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|---|--|
| Facility: <u>Callaway</u> Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/> | Date of Examination: <u>3/4/19</u> Operating Test Number: <u>2019-1</u> |
|---|--|

| Administrative Topic (see Note) | Type Code* | Describe activity to be performed |
|---------------------------------|------------|---|
| Conduct of Operations A1 | R, N | 2.1.40 (3.9) Knowledge of refueling administrative requirements. JPM: Review OSP-SF-00003 to determine if core alterations can begin |
| Conduct of Operations A2 | R, N | 2.1.18 (3.8) Ability to make accurate, clear, and concise logs, records, status boards, and reports. JPM: Determine Reportability |
| Equipment Control A3 | R, N | 2.2.17 (3.8) Knowledge of the process for managing maintenance activities during power operations, such as risk assessments, work prioritization, and coordination with the transmission system operator. JPM: Review Work Week Schedule and determine Technical Specifications and risk mitigation strategies |
| Radiation Control A4 | R, N | 2.3.6 (3.6) Ability to approve release permits. JPM: Review CA0855 for accuracy and determine ODCM LCO limits will be exceeded |
| Emergency Plan A5 | R, D | 2.4.41 (4.6) Knowledge of the Emergency Action Level (EAL) thresholds and classification JPM: Classify Event and Complete Notification Form – Sentry Not Available |

NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).

* Type Codes and Criteria: (C)ontrol room, (S)imulator, or Class(R)oom
 (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs and RO retakes)
 (N)ew or (M)odified from bank (≥ 1)
 (P)revious 2 exams (≤ 1, randomly selected)

SRO Administrative JPMs:

- SRO Admin #1 This is a NEW JPM. The SRO candidate will be required to review OSP-SF-00003 surveillance (Attachment 2 and 3) to determine if core alteration can begin. The candidate will determine that core alterations can not begin due to the configuration of CTMT Purge Gas Detectors, GTRE0022 and GTRE0033. Additionally, direct communications have not been established supporting core alterations.
- SRO Admin #2 This is a NEW JPM. The SRO candidate will be required to determine the reportability for a deviation and implementation of 10CFR50.54 X&Y during a severe weather event. A 1 hour report is required to the NRC Operations Center.
- SRO Admin #3 This is a NEW JPM. The SRO candidate will be required to review a work week schedule with 5 planned activities. Out of these activities, 1 will require Technical Specification 3.8.1 Condition B entry. Furthermore, the candidate will determine that the planned work activities cannot occur due to parallel work on the Security Diesel and the "A" EDG day tank.
- SRO Admin #4 This is a NEW JPM. The SRO candidate will be required to find multiple errors on CA0855, Liquid / Gaseous Release Worksheet, concerning a 'B' Waste Gas Decay Tank Batch release. Additionally, the SRO candidate will determine that an ODCM Gaseous Effluent LCO will not be met if the Batch release is completed.
- SRO Admin #5 This is a BANK JPM. This JPM has not been used on a previous ILT NRC Exam. This JPM is Time Critical and the candidate will have 15 minutes to classify an event based on the conditions given and then an additional 15 minutes (from the time of declaration) to complete EIP-ZZ-00102 Attachment 4, Notification Form – Sentry NOT Available. Sentry not available is a change from the original bank JPM and will allow the JPM to be given in a classroom setting

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

A1

| | | | |
|------------------|--|-------------|------------|
| JPM No: | No bank id yet- | KSA No: | Gen 2.1.40 |
| Revision Date: | 11/15/2018 | KSA Rating: | 3.9 |
| Job Title: | SRO | | |
| Duty: | Refuel | | |
| Task Title: | Review OSP-SF-00003 to determine if Core Alterations can begin | | |
| Completion Time: | 20 minutes | | |

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☒ Simulator/Lab ☐ Plant ☒ Classroom

Method of Performance: ☐ Simulated ☒ Performed

☐ Alternate Path ☐ Time Critical ☐ RCA

References: OSP-SF-00003, Pre-Core Alterations Verifications, Rev 30

Tools / Equipment: None

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

A1

Initial Conditions: The Plant is MODE 6. You are an extra SRO on shift that will be the Fuel Handling Supervisor when core alterations start in 45 minutes. A Reactor Operator has completed the surveillance OSP-SF-00003 Section 6.3 "Prior to Core Alterations".

Applicable plant data is as follows:

- Per OSP-SF-00001, the required refueling boron concentration is 1900 ppm.
- Current RCS boron concentration 2050 ppm.
- Current Refueling Pool boron concentration is 2030 ppm.
- OSP-BL-00001, Unborated Water Source Isolation Valves/MODE 6, is current.
- Source Range Nuclear Instruments N31 & N32 are OPERABLE.
- N60 & N61, Gamma metric Nuclear Instruments, are NON-Functional due to an emergent Engineering issue.
- Refueling water level is 24ft above the top of the reactor vessel flange with "A" RHR OPERABLE and in service with 3000 gpm flow.
- OSP-GT-00003 was just performed.
- Containment Personnel Airlock Doors and the Emergency Access Hatch Doors are CLOSED and will remain closed during core alterations.
- Containment Equipment Hatch is OPEN and will remain open during core alterations. Designated individuals are briefed and standing by to close it if necessary.
- Containment Purge is in service with GTRE0022 and GTRE0033, CTMT Purge EXH Gas Detector, in OPERATE.
- CRVIS plus GKRE04 and GKRE05 are OPERABLE.
- OSP-GT-00004 is current.
- Direct Communications are not established between the Control Room and the refueling station.

Initiating Cues: The Shift Outage Manager (SOM) has directed you to review the completed OSP-SF-00003 surveillance, to ensure core alterations can start when scheduled. Report your results to the SOM.

Task Standard: The SRO candidate should determine that core alternations can not proceed as scheduled until the following items are corrected:

1. As the Equipment Hatch is OPEN with Purge in operation, GTRE0022 and GTRE0033 should be in BYPASS (not operate) per step 6.3.6.
2. Direct Communications are NOT yet established as required per step 6.3.10.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

A1

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|----------|---|---|--|--|
| 1. | Obtain a verified working copy of OSP-SF-00003, , Pre Core Alterations Verifications | Provide the candidate with a the completed OSP-SF-00003, Pre Core Alterations Verifications | Candidate obtained surveillance procedure. | <div>S U</div> <div>Comments:</div> |
| *2 | Determines GTRE0022 and GTRE033 are not in the correct configuration OSP-SF-00003 step 6.3.6 | SEE KEY Provided Note: If the Candidate stops after determining only one reason core alteration can not begin, "Ask if there are addition reasons core alteration can not begin" | Candidate determined GTRE0022 and GTRE033 are in OPERATE but should be in BYPASS per step 6.3.6 | <div>S U</div> <div>Comments:</div> |
| *3 | Determines that direct communications have not been established are required before core alteration can begin OSP-SF-00003 step 6.3.10 | | Candidate determined direct communications between the control room and the refueling station are NOT yet established and are required to be established within 1 hour prior to start. | <div>S U</div> <div>Comments:</div> |
| 4. | THE JPM IS COMPLETE | Record Stop time on Page 2 | | <div>S U</div> <div>Comments:</div> |

Initial Conditions: The Plant is MODE 6. You are an extra SRO on shift that will be the Fuel Handling Supervisor when core alterations start in 45 minutes. A Reactor Operator has completed the surveillance OSP-SF-00003 Section 6.3 "Prior to Core Alterations".

Applicable plant data is as follows:

- Per OSP-SF-00001, the required refueling boron concentration is 1900 ppm.
- Current RCS boron concentration 2050 ppm.
- Current Refueling Pool boron concentration is 2030 ppm.
- OSP-BL-00001, Unborated Water Source Isolation Valves/MODE 6, is current.
- Source Range Nuclear Instruments N31 & N32 are OPERABLE.
- N60 & N61, Gamma metric Nuclear Instruments, are NON-Functional due to an emergent Engineering issue.
- Refueling water level is 24ft above the top of the reactor vessel flange with "A" RHR OPERABLE and in service with 3000 gpm flow.
- OSP-GT-00003 was just performed.
- Containment Personnel Airlock Doors and the Emergency Access Hatch Doors are CLOSED and will remain closed during core alterations.
- Containment Equipment Hatch is OPEN and will remain open during core alterations. Designated individuals are briefed and standing by to close it if necessary.
- Containment Purge is in service with GTRE0022 and GTRE0033, CTMT Purge EXH Gas Detector, in OPERATE.
- CRVIS plus GKRE04 and GKRE05 are OPERABLE.
- OSP-GT-00004 is current.
- Direct Communications are not established between the Control Room and the refueling station.

Initiating Cues: The Shift Outage Manager (SOM) has directed you to review the completed OSP-SF-00003 surveillance, to ensure core alterations can start when scheduled. Report your results to the SOM.

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

A2

JPM No: Admin1-SRO-SO-003, KSA No: Gen 2.1.18
Determine Reportability
Revision Date: 09/10/2018 KSA Rating: 3.8
Job Title: SRO
Duty: Administrative
Task Title: Determine Reportability
Requirements
Completion Time: 20 minutes

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☒ Simulator/Lab ☐ Plant ☒ Classroom

Method of Performance: ☐ Simulated ☒ Performed

☐ Alternate Path ☐ Time Critical ☐ RCA

References: APA-ZZ-00520, Reporting Requirements and Responsibilities, Rev 50
OTO-ZZ-00012, Severe Weather, Rev 39

Tools / Equipment: None

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

A2

Initial Conditions: Reactor Power is 100%.

OTO-ZZ-00012, Severe Weather, Attachment E, 'Tornado Warning for Callaway Plant' is in progress.

The Shift Manager has authorized a security staffing deviation due to the severe weather IAW 10 CFR50.54X&Y. This deviation is also a Technical Specification deviation.

The Shift Manager has reviewed EALS and none are applicable.

Initiating Cues: You are an extra SRO on shift performing Control Room observations. The Shift Manager has directed you to determine the initial reportability requirements for this event per APA-ZZ-00520, Reporting Requirements and Responsibilities.

Inform the Shift Manager of the shortest time requirement AND the agency(s) requiring notification.

Task Standard: The SRO will have determined that a 1 hour report is required to be made to the NRC Operation Center.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

A2

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|--|---|--|
| 1. | Obtain a verified working copy of APA-ZZ-00520, REPORTING REQUIREMENTS AND RESPONSIBILITIES | Provide the candidate with a copy of APA-ZZ-00520, REPORTING REQUIREMENTS AND RESPONSIBILITIES | Candidate obtained correct procedure. | <div>S U</div> <div>Comments:</div> |
| *2 | Determines a 1 hour report is required Attachment 1, Step 3.d OR Attachment 4 Sheet 1 OR Attachment 2 Sheet 9 OR Attachment 3 sheet 16 | | Candidate determined a 1 hour report is needed per Step #3d | <div>S U</div> <div>Comments:</div> |
| *3 | Determines the NRC Operations Center is the agency required to be notified. Attachment 1, Step 3.d OR Attachment 4 Sheet 1 | | Candidate determined the NRC Operations Center (NRC OD) is the agency required to be notified. (Step 3.d.1 on Attachment 1 OR Attachment 4 Sheet 1) | <div>S U</div> <div>Comments:</div> |
| 4. | THE JPM IS COMPLETE | Record Stop time on Page 2 | | <div>S U</div> <div>Comments:</div> |

Initial Conditions: Reactor Power is 100%.

OTO-ZZ-00012, Severe Weather, Attachment E, 'Tornado Warning for Callaway Plant' is in progress.

The Shift Manager has authorized a security staffing deviation due to the severe weather IAW 10 CFR50.54X&Y. This deviation is also a Technical Specification deviation.

The Shift Manager has reviewed EALS and none are applicable.

Initiating Cues: You are an extra SRO on shift performing Control Room observations. The Shift Manager has directed you to determine the initial reportability requirements for this event per APA-ZZ-00520, Reporting Requirements and Responsibilities.

Inform the Shift Manager of the shortest time requirement AND the agency(s) requiring notification.

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

A3

JPM No: Admin2-SRO-SO-001, KSA No: Gen 2.2.17
Review Work Week Schedule
and determine Technical
Specifications and risk
mitigation strategies
Revision Date: 11/07/2018 KSA Rating: 3.8
Job Title: SRO
Duty: Administrative
Task Title: Assess Plant Risk
Completion Time: 20 minutes

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☒ Simulator/Lab ☐ Plant ☒ Classroom

Method of Performance: ☐ Simulated ☒ Performed

☐ Alternate Path ☐ Time Critical ☐ RCA

References: ODP-ZZ-00002, Appendix 2 Risk Management Actions for Planned
Risk Significant Activities, Rev 15
EDP-ZZ-01129, Callaway Energy Center Risk Assessment, Rev 47
Technical Specifications 3.8.1, AC Sources Operating, and it basis

Tools / Equipment: None

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

A3

Initial Conditions: Reactor Power is projected to be 100%.

Your upcoming "A" Train work week schedule is as follows:

| Task / Scope | Estimated Start | Estimated Finish |
|---|-----------------|------------------|
| Security Diesel – WPA required for engine rebuild with piston replacement | Monday @0700 | Thursday @1200 |
| "A" CCW pump – WPA required for clean and inspect | Monday @0700 | Tuesday @1500 |
| "C" Air Compressor – WPA required for clean and inspect compressor and dryer inspection | Tuesday @0700 | Wednesday @1500 |
| "A" EDG day tank – WPA required to drain tank for drain valve replacement | Wednesday @0700 | Wednesday @1500 |
| "A" Intake Pump – WPA required for bay inspection | Thursday @0700 | Friday @1500 |

Initiating Cues: The Shift Manager has directed you to review your upcoming work week schedule to determine the Technical Specifications, if any, that will be entered during the week.

Additionally, determine risk management actions / requirements / limitations, if any, per ODP-ZZ-00002 Appendix 2.

Inform the Shift Manager of the results of your review by writing the results below.

Task Standard: The SRO candidate should determine that T.S. 3.8.1 Condition B is not met due to the "A" EDG day tank work. Furthermore, the parallel work on the "A" EDG day tank and the Security Diesel is not allowed per ODP-ZZ-00002, Appendix 2, Risk Management Actions for planned Risk Significant Activities.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

A3

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|---|---|--|
| *1. | Determines "A" EDG will be Inoperable. | Note: T.S. 3.8.3 DG fuel oil is not applicable. Also T.S. 3.7.7 is not applicable as 1 "A" Train CCW pump will still be operable with only 1 being required. | Candidate determined that due to the day tank work the "A" EDG will be inoperable and T.S. LCO 3.8.1 Condition B is not met. | <div>S U</div> <div>Comments:</div> |
| *2. | Determines Risk Mitigation Activities | | Candidate determined that the actions of Section 3.0 and Step 2.2 are applicable and due to the fact that "A" EDG and the Security Diesel are scheduled to happen in parallel which is NOT allowed per ODP-ZZ-00002 Appendix 2. | <div>S U</div> <div>Comments:</div> |
| 3. | THE JPM IS COMPLETE | Record Stop time on Page 2 | | <div>S U</div> <div>Comments:</div> |

Initial Conditions: Reactor Power is projected to be 100%.

Your upcoming "A" Train work week schedule is as follows:

| Task / Scope | Estimated Start | Estimated Finish |
|---|------------------------|-------------------------|
| Security Diesel – WPA required for engine rebuild with piston replacement | Monday @0700 | Thursday @1200 |
| "A" CCW pump – WPA required for clean and inspect | Monday @0700 | Tuesday @1500 |
| "C" Air Compressor – WPA required for clean and inspect compressor and dryer inspection | Tuesday @0700 | Wednesday @1500 |
| "A" EDG day tank – WPA required to drain tank for drain valve replacement | Wednesday @0700 | Wednesday @1500 |
| "A" Intake Pump – WPA required for bay inspection | Thursday @0700 | Friday @1500 |

Initiating Cues: The Shift Manager has directed you to review your upcoming work week schedule to determine the Technical Specifications, if any, that will be entered during the week.

Additionally, determine risk management actions / requirements / limitations, if any, per ODP-ZZ-00002 Appendix 2.

Inform the Shift Manager of the results of your review by writing the results below.

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

A4

JPM No: Admin3-SRO-SO-001, KSA No: Gen 2.3.6
Review CA0855 for accuracy
and determine ODCM LCO
will be not met if WGD
release is completed

Revision Date: 09/12/2018 KSA Rating: 3.8
Job Title: SRO
Duty: Administrative
Task Title: Determine Technical
Specifications/TRM/ODCM
Completion Time: 25 minutes

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☒ Simulator/Lab ☐ Plant ☒ Classroom

Method of Performance: ☐ Simulated ☒ Performed

☐ Alternate Path ☐ Time Critical ☐ RCA

References: TRM 16.11.2.2 (ODCM 9.7.1)
HTP-ZZ-02014, Release permit processing using the EMS Application
Software, Rev 59
CA0855 Liquid / Gaseous Release Worksheet, Rev 0
Offsite Dose Calculation Manual, ODCM, Rev 6/18

Tools / Equipment: None

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

A4

Initial Conditions: Reactor Power is 100%.

Due to an emergent issue, the 'B' Waste Gas Decay Tank (WGDT) is required to be fully discharged. There is limited Rad/Chem Technician support. Applicable plant data is as follows:

- Permit #19-050
- Initial 'B' WGDT Pressure is 150 psig
- Calculated start and stop time are Today @ 0900 and 1030 respectively
- Effluent monitor Background is 1uCi/ml
- Only the GSP Noble gas file will be used and the File name is: File #01
- No specific values have been adjusted as directed by RP supervision

RP has provided the following release data (due to noble gases):

- Dose from this release at the SITE Boundary: 3 mrads gamma and 5 mrads beta.
- Dose from previous releases at the SITE Boundary this calendar quarter: 1 mrad gamma and 0 mrad beta
- Dose from previous releases at the SITE Boundary this calendar year: 8 mrads gamma and 7 mrad beta

Initiating Cues: You are an extra SRO on shift. The Shift Manager has directed you to review the CA0855 for accuracy per HTP-ZZ-02014 step 6.4.1.

Review the estimated Dose projection for compliance with the FSAR (Technical Requirements Manual)

Inform the Shift Manager of the results of your CA0855 review and if all Gaseous Effluent parameters will be within allowed limits.

Task Standard: The SRO candidate will have determined that there were 3 errors on the CA0855 to include identification of which WGDT, Waste volume, waste flowrate. Additionally, TRM 16.11.2.2 (ODCM 9.7.1) will not be met as this upcoming release will exceed the gamma dose at the SITE BOUNDARY for the calendar year.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

A4

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|----------|--|----------------------------|---|---|
| *1. | Determines multiple errors were made on the CA0855 – SEE KEY for ERRORS. | | <p>Candidate determined that the following errors were made on the CA0855:</p> <ul style="list-style-type: none"> Waste Flowrate should 5 cfm per Attachment 1 Eff Monitor Background should be 1uCi/ml not 10 uCi/ml | <p>S U</p> <p>Comments:</p> |
| *2. | Determines TRM 16.11.2.2 (ODCM 9.7.1) LCO will not be met. | | <p>Candidate determined that TRM 16.11.2.2 (ODCM 9.7.1) will be exceeded (LCO not met) based on the current calendar year gamma dose exceeding 10 mrad.</p> | <p>S U</p> <p>Comments:</p> |
| 3. | THE JPM IS COMPLETE | Record Stop time on Page 2 | | <p>S U</p> <p>Comments:</p> |

Initial Conditions: Reactor Power is 100%.

