</p> |
| | BOP | <p>[2] IF pressure continues to drop, THEN</p> <p>START removing unit from service in accordance with AOP-C.03, Emergency Shutdown.</p> |
| Communication: If directed wait 3 minutes and report as AUO, "The standby EHC pump is running, I see no leakage, pressure is about 1350 and going down slowly." | | |
| | SRO | Transitions to AOP-C.03 RAPID SHUTDOWN OR LOAD REDUCTION. |
| | SRO | Directs performance of AOP-C.03 RAPID SHUTDOWN OR LOAD REDUCTION. |
| | SRO | <p>1. ENSURE crew has been briefed on reactivity management expectations</p> <p>USING Appendix A.</p> |

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

APPENDIX A**REACTIVITY MANAGEMENT BRIEFING**

NOTE This appendix should be used in addition to event-based brief.

[1] ENSURE crew has been briefed on the following:

- Reason for Rapid Shutdown or Load Reduction
- Load Reduction Rate: _____
- Desired final power level: _____
- Reactivity Management expectations:
 - Unit Supervisor shall concur with all reactivity manipulations
 - Ensure reactor responding as expected using diverse indications
 - Tavg-Tref Mismatch requirements:
 - 3°F control band
 - 5°F reactor trip criteria
 - Crew focus will be on reducing power in a controlled and conservative manner.
 - OATC will monitor rod insertion limits and AFD limit
 - Boration source: _____
- Crew will monitor reactor trip and turbine trip criteria using App. B
- CRO will stop secondary plant equipment using App. C.
- Termination Criteria (conditions requiring Reactor Trip, Turbine Trip, or condition no longer requiring rapid load reduction):

| | | | |
|--|----------|--|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | SRO | Chooses a power reduction rate of 1%, final power level of < 50%, and BAT as the boration source. (1% to 3% acceptable.) | |
| Examiner note: The crew must reduce power to < 50% or lower to trip the Main Turbine. | | | |
| | CREW | 2. MONITOR reactor/turbine trip NOT required USING Appendix B, <i>Reactor and Turbine Trip Criteria</i> . (two extra copies provided for UOs) | |
| Examiner note: Appendix B REACTOR AND TURBINE TRIP CRITERIA see page 37. | | | |
| | CREW | 3. CHECK VALVE POSITION LIMIT light DARK on EHC panel. [M-2] | |
| NOTE Step 4 should be handed off to opposite unit or extra operator (if available). If NO operator is available, notifications should be performed concurrently with subsequent steps (when time permits). | | | |
| | CREW | 4. ENSURE following personnel notified of rapid shutdown or load reduction: [C.1] <ul style="list-style-type: none"> • Balancing Authority (Load Coordinator) (751-7547). • Chemistry • Radiation Protection • Plant Management | |
| Communications: Acknowledge notifications to Chemistry, Radcon, SELD, and Plant management. If required, SM direct the crew to lower plant power using AOP-C.03. | | | |
| | CREW | Makes notifications as required. | |
| NOTE Boration volumes and flowrates listed in this procedure are recommendations and may be adjusted as necessary. | | | |

| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
|---|----------|---|-------------|
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ATC | <p>5. INITIATE boration:</p> <p>a. CHECK rod control AVAILABLE:</p> <ul style="list-style-type: none"> Control Bank D rods capable of being moved NO dropped or misaligned rods in Control Bank D. | |
| | ATC | <p>b. CHECK Control Bank D group position greater than 200 steps.</p> <p>c. CHECK boration capability from BAT AVAILABLE.</p> | |
| | SRO | <p>d. DETERMINE recommended boration volume from BAT:</p> <ul style="list-style-type: none"> ~800 gal to reduce power from 100% to 20% <p>OR</p> <ul style="list-style-type: none"> 10 gal for each 1% power reduction (from current power level) <p>OR</p> <ul style="list-style-type: none"> volume recommended by Reactor Engineering. | |
| | SRO | Determines at least 500 gal as required to reduce power from 100% to <50%. (or desired amount for power reduction). | |
| | SRO | <p>5. e. DETERMINE recommended boration flowrate from table below or from Reactor Engineering:</p> | |

| | | | | | |
|---|----------|---------------------------------|--|--------------|--|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | | Event No.: 5 | |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | |

| | | <table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th style="padding: 5px;">LOAD REDUCTION RATE(%/min)</th> <th style="padding: 5px;">BORATION FLOWRATE</th> </tr> <tr> <td style="text-align: center; padding: 5px;">1%</td> <td style="text-align: center; padding: 5px;">~15 gpm</td> </tr> <tr> <td style="text-align: center; padding: 5px;">2%</td> <td style="text-align: center; padding: 5px;">~30 gpm</td> </tr> <tr> <td style="text-align: center; padding: 5px;">3%</td> <td style="text-align: center; padding: 5px;">~45 gpm</td> </tr> </table> | LOAD REDUCTION RATE(%/min) | BORATION FLOWRATE | 1% | ~15 gpm | 2% | ~30 gpm | 3% | ~45 gpm |
|---|----------------------|--|-------------------------------|----------------------|----|---------|----|---------|----|---------|
| LOAD REDUCTION RATE(%/min) | BORATION FLOWRATE | | | | | | | | | |
| 1% | ~15 gpm | | | | | | | | | |
| 2% | ~30 gpm | | | | | | | | | |
| 3% | ~45 gpm | | | | | | | | | |
| | SRO | Chooses a 1% load reduction rate. (1% to 3% acceptable.) | | | | | | | | |
| | ATC | f. ENSURE concurrence obtained from STA for boration volume and flowrate. | | | | | | | | |
| | ATC | g. CHECK status of charging and letdown: <ul style="list-style-type: none"> normal letdown flow ESTABLISHED charging flow control HIC-62-93A in AUTO. | | | | | | | | |
| | ATC | h. DETERMINE if normal boration will be used: <ul style="list-style-type: none"> desired load reduction rate is <u>less than</u> 4% per minute time is available for normal boration. | | | | | | | | |
| | ATC | i. INITIATE normal boration USING Appendix H. | | | | | | | | |
| APPENDIX H NORMAL BORATION | | | | | | | | | | |
| | ATC | 1. RECORD desired boration volume and flowrate: <div style="margin-left: 40px;"> Volume (gal) _____ Flowrate (gpm) _____ </div> | | | | | | | | |

| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
|---|----------|--|-------------|
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ATC | Records at least 500 gal as required at 15 to 45 gpm (or desired amount for power reduction). | |
| | ATC | 2. PLACE [HS-62-140A] , Makeup Control to STOP position. | |
| | ATC | Places HS-62-140A to STOP. | |
| | ATC | 3. PLACE [HS-62-140B] , Makeup mode selector switch in BORATE position. | |
| | ATC | Places HS-62-140B to BORATE | |
| <div style="border: 1px solid black; padding: 5px; margin: 5px auto; width: 80%;"> <p>NOTE</p> <p>Boric Acid controller setting is twice the desired flow rate. Maximum Boric Acid flow is ~45 gpm.</p> </div> | | | |
| | ATC | 4. ADJUST [FC-62-139] , BA flow controller setpoint for desired flow rate. | |
| | ATC | Places FIC-62-139 to 15 to 45 gpm. | |
| | ATC | 5. ADJUST [FQ-62-139] , BA integrator (batch counter) to desired boric acid volume. | |
| | ATC | Places FQ-62-139 to at least 500 gal. (or desired amount for power reduction). | |
| | ATC | 6. PLACE [HS-62-140A] , Makeup Control Switch mode selector switch to START. | |
| | ATC | Places HS-62-140A to START | |
| | ATC | 7. ENSURE boric acid transfer pump aligned to blender in FAST speed. | |
| | ATC | <p>8. IF desired boric acid flow rate NOT obtained, THEN ADJUST one or both of the following as necessary:</p> <ul style="list-style-type: none"> • [FC-62-139], BA flow controller • recirculation valve for BAT aligned to blender. <p>9. ENSURE desired boric acid flow indicated on FI-62-139.</p> <p>10. RECORD time when boration flow established:</p> <p>Time: _____</p> | |

| | | | | |
|---|----------|---------------------------------|--|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | | |
| Time | Position | Applicant's Actions or Behavior | | |

Examiner Note: The crew continues actions to lower plant power using AOP-C.03 RAPID SHUTDOWN OR LOAD REDUCTION here.

| | | |
|--|--|--|
| | | 5. INITIATE boration: J. CONTROL boration flow as required to inject desired boric acid volume. |
|--|--|--|

CAUTION

 If borating from RWST, Turbine Load Reduction Rate greater than 2% per minute could result in violating Rod Insertion Limit.

| | | |
|--|-----|---|
| | BOP | 6. INITIATE load reduction as follows: a. CHECK OPER AUTO light LIT on EHC panel. [M-2] b. ADJUST load rate to desired value: <ul style="list-style-type: none"> between 1% and 4% per minute if borating via FCV-62-138 OR between 1% and 3% per minute if borating via normal boration (App. H) OR 2% per minute if borating from RWST. |
| | BOP | Adjusts load rate approx 1% to 3% per minute. |

| | BOP | c. ADJUST setter for desired power level: <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">DESIRED RX POWER LEVEL</th> <th style="padding: 5px;">RECOMMENDED SETTER VALUE</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">50%</td> <td style="padding: 5px;">35</td> </tr> <tr> <td style="padding: 5px;">40%</td> <td style="padding: 5px;">30</td> </tr> <tr> <td style="padding: 5px;">30%</td> <td style="padding: 5px;">25</td> </tr> <tr> <td style="padding: 5px;">20% or less</td> <td style="padding: 5px;">15</td> </tr> </tbody> </table> | DESIRED RX POWER LEVEL | RECOMMENDED SETTER VALUE | 50% | 35 | 40% | 30 | 30% | 25 | 20% or less | 15 |
|---------------------------|-----------------------------|---|---------------------------|-----------------------------|-----|----|-----|----|-----|----|-------------|----|
| DESIRED RX POWER LEVEL | RECOMMENDED SETTER VALUE | | | | | | | | | | | |
| 50% | 35 | | | | | | | | | | | |
| 40% | 30 | | | | | | | | | | | |
| 30% | 25 | | | | | | | | | | | |
| 20% or less | 15 | | | | | | | | | | | |
| | BOP | Adjusts setter to 35 or less. | | | | | | | | | | |

| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
|---|----------|---|-------------|
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP | d. VERIFY boration flow established. e. INITIATE turbine load reduction by depressing GO pushbutton. | |
| | BOP | Depresses GO pushbutton. | |
| | BOP | f. CONTROL turbine load reduction as necessary to reduce power to desired level. | |
| | ATC | 7. MONITOR T-avg/T-ref mismatch: a. CHECK T-ref indication AVAILABLE. | |
| | | b. MONITOR automatic rod control maintaining T-avg/T-ref mismatch less than 3°F. | |
| | ATC | Coordinates with the BOP to maintain T-avg/Program T-ref mismatch less than 3°F using the TI-28 figure 3 or ICS. | |
| | BOP | 8. MONITOR automatic control of MFW pump speed AVAILABLE. | |
| | BOP | 9. STOP secondary plant equipment USING Appendix C, <i>Secondary Plant Equipment</i> . | |
| Examiner Note: Appendix C, SECONDARY PLANT EQUIPMENT starts at page 38. | | | |
| <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>NOTE</p> <p>If LEFM thermal power (U2118) is inoperable, rod insertion limit curve must be raised by 3 steps. Rod insertion limit alarms and ICS display are NOT automatically adjusted when LEFM is inoperable.</p> </div> | | | |
| | CREW | 10. MONITOR control rods above low-low insertion limit USING ICS or COLR. | |

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

| | | | |
|--|--|--|--|
| NOTE | | | |
| Initiating plant shutdown required by Tech Specs requires 4 hour NRC notification per NPG-SPP-03.5, <i>Regulatory Reporting Requirements</i> . | | | |

| | | |
|--|------|---|
| | CREW | 11. EVALUATE Tech Specs/TRM for applicability: <ul style="list-style-type: none"> • [CTS] 3.2.1 or [ITS] 3.2.3, Axial Flux Difference • [CTS] 3.1.1.1 or [ITS] 3.1.1, Shutdown Margin • [CTS] 3.1.3.6 or [ITS] 3.1.6, Rod Insertion Limits • [CTS] TRM 3.1.2.2, Boration Flowpaths or [ITS] TRM 8.1.1, Boration Flowpaths - Operating • [CTS] 3.5.5 or [ITS] 3.5.4, RWST. |
| | CREW | 12. EVALUATE EPIP-1, <i>Emergency Plan Initiating Conditions Matrix</i> . |
| | ATC | 13. PERFORM the following to reduce boron concentration difference between pwr and RCS loops: <ul style="list-style-type: none"> a. CHECK at least one normal spray valve AVAILABLE. b. ENSURE at least one backup heater group ENERGIZED. c. ENSURE spray valve(s) responds to control RCS pressure. |
| | ATC | Places Pressurizer Backup Heaters to ON, as required. |

| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
|---|----------|--|-------------|
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | CREW | <p>14. WHEN reactor power change exceeds 15% within one hour, THEN NOTIFY Chemistry to initiate sampling as required by the following:</p> <ul style="list-style-type: none"> • 0-SI-CEM-000-050.2 • 0-SI-CEM-030-407.2 • 0-SI-CEM-030-415.0. | |
| | CREW | <p>15. MONITOR if turbine load reduction can be stopped:</p> <p>a. CHECK the following conditions met:</p> <ul style="list-style-type: none"> • reactor shutdown is NOT needed • turbine shutdown is NOT needed • turbine load at desired power level (further load reduction NOT needed) <p>b. ENSURE turbine load reduction STOPPED.</p> <p>c. WHEN control rods are above the low-low insertion limit, THEN ENSURE boration flow STOPPED.</p> <p>d. NOTIFY Chem Lab to sample RCS for boron concentration.</p> <p>e. MAINTAIN T-avg within 3°F of T-ref USING one of the following:</p> <ul style="list-style-type: none"> • AUTO or MANUAL rod control OR • dilution or boration USING 0-SO-62-7 OR • additional turbine load reduction. | |


| | | |
|--|-----------------|--|
| Op-Test No.: 2016-301 | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | |
| Time | Position | Applicant's Actions or Behavior |
| | | <p>15. f. CHECK reactor power greater than 50%.</p> <p>g. DETERMINE Tech Spec AFD limits for current power level USING ICS (Primary Mimics, Doghouse Display) or COLR.</p> <p>h. CHECK AFD within Tech Spec limits on at least three operable power range NIS channels.</p> <p>i. IF AFD is outside target band, THEN INITIATE 0-SI-NUC-000-044.0, <i>Axial Flux Difference</i>.</p> <p>15. J. INITIATE performance of 0-SI-OPS-092-078.0, Power Range Neutron Flux Channel Calibration By Heat Balance Comparison.</p> <p>k. CHECK C-7 LOSS OF LOAD INTERLOCK [M-4A window E-5] DARK.</p> |
| <p style="text-align: center;">NOTE</p> <p>Time in core life, expected Xenon changes, and planned power changes should be considered when evaluating need for boration or dilution. If dilution is required, Reactor Engineering Data Sheet provides recommended dilution volume for first hour following downpower.</p> | | |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:5

Event Description: EHC Low Pressure Alarm/Plant Power Reduction

| Time | Position | Applicant's Actions or Behavior |
|------|----------|--|
| | | <p>L. CONSULT Reactor Engineering and STA regarding ΔI control and compensating for Xe changes.</p> <p>m. PERFORM the following as necessary to control ΔI and maintain T-avg on program:</p> <ul style="list-style-type: none"> • INITIATE boration or dilution as necessary USING 0-SO-62-7, <i>Boron Concentration Control</i> OR • ADJUST control rod position as necessary. <p>15. n. CHECK at least one normal pwr spray valve OPERABLE.</p> <p>o. DETERMINE appropriate procedure based upon power level and cause of rapid shutdown:</p> <ul style="list-style-type: none"> • Other applicable AOP OR • 0-GO-5, <i>Normal Power Operation</i> (if greater than approximately 30% power) OR • 0-GO-4, <i>Power Ascension from Less than 5% to 30% Power</i> (if less than approximately 30%) <p>p. GO TO appropriate plant instruction.</p>  |

Examiner Note: When the crew has sufficiently reduced power the Lead Examiner may go to the next event starting at page 49.

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:5

Event Description: EHC Low Pressure Alarm/Plant Power Reduction

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

Appendix B
(Page 1 of 3)

REACTOR AND TURBINE TRIP CRITERIA

| REACTOR TRIP CRITERIA | TURBINE TRIP CRITERIA |
|--|---|
| Turbine trip required or imminent with reactor power greater than P-9 (50%) | Turbine vibration exceeding 14 mils with one of the following: |
| Uncontrolled rod movement which CANNOT be stopped by placing rods in MANUAL (AOP-C.01) | <ul style="list-style-type: none"> high vibration on multiple bearings |
| Loss of S/G level control: level dropping or rising toward trip setpoint and level CANNOT be restored (AOP-S.01) | OR |
| More than one dropped rod (AOP-C.01) | <ul style="list-style-type: none"> abnormal noise/vibration apparent |
| T-avg/T-ref mismatch CANNOT be maintained less than 5°F (refer to Step 7 or App. E) | |
| ≥ 30% turbine load: Condenser Pressure > 2.7 psia AND CANNOT be restored within 5 minutes (AOP-S.02) | < 30% turbine load: Condenser Pressure > 1.72 psia (AOP-S.02) |
| Any automatic reactor trip setpoint reached OR automatic trip imminent: <ul style="list-style-type: none"> Turbine trip above P-9 (50%) Safety injection Power Range high flux 109% Power Range flux rate ± 5% in 2 seconds Pressurizer high level 92% Pressurizer pressure low 1970 psig Pressurizer pressure high 2385 psig RCS low flow 90% RCP undervoltage 5.022 kilovolts RCP underfrequency 57.0 Hz OTΔT 115% (variable) OPΔT 108.7% (variable) S/G low level 10.7% [15% EAM] SSPS general warning in both trains | Any automatic turbine trip setpoint reached OR automatic trip imminent: <ul style="list-style-type: none"> High Stator Cooling Water temp 90°C OR Stator D/P 12 psig below normal Both MFPT's tripped Low Auto Stop Oil pressure 45 psig High S/G level 81% narrow range Main Turb Bearing Oil low pressure 7 psig Thrust Bearing Oil high pressure 60 psig Turbine Overspeed 1980 rpm Loss of EHC pressure <u>Unit 1 Only:</u> GCB tripped OR 500kV breakers 5034 and 5038 tripped. <u>Unit 2 Only:</u> GCB tripped OR 161kV breakers 924 and 928 tripped. |

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

Appendix C
(Page 1 of 10)

SECONDARY PLANT EQUIPMENT

1.0 ACTIONS

1. **ENSURE** plant announcement(s) made on the following:

- starting rapid shutdown (or load reduction) due to (reason) ☐
- stopping secondary plant equipment ☐

NOTES

- 1) If reactor power will be reduced below 50%, AUO should be on station at #3 heater drain tank (if possible) when 60% power is reached.
- 2) Dispatching of AUO in Steps 1.02 and 1.03 may be performed out of sequence.

2. **IF** reactor power will be reduced below 50%,
THEN
DISPATCH AUO with Appendix K (Unit 1) or L (Unit 2) to #3 Heater Drain Tank. ☐
3. **IF** one MFP will be shutdown using this appendix,
THEN
DISPATCH AUO to OPEN MFWP recirc manual Isolation valve for MFWP to be removed from service:
(N/A valves **NOT** opened)

| UNIT | MFWP | VALVE | LOCATION | OPEN ✓ |
|------|------|-------------|--|--------------------------|
| 1 | 1A | 1-VLV-3-576 | TB el. 706, Northeast corner of 1A condenser | <input type="checkbox"/> |
| | 1B | 1-VLV-3-577 | TB el. 706, Northeast corner of 1A condenser | <input type="checkbox"/> |
| 2 | 2A | 2-VLV-3-576 | TB el. 706, Southeast corner of 2A condenser | <input type="checkbox"/> |
| | 2B | 2-VLV-3-577 | TB el. 706, Southeast corner of 2A condenser | <input type="checkbox"/> |

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

Appendix C
(Page 2 of 10)

1.0 ACTIONS (continued)

4. **IF BOTH** of the following conditions are met:

- power is being reduced as directed by AOP-S.01 (Main Feedwater Malfunctions) or AOP-S.04 (Condensate or Heater Drain Malfunctions)
- leaving secondary pumps in service is desired

THEN

GO TO Step 1.08.