Due to an emergent issue, the 'B' Waste Gas Decay Tank (WGDT) is required to be fully discharged. There is limited Rad/Chem Technician support. Applicable plant data is as follows:

- Permit #19-050
- Initial 'B' WGDT Pressure is 150 psig
- Calculated start and stop time are Today @ 0900 and 1030 respectively
- Effluent monitor Background is 1uCi/ml
- Only the GSP Noble gas file will be used and the File name is: File #01
- No specific values have been adjusted as directed by RP supervision

RP has provided the following release data (due to noble gases):

- Dose from this release at the SITE Boundary: 3 mrad gamma and 5 mrad beta.
- Dose from previous releases at the SITE Boundary this calendar quarter: 1 mrad gamma and 0 mrad beta
- Dose from previous releases at the SITE Boundary this calendar year: 8 mrad gamma and 7 mrad beta

Initiating Cues: You are an extra SRO on shift. The Shift Manager has directed you to review the CA0855 for accuracy per HTP-ZZ-02014 step 6.4.1.

Review the estimated Dose projection for compliance with the FSAR (Technical Requirements Manual)

Inform the Shift Manager of the results of your CA0855 review and if all Gaseous Effluent parameters will be within allowed limits.

Liquid / Gaseous Release Worksheet

Release Permit Number: L / G 19-050

Release Sample Point:

- | | |
|--|---|
| <p>___ RP #05 S/G Blowdown Surge Tank'</p> <p>___ RP #09 Discharge Monitor Tank 'A'</p> <p>___ RP #10 Discharge Monitor Tank 'B'</p> <p>___ UR #03 Aux Boiler</p> | <p>___ RP #11A Containment Vent</p> <p>___ RP #11B Containment Mini-Purge</p> <p>___ RP #11C Containment S/D Purge</p> <p>___ RP #12 Aux/Fuel Building Vent</p> <p>___ RP #13 Radwaste Building Vent</p> <p><u>X</u> RP #14 Waste Gas Decay Tank (Circle one)</p> <p style="margin-left: 100px;">A <u>(B)</u> C D E F G H</p> <p>___ RP #15 Laundry Decon. Facility</p> |
|--|---|

Chemistry Data¹:

N₂H₄

N/A

Release Data:

| | OPEN | UPDATE | CLOSURE |
|---|------------------|--------------------|---------|
| Sample or Filter Change Date and time | TODAY / 0630 | | |
| Sampled by (Initials/ PIN) | RPT / 12678 | | |
| Waste Volume (GAL or CF or ΔP) | 150 ps. | | |
| Waste Flowrate (GPM or CFM) ² | <u>25 cfm</u> | should be 5 cfm | |
| Dilution Flowrate (GPM or CFM) ² | 0 | | |
| Eff. Monitor Background (μCi/unit) | <u>10 μCi/ml</u> | should be 1 μCi/ml | |
| GSP Configuration Files | | | |
| Liquid | | | |
| Noble Gas | File #01 | | |
| Particulate | | | |
| Iodine | | | |
| Release Start Date and time ³ | TODAY / 0900 | | |
| Release Stop Date and time ³ | TODAY / 1030 | | |
| Release Permit Version Number | Always Zero (0) | | |

Notes

¹ To be completed by Rad/Chem Technician (Chemistry).

² Enter only if different from data base default.

³ To be completed by Rad/Chem Technician (Count Room)

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

A5

JPM No: Admin4-SRO- S&O-002(TC) KSA No: Gen 2.4.41
Revision Date: 09/06/2018 KSA Rating: 4.6
Job Title: SRO
Duty: RERP Implementation
Task Title: Emergency Event Classification
Completion Time: ≤ 30 minutes

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☐ Simulator/Lab ☐ Plant ☒ Classroom

Method of Performance: ☐ Simulated ☒ Performed

☐ Alternate Path ☒ Time Critical ☐ RCA

References: EIP-ZZ-00101, Classification Of Emergencies, Rev 55
EIP-ZZ-00101, Addendum 1, Emergency Action Level Classification Matrix, Rev 8
EIP-ZZ-00102, Emergency Implementing Actions, Rev 64
CA3255, Sentry – "Release Status" Decision Tree, Rev 0
CA2843, PAR Flowchart, Rev 1

Tools / Equipment: None

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

A5

- Initial Conditions: The Plant was at 100% and has been on line for 15 days following a refuel outage when:
- PZR level and pressure begin lowering.
 - The Crew entered OTO-BB-00003, RCS Excessive Leakage.
 - The RO stabilized PZR level and then estimated the leakage at 40 gpm.
 - Currently, the crew is continuing to reduce power per OTO-BB-00003.
 - Sentry is NOT Available.
 - CTMT NORM SUMP LEV on LF-LI-9 is 63" and rising.
 - GT-RE-21B, Unit Vent Monitor, is reading $4.8 \text{ E}^{+2} \mu\text{Ci/cc}$.
 - GT-RE-21B's Hi Hi Alarm setpoint is $3.0 \text{ E}^{+4} \mu\text{Ci/cc}$.
 - Wind Speed is 5 mph from 270° (due west).

Initiating Cues: You're an extra SRO on shift and have been provided the EIP-ZZ-00101&102, CA3255 and CA2843. Determine the Emergency Event Classification and complete EIP-ZZ-00102 Attachment 4, Notification Form – Sentry NOT Available within the required time limits.

This JPM is TIME CRITICAL.

Simulator Set up and/or Note(s): None

Task Standard: Upon completion of the JPM the candidate should determine an Unusual Event, SU 5.1, Unidentified or pressure boundary leakage $> 10 \text{ gpm}$, within 15 minutes of start. The candidate will then complete EIP-ZZ-00102 Attachment 4, Notification Form – Sentry NOT Available, within 15 minutes of the event classification time. Total time shall not exceed 30 minutes but the second 15 minute clock started at the EAL classification time.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

A5

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|----------|---|---|---|--|
| 1. | Obtain a verified working copy of EIP-ZZ-00101, Classification of Emergencies, ADD 1 Wall Chart, and combined EAL attachments | | Candidate obtained procedure copies | <div>S U</div> <div>Comments:</div> |
| *2. | Using the given conditions and Addendum 1, determine the appropriate emergency classification | NOTE: If after the declaration, the candidate begins to make a crew update or call security etc (EIP-ZZ-00102 EC flowchart actions), respond "Another SRO will take care of the EC flowchart actions, complete Attachment 4" | Candidate declared a Unusual Event based on EAL SU5.1 within 15 minutes $T1 - T0 \leq 15 \text{ minutes}$ | <div>S U</div> <div>Comments:</div> <div>Time of Declaration $T1$ (Start of new 15 min clock)</div> |
| *3. | Complete EIP-ZZ-00102 Attachment 4 – Notification Form – Sentry NOT Available. | See KEY for correct answers. Note: Items in red text on Attachment 4 are critical | Candidate completed Attachment 4, Notification Form – Sentry NOT Available, within 15 minutes of completing the EAL classification $T2 - T1 \leq 15 \text{ minutes}$ | <div>S U</div> <div>Comments:</div> <div>Time Notification Sent $T2$ (Completion time of 2nd 15 min clock)</div> |
| 4. | THE JPM IS COMPLETE | Record Stop time on Page 2 | | <div>S U</div> <div>Comments</div> |

Initial Conditions: The Plant was at 100% and has been on line for 15 days following a refuel outage when:

- PZR level and pressure begin lowering.
- The Crew entered OTO-BB-00003, RCS Excessive Leakage.
- The RO stabilized PZR level and then estimated the leakage at 40 gpm.
- Currently, the crew is continuing to reduce power per OTO-BB-00003.
- Sentry is NOT Available.
- CTMT NORM SUMP LEV on LF-LI-9 is 63" and rising.
- GT-RE-21B, Unit Vent Monitor, is reading $4.8 \text{ E}^{+2} \mu\text{Ci/cc}$.
- GT-RE-21B's Hi Hi Alarm setpoint is $3.0 \text{ E}^{+4} \mu\text{Ci/cc}$.
- Wind Speed is 5 mph from 270° (due west).

Initiating Cues: You're an extra SRO on shift and have been provided the EIP-ZZ-00101&102, CA3255 and CA2843. Determine the Emergency Event Classification and complete EIP-ZZ-00102 Attachment 4, Notification Form – Sentry NOT Available within the required time limits.

This JPM is TIME CRITICAL.

KEY

EIP-ZZ-00102

Rev. 064

Attachment 4

Notification Form - Sentry NOT Available

Sheet 1 of 1

* Candidate fills
in time + date
of their EAL
declaration

☒ Initial Message / ☐ Follow-up Message

| | |
|--|--|
| * 01.DRILL: <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No | |
| * 02.Emergency Classification: <input checked="" type="checkbox"/> Unusual Event / <input type="checkbox"/> Alert / <input type="checkbox"/> Site Emergency / <input type="checkbox"/> General Emergency / <input type="checkbox"/> Drill Termination / <input type="checkbox"/> Event Closeout / <input type="checkbox"/> Plant Recovery | |
| * 03.Emergency Declared Date/Time: * / (Time first declaration was made for current EAL level.) | |
| * 04.Emergency Action Level (EAL): SUS.1 | |
| * 05. Emergency Action Level Description: RCS unidentified or pressure boundary leakage > 10 gpm for ≥ 15 min. | |
| * 06.Reactor Status: <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Reducing Power <input type="checkbox"/> Shut Down | |
| -Release Status- | |
| * 08.Release Information: <input checked="" type="checkbox"/> Release evaluation is in progress There <input type="checkbox"/> IS / <input type="checkbox"/> is NO Release above normal operating limits (0.1 mr/hr at EAB) | |
| 09. Liquid Release: <input type="checkbox"/> Yes or <input checked="" type="checkbox"/> No (Yes only if EAL RU1.2 and/or RA1.2 is declared) | |
| 10. Release Start Time: | |
| 11. Release Duration Hours: | |
| * 12.Wind Direction (from): 270° | |
| * 14.Affected Sectors: E | |
| * 15.Wind Speed: 5 miles per hour | |
| 16. Plume Arrival at 2 Miles: | |
| 17. Plume Arrival at 5 Miles: | |
| 18. Plume Arrival at 10 Miles: | |
| -Protective Actions- | |
| * 19.Protective Actions Required (PAR): <input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No | |
| 20. Protective Action Basis: <input type="checkbox"/> Effluent Monitor <input type="checkbox"/> Field Team <input type="checkbox"/> Plant Conditions | |
| 21. PAR 1 Type: <input type="checkbox"/> Evacuate / <input type="checkbox"/> Shelter / <input type="checkbox"/> None / <input type="checkbox"/> Other | |
| 22. PAR 1 Location: 2 miles | |
| 23. PAR 1 Sectors: | |
| 24. PAR 2 Type: <input type="checkbox"/> Evacuate / <input type="checkbox"/> Shelter / <input type="checkbox"/> None / <input type="checkbox"/> Other | |
| 25. PAR 2 Location: 5 miles | |
| 26. PAR 2 Sectors: | |
| 27. PAR 3 Type: <input type="checkbox"/> Evacuate / <input type="checkbox"/> Shelter / <input type="checkbox"/> None / <input type="checkbox"/> Other | |
| 28. PAR 3 Location: 10 miles | |
| 29. PAR 3 Sectors: | |
| 30. Additional Protective Actions: (SAE) Place milk animals within 10 miles of the plant on stored feed, covered water and shelter, if possible. | |
| 40. Additional Notes: | |

*Items required for an accurate notification are **Bolded (and Red if color copy)**.

EC/RM Approval: _____ Communicator: _____ Time Sent: _____
(Name & PIN) (Name & PIN)

Distribution: FAX to TSC 68604 (573-676-8604), EOF 64900 (573-676-4900,) original to Communicator

KEY

| | |
|--|--------------------------------------|
| Facility: <u>Callaway</u> | Date of Examination: <u>3/4/19</u> |
| Exam Level: RO <input type="checkbox"/> SRO-I <input checked="" type="checkbox"/> SRO-U <input type="checkbox"/> | Operating Test Number: <u>2019-1</u> |

| Control Room Systems:* 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U | | |
|--|-----------------------------|-----------------|
| System/JPM Title | Type Code* | Safety Function |
| S1. 001 Rod Control / Low power repositions control banks with a shutdown bank rod drop / Reactor shutdown required. | M, S, L, A | 1 |
| S2. 004 CVCS (BG) / Swap From the NCP to 'B' CCP | M, S, A, P ¹ | 2 |
| S3. 006 Emergency Core Cooling System / Raise Safety Injection Accumulator Level | D, S, EN | 3 |
| S4. 005 Residual Heat Removal / Borate the "A" train of RHR | D, S, EN | 4P |
| S5. 028 Hydrogen Recombiner and Purge Control System / Place Containment Hydrogen Analyzer in service | D, S | 5 |
| S6. 015 Nuclear Instrument System / Perform a PR NI Gain Adjustment | M, S | 7 |
| S7. 060 Accidental Gas Release / Respond to Off normal conditions and manually actuate CRVIS when automatic and actuation pushbuttons fail. | N, S, A | 9 |
| In-Plant Systems:* 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U | | |
| P1. 035 Main and Reheat Steam System (AB) / Isolate a Failed Open Atmospheric Steam Dump | A, D, E, R, P ¹ | 4S |
| P2. 004 Chemical and Volume Control System / Locally initiate Emergency Boration per FR-S.1 | A, M, R | 1 |
| P3. 002 Reactor Coolant System / Swap Seal Injection Filters | D, R | 2 |
| <p>* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all five SRO-U systems must serve different safety functions, and in-plant systems and functions may overlap those tested in the control room.</p> | | |
| * Type Codes | Criteria for R /SRO-I/SRO-U | |

| | |
|--|--|
| (A)lternate path | 4-6/4-6 /2-3 |
| (C)ontrol room | |
| (D)irect from bank | $\leq 9/\leq 8/\leq 4$ |
| (E)mergency or abnormal in-plant | $\geq 1/\geq 1/\geq 1$ |
| (EN)gineered safety feature | $\geq 1/\geq 1/\geq 1$ (control room system) |
| (L)ow-Power/Shutdown | $\geq 1/\geq 1/\geq 1$ |
| (N)ew or (M)odified from bank including 1(A) | $\geq 2/\geq 2/\geq 1$ |
| (P)revious 2 exams | $\leq 3/\leq 3/\leq 2$ (randomly selected) |
| (R)CA | $\geq 1/\geq 1/\geq 1$ |
| (S)imulator | |

Note 1. The JPMs from the 2016 exam were randomly selected by placing 11 slips of paper labeled "A" through "K" in a container. No JPMs from the 2017 NRC exam were available for random selection as those JPMs will be used as a part of 2019 Audit Exam.

Simulator JPMs

- S1 This is an ALTERNATE PATH, MODIFIED bank JPM. The reactor is critical at 10E-8 amps and the candidate is directed to raise power to 1% per OTG-ZZ-00003, Plant Startup Hot Zero Power to 30% Power – IPTE. While moving Control Bank 'D' rods, a shutdown bank rod, N-7, drops fully into the core. The candidate will enter OTO-SF-00001 and Attachment A directs the reactor to be shutdown if less than 5% power. The candidate must begin the reactor shutdown. The Bank JPM, id#URO-SSF-03-C120J, is not an alternate path nor does it include the dropped rod and requirement to shutdown the reactor.
- S2 This is an ALTERNATE PATH, MODIFIED bank JPM id#BG-RO-S-004(A). The original JPM was used on the 2016 Exam. The candidate will perform the actions of OTN-BG-00001, Addendum 1 to shift from the NCP to the B CCP. After the B CCP is started and during the transition from the NCP flow controller to the B CCP flow controller, the B CCP shaft will shear, requiring the candidate to restore charging flow. Upon completion of this JPM, the candidate will have restored charging flow to normal.
- S3 This is a BANK JPM. The bank JPM id #EP-RO-S-001. The JPM has not been used on ILT NRC Exam since at least 2013. The candidate will have started and secured SI Pump B when abnormal discharge pressure developed on initial start. Upon completion of this JPM, SI Accumulator "A" level will have been raised to approximately 40% (but less than 80%), and restored Safety Injection System lineup.
- S4 This is a BANK JPM. The bank JPM id #URO-SEJ-02-C023J. The JPM has not been used on ILT NRC Exam since at least 2013. The candidate will perform Boration of the "A" Train of RHR in preparation for being placed in service.

- S5 This is a BANK JPM. The bank JPM id #EOP-RO-S-006 (previously id# URO-SGS01C29J). The JPM has not been used on ILT NRC Exam since at least 2013. Upon completion of this JPM, the candidate will have placed hydrogen analyzer 'A' in service.
- S6 This is a MODIFIED bank JPM. The bank JPM id #SE-RO-S-003(A). The JPM has not been used on ILT NRC Exam since at least 2013. The candidate will be required to perform a PR NI gain adjustment per OSP-SE-00004 Attachment 1. This JPM was modified from an Alternate Path JPM by removing a malfunction which required additional actions to reset PR NI trips. This JPM is now a normal evolution/task (i.e not alternate path).
- S7 This is an ALTERNATE PATH, NEW JPM. The candidate will be directed to respond to an area radiation alarm. In the process of responding, a separate set of process rad alarms will actuate and the Control Room Ventilation Isolation Signal (CRVIS) will fail to automatically actuate and will not actuate using the actuation pushbutton. Upon completion of this JPM, the candidate will have manually aligned either "A" or "B" train of CRVIS using component hand switches per an EFSAS abnormal procedure attachment.