5. **WHEN** turbine impulse pressure is approximately 80% or less,
THEN
PERFORM the following:

- a. **ENSURE** one Cond Demin Booster Pump STOPPED.
- b. **ENSURE** associated suction valve CLOSED:



| COND DEMIN BOOSTER PUMP | SUCTION VALVE | CLOSED ✓ |
|----------------------------|---------------|--------------------------|
| A | FCV-2-290 | <input type="checkbox"/> |

OR

| | | |
|---|-----------|--------------------------|
| B | FCV-2-285 | <input type="checkbox"/> |
|---|-----------|--------------------------|

OR

| | | |
|---|-----------|--------------------------|
| C | FCV-2-280 | <input type="checkbox"/> |
|---|-----------|--------------------------|

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

Appendix C
(Page 3 of 10)

1.0 ACTIONS (continued)

6. **WHEN** turbine impulse pressure is approximately 70-75%,
THEN
PERFORM the following:

- a. **ENSURE** one Condensate Booster Pump STOPPED. ☐
- b. **ENSURE** associated CBP suction valve CLOSED:

| CONDENSATE BOOSTER PUMP | SUCTION VALVE | CLOSED ✓ |
|----------------------------|---------------|--------------------------|
| A | FCV-2-94 | <input type="checkbox"/> |

OR

| | | |
|---|----------|--------------------------|
| B | FCV-2-87 | <input type="checkbox"/> |
|---|----------|--------------------------|

OR

| | | |
|---|----------|--------------------------|
| C | FCV-2-81 | <input type="checkbox"/> |
|---|----------|--------------------------|

- c. **PERFORM** applicable procedure to adjust seal injection water pressure on stopped CBP to prevent water intrusion in oil: (may be assigned to another operator or delayed if necessary)

- 1-SO-2/3-1 Section 7.2 ☐

OR

- 2-SO-2/3-1 Section 7.3 ☐

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

[7] **WHEN** turbine impulse pressure is approximately 65% or less,
THEN
PERFORM the following:

[a] **STOP** remaining two Cond Demin Booster Pumps simultaneously.

☐

[b] **ENSURE** suction valves CLOSED:

| COND DEMIN BOOSTER PUMP | SUCTION VALVE | CLOSED √ |
|----------------------------|---------------|--------------------------|
| A | FCV-2-290 | <input type="checkbox"/> |
| B | FCV-2-285 | <input type="checkbox"/> |
| C | FCV-2-280 | <input type="checkbox"/> |

[c] **STOP** one No. 3 Heater Drain pump.

☐

[d] **STOP** one No. 7 Heater Drain pump.

☐

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

Appendix C
(Page 4 of 10)

1.0 ACTIONS (continued)

7. **WHEN** turbine impulse pressure is approximately 65% or less,
THEN
PERFORM the following:

- a. **STOP** remaining two Cond Demin Booster Pumps simultaneously. ☐
- b. **ENSURE** suction valves CLOSED:

| COND DEMIN BOOSTER PUMP | SUCTION VALVE | CLOSED <input checked="" type="checkbox"/> |
|-------------------------|---------------|--|
| A | FCV-2-290 | <input type="checkbox"/> |
| B | FCV-2-285 | <input type="checkbox"/> |
| C | FCV-2-280 | <input type="checkbox"/> |

- c. **STOP** one No. 3 Heater Drain pump. ☐
- d. **STOP** one No. 7 Heater Drain pump. ☐
8. **IF** reactor power will be maintained greater than 50%,
THEN
GO TO Notes prior to Step 1.011. ☐



| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

Appendix C
(Page 5 of 10)

1.0 ACTIONS (continued)

CAUTION

Isolation of all three intermediate heater strings could occur if turbine is tripped prior to fully opening LCV-6-105A and B using Appendix K or L.

9. **WHEN** reactor power is less than 60%
AND AUO with Appendix K (Unit 1) or L (Unit 2)
 is on station at #3 Heater Drain Tank,
THEN
PERFORM the following:
- a. **STOP** #3 Heater Drain Tank Pumps. ☐
 - b. **NOTIFY** AUO to perform App. K (Unit 1)
 or App. L (Unit 2) to fully open #3 Heater Drain Tank
 Bypass Valves. ☐
 - c. **CLOSE** isolation valves from #3 Htr Drain Pumps
 to heater strings:

| VALVE | DESCRIPTION | CLOSED ✓ |
|-----------|-------------------------------------|--------------------------|
| FCV-6-108 | Htr Drain Tk Pump 3 to Htr String A | <input type="checkbox"/> |
| FCV-6-109 | Htr Drain Tk Pump 3 to Htr String B | <input type="checkbox"/> |
| FCV-6-110 | Htr Drain Tk Pump 3 to Htr String C | <input type="checkbox"/> |

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

Appendix C
(Page 6 of 10)

1.0 ACTIONS (continued)

NOTES

- 1) The following step ensures that MFW Bypass valves are available to control feedwater flow at low power.
- 2) If any MFW Reg valve is in MANUAL, the associated MFW Bypass valve controller should remain in MANUAL to prevent undesired opening of bypass valve.

10. **WHEN** Reactor power is less than 50%,
THEN
PERFORM the following:

- a. **IF** all MFW Reg Valves are in AUTO,
THEN
PLACE MFW Bypass Reg Valve controllers in AUTO. ☐
- b. **IF** any MFW Reg Valve is in MANUAL,
THEN
PERFORM the following:
 - (1) **MAINTAIN** MFW Bypass Reg Valve in MANUAL
for S/G with MFW Reg valve in MANUAL. ☐
 - (2) **PLACE** MFW Bypass Reg Valves in AUTO
for remaining S/Gs. ☐

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

Appendix C
(Page 7 of 10)

1.0 ACTIONS (continued)

NOTES

- 1) If performing this AOP to reduce power to allow shutting down one MFW pump, the affected MFWP may be removed from service at power level less than 55% (Unit 1) or 60% (Unit 2).
- 2) AFW start function on loss of both MFW pumps is inoperable when a MFW pump is RESET but **NOT** pumping forward. **[CTS]** LCO 3.3.2.1 (Unit 1) or **[CTS]** 3.3.2 (Unit 2) **[ITS]** Tech Spec 3.3.2 allows AFW start channel to be inoperable for up to 4 hours when shutting down a MFWP.

11. **WHEN** it is desired to remove one MFW pump from service
AND power level is less than applicable limit:

- turbine impulse pressure less than approximately 45%

OR

- reactor power less than value specified in Note 1,

THEN

PERFORM the following:

- a. **ENSURE** MFWP Recirc Manual Isolation valve OPEN
for MFWP to be removed from service: (N/A valves
NOT opened)

| UNIT | MFWP | VALVE | LOCATION | OPEN <input checked="" type="checkbox"/> |
|------|------|-------------|--|--|
| 1 | 1A | 1-VLV-3-576 | TB el. 706, Northeast corner of 1A condenser | <input type="checkbox"/> |
| | 1B | 1-VLV-3-577 | TB el. 706, Northeast corner of 1A condenser | <input type="checkbox"/> |
| 2 | 2A | 2-VLV-3-576 | TB el. 706, Southeast corner of 2A condenser | <input type="checkbox"/> |
| | 2B | 2-VLV-3-577 | TB el. 706, Southeast corner of 2A condenser | <input type="checkbox"/> |

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

Appendix C
(Page 8 of 10)

1.0 ACTIONS (continued)

11. (continued)

- b. **THROTTLE OPEN** recirc valve in MANUAL (30-50% OPEN) for MFWP to be removed from service. ☐
- c. **PLACE** speed controller in MANUAL for MFWP to be removed from service. ☐
- d. **REDUCE** speed gradually on MFWP to be removed from service. ☐
- e. **ENSURE** proper loading on remaining MFWP. ☐
- f. **IF** MFWP CANNOT be fully unloaded with speed controller,
THEN
PERFORM one of the following:
 - **NOTIFY** I&C to slowly adjust hand speed changer for affected MFWP UNTIL MFWP is fully unloaded.
OR ☐
 - **THROTTLE OPEN** recirc valve for affected MFWP to assist in unloading MFWP
OR ☐
 - **SLOWLY CLOSE** governor valve by bumping closed governor valve positioner (if operable)
OR ☐
 - **OBTAIN** SRO concurrence that MFWP flow is sufficiently low to allow tripping MFWP. ☐
- g. **WHEN** MFWP is unloaded sufficiently,
THEN
TRIP affected MFWP. ☐

(Step continued on next page)

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

Appendix C
(Page 9 of 10)

1.0 ACTIONS (continued)

11. (continued)

- h. **CLOSE** recirc valve for MFWP removed from service. ☐
- i. **CLOSE** recirc valve Manual Isolation inlet valve for MFWP removed from service. ☐
- j. **OPEN** drain valves for MFWP removed from service:
[M-3]
 - **[HS-46-14]**, MFWP A drain valves. ☐
 - OR**
 - **[HS-46-41]**, MFWP B drain valves. ☐

12. **WHEN** turbine impulse pressure is approximately 45% or less,
THEN
PERFORM the following:

- a. **STOP** remaining No. 7 Heater Drain pump. ☐
- b. **CLOSE** isolation valves from #7 Heater Drain Pumps to heater strings:

| VALVE | DESCRIPTION | CLOSED ✓ |
|-----------|-------------------------------------|--------------------------|
| FCV-6-143 | Htr Drain Tk Pump 7 to Htr String A | <input type="checkbox"/> |
| FCV-6-163 | Htr Drain Tk Pump 7 to Htr String B | <input type="checkbox"/> |
| FCV-6-184 | Htr Drain Tk Pump 7 to Htr String C | <input type="checkbox"/> |

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:5 |
| Event Description: EHC Low Pressure Alarm/Plant Power Reduction | | | |
| Time | Position | Applicant's Actions or Behavior | |

Appendix C
(Page 10 of 10)

1.0 ACTIONS (continued)

13. **WHEN** turbine impulse pressure is approximately 30% or less,
THEN
PERFORM the following:

- a. **ENSURE** main turbine EHC controls in IMP OUT. ☐
- b. **IF** #3 heater drain tank pumps are still running,
THEN
PERFORM Step 1.09 of this appendix. ☐
- c. **STOP** one of two running Condensate Booster Pumps. ☐
- d. **ENSURE** associated CBP suction valve CLOSED:

| CONDENSATE BOOSTER PUMP | SUCTION VALVE | CLOSED ✓ |
|----------------------------|---------------|--------------------------|
| A | FCV-2-94 | <input type="checkbox"/> |

OR

| | | |
|---|----------|--------------------------|
| B | FCV-2-87 | <input type="checkbox"/> |
|---|----------|--------------------------|

OR

| | | |
|---|----------|--------------------------|
| C | FCV-2-81 | <input type="checkbox"/> |
|---|----------|--------------------------|

- e. **STOP** one of three Hotwell Pumps. ☐
- f. **PERFORM** applicable procedure to adjust seal injection water pressure on stopped CBP to prevent water intrusion in oil: (may be assigned to another operator or delayed if necessary)
 - 1-SO-2/3-1 Section 7.2 ☐
 - OR**
 - 2-SO-2/3-1 Section 7.3 ☐

End of Section

Examiner Note: When the crew has sufficiently reduced power the Lead Examiner may go to the next event.

| | | |
|--------------------------------------|-----------------|---------------------------------|
| Op-Test No.: 2016-301 | Scenario No.: 3 | Event No.:6 |
| Event Description: MSIV's Close/ATWS | | |
| Time | Position | Applicant's Actions or Behavior |

Direct the Simulator Operator to initiate Event 6 MSIV's Close/ATWS

Indications/Alarms

Alarms:

- 1-M-4D
 - STEAM LINE LOW PRESS SI REACTOR TRIP (First Out)
- 1-M-5A
 - FS 3 35A STEAM GEN FEEDWATER FLOW HIGH
 - STEAMLINE STOP VALVES CLOSED
- 1-M-6A
 - Reactor Trip Bistables trip

Indications:

- 1-M-4
 - MSIV's Close


Examiner Note: Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.

Panel M4-D F-1


**STEAM LINE
LOW PRESS SI
REACTOR TRIP**

[1] IF reactor trips, THEN
GO TO E-0, *Reactor Trip or Safety Injection.*

| | | |
|---|------|--|
| | SRO | Transitions to E-0 REACTOR TRIP OR SAFETY INJECTION and directs Immediate Operator Actions (IOAs). |
| Examiner Note: following IOA performance, prior to Steps 1-4 immediate action verification, ATC/BOP surveys MCBs for any expected automatic system response that failed to occur. Upon discovery, they may take manual action(s) to align plant systems as expected for the event in progress. (Ref. EPM-4, Prudent Operator Actions) | | |
| | CREW | Performs the first four steps of E-0 unprompted. |
| | SRO | Directs performance of E-0 REACTOR TRIP OR SAFETY INJECTION. |

| | | | | | |
|--|----------|---|--|-------------|--|
| Op-Test No.: 2016-301 | | Scenario No.: 3 | | Event No.:6 | |
| Event Description: MSIV's Close/ATWS | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | |
| <p style="text-align: center;">NOTE 1 Steps 1 through 4 are immediate action steps.</p> <p style="text-align: center;">NOTE 2 This procedure has a foldout page.</p> | | | | | |
| | ATC | <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <p>1. VERIFY reactor TRIPPED:</p> <ul style="list-style-type: none"> Reactor trip breakers OPEN Reactor trip bypass breakers DISCONNECTED or OPEN Rod bottom lights LIT Rod position indicators less than or equal to 12 steps. Neutron flux DROPPING </div> <div style="width: 35%;"> <p>TRIP reactor.</p> <p>IF reactor CANNOT be tripped, THEN PERFORM the following:</p> <p>a. MONITOR status trees.</p> <p>b. GO TO FR-S.1, Nuclear Power Generation/ATWS.</p> <div style="text-align: center; margin-top: 10px;">  </div> </div> </div> | | | |
| | SRO | Transitions to FR-S.1, NUCLEAR POWER GENERATION/ATWS | | | |
| | SRO | Directs actions of FR-S.1, NUCLEAR POWER GENERATION/ATWS | | | |
| <p>CAUTION RCPs should NOT be tripped with reactor power greater than 5%.</p> | | | | | |
| <p>NOTE Steps 1 and 2 are immediate action steps.</p> | | | | | |
| | ATC | <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <p>1. VERIFY reactor TRIPPED:</p> <ul style="list-style-type: none"> Reactor trip breakers OPEN Reactor trip bypass breakers OPEN or DISCONNECTED Neutron flux DROPPING Rod bottom lights LIT Rod position indicators less than or equal to 12 steps. </div> <div style="width: 35%;"> <p>TRIP reactor.</p> <p>IF reactor trip breakers will NOT open, THEN MAINTAIN auto or manual rod insertion at max achievable rate UNTIL rods are at bottom.</p> </div> </div> | | | |
| CRITICAL TASK | ATC | Places HS-85-5111 Rod Control to IN. | | | |
| | BOP | <p>2. VERIFY turbine TRIPPED:</p> <ul style="list-style-type: none"> ALL turbine stop valves CLOSED. | | | |

| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:6 |
|--------------------------------------|----------|--|-------------|
| Event Description: MSIV's Close/ATWS | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP/ATC | <p>3. CHECK AFW System operation:</p> <ul style="list-style-type: none"> a. MD AFW pumps RUNNING b. TD AFW pump RUNNING. c. MD AFW LCVs in AUTO. d. TD AFW LCVs OPEN. | |
| | BOP | Places HS-3-128A to START. | |
| | BOP | <p>4. EMERGENCY BORATE RCS by performing the following:</p> <ul style="list-style-type: none"> a. ENSURE at least one CCP RUNNING. b. INITIATE Emergency Boration USING EA-68-4. c. VERIFY charging flow path established: <ul style="list-style-type: none"> • FCV-62-90 OPEN • FCV-62-91 OPEN • FCV-62-86 or FCV-62-85 OPEN. d. CHECK pressurizer pressure less than 2335 psig. <p>c. PERFORM the following:</p> <p>IF SI is NOT actuated, THEN ESTABLISH normal charging flow USING EA-62-5, Establishing Normal Charging and Letdown</p> <p>IF SI is actuated OR normal charging CANNOT be established, THEN ENSURE CCPIT flow established:</p> <ul style="list-style-type: none"> 1) ALIGN CCP suction to RWST. 2) OPEN CCPIT inlet and outlet valves. | |
| CRITICAL TASK | | Places 1-HS-62-135A and/or 1-HS-62-136A to RWST to CCP Suction to OPEN. Places 1-HS-63-39A and or 1-HS-63-40A CCPIT INLET ISOL to OPEN. | |


| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:6 |
|--------------------------------------|----------|--|-------------|
| Event Description: MSIV's Close/ATWS | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP | <p>From EA-68-4 EMERGENCY BORATION</p> <p>[1] IF emergency boration was directed by FR-S.1 (Nuclear Power Generation/ATWS) or FR-S.2 (Loss of Core Shutdown), THEN PERFORM the following:</p> <p>[1.1] IF BAT will be used as boration source, THEN GO TO Section 4.2, Emergency Boration from BAT. <input type="checkbox"/></p>  <p>[1] ENSURE boric acid transfer pump aligned to the blender is running in fast speed. <input type="checkbox"/></p> <p>[2] ADJUST emergency borate valve [FCV-62-138] to obtain at least 35 gpm boric acid flow on [FI-62-137A]. <input type="checkbox"/></p> <p>[3] MONITOR emergency boration flow:</p> <p>[3.1] CHECK emergency boration flow established on [FI-62-137A]. <input type="checkbox"/></p> | |
| | BOP | <p>Places HS-62-230A BA Transfer Pump 1A to STOP Places HS-62-230D BA Transfer Pump 1A Speed Sel to FAST Places HS-62-230A BA Transfer Pump 1A to START.</p> <p style="text-align: center;">OR</p> <p>Places HS-62-232A to BA Transfer Pump 1B to STOP Places HS-62-232D BA Transfer Pump 1B Speed Sel to FAST Places HS-62-232A to BA Transfer Pump 1B to START.</p> | |
| CRITICAL TASK | BOP | Places HS-62-138A Emergency Boration Flow Control valve to OPEN to obtain at least 35 gpm. | |


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| Op-Test No.: 2016-301 | Scenario No.: 3 | Event No.: 6 |
| Event Description: MSIV's Close/ATWS | | |
| Time | Position | Applicant's Actions or Behavior |


| | | |
|---|-----|--|
| | BOP | <p>From EA-68-4 EMERGENCY BORATION</p> <p>[1] IF emergency boration was directed by FR-S.1 (Nuclear Power Generation/ATWS) or FR-S.2 (Loss of Core Shutdown), THEN PERFORM the following:</p> <p style="margin-left: 40px;">[1.2] IF RWST will be used as boration source, THEN GO TO Section 4.3, Emergency Boration from RWST. <input type="checkbox"/></p> <div style="text-align: center; margin: 10px 0;"> </div> <p>[1] OPEN RWST supply to CCP suction [LCV-62-135] and [LCV-62-136]. <input type="checkbox"/></p> <p>[2] WHEN [LCV-62-135] or [LCV-62-136] is FULL OPEN, THEN CLOSE VCT outlet valves [LCV-62-132] and [LCV-62-133]. <input type="checkbox"/></p> <p>[3] IF CCPIT flow already established (SI actuated) THEN GO TO Step [7]. <input type="checkbox"/></p> <div style="text-align: center; margin: 10px 0;"> </div> <p>[4] ADJUST normal charging flow to at least 90 gpm USING [FCV-62-93] and [FCV-62-89]. <input type="checkbox"/></p> <p>[5] IF required boration flow CANNOT be obtained using normal charging path, THEN ALIGN CCPIT flow path:</p> <p style="margin-left: 40px;">[5.1] OPEN CCPIT outlet valve [FCV-63-26] or [FCV-63-25]. <input type="checkbox"/></p> <p style="margin-left: 40px;">[5.2] OPEN CCPIT inlet valve [FCV-63-39] or [FCV-63-40]. <input type="checkbox"/></p> <p style="margin-left: 40px;">[5.3] ENSURE charging isolation [FCV-62-90] or [FCV-62-91] CLOSED. <input type="checkbox"/></p> |
| CRITICAL TASK | | Places 1-HS-62-135A and/or 1-HS-62-136A to RWST to CCP Suction to OPEN. Places 1-HS-63-39A and or 1-HS-63-40A CCPIT INLET ISOL to OPEN. |
| | | Places 1-HS-62-132A and 1-HS-62-133A VCT outlet to CLOSE after LCV-62-135 and LCV-62-136 are full OPEN. |
| Examiner Note: When the crew has sufficiently taken the actions to meet the critical task for reactivity control for the ATWS the booth operator will open Rx Trip Bkrs in two minutes. | | |
| Examiner Note: When the crew has sufficiently taken the actions to meet the critical task for reactivity control for the ATWS the booth operator will insert Event 7, #2 S/G Fault Outside Containment in two minutes. | | |

| | | |
|--------------------------------------|-----------------|---------------------------------|
| Op-Test No.: 2016-301 | Scenario No.: 3 | Event No.:6 |
| Event Description: MSIV's Close/ATWS | | |
| Time | Position | Applicant's Actions or Behavior |

Examiner Note: Steps from FR-S.1 continue here.

| | | |
|--|-----|---|
| | ATC | <p>5. VERIFY Containment Purge isolated:</p> <p>a. VERIFY containment purge and vent dampers (System 30) CLOSED. [Panel 6K and 6L]</p> |
| | ATC | <p>6. MONITOR for SI signal:</p> <p>a. CHECK SI signal ACTUATED.</p> <p>a. IF SI signal is required, THEN ACTUATE SI signal.</p> <p>IF SI signal is NOT required, THEN GO TO Step 7.</p>  <p>b. PERFORM the following WHILE continuing with this procedure:</p> <p>1) E-0, Reactor Trip or Safety Injection, Steps 1 through 4.</p> <p>2) ES-0.5, Equipment Verifications.</p> |
| | BOP | <p>Performs E-0, REACTOR TRIP OR SAFETY INJECTION, Steps 1 through 4 and ES-0.5, EQUIPMENT VERIFICATIONS as required go to page 66 for details.</p> |
| | BOP | <p>7. CHECK reactor and turbine trip status:</p> <p>a. Reactor TRIPPED.</p> <p>a. DISPATCH personnel to perform the following:</p> <ul style="list-style-type: none"> OPEN reactor trip breakers and MG set output breakers locally [MG Set Room, Aux Bldg el. 759]. OPEN breakers to MG sets locally [480V Unit Boards A and B]. |

| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:6 |
|---|----------|---|-------------|
| Event Description: MSIV's Close/ATWS | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | | b. Turbine TRIPPED: • ALL turbine stop valves CLOSED. | |
| | ATC | 8. MONITOR reactor subcritical: a. Power range channels less than 5%. b. Intermediate range SUR NEGATIVE. c. GO TO Step 19.  | |
| | SRO | 19. ENSURE status tree monitoring initiated. | |
| Examiner Note: MONITOR status trees, the crew will implement status tree monitoring via SPDS. When a RED or ORANGE path status tree is observed, the SRO will designate one of the Board operators (typically the BOP) to verify status tree conditions using 1-FR-0, UNIT 1 STATUS TREES. Once verified, the SRO should direct the crew to transition to the appropriate RED and/or ORANGE path procedure(s). | | | |
| | BOP | 20. MAINTAIN S/G narrow range levels: a. Greater than 10% [25% ADV]. b. Between 10% [25% ADV] and 50%. | |
| | BOP | Manually controls AFW flow to maintain total AFW flow greater than 440 gpm until S/G are greater than 10% NR. | |

| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:6 |
|--|----------|---|-------------|
| Event Description: MSIV's Close/ATWS | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ATC | <p>21. MONITOR boration termination criteria:</p> <p>a. NOTIFY Chem Lab to sample RCS boron concentration.</p> <p>b. CHECK for all of the following:</p> <ul style="list-style-type: none"> • all control rods FULLY INSERTED • RCS temperature greater than 540°F • no RCS dilution has occurred. <p>c. WHEN emergency boration is no longer needed, THEN STOP emergency boration USING EA-68-4, Emergency Boration.</p> | |
| | SRO | <p>22. RETURN TO procedure and step in effect.</p> <p style="text-align: center;"></p> <p style="text-align: center;">END</p> | |
| | SRO | Transitions to E-0, REACTOR TRIP OR SAFETY INJECTION. | |
| | SRO | Directs performance of E-0, REACTOR TRIP OR SAFETY INJECTION. | |
| <p>NOTE 1 Steps 1 through 4 are immediate action steps.</p> <p>NOTE 2 This procedure has a foldout page.</p> | | | |

| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:6 |
|--------------------------------------|----------|--|-------------|
| Event Description: MSIV's Close/ATWS | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ATC | 1. VERIFY reactor TRIPPED: <ul style="list-style-type: none"> Reactor trip breakers OPEN Reactor trip bypass breakers DISCONNECTED or OPEN Rod bottom lights LIT Rod position indicators less than or equal to 12 steps. Neutron flux DROPPING | |
| | BOP | 2. VERIFY turbine TRIPPED: <ul style="list-style-type: none"> Turbine stop valves CLOSED. | |
| | BOP | 3. VERIFY at least one 6.9KV shutdown board ENERGIZED on this unit. | |
| | ATC | 4. DETERMINE if SI actuated: <ul style="list-style-type: none"> ECCS pumps RUNNING. Any SI alarm LIT [M-4D]. | |
| | BOP | 5. PERFORM ES-0.5, Equipment Verifications WHILE continuing in this procedure. | |
| | SRO/ATC | Continues with the performance of E-0 REACTOR TRIP OR SAFETY INJECTION | |
| | BOP | Performs ES-0.5, EQUIPMENT VERIFICATIONS go to page 66 for details | |
| | SRO | Addresses foldout page, see next page for details. | |
| CRITICAL TASK | BOP | Places HS-3-173A SG-2 Turbine AFP LCV to CLOSE Based on FOP actions. | |
| | | | |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:6

Event Description: MSIV's Close/ATWS

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

FOLDOUT PAGE**RCP TRIP CRITERIA****IF** any of the following conditions occurs:

- RCS pressure less than 1250 psig **AND** at least one CCP or SI pump running
- OR**
- Phase B isolation,


THEN**STOP** all RCPs.**EVENT DIAGNOSTICS**


- **IF** any S/G pressure is dropping uncontrolled, **THEN**
PERFORM the following:
 - a. **CLOSE** MSIVs and MSIV bypass valves.
 - b. **IF** any S/G pressure continues to drop uncontrolled, **THEN**
PERFORM the following:
 - 1) **ENSURE** SI actuated.
 - 2) **IF** at least one S/G is intact (S/G pressure controlled or rising),
THEN
ISOLATE AFW to faulted S/G(s):
 - **CLOSE** AFW level control valves for faulted S/G(s)
 - **IF** any AFW valve for faulted S/G CANNOT be CLOSED, **THEN**
PERFORM Appendix E, Isolating AFW to Faulted S/G.
 - 3) **ENSURE** at least one of the following conditions met:
 - total AFW flow greater than 440 gpm
 - OR**
 - Narrow Range level greater than 10% [25% ADV] in at least one intact S/G.
- **IF** both trains of shutdown boards de-energized, **THEN**
GO TO ECA-0.0, Loss of All AC Power.

TANK SWITCHOVER SETPOINTS

- **IF** CST level less than 5%, **THEN**
ALIGN AFW suction to ERCW.
- **IF** RWST level less than 27%, **THEN**
GO TO ES-1.3, Transfer to RHR Containment Sump.

| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:6 |
|--------------------------------------|----------|--|-------------|
| Event Description: MSIV's Close/ATWS | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ATC | <p>6. DETERMINE if secondary heat sink available:</p> <p>a. CHECK total AFW flow greater than 440 gpm.</p> <p>b. CHECK narrow range level greater than 10% [25% ADV] in at least one S/G.</p> <p>b. MAINTAIN total feed flow greater than 440 gpm UNTIL narrow range level greater than 10% [25% ADV] in at least one S/G.</p> <p>c. CONTROL feed flow:</p> <p>1) MAINTAIN narrow range lvl between 10% [25% ADV] and 50% in intact and ruptured S/Gs.</p> <p>2) IF AFW flow is isolated to any faulted or ruptured S/G, THEN MONITOR AFW flow and LCV positions to verify flow remains ISOLATED.</p> | |
| | ATC/BOP | Manually controls AFW flow to maintain total AFW flow greater than 440 gpm until S/G are greater than 10% NR. | |
| | ATC | <p>7. CHECK if main steam lines should be isolated:</p> <p>a. CHECK if any of the following conditions have occurred:</p> <ul style="list-style-type: none"> Any S/G pressure less than 600 psig <p>OR</p> <ul style="list-style-type: none"> Any S/G pressure dropping UNCONTROLLED <p>OR</p> <ul style="list-style-type: none"> Phase B actuation. <p>b. ENSURE MSIVs and MSIV bypass valves CLOSED.</p> <p>c. ENSURE applicable Foldout Page actions COMPLETED.</p> | |

| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:6 |
|--------------------------------------|----------|---|-------------|
| Event Description: MSIV's Close/ATWS | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ATC | <p>8. CHECK RCP trip criteria:</p> <p>a. CHECK the following:</p> <ul style="list-style-type: none"> RCS pressure less than 1250 psig <p>AND</p> <ul style="list-style-type: none"> At least one CCP OR SI pump RUNNING. <p>b. STOP RCPs.</p> <p>a. GO TO Step 9. </p> | |
| | ATC/BOP | <p>9. MONITOR RCS temperatures:</p> <ul style="list-style-type: none"> IF any RCP running, THEN CHECK T-avg stable at or trending to between 547°F and 552°F. <p>OR</p> <ul style="list-style-type: none"> IF RCPs stopped, THEN CHECK T-cold stable at or trending to between 547°F and 552°F. <p>IF temperature less than 547°F and dropping, THEN PERFORM the following:</p> <p>a. ENSURE steam dumps and atmospheric reliefs CLOSED.</p> <p>b. IF cooldown continues, THEN CONTROL total feed flow:</p> <ol style="list-style-type: none"> ENSURE total AFW flow less than or equal to 600 gpm. MAINTAIN total AFW flow greater than 440 gpm UNTIL narrow range level is greater than 10% [25% ADV] in at least one S/G. <p>c. IF cooldown continues after AFW flow is controlled, THEN CLOSE MSIVs and MSIV bypass valves.</p> | |
| | ATC/BOP | Manually controls AFW flow to maintain total AFW flow greater than 440 gpm and less than 600 gpm until S/G are greater than 10% NR. | |
| | ATC | <p>10. CHECK pressurizer PORVs, safeties, and spray valves:</p> <p>a. Pressurizer PORVs CLOSED.</p> <p>b. Pressurizer safety valves CLOSED.</p> <p>c. Normal spray valves CLOSED.</p> | |

| Op-Test No.: 2016-301 | | Scenario No.: 3 | Event No.:6 |
|---|----------|---|-------------|
| Event Description: MSIV's Close/ATWS | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | | d. Power to at least one block valve AVAILABLE. e. At least one block valve OPEN. | |
| | ATC | 11. DETERMINE if S/G secondary pressure boundaries are INTACT: • CHECK all S/G pressures CONTROLLED or RISING. • CHECK all S/G pressures greater than 140 psig. <div style="display: inline-block; vertical-align: top; width: 40%;"> PERFORM the following: a. MONITOR status trees. b. GO TO E-2, Faulted Steam Generator Isolation. </div>  | |
| Examiner Note: MONITOR status trees, the crew will implement status tree monitoring via SPDS. When a RED or ORANGE path status tree is observed, the SRO will designate one of the Board operators (typically the BOP) to verify status tree conditions using 1-FR-0, UNIT 1 STATUS TREES. Once verified, the SRO should direct the crew to transition to the appropriate RED and/or ORANGE path procedure(s). | | | |
| | SRO | Transitions to E-2, FAULTED STEAM GENERATOR ISOLATION. | |
| | SRO | Direct actions from E-2, FAULTED STEAM GENERATOR ISOLATION. | |
| | | | |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:7, 8

Event Description: B MDAFW Fails to AUTO START, Steam Line Break Steam Generator #2.

| Time | Position | Applicant's Actions or Behavior |
|---|----------|---|
| <p>CAUTION Unisolating a faulted S/G or secondary break should NOT be considered UNLESS needed for RCS cooldown.</p> <p>NOTE This procedure has a foldout page.</p> | | |
| | SRO | Addresses Foldout page. |
| <p style="text-align: center;">Foldout Page (Page 1 of 1)</p> <p style="text-align: center;"><u>TANK SWITCHOVER SETPOINTS</u></p> <ul style="list-style-type: none"> • IF RWST level less than 27%, THEN GO TO ES-1.3, Transfer to RHR Containment Sump. • IF CST level less than 5%, THEN ALIGN AFW suction to ERCW USING EA-3-9, Establishing Turbine Driven AFW Flow, and EA-3-10, Establishing Motor Driven AFW Flow. | | |
| | BOP | <p>1. CHECK MSIVs and MSIV bypass valves CLOSED. CLOSE valves.</p> <p>IF any MSIV OR MSIV bypass valve CANNOT be closed, THEN CLOSE valve USING EA-1-1, Closing MSIVs Locally.</p> |
| | BOP | <p>2. CHECK ANY S/G secondary pressure boundary INTACT:</p> <ul style="list-style-type: none"> • Any S/G pressure CONTROLLED or RISING. |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:7, 8

Event Description: B MDAFW Fails to AUTO START, Steam Line Break Steam Generator #2.


| Time | Position | Applicant's Actions or Behavior |
|---|----------|---|
| | SRO | <p>3. IDENTIFY Faulted S/G(s):</p> <p>a. CHECK S/G pressures:</p> <ul style="list-style-type: none"> Any S/G pressure DROPPING in an uncontrolled manner. <p>OR</p> <ul style="list-style-type: none"> Any S/G pressure less than 140 psig. |
| | SRO | Identifies #2 S/G as faulted. |
| <p>CAUTION</p> <ol style="list-style-type: none"> 1) Secondary heat sink requires at least one S/G available. 2) If the TD AFW pump is the only source of feed flow, isolating both steam supplies will result in loss of secondary heat sink. | | |
| | BOP | <p>4. ISOLATE Faulted S/G(s):</p> <p>a. ENSURE MFW isolated to faulted S/G(s) by any of the following:</p> <ul style="list-style-type: none"> feedwater isolation valve CLOSED [M-4] <p>OR</p> <ul style="list-style-type: none"> feedwater regulating valve and bypass valve CLOSED [M-3]. |
| | BOP | <p>b. ENSURE AFW isolated to faulted S/G(s):</p> <ol style="list-style-type: none"> 1) ENSURE AFW LCVs for faulted S/G are CLOSED. 2) PLACE TD AFW LCV for faulted S/G in CLOSE PULL TO LOCK. 3) MONITOR AFW flow and LCV positions to verify AFW remains isolated to faulted S/G. |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:7, 8

Event Description: B MDAFW Fails to AUTO START, Steam Line Break Steam Generator #2.


| Time | Position | Applicant's Actions or Behavior |
|----------------------|----------|--|
| CRITICAL TASK | BOP | Places HS-3-173A SG-2 Turbine AFP LCV to CLOSE Places HS-3-156A SG-2 Motor AFP LCV to CLOSE Based on FOP actions. |
| | BOP | c. CHECK S/G #1 or #4 faulted. c. GO TO Substep 4.e.  |
| | BOP | 4. e. VERIFY S/G blowdown valves CLOSED. f. VERIFY atmospheric relief CLOSED. |
| | BOP | 5. VERIFY secondary radiation NORMAL: a. CHECK secondary radiation NORMAL USING Appendix A, Secondary Rad Monitors. (App. A also contained in ES-0.5) b. PERFORM Appendix F, Verifying Secondary Radiation Using Surveys and Sampling. |

Op-Test No.: 2016-301

Scenario No.: 3

Event No.:7, 8

Event Description: B MDAFW Fails to AUTO START, Steam Line Break Steam Generator #2.

| Time | Position | Applicant's Actions or Behavior |
|---|----------|--|
| | BOP | <p>6. CHECK SI termination criteria:</p> <ul style="list-style-type: none"> a. RCS subcooling based on core exit T/Cs greater than 40°F. b. Secondary heat sink: <ul style="list-style-type: none"> • Narrow range level in at least one Intact S/G greater than 10% [25% ADV] OR • Total feed flow to Intact S/Gs greater than 440 gpm. c. RCS pressure STABLE or RISING. d. Pressurizer level greater than 10% [20% ADV]. e. GO TO ES-1.1, SI Termination.  |
| Lead Examiner may terminate the scenario at E-2 SI Termination criteria determination or earlier at Lead Examiner discretion. | | |


| | | |
|---|----------|---|
| Op-Test No.: 2016-301 | | Scenario No.: 3 |
| Event Description: ES-0.5 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| ES-0.5 Actions | | |
| | BOP | 1. VERIFY D/Gs RUNNING. |
| | BOP | 2. VERIFY D/G ERCW supply valves OPEN. |
| | BOP | 3. VERIFY at least four ERCW pumps RUNNING. |
| | BOP | 4. VERIFY CCS pumps RUNNING: <ul style="list-style-type: none"> • Pump 1A-A (2A-A) • Pump 1B-B (2B-B) • Pump C-S. |
| | BOP | 5. VERIFY EGTS fans RUNNING. |
| | BOP | 6. VERIFY generator breakers OPEN. |
| | BOP | 7. NOTIFY at least two AUOs to report to MCR to be available for local actions. |
| | BOP | 8. VERIFY AFW pumps RUNNING: <ul style="list-style-type: none"> a. MD AFW pumps b. TD AFW pump. |
| NOTE AFW level control valves should NOT be repositioned if manual action has been taken to control S/G levels, to establish flow due to failure, or to isolate a faulted S/G. | | |

| Op-Test No.: 2016-301 | | Scenario No.: 3 |
|-----------------------------------|----------|---|
| Event Description: ES-0.5 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <p>9. CHECK AFW valve alignment:</p> <p>a. VERIFY MD AFW LCVs in AUTO.</p> <p>b. VERIFY TD AFW LCVs OPEN.</p> <p>c. VERIFY MD AFW pump recirculation valves FCV-3-400 and FCV-3-401 CLOSED.</p> |
| | BOP | <p>10. VERIFY MFW Isolation:</p> <p>a. CHECK MFW pumps TRIPPED.</p> <p>b. ENSURE the following:</p> <ul style="list-style-type: none"> • MFW regulating valves CLOSED • MFW regulating bypass valve controllers in MANUAL with output ZERO • MFW isolation valves CLOSED. |
| | BOP | <p>11. MONITOR ECCS operation:</p> <p>a. VERIFY ECCS pumps RUNNING:</p> <ul style="list-style-type: none"> • CCPs • RHR pumps • SI pumps <p>b. VERIFY CCP flow through CCPIT.</p> |

| Op-Test No.: 2016-301 | | Scenario No.: 3 |
|-----------------------------------|----------|---|
| Event Description: ES-0.5 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| | | <p>c. CHECK RCS pressure less than 1650 psig.</p> <p>d. VERIFY SI pump flow.</p> <p>e. CHECK RCS pressure less than 300 psig.</p> <p>f. VERIFY RHR pump flow.</p> |

| Op-Test No.: 2016-301 | | Scenario No.: 3 |
|-----------------------------------|----------|---|
| Event Description: ES-0.5 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <p>12. VERIFY ESF systems ALIGNED:</p> <p>a. Phase A ACTUATED:</p> <ul style="list-style-type: none"> • PHASE A TRAIN A alarm LIT [M-6C, B5]. • PHASE A TRAIN B alarm LIT [M-6C, B6]. <p>b. Contmt Vent Isolation ACTUATED:</p> <ul style="list-style-type: none"> • CNTMT VENT ISOLATION TRAIN A alarm LIT [M-6C, C5]. • CNTMT VENT ISOLATION TRAIN B alarm LIT [M-6C, C6]. <p>c. Status monitor panels:</p> <ul style="list-style-type: none"> • 6C DARK • 6D DARK • 6E LIT OUTSIDE outlined area • 6H DARK • 6J LIT. <p>d. Train A status panel 6K:</p> <ul style="list-style-type: none"> • CNTMT VENT GREEN • PHASE A GREEN <p>e. Train B status panel 6L:</p> <ul style="list-style-type: none"> • CNTMT VENT GREEN • PHASE A GREEN |

| Op-Test No.: 2016-301 | | Scenario No.: 3 |
|-----------------------------------|----------|--|
| Event Description: ES-0.5 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <p>13. MONITOR for containment spray and Phase B actuation:</p> <p>a. CHECK for any of the following:</p> <ul style="list-style-type: none"> • Phase B ACTUATED <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Containment pressure greater than 2.8 psig. <p>b. VERIFY containment spray INITIATED:</p> <ol style="list-style-type: none"> 1) Containment spray pumps RUNNING. 2) Containment spray header isolation valves FCV-72-39 and FCV-72-2 OPEN. 3) Containment spray recirculation valves to RWST FCV-72-34 and FCV-72-13 CLOSED. 4) Containment spray header flow greater than 4750 gpm per train. 5) Panel 6E LIT. <p>c. VERIFY Phase B ACTUATED:</p> <ul style="list-style-type: none"> • PHASE B TRAIN A alarm LIT [M-6C, A5]. • PHASE B TRAIN B alarm LIT [M-6C, A6]. <p>d. ENSURE RCPs STOPPED.</p> <p>e. VERIFY Phase B valves CLOSED:</p> <ul style="list-style-type: none"> • Panel 6K PHASE B GREEN. • Panel 6L PHASE B GREEN. |