In Plant JPMs

- P1 This is an ALTERNATE PATH, BANK JPM. This JPM was used on the 2016 Exam and the Bank ID is AB-NLO-P-001(A). The candidate will be assigned the task of locally closing Atmospheric Steam Dumps, AB PV-1 AND AB PV-4. Upon completion of this JPM, the candidate will have closed AB PV-1 and isolated AB PV-4. AB PV-1 was closed by isolating Air/N2 from the valve. AB PV-4 was isolated by closing the manual isolation valve, ABV0007.
- P2 This is an ALTERNATE PATH, MODIFIED BANK JPM. This is a Bank JPM id# URO-AEO-07-P024J (A). This JPM has not been used on an ILT NRC exam since at least 2013. The Bank JPM was alternate path based on starting conditions and control room actions. This JPM was modified to initially cue the RNO which is not alternate path but later steps are alternate path. The candidate will be directed to perform action in the plant to emergency borate per FR-S.1 Step #4 RNO. Once completed, the candidate will be required to trip the RTB and RTB Bypass breakers which wont work requiring an alternate path. The JPM will be complete when borate flow is established using BGV0177, alternate boration valve and the both Generator and Motor Circuit Control Breakers in Pull To Lock on panels SF103A&B.
- P3 This is a BANK JPM. This is a Bank JPM id# BG-NLO-R-001. This JPM has not been used on an ILT NRC exam since at least 2013. The candidate will be directed to swap RCP Seal Injection filters per a normal procedure. The JPM will be complete when the 'B' CVCS seal water injection filter will have been placed in service and 'A' placed in standby.

| | |
|--|--------------------------------------|
| Facility: <u>Callaway</u> | Date of Examination: <u>3/4/19</u> |
| Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/> | Operating Test Number: <u>2019-1</u> |

| Control Room Systems:* 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U | | |
|--|--|-----------------|
| System/JPM Title | Type Code* | Safety Function |
| S1. 001 Rod Control / Low power repositions control banks with a shutdown bank rod drop / Reactor shutdown required. | M, S, L, A | 1 |
| S3. 006 Emergency Core Cooling System / Raise Safety Injection Accumulator Level | D, S, EN | 3 |
| In-Plant Systems:* 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U | | |
| P1. 035 Main and Reheat Steam System (AB) / Isolate a Failed Open Atmospheric Steam Dump | A, D, E, R, P ¹ | 4S |
| P2. 004 Chemical and Volume Control System / Locally initiate Emergency Boration per FR-S.1 | A, M, R | 1 |
| P3. 002 Reactor Coolant System / Swap Seal Injection Filters | D, R | 2 |
| <p>* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all five SRO-U systems must serve different safety functions, and in-plant systems and functions may overlap those tested in the control room.</p> | | |
| * Type Codes | Criteria for R /SRO-I/SRO-U | |
| (A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power/Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator | 4-6/4-6 /2-3 $\leq 9/\leq 8/\leq 4$ $\geq 1/\geq 1/\geq 1$ $\geq 1/\geq 1/\geq 1$ (control room system) $\geq 1/\geq 1/\geq 1$ $\geq 2/\geq 2/\geq 1$ $\leq 3/\leq 3/\leq 2$ (randomly selected) $\geq 1/\geq 1/\geq 1$ | |

Note 1. The JPMs from the 2016 exam were randomly selected by placing 11 slips of paper labeled "A" through "K" in a container. No JPMs from the 2017 NRC exam were available for random selection as those JPMs will be used as a part of 2019 Audit Exam.

Simulator JPMs

S1 This is an ALTERNATE PATH, MODIFIED bank JPM. The reactor is critical at 10E-8 amps and the candidate is directed to raise power to 1% per OTG-ZZ-00003, Plant Startup Hot Zero Power to 30% Power – IPTE. While moving

Control Bank 'D' rods, a shutdown bank rod, N-7, drops fully into the core. The candidate will enter OTO-SF-00001 and Attachment A directs the reactor to be shutdown if less than 5% power. The candidate must begin the reactor shutdown. The Bank JPM, id#URO-SSF-03-C120J, is not an alternate path nor does it include the dropped rod and requirement to shutdown the reactor.

- S3 This is a BANK JPM. The bank JPM id #EP-RO-S-001. The JPM has not been used on ILT NRC Exam since at least 2013. The candidate will have started and secured SI Pump B when abnormal discharge pressure developed on initial start. Upon completion of this JPM, SI Accumulator "A" level will have been raised to approximately 40% (but less than 80%), and restored Safety Injection System lineup.

In Plant JPMs

- P1 This is an ALTERNATE PATH, BANK JPM. This JPM was used on the 2016 Exam and the Bank ID is AB-NLO-P-001(A). The candidate will be assigned the task of locally closing Atmospheric Steam Dumps, AB PV-1 AND AB PV-4. Upon completion of this JPM, the candidate will have closed AB PV-1 and isolated AB PV-4. AB PV-1 was closed by isolating Air/N2 from the valve. AB PV-4 was isolated by closing the manual isolation valve, ABV0007.
- P2 This is an ALTERNATE PATH, MODIFIED BANK JPM. This is a Bank JPM id#URO-AEO-07-P024J (A). This JPM has not been used on an ILT NRC exam since at least 2013. The Bank JPM was alternate path based on starting conditions and control room actions. This JPM was modified to initially cue the RNO which is not alternate path but later steps are alternate path. The candidate will be directed to perform action in the plant to emergency borate per FR-S.1 Step #4 RNO. Once completed, the candidate will be required to trip the RTB and RTB Bypass breakers which wont work requiring an alternate path. The JPM will be complete when borate flow is established using BGV0177, alternate boration valve and the both Generator and Motor Circuit Control Breakers in Pull To Lock on panels SF103A&B.
- P3 This is a BANK JPM. This is a Bank JPM id# BG-NLO-R-001. This JPM has not been used on an ILT NRC exam since at least 2013. The candidate will be directed to swap RCP Seal Injection filters per a normal procedure. The JPM will be complete when the 'B' CVCS seal water injection filter will have been placed in service and 'A' placed in standby.

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S1

| | | | |
|------------------|---|-------------|-----------|
| JPM No: | No bank id yet | KSA No: | 001A2.03 |
| Revision Date: | 09/25/2018 | KSA Rating: | 3.5 / 4.2 |
| Job Title: | URO/SRO | | |
| Duty: | SF – Control Rod Drive System | | |
| Task Title: | REACTOR START UP CONTROL ROD REPOSITIONING | | |
| Completion Time: | 10 minutes | | |

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☒ Simulator/Lab ☐ Plant ☐ Classroom

Method of Performance: ☐ Simulated ☒ Performed

☒ Alternate Path ☐ Time Critical ☐ RCA

References: OTO-SF-00001, Rod Control Malfunctions, Rev 17
 OTG-ZZ-00003, Plant Startup Hot Zero Power to 30% Power – IPTE,
 Rev 63

Tools / Equipment: None

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

S1

Initial Conditions: The Plant is in MODE 2 at 10^{-8} AMPS.

Initiating Cues: The CRS has directed you to withdraw control rods to raise power to 1% per OTG-ZZ-00003, Plant Startup hot Zero Power to 30% Power – IPTE, step 5.2.7a.

Simulator Setup and / or Notes: Initialize at 10^{-8} AMPS with the following rod positions:
ALL SHUTDOWN BANKS to 228 STEPS.
CONTROL BANKS A & B to 228 STEPS.
CONTROL BANK C to 215 STEPS.
CONTROL BANK D to ~84 STEPS.

Simulator Operator: Once rods are being withdrawn, and per the cue IMF SFN07_DR stationary gripper to cause shutdown bank rod N-7 to fully drop into the core.

Task Standard: Upon completion of this JPM, determined the need to shutdown the reactor due to a dropped rod, and began to insert negative reactivity in order to shutdown the reactor.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S1

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|--|---|----------------------------------|
| 1. | Obtain a verified working copy of OTG-ZZ-00003, Plant Startup Hot Zero Power to 30% Power – IPTE. | Provide candidate with copy of OTG-ZZ-00003 | Candidate obtained a copy | S U Comments: |
| 2. | Review Precautions and Limitations Section 3.0 | If necessary " ALL PRECAUTIONS AND LIMITATIONS ARE SATISFIED " | Candidate reviewed precautions and limitations | S U Comments: |
| 3. | Review Prerequisites Section 4.0 | If necessary " ALL PREREQUISITE CONDITIONS ARE SATISFIED " | Candidate reviewed prerequisites | S U Comments: |
| 4. | Review Continuous Actions Section 5.1 | | Candidate reviewed continuous actions | S U Comments: |
| 5. | PERFORM the following: a. INITIATE raising Reactor power to less than 1%. Step 5.2.7.a | If the Candidate starts to adjust the MFP pre start actions and placing one in service " the BOP is starting a MFP IAW OTN-AE-00001 " | Candidate verified SE HS-9 ROD BANK SEL SW, is in Manual | S U Comments: |
| 6. | PERFORM the following: a. INITIATE raising Reactor power to less than 1%. Step 5.2.7.a | Note: the withdraws should be in small incremental steps. | Candidate began withdrawing Control Bank 'D' by using SF HS-2 to the withdraw position. | S U Comments: |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S1

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|---|---|-----------------|
| 7. | PERFORM the following: a. INITIATE raising Reactor power to less than 1%. Step 5.2.7.a | BOOTH OPERATOR: After the an initial rod withdrawal is completed and before 1% is reached with the evaluator's cue, INSERT malfunction to drop shutdown bank rod N-7 | Candidate monitored NI and rod positions while power was raised toward 1%. Comments: | S U |
| 8. | PERFORM the following: a. INITIATE raising Reactor power to less than 1%. Step 5.2.7.a | Start of Alternate path | Candidate repositioned control banks by using SF HS-2 to the withdraw position. Comments: | S U |
| 9. | Dropped rod recognized and transition to OTO-SF-00001, Rod Control Malfunctions | Note: Annunciator 81B will also direct the candidate to OTO-SF-00001. If required and or asked " respond to the annunciator as appropriate " | Candidate determined that a shutdown bank rod dropped fully into the core and entered OTO-SF-00001. Comments: | S U |
| 10. | CHECK Both Of The Following Are Met For Indication Of Multiple Dropped Rods: Annunciator 81A, Two/More Rods At Bottom - LIT Rod Bottom lights for greater than one rod – LIT OTO-SF-00001, Step #1 | | Candidate determined that only 1 rod dropped and implemented RNO to proceed to step 3 Comments: | S U |
| 11. | CHECK Main Turbine Runback Or Load Reject - IN PROGRESS OTO-SF-00001, Step #3 | | Candidate determined the turbine is not online so there is no runback in progress and implemented RNO to proceed to step 5 Comments: | S U |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S1

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|--|---|-------------------------------|
| 12. | PLACE Rod Control in MANUAL: • SE HS-9 And CHECK Control Rods Motion – STOPPED OTO-SF-00001, Step #5 & 6 | Note: SE HS-9 was in Manual | Candidate verified SE HS- 9 in Manual. | S U Comments: |
| 13. | CHECK Instruments Indications – NORMAL OTO-SF-00001, Step #7 | | Candidate determined that Instrument Indications are normal. | S U Comments: |
| 14. | NOTES • An Urgent Failure in the Logic Cabinet prevents all automatic and manual rod motion in overlap. • An Urgent Failure in a Power Cabinet prevents all rod motion by the rods powered from the failed cabinet. Note prior to OTO-SF- 00001, Step #8 | | Candidate read and placekept note | S U Comments: |
| 15. | CHECK Annunciator 79A, Rod Ctrl Urg Fail – LIT OTO-SF-00001, Step #8 | If the candidate begins to adjust boron concentration respond as the CRS "BOP will control Tave" | Candidate determined that Ann 79A is NOT LIT and read the RNO but as the turbine is off line Tave will have to be controlled with boron concentration and goes to step #10. | S U Comments: |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S1

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|---|--|----------------------------------|
| 16. | CHECK Both Of The Following Are – EXTINGUISHED Annunciator 81B, Rod At Bottom All Rod Bottom lights OTO-SF-00001, Step #10 | | Candidate determined that only 1 rod is at bottom and proceeded to Attachment A per the RNO. | S U Comments: |
| *17. | CHECK Reactor Power – LESS THAN 5% OTO-SF-00001, Attachment A, Step #1 | | Candidate determined power is less than 5% and proceeded to step A2 and determined that a Reactor shutdown is required. | S U Comments: |
| *18. | SHUTDOWN The Reactor OTO-SF-00001, Attachment A, Step #2 | Note: There are 2 distinct actions in Step #18 and #19 – both of which are CRITICAL: 1) Determine the requirement to shutdown the reactor 2) Taking action to insert negative reactivity into the core by either of the 3 actions listed | Candidate took action to inserted negative reactivity to shutdown the reactor by either: <ul style="list-style-type: none"> Inserting rods manually using SE HS-9 Tripping the Reactor Beginning Emergency Boration | S U Comments: |
| 19. | THE JPM IS COMPLETE | Record Stop time on Page 2 | Candidate informed the CRS that a reactor shutdown is required. | S U Comments: |

Initial Conditions: The Plant is in MODE 2 at 10^{-8} AMPS.

Initiating Cues: The CRS has directed you to withdraw control rods to raise power to 1% per OTG-ZZ-00003, Plant Startup hot Zero Power to 30% Power – IPTE, step 5.2.7a.

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S2

| | | | |
|------------------|------------------------------|-------------|-----------|
| JPM No: | BG-RO-S-004(A) | KSA No: | 004A4.08 |
| Revision Date: | 11/20/2018 | KSA Rating: | 3.8 / 3.4 |
| Job Title: | URO/SRO | | |
| Duty: | CVCS | | |
| Task Title: | Swap from the NCP to 'B' CCP | | |
| Completion Time: | 15 minutes | | |

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☒ Simulator/Lab ☐ Plant ☐ Classroom

Method of Performance: ☐ Simulated ☒ Performed

☒ Alternate Path ☐ Time Critical ☐ RCA

References: OTN-BG-00001 ADD 1, Shifting from the NCP to One of the CCPs,
Rev 12

Tools / Equipment: None

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S2

Initial Conditions: The NCP is running with 75 GPM letdown flow.

Preparations have been made to tag out the NCP.

Initiating Cues: The CRS has directed you to place the B CCP in service and secure the NCP per OTN-BG-00001 ADD 1, Shifting from the NCP to one of the CCP's, and beginning at step 5.1. Inform the CRS when complete.

The boron concentration when the B CCP was run last week was 5 PPM higher than the existing boron concentration.

An OT has been briefed and is standing by to perform local actions.

Simulator Set up and/or Notes: use any IC where the NCP AND 'B' CCW ARE RUNNING. ENSURE LETDOWN FLOW IS 75 GPM AND BG HV-8111 IS OPEN ('B' CCP MINIFLOW).

- Run scenario file ILT_JPM_S2.sce to **Insert Malfunction PBG05BZPTDGRD = 0.01 (with PBG05BPTFLAGD = 1) condition HWX01D124M LE 0.10** (This will shear the 'B' CCP shaft after flow is increased (and NCP flow lowered) which is triggered after 'B' CCP Handswitch is taken to RUN).

Task Standard: Upon completion of this JPM, the candidate will have restored charging flow to normal.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S2

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|---|---|----------------------------------|
| 1. | Obtain a verified working copy of OTN BG 00001 ADD 1, SHIFTING FROM THE NCP TO ONE OF THE CCP'S | | Candidate obtained a copy. | S U Comments: |
| 2. | Review Precautions and Limitations Section 3.0 | If necessary " ALL PRECAUTIONS AND LIMITATIONS ARE SATISFIED " | Candidate reviewed precautions and limitations. | S U Comments: |
| 3. | Review Prerequisites Section 4.0 | If necessary " ALL PREREQUISITE CONDITIONS ARE SATISFIED " | Candidate reviewed prerequisites. | S U Comments: |
| 4. | All hand switches referenced in this section are located on RL001 or RL002 unless noted otherwise. Transferring charging pumps will cause area radiation levels to change in both pump rooms. NOTE prior to Step 5.1.1 | | Candidate read and placekept. | S U Comments: |
| 5. | NOTIFY RP that the 'B' CCP will be started and that the NCP will be secured. Step 5.1.1 | RP ACKNOWLEDGES | Candidate notified RP and informed them of swapping NCP to 'B' CCP. | S U Comments: |

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| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--------------|--|---|
| 6. | <p>PLACE the Auxiliary Lube Oil Pump handswitch for the 'B' CCP to be started in AUTO and ENSURE the RUN light is on.</p> <p>BG HIS-2AX, CCP B AUX L-O PUMP</p> <p>Step 5.1.2</p> | | <p>Candidate placed BG HIS-2AX, CCP B AUX L-O PUMP, in Auto and ensured the RUN light it LIT.</p> | <p>S U</p> <p>Comments:</p> |
| 7. | <p>ENSURE 'B' CCP is supplied by 'B' CCW TRAIN in service</p> <p>Step 5.1.3</p> | | <p>Candidate verified 'B' CCW TRAIN is in service.</p> | <p>S U</p> <p>Comments:</p> |
| *8. | <p>PLACE BG FK-121, CCP DISCH FLOW CTRL, in "MANUAL" and set at MINIMUM FLOW</p> <p>Step 5.1.4</p> | | <p>Candidate placed BG FK-121, CCP DISCH FLOW CTRL, in "MANUAL" and set to MINIMUM FLOW.</p> <p>BG FK-121 "MANUAL" LIGHT COMES ON AND "AUTO" LIGHT GOES OFF.</p> | <p>S U</p> <p>Comments:</p> |
| 9. | <p>CAUTION: The CCPs should NOT be run at less than 130 gpm, (including recirc flow), for more than 30 minutes.</p> <p>The CCPs should NOT be run at less than 60 gpm. The CCP recirculation valves ensure 60 gpm recirc to the VCT. [Ref: 6.2.7].</p> <p>CAUTION prior to Step 5.1.5</p> | | <p>Candidate read and placekept caution.</p> | <p>S U</p> <p>Comments:</p> |

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| 10. | CHECK the Charging Pump Recirculation valve for the pump to be started is OPEN: BG HIS-8111, CCP B RECIRC VLV Step 5.1.5 | | Candidate verified BG HV-8111 is open by verifying BG HIS-8111 RED LIGHT is ON and GREEN LIGHT is OFF. | S U Comments: |
| 11. | NOTE : It is recommended that the Auxiliary Lube Oil Pump be allowed to run for at least 5 minutes prior to starting the associated CCP. NOTE prior to Step 5.1.6 | If necessary, "the Auxiliary Lube Oil Pump has been running for 10 minutes" If asked as a OT, Role play and report, "pre start checks on the "B" CCP are complete sat" | Candidate read and placekept note. | S U Comments: |
| *12. | START the CCP supplied by the in service CCW train using the appropriate switch: BG HIS-2A, CCP B Step 5.1.6 | | Candidate started 'B' CCP by placing BG HIS-2A TO RUN. BG HIS-2A RED LIGHT goes ON and GREEN LIGHT goes OFF. | S U Comments: |
| 13. | Locally CHECK that the Room Cooler has started for the CCP that was started SGL12B, AUX BLD CCP B RM CLR, for CCP B Step 5.1.7 | When the candidate contacts an OT to locally verify that the room cooler has started: CUE: "SGL12B, AUX BLD CCP B RM CLR has started." | Candidate verified SGL12B, AUX BLD CCP B RM CLR, is in service. | S U Comments: |

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| 14. | <p>IF this Addendum was entered from Section for Charging Pump Breaker NB0104</p> <p>OR NB0201 Operability Check in OTN-BG-00001, Chemical And Volume</p> <p>Control System, CHECK the CCP Breaker closed properly.</p> <p>Step 5.1.8</p> | NOTE: STEP 5.1.8 IS NOT REQUIRED | Candidate determines that step is Not Applicable. | <p>S U</p> <p>Comments:</p> |
| 15. | <p>NOTE: If the Aux Lube Oil Pump remains in service following the next step, the system engineer should be notified.</p> <p>Note prior to Step 5.1.9</p> | | Candidate read and placekept note. | <p>S U</p> <p>Comments:</p> |
| 16. | <p>CHECK that the Auxiliary Lube Oil Pump handswitch RUN light has gone OUT and the STOP light is LIT after a reasonable time following start of the CCP.</p> <p>BG HIS-2AX, CCP B AUX L-O PUMP</p> <p>Step 5.1.9</p> | | <p>Candidate verified 'B' AUX LUBE OIL PUMP has stopped by observing handswitch light indication on BG HIS-2AX.</p> <p>BG HIS-2AX GREEN LIGHT is ON and RED LIGHT is OFF.</p> | <p>S U</p> <p>Comments:</p> |
| *17. | <p>PLACE BG FK-124, NCP DISCH FLOW CTRL, in MANUAL.</p> <p>Step 5.1.10</p> | | Candidate placed BG FK-124 IN "MANUAL" and observes BG FK-124 "MANUAL" LIGHT comes ON and "AUTO" LIGHT goes OFF. | <p>S U</p> <p>Comments:</p> |