| Op-Test No.: 2016-301 | | Scenario No.: 3 |
|---|----------|--|
| Event Description: ES-0.5 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| | | f. WHEN 10 minutes have elapsed, THEN ENSURE containment air return fans RUNNING. |
| NOTE The continuous action in Step 14 remains applicable if containment pressure rises above 1.5 psig after ES-0.5 is completed. | | |
| | BOP | 14. MONITOR if containment vacuum relief isolation valves should be closed: a. CHECK containment pressure greater than 1.5 psig. a. GO TO Step 15.  |
| | BOP | 15. CHECK secondary and containment rad monitors USING the following: <ul style="list-style-type: none"> • Appendix A, Secondary Rad Monitors • Appendix B, Containment Rad Monitors. |
| | | <p style="text-align: center;">APPENDIX A</p> <p style="text-align: center;">SECONDARY RAD MONITORS</p> 1. IF SI occurred on <u>Unit 1</u> , THEN CHECK following rad monitors including available trends prior to isolation: <ul style="list-style-type: none"> • Condenser exhaust recorder 1-RR-90-119 • S/G blowdown recorder 1-RR-90-120 • Unit 1 Main steam line rad monitors [1-M-30] • Post-Accident rad recorder 1-RR-90-268B points 3 (blue), 4 (violet), 5 (black), and 6 (turquoise). [1-M-31 (back of 1-M-30)] |

| Op-Test No.: 2016-301 | | Scenario No.: 3 |
|-----------------------------------|----------|--|
| Event Description: ES-0.5 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| | | 3. NOTIFY Unit Supervisor whether secondary radiation is NORMAL or HIGH. |
| | BOP | <p style="text-align: center;">APPENDIX B</p> <p style="text-align: center;">CONTAINMENT RAD MONITORS</p> <p>1. IF SI occurred on <u>Unit 1</u>, THEN CHECK following rad monitors:</p> <ul style="list-style-type: none"> • Upper containment post-accident rad monitors 1-RM-90-271A and 1-RM-90-272A NORMAL [1-M-30] • Lower containment post-accident rad monitors 1-RM-90-273A and 1-RM-90-274A NORMAL [1-M-30] • Containment rad recorders 1-RR-90-112 and 1-RR-90-106 NORMAL [0-M-12] (prior to isolation). |
| | BOP | 16. WHEN directed by E-0, THEN PERFORM Appendix D, Hydrogen Mitigation Actions. |
| | BOP | 17. CHECK pocket sump pumps STOPPED: [M-15, upper left corner] |
| | BOP | <ul style="list-style-type: none"> • HS-77-410, Rx Bldg Aux Floor and Equipment Drain Sump pump A • HS-77-411, Rx Bldg Aux Floor and Equipment Drain Sump pump B. |
| | BOP | 18. DISPATCH personnel to perform EA-0-1, Equipment Checks Following ESF Actuation. |
| | BOP | 19. ENSURE plant announcement has been made regarding Reactor Trip and SI. |

| | | |
|-----------------------------------|----------|---|
| Op-Test No.: 2016-301 | | Scenario No.: 3 |
| Event Description: ES-0.5 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | 20. PERFORM Appendix E, Spent Fuel Cooling Actions, as time permits. |
| END OF TEXT | | |

| | | | |
|--|------------------------------|---------------------|--|
| Facility: | <u>Sequoyah</u> | Scenario No.: 4 | Op Test No.: <u>2016-301</u> |
| Examiners: | _____ | Candidates: | _____ |
| | _____ | | _____ |
| | | | SRO |
| | | | ATC |
| | | | BOP |
| Initial Conditions: 76% BOL, EOOS risk green, LI-3-93 is in MAINT BYPASS, RTS 2 hours.. | | | |
| Turnover: Raise power to 100%. | | | |
| Critical Tasks Manually isolate the faulted S/G prior to the completion of E-2 during a Feed Line or Steam Line break by manually closing valve LCV-3-175. Manually establish at least 440 gpm feed water flow rate to the SGs while in FR-H.1 before any three SG wide range levels are less than 23% [43% ADV]. Manually close Pressurizer Main Spray valves prior to exceeding an AUTO Reactor Trip setpoint. | | | |
| Event No. | | Event Type | Event Description |
| 1 | R-ATC N-BOP/SRO | R-ATC N-BOP/SRO | Raise Reactor power to 100% |
| 2 | RX07A | I-ATC/SRO TS-SRO | Pressurizer Pressure instrument PT 68-340 will fail high resulting in pressurizer spray valves opening. The ATC will manually close the spray valves and stop the RCS depressurization using immediate operator actions and AOP-I.04. The SRO will address Tech Spec and determine the instrument is INOPERABLE. |
| 3 | NI12D | I-ATC/SRO TS-SRO | Power range Instrument N-41 drifts high, the ATC takes immediate action to place rod control in manual. The SRO declares power range instrument N-41 INOPERABLE. |
| 4 | CW03A ZDIHS2704A CWR04 | C-BOP/SRO | CCW Traveling Screen 1A develops clogging along with a failure of the Screen Wash pumps to AUTO-START. The BOP will manually start the Screen Wash pumps using the ARP. |
| 5 | MS09 | C-BOP/SRO | Gland Seal pressure degrades due to a failure of the HP Gland Seal supply system. The BOP will open FCV-47-181 Gland Seal Steam Regulator Bypass using the ARP or AOP-S.02, LOSS OF CONDENSER VACUUM. |
| 6 | CN09 TC11ALL TC12ALL | C-ATC | The Main Condenser Vacuum degrades rapidly and the Main Turbine fails to AUTO trip. The crew enters E-0 REACTOR TRIP OR SAFETY INJECTION where the ATC will trip the reactor and the BOP manually trips the Main Turbine during Immediate Operator Actions. |
| 7 | FW22D | M | A feed line break develops inside the containment. The crew closes MSIV's and isolates AFW to #4 S/G using Prudent Operator Actions. |
| 8 | ZDIHS4655A | C-BOP | The motor driven Auxiliary Feed water pumps fail and the turbine driven Auxiliary Feed water pump trips due to electrical overspeed. The latch-up lever fails to automatically reset. The SRO transitions to FR-H.1 and the BOP establishes Auxiliary Feed water by resetting the TD AFW steam valve. |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | |

2016-301 Scenario 4 Summary

Event 1 – The crew raises plant power using GO-5 section 5.1 from 95% to 100% power

Event 2 – When directed by the lead examiner, Pressurizer Pressure instrument PT 68-340 will fail high resulting in pressurizer spray valves opening. The ATC will take immediate operator action (IOA) to manually close the spray valves and stop the RCS depressurization. The crew will respond using AOP-I.04, Pressurizer Instrument Malfunction, Section 2.3 to implement mitigating actions, select another controlling channel, and return spray control to automatic. The SRO will enter LCO 3.3.1 Condition A, E and K, and LCO 3.3.2 Condition A, D and Q.

Event 3 – When directed by the Lead Examiner a power Range instrument Channel I (N-41) fails high. The ATC places rod control in manual due to inadvertent insertion using immediate operator actions and AOP-C.01, ROD CONTROL SYSTEM MALFUNCTIONS. The crew will transition to AOP-I.01 NUCLEAR INSTRUMENT MALFUNCTION. The ATC will defeat the failed channel and place rod control to automatic. The SRO will enter LCO 3.3.1 Condition A, D, E, O and P.

Event 4 – When directed by the lead examiner, CCW Traveling Screen 1A develops clogging with a failure of the 1A Screen Wash pump to AUTO-Start. The BOP will manually start the 1A Screen Wash pump using the ARP.

Event 5 – When directed by the lead examiner, Gland Seal pressure degrades due to a failure of the HP Gland Seal supply system. The BOP will open FCV-47-181 Gland Seal Steam Regulator Bypass using the AR or AOP-S.02, LOSS OF CONDENSER VACUUM.

Event 6 – When directed by the lead examiner, the Main Condenser Vacuum degrades rapidly and the Main Turbine fails to AUTO trip. The crew enters E-0 REACTOR TRIP OR SAFETY INJECTION where the ATC will trip the reactor and the BOP manually trips the Main Turbine during Immediate Operator Actions. (Credit sought for a post trip component malfunction for the BOP. The verifiable action is an action that only the BOP will perform.)

Event 7 – A feed line break develops inside the containment. The crew closes MSIV's and isolates AFW to #4 S/G using E-2.

Event 8 – The motor driven Auxiliary Feed water pumps fail and the turbine driven Auxiliary Feed water pump trips due to electrical overspeed along with the latch-up lever failing to automatically reset. The SRO transitions to FR-H.1 LOSS OF SECONDARY HEAT SINK where the BOP establishes Auxiliary Feed water by resetting the TD AFW steam valve. (Credit sought for a post trip component malfunction for the BOP. The verifiable action is an action that only the BOP will perform.)

Op-Test No.: 2016-301

Scenario No.: 4

Event No.:1

Event Description: Power Ascension

Time

Position

Applicant's Actions or Behavior

No action required for event 1Examiner Note: The following Steps are from **0-GO-5 NORMAL POWER OPERATION**.**NOTE**

Control rods may be used along with dilution during reactor power rise to maintain AFD within the target control band.

[9] **IF** diluting the RCS to raise T_{AVG} , **THEN**

CONTINUE dilution and raise turbine load to maintain T_{REF} with T_{AVG} . (0-SO-62-7). ☐

5.1 Power Ascension From 30% to 100% (continued)**CAUTIONS**

- 1) LCV-6-105A and/or 105B may be throttling open due to condensate system pressure being higher than #3 HDT pump discharge pressure.
- 2) Turbine runback will occur if #3 HDT pump flow to the condensate system drops below 5500 gpm (for greater than 10 seconds), condensate bypass valve LCV-6-105A or 105B opens, and turbine load is above 81% (Unit 1) or 82% (Unit 2).

[50] **PRIOR** to raising turbine load above 77%:

ENSURE the following:

[50.1] LCV-6-106A and -106B are controlling properly. _____

[50.2] LCV-6-105A and -105B are **CLOSED**. _____

NOTE

Ramp load rate rises shall be within the limits of TI-40.

[51] **RECORD** power ascension ramp rate from TI-40. _____ ☐

NOTES

- 1) Operation above 75% Load with only two Hotwell Pumps in service requires further evaluation.
- 2) Steps 5.1[52] through 5.1[55] may be performed out of sequence.

[52] **CONTINUE** the power ascension to 90% reactor power. ☐

Op-Test No.: 2016-301

Scenario No.: 4

Event No.:1

Event Description: Power Ascension

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

Examiner Note: The following Steps are from **0-SO-62-7 BORON CONCENTRATION CONTROL, Section 6.2, Dilute.**

CAUTION 1 When making an RCS dilution of ≥ 3000 gallons, it should be done in batches with an RCS boron concentration verification at the halfway point (e.g., 1500 gallons). Allow at least 15 minutes between batches. [C.5] [C.7]

CAUTION 2 Returning the Boric Acid Blender to service after unplugging, cleaning, or maintenance on the Boric Acid System could introduce debris, sludge, air or chunks of solidified boron into the CCP suction resulting in pump damage. Extreme care must be exercised to properly flush the Boric Acid Blender system following an outage. [C.2]

NOTE 1 If an excessive amount of dilution is required (plant startup), the pressurizer heaters should be energized to cause pressurizer spray operation for equalizing boron concentration in RCS and pressurizer.

NOTE 2 Dilute mode will be used anytime a long-term positive reactivity addition is desired. The operator should use the normal dilute mode whenever conditions permit.

Examiner Note: Dilutions will be performed based on the Reactor Engineering provided Reactivity Spreadsheet

SRO

[1] **ENSURE** unit is NOT in a Tech Spec or TRM action that prohibits positive reactivity additions. [C.1]

NOTE HUT level rise of 1% is equal to 1380 gallons (TI-28 Figure 34).

ATC

[2] **ENSURE** sufficient capacity available in the HUT selected to receive expected amounts of CVCS letdown: (N/A if not used)

| HUT | LEVEL | INITIALS |
|-----|---------|----------|
| A | _____ % | _____ |
| B | _____ % | _____ |

ATC

[3] **ENSURE** makeup system is aligned for **AUTO** operation in accordance with Section 5.1.

| | | | |
|------------------------------------|----------|--|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:1 |
| Event Description: Power Ascension | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ATC | <p>[4] RECORD the quantity of dilution water required to achieve desired boron concentration using Appendix D. (N/A for minor power changes)</p> <p>_____ gals</p> | |
| NOTE | | Due to eyeball interpolation the verified calculation may slightly differ from the initial calculation. The following signoff indicates that any differences in the two results have been discussed and are close enough to be considered validated. | |
| | SRO | <p>[5] PERFORM Appendix I <i>Independent Verification of Calculation for Amount of Boric Acid or Primary Water</i>. (N/A if App. D was performed by SRO to verify data from Rx Engineering)</p> | |
| | ATC | <p>[6] PLACE [HS-62-140A], Boric Acid Supply to Blender Flow Control Switch to the STOP position.</p> | |
| | ATC | <p>[7] PLACE [HS-62-140B], CVCS Makeup Selector Switch to the DILUTE position.</p> | |
| | ATC | <p>[8] ENSURE [HS-62-140D], Boric Acid Valve to the Blender is CLOSED (Green light is LIT).</p> | |
| | ATC | <p>[9] SET [FQ-62-142], Batch Integrator for the desired quantity.</p> | |
| NOTE | | Primary Water Flow Controller [FC-62-142] receives its reference signal (70 gpm) from setpoint potentiometer (dial indicator) located on panel M-6. A setpoint of 35% corresponds to a 70 gpm primary water flow rate. | |
| | ATC | <p>[10] ADJUST [FC-62-142], Primary Makeup Water Flow Controller for the desired flow rate.</p> | |

| | | | |
|------------------------------------|----------|---|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:1 |
| Event Description: Power Ascension | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ATC | [11] PLACE [HS-62-140A], Boric Acid Supply to Blender Flow Control Switch to the START position. | |
| NOTE | | Flow oscillations and/or erratic controller response may require manual operation of Primary Water Flow Controller [FC-62-142] until stable conditions exist. | |
| | ATC | [12] VERIFY the following: [a] Inlet to top of VCT [FCV-62-128] is OPEN . [b] Primary Water flow by [FI-62-142A] OR [FQ-62-142] . | |
| NOTE | | Alternate dilution in small amounts is acceptable on a regular basis, provided no significant changes in seal water temperature or seal leakoff are indicated. Batches of 5 to 10 gallons may be added through FCV-62-144 on a frequency not to exceed once per 30 minutes. ICS points for No. 1 seal leakoffs and seal water temperatures on the RCPs should be monitored during and after dilution. | |
| | ATC | [13] IF primary water addition to the bottom of the VCT [FCV-62-144] is desired, THEN | |
| | ATC | Addresses step 13 as N/A | |
| NOTE | | It may take approximately 15 minutes before any changes to reactivity are indicated on nuclear instrumentation or RCS temperature indication. | |
| | ATC | [14] MONITOR nuclear instrumentation and reactor coolant temperature to ensure the proper response from dilution. | |
| | ATC | [15] IF [LI-62-129], Volume Control Tank Level, rises to 63 percent, THEN ENSURE [LCV-62-118], Volume Control Tank Divert Valve OPENS to divert excess water to the Holdup Tanks. | |
| | | | |

Op-Test No.: 2016-301

Scenario No.: 4

Event No.:1

Event Description: Power Ascension

| Time | Position | Applicant's Actions or Behavior |
|--|----------|---|
| | | |
| Time | Position | Applicant's Actions or Behavior |
| | ATC | <p>[16] WHEN dilution is complete, THEN</p> <p>[a] PLACE [HS-62-140A], Boric Acid to Blender Flow Control Switch to the STOP position.</p> <p>[b] IF [FCV-62-144] was previously OPENED, THEN CLOSE [FCV-62-144] with [HS-62-144].</p> <p>[c] VERIFY no primary water flow on either [FI-62-142A] OR [FQ-62-142].</p> <p>[d] ENSURE [FCV-62-128] is CLOSED.</p> |
| Lead Examiner may cue the next event when power has been sufficiently raised | | |

Op-Test No.: 2016-301

Scenario No.: 4

Event No.:2

Event Description: Pressurizer Pressure Transmitter PT 68-340 Fail High

Time

Position

Applicant's Actions or Behavior

Direct facility operator to insert Event 2, Pressurizer Pressure Transmitter PT 68-340 Fail High**Indications/Alarms****Annunciator:****1-M-5**

- 5A B-3, "PS-68-340F/G PRESSURIZER PRESS ABOVE REF SET POINT"

1-M-6

- 6A C-5, "PS-68-340A PRESSURIZER HIGH PRESSURE"

Indications**1-M-5**

- 1-PI-68-334, 323, 322 RCS PZR PRESS indicators decreasing

Significant Resultant Alarms/Indications:**1-M-4**

- 1-XI-68-340B & 340D RED indicating lights illuminated indicating Pzr Spray Valves open

Panel M5-A, B-3

PS-68-340F/G
PRESSURIZER
PRESS ABOVE
REF SET POINT

Op-Test No.: 2016-301

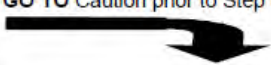
Scenario No.: 4

Event No.:2

Event Description: Pressurizer Pressure Transmitter PT 68-340 Fail High

| Time | Position | Applicant's Actions or Behavior | | | | | | |
|--|---------------|--|-------|---------------|------|---|-----|----|
| <div style="border: 1px solid black; padding: 10px; margin: 10px;"> <p style="text-align: center;">NOTE</p> <p>Changes in pressurizer heater/spray operation may cause small reactivity changes due to:</p> <ul style="list-style-type: none"> • Differences in boron concentration between Pzr & Loops or • Changes in pressure due to pressure coefficient of reactivity. </div> <p>Corrective Actions:</p> <p>[1] CHECK pressurizer pressure.</p> <p>[2] IF channel failed, THEN</p> <p style="padding-left: 40px;">GO TO AOP-I.04, Pressurizer Instrument Malfunction.</p> <p>[3] IF pressurizer pressure high, THEN</p> <p style="padding-left: 40px;">PERFORM the following:</p> <p>[3.1] ENSURE pressurizer heaters OFF.</p> <p>[3.2] ENSURE pressurizer spray valves OPEN.</p> <p>[3.3] ADJUST plant parameters as necessary.</p> <p>[4] [CTS] EVALUATE TS 3.3.1, 3.3.2, 3.3.3.5.</p> <p style="padding-left: 40px;">[ITS] EVALUATE Technical Specifications 3.3.1, 3.3.2, and 3.3.4.</p> | | | | | | | | |
| <p>Examiner Note: Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.</p> | | | | | | | | |
| CT | ATC | Places PIC-68-340A, Master Pressure Controller in MANUAL and lowers output. OR Places PZR Spray controllers PIC-68-340D (Loop 1) and/or PIC-68-340B (Loop 2) and lowers output. Using immediate operator actions (IOAs) | | | | | | |
| | SRO | Transitions to AOP-I.04 PRESSURIZER INSTRUMENT AND CONTROL MALFUNCTIONS. | | | | | | |
| | SRO | Directs action from AOP-I.04 PRESSURIZER INSTRUMENT AND CONTROL MALFUNCTIONS. | | | | | | |
| <p>NOTE: If spray valve is open due to pressure instrument failure, then Section 2.3 is the appropriate entry point.</p> <p>1. DIAGNOSE the failure:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>IF...</th> <th>GO TO SECTION</th> <th>PAGE</th> </tr> </thead> <tbody> <tr> <td>Pressurizer Pressure Instrument OR Controller Malfunction</td> <td>2.3</td> <td>11</td> </tr> </tbody> </table> | | | IF... | GO TO SECTION | PAGE | Pressurizer Pressure Instrument OR Controller Malfunction | 2.3 | 11 |
| IF... | GO TO SECTION | PAGE | | | | | | |
| Pressurizer Pressure Instrument OR Controller Malfunction | 2.3 | 11 | | | | | | |

| | | | |
|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:2 |
| Event Description: Pressurizer Pressure Transmitter PT 68-340 Fail High | | | |
| Time | Position | Applicant's Actions or Behavior | |

| | | | |
|--|-----|---|---|
| NOTE Step 1 is an IMMEDIATE ACTION. | | | |
| | SRO | 1. CHECK normal spray valves CLOSED. | <p>IF RCS pressure is less than 2260 psig, THEN CLOSE affected spray valve(s) USING the following:</p> <ul style="list-style-type: none"> PIC-68-340A, Master Pressure Controller. <p>OR</p> <ul style="list-style-type: none"> PZR Spray controllers PIC-68-340D (Loop 1) and/or PIC-68-340B (Loop 2). |
| | ATC | Places Master Pressure Controller in MANUAL OR Spray controllers PIC-68-340D (Loop 1) and/or PIC-68-340B (Loop 2) in MANUAL if not already performed. | |
| | ATC | 2. MONITOR pressurizer pressure stable or trending to desired pressure. | |
| NOTE: Appendix L shows layout of PZR pressure control for operator reference. | | | |
| | ATC | 3. CHECK PI-68-340A NORMAL. | <p>PERFORM the following:</p> <ol style="list-style-type: none"> ENSURE PRESS CONTROL SELECTOR switch XS-68-340D in PT-68-334 & 323. ENSURE LOOP TAVG ΔT REC/SEL selector switch XS-68-2B in LOOP 2, 3, or 4. ENSURE PRESS REC CHANNEL SELECTOR XS-68-340B in PT-68-334, PT-68-323, or PT-68-322. GO TO Caution prior to Step 8.  |
| | ATC | Places PRESS CONTROL SELECTOR switch XS-68-340D in PT-68-334 & 323. | |
| | ATC | Places LOOP TAVG Δ T REC/SEL selector switch XS-68-2B in LOOP 2, 3, or 4. | |

| | | | |
|---|----------|--|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:2 |
| Event Description: Pressurizer Pressure Transmitter PT 68-340 Fail High | | | |
| Time | Position | Applicant's Actions or Behavior | |
| <p>CAUTION RCS pressure changes and changes in RCS boron concentration (due to differences between pwr and RCS boron) may cause small change in core reactivity.</p> | | | |
| Communication: If contacted, report "I&C will report to the MCR in ~ 45 minutes." | | | |
| | ATC | <p>8. MONITOR reactor power:</p> <p>a. CHECK reactor in Mode 1 or 2.</p> <p>b. MONITOR core thermal power for unexpected changes.</p> | |
| | SRO | <p>9. EVALUATE the following Tech Specs for applicability:</p> <ul style="list-style-type: none"> • [CTS] 3.2.5 DNB Parameters or [ITS] 3.4.1 DNB Limits • [CTS] 3.3.1.1 (3.3.1) or [ITS] 3.3.1, Reactor Trip System Instrumentation • [CTS] 3.3.2.1 (3.3.2) or [ITS] 3.3.2, ESF Actuation System Instrumentation • [CTS] 3.3.3.5 Remote Shutdown Instrumentation or [ITS] 3.3.4 Remote Shutdown Monitoring Instrumentation | |
| | SRO | Enters LCO 3.4.1 Condition A if RCS Pressure decreases to less than 2220 psia. | |
| | SRO | Enters LCO 3.3.1 Condition A, K and E. | |
| | SRO | Enters LCO 3.3.2 Condition A, D and Q | |
| | | | |