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| 18. | <p>NOTE: IF BGHV8109, NCP RECIRC VLV, is closed and flow through the NCP drops below 100 gpm, Annunciator Window 41F, NCP FLOW HI/LO, will alarm.</p> <p>IF flow through the NCP drops below 65 gpm, Annunciator Window 41F, NCP FLOW HI/LO, will reflash and BGHV8109, NCP RECIRC VLV, will open.</p> <p>BGHV8109, NCP RECIRC VLV, is opened when lowering NCP flow to prevent a transient in seal injection flow.</p> <p>Steps 5.1.11 through 5.1.13 should be performed together to enable transfer of the pumps.</p> <p>Note prior to Step 5.1.11</p> | | Candidate read and placekept note. | <p>S U</p> <p>Comments:</p> |
| 19. | <p>WHEN flow through the NCP is less than 100 gpm, as indicated by Annunciator Window 41F, use BG HIS-8109, NCP RECIRC VLV and OPEN BGHV8109.</p> <p>Step 5.1.11</p> | | Candidate observed BG HIS-8109 red light LIT, green light OFF after Annunciator 49F was LIT. | <p>S U</p> <p>Comments:</p> |

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| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
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| 20. | <p>RAISE CCP flow using BG FK-121, CCP DISCH FLOW CTRL, while LOWERING NCP flow using BG FK-124, NCP DISCH FLOW CTRL, to maintain a constant charging flow as indicated on BG FI-121A, CHG HDR FLOW.</p> <p>Step 5.1.12</p> | <p>WHEN BG FK-121, CCP DISCH FLOW CTRL HAS BEEN ADJUSTED TO RAISE CCP FLOW,</p> <p>Start of Alternate path</p> <p>Simulator operator verifies the conditional malfunction to shear the 'B' CCP's shaft is inserted.</p> <p>Note: If the operator identifies an issue with the "B" CCP and trips the pump, the candidate should perform immediate actions of OTO-BG-00001 and either start the A CCP or return the NCP fully to service</p> <p>Note: At this point the Applicant will stop performing steps of OTN-BG-00001 ADD1</p> | <p>Candidate depressed the DOWN arrow button on BG FK-124 and depressed the UP arrow button on BG FK-121 which raised CCP flow using BG FK-121, CCP DISCH FLOW CTRL, and LOWERED NCP flow using BG FK-124, NCP DISCH FLOW CTRL.</p> <p>Candidate observed lowering charging flow and/or lower PZR level with no effect when raising "B" CCP control output. "B" CCP pump indication (green, yellow, red) did not change.</p> | <p>S U</p> <p>Comments:</p> |
| *21. | <p>IF desired to restore the NCP, ADJUST BG FK-124 and BG HC-182 as required to maintain the following:</p> <ul style="list-style-type: none"> SEAL INJ FLOW 8-13 GPM / RCP CHARGING FLOW MAINTAINING STABLE PZR | <p>IF the applicant asks the CRS what to do, respond "What actions do you recommend?"</p> <p>After the applicant describes the actions they will take state "Take the actions you have described"</p> | <p>Candidate raised NCP FLOW USING BG FK-124.</p> | <p>S U</p> <p>Comments:</p> |

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| 22. | <p>If the candidate proceeds to OTO-BG-00001 due to "IF a Charging pump has tripped, Go To OTO-BG-00001, Pressurizer Level Control Malfunction."</p> <p>Ann 42E step 3.2</p> | <p>Note: the candidate can either restore the NCP or start the "A" CCP in step 1 of OTO-BG-00001.</p> | <p>The candidate should perform immediate actions of OTO-BG-00001.</p> | <p>S U Comments</p> |
| 23. | <p>CHECK Charging Pumps – AT LEAST ONE RUNNING:</p> <p>Step 1 of OTO-BG-00001</p> | | <p>Candidate observed the following:</p> <p>NCP is running at reduced flow.</p> <p>B CCP is degraded (sheared shaft).</p> <p>A CCP is in standby.</p> | <p>S U Comments</p> <p>NOTE: Step 1 of OTO-BG-00001 is an immediate action step. It is required to be performed from memory per ODP-ZZ-00025.</p> |

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| *24. | <p>PERFORM the following:</p> <ul style="list-style-type: none"> a. ENSURE CCP Recirc valves OPEN: <ul style="list-style-type: none"> • BG HIS-8110 • BG HIS-8111 b. ENSURE CCP or NCP suction is aligned to VCT or RWST c. *START one CCP: <ul style="list-style-type: none"> • BG HIS-1A • BG HIS-2A d. IF CCP can NOT be started, THEN START NCP <ul style="list-style-type: none"> • BG HIS-3 e. ENSURE CCW Pump is running in the same train as the CCP that was started. f. IF a charging pump can not be started, THEN ISOLATE letdown by closing all Letdown Throttle Isolation Valves: <ul style="list-style-type: none"> • BG HIS-8149AA • BG HIS-8149BA • BG HIS-8149CA <p>RNO Step 1</p> | | <p>Candidate observes CCP suction is aligned to the VCT.</p> <p>*Candidate starts A CCP using BG HIS-1A</p> <p>Candidate observes A Train CCW Pump is running</p> | <p>S U</p> <p>Comments</p> <p>Note: The critical task is to start the A CCP or to restore the NCP. All other steps are just verified. This JPM step only shows the Performance standard for the "A" CCP. The NCP is shown above.</p> |
| 25. | Inform the CRS that charging flow has been restored. | THE CONTROL ROOM SUPERVISOR ACKNOWLEDGES | Candidate informed the CRS that the 'B' CCP is not functioning correctly and that charging flow has been restored. | <p>S U</p> <p>Comments:</p> |
| 26. | THE JPM IS COMPLETE | Record Stop Time on Page 2 | | <p>S U</p> <p>Comments:</p> |

Initial Conditions: The NCP is running with 75 GPM letdown flow.
Preparations have been made to tag out the NCP.

Initiating Cues: The CRS has directed you to place the B CCP in service and secure the NCP per OTN-BG-00001 ADD 1, Shifting from the NCP to one of the CCP's, and beginning at step 5.1. Inform the CRS when complete.

The boron concentration when the B CCP was run last week was 5 PPM higher than the existing boron concentration.

An OT has been briefed and is standing by to perform local actions.

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| JPM No: | EP-RO-S-001 | KSA No: | 006A1.13 |
| Revision Date: | 11/20/2018 | KSA Rating: | 3.5 / 3.7 |
| Job Title: | URO/SRO | | |
| Duty: | Safety Injection Accumulators | | |
| Task Title: | Raising Safety Injection Accumulator Level | | |
| Completion Time: | 15 minutes | | |

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☒ Simulator/Lab ☐ Plant ☐ Classroom

Method of Performance: ☐ Simulated ☒ Performed

☐ Alternate Path ☐ Time Critical ☐ RCA

References: OTN-EP-00001, Accumulator Safety Injection System
 OTN-EP-00001 Addendum 1, SI Accumulator Level Control
 CAR 200303918, Containment Spray Pump Gas Binding

Tools / Equipment: NONE

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Initial Conditions: The Plant is in MODE 1. Safety Injection Accumulator 'A' level is 25%.
The SI test header is NOT in service.

Initiating Cues: You have been directed to raise SI Accumulator 'A' level to 40%, using SI Pump 'B', per OTN-EP-00001 Addendum 01, SI ACCUMULATOR LEVEL CONTROL Section 5.1, and maintain Accumulator pressure between 602 and 648 psig.

Notify the CRS when complete.

Simulator Set up and/or Note(s):

- Ensure CCW Train B is in service.
- Set Plant Parameter/EP/TEP01ATAZTCPLL/10.31
- Plant Parameter/EP/TEP01ATAZTCGP/629
- For B SI pump cavitation:
 - Engineering Mode:
 - ME Schem/EM/m22em01/HV8923B/manual valve/1/insert
 - ME Schem/EM/m22em01/HV8923B/manual valve stem position/0.05/insert

Delete the B SI Pump cavitation malfunctions when directed to at JPM step#16.

Task Standard: The candidate will started the 'B' SI pump, identified abnormal pump conditions, corrected issue, and restarted the 'B' SI pump. Upon completion of this JPM, SI Accumulator "A" level will have been raised to approximately 40% (but less than 80%), and restored Safety Injection System lineup.

Start Time: _____

Stop Time: _____

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| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|----------|--|--|---------------------------------------|------------------------------|
| 1. | Obtain a verified working copy of OTN-EP-00001 Add 1 | Cue: After locating a working copy, provide procedure. | Candidate obtained a procedure copy | S U Comments: |
| 2. | Review precautions, limitations, and prerequisites | Cue: If necessary, cue all P&Ls are met. | Candidate place kept. | S U Comments: |
| 3. | <p>SI Accumulator pressure and level indicators are listed on Attachment 1, SI Accumulator Pressure And Level Indication On RL018.</p> <p>SI Accumulator levels and corresponding points are listed on Attachment 2, SI Accumulator Level Percentage To Volume Points.</p> <p>Flow through EP8956A-D would require leak testing in accordance with T/S SR 3.4.14.1.</p> <p>NOTES before Step 5.1</p> | | Candidate read and placekept note. | S U Comments: |
| 4. | <p>Changing accumulator level causes a corresponding change in accumulator pressure. Accumulator pressure must be closely monitored when adjusting level.</p> <p>CAUTION before Step 5.1</p> | | Candidate read and placekept caution. | S U Comments: |

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| 5. | <p>Normal accumulator level is equal to or greater than 15%, and equal to or less than 85%, as indicated on EP LI-950 through EP LI-957. Normal accumulator pressure is equal to or greater than 602 psig, and equal to or less than 648 psig, as indicated on EP PI-960 through EP PI-967.</p> <p>NOTE before Step 5.1.1</p> | | Candidate read and placekept note. | <p>S U</p> <p>Comments:</p> |
| 6. | <p>CHECK that the reactor is in ONE of the following:</p> <ul style="list-style-type: none"> • MODE 1 • MODE 2 • MODE 3 <p>Step 5.1.1</p> | | Candidate observed plant conditions to correlate MODE. | <p>S U</p> <p>Comments:</p> |
| 7. | <p>CHECK that RCS pressure is equal to or greater than 2000 psig.</p> <p>Step 5.1.2</p> | | Candidate observed RCS pressure indications. | <p>S U</p> <p>Comments:</p> |
| 8. | <p>ENSURE the following are in standby alignment per OTN-EM-00001, Safety Injection System:</p> <ul style="list-style-type: none"> • SI System • RWST <p>Step 5.1.3</p> | <p>If required:</p> <p>Cue: " SI system and RWST are in a standby alignment per OTN-EM-00001, Safety Injection System."</p> | Candidate observed EM system status. | <p>S U</p> <p>Comments:</p> |

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| 9. | <p>IF the SI Test Line and EMV0257, SI TEST LINE PRESS REGULATOR, are in service, on RL017, REMOVE BOTH from service by performing the following:</p> <p>Step 5.1.4</p> | <p>If required:</p> <p>Cue: " The SI Test Line and EMV0257, SI TEST LINE PRESS REGULATOR, are NOT in service."</p> | <p>Candidate observed indications on RL017</p> | <p>S U</p> <p>Comments:</p> |
| 10. | <p>REQUEST SM/CRS to determine desired final level and pressure of selected accumulator and RECORD below:</p> <p>Step 5.1.5</p> | | <p>Candidate wrote values in the spaces provided consistent with the Initiating Cues.</p> | <p>S U</p> <p>Comments:</p> |
| 11. | <p>REQUEST SM/CRS to determine SI Pump to start and MARK below:</p> <ul style="list-style-type: none"> • SI Pump A • SI Pump B <p>Step 5.1.6</p> | | <p>Candidate circled (marked) SI Pump B</p> | <p>S U</p> <p>Comments:</p> |
| 12. | <p>ENSURE the component cooling water train is in service for the respective SI Pump to be started per OTN-EG-00001, Component Cooling Water System.</p> <p>Step 5.1.7</p> | | <p>Candidate observed a B train CCW pump with red light LIT and green light EXTINGUISHED.</p> | <p>S U</p> <p>Comments:</p> |

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|-------------|--|--------------|--|---|
| 13. | <p>The SI Pumps should NOT be run on only recirculation flow for greater than 30 minutes due to the pump manufacturer's constraints for running these pumps at reduced flow rates. Pump flow rates should NOT be lowered to less than 45 gpm.</p> <p>CAUTION before Step 5.1.8</p> | | <p>Candidate read and placekept caution.</p> | <p>S U</p> <p>Comments:</p> |
| 14. | <p>At RL017, as directed by the SM/CRS, START an SI Pump per the following:</p> <p>IF starting SI Pump B, PERFORM the following:</p> <ol style="list-style-type: none"> 1. Using BN HIS-8806B, RWST TO SI PUMPS, ENSURE BNHV8806B is OPEN. 2. Using EM HIS-8923B, SI PUMP B SUCT VLV, ENSURE EMHV8923B is OPEN. 3. Using EM HIS-5, SI PUMP B, START SI Pump B. 4. Using EM PI-923, SI PUMP B DISCH PRESS, CHECK SI Pump B discharge rises to approximately 1500 psig. <p>Step 5.1.8.b.</p> | | <p>Candidate observed BN HIS-8806B handswitch red light LIT, green light EXTINGUISHED.</p> <p>Candidate observed EM HIS-8923B handswitch red light LIT, green light EXTINGUISHED.</p> <p>Candidate rotated EM HIS-5 to right RUN until redlight LIT and green light EXTINGUISHED.</p> <p>Candidate observed EM PI-923 indication</p> | <p>S U</p> <p>Comments:</p> |

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| *15. | EM PI 923 indicates oscillating psig, computer point indicates oscillating amps | | <p>Candidate rotated EM HIS-5 to STOP until green light LIT and red light EXTINGUISHED.</p> <p>Candidate informed CRS of abnormal pump discharge pressure.</p> | <p>S U</p> <p>Comments:</p> |
| *16. | <p>*3. Using EM HIS-5, SI PUMP B, START SI Pump B.</p> <p>4. Using EM PI-923, SI PUMP B DISCH PRESS, CHECK SI Pump B discharge rises to approximately 1500 psig.</p> <p>Step 5.1.8.b. (continued)</p> | <p>TIME COMPRESSION</p> <p>Cue: "Engineering determined that a void was present and the pump has been vented"</p> <p>Repeat initial cue if necessary to fill A accumulator to 40% using the 'B' SI Pump."</p> <p>Note: Starting the pump is the only critical item in this step.</p> | <p>Candidate rotated EM HIS-5 to right RUN until red light LIT and green light EXTINGUISHED.</p> <p>Candidate observed EM PI-923 indication</p> | <p>S U</p> <p>Comments:</p> |
| *17. | <p>At RL018, using EM HIS-8888, ACC TANKS FILL LINE VLV, OPEN EMHV8888.</p> <p>Step 5.1.9</p> | | <p>Candidate depressed OPEN pushbutton on EM HIS-8888 until red light LIT.</p> | <p>S U</p> <p>Comments:</p> |

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|-------------|--|--|---|---|
| *18. | <p>FILL and VENT the accumulators per the following:</p> <p>a. At RL018, OPEN the selected accumulator tank fill line isolation valve and MARK the one opened:</p> <p style="padding-left: 40px;">*• Using EP HIS-8878A, ACC TANK A FILL LINE VLV, OPEN EPHV8878A.</p> <p>b. MONITOR selected accumulator pressure while filling and VENT as necessary in accordance with OTN-EP-00001 ADD02, SI Accumulator Pressure Control, to maintain pressure in the required range.</p> <p>c. MONITOR all accumulators for rising pressure or level.</p> <p>Step 5.1.10</p> | <p>Note: Opening EPHV8878A is the only critical part of this step.</p> | <p>Candidate depressed OPEN pushbutton on EP HIS-8878A until red light LIT.</p> <p>Candidate circled (marked) in procedure first bullet on step.</p> <p>Candidate observed Accumulator tank level indicators</p> <p>Candidate observed Accumulator tank pressure indicators</p> | <p style="text-align: center;">S U</p> <p>Comments:</p> |

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|-------------|--|--------------|--|--|
| 19. | <p>Backleakage past EP8956A (B, C, D), SI ACC TK A (B, C, D) OUT UPSTRM CHECK, may cause forward flow through Pressure Isolation Valves (PIVs) EPV0010/20/30/40, SI PMPS TO RCS COLD LEG LOOP 1(2, 3, 4) CHECK.</p> <p>CAUTION before Step 5.1.10.d.</p> | | <p>Candidate read and placekept caution.</p> | <p>S U</p> <p>Comments:</p> |
| 20. | <p>IF level or pressure rises in any accumulator NOT being filled, Refer To T/S SR 3.4.14.1 for testing due to possible forward flow through Pressure Isolation Valves (PIVs) EPV0010/20/30/40, SI PMPS TO RCS COLD LEG LOOP 1(2, 3, 4) CHECK.</p> <p>Step 5.1.10.d.</p> | | <p>Candidate observed accumulator MCB indications.</p> | <p>S U</p> <p>Comments:</p> |
| *21. | <p>WHEN the selected accumulator reaches the desired level recorded in Step 5.1.5, at RL018 CLOSE the selected accumulator tank fill line isolation valve and MARK the one closed.</p> <ul style="list-style-type: none"> Using EP HIS-8878A, ACC TANK A FILL LINE VLV, CLOSE EPHV8878A. <p>Step 5.1.11</p> | | <p>Candidate observed MCB level indication for Accumulator A.</p> <p>Candidate depressed CLOSE pushbutton on EM HIS-8878A until green light LIT.</p> | <p>S U</p> <p>Comments:</p> <p>NOTE: Level must be between 40% and 80% on either the PPC or control board indication to meet Critical Task.</p> |

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|----------|---|--|--|----------------------------------|
| 22. | To raise level in another accumulator, REPEAT Steps 5.1.10 and 5.1.11 for that accumulator. | | Candidate proceeded to step 5.1.13 | S U Comments: |
| | Step 5.1.12 | | | |
| 23. | <p>WHEN completed with raising the accumulator levels, PERFORM the following:</p> <ul style="list-style-type: none"> • Using EP HIS-8878A, ACC TANK A FILL LINE VLV, ENSURE EPHV8878A is CLOSED. | Note: EPHV8878A was closed in procedure step 5.1.11 (2 steps previous) | Candidate observed EP HIS-8878A green light LIT, red light EXTINGUISHED. | S U Comments: |
| | Step 5.1.13 | | | |
| *24. | <p>At RL017, STOP the running SI Pump and MARK the one stopped:</p> <ul style="list-style-type: none"> • Using EM HIS-5, SI PUMP B, STOP SI Pump B. | | Candidate rotated EM HIS-5 handswitch to STOP until green light LIT, red light EXTINGUISHED. | S U Comments: |
| | Step 5.1.14 | | | |
| *25. | At RL018, using EM HIS-8888, ACC TANKS FILL LINE VLV, CLOSE EMHV8888. | | Candidate depressed CLOSE pushbutton on EM HIS-8888 until green light LIT. | S U Comments: |
| | Step 5.1.15 | | | |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S3

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|----------------------------|-------------------------|----------------------------------|
| 26. | IF the SI Test Line AND EMV0257 were removed from service in Step 5.1.4, RESTORE the SI Test Line AND EMV0257 to service per OTN-EM-00001, Safety Injection System. Step 5.1.16 | | Candidate N/A'ed step. | S U Comments: |
| 27. | THE JPM IS COMPLETE | Record Stop Time on Page 2 | | S U Comments |

Initial Conditions: The Plant is in MODE 1. Safety Injection Accumulator 'A' level is 25%.
The SI test header is NOT in service.

Initiating Cues: You have been directed to raise SI Accumulator 'A' level to 40%, using SI Pump 'B', per OTN-EP-00001 Addendum 01, SI ACCUMULATOR LEVEL CONTROL Section 5.1, and maintain Accumulator pressure between 602 and 648 psig.

Notify the CRS when complete.

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S4

| | | | |
|------------------|------------------------|-------------|----------|
| JPM No: | URO-SEJ-02-C023J | KSA No: | 005A4.01 |
| Revision Date: | 11/21/2018 | KSA Rating: | 3.6/3.4 |
| Job Title: | URO/SRO | | |
| Duty: | RESIDUAL HEAT REMOVAL | | |
| Task Title: | BORATION OF RHR SYSTEM | | |
| Completion Time: | 20 minutes | | |

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☒ Simulator/Lab ☐ Plant ☐ Classroom

Method of Performance: ☐ Simulated ☒ Performed

☐ Alternate Path ☐ Time Critical ☐ RCA

References: OTN-EJ-00001, Addendum 1, A RHR Train Boration, Rev 9

Tools / Equipment: None

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

S4

- Initial Conditions: The Plant is in MODE 4 cooling down for a refueling outage.
- The RWST Boron Concentration is 2400 ppm and the "A" RHR Train is 700 ppm. The RCS Boron concentration is 2142 ppm.
 - "B" CCW is supplying the Service Loop and the "A" CCW Pump is running.
 - The SI test Header and EMV0257 are NOT in service.
 - The Hot Lab Technician has been notified that samples will be needed.
 - An OT is standing by and has a key for BN8717 from Key Issue
 - "B" RHR Train is in a Standby alignment.

Initiating Cues: The Control Room Supervisor has directed you to perform OTN-EJ-00001 Addendum 1 Section 5.1 to Borate the "A" train of RHR in preparation to place it in service. Inform the CRS when you are ready to direct Chemistry to sample the "A" RHR Train.

- Simulator Set up and/or Note(s): Load Configuration 18-4, use a Mode 4 IC. (IC167 was setup for this JPM)
- Ensure the "B" CCW is supplying the Service Loop and the "A" CCW Pump is running.

Task Standard: Upon completion of this JPM, the candidate will have borate the "A" RHR Train in preparation for it being place in service.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S4

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|---|--|----------------------------------|
| 1. | Obtain a verified working copy of OTN-EJ-00001, Addendum 1 A RHR Train Boration. | Provide candidate procedure copy | Candidate obtained procedure copy | S U Comments: |
| 2. | Review Precautions and Limitations Section 3.0 | If necessary " ALL PRECAUTIONS AND LIMITATIONS ARE SATISFIED " If Asked about Prereq 4.2, "that is the reason you are performing this task" | Candidate reviewed precautions and limitations | S U Comments: |
| 3. | Review Prerequisites Section 4.0 | If necessary " ALL PREREQUISITE CONDITIONS ARE SATISFIED " | Candidate reviewed prerequisites | S U Comments |
| 4. | NOTE Attachment 2 provides locations of equipment outside the Control Room. Unless otherwise indicated, all steps in this procedure are performed locally. RHR system data is provided in OTN-EJ-00001, Residual Heat Removal System. Note prior to section 5 | | Candidate read and placekept note | S U Comments |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S4

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--|---|--|
| 5. | <p>CAUTION</p> <p>Placing a train of RHR in service for cooldown requires that either both trains of RHR must be</p> <p>borated or that RHR train boron concentration must be greater than the boron concentration required for shutdown margin, as determined by the latest Chemistry sample.</p> <p>Caution prior to section 5.1</p> | | <p>Candidate read and placekept caution</p> | <p>S U</p> <p>Comments</p> |
| 6. | <p>CAUTION</p> <p>When in MODE 1, 2 or 3, opening BN8717, RHR SPLY TO RWST ISO, makes both trains of RHR inoperable.</p> <p>Caution prior to step 5.1.1</p> | | <p>Candidate read and placekept caution</p> | <p>S U</p> <p>Comments</p> |
| 7. | <p>PERFORM the following to prevent diluting the RWST below Technical Specification values:</p> <ul style="list-style-type: none"> • As needed, SAMPLE the RWST. • As needed, ADJUST Boron to prevent diluting RWST. <p>Step 5.1.1</p> | <p>Cue if necessary as CRS, there is no need at this point in time to adjust RWST boron concentration. Chemistry verified the RWST will remain Operable.</p> | <p>Candidate N/A'ed procedure step</p> | <p>S U</p> <p>Comments</p> |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S4

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--|---|---------------------------------|
| 8. | NOTIFY the Hot Lab Technician that boron concentration samples will be needed at the end of this section. Step 5.1.2 | Information provided in the initiating cue | Candidate placekept step and proceeded to next step | S U Comments |
| 9 | IF directed by the SM/CRS, REMOVE EMV0257, SI TEST LINE PRESS REGULATOR, from service per OTN-EM-00001, Safety Injection System. Step 5.1.3 | Information provided in the initiating cue | Candidate N/A'ed procedure step | S U Comments |
| 10. | OBTAIN key for BN8717, RHR SPLY TO RWST ISO, from Key Issue tag 101. Step 5.1.4 | Information provided in the initiating cue | Candidate placekept step and proceeded to next step | S U Comments |
| 11. | NOTE Closing all RHR suction isolations from the RCS prevents sending hot RCS fluid into the common ECCS suction piping. [Ref: 6.2.11] Note in Step 5.1.5 | | Candidate read and placekept note | S U Comments |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S4

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--|--|--|
| 12. | <p>PERFORM the following:</p> <ul style="list-style-type: none"> • Using EJ HIS-8811A, CTMT RECIRC SUMP TO RHR PUMP A SUCT, ENSURE EJHV8811A is CLOSED. • Using BB HIS-8702A, LOOP 1 HOT LEG TO RHR PUMP A SUCT, ENSURE BBPV8702A is CLOSED. • Using EJ HIS-8701A, LOOP 1 HOT LEG TO RHR PUMP A SUCT, ENSURE EJHV8701A is CLOSED. • Using EJ HIS-8804A, RHR A TRN A TO CHG PUMPS, ENSURE EJHV8804A is CLOSED. • ENSURE EJV0001, RHR TRN A TO CVCS LETDOWN ISO, is CLOSED. • Using EJ HIS-8840, RHR HOT LEG RECIRC VLV, for both Train A and Train B, ENSURE EJHV8840 is CLOSED. | <p>Note: BBPV8702 and BBPV8701A are closed with power removed (due to # of boration flowpaths)</p> <p>If asked, "Primary Operator reports that EJV0001 is CLOSED"</p> | <p>Candidate observed GREEN Light LIT and RED Light OFF for each valve listed.</p> | <p>S U</p> <p>Comments</p> |
| 13. | <p>IF RCS pressure is less than 400 psig, using BOTH of the following handswitches, CLOSE EJHV8809A:</p> <p>a. EJ HIS-8809AA, POWER LOCKOUT FOR EJ HV-8809A</p> <p>b. EJ HIS-8809A, RHR TO ACC INJ LOOPS 1 & 2</p> <p>Step 5.1.6</p> | . | <p>Candidate N/A'ed procedure step</p> | <p>S U</p> <p>Comments</p> |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S4

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--------------|---|---------------------------------|
| 14. | Using BN HIS-8812A, RWST TO RHR PUMP A SUCTION, ENSURE BNHV8812A is OPEN. Step 5.1.7 | | Candidate observed GREEN Light OFF and RED Light LIT for BN HIS-8821A. | S U Comments |
| 15. | Using EJ FK-618, RHR HX A BYPASS CTRL, CLOSE EJFCV0618. Step 5.1.8 | | Candidate observed GREEN Light LIT and RED Light OFF. | S U Comments |
| 16. | CAUTION With either EJHV8716A or B closed while in MODES 4 and 5, the RHR train which is aligned for boration will be inoperable for both RHR and SI. [Ref: 6.2.19, 6.2.12] The train lined up for SI should be isolated from the train in recirculation mode when only one train of RHR is in the recirculation mode of operation. Performing the following step ensures that B RHR Train remains OPERABLE for Safety Injection. [Ref: 6.2.8, 6.2.10] Caution prior to Step 5.1.9 | | Candidate read and placekept caution | S U Comments |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S4

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--|---|--|
| *17. | <p>PERFORM the following:</p> <ul style="list-style-type: none"> • Using EJ HIS-8716A, RHR TRN A HOT LEG RECIRC VLV, ENSURE EJHV8716A is OPEN. *• Using EJ HIS-8716B, RHR TRN B HOT LEG RECIRC VLV, ENSURE EJHV8716B is CLOSED. <p>Step 5.1.9</p> | <p>Note: Bulleted steps may be performed in any order. EJHIS-8716B is the only CRITICAL part of this step.</p> | <p>Candidate observed EJHV8716A GREEN Light OFF and RED Light LIT.</p> <p>Candidate depressed the close Pushbutton and observed EJHV8716B GREEN Light LIT and RED Light OFF.</p> | <p>S U</p> <p>Comments</p> |
| 18. | <p>CAUTION - The temperature of CCW supplied to the various components during normal operation should not exceed 105°F. During initial RHR operation, the temperature limit may be allowed to reach 120°F for a maximum of 4 hours.</p> <p>Caution prior to step 5.1.10</p> | | <p>Candidate read and placekept caution</p> | <p>S U</p> <p>Comments</p> |
| 19. | <p>PERFORM the following to align CCW to the A RHR HX per OTN-EG-00001, Component Cooling Water System:</p> <ul style="list-style-type: none"> a. ENSURE SW/ESW is aligned to the A CCW HX. b. ENSURE the A CCW Train is in operation. c. ENSURE adequate flow to the various CCW system loads. <p>Step 5.1.10 a-c</p> | <p>Information provided in the initiating cue</p> | <p>Candidate verified the CCW trains were in the correct lineup to support A RHR Boration.</p> <p>Candidate verified that EF HIS 51 is open by observing GREEN Light OFF and RED Light LIT.</p> | <p>S U</p> <p>Comments</p> |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S4

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|---|---|-----------------------------------|
| 20. | <p>CAUTION</p> <p>Closing the CCW inlet valve to RHR heat exchanger while in service will result in flashing the CCW side of the heat exchanger to steam.</p> <p>Caution prior to step 5.1.10 d</p> | | <p>Candidate read and placekept caution</p> | <p>S U</p> <p>Comments</p> |
| 21. | <p>d. Using EG HIS-101, CCW TO RHR HX A, ENSURE EGHV0101 is open.</p> <p>e. IF Annunciator 51A, RHR HX A CCW FLOW HILO, is in ALARM, THROTTLE CLOSED EC HIS-11, SFP HX A CCW OUTLET VLV, until Annunciator 51A clears.</p> <p>Step 5.1.10 d-e</p> | <p>If Annunciator 51A alarms and the candidate proceeds to address it, Cue " Another operator will address this"</p> | <p>Candidate opened EGHV0101 by pushing the OPEN pushbutton on EJ HIS-101 and observed GREEN Light OFF and RED Light LIT.</p> | <p>S U</p> <p>Comments</p> |
| *22. | <p>Using EJ HIC-606, RHR HX A FLOW CTRL, CLOSE EJHCV0606.</p> <p>Step 5.1.11</p> | | <p>Candidate fully rotated EJ HIC-606 in the clockwise direction to close EJ HIC-606.</p> | <p>S U</p> <p>Comments</p> |
| 23. | <p>Using EJ HIS-610, RHR PUMP A MINIFLOW VLV, ENSURE EJFCV0610 is OPEN.</p> <p>Step 5.1.12</p> | | <p>Candidate observed GREEN Light OFF and RED Light LIT.</p> | <p>S U</p> <p>Comments</p> |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S4

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|---|---|---------------------------------|
| *24. | Using EJ HIS-1, RHR PUMP A, START PEJ01A, RHR PUMP A. Step 5.1.13 | | Candidate started the A RHR Pump by rotating EJ HIS-1 to the START position | S U Comments |
| 25. | ENSURE that the following RHR pump minimum flow criteria are complied with: [Ref: 6.2.9] • Not less than 500 gpm • Should NOT be run with flow less than 1700 gpm for greater than 2 hours 15 minutes Step 5.1.14 | If asked as OT in the field, reply "RHR flow is ~1000gpm." | Candidate monitored RHR flow indicated and ensured above the stated limits. | S U Comments |
| 26. | ADJUST boron concentration in A RHR Train per Attachment 1. Step 5.1.14 | | Candidate proceeded to Attachment 1. | S U Comments |
| 27. | ENSURE there are no flow paths that could depressurize the RCS when BN8717, RHR SPLY TO RWST ISO, is opened. Att 1 Step 1 | | Candidate verified no flowpath could depressurize the RCS when BN8717 is opened Locally | S U Comments |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S4

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--|---|--|
| 28. | <p>2) ESTABLISH recirculation flow as follows:</p> <p>a) Using EJFIS0610, RHR PUMP A DISCH TO RHR HX A FLOW IND SWITCH, to monitor flow, PERFORM the following:</p> <p>(1) UNLOCK BN8717, RHR SPLY TO RWST ISO.</p> <p>Att 1 Step 2.a.(1)</p> | Cue: Role Play as OT and report "BN8717 is unlocked" | Candidate directed OT to unlock BN0717. | <p>S U</p> <p>Comments</p> |
| 29. | <p>(2) THROTTLE OPEN BN8717 to establish a recirculation flow (approximately 1700 gpm) through the A RHR train back to the RWST.</p> <p>Att 1 Step 2.a.(2)</p> | Cue: Role Play as OT and report "EJFIS610 is reading ~1700 gpm." | Candidate directed OT to throttle Open BN8717 to ~1700 gpm. | <p>S U</p> <p>Comments</p> |
| 30. | <p>(3) As the recirculation flow is being raised, PERFORM the following:</p> <ul style="list-style-type: none"> • Using EJ PI-614, RHR PUMP A DISCH PRESS, MONITOR PEJ01A, RHRPUMP A, discharge pressure. • IF signs of pump cavitation or any other abnormal pump or system transients occur, STOP PEJ01A, RHR PUMP A, using EJ HIS-1. <p>Att 1 Step 2.a.(3)</p> | | Candidate monitored RHR for signs of cavitation | <p>S U</p> <p>Comments</p> |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S4

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|--|---|--|
| 31. | <p>NOTE</p> <p>After performing the next step, approximately five minutes are allowed to elapse before continuing with the procedure.</p> <p>Note prior to Att1 Step 2.b</p> | | <p>Candidate read and placekept note</p> | <p>S U</p> <p>Comments</p> |
| *32. | <p>Using EJ HIC-606, RHR HX A FLOW CTRL, THROTTLE OPEN EJHCV0606 approximately 10%.</p> <p>Att1 Step 2.b</p> | | <p>Candidate raised RHR flow by raising the output on EJ HIC-606.</p> | <p>S U</p> <p>Comments</p> |
| *33. | <p>c) WAIT approximately five minutes.</p> <p>*d) Using EJ HIC-606, RHR HX A FLOW CTRL, CLOSE EJHCV0606.</p> <p>Att1 Step 2.c-d</p> | <p>Cue "5 minutes has elapsed"</p> <p>Note: Step 2.d is Critical</p> | <p>Candidate lowered RHR flow by taking the output on EJ HIC-606 to zero.</p> | <p>S U</p> <p>Comments</p> |
| 34. | <p>NOTE</p> <p>After performing the next step, approximately five minutes are allowed to elapse before continuing with the procedure.</p> <p>Note prior to Att1 Step 2.e</p> | | <p>Candidate read and placekept note</p> | <p>S U</p> <p>Comments</p> |
| *35. | <p>Using EJ FK-618, RHR HX A BYPASS CTRL, THROTTLE OPEN EJFCV0618 approximately 10%.</p> <p>Att1 Step 2.e</p> | | <p>Candidate raised RHR flow by raising the output on EJ FK-618 to ~10%.</p> | <p>S U</p> <p>Comments</p> |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S4

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--|---|---------------------------------|
| *36. | f) WAIT approximately five minutes. *g) Using EJ FK-618, RHR HX A BYPASS CTRL, CLOSE EJFCV0618. Att1 Step 2.f-g | Cue "5 minutes has elapsed" Note: Step 2.g is Critical | Candidate lowered RHR flow by taking the output on EJ FK-618 to zero. | S U Comments |
| 37. | THE JPM IS COMPLETE | Record Stop time on Page 2 | | S U Comments |

- Initial Conditions: The Plant is in MODE 4 cooling down for a refueling outage.
- The RWST Boron Concentration is 2400 ppm and the "A" RHR Train is 700 ppm. The RCS Boron concentration is 2142 ppm.
 - "B" CCW is supplying the Service Loop and the "A" CCW Pump is running.
 - The SI test Header and EMV0257 are NOT in service.
 - The Hot Lab Technician has been notified that samples will be needed.
 - An OT is standing by and has a key for BN8717 from Key Issue
 - "B" RHR Train is in a Standby alignment.

Initiating Cues: The Control Room Supervisor has directed you to perform OTN-EJ-00001 Addendum 1 Section 5.1 to Borate the "A" train of RHR in preparation to place it in service. Inform the CRS when you are ready to direct Chemistry to sample the "A" RHR Train.

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

S5

JPM No: EOP-RO-S-006 EOP Add 16 KSA No: 028A4.03
Revision Date: 04/06/2018 KSA Rating: 3.1 / 3.3
Job Title: URO/SRO
Duty: CONTAINMENT HYDROGEN
CONTROL
Task Title: PLACING CONTAINMENT H2
ANALYZER IN SERVICE
Completion Time: 10 minutes

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☒ Simulator/Lab ☐ Plant ☐ Classroom

Method of Performance: ☐ Simulated ☒ Performed

☐ Alternate Path ☐ Time Critical ☐ RCA

References: EOP ADDENDUM 16, Placing Hydrogen analyzers in Service, Rev 1

Tools / Equipment: None

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

S5

Initial Conditions: Callaway experienced a large loss of coolant accident. Operators are performing the actions of E-1, Loss of Reactor or Secondary Coolant.

Initiating Cues: You have been directed to place hydrogen analyzer 'A' in service per EOP Addendum 16.