Op-Test No.: 2016-301

Scenario No.: 4

Event No.:2

Event Description: Pressurizer Pressure Transmitter PT 68-340 Fail High

| Time | Position | Applicant's Actions or Behavior | | | | | | |
|---|---|--|-----------|-----------------|-----------------|---|---|-------------|
| | SRO | <p>3.4 REACTOR COOLANT SYSTEM (RCS)</p> <p>3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits</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 is ≥ 2220 psia; b. RCS average temperature is $\leq 583^{\circ}\text{F}$; and c. RCS total flow rate $\geq 378,400$ gpm. <p>APPLICABILITY: MODE 1.</p> <p style="text-align: center;">NOTE</p> <p>Pressurizer pressure limit does not apply during:</p> <ul style="list-style-type: none"> a. THERMAL POWER ramp $> 5\%$ RTP per minute; b. THERMAL POWER step $> 10\%$ RTP; c. PHYSICS TESTS; or d. Performance of SR 3.1.3.2. <p>ACTIONS</p> <table border="1"> <thead> <tr> <th>CONDITION</th> <th>REQUIRED ACTION</th> <th>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> </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 |
| CONDITION | REQUIRED ACTION | COMPLETION TIME | | | | | | |
| A. One or more RCS DNB parameters not within limits. | A.1 Restore RCS DNB parameter(s) to within limit. | 2 hours | | | | | | |
| | SRO | <p>3.3 INSTRUMENTATION</p> <p>3.3.1 Reactor Trip System (RTS) Instrumentation</p> <p>LCO 3.3.1 The RTS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.</p> <p>APPLICABILITY: According to Table 3.3.1-1.</p> <p>ACTIONS</p> <p style="text-align: center;">NOTE</p> <p>Separate Condition entry is allowed for each Function.</p> <table border="1"> <thead> <tr> <th>CONDITION</th> <th>REQUIRED ACTION</th> <th>COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td>A. One or more Functions with one or more required channels or trains inoperable.</td> <td>A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s).</td> <td>Immediately</td> </tr> </tbody> </table> | CONDITION | REQUIRED ACTION | COMPLETION TIME | A. One or more Functions with one or more required channels or trains inoperable. | A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s). | Immediately |
| CONDITION | REQUIRED ACTION | COMPLETION TIME | | | | | | |
| A. One or more Functions with one or more required channels or trains inoperable. | A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s). | Immediately | | | | | | |

Op-Test No.: 2016-301

Scenario No.: 4

Event No.:2

Event Description: Pressurizer Pressure Transmitter PT 68-340 Fail High

| Time | Position | Applicant's Actions or Behavior | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|--|--|---------------------------------------|---------------------------------------|--|--|----------|---|----------------------|------------|------------------------------|--------------------|-----------------------------|-----------------------|-----|---|---|--|---------------------------------------|---------------------------------------|-------------------------|--|--|--|--|--|--|--------|------------------|---|---|--|---------------|-----------|---------|-----|---|---|--|
| | | E. One channel inoperable. | <div>NOTE</div> <div>The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels.</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | E.1 | Place channel in trip. | 72 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <u>OR</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | E.2 | Be in MODE 3. | 78 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | K. One channel inoperable. | <div>NOTE</div> <div>The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels.</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | K.1 | Place channel in trip. | 72 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <u>OR</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | K.2 | Reduce THERMAL POWER to < P-7. | 78 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Reactor Trip System Instrumentation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <table><thead><tr><th>FUNCTION</th><th>APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS</th><th>REQUIRED CHANNELS</th><th>CONDITIONS</th><th>SURVEILLANCE REQUIREMENTS</th><th>ALLOWABLE VALUE</th><th>NOMINAL TRIP SETPOINT</th></tr></thead><tbody><tr><td>6. Overtemperature ΔT</td><td>1,2</td><td>4</td><td>E</td><td>SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6^{(b)(c)} SR 3.3.1.7^{(b)(c)} SR 3.3.1.10^{(b)(c)} SR 3.3.1.14</td><td>Refer to Note 1 (Page 3.3.1-20)</td><td>Refer to Note 1 (Page 3.3.1-20)</td></tr><tr><td>8. Pressurizer Pressure</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>a. Low</td><td>1^(g)</td><td>4</td><td>K</td><td>SR 3.3.1.1 SR 3.3.1.7^{(b)(c)} SR 3.3.1.10^{(b)(c)} SR 3.3.1.14</td><td>≥ 1964.8 psig</td><td>1970 psig</td></tr><tr><td>b. High</td><td>1,2</td><td>4</td><td>E</td><td>SR 3.3.1.1 SR 3.3.1.7^{(b)(c)} SR 3.3.1.10^{(b)(c)} SR 3.3.1.14</td><td>≤ 2390.2 psig</td><td>2385 psig</td></tr></tbody></table> | | | | | | | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | 6. Overtemperature ΔT | 1,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 ^{(b)(c)} SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 | Refer to Note 1 (Page 3.3.1-20) | Refer to Note 1 (Page 3.3.1-20) | 8. Pressurizer Pressure | | | | | | | a. Low | 1 ^(g) | 4 | K | SR 3.3.1.1 SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 | ≥ 1964.8 psig | 1970 psig | b. High | 1,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 |
| FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. Overtemperature ΔT | 1,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 ^{(b)(c)} SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 | Refer to Note 1 (Page 3.3.1-20) | Refer to Note 1 (Page 3.3.1-20) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. Pressurizer Pressure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a. Low | 1 ^(g) | 4 | K | SR 3.3.1.1 SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 | ≥ 1964.8 psig | 1970 psig | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b. High | 1,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 | ≤ 2390.2 psig | 2385 psig | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (g) Above the P-7 (Low Power Reactor Trips Block) interlock. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Op-Test No.: 2016-301

Scenario No.: 4

Event No.:2

Event Description: Pressurizer Pressure Transmitter PT 68-340 Fail High

| Time | Position | Applicant's Actions or Behavior | | | | | | | | | | | | |
|---|---|---|-----------|-----------------|-----------------|---|---|-------------|----------------------------|---|--|-------------------------------------|--|--|
| | SRO | <p>3.3 INSTRUMENTATION</p> <p>3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation</p> <p>LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.</p> <p>APPLICABILITY: According to Table 3.3.2-1.</p> <p>ACTIONS</p> <p style="text-align: right;">NOTE</p> <p>Separate Condition entry is allowed for each Function.</p> <table border="1"> <thead> <tr> <th>CONDITION</th> <th>REQUIRED ACTION</th> <th>COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td>A. One or more Functions with one or more required channels or trains inoperable.</td> <td>A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s).</td> <td>Immediately</td> </tr> <tr> <td>D. One channel inoperable.</td> <td> <p style="text-align: center;">NOTE</p> <p>The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels.</p> <p>D.1 Place channel in trip. 72 hours</p> <p><u>OR</u></p> <p>D.2.1 Be in MODE 3. 78 hours</p> <p><u>AND</u></p> <p>D.2.2 Be in MODE 4. 84 hours</p> </td> <td></td> </tr> <tr> <td>Q. One or more channels inoperable.</td> <td> <p>Q.1 Verify interlock is in required state for existing unit condition. 1 hour</p> <p><u>OR</u></p> <p>Q.2.1 Be in MODE 3. 7 hours</p> <p><u>AND</u></p> <p>Q.2.2 Be in MODE 4. 13 hours</p> </td> <td></td> </tr> </tbody> </table> | CONDITION | REQUIRED ACTION | COMPLETION TIME | A. One or more Functions with one or more required channels or trains inoperable. | A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s). | Immediately | D. One channel inoperable. | <p style="text-align: center;">NOTE</p> <p>The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels.</p> <p>D.1 Place channel in trip. 72 hours</p> <p><u>OR</u></p> <p>D.2.1 Be in MODE 3. 78 hours</p> <p><u>AND</u></p> <p>D.2.2 Be in MODE 4. 84 hours</p> | | Q. One or more channels inoperable. | <p>Q.1 Verify interlock is in required state for existing unit condition. 1 hour</p> <p><u>OR</u></p> <p>Q.2.1 Be in MODE 3. 7 hours</p> <p><u>AND</u></p> <p>Q.2.2 Be in MODE 4. 13 hours</p> | |
| CONDITION | REQUIRED ACTION | COMPLETION TIME | | | | | | | | | | | | |
| A. One or more Functions with one or more required channels or trains inoperable. | A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s). | Immediately | | | | | | | | | | | | |
| D. One channel inoperable. | <p style="text-align: center;">NOTE</p> <p>The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels.</p> <p>D.1 Place channel in trip. 72 hours</p> <p><u>OR</u></p> <p>D.2.1 Be in MODE 3. 78 hours</p> <p><u>AND</u></p> <p>D.2.2 Be in MODE 4. 84 hours</p> | | | | | | | | | | | | | |
| Q. One or more channels inoperable. | <p>Q.1 Verify interlock is in required state for existing unit condition. 1 hour</p> <p><u>OR</u></p> <p>Q.2.1 Be in MODE 3. 7 hours</p> <p><u>AND</u></p> <p>Q.2.2 Be in MODE 4. 13 hours</p> | | | | | | | | | | | | | |

Op-Test No.: 2016-301

Scenario No.: 4

Event No.:2

Event Description: Pressurizer Pressure Transmitter PT 68-340 Fail High

| Time | Position | Applicant's Actions or Behavior | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|--|--------------------|-----------------------------|--|--|--|----------|---|----------------------|------------|------------------------------|--------------------|-----------------------------|---------------------|--|--|--|--|--|--|----------------------------------|----------------------|---|---|--|---------------|-----------|---------------------|--|--|--|--|--|--|---|--|--|--|--|--|--|--|-------|---|---|------------|---------------|-----------|---|-------|---|---|------------|---------------|-----------|
| | | <table><tr><th colspan="7">Table 3.3.2-1 (page 1 of 9) Engineered Safety Feature Actuation System Instrumentation</th></tr><tr><th>FUNCTION</th><th>APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS</th><th>REQUIRED CHANNELS</th><th>CONDITIONS</th><th>SURVEILLANCE REQUIREMENTS</th><th>ALLOWABLE VALUE</th><th>NOMINAL TRIP SETPOINT</th></tr><tr><td colspan="7">1. Safety Injection</td></tr><tr><td>d. Pressurizer Pressure - Low</td><td>1,2,3^(a)</td><td>3</td><td>D</td><td>SR 3.3.2.1 SR 3.3.2.4^{(b)(c)} SR 3.3.2.8^{(b)(c)} SR 3.3.2.9</td><td>≥ 1864.8 psig</td><td>1870 psig</td></tr><tr><td colspan="7">8. ESFAS Interlocks</td></tr><tr><td>b. Pressurizer Pressure, P-11/ Not P-11</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>(1) Not P-11, Automatic Unblock of Safety Injection on Increasing Pressure</td><td>1,2,3</td><td>3</td><td>Q</td><td>SR 3.3.2.8</td><td>≤ 1975.2 psig</td><td>1970 psig</td></tr><tr><td>(2) P-11, Enable Manual Block of Safety Injection on Decreasing Pressure</td><td>1,2,3</td><td>3</td><td>Q</td><td>SR 3.3.2.8</td><td>≥ 1956.8 psig</td><td>1962 psig</td></tr></table> | Table 3.3.2-1 (page 1 of 9) Engineered Safety Feature Actuation System Instrumentation | | | | | | | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | 1. Safety Injection | | | | | | | d. Pressurizer Pressure - Low | 1,2,3 ^(a) | 3 | D | SR 3.3.2.1 SR 3.3.2.4 ^{(b)(c)} SR 3.3.2.8 ^{(b)(c)} SR 3.3.2.9 | ≥ 1864.8 psig | 1870 psig | 8. ESFAS Interlocks | | | | | | | b. Pressurizer Pressure, P-11/ Not P-11 | | | | | | | (1) Not P-11, Automatic Unblock of Safety Injection on Increasing Pressure | 1,2,3 | 3 | Q | SR 3.3.2.8 | ≤ 1975.2 psig | 1970 psig | (2) P-11, Enable Manual Block of Safety Injection on Decreasing Pressure | 1,2,3 | 3 | Q | SR 3.3.2.8 | ≥ 1956.8 psig | 1962 psig |
| Table 3.3.2-1 (page 1 of 9) Engineered Safety Feature Actuation System Instrumentation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Safety Injection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d. Pressurizer Pressure - Low | 1,2,3 ^(a) | 3 | D | SR 3.3.2.1 SR 3.3.2.4 ^{(b)(c)} SR 3.3.2.8 ^{(b)(c)} SR 3.3.2.9 | ≥ 1864.8 psig | 1870 psig | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. ESFAS Interlocks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b. Pressurizer Pressure, P-11/ Not P-11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (1) Not P-11, Automatic Unblock of Safety Injection on Increasing Pressure | 1,2,3 | 3 | Q | SR 3.3.2.8 | ≤ 1975.2 psig | 1970 psig | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (2) P-11, Enable Manual Block of Safety Injection on Decreasing Pressure | 1,2,3 | 3 | Q | SR 3.3.2.8 | ≥ 1956.8 psig | 1962 psig | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ATC | <p>10. CHECK PZR PRESS and PZR SPRAY controllers in AUTO.</p> <p>WHEN malfunction has been identified AND isolated or corrected, THEN PERFORM the following:</p> <p>a. ENSURE Master Pzr Pressure Controller PIC-68-340A Output Percent Meter is less than 40%.</p> <p>b. ENSURE PZR PRESS Controller, PZR SPRAY controller, and PZR HTRS in AUTO.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ATC | Lowers output to less than 40% and places Master Pressure Controller in AUTO OR Spray controllers PIC-68-340D (Loop 1) and/or PIC-68-340B (Loop 2) in AUTO. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NOTE: | | If performing AOP in conjunction with AOP-I.11 for an Eagle LCP failure, then actions to hard trip bistables should be delayed until Eagle system reset is attempted. Actions to hard trip bistables must be completed within 6 hours UNLESS affected loop is restored to operable status by resetting Eagle rack. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Op-Test No.: 2016-301

Scenario No.: 4



Event No.:2

Event Description: Pressurizer Pressure Transmitter PT 68-340 Fail High

| Time | Position | Applicant's Actions or Behavior | | | | | | |
|--|----------|---|-------------------------|---------|----------|------------------|---|---|
| | CREW | <p>11. REMOVE failed pressurizer pressure channel from service:</p> <p>a. CHECK any pressurizer pressure channel INOPERABLE.</p> <p>a. IF all channels are OPERABLE, THEN GO TO Step 12.</p> <p>b. CHECK OTΔT setpoint on affected channel NORMAL.</p> <p>b. GO TO Substep 11.d.</p> <p>11. d. IF any of the following conditions exists:</p> <ul style="list-style-type: none"> transmitter signal failed (entire instrument loop affected including OTΔT pressure input) <p>OR</p> <ul style="list-style-type: none"> OTΔT pressure input potentially affected or status CANNOT be determined, <p>THEN PERFORM applicable appendix:</p> <table border="1"> <thead> <tr> <th>PZR PRESSURE INSTRUMENT</th> <th>CHANNEL</th> <th>APPENDIX</th> </tr> </thead> <tbody> <tr> <td>P-68-340 (P-455)</td> <td>I</td> <td>A</td> </tr> </tbody> </table> | PZR PRESSURE INSTRUMENT | CHANNEL | APPENDIX | P-68-340 (P-455) | I | A |
| PZR PRESSURE INSTRUMENT | CHANNEL | APPENDIX | | | | | | |
| P-68-340 (P-455) | I | A | | | | | | |
| | Crew | Performs a Crew Brief as time allows. | | | | | | |
| | Crew | <p>Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.</p> <p>Operations Management - Typically Shift Manager.</p> <p>Maintenance Personnel – Typically Work Control Center</p> | | | | | | |
| <p>When technical specifications have been identified or at discretion of the Lead Examiner, proceed to the next event.</p> | | | | | | | | |

| | | |
|--|-----------------|---------------------------------|
| Op-Test No.: 2016-301 | Scenario No.: 4 | Event No.:3 |
| Event Description: Power Range Instrument N-41 Drifts High | | |
| Time | Position | Applicant's Actions or Behavior |

| Direct facility operator to insert Event 3, Power Range Instrument N-41 Drifts High | | | | | | | | |
|--|---------------|---|-------|---------------|------|--|-----|---|
| Indications available: <ul style="list-style-type: none"> Control Rods Inserting N-41 Indicator ramps to full scale Annunciator: <ul style="list-style-type: none"> M4-B. E3 NC-46B NIS POWER RANGE CHANNEL DEVIATION | | | | | | | | |
| | ATC | Takes Immediate action to place HS-85-5110 ROD CONTROL MODE SELECTOR in MANUAL. | | | | | | |
| | SRO | Transitions to AOP-C.01 ROD CONTROL SYSTEM MALFUNCTIONS. | | | | | | |
| | SRO | Directs actions from AOP-C.01 ROD CONTROL SYSTEM MALFUNCTIONS. | | | | | | |
| 1. DIAGNOSE the failure: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 60%;">IF...</th> <th style="width: 20%;">GO TO SECTION</th> <th style="width: 20%;">PAGE</th> </tr> </thead> <tbody> <tr> <td>Uncontrolled rod bank movement (rod movement NOT due to actual T-avg/T-ref mismatch or change in reactor/turbine power)</td> <td style="text-align: center;">2.1</td> <td style="text-align: center;">4</td> </tr> </tbody> </table> | | | IF... | GO TO SECTION | PAGE | Uncontrolled rod bank movement (rod movement NOT due to actual T-avg/T-ref mismatch or change in reactor/turbine power) | 2.1 | 4 |
| IF... | GO TO SECTION | PAGE | | | | | | |
| Uncontrolled rod bank movement (rod movement NOT due to actual T-avg/T-ref mismatch or change in reactor/turbine power) | 2.1 | 4 | | | | | | |
| NOTE: Step 1 is an immediate action step. | | | | | | | | |
| | ATC | 1. STOP uncontrolled rod motion: a. PLACE rod control in MAN. b. CHECK rod motion STOPPED. | | | | | | |
| | ATC | Takes Immediate action to place HS-85-5110 ROD CONTROL MODE SELECTOR in MANUAL. | | | | | | |
| CAUTION: Control Rods should NOT be manually <u>withdrawn</u> during a plant transient. | | | | | | | | |
| | ATC | 2. MONITOR for plant transient: a. CHECK reactor power and T-avg STABLE. | | | | | | |

| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:3 |
|--|----------|---|-------------|
| Event Description: Power Range Instrument N-41 Drifts High | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | | <p>b. CHECK reactor power greater than 90%.</p> <p>b. GO TO Step 3.</p>  <p>c. CHECK ICS thermal power indication AVAILABLE.</p> <p>d. MONITOR reactor power less than or equal to applicable limit:</p> <p>1) IF LEFM is operable, THEN CHECK ICS point U2118RA (10 minute average):</p> <ul style="list-style-type: none"> less than or equal to 3455 MWt STABLE or LOWERING. | |
| | ATC | <p>3. CHECK for instrumentation malfunction:</p> <p>a. CHECK all Vital Instrument Power Boards ENERGIZED:</p> <ul style="list-style-type: none"> VITAL POWER BOARD UV OR BREAKER TRIP alarms [M-1C windows A-7, B-7, C-7, and D-7] DARK | |
| | ATC | <p>b. CHECK nuclear instrumentation OPERABLE.</p> <p>b. GO TO AOP-I.01, Nuclear Instrument Malfunction.</p>  | |

| | | | |
|--|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:3 |
| Event Description: Power Range Instrument N-41 Drifts High | | | |
| Time | Position | Applicant's Actions or Behavior | |

| | | | | | | | | |
|---|----------------------|---|--------------|----------------------|-------------|---------------------|-----|----|
| | SRO | Transitions to AOP-I.01, NUCLEAR INSTRUMENT MALFUNCTION. | | | | | | |
| | SRO | Directs actions of AOP-I.01, NUCLEAR INSTRUMENT MALFUNCTION. | | | | | | |
| <p>1. DIAGNOSE the failure:</p> <table border="1"> <tr> <td>IF...</td> <td>GO TO SECTION</td> <td>PAGE</td> </tr> <tr> <td>Power Range Failure</td> <td>2.3</td> <td>16</td> </tr> </table> | | | IF... | GO TO SECTION | PAGE | Power Range Failure | 2.3 | 16 |
| IF... | GO TO SECTION | PAGE | | | | | | |
| Power Range Failure | 2.3 | 16 | | | | | | |
| | ATC | 1. PLACE rod control in MAN. | | | | | | |
| | ATC | 2. IF power rise is in progress, THEN STABILIZE reactor power at current level. | | | | | | |
| Communication: If contacted, report “I&C will report to the MCR in ~ 45 minutes.” | | | | | | | | |
| | SRO | <p>3. EVALUATE the following Tech Specs for applicability:</p> <ul style="list-style-type: none"> 3.3.1.1 (3.3.1), Reactor Trip System Instrumentation 3.3.3.5, Remote Shutdown Instrumentation 3.3.3.7, Accident Monitoring Instrumentation 4.2.4.2, QPTR with one PR Channel Inoperable. | | | | | | |
| | SRO | Enters LCO 3.3.1 Condition A, D, E, O and P. | | | | | | |
| | | | | | | | | |

Op-Test No.: 2016-301

Scenario No.: 4

Event No.:3

Event Description: Power Range Instrument N-41 Drifts High

| Time | Position | Applicant's Actions or Behavior | | | | | | | | | |
|---|--|--|-----------|-----------------|-----------------|---|---|-------------|--|--|--|
| | SRO | <p>3.3 INSTRUMENTATION</p> <p>3.3.1 Reactor Trip System (RTS) Instrumentation</p> <p>LCO 3.3.1 The RTS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.</p> <p>APPLICABILITY: According to Table 3.3.1-1.</p> <p>ACTIONS _____</p> <p>NOTE _____</p> <p>Separate Condition entry is allowed for each Function.</p> <table border="1"> <thead> <tr> <th>CONDITION</th> <th>REQUIRED ACTION</th> <th>COMPLETION TIME</th> </tr> </thead> <tbody> <tr> <td>A. One or more Functions with one or more required channels or trains inoperable.</td> <td>A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s).</td> <td>Immediately</td> </tr> <tr> <td>D. One Power Range Neutron Flux - High channel inoperable.</td> <td> <p>NOTE _____</p> <p>The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels.</p> <p>D.1.1 Place channel in trip. 72 hours</p> <p>AND</p> <p>D.1.2 Reduce THERMAL POWER to \leq 75% RTP. 78 hours</p> <p>OR</p> <p>D.2.1 Place channel in trip. 72 hours</p> <p>AND</p> <p>D.2.2 NOTE _____</p> <p>Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable.</p> <p>Perform SR 3.2.4.2. Once per 12 hours</p> <p>OR</p> <p>D.3 Be in MODE 3. 78 hours</p> </td> <td></td> </tr> </tbody> </table> | CONDITION | REQUIRED ACTION | COMPLETION TIME | A. One or more Functions with one or more required channels or trains inoperable. | A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s). | Immediately | D. One Power Range Neutron Flux - High channel inoperable. | <p>NOTE _____</p> <p>The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels.</p> <p>D.1.1 Place channel in trip. 72 hours</p> <p>AND</p> <p>D.1.2 Reduce THERMAL POWER to \leq 75% RTP. 78 hours</p> <p>OR</p> <p>D.2.1 Place channel in trip. 72 hours</p> <p>AND</p> <p>D.2.2 NOTE _____</p> <p>Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable.</p> <p>Perform SR 3.2.4.2. Once per 12 hours</p> <p>OR</p> <p>D.3 Be in MODE 3. 78 hours</p> | |
| CONDITION | REQUIRED ACTION | COMPLETION TIME | | | | | | | | | |
| A. One or more Functions with one or more required channels or trains inoperable. | A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s). | Immediately | | | | | | | | | |
| D. One Power Range Neutron Flux - High channel inoperable. | <p>NOTE _____</p> <p>The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels.</p> <p>D.1.1 Place channel in trip. 72 hours</p> <p>AND</p> <p>D.1.2 Reduce THERMAL POWER to \leq 75% RTP. 78 hours</p> <p>OR</p> <p>D.2.1 Place channel in trip. 72 hours</p> <p>AND</p> <p>D.2.2 NOTE _____</p> <p>Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable.</p> <p>Perform SR 3.2.4.2. Once per 12 hours</p> <p>OR</p> <p>D.3 Be in MODE 3. 78 hours</p> | | | | | | | | | | |

Op-Test No.: 2016-301

Scenario No.: 4

Event No.:3

Event Description: Power Range Instrument N-41 Drifts High

| Time | Position | Applicant's Actions or Behavior | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|-------------------------------------|--|--|---------------------------------------|---------------------------------------|----------|----------|---|----------------------|------------|------------------------------|--------------------|-----------------------------|--------------------------------|--|--|--|--|--|--|---------|-----|---|---|--|--------------|----------|---|--|--|--|--|--|--|--------|---------------------|---|---|---|-------------|---------|-------------------|--|--|--|--|--|--|--------------------------------|--|--|--|--|--|--|---------|-----|---|---|--|--------------|----------|-----------------------|-----|---|---|--|---------------------------------------|---------------------------------------|-----------------|-----|---|---|--|---------------------------------------|---------------------------------------|
| | | E. One channel inoperable. | NOTE: The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | E.1 | Place channel in trip. | | | 72 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | <u>OR</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | E.2 | Be in MODE 3. | | | 78 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | O. One or more channels inoperable. | O.1 | Verify interlock is in required state for existing unit conditions. | | | 1 hour | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | <u>OR</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | O.2 | Be in MODE 3. | | | 7 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | P. One or more channels inoperable. | P.1 | Verify interlock is in required state for existing unit conditions. | | | 1 hour | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | <u>OR</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | P.2 | Be in MODE 2. | | | 7 hours | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reactor Trip System Instrumentation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table><thead><tr><th>FUNCTION</th><th>APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS</th><th>REQUIRED CHANNELS</th><th>CONDITIONS</th><th>SURVEILLANCE REQUIREMENTS</th><th>ALLOWABLE VALUE</th><th>NOMINAL TRIP SETPOINT</th></tr></thead><tbody><tr><td colspan="7">2. Power Range Neutron Flux</td></tr><tr><td>a. High</td><td>1,2</td><td>4</td><td>D</td><td>SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7^{(b)(c)} SR 3.3.1.11^{(b)(c)} SR 3.3.1.14</td><td>≤ 111.4% RTP</td><td>109% RTP</td></tr><tr><td colspan="7">*</td></tr><tr><td>b. Low</td><td>1^(d),2</td><td>4</td><td>E</td><td>SR 3.3.1.1 SR 3.3.1.8^{(b)(c)} SR 3.3.1.11^{(b)(c)}</td><td>≤ 27.4% RTP</td><td>25% RTP</td></tr><tr><td colspan="7">*Information only</td></tr><tr><td colspan="7">2. Power Range Neutron Flux</td></tr><tr><td>a. High</td><td>1,2</td><td>4</td><td>D</td><td>SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7^{(b)(c)} SR 3.3.1.11^{(b)(c)} SR 3.3.1.14</td><td>≤ 111.4% RTP</td><td>109% RTP</td></tr><tr><td>6. Overtemperature ΔT</td><td>1,2</td><td>4</td><td>E</td><td>SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6^{(b)(c)} SR 3.3.1.7^{(b)(c)} SR 3.3.1.10^{(b)(c)} SR 3.3.1.14</td><td>Refer to Note 1 (Page 3.3.1-20)</td><td>Refer to Note 1 (Page 3.3.1-20)</td></tr><tr><td>7. Overpower ΔT</td><td>1,2</td><td>4</td><td>E</td><td>SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6^{(b)(c)} SR 3.3.1.7^{(b)(c)} SR 3.3.1.10^{(b)(c)} SR 3.3.1.14</td><td>Refer to Note 2 (Page 3.3.1-21)</td><td>Refer to Note 2 (Page 3.3.1-21)</td></tr></tbody></table> | | | | | | | | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | 2. Power Range Neutron Flux | | | | | | | a. High | 1,2 | 4 | D | SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.11 ^{(b)(c)} SR 3.3.1.14 | ≤ 111.4% RTP | 109% RTP | * | | | | | | | b. Low | 1 ^(d) ,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.8 ^{(b)(c)} SR 3.3.1.11 ^{(b)(c)} | ≤ 27.4% RTP | 25% RTP | *Information only | | | | | | | 2. Power Range Neutron Flux | | | | | | | a. High | 1,2 | 4 | D | SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.11 ^{(b)(c)} SR 3.3.1.14 | ≤ 111.4% RTP | 109% RTP | 6. Overtemperature ΔT | 1,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 ^{(b)(c)} SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 | Refer to Note 1 (Page 3.3.1-20) | Refer to Note 1 (Page 3.3.1-20) | 7. Overpower ΔT | 1,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 ^{(b)(c)} SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 | Refer to Note 2 (Page 3.3.1-21) | Refer to Note 2 (Page 3.3.1-21) |
| FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Power Range Neutron Flux | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a. High | 1,2 | 4 | D | SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.11 ^{(b)(c)} SR 3.3.1.14 | ≤ 111.4% RTP | 109% RTP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b. Low | 1 ^(d) ,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.8 ^{(b)(c)} SR 3.3.1.11 ^{(b)(c)} | ≤ 27.4% RTP | 25% RTP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Information only | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Power Range Neutron Flux | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a. High | 1,2 | 4 | D | SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.11 ^{(b)(c)} SR 3.3.1.14 | ≤ 111.4% RTP | 109% RTP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. Overtemperature ΔT | 1,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 ^{(b)(c)} SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 | Refer to Note 1 (Page 3.3.1-20) | Refer to Note 1 (Page 3.3.1-20) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. Overpower ΔT | 1,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 ^{(b)(c)} SR 3.3.1.7 ^{(b)(c)} SR 3.3.1.10 ^{(b)(c)} SR 3.3.1.14 | Refer to Note 2 (Page 3.3.1-21) | Refer to Note 2 (Page 3.3.1-21) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Op-Test No.: 2016-301


Scenario No.: 4

Event No.:3

Event Description: Power Range Instrument N-41 Drifts High

| Time | Position | Applicant's Actions or Behavior | | | | | | | | | | | | | | | | | | | | | |
|--|----------|---|----------------------------------|-------------|----------------------------|---------|-------------|-------------|---------|----------------------------------|---|---|---|-------------|-------------|---------|-----------------------------------|-----|---|---|-------------|----------------------------|---------|
| | | <div>16. Reactor Trip System Interlocks</div> <table><tr><td>c. Power Range Neutron Flux, P-8</td><td>1</td><td>4</td><td>P</td><td>SR 3.3.1.11</td><td>≤ 37.4% RTP</td><td>35% RTP</td></tr><tr><td>d. Power Range Neutron Flux, P-9</td><td>1</td><td>4</td><td>P</td><td>SR 3.3.1.11</td><td>≤ 52.4% RTP</td><td>50% RTP</td></tr><tr><td>e. Power Range Neutron Flux, P-10</td><td>1,2</td><td>4</td><td>O</td><td>SR 3.3.1.11</td><td>≥ 7.6% RTP and ≤ 12.4% RTP</td><td>10% RTP</td></tr></table> | c. Power Range Neutron Flux, P-8 | 1 | 4 | P | SR 3.3.1.11 | ≤ 37.4% RTP | 35% RTP | d. Power Range Neutron Flux, P-9 | 1 | 4 | P | SR 3.3.1.11 | ≤ 52.4% RTP | 50% RTP | e. Power Range Neutron Flux, P-10 | 1,2 | 4 | O | SR 3.3.1.11 | ≥ 7.6% RTP and ≤ 12.4% RTP | 10% RTP |
| c. Power Range Neutron Flux, P-8 | 1 | 4 | P | SR 3.3.1.11 | ≤ 37.4% RTP | 35% RTP | | | | | | | | | | | | | | | | | |
| d. Power Range Neutron Flux, P-9 | 1 | 4 | P | SR 3.3.1.11 | ≤ 52.4% RTP | 50% RTP | | | | | | | | | | | | | | | | | |
| e. Power Range Neutron Flux, P-10 | 1,2 | 4 | O | SR 3.3.1.11 | ≥ 7.6% RTP and ≤ 12.4% RTP | 10% RTP | | | | | | | | | | | | | | | | | |
| | ATC | 4. CHECK THREE power range channels OPERABLE. | | | | | | | | | | | | | | | | | | | | | |
| | CREW | 5. PLACE following switches located on Detector Current Comparator drawer [M-13, N50] in position corresponding to failed Power Range Channel: <ul style="list-style-type: none">• Upper Section• Lower Section• Appropriate Rod Stop Bypass switch• Appropriate Power Mismatch Bypass switch | | | | | | | | | | | | | | | | | | | | | |
| | ATC | Places Upper & Lower Section, Rod Stop Bypass switch & Power Mismatch Bypass switches to N-41 | | | | | | | | | | | | | | | | | | | | | |
| | CREW | 6. DEFEAT failed Power Range channel USING Comparator Channel Defeat switch. [Comparator and Rate Drawer, M-13 N37] | | | | | | | | | | | | | | | | | | | | | |
| | ATC | Places Comparator Channel Defeat switch to N-41 | | | | | | | | | | | | | | | | | | | | | |
| <div>CAUTION</div> <div>Control rods should NOT be manually withdrawn during a plant transient.</div> | | | | | | | | | | | | | | | | | | | | | | | |
| <div>NOTE</div> <div>Tavg is required to be within 1°F of Tref when restoring automatic rod control.</div> | | | | | | | | | | | | | | | | | | | | | | | |

| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:3 |
|--|----------|---|-------------|
| Event Description: Power Range Instrument N-41 Drifts High | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ATC | <p>7. RESTORE Tavg as necessary USING one of the following:</p> <ul style="list-style-type: none"> • manual rod control OR • RCS boration/dilution OR • turbine load reduction | |
| | ATC | Places HS-85-5111 Rod control to OUT to restore T _{AVE} to within 1 deg F of T _{REF} as required. | |
| | ATC | <p>8. IF reactor power is greater than P-6 (10^{-4} %) THEN ENSURE OPERABLE Power Range channel selected on the following:</p> <ul style="list-style-type: none"> • NR-45 Recorder [M-4] • RCS Temp ΔT recorder - (green pen) [M-5, XS-68-2B] | |
| | ATC | <p>9. IF auto rod control is desired, THEN RESTORE rod control to AUTO.</p> | |
| Examiner Note: The following is from 0-SO-85-1CONTROL ROD DRIVE SYSTEM. | | | |


| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:3 |
|--|----------|--|-------------|
| Event Description: Power Range Instrument N-41 Drifts High | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ATC | <p>6.4 Transferring from Manual to Auto Rod Control</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;">NOTES</p> <p>1) A laminated copy of this section can be maintained in the Unit Control Room for repetitive use for routine rod manipulations.</p> <p>2) Defeating or restoring Tavg/Delta T or NIS channel may cause step change in input to rod control. A delay of at least 3 minutes prior to returning rod control to automatic will allow lead/lag signal to decay off.</p> <p>3) This Section may be N/A if Rod Control is being returned to AUTO in response to a transient (runback) condition.</p> </div> <p>[1] ENSURE turbine power is greater than 15 percent. _____</p> <p>[2] ENSURE Window 31 (E-3), LOW TURB IMPULSE PRESS ROD WITHDRAWAL BLOCKED C-5, Permissive light on panel [XA-55-4A] is NOT LIT. _____</p> <p>[3] ENSURE less than 1 degree Tavg/Tref mismatch. _____</p> <p>[4] PLACE [HS-85-5110], Rod Control Mode Selector in the AUTO position. _____</p> <p>[5] VERIFY Rod Speed Indicator [SI-412], indicates 8 Steps/minute. _____</p> <p style="text-align: center;">End of Section 6.4</p> | |
| | ATC | Places HS-85-5110 ROD CONTROL MODE SELECTOR in AUTO. | |
| | CREW | <p>10. CHECK reactor power greater than 75%. GO TO Step 12.</p>  | |
| | CREW | <p>11. NOTIFY Reactor Engineering to perform 0-SI-NUC-000-011.0, Moveable Detector Determination of Quadrant Power Tilt Ratio.</p> | |

Op-Test No.: 2016-301

Scenario No.: 4

Event No.:3

Event Description: Power Range Instrument N-41 Drifts High

| Time | Position | Applicant's Actions or Behavior | | | | | | | | | | | | | | | |
|---|----------|---|---------------------|---------|----------|------|---|---|------|----|---|------|-----|---|------|----|---|
| | CREW | <p>12. NOTIFY I&C to remove failed power range channel from service USING appropriate Appendix:</p> <table border="1"> <thead> <tr> <th>POWER RANGE CHANNEL</th> <th>PROT CH</th> <th>APPENDIX</th> </tr> </thead> <tbody> <tr> <td>N-41</td> <td>I</td> <td>A</td> </tr> <tr> <td>N-42</td> <td>II</td> <td>B</td> </tr> <tr> <td>N-43</td> <td>III</td> <td>C</td> </tr> <tr> <td>N-44</td> <td>IV</td> <td>D</td> </tr> </tbody> </table> <p>13. GO TO appropriate plant procedure.</p>  <p style="text-align: right;">END OF SECTION</p> | POWER RANGE CHANNEL | PROT CH | APPENDIX | N-41 | I | A | N-42 | II | B | N-43 | III | C | N-44 | IV | D |
| POWER RANGE CHANNEL | PROT CH | APPENDIX | | | | | | | | | | | | | | | |
| N-41 | I | A | | | | | | | | | | | | | | | |
| N-42 | II | B | | | | | | | | | | | | | | | |
| N-43 | III | C | | | | | | | | | | | | | | | |
| N-44 | IV | D | | | | | | | | | | | | | | | |
| | Crew | Performs a Crew Brief as time allows. | | | | | | | | | | | | | | | |
| | Crew | <p>Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.</p> <p>Operations Management - Typically Shift Manager.</p> <p>Maintenance Personnel – Typically Work Control Center</p> | | | | | | | | | | | | | | | |
| Lead Examiner may cue the next event when Tech Specs have been addressed. | | | | | | | | | | | | | | | | | |

| | | |
|--|-----------------|---------------------------------|
| Op-Test No.: 2016-301 | Scenario No.: 4 | Event No.: 4 |
| Event Description: CCW Traveling Screen Fail to AUTO START | | |
| Time | Position | Applicant's Actions or Behavior |

| | | |
|---|------|--|
| Direct facility operator to insert Event 4, CCW Traveling Screen Fail to AUTO START | | |
| <p>Indications/Alarms</p> <p>Annunciator:</p> <p>1-M-15</p> <ul style="list-style-type: none"> • M15 A-1 LS-27-9B CCW PUMP 1A PIT LEVEL LOW. • M15 A-4 PdS-27-13B TRAV SCREEN 1B DIFF PRESS HI | | |
| <p style="text-align: center;">Panel M15-A, A-4</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;">PdS-27-13B TRAV SCREEN 1B DIFF PRESS HI</p> </div> <p>Corrective Actions:</p> <ul style="list-style-type: none"> [1] VERIFY pressure on [1-PDI-27-13A] $\geq 5"$ H₂O. [2] VERIFY screen wash pumps and traveling screens start. [3] DISPATCH operator to CCW pumping station for local inspection. [4] WHEN differential pressure reduces to normal on [1-PDI-27-13A], THEN STOP screen wash pumps and traveling screens locally in accordance with 0-SO-27-1. [5] IF this alarm condition is suspected to be caused by an Intake Intrusion Event, THEN REFER TO GOI-6, <i>Apparatus Operation</i>, for instructions to mitigate this event. | | |
| <p>Communication: If dispatched, wait 10 minutes and report "Travelling Screens and Screen Wash Pumps are not running."</p> <p>If asked to start the screen wash pumps "I cannot locally start the screen wash pumps."</p> | | |
| <p>Communication: If dispatched, wait 2 minutes and report "Travelling Screens and Screen Wash Pumps are running."</p> | | |
| | BOP | Places HS-27-4A SCREEN WASH PUMP 1A to START. |
| | Crew | Performs a Crew Brief as time allows. |
| | Crew | <p>Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.</p> <p>Operations Management - Typically Shift Manager.</p> <p>Maintenance Personnel – Typically Work Control Center</p> |
| Lead Examiner may cue the next event when desired. | | |

| | | |
|---|-----------------|---------------------------------|
| Op-Test No.: 2016-301 | Scenario No.: 4 | Event No.:5 |
| Event Description: HP Turbine Gland Seal Reg Failure PCV-47-183/Loss of Condenser Vacuum. | | |
| Time | Position | Applicant's Actions or Behavior |

Direct facility operator to insert Event 5, HP Turbine Gland Seal Failure/Loss of Condenser Vacuum.