Simulator Set up and/or Note(s): Use any Mode 1 IC and perform the following:

- Select Override Meters (GS)
- Select HWX20D3M, HWX20D4M, HWX20D5M and SET to 0.15 (run ILT JPM S5.sce if applicable)
- Ensure all CTMT Coolers and Hydrogen Mixing Fans are in SLOW

If desired for Sim to model the LOCA, Select Malfunction

- Select BB002_A and SET to 5000.
- Ramp of 5 sec.
- Trip RCPs when RCS pressure lowers to less than 1400.
- Freeze simulator.
- Roll recorders on RL017 and CTMT&H2 recorders (5 of them) on RL019.

Task Standard: Upon completion of this JPM, the candidate will have placed hydrogen analyzer 'A' in service.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S5

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|---|--|---------------------|
| 1. | Obtain a verified working copy of EOP Addendum 16 | Provide candidate with procedure | Candidate obtained procedure copy | S U Comments: |
| *2. | Place power lockout switches for hydrogen analyzer containment isolation valves in non-iso position as necessary: Train A: <ul style="list-style-type: none">GS HIS-40GS HIS-42 Step 1 | | Candidate placed GS-HIS-40 and GS HIS-42 in the non-iso position. | S U Comments: |
| *3. | Open hydrogen analyzer a containment isolation valves: <ul style="list-style-type: none">GS HIS-12GS HIS-13GS HIS-14GS HIS-17GS HIS-18 Step 2 | If asked about Admin control for these valves (per the cover), Role Play as CRS and reply "I will address admin controls later" | Candidate opened GS HIS-12 GS HIS-13 GS HIS-14 GS HIS-17 GS HIS-18 By depressing the OPEN pushbutton | S U Comments: |
| *4. | Place containment hydrogen analyzer 'A' in analyze position and record time: GS HIS-16A Time: _____ Step 3 | | Candidate placed GS HIS-16A in analyze | S U Comments: |
| 5. | Open hydrogen analyzer 'B' containment isolation valves: Step 4 | Cue was for the "A" Hydrogen Analyzer only. | Candidate N/A'd step | S U Comments: |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S5

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|--------------|--|---------------------------|
| 6. | Place containment hydrogen analyzer 'B' in analyze position and record time: _____ | | Candidate N/A'd step | S U Comments: |
| | Step 5 | | | |
| 7. | Check containment cooler fans – running in slow speed <ul style="list-style-type: none"> • GN HIS-9 • GN HIS-17 • GN HIS-5 • GN HIS-13 | | Candidate checked ALL containment cooler fans – running in slow speed | S U Comments: |
| | Step 6 | | | |
| 8. | Check containment hydrogen mixing fans – running in slow speed <ul style="list-style-type: none"> • GN HIS-2 • GN HIS-4 • GN HIS-1 • GN HIS-3 | | Candidate checked ALL containment hydrogen mixing fans – running in slow speed | S U Comments: |
| | Step 7 | | | |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S5

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|----------|---|---|---|----------------------------------|
| 9. | <p>NOTE: To ensure an accurate hydrogen measurement, the following warmup times are required:</p> <p>Analyzer heat trace has been energized in ANALYZE or STANDBY position for at least 2 Hours.</p> <p>Analyzer has been in ANALYZE position with supply and return valves open for at least 15 Minutes.</p> <p>Note prior to step 8</p> | <p>If asked from note, Confirm analyzer heat has been energized in ANALYZE for over two hours with supply and return valves open for 20 minutes.</p> | <p>Candidate read and placekept note</p> | <p>S U</p> <p>Comments:</p> |
| 10. | <p>Monitor containment hydrogen concentration:</p> <p>GS AI-19 (Analyzer A)</p> <p>Step 8</p> | | <p>Candidate monitored GS AI-19</p> | <p>S U</p> <p>Comments:</p> |
| 11. | <p>THE JPM IS COMPLETE</p> | <p>Record Stop time on Page 2</p> | <p>Candidate informed the CRS that the "A" Hydrogen analyzer is in service.</p> | <p>S U</p> <p>Comments:</p> |

Initial Conditions: Callaway experienced a large loss of coolant accident. Operators are performing the actions of E-1, Loss of Reactor or Secondary Coolant.

Initiating Cues: You have been directed to place hydrogen analyzer 'A' in service per EOP Addendum 16.

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S6

| | | | |
|------------------|--|-------------|----------|
| JPM No: | No bank id yet | KSA No: | 015A1.01 |
| Revision Date: | 09/19/2018 | KSA Rating: | 3.5/3.8 |
| Job Title: | URO/SRO | | |
| Duty: | Nuclear Instrumentation (SE) | | |
| Task Title: | Perform a Power Range NI Gain Adjustment | | |
| Completion Time: | 10 minutes | | |

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☒ Simulator/Lab ☐ Plant ☐ Classroom

Method of Performance: ☐ Simulated ☒ Performed

☐ Alternate Path ☐ Time Critical ☐ RCA

References: OSP-SE-00004, NIS POWER RANGE HEAT BALANCE, Rev 38

Tools / Equipment: None

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

S6

Initial Conditions: A Plant Computer Heat Balance was just calculated in accordance with OSP-SE-00004, NIS POWER RANGE HEAT BALANCE.

Based on the data it has been determined that NIS Power Range Channel N42 needs to have its gain adjusted.

Initiating Cues: The Control Room Supervisor directs you to perform gain adjustment for NIS Power Range Channel N42 per step 6.3.8 of OSP-SE-00004, NIS POWER RANGE HEAT BALANCE.

Calorimetric Calculation summary has been printed out.
Inform the CRS when complete.

Note: The operator will receive the cue sheet and 2 calorimetric images (enclosed after cue sheet)

Simulator Set up and/or Note(s):

- Load 100% IC-10
- Adjust N42 to slightly less than 99%
- Ensure Rod Selection HS, SE HS-9, is in Automatic
- Placekeep OSP-SE-00004 up to and including step 6.3.7.

Task Standard: Upon completion of this JPM, the operator will have correctly adjusted N42 to an indicated Reactor Power greater than calculated RTP, but not greater than 1% above calculated RTP.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S6

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|----------|---|--|---|----------------------------------|
| 1. | Obtain a copy of OSP-SE-00004, NIS POWER RANGE HEAT BALANCE | Provide candidate with procedure copy | Candidate obtained procedure copy. | S U Comments: |
| 2. | Review Acceptance Criteria, Precautions, Limitations, and Prerequisites | All Precautions, Limitations, and Prerequisites are met. | Candidate reviewed Acceptance Criteria, Precautions, Limitations, and Prerequisites | S U Comments: |
| 3. | <p>Note:</p> <p>Attachment 1 provides instructions and may be used as stand-alone work instructions for Power Range Channel gain adjustment performance.</p> <p>During a rapid downpower change of more than 10% per hour, NIS Power Range Channels should be adjusted to greater than calculated RTP, but NOT greater than 2% above calculated RTP during the performance of Step 6.3.8.</p> <p>Note Prior to Step 6.3.8</p> | <p>Note: section 6.3 is applicable and at step 6.3.5 the candidate is directed to step 6.3.8 which is to perform Attachment 1. There are no action in steps 6.3.1 through 6.3.7 and are not listed here and the Note prior to Step 6.3.8 explains that Attachment may be used as a stand alone document hence not all of section 6.3 is provided in the JPM.</p> | Candidate read and placekept Note | S U Comments: |
| 4. | <p>CAUTION</p> <p>Gain adjustment can cause a POSITIVE RATE TRIP if performed too fast (more than 4.25% of RTP in 2 seconds).</p> <p>Power Range Channel gain adjustments are performed one channel at a time. Two Channel trips will cause a Reactor Trip.</p> <p>Caution prior to Step 6.3.8</p> | | Candidate read and placekept Caution | S U Comments: |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S6

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--|---|----------------------------------|
| 5. | RECORD calculated RTP for Power Range Channel N42 gain adjustment. Attachment 1, 1 st row | | Candidate recorded 99.9% on Attachment 1 (given in initial conditions) | S U Comments: |
| 6. | IF RTP is less than 40% AND indicated Reactor Power will be adjusted DOWN, RECORD Neutron Flux High Trip setpoint for Channel N42, OR N/A. Attachment 1, 2 nd row | | Candidate recorded N/A on Attachment 1 | S U Comments: |
| 7. | STA REVIEW to indicate compliance with APA-ZZ-01300, Reactivity Management Program, IF any NIS Power Range Channel will be adjusted DOWN more than 1%, OR N/A. Attachment 1, 3 rd row | | Candidate recorded N/A on Attachment 1 | S U Comments: |
| 8. | SM/CRS APPROVAL for NIS Power Range Channel N42 gain adjustments. Attachment 1, 4 th row | Role play as the CRS. "Approval Granted to perform the NIS Power Range Channel gain adjustment. initial and date have been provided on Attachment 2" | Candidate obtained CRS approval on Attachment 1 | S U Comments: |
| *9. | PLACE SE HS-9, ROD BANK AUTO/MAN SEL, in the MAN position. Attachment 1, 5 th row | | Candidate PLACED SE HS-9, ROD BANK AUTO/MAN SEL, in the MAN position. | S U Comments: |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S6

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|--------------|---|---|
| 10. | <p>At SE054B, PERFORM the following to adjust N42:</p> <p>RECORD As Found position of GAIN potentiometer on drawer N42B.</p> <p>Attachment 1, N42 column, 1st row</p> | | <p>Candidate RECORDED As Found position of GAIN potentiometer on drawer N42B on Attachment 1</p> | <p>S U</p> <p>Comments:</p> |
| 11. | <p>RECORD As Found PERCENT FULL POWER indicated on drawer N42A.</p> <p>Attachment 1, N42 column, 2nd row</p> | | <p>Candidate RECORDED As Found PERCENT FULL POWER indicated on drawer N42A on Attachment 1</p> | <p>S U</p> <p>Comments:</p> |
| *12. | <p>SLOWLY ADJUST Channel N42 GAIN potentiometer to avoid a POSITIVE RATE TRIP, UNTIL indicated Reactor Power is greater than calculated RTP, but NOT greater than 1% above calculated RTP.</p> <p>Attachment 1, N42 column, 3rd row</p> | | <p>Candidate SLOWLY ADJUSTED Channel N42 GAIN potentiometer, UNTIL indicated Reactor Power was greater than calculated RTP, but NOT greater than 1% above calculated RTP.</p> | <p>S U</p> <p>Comments:</p> |
| 13. | <p>RECORD As Left position of GAIN potentiometer on drawer N42B.</p> <p>Attachment 1, N42 column, 4th row</p> | | <p>Candidate RECORDED As Left position of GAIN potentiometer on drawer N42B on Attachment 1</p> | <p>S U</p> <p>Comments:</p> |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S6

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|---|---|---|
| 14. | <p>RECORD As Left PERCENT FULL POWER indicated on drawer N42A.</p> <p>Attachment 1, N42 column, 5th row</p> | | <p>Candidate RECORDED As Left PERCENT FULL POWER indicated on drawer N42A on Attachment 1</p> | <p>S U</p> <p>Comments:</p> |
| 15. | <p>RECORD As Left DETECTOR CURRENT microamperes for drawer N42B (upper detector).</p> <p>Attachment 1, N42 column, 6th row</p> | | <p>Candidate RECORDED As Left DETECTOR CURRENT microamperes for drawer N42B (upper detector).</p> | <p>S U</p> <p>Comments:</p> |
| 16. | <p>RECORD As Left DETECTOR CURRENT microamperes on drawer N42B (lower detector).</p> <p>Attachment 1, N42 column, 7th row</p> | | <p>Candidate RECORDED As Left DETECTOR CURRENT microamperes on drawer N42B (lower detector).</p> | <p>S U</p> <p>Comments:</p> |
| *17. | <p>IF this is the last channel to be adjusted, PLACE SE HS-9, ROD BANK AUTO/MAN SEL, in required position as directed by SM/CRS.</p> <p>Attachment 1</p> | <p>If asked, role play as the CRS and say: "no other adjustments are desired at this point in time"</p> | <p>Candidate to placed SE HS-9 ROD BANK AUTO/MAN SEL, in the AUTO position.</p> | <p>S U</p> <p>Comments:</p> |
| 18. | THE JPM IS COMPLETE | <p>Record Stop time on Page 2</p> | | <p>S U</p> <p>Comments:</p> |

Initial Conditions: A Plant Computer Heat Balance was just calculated in accordance with OSP-SE-00004, NIS POWER RANGE HEAT BALANCE.

Based on the data it has been determined that NIS Power Range Channel N42 needs to have its gain adjusted.

Initiating Cues: The Control Room Supervisor directs you to perform gain adjustment for NIS Power Range Channel N42 per step 6.3.8 of OSP-SE-00004, NIS POWER RANGE HEAT BALANCE.

Calorimetric Calculation summary has been printed out.

Inform the CRS when complete.

Sys Tree

CURRENT FUNCTION: CALM1

SIMULATOR Svr

ALARM

S

C

H

P

Z

I

CALLAWAY NUCLEAR POWER RANGE CHANNEL

CALORIMETRIC CALCULATION SUMMARY

REAL-TIME

PAGE 1 OF 2

TIME

DATE

| TOTAL CORE THERMAL POWER | VALUE | QUAL | UNITS |
|--|---------|------|---------|
| STEAM GENERATOR THERMAL POWER - LOOP 1 | 3050.2 | GOOD | MBTU/HR |
| - LOOP 2 | 3047.7 | GOOD | MBTU/HR |
| - LOOP 3 | 3052.3 | GOOD | MBTU/HR |
| - LOOP 4 | 3050.5 | GOOD | MBTU/HR |
| TOTAL | 12200.6 | GOOD | MBTU/HR |
| TOTAL CORE THERMAL POWER (CTP) | 3561.1 | GOOD | MW |
| CORE THERMAL POWER (PERCENT) | 99.9 | GOOD | % |
| AVERAGE OF NIS READINGS | 99.75 | GOOD | % |
| 1 MIN AVG OF RCS LOOP AVG DT | 98.9 | GOOD | % |
| DELTA T DEVIATION FROM CTPPC | 1.0 | GOOD | % |

SUMMARY OF NIS INDICATIONS

| | VALUE | QUAL | UNITS | CAL - NIS |
|--------------------------|--------|------|-------|-----------|
| ONE MINUTE AV OF NIS CH1 | 100.15 | GOOD | % | -0.26 |
| ONE MINUTE AV OF NIS CH2 | 98.75 | GOOD | % | 1.16 |
| ONE MINUTE AV OF NIS CH3 | 100.09 | GOOD | % | -0.20 |
| ONE MINUTE AV OF NIS CH4 | 100.04 | GOOD | % | -0.15 |

FEED (1) / STEAM (2) OPTION = 1

Canc

Tog

Back

Fore

F1 MENU

F2

F3

F4

F5

F6

| | | | | | | | | | | | | | | | | |
|--------------------------------------|--|--|--|--|--|---------------|--|--|--|-------------|---|---|---|---|---|---|
| Sys Tree | | | | | | | | | | | | | | | | |
| CURRENT FUNCTION: CALM2 | | | | | | SIMULATOR Svr | | | | ALARM | S | C | H | P | Z | I |
| CALLAWAY NUCLEAR POWER RANGE CHANNEL | | | | | | | | | | PAGE 2 OF 2 | | | | | | |
| CALORIMETRIC CALCULATION SUMMARY | | | | | | | | | | TIME | | | | | | |
| REAL-TIME | | | | | | | | | | DATE | | | | | | |

| STEAM GENERATOR ENTHALPY CHANGE | LOOP 1 | | LOOP 2 | | LOOP 3 | | LOOP 4 | | UNITS |
|---------------------------------|--------|------|--------|------|--------|------|--------|------|---------|
| | VALUE | QUAL | VALUE | QUAL | VALUE | QUAL | VALUE | QUAL | |
| STEAM GEN. PRESSURE (PSIG) | 988.7 | GOOD | 988.7 | GOOD | 988.6 | GOOD | 988.7 | GOOD | PSIG |
| STEAM GEN. PRESSURE (PSIA) | 1003.4 | GOOD | 1003.4 | GOOD | 1003.3 | GOOD | 1003.4 | GOOD | PSIA |
| CORRESPONDING ENTHALPY (HG) | 1192.8 | GOOD | 1192.8 | GOOD | 1192.8 | GOOD | 1192.8 | GOOD | BTU/LBM |
| CORRESPONDING ENTHALPY (HF) | 418.8 | GOOD | 419.5 | GOOD | 418.6 | GOOD | 418.9 | GOOD | BTU/LBM |
| ENTHALPY RISE (HG - HF) | 774.0 | GOOD | 773.3 | GOOD | 774.2 | GOOD | 773.9 | GOOD | BTU/LBM |
| BLOWDOWN ENTHALPY | 543.1 | GOOD | 543.1 | GOOD | 543.1 | GOOD | 543.1 | GOOD | BTU/LBM |
| FEEDWATER TEMPERATURE | 439.4 | GOOD | 440.0 | GOOD | 439.2 | GOOD | 439.5 | GOOD | F |

| SUMMARY INFORMATION | LOOP 1 | | LOOP 2 | | LOOP 3 | | LOOP 4 | | UNITS |
|-------------------------|--------|------|--------|------|--------|------|--------|------|--------|
| | VALUE | QUAL | VALUE | QUAL | VALUE | QUAL | VALUE | QUAL | |
| CORRECTED FEED FLOW | 3959.5 | GOOD | 3959.7 | GOOD | 3961.1 | GOOD | 3960.5 | GOOD | KLB/HR |
| CORRECTED STEAM FLOW | 4058.2 | GOOD | 4021.0 | GOOD | 4057.6 | GOOD | 3976.6 | GOOD | KLB/HR |
| CORRECTED BLOWDOWN FLOW | 21.47 | GOOD | 21.47 | GOOD | 21.47 | GOOD | 21.47 | GOOD | KLB/HR |
| MISMATCH | 120.09 | GOOD | 82.80 | GOOD | 117.98 | GOOD | 37.55 | GOOD | KLB/HR |
| TILTS | 1.00 | GOOD | 1.00 | GOOD | 1.00 | GOOD | 1.00 | GOOD | |
| AUCT. HIGHEST T AVG | 585.3 | GOOD | | | | | | | F |
| HIGHEST DIFF. TEMP | 99.6 | GOOD | | | | | | | % |

| | | | | | | | | | | | | | | | |
|------|-----|------|------|---|---|---|---|---------|----|----|----|----|----|--|--|
| Canc | Tog | Back | Fore | ← | → | ↑ | ↓ | F1 MENU | F2 | F3 | F4 | F5 | F6 | | |
|------|-----|------|------|---|---|---|---|---------|----|----|----|----|----|--|--|

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S7

| | | | |
|------------------|----------------------------------|-------------|---------------|
| JPM No: | No bank id yet | KSA No: | APE 060AA2.05 |
| Revision Date: | 11/28/2018 | KSA Rating: | 3.7/4.2 |
| Job Title: | URO/SRO | | |
| Duty: | SA – EFSAS | | |
| Task Title: | Respond to Off-Normal Conditions | | |
| Completion Time: | 15 minutes | | |

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☒ Simulator/Lab ☐ Plant ☐ Classroom

Method of Performance: ☐ Simulated ☒ Performed

☒ Alternate Path ☐ Time Critical ☐ RCA

References: OTA-RK-00020, Addendum 63B, control Room Radiation High CRVIS, Rev 0
 OTO-SA-00001, EFSAS Verification and Restoration, Rev 41
 OTA-SP-RM011, Radiation Monitor Control Panel RM-11, Rev 43

Tools / Equipment: None

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

S7

Initial Conditions: Reactor Power is 100%. A CVCS mixed bed demin has been sluiced to radwaste and preparations are underway to fill the mixed bed with new resin.

Annunciator 62B, Area Radiation High, has just alarmed.

Initiating Cues: The CRS has directed you to respond to Annunciator 62B.

Simulator Set up and/or Notes: Any MODE 1 IC. Close BG HIS-8245 CVCS Demin Outlet Valve.

(Running Scenario file ILT_JPM_S7 will perform the below actions)

- Fail CRVIS to Actuate by inserting the following malfunctions:
 - Automatic Actuation Signal
 - SA036D_CRVIS=0
 - SA036E_CRVIS=0
 - Manual Pushbuttons
 - X18I94A=0
 - X18I98A=0
- Insert the following Radiation Monitor Alarms as follows:
 - (Setup) IMF SDRE0005 to 5 mr/hr
 - (Pending) IMF GKRE0004 = 5.0×10^{-3} uCi/ml (5E-3)
 - (Pending) IMF GKRE0005 = 8.0×10^{-3} uCi/ml (8E-3)

Task Standard: Upon completion of this JPM, the candidate will have manually initiated either train of CVRIS per OTO-SA-00001.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S7

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--|------------------------------------|----------------------------------|
| 1. | Obtain a verified working copy of Annunciator 62B. | | Candidate obtained a copy. | S U Comments: |
| 2. | <p>NOTE:</p> <p>A loss of control power to SD055A or SD055B may cause alarms on the following annunciator windows:</p> <ul style="list-style-type: none"> • 62A, AREA RAD HIHI • 62B, AREA RAD HI • 62C, AREA RAD MON FAIL <p>Annunciator 62B - Note prior to Step 3.1</p> | | Candidate read and placekept note. | S U Comments: |
| 3. | <p>CHECK the following AND DETERMINE the affected monitor:</p> <ul style="list-style-type: none"> • SD055A, CTRL PNL -- AREA RADN MONITOR • SD055B, CTRL PNL -- AREA RADN MONITOR <p>Annun 62B – Step 3.1</p> | <p>Note: Panels SD055A&B are not modeled and are represented by pictures.</p> <p>SDRE0005 is top row 5th from the left.</p> <p>When the candidate arrives at the mockup and is reviewing the panel for indications CUE "SDRE0005 yellow light is LIT". Using pen, point to meter and indicate the pin is approximately midpoint of the meter face.</p> | | S U Comments: |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S7

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--------------|--|---|
| 4. | <p>IF either panel has lost control power, ENSURE CLOSED the applicable breaker(s):</p> <p>SD055A</p> <p>PN0704, FU LS FEED TO - SD055A - RADIATION MONITOR AC INPUT THRU FUSE F1</p> <p>PN0827, FU LS FEED TO - SD055A - RADIATION MONITOR SD055B</p> <p>PN0735, FU LS FEED TO - SD055B - RADIATION MONITOR AC INPUT</p> <p>PN0825, FU LS FEED TO - SD055B - RADIATION MONITOR</p> <p>Annun 62B – Step 3.2</p> | | Candidate N/A'ed step | <p>S U</p> <p>Comments:</p> |
| 5. | <p>Refer To the Rad Monitor Table following these steps AND PERFORM the following:</p> <ul style="list-style-type: none"> • DETERMINE the alarming location. • CONFIRM the alarm using the indicated Computer Points. <p>Annun 62B – Step 3.3</p> | | Candidate determined that the Radwaste Building is affected. | <p>S U</p> <p>Comments:</p> |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S7

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--|--|---|
| 6. | <p>IF the affected area is accessible by plant personnel:</p> <p>3.4.1. NOTIFY Radiation Protection to survey the area to determine actual radiation levels.</p> <p>3.4.2. DISPATCH an operator to the area to assist RP in determining the source of increased radiation levels.</p> <p>Annun 62B – Step 3.4</p> | <p>Booth Operator: IMFs to cause GKRE0004/5 to read the values listed in the setup. Ensure Annunciators 61A, 61B, and 63B alarm</p> | <p>Candidate notified Radiation Protection of ARM alarm in the Radwaste Building and dispatched an operator to assist RP.</p> | <p>S U</p> <p>Comments:</p> |
| 7. | <p>Obtain a verified working copy of Annunciator 61A and per step 3.1 proceeded to the RM-11 and determined OTA-SP-RM011 Attachment 13 is appropriate.</p> | | <p>Candidate obtained a copy of Annunciator 61A and proceeded to the RM-11 console.</p> <p>The candidate determined Attachment 13 of OTA-RM-00011 is the correct section to implement.</p> | <p>S U</p> <p>Comments:</p> |
| 8. | <p>1. AUTOMATIC ACTIONS: a. On RED alarm of GAS Channel 043 or 053, CRVIS actuates.</p> <p>2. IMMEDIATE ACTIONS: None</p> <p>OTA-SP-RM011 Attachment 13 – Step 1 & 2</p> | <p>Note: The candidate may try to actuate CRVIS at panel RL017/018 by pushing SA HS-9 and 13. Per the setup, the pushbuttons are failed.</p> | <p>Candidate reviewed Automatic Actions and Immediate Actions</p> | <p>S U</p> <p>Comments:</p> |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S7

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|---|---|---|
| 9. | <p>OPERATOR ACTIONS:</p> <p>NOTE: For YELLOW alarm of the Particulate Channels 041 and 051, and Iodine Channels 042 and 052, ESFAS trip function does NOT occur.</p> <p>a. IF alarm is YELLOW on the Particulate Channels 041 and 051, and Iodine Channels 042 and 052, NOTIFY Count Room to sample and determine the source.</p> <p>Attachment 13 – Step 3.a and NOTE prior to step 3.a</p> | | <p>Candidate determined a RED alarm is present and proceed on to step 3.b</p> | <p>S U</p> <p>Comments:</p> |
| 10. | <p>IF alarm is RED on GAS channels 043 or 053, ENSURE CRVIS has actuated by the following:</p> <ul style="list-style-type: none"> • Visual observation of ESFAS status panels • Main Control Board Annunciator 63A, CRVIS <p>Attachment 13 – Step 3b</p> | <p>Note: The candidate may try to actuate CRVIS at panel RL017/018 by pushing SA HS-9 and 13. Per the setup, the pushbuttons are failed.</p> <p>NOTE: the first step of Annunciator 63B is ENSURE CRVIS actuation per OTO-SA-00001, Engineered Safety Features Actuation Verification and Restoration and is not listed here.</p> | <p>Candidate determined that a CRVIS should have occurred but did not and proceeds to OTO-SA-00001.</p> | <p>S U</p> <p>Comments:</p> |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S7

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|----------|---|---|--|----------------------------------|
| 11. | CHECK Applicable ESF Components - PROPER EMERGENCY ALIGNMENT - Refer To the following Attachment(s) as necessary: OTO-SA-00001, Step 1 | If asked what CVRIS train should be placed in service, respond "its up to your discretion" Note: Attachment AB and AC are very similar only separated by Train and component ID. Only Attachment AB is listed in the JPM but either are successful and B Train manual actuation can be followed by using the below JPM steps. | Candidate determined that either • Attachment AB, CRVIS Train A Verification OR • Attachment AC, CRVIS Train B Verification Should be entered. | S U Comments: |
| 12. | NOTE See numbered NOTES on the last page of this Attachment. OTO-SA-00001, Attachment AB, Note prior to Step 1 | Attachment AB items are bulleted and can be performed in any order. | Candidate read and placekept note | S U Comments: |
| *13. | AB1. CRVIS Train A (SA066X): CGK01A, CONTROL BLDG EXH FAN is stopped OTO-SA-00001, Step 1 | | Candidate stopped CGK01A by taking GK HIS-16 to the STOP position | S U Comments: |
| *14. | AB1. CRVIS Train A (SA066X): CGK02A, ACCESS CONTROL EXH FAN is stopped OTO-SA-00001, Step 1 | | Candidate stopped CGK02A by taking GK HIS-47 to the STOP position | S U Comments: |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S7

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|--------------|--|----------------------------------|
| *15. | AB1. CRVIS Train A (SA066X): 14-E CGK03A, CONTROL RM FILTRATION FAN 14-F GKHZ19A, FILTRATION FAN INLET 14-G GKHZ19B, FILTRATION FAN OUTLET 14-H GKHZ19C, A/C EQUIP RM EXH 14-J GKHZ19D, A/C EQUIP RM SUPPLY OTO-SA-00001, Step 1 | | Candidate started or opened multiple fans/dampers by taking GK HIS-19 to the OPEN/RUN position | S U Comments: |
| *16. | AB1. CRVIS Train A (SA066X): 15-E CGK04A, CONTROL RM PRESSURIZATION FAN 15-F GKHZ75A, PRESSURIZATION FILTER TRAIN INLET 15-G GKHZ75B, PRESSURIZATION FILTER TRAIN OUTLET(14-D GKHZ75C, ESF SWGR ROOMS X-CONN OTO-SA-00001, Step 1 | | Candidate started or opened multiple fans/dampers by taking GK HIS-75 to the OPEN/RUN position | S U Comments: |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S7

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--------------|--|----------------------------------|
| *17. | AB1. CRVIS Train A (SA066X): SGK02, CONTROL BLDG SUPPLY UNIT OTO-SA-00001, Step 1 | | Candidate stopped SGK02 by taking GK HIS-8 to the STOP position | S U Comments: |
| 18. | AB1. CRVIS Train A (SA066X): 16-E SGK04A, CONTROL RM A/C UNIT 16-F GKHZ29A, A/C UNIT INLET 16-G GKHZ29B, A/C UNIT OUTLET OTO-SA-00001, Step 1 | | Candidate ensured multiple fans/dampers were open / running. | S U Comments: |
| 19. | AB1. CRVIS Train A (SA066X): 17-D SGK05A, CLASS IE A/C UNIT OTO-SA-00001, Step 1 | | Candidate ensured SGK05A was running by observing RED Light LIT and GREEN Light OFF. | S U Comments: |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S7

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--------------|--|----------------------------------|
| *20. | AB1. CRVIS Train A (SA066X): 15-H GKHZ13A, MAIN SUPPLY DAMPER 15-J GKHZ13B, MAIN EXH DAMPER 15-K GKHZ13C, MAIN EXH DAMPER 15-L GKHZ13D, MAIN SUPPLY DAMPER 16-H GKHZ13E, MAIN EXH DAMPER 16-J GKHZ13F, MAIN SUPPLY DAMPER 16-K GKHZ13G, MAIN EXH DAMPER 16-L GKHZ13H, MAIN EXH DAMPER OTO-SA-00001, Step 1 | | Candidate closed multiple dampers by taking GK HIS-13 to the CLOSED position | S U Comments |
| *21. | AB1. CRVIS Train A (SA066X): 14-K GKHZ59A, LOWER SPREADING RM SUPPLY 14-L GKHZ59B, LOWER SPREADING RM EXH OTO-SA-00001, Step 1 | | Candidate closed multiple dampers by taking GK HIS-59 to the CLOSED position | S U Comments: |
| *22. | AB1. CRVIS Train A (SA066X): 17-G GKHZ160, SPREADING RMS TO CR FILTER TRAIN OTO-SA-00001, Step 1 | | Candidate opened GKHZ160 by taking GK HIS-160 to the OPEN position | S U Comments: |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

S7

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|----------------------------|---|----------------------------------|
| *23. | AB1. CRVIS Train A (SA066X): 17-H GKHZ172A, CHASE & TK AREA SUPPLY 17-J GKHZ172B, CHASE & TK AREA EXH OTO-SA-00001, Step 1 | | Candidate closed multiple dampers by taking GK HIS-172 to the CLOSED position | S U Comments: |
| *24 | AB1. CRVIS Train A (SA066X): 17-K GKHZ174A, HOT LAB/FUME HOOD EXH 17-L GKHZ174B, HOT LAB/COUNT RM SUPPLY OTO-SA-00001, Step 1 | | Candidate closed multiple dampers by taking GK HIS-174 to the CLOSED position | S U Comments: |
| 25. | THE JPM IS COMPLETE | Record Stop Time on Page 2 | | S U Comments: |

Initial Conditions: Reactor Power is 100%. A CVCS mixed bed demin has been sluiced to radwaste and preparations are underway to fill the mixed bed with new resin.

Annunciator 62B, Area Radiation High, has just alarmed.

Initiating Cues: The CRS has directed you to respond to Annunciator 62B.

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

P1

| | | | |
|------------------|---|-------------|-----------|
| JPM No: | AB-NLO-P-001(A) | KSA No: | 041A2.02 |
| Revision Date: | 09/05/2018 | KSA Rating: | 3.6 / 3.9 |
| Job Title: | OT/URO/SRO | | |
| Duty: | Main Steam System | | |
| Task Title: | Isolate a Failed Open Atmospheric Steam Dump | | |
| Completion Time: | 10 minutes | | |

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☐ Simulator/Lab ☒ Plant ☐ Classroom

Method of Performance: ☒ Simulated ☐ Performed

☒ Alternate Path ☐ Time Critical ☒ RCA

References: OTO-AB-00001, Steam Dump Malfunction, Rev 18

Tools / Equipment: PPE

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

P1

Initial Conditions: A Reactor trip occurred from 100% power.

The crew has entered E-2, Faulted Steam Generator Isolation, due to Atmospheric Steam Dumps, AB PV-1 AND AB PV-4, failing open.

The valves cannot be closed from the Control Room.

Initiating Cues: The Control Room Supervisor (CRS) directs you to go to Area 5 and close AB PV-1 and AB PV-4.

Close AB PV-1 (SG A) first, then AB PV-4 (SG D) using Step 3 RNO of OTO-AB-00001, Steam Dump Malfunction.

Inform the CRS when both valves are closed.

Task Standard: Upon completion of this JPM, the Operator will have closed AB PV-1 and isolated AB PV-4. AB PV-1 was closed by isolating Air/N2 from the valve. AB PV-4 was isolated by closing the manual isolation valve, ABV0007.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

P1

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|----------|--|---|---|----------------------------------|
| 1. | Obtain a verified working copy of OTO-AB-00001, Steam Dump Malfunction. | Provide Candidate with procedure copy | Candidate obtained procedure copy | S U Comments: |
| *2. | Close the Air/N2 Isolation Valve for the affected SG ASD: • ABV0733 (SG A) Step 3 RNO a. | ABV0733 is in the position you described | Candidate closed ABV0733 by rotating the handwheel in the clockwise direction | S U Comments: |
| *3. | Open the Air/N2 Drain Valve for the affected SG ASD: • ABV0734 (SG A) Step 3 RNO b. | ABV0734 is in the position you described AB PV-1 indicates closed and steam flow can NOT be heard through the ASD May contact the control room at this time | Candidate opened ABV0734 by rotating the handwheel in the counterclockwise direction. | S U Comments: |
| 4. | Close the Air/N2 Isolation Valve for the affected SG ASD: • ABV0739 (SG D) Step 3 RNO a. | ABV0739 is in the position you described | Candidate closed ABV0739 by rotating the handwheel in the clockwise direction | S U Comments: |
| 5. | Open the Air/N2 Drain Valve for the affected SG ASD: • ABV0740 (SG D) Step 3 RNO b. | ABV0740 is in the position you described “AB PV-4 indicates open and steam flow can be heard through the ASD”. | Candidate opened ABV0740 by rotating the handwheel in the counterclockwise direction. | S U Comments: |
| | | The next step is the start of the alternate path. The student must recognize that AB-PV-4 is NOT closed and take additional actions to close the valve. | | |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

P1

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|----------|--|---|---|---|
| *6. | <p>If the SG ASD is not closed, then unlock and close the manual isolation valve for the affected SG ASD:</p> <ul style="list-style-type: none"> ABV0007 (SG D) <p>Step 3 RNO</p> | <p>After ABV0007 is unlocked and closed: “ABV0007 is in the position you described”</p> <p>After ABV0007 is closed “steam flow can NOT be heard through the ASD”</p> <p>May contact the control room at this time</p> | <p>Candidate determined AB PV-4 is NOT closed and unlocked and closed ABV0007 by rotating the handwheel in the clockwise direction.</p> | <p>S U</p> <p>Comments:</p> |
| 7. | <p>Notify CRS that AB PV-1 and AB PV-4 have been closed/isolated</p> | <p>CRS acknowledges</p> | <p>Candidate notified CRS that AB PV-1 was closed and AB PV-4 has been manually isolated</p> | <p>S U</p> <p>Comments:</p> |
| 8. | <p>THE JPM IS COMPLETE</p> | <p>Record Stop time on Page 2</p> | | <p>S U</p> <p>Comments</p> |

Initial Conditions: A Reactor trip occurred from 100% power.

The crew has entered E-2, Faulted Steam Generator Isolation, due to Atmospheric Steam Dumps, AB PV-1 AND AB PV-4, failing open.

The valves cannot be closed from the Control Room.

Initiating Cues: The Control Room Supervisor (CRS) directs you to go to Area 5 and close AB PV-1 and AB PV-4.

Close AB PV-1 (SG A) first, then AB PV-4 (SG D) using Step 3 RNO of OTO-AB-00001, Steam Dump Malfunction.

Inform the CRS when both valves are closed.

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

P2

| | | | |
|------------------|---------------------------------|-------------|------------|
| JPM No: | URO-AEO-07-P024J (A) | KSA No: | 004 2.1.30 |
| Revision Date: | 11/16/2018 | KSA Rating: | 4.4/4.0 |
| Job Title: | OT/URO/SRO | | |
| Duty: | Unit Reactor Operator | | |
| Task Title: | Abnormal / Emergency Operations | | |
| Completion Time: | 10 minutes | | |

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☐ Simulator/Lab ☒ Plant ☐ Classroom

Method of Performance: ☒ Simulated ☐ Performed

☒ Alternate Path ☐ Time Critical ☒ RCA

References: FR-S.1, Response to Nuclear Power Generation, Rev 12

Tools / Equipment: PPE

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

P2

Initial Conditions: The Reactor failed to trip following receipt of a valid trip signal. The crew attempted to manually trip the Reactor, but was unsuccessful.

The "A" CCP is running and BOTH Boric Acid Transfer pumps are running.

BG-HIS-8104 is OPEN and Emergency Boration Flow is 0 GPM.

Both BN-HIS-112D and BN-HIS-112E are seized in the CLOSED position and will not open.

Initiating Cues: The Control Room Supervisor directs you to initiate Local Emergency Boration of the RCS per Step 4. RNO of FR-S.1, Response to Nuclear Power Generation/ATWS.

Inform the Control Room Supervisor when Emergency Boration is established.