Panel 1-M-2A

Indications available:

Annunciator:

1-M-2A

- **2A A-5 PIS-47-196 TURBINE SEAL STEAM PRESS ABNORMAL**

**PS-47-196B
TURBINE
SEAL STEAM
PRESS ABNORMAL**

[1] **CHECK** 1-PI-47-187 on 1-M-2 to verify header pressure (approximately 125 psig).

[2] **IF** header pressure low, **THEN**

[2.1] **BUMP OPEN** 1-FCV-47-181 steam seal bypass to restore header pressure. (1-PI-47-189 approximately 19 psia)



[2.2] **PERFORM** 1-SO-2-9, *Condenser Vacuum And Turbine Steam Seal System Operation*, to complete bypass of 1-PCV-47-183.


Examiner Note: Several steps, notes, and cautions in the Annunciator response procedure do not apply to this failure. Only those that are applicable are listed in this event guide.

Communication: If dispatched, wait 5 minutes and report **“1-PCV-47-183 HP Steam Seal Regulator appears to be closed.”**

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| | BOP | Momentarily places HS-47-181A HP STM SUPPLY BYPASS ISOL OPEN. |
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Examiner Note: Crew may not enter AOP-S.02.

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| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:5 |
| Event Description: HP Turbine Gland Seal Reg Failure PCV-47-183/Loss of Condenser Vacuum. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | SRO | May transition to AOP-S.02, LOSS OF CONDENSER VACUUM. | |
| | SRO | May direct actions using AOP-S.02, LOSS OF CONDENSER VACUUM. | |
| CAUTION | | Turbine will trip automatically when condenser pressure reaches 3.9 to 5.4 psia. | |
| NOTE: | | Highest reading operable condenser pressure instrument should be used. | |
| | BOP | 1. MONITOR condenser pressure for turbine trip criteria. [C.1] a. CHECK main turbine/generator on line. b. CHECK turbine load greater than or equal to 30%. | |
| | BOP | 1. c. CHECK condenser pressure less than or equal to 2.7 psia. c. IF condenser pressure exceeds 3.5 psia OR pressure CANNOT be restored to less than 2.7 psia within 5 minutes, THEN TRIP the reactor and GO TO E 0, Reactor Trip or Safety Injection.  d. GO TO Step 3.  | |
| | BOP | 3. ENSURE all available condenser vacuum pumps RUNNING . | |
| | BOP | Places HS-2-176A CONDR VAC Pump 1B to START . | |
| | BOP | 4. ENSURE condenser vacuum breaker CLOSED . | |

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|---|----------|---|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:5 |
| Event Description: HP Turbine Gland Seal Reg Failure PCV-47-183/Loss of Condenser Vacuum. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| CAUTION: If CCW intake blockage has occurred resulting in pump cavitation (swinging amps) or loss of suction to CCW pumps, continued CCW pump operation could result in pump damage. | | | |
| | BOP | 5. MONITOR CCW Pump operation: a. CHECK for any of the following: <ul style="list-style-type: none"> less than two CCW Pumps RUNNING on affected unit. [M-15] [C.1] OR <ul style="list-style-type: none"> Indication of severe intake blockage resulting in cavitation or imminent loss of CCW pump suction. a. GO TO Step 6  | |
| | BOP | 6. CHECK turbine gland seal steam supply pressure between 120 psig and 130 psig [M-2, PI-47-187]. | |
| | BOP | 7. CHECK HP steam seal steam supply between 16 psia and 20 psia [M-2, PI-47-189]. MAINTAIN HP steam seal supply pressure between 16 psia and 20 psia USING PCV-47-191, Gland Seal Steam Spillover Bypass Isol. | |
| | BOP | Places HS-47-191A GLAND SEAL STM SPILLOVER BYPASS ISOL to CLOSE to maintain HP Seal Steam pressure between 16 and 20 psia. | |
| | BOP | 8. CHECK annunciator PIS-47-196 TURBINE SEAL STEAM PRESS. ABNORMAL, DARK. [M-2A, window A5]. | |

| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:5 |
|---|----------|--|-------------|
| Event Description: HP Turbine Gland Seal Reg Failure PCV-47-183/Loss of Condenser Vacuum. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP | <p>9. DISPATCH operator to perform the following:</p> <p>a. CHECK loop seal on vacuum breaker [Turbine Bldg, 706' elev].</p> <p>b. CHECK the following components:</p> <ul style="list-style-type: none"> • Main Turbine rupture discs intact • Condenser shell intact • Main Feedwater Pump rupture discs intact • Main Turbine exhaust hoods <p>c. VERIFY Main Steam Dump Drain Tank level control operating properly.</p> | |
| | BOP | 10. CHECK main turbine/generator on line. | |
| | BOP | 11. CHECK condenser pressure STABLE or DROPPING . | |
| | Crew | Performs a Crew Brief as time allows. | |
| | Crew | <p>Notifications should be addressed as applicable if not specifically addressed by the procedure or in the CREW brief.</p> <p>Operations Management - Typically Shift Manager.</p> <p>Maintenance Personnel – Typically Work Control Center</p> | |
| Lead Examiner may cue the next event when desired. | | | |

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| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.: 6 |
| Event Description: Total Loss of Vacuum/Rx Trip. | | | |
| Time | Position | Applicant's Actions or Behavior | |

| | | |
|--|------|--|
| Direct the Simulator Operator to initiate Event 6, Total Loss of Vacuum | | |
| Indications/Alarms Alarms: <ul style="list-style-type: none"> 1-M-4 • 4C D-3 PS-47-118 CONDENSER VACUUM LOW TURBINE TRIP • 4D E-3 P-9 TURBINE TRIP REACTOR TRIP Indications: <ul style="list-style-type: none"> 1-M-4 • All Control Rods inserted | | |
| | BOP | Places HS-47-24 TURBINE TRIP to Trip. |
| | SRO | Transitions to E-0 REACTOR TRIP OR SAFETY INJECTION and directs Immediate Operator Actions (IOAs). |
| Examiner Note: following IOA performance, prior to Steps 1-4 immediate action verification, ATC/BOP surveys MCBs for any expected automatic system response that failed to occur. Upon discovery, they may take manual action(s) to align plant systems as expected for the event in progress. (Ref. EPM-4, Prudent Operator Actions) | | |
| Examiner Note: The A and B Motor Driven AFW pumps trip. The TD AFW pump did not start due to a faulty electrical overspeed trip. | | |
| | CREW | Performs the first four steps of E-0 unprompted. |
| | SRO | Directs performance of E-0 REACTOR TRIP OR SAFETY INJECTION. |
| NOTE 1 Steps 1 through 4 are immediate action steps. | | |
| NOTE 2 This procedure has a foldout page. | | |
| | ATC | 1. VERIFY reactor TRIPPED: <ul style="list-style-type: none"> • Reactor trip breakers OPEN • Reactor trip bypass breakers DISCONNECTED or OPEN • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps. • Neutron flux DROPPING |

| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.: 6 |
|---|----------|---|--------------|
| Event Description: Total Loss of Vacuum/Rx Trip. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP | 2. VERIFY turbine TRIPPED: <ul style="list-style-type: none"> Turbine stop valves CLOSED. | |
| | BOP | Places HS-47-24 TURBINE TRIP to Trip (if not already performed). | |
| | BOP | 3. VERIFY at least one 6.9KV shutdown board ENERGIZED on this unit. | |
| | ATC | <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> 4. DETERMINE if SI actuated: <ul style="list-style-type: none"> ECCS pumps RUNNING. Any SI alarm LIT [M-4D]. </div> <div style="width: 50%;"> DETERMINE if SI required: <div style="margin-left: 20px;"> a. IF any of the following conditions exists: <ul style="list-style-type: none"> S/G pressure less than 600 psig <p style="text-align: center;">OR</p> RCS pressure less than 1870 psig, <p style="text-align: center;">OR</p> Containment pressure greater than 1.5 psig, <p>THEN ACTUATE SI. </p></div> <div style="margin-left: 20px;"> b. IF SI is NOT required, THEN PERFORM the following: <ol style="list-style-type: none"> 1) MONITOR status trees. 2) GO TO ES-0.1, Reactor Trip Response. </div> </div> </div> | |
| Examiner Note: If the crew enters ES-0.1 go to page 48. | | | |
| Examiner Note: The Main Feed Line Break Inside Containment will automatically insert two minutes after the Reactor trip. | | | |

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|---|-----------------|---------------------------------|
| Op-Test No.: 2016-301 | Scenario No.: 4 | Event No.: 7 |
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | |
| Time | Position | Applicant's Actions or Behavior |

Indications available:

Annunciators:

1-M-3

- 3C C-6, "LS-3-171D STM GEN #4 LEVEL LOW"
- 3C E-6, "LS-3-175D STM GEN #4 LEVEL LOW"

1-M-5

- 5A B-7, "LS-3-42D STEAM GEN LVL HIGH-LOW DEVIATION"
- 5C B-3, "MS-30-241 LOWER COMPT MOISTURE HI".

1-M-6

- 6B D-1, "LS-3-107D STM GEN LOOP 4 LOW FW FLOW LOW WATER LEVEL"
- 6B D-4, "LS-3-106B STEAM GENERATOR LOOP 4 LOW LOW WATER LEVEL"
- 6E C-6, ZS-61-186 ICE CONDENSER LOWER INLET DOOR OPEN

Indicators:

1-M-4

- 1-LI-3-110, 107, 106, SG-4 NR LEVEL: decreasing level

| | | |
|--|-----|---|
| | ATC | <p>1. VERIFY reactor TRIPPED:</p> <ul style="list-style-type: none"> • Reactor trip breakers OPEN • Reactor trip bypass breakers DISCONNECTED or OPEN • Rod bottom lights LIT • Rod position indicators less than or equal to 12 steps. • Neutron flux DROPPING |
| | BOP | <p>2. VERIFY turbine TRIPPED:</p> <ul style="list-style-type: none"> • Turbine stop valves CLOSED. |
| | BOP | <p>3. VERIFY at least one 6.9KV shutdown board ENERGIZED on this unit.</p> |

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|--|----------|---|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:7 |
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ATC | 4. DETERMINE if SI actuated: <ul style="list-style-type: none"> ECCS pumps RUNNING. Any SI alarm LIT [M-4D]. | |
| | BOP | 5. PERFORM ES-0.5, Equipment Verifications WHILE continuing in this procedure. | |
| | SRO/ATC | Continues with the performance of E-0 REACTOR TRIP OR SAFETY INJECTION | |
| | BOP | Performs ES-0.5, EQUIPMENT VERIFICATIONS. (go to page 49 for details) | |
| | SRO | Addresses foldout page. (see next page for details) | |
| | ATC | Places HS 68-8A, 31A, 50A, and 73A RCP's to STOP based on FOP actions. | |
| | BOP | Places HS-1-4A, 1-11A, 1-22A and 1-29A MAIN STM ISOL to CLOSE based on FOP actions. | |
| CT | BOP | Places HS-3-175A SG-4 TURBINE AFP LCV to CLOSE based on FOP actions. | |
| Examiner Note: If MD AFW LCV are not placed to ACC RESET and CLOSE ask followup question "what would be required if MD AFW pump started." | | | |
| Examiner Note: From EPM-4 | | | |
| 3.6.1 Adverse Containment Values | | | |
| B. <u>Adverse containment conditions</u> are deemed to exist whenever containment pressure exceeds 2.8 psig. Once containment pressure exceeds this value, adverse containment values must be used where provided in the EOPs and AOPs. Once implemented, adverse containment values shall continue to be used until TSC evaluation has determined that a return to normal values is acceptable. TSC evaluation is required even if containment pressure subsequently returns to normal. | | | |


Op-Test No.: 2016-301

Scenario No.: 4


Event No.:7


Event Description: Loss of All Feed/Feed Line Break Inside Containment.

| Time | Position | Applicant's Actions or Behavior |
|---|----------|---------------------------------|
| Foldout Page (Page 1 of 1) | | |
| <p><u>RCP TRIP CRITERIA</u></p> <p>IF any of the following conditions occurs:</p> <ul style="list-style-type: none"> RCS pressure less than 1250 psig AND at least one CCP or SI pump running OR Phase B isolation, <p>THEN STOP all RCPs.</p> <p><u>EVENT DIAGNOSTICS</u></p> <ul style="list-style-type: none"> IF any S/G pressure is lowering uncontrolled, THEN PERFORM the following: <ol style="list-style-type: none"> CLOSE MSIVs and MSIV bypass valves. IF any S/G pressure continues to lower uncontrolled, THEN PERFORM the following: <ol style="list-style-type: none"> ENSURE SI actuated. IF at least one S/G is intact (S/G pressure controlled or rising), THEN ISOLATE AFW to faulted S/G(s): <ul style="list-style-type: none"> CLOSE AFW level control valves for faulted S/G(s). IF any AFW valve for faulted S/G CANNOT be CLOSED, THEN REFER TO Appendix E to stop AFW flow to faulted S/G. ENSURE at least one of the following conditions met: <ul style="list-style-type: none"> total AFW flow greater than 440 gpm OR Narrow Range level greater than 10% [25% ADV] in at least one intact S/G. IF both trains of shutdown boards de-energized, THEN GO TO ECA-0.0, Loss of All AC Power. <p><u>TANK SWITCHOVER SETPOINTS</u></p> <ul style="list-style-type: none"> IF CST level less than 5%, THEN ALIGN AFW suction to ERCW. IF RWST level less than 27%, THEN GO TO ES-1.3, Transfer to RHR Containment Sump. | | |


| Op-Test No.: 2016-301 | Scenario No.: 4 | Event No.: 7 |
|--|-----------------|---|
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP/ATC | <p>6. DETERMINE if secondary heat sink available:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>a. CHECK total AFW flow greater than 440 gpm.</p> <p>b. CHECK narrow range level greater than 10% [25% ADV] in at least one S/G.</p> </div> <div style="width: 45%;"> <p>a. IF S/G narrow range level is less than 10% [25% ADV] in all S/Gs, THEN START AFW pumps and ALIGN valves as necessary to raise AFW flow greater than 440 gpm.</p> <p>b. MAINTAIN total feed flow greater than 440 gpm UNTIL narrow range level greater than 10% [25% ADV] in at least one S/G. IF AFW flow greater than 440 gpm CANNOT be established, THEN PERFORM the following:</p> <ol style="list-style-type: none"> 1) MONITOR status trees. 2) GO TO FR-H.1, Loss of Secondary Heat Sink. </div> </div> <div style="text-align: right; margin-top: 10px;">  </div> |
| <p>Examiner Note: Crew should recognize Loss of Heat Sink entry conditions, total AFW flow less than 440 gpm due to a loss of all AFW pumps, and implement 1-FR-0 verification and transitions to FR-H.1.</p> | | |

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|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:7 |
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | | |
| Time | Position | Applicant's Actions or Behavior | |


| | | |
|---|-----|---|
| | SRO | Transitions to FR-H.1, LOSS OF SECONDARY HEAT SINK. |
| CAUTION Feeding an Intact or Ruptured S/G is preferred to feeding a Faulted S/G. Thermal stresses from feeding a Faulted S/G could rupture tubes, resulting in a Faulted-AND-Ruptured S/G. | | |
| | SRO | Directs actions from FR-H.1, LOSS OF SECONDARY HEAT SINK. |
| | SRO | 1. DETERMINE procedure applicability: <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 60%;"> a. CHECK the following: <ul style="list-style-type: none"> Total feed flow less than 440 gpm due to operator action directed by another procedure. <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> Total feed flow capability of greater than 440 gpm AVAILABLE. </div> <div style="width: 35%; text-align: right;"> a. GO TO Step 2.  </div> </div> |
| | ATC | 2. MONITOR RWST level greater than 27%. |
| | ATC | 3. CHECK if secondary heat sink required: <div style="margin-left: 20px;"> a. RCS pressure greater than any non-Faulted S/G pressure. b. RCS temperature greater than 350°F. </div> |
| | ATC | 4. MONITOR at least one CCP available. |
| NOTE Pressurizer pressure greater than or equal to 2335 psig with rising RCS temperature and a low loop delta-T indicates loss of heat removal capability. | | |

| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:7 |
|---|----------|--|-------------|
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | ATC | <p>5. MONITOR RCS feed and bleed criteria:</p> <p>a. CHECK the following:</p> <ul style="list-style-type: none"> Any three S/G <u>wide range</u> levels less than 23% [43% ADV] <p>OR</p> <ul style="list-style-type: none"> Pressurizer pressure greater than or equal to 2335 psig due to <u>loss of secondary heat removal</u>. <p>a. GO TO Step 6.</p>  | |
| | BOP | <p>6. MONITOR CST level greater than 5%.</p> | |
| | BOP | <p>7. ATTEMPT to establish AFW flow to at least one S/G in the following order of priority-- Intact, Ruptured, Faulted:</p> <p>a. CHECK S/G blowdown isolation valves CLOSED.</p> <p>b. CHECK control room indications for cause of AFW failure:</p> <ul style="list-style-type: none"> CST level AFW pump power supply AFW valve alignment | |

| | | |
|--|-----------------|---|
| Op-Test No.: 2016-301 | Scenario No.: 4 | Event No.: 7 |
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <p>7. c. ESTABLISH MD AFW pump flow:</p> <ol style="list-style-type: none"> 1) ENSURE MD AFW pumps RUNNING. 2) ENSURE AFW level control valves OPEN. 3) ENSURE MD AFW recirculation valves FCV-3-400 and FCV-3-401 CLOSED. <p>d. ESTABLISH TD AFW pump flow:</p> <ol style="list-style-type: none"> 1) ENSURE turbine steam supply valves OPEN: <ul style="list-style-type: none"> • Either FCV-1-15 or FCV-1-16 • FCV-1-17 and FCV-1-18 • Trip and throttle valve, FCV-1-51. 2) ENSURE AFW level control valves OPEN. 3) RAISE TD AFW pump speed as necessary. <p>c. PERFORM the following:</p> <ul style="list-style-type: none"> • REFER TO EA-3-10, Establishin Motor Driven AFW Flow, as necessary • DISPATCH personnel to restore MD AFW pump flow. <p>d. PERFORM the following:</p> <ul style="list-style-type: none"> • REFER TO EA-3-9, Establishing Turbine Driven AFW Flow, as necessary • DISPATCH personnel to restore TD AFW pump flow. |
| <p>Communication: If dispatched, wait 5 minutes and report:</p> <p>“The Mechanical Overspeed has not tripped.”</p> <p>“No damage to the TD AFW pump or turbine.”</p> <p>“The PIP directs me to EA-3-5.”</p> <p>“The trip linkage is not latched.”</p> <p>If directed to reset the TD AFW OS Trip mechanism wait 5 minutes and report, “EA-3-5 directs me to tell you to place 1-FCV-1-51 to CLOSE for 10 seconds.”</p> | | |
| <p>Communication: If dispatched to inspect the 1A MD AFW breaker report, “Indicating lights on the 1A MD AFW breaker are dark.”</p> | | |
| CT | BOP | Places HS-1-51A-S TRIP/THROTTLE POS to CLOSE. |
| <p>NOTE Continuous actions in Step 8 are NOT applicable after RCS feed and bleed is initiated in Step 17.</p> | | |

| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:7 |
|---|----------|--|-------------|
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP | <p>8. MONITOR for AFW flow:</p> <p>a. CHECK total AFW flow to S/Gs greater than 440 gpm.</p> <p>b. RETURN TO procedure and step in effect.</p>  | |
| | SRO | Transitions to E-0 REACTOR TRIP OR SAFETY INJECTION step 6. | |
| | BOP | <p>6. DETERMINE if secondary heat sink available:</p> <p>a. CHECK total AFW flow greater than 440 gpm.</p> <p>b. CHECK narrow range level greater than 10% [25% ADV] in at least one S/G.</p> <p>a. IF S/G narrow range level is less than 10% [25% ADV] in all S/Gs, THEN START AFW pumps and ALIGN valves as necessary to raise AFW flow greater than 440 gpm.</p> <p>b. MAINTAIN total feed flow greater than 440 gpm UNTIL narrow range level greater than 10% [25% ADV] in at least one S/G.</p> | |

| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:7 |
|---|----------|---|-------------|
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | | <p>c. CONTROL feed flow:</p> <ol style="list-style-type: none"> 1) MAINTAIN narrow range lvl between 10% [25% ADV] and 50% in intact and ruptured S/Gs. 2) IF AFW flow is isolated to any faulted or ruptured S/G, THEN MONITOR AFW flow and LCV positions to verify flow remains ISOLATED. | |
| | | <p>7. CHECK if main steam lines should be isolated:</p> <ol style="list-style-type: none"> a. CHECK if any of the following conditions have occurred: <ul style="list-style-type: none"> • Any S/G pressure less than 600 psig OR • Any S/G pressure lowering UNCONTROLLED OR • Phase B actuation. b. ENSURE MSIVs and MSIV bypass valves CLOSED. c. ENSURE applicable Foldout Page actions COMPLETED. | |
| CT | BOP | Places HS-1-4A, 1-11A, 1-22A and 1-29A MAIN STM ISOL to CLOSE if not already performed. | |
| CT | BOP | Places HS-3-175A SG-4 TURBINE AFP LCV to CLOSE if not already performed. | |
| | | <p>8. CHECK RCP trip criteria:</p> <ol style="list-style-type: none"> a. CHECK the following: <ul style="list-style-type: none"> • RCS pressure less than 1250 psig AND • At least one CCP OR SI pump RUNNING. b. STOP RCPs. | |

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|---|----------|---|--|--|--|
| Op-Test No.: 2016-301 | | Scenario No.: 4 | | Event No.:7 | |
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | |
| | ATC | Places HS 68-8A, 31A, 50A, and 73A RCP's to STOP if not already performed. | | | |
| | | 9. MONITOR RCS temperatures: <ul style="list-style-type: none"> • IF any RCP running, THEN CHECK T-avg stable at or trending to between 547°F and 552°F. OR • IF RCPs stopped, THEN CHECK T-cold stable at or trending to between 547°F and 552°F. | | | |
| | BOP | Manually controls AFW flow to maintain total AFW flow greater than 440 gpm and less than 600 gpm until S/G are greater than 25% NR. | | | |
| | ATC | 10. CHECK pressurizer PORVs, safeties, and spray valves: <ul style="list-style-type: none"> a. Pressurizer PORVs CLOSED. b. Pressurizer safety valves CLOSED. c. Normal spray valves CLOSED. d. Power to at least one block valve AVAILABLE. e. At least one block valve OPEN. | | | |
| | SRO | 11. DETERMINE if S/G secondary pressure boundaries are INTACT: <ul style="list-style-type: none"> • CHECK all S/G pressures CONTROLLED or RISING. • CHECK all S/G pressures greater than 140 psig. | | PERFORM the following: <ul style="list-style-type: none"> a. MONITOR status trees. b. GO TO E-2, Faulted Steam Generator Isolation.  | |


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|---|----------|---------------------------------|-------------|
| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:7 |
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | | |
| Time | Position | Applicant's Actions or Behavior | |

Examiner Note: MONITOR status trees, the crew will implement status tree monitoring via SPDS. When a RED or ORANGE path status tree is observed, the SRO will designate one of the Board operators (typically the BOP) to verify status tree conditions using 1-FR-0, UNIT 1 STATUS TREES. Once verified, the SRO should direct the crew to transition to the appropriate RED and/or ORANGE path procedure(s).


Examiner Note: If an ORANGE Path for Containment is evident, the SRO will transition to FR-Z.1, If not the SRO will transition to E-2, go to page 43 for details.


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|--|-----|---|
| | SRO | Transitions to FR-Z.1 High Containment Pressure. |
| | SRO | Directs actions from FR-Z.1 High Containment Pressure. |
| FR-Z.1 Actions | | |
| <p>NOTE If this procedure has been entered for an orange path and performance of ECA-1.1 (Loss of RHR Sump Recirculation) is required, FR-Z.1 may be performed concurrently with ECA-1.1.</p> | | |
| | BOP | 1. MONITOR RWST level greater than 27%. |
| | BOP | 2. VERIFY Phase B valves CLOSED: <ul style="list-style-type: none"> Panel 6K PHASE B GREEN Panel 6L PHASE B GREEN. |
| | BOP | 3. ENSURE RCPs STOPPED. |


| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:7 |
|---|----------|---|-------------|
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP | <p>4. DETERMINE if this procedure should be exited:</p> <p>a. CHECK for faulted S/G:</p> <ul style="list-style-type: none"> Any S/G pressure LOWERING in an uncontrolled manner <p>OR</p> <ul style="list-style-type: none"> Any S/G pressure less than 140 psig. <p>b. CHECK containment pressure less than 12 psig.</p> <p>c. CHECK at least one containment spray pump RUNNING and delivering flow.</p> <p>d. CHECK containment spray pump suction aligned to RWST.</p> <p>e. ENSURE the following:</p> <ul style="list-style-type: none"> one containment spray pump in PULL TO LOCK remaining containment spray pump RUNNING. | |
| | BOP | Places the A OR B Containment Spray 1-HS-72-27A or 1-HS-72-10A hand switch in PULL-TO-LOCK. | |

| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:7 |
|---|----------|--|-------------|
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP | <p>4. (Continued)</p> <p>f. MONITOR one cntmt spray pump RUNNING and delivering flow.</p> <p>g. CHECK at least one containment air return fan RUNNING.</p> <p>h. RETURN to procedure and step in effect.</p>  | |
| | SRO | Transitions to E-2, FAULTED STEAM GENERATOR ISOLATION. | |
| | SRO | Direct actions from E-2, FAULTED STEAM GENERATOR ISOLATION. | |
| CAUTION | | Unisolating a faulted S/G or secondary break should NOT considered UNLESS needed for RCS cooldown. | |
| NOTE | | This procedure has a foldout page. | |
| | SRO | Addresses Foldout page. | |
| <p style="text-align: center;">Foldout Page (Page 1 of 1)</p> <p style="text-align: center;"><u>TANK SWITCHOVER SETPOINTS</u></p> <ul style="list-style-type: none"> • IF RWST level less than 27%, THEN GO TO ES-1.3, Transfer to RHR Containment Sump. • IF CST level less than 5%, THEN ALIGN AFW suction to ERCW USING EA-3-9, Establishing Turbine Driven AFW Flow, and EA-3-10, Establishing Motor Driven AFW Flow. | | | |

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|--|----------|---|--|-------------|--|
| Op-Test No.: 2016-301 | | Scenario No.: 4 | | Event No.:7 | |
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | |
| | BOP | 1. CHECK MSIVs and MSIV bypass valves CLOSED . CLOSE valves. IF any MSIV OR MSIV bypass CANNOT be closed, THEN CLOSE valve USING EA-1-1, C MSIVs Locally. | | | |
| | BOP | 2. CHECK ANY S/G secondary pressure boundary INTACT : <ul style="list-style-type: none"> Any S/G pressure CONTROLLED or RISING. | | | |
| | SRO | 3. IDENTIFY Faulted S/G(s): a. CHECK S/G pressures: <ul style="list-style-type: none"> Any S/G pressure DROPPING in an uncontrolled manner. OR <ul style="list-style-type: none"> Any S/G pressure less than 140 psig. | | | |
| | SRO | Identifies #4 S/G as faulted. | | | |
| CAUTION 1) Secondary heat sink requires at least one S/G available. 2) If the TD AFW pump is the only source of feed flow, isolating both steam supplies will result in loss of secondary heat sink. | | | | | |

| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:7 |
|---|----------|---|-------------|
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP | <p>4. ISOLATE Faulted S/G(s):</p> <p>a. ENSURE MFW isolated to faulted S/G(s) by any of the following:</p> <ul style="list-style-type: none"> • feedwater isolation valve CLOSED [M-4] <p>OR</p> <ul style="list-style-type: none"> • feedwater regulating valve and bypass valve CLOSED [M-3]. | |
| | BOP | <p>b. ENSURE AFW isolated to faulted S/G(s):</p> <ol style="list-style-type: none"> 1) ENSURE AFW LCVs for faulted S/G are CLOSED. 2) PLACE TD AFW LCV for faulted S/G in CLOSE PULL TO LOCK. 3) MONITOR AFW flow and LCV positions to verify AFW remains isolated to faulted S/G. | |
| CT | BOP | Places HS-3-175A SG-4 Turbine AFP LCV to CLOSE. | |
| | BOP | <p>c. CHECK S/G #1 or #4 faulted.</p> <p>c. GO TO Substep 4.e.</p>  | |
| | BOP | <p>4. e. VERIFY S/G blowdown valves CLOSED.</p> <p>f. VERIFY atmospheric relief CLOSED.</p> | |

| Op-Test No.: 2016-301 | | Scenario No.: 4 | Event No.:7 |
|---|----------|---|-------------|
| Event Description: Loss of All Feed/Feed Line Break Inside Containment. | | | |
| Time | Position | Applicant's Actions or Behavior | |
| | BOP | <p>5. VERIFY secondary radiation NORMAL:</p> <p>a. CHECK secondary radiation NORMAL USING Appendix A, Secondary Rad Monitors. (App. A also contained in ES-0.5)</p> <p>b. PERFORM Appendix F, Verifying Secondary Radiation Using Surveys and Sampling.</p> | |
| | BOP | <p>6. CHECK SI termination criteria:</p> <p>a. RCS subcooling based on core exit T/Cs greater than 40°F.</p> <p>b. Secondary heat sink:</p> <ul style="list-style-type: none"> • Narrow range level in at least one Intact S/G greater than 10% [25% ADV] OR • Total feed flow to Intact S/Gs greater than 440 gpm. <p>c. RCS pressure STABLE or RISING.</p> <p>d. Pressurizer level greater than 10% [20% ADV].</p> <p>e. GO TO ES-1.1, SI Termination.</p>  | |
| <p>The scenario may be terminated when the isolates #4 Steam Generator, at the discretion of the Lead examiner.</p> | | | |


| Op-Test No.: 2016-301 | | Scenario No.: 4 |
|-----------------------------------|----------|---|
| Event Description: ES-0.1 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <p>NOTE This procedure has a foldout page.</p> <p>1. MONITOR for SI actuation:</p> <ul style="list-style-type: none"> • IF SI actuation occurs, THEN GO TO E-0, Reactor Trip or Safety Injection.  |
| | | <p>2. VERIFY Generator Circuit Bkr (GCB) OPEN. [M-1] OPEN GCB.</p> <p>IF GCB CANNOT be opened, THEN PERFORM the following: [ECB]</p> <ul style="list-style-type: none"> • <u>Unit 1 Only:</u> ENSURE breakers 5034 and 5038 OPEN. • <u>Unit 2 Only:</u> ENSURE breakers 924 and 928 OPEN. |
| | | |
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Op-Test No.: 2016-301

Scenario No.: 4

Event Description: ES-0.5 Actions

| Time | Position | Applicant's Actions or Behavior |
|-----------------------|----------|---|
| ES-0.5 Actions | | |
| | BOP | 1. VERIFY D/Gs RUNNING. |
| | BOP | 2. VERIFY D/G ERCW supply valves OPEN. |
| | BOP | 3. VERIFY at least four ERCW pumps RUNNING. |
| | BOP | 4. VERIFY CCS pumps RUNNING: <ul style="list-style-type: none"> • Pump 1A-A (2A-A) • Pump 1B-B (2B-B) • Pump C-S. |
| | BOP | 5. VERIFY EGTS fans RUNNING. |
| | BOP | 6. VERIFY generator breakers OPEN. |
| | BOP | 7. NOTIFY at least two AUOs to report to MCR to be available for local actions. |
| | BOP | 8. VERIFY AFW pumps RUNNING: <ul style="list-style-type: none"> a. MD AFW pumps b. TD AFW pump. |
| | BOP | 9. CHECK AFW valve alignment: <ul style="list-style-type: none"> a. VERIFY MD AFW LCVs in AUTO. b. VERIFY TD AFW LCVs OPEN. c. VERIFY MD AFW pump recirculation valves FCV-3-400 and FCV-3-401 CLOSED. |

| Op-Test No.: 2016-301 | | Scenario No.: 4 |
|-----------------------------------|----------|--|
| Event Description: ES-0.5 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <p>10. VERIFY MFW Isolation:</p> <p>a. CHECK MFW pumps TRIPPED.</p> <p>b. ENSURE the following:</p> <ul style="list-style-type: none"> • MFW regulating valves CLOSED • MFW regulating bypass valve controllers in MANUAL with output ZERO • MFW isolation valves CLOSED. |
| | BOP | Manually closes Feed Reg Valves. |
| | BOP | <p>11. MONITOR ECCS operation:</p> <p>a. VERIFY ECCS pumps RUNNING:</p> <ul style="list-style-type: none"> • CCPs • RHR pumps • SI pumps <p>b. VERIFY CCP flow through CCPIT.</p> <p>c. CHECK RCS pressure less than 1650 psig.</p> <p>c. GO TO Step 12.</p>  |


Op-Test No.: 2016-301

Scenario No.: 4

Event Description: ES-0.5 Actions

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---|
| | BOP | <p>12. VERIFY ESF systems ALIGNED:</p> <p>a. Phase A ACTUATED:</p> <ul style="list-style-type: none"> • PHASE A TRAIN A alarm LIT [M-6C, B5]. • PHASE A TRAIN B alarm LIT [M-6C, B6]. <p>b. Cntmt Vent Isolation ACTUATED:</p> <ul style="list-style-type: none"> • CNTMT VENT ISOLATION TRAIN A alarm LIT [M-6C, C5]. • CNTMT VENT ISOLATION TRAIN B alarm LIT [M-6C, C6]. <p>c. Status monitor panels:</p> <ul style="list-style-type: none"> • 6C DARK • 6D DARK • 6E LIT OUTSIDE outlined area • 6H DARK • 6J LIT. <p>d. Train A status panel 6K:</p> <ul style="list-style-type: none"> • CNTMT VENT GREEN • PHASE A GREEN <p>e. Train B status panel 6L:</p> <ul style="list-style-type: none"> • CNTMT VENT GREEN • PHASE A GREEN |

| Op-Test No.: 2016-301 | | Scenario No.: 4 |
|-----------------------------------|----------|--|
| Event Description: ES-0.5 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <p>13. MONITOR for containment spray and Phase B actuation:</p> <p>a. CHECK for any of the following:</p> <ul style="list-style-type: none"> Phase B ACTUATED <p>OR</p> <ul style="list-style-type: none"> Containment pressure greater than 2.8 psig. <p>b. VERIFY containment spray INITIATED:</p> <ol style="list-style-type: none"> Containment spray pumps RUNNING. Containment spray header isolation valves FCV-72-39 and FCV-72-2 OPEN. Containment spray recirculation valves to RWST FCV-72-34 and FCV-72-13 CLOSED. Containment spray header flow greater than 4750 gpm per train. Panel 6E LIT. |
| | BOP | <p>c. VERIFY Phase B ACTUATED:</p> <ul style="list-style-type: none"> PHASE B TRAIN A alarm LIT [M-6C, A5]. PHASE B TRAIN B alarm LIT [M-6C, A6]. <p>d. ENSURE RCPs STOPPED.</p> <p>e. VERIFY Phase B valves CLOSED:</p> <ul style="list-style-type: none"> Panel 6K PHASE B GREEN. Panel 6L PHASE B GREEN. <p>f. WHEN 10 minutes have elapsed, THEN ENSURE containment air return fans RUNNING.</p> |

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|---|----------|---|
| Op-Test No.: 2016-301 | | Scenario No.: 4 |
| Event Description: ES-0.5 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| NOTE The continuous action in Step 14 remains applicable if containment pressure rises above 1.5 psig after ES-0.5 is completed. | | |
| | BOP | 14. MONITOR if containment vacuum relief isolation valves should be closed: a. CHECK containment pressure greater than 1.5 psig. a. GO TO Step 15.  |
| | BOP | 15. CHECK secondary and containment rad monitors USING the following: <ul style="list-style-type: none"> • Appendix A, Secondary Rad Monitors • Appendix B, Containment Rad Monitors. |
| | | <p style="text-align: center;">APPENDIX A</p> <p style="text-align: center;">SECONDARY RAD MONITORS</p> <p>1. IF SI occurred on <u>Unit 1</u>, THEN CHECK following rad monitors including available trends prior to isolation:</p> <ul style="list-style-type: none"> • Condenser exhaust recorder 1-RR-90-119 • S/G blowdown recorder 1-RR-90-120 • Unit 1 Main steam line rad monitors [1-M-30] • Post-Accident rad recorder 1-RR-90-268B points 3 (blue), 4 (violet), 5 (black), and 6 (turquoise). [1-M-31 (back of 1-M-30)] <p>3. NOTIFY Unit Supervisor whether secondary radiation is NORMAL or HIGH.</p> |

| Op-Test No.: 2016-301 | | Scenario No.: 4 |
|-----------------------------------|----------|--|
| Event Description: ES-0.5 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <p style="text-align: center;">APPENDIX B</p> <p style="text-align: center;">CONTAINMENT RAD MONITORS</p> <p>1. IF SI occurred on <u>Unit 1</u>, THEN CHECK following rad monitors:</p> <ul style="list-style-type: none"> Upper containment post-accident rad monitors 1-RM-90-271A and 1-RM-90-272A NORMAL [1-M-30] Lower containment post-accident rad monitors 1-RM-90-273A and 1-RM-90-274A NORMAL [1-M-30] Containment rad recorders 1-RR-90-112 and 1-RR-90-106 NORMAL [0-M-12] (prior to isolation). |
| | BOP | <p>16. WHEN directed by E-0, THEN PERFORM Appendix D, Hydrogen Mitigation Actions.</p> |
| | BOP | <p>17. CHECK pocket sump pumps STOP pumps. STOPPED: [M-15, upper left corner]</p> <ul style="list-style-type: none"> HS-77-410, Rx Bldg Aux Floor and Equipment Drain Sump pump A HS-77-411, Rx Bldg Aux Floor and Equipment Drain Sump pump B. |
| | BOP | <p>18. DISPATCH personnel to perform EA-0-1, Equipment Checks Following ESF Actuation.</p> |
| | BOP | <p>19. ENSURE plant announcement has been made regarding Reactor Trip and SI.</p> |
| | BOP | <p>20. PERFORM Appendix E, Spent Fuel Cooling Actions, as time permits.</p> |

| Op-Test No.: 2016-301 | | Scenario No.: 4 |
|-----------------------------------|----------|--|
| Event Description: ES-0.5 Actions | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <p style="text-align: center;">APPENDIX B</p> <p style="text-align: center;">CONTAINMENT RAD MONITORS</p> <p>1. IF SI occurred on <u>Unit 1</u>, THEN CHECK following rad monitors:</p> <ul style="list-style-type: none"> • Upper containment post-accident rad monitors 1-RM-90-271A and 1-RM-90-272A NORMAL [1-M-30] • Lower containment post-accident rad monitors 1-RM-90-273A and 1-RM-90-274A NORMAL [1-M-30] • Containment rad recorders 1-RR-90-112 and 1-RR-90-106 NORMAL [0-M-12] (prior to isolation). |
| | BOP | <p>16. WHEN directed by E-0, THEN PERFORM Appendix D, Hydrogen Mitigation Actions.</p> |
| | BOP | <p>17. CHECK pocket sump pumps STOP pumps. STOPPED: [M-15, upper left corner]</p> <ul style="list-style-type: none"> • HS-77-410, Rx Bldg Aux Floor and Equipment Drain Sump pump A • HS-77-411, Rx Bldg Aux Floor and Equipment Drain Sump pump B. |
| | BOP | <p>18. DISPATCH personnel to perform EA-0-1, Equipment Checks Following ESF Actuation.</p> |
| | BOP | <p>19. ENSURE plant announcement has been made regarding Reactor Trip and SI.</p> |
| | BOP | <p>20. PERFORM Appendix E, Spent Fuel Cooling Actions, as time permits.</p> |