Task Standard: Upon completion of this JPM, the Candidate will have aligned a boration flow path from a boric acid source, through alternate boration valve BGV0177, to the Reactor Coolant System. In addition, the candidate will have placed both Generator and Motor Circuit Control Breakers in Pull To Lock on panels SF103A&B.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

P2

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|----------|--|---|--|----------------------------------|
| 1. | Obtain a verified working copy of FR-S.1, Response to Nuclear Power Generation / ATWS. | Provide Candidate with procedure copy | Candidate obtained procedure copy | S U Comments: |
| 2. | CHECK charging pumps – AT LEAST ONE RUNNING: CCP (s): <ul style="list-style-type: none"> • BG HIS-1A • BG HIS-2A OR NCP: <ul style="list-style-type: none"> • BG HIS-3 Step 4.a | Information was provided in the stem that the "A" CCP was running. NOTE: the candidate may proceed directly to the RNO as the cue states to perform actions to Locally initiate Emergency Boration | Candidate verified that a charging pump is running | S U Comments: |
| 3. | ALIGN emergency boration flow path: START Boric Acid Transfer Pumps: <ul style="list-style-type: none"> • BG HIS-5A • BG HIS-6A Step 4.b.1 | Information was provided in the stem that both Boric Acid Transfer Pumps are running. | Candidate verified that both Boric Acid Transfer Pumps are running. | S U Comments: |
| 4. | OPEN Emergency Borate To Charging Pump Suction valve: <ul style="list-style-type: none"> • BG HIS-8104 Step 4.b.2 | Information was provided in the stem that BG-HIS-8104 is OPEN. | Candidate verified that BG-HIS-8104, Emergency Borate to charging Pump suction Valve, is OPEN. | S U Comments: |
| 5. | CHECK Emergency Boration Flow – GREATER THAN 30 GPM: BG FI-183A Step 4.b.3 | Information was provided in the stem that Emergency Boration Flow is zero. | Candidate proceeded to RNO column if not already there. | S U Comments: |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

P2

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|----------|---|--|--|---|
| 6. | <p>Normal or alternate boration flow path:</p> <p>a) PLACE RCS Makeup Control switch in STOP position:</p> <ul style="list-style-type: none"> • BG HS-26 <p>b) OPEN Boric Acid To Boric Acid Blending Tee valve:</p> <ul style="list-style-type: none"> • BG HIS-110A <p>c) OPEN Makeup To VCT Outlet valve:</p> <ul style="list-style-type: none"> • BG HIS-110B <p>d) START Boric Acid Transfer Pumps:</p> <ul style="list-style-type: none"> • BG HIS-5A • BG HIS-6A <p>Step 4 RNO substeps a-d</p> | <p>Role Play as the RO and report "steps a through d are complete."</p> | <p>Candidate determined the boration from the RWST will not work (due to BN-HIS-112D and 112E seized closed) and proceeded through the RNO to the "Normal or alternate boration flow path:" section.</p> | <p>S U</p> <p>Comments:</p> |
| *7. | <p>e) CHECK Boric Acid Flow greater than 30 GPM:</p> <ul style="list-style-type: none"> • BG FR-110 <p>IF boric acid flow is less than 30 GPM, THEN locally UNLOCK and OPEN CVCS Alternate Immediate Boration valve:</p> <ul style="list-style-type: none"> • BGV0177 (AB-1974 Plant North side SI pp rm A) <p>f) MAINTAIN charging flow greater than emergency boration flow.</p> <p>Step 4 RNO substeps e-f</p> | <p>Role Play as the RO and report "Boric Acid Flow is 0 gpm."</p> <p>After BGV0177 is opened, Role Play as the RO and report when asked "Boric Acid Flow is 45 gpm."</p> <p>After BGV0177 is open, Role Play as RO "The reactor has failed to Trip, Perform Step 6 RNO of FR-S.1"</p> | <p>Candidate unlocked and OPENED (by turning counterclockwise) BGV0177.</p> | <p>S U</p> <p>Comments:</p> |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

P2

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|----------|---|--|---|---|
| 8. | <p>Check if the following Trips have occurred:</p> <p>a. Locally TRIP Reactor (Reactor Trip Switchgear):</p> <ul style="list-style-type: none"> ●PUSH breaker TRIP buttons on the following: <ul style="list-style-type: none"> ●Reactor Trip Breakers AND ●Bypass Trip Breakers <p>Step 6 RNO a</p> | <p>Cue: "There is NO change in voltage and no noise is heard".</p> <p>Note: Do not allow the candidate to open the doors.</p> | <p>Candidate pushed TRIP pushbuttons on the</p> <ul style="list-style-type: none"> ●Reactor Trip Breakers <p>AND</p> <ul style="list-style-type: none"> ●Bypass Trip Breakers | <p>S U</p> <p>Comments:</p> |
| *9. | <p>Check if the following Trips have occurred:</p> <p>IF breaker(s) will NOT trip, THEN PLACE the following MG Set breakers on Panels SF103A and SF103B in PULL-TO-LOCK (AB-2026 MG Set room):</p> <ul style="list-style-type: none"> ●Generator Circuit Breaker Control switches <p>AND</p> <ul style="list-style-type: none"> ●Motor Circuit Breaker Control switches <p>Step 6 RNO a</p> | <p>START OF ALTERNATE PATH</p> <p>After the candidate placed each breaker in Pull To Lock, "the breaker is in the position you indicate"</p> <p>Note: there are a total of 4 breakers that are required for this critical step. Generator Circuit Breaker Control and Motor Circuit Breaker control switches on each SF103 A and B.</p> | <p>Candidate proceeded to Panels SF103A and SF103B and placed the following MG Set Breakers in Pull To Lock:</p> <ul style="list-style-type: none"> ●Generator Circuit Breaker Control switches <p>AND</p> <ul style="list-style-type: none"> ●Motor Circuit Breaker Control switches | <p>S U</p> <p>Comments:</p> |
| 10. | THE JPM IS COMPLETE | Record Stop time on Page 2 | | <p>S U</p> <p>Comments</p> |

Initial Conditions: The Reactor failed to trip following receipt of a valid trip signal. The crew attempted to manually trip the Reactor, but was unsuccessful.

The "A" CCP is running and BOTH Boric Acid Transfer pumps are running.

BG-HIS-8104 is OPEN and Emergency Boration Flow is 0 GPM.

Both BN-HIS-112D and BN-HIS-112E are seized in the CLOSED position and will not open.

Initiating Cues: The Control Room Supervisor directs you to initiate Local Emergency Boration of the RCS per Step 4. RNO of FR-S.1, Response to Nuclear Power Generation/ATWS.

Inform the Control Room Supervisor when Emergency Boration is established.

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

P3

JPM No: BG-NLO-R-001 KSA No: 002G2.1.20
Revision Date: 11/19/2018 KSA Rating: 4.6/4.6
Job Title: OT/URO/SRO
Duty: Reactor Coolant System
Task Title: Shift and vent CVCS seal water
injection filters
Completion Time: 15 minutes

The performance of this task was evaluated against the standards contained in this JPM and determined to be:

☐ SATISFACTORY ☐ UNSATISFACTORY

Reason, if UNSATISFACTORY:

Evaluator Signature: _____ Date: _____
Task Performer: _____

Location of Performance:

☐ Control Room ☐ Simulator/Lab ☒ Plant ☐ Classroom

Method of Performance: ☒ Simulated ☐ Performed

☐ Alternate Path ☐ Time Critical ☒ RCA

References: OTN-BG-00005, CVCS Filters, Rev 10
Surveys for rooms 1306A & 1306B

Tools / Equipment: PPE

CALLAWAY ENERGY CENTER

JOB PERFORMANCE MEASURE

P3

Initial Conditions: The Plant is in MODE 1. 'A' CVCS seal water injection filter has a high D/P and needs to be changed out. 'B' seal water injection filter has been filled, vented, and is in standby.

Initiating Cues: The CRS directs you to place 'B' CVCS seal water injection filter in service and place 'A' filter in standby per OTN-BG-00005, CVCS Filters, section 5.1. Inform the CRS when complete.

Simulator Set up and/or Note(s): None

Task Standard: Upon completion of this JPM, the 'B' CVCS seal water injection filter will have been placed in service and 'A' placed in standby.

Start Time: _____

Stop Time: _____

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

P3

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|---------------------------------------|--|------------------------------|
| 1. | Obtain a working copy of OTN-BG-00005, CVCS Filters | Provide Candidate with procedure copy | Candidate obtained a procedure copy | S U Comments: |
| 2. | Review precautions, limitations, and prerequisites | | Candidate review and place kept section 3.0 and 4.0. | S U Comments: |
| 3. | If the valves in Step 5.1.1 are NOT in the desired position, the SM/CRS should be contacted to determine the required action. NOTE before Step 5.1 | | Candidate read and placekept. | S U Comments: |
| 4. | Improper sequence of steps may cause a loss of RCP Seal Injection or increased RCS leakage. CAUTION before Step 5.1.1 | | Candidate read and placekept. | S U Comments: |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

P3

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|---|--|--|---|
| 5. | <p>PERFORM the following (to confirm FBG04B is in standby):</p> <ul style="list-style-type: none"> CHECK BGV0105, CVCS SEAL WTR INJ FLTR B IN ISO, OPEN. CHECK BGV0106, CVCS SEAL WTR INJ FLTR B OUT ISO, CLOSED. <p>Step 5.1</p> | <p>Cue: "BGV0105 stem is up."</p> <p>Cue: "BGV0106 stem is down."</p> | <p>Candidate observed valve stem indication.</p> | <p>S U</p> <p>Comments:</p> |
| *6. | <p>Slowly OPEN BGV0106.</p> <p>Step 5.1.2</p> | <p>Cue: "Handle is turning."PAUSE "Handle stops, stem is up."</p> | <p>Candidate rotated BGV0106 handle in counter-clockwise (OPEN) direction.</p> | <p>S U</p> <p>Comments:</p> <p>NOTE speed of valve manipulation is not important for JPM.</p> <p>Candidate may open valve incrementally</p> |
| 7. | <p>MONITOR for flow through FBG04B by observing a rise on BGPIS0141, SEAL WTR INJ FLTR B.</p> <p>Step 5.1.3</p> | <p>Cue: Using a pointer indicate pressure in an acceptable range but less than 28psid.</p> | <p>Candidate observed BGPIS0141 indication</p> | <p>S U</p> <p>Comments:</p> |
| *8. | <p>CLOSE BGV0102, CVCS SEAL WTR INJ FLTR A OUT ISO.</p> <p>Step 5.1.4</p> | <p>Cue: "Handle is turning."PAUSE "Handle stops, stem is down."</p> | <p>Candidate rotated BGV0102 handle in clockwise (CLOSED) direction.</p> | <p>S U</p> <p>Comments:</p> |

CALLAWAY ENERGY CENTER JOB PERFORMANCE MEASURE

P3

| JPM STEP | TASK ELEMENT | EXAMINER CUE | PERFORMANCE STANDARD | SCORE |
|-------------|--|---|--|----------------------------------|
| 9. | ENSURE the d/p on BGPIS0141 is less than 28 psid. | Cue: Using a pointer indicate pressure in an acceptable range but less than 28psid. | Candidate observed BGPIS0141 indication | S U Comments: |
| | Step 5.1.5 | | | |
| 10. | ADJUST flow to RCP Seals per OTN-BG-00001, Chemical and Volume Control System. | Cue: "Understand filters are swapped." | Candidate called the Control Room Supervisor | S U Comments: |
| | Step 5.1.6 | | | |
| 11. | THE JPM IS COMPLETE | Record Stop time on Page 2 | | S U Comments |

Initial Conditions: The Plant is in MODE 1. 'A' CVCS seal water injection filter has a high D/P and needs to be changed out. 'B' seal water injection filter has been filled, vented, and is in standby.

Initiating Cues: The CRS directs you to place 'B' CVCS seal water injection filter in service and place 'A' filter in standby per OTN-BG-00005, CVCS Filters, section 5.1. Inform the CRS when complete.

| | | |
|--|-----------------------|---------------------|
| Facility: Callaway | Scenario No. 2, Rev 1 | Op-Test No.: 2019-1 |
| Examiners: _____ | | Operators: _____ |
| _____ | | _____ |
| _____ | | _____ |
| Initial Conditions: Mode 2 at 10-8 AMPS. | | |
| Turnover: No equipment out of service. The crew is directed to withdraw control rods to raise power to 1% per OTG-ZZ-00003, Plant Startup hot Zero Power to 30% Power – IPTE, step 5.2.7a. | | |

| Event No. | Malf. No. | Event Type* | Event Description |
|-----------|--|------------------------------|---|
| 1 | N/A | SRO (R) RO (R) | Withdraw control rods to raise power to 1% OTG-ZZ-00003, Plant Startup Hot Zero Power to 30% Power – IPTE |
| 2 | X18I101A | SRO (C) BOP (C) | Inadvertent Start of "B" MDAFP OTO-SA-00001, EFSAS Verification and Restoration |
| 3 | AB / ABPV0001A_1 | SRO (C) BOP (C) | Atmospheric Steam Dump 'A' fails open with manual control OTO-AB-00001, Steam Dump Malfunction (Tech Spec 3.7.4) |
| 4 | BB / CRCPV2_1 | SRO (C) BOP (C) | "A" RCP High Vibration OTO-BB-00002, RCP Off Normal (Tech Spec 3.4.4) |
| 5 | BB / BB001_A | SRO (M) RO (M) BOP (M) | RCS Leak that becomes DBA LOCA. RX Trip E-0, Reactor Trip or Safety Injection, then E-1, Loss of Primary or Secondary Coolant, then ES-1.3, Transfer to Cold Leg Recirculation |
| 6 | SA / SIS_A_Block_Auto SIS_B_Block_Auto | SRO (I) RO (I) | Safety Injection fails to Automatically Actuate |
| 7 | SB / PEG01C_PEJ01A_ SEQ PEG01D_PEJ01B_ SEQ | SRO (C) RO (C) | Both RHR pump fails to Auto start |

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

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

Scenario #2 Event Description
Callaway 2019-1 NRC ES-D-1, Rev. 1

The Plant is stable in Mode 2 at 10^{-8} AMPS. The crew has been directed to withdraw control rods to raise power to 1% per OTG-ZZ-00003, Plant Startup hot Zero Power to 30% Power – IPTE, step 5.2.7a.

Once power is raised to ~1%, an inadvertent MDAFAS is received resulting in the 'B' MDAFP will autostart and feed "A" and "D" Steam Generators. The crew will respond and secure the 'B' MDAFP and reset the signal per OTO-SA-00001, EFSAS Verification and Restoration.

After the crew has addressed "B" MDAFP and associated Technical Specifications, the 'A' Atmospheric Steam Dump fails open. The BOP operator should close the dump valve using manual control. The crew should enter OTO-AB-00001, Steam Dump Malfunction. This failure will result in Technical Specification 3.7.4 not being met.

After the ASD is addressed including its Technical Specifications, a mechanical failure causes 'A' RCP vibrations to rise rapidly above the immediate trip setpoint. This will drive the crew to enter OTO-BB-00002, RCP Off Normal. The crew will recognize the need to immediately trip the 'A' RCP. This failure will result in Technical Specification 3.4.4 not being met.

Due to the 'A' RCP vibrations, a leak develops on the Loop 1 Hot Leg piping. The crew may respond by entering OTO-BB-00003, RCS Excessive Leakage, but the leak continues to grow quickly into a DBA LOCA. The Crew will respond IAW E-0, Reactor Trip or Safety Injection. The crew will transition to E-1, Loss of Reactor or Secondary Coolant. When RWST Level lowers to 36%, the crew will transition to ES-1.3 and swap complete the ECCS swap from the RWST to the Containment sumps. Once completed the crew will return to E-1, Loss of Reactor or Secondary Coolant.

During the LOCA, Safety Injection will fail to automatically actuate. Furthermore, both "A" and "B" RHR pumps will fail to auto start.

The scenario may be terminated after the transition back to E-1 from ES-1.3.

Scenario #2 Event Description
Callaway 2019-1 NRC ES-D-1, Rev. 1

Critical Tasks:

| | | |
|---|---|---|
| Critical Tasks | Manually actuate at least one train of SIS-actuated safeguards equipment before transition to E-1, E-2 or E-3 series or transition to any FRG. | Establish flow from at least one RHR Pump before completion of E-0 Attachment A |
| EVENT | 6 | 7 |
| Safety significance | <p>Failure to manually actuate SI under the postulated conditions constitutes misoperation or incorrect crew performance in which the crew does not prevent "degraded emergency core cooling system (ECCS)...capacity."</p> <p>In this case, SI can be manually actuated from the control room. Therefore, failure to manually actuate SI also represents a failure by the crew to "demonstrate the following abilities:</p> <ul style="list-style-type: none"> Effectively direct or manipulate engineered safety feature (ESF) controls that would prevent (degraded emergency core cooling system (ECCS)...capacity) Recognize a failure or an incorrect automatic actuation of an ESF system or component <p>Take one or more actions that would prevent a challenge to plant safety"</p> | <p>Failure to manually start at least one low-head ECCS pump under the postulated conditions constitutes misoperation or incorrect crew performance in which the crew does not prevent "degraded emergency core cooling system (ECCS) ...capacity."</p> <p>The acceptable results obtained in the FSAR analysis of a large-break LOCA are predicated on the assumption of minimum ECCS pumped injection. The analysis assumes that a minimum pumped ECCS flow rate, which varies with RCS pressure, is injected into the core. The flow rate values assumed for minimum pumped injection are based on operation of one each of the following ECCS pumps: high-head pump, intermediate-head pump, and low-head pump. Operation of this minimum required complement of ECCS injection pumps is consistent with the FSAR assumption that only minimum safeguards are actuated.</p> |
| Cueing | <p>Indication and/or annunciation that that SI is required</p> <ul style="list-style-type: none"> PRZR pressure or SG pressure less than SI actuation setpoint Containment pressure greater than SI actuation setpoint Subcooled margin less than the foldout page criterion for SI actuation in ES-0.1 PRZR water level less than the foldout page criterion for SI actuation in ES-0.1 <p>No indication or annunciation that SI is actuated</p> | <p>Indication and/or annunciation that low-head ECCS pumped injection is required</p> <ul style="list-style-type: none"> SI actuation RCS pressure below the shutoff head of the low-head ECCS pumps <p>AND</p> <p>Indication and/or annunciation that no low-head ECCS pump is injecting into the core</p> <ul style="list-style-type: none"> Control switch indication that the circuit breakers or contactors for both low-head ECCS pumps are open All low-head ECCS pump discharge pressure indicators read zero All flow rate indicators for low-head pumped injection read zero |
| Performance indicator | <p>Manipulation of controls as required to actuate at least one train of SI</p> <ul style="list-style-type: none"> SB HS-27 SB HS-28 | <p>Manipulation of controls as required to start at least one low-head ECCS pump</p> <ul style="list-style-type: none"> Control switch indication that the circuit breaker or contactor for at least one low-head ECCS pump is closed |
| Performance feedback | <p>Indication that both Trains of SI – Actuated</p> <ul style="list-style-type: none"> LOCA Sequencer annunciator 30A – Lit LOCA Sequencer annunciator 30B – Lit SB069 SI Actuate Red Light – Lit SOLID (NOT blinking) | <p>Indication and/or annunciation that at least one low-head ECCS pump is injecting</p> <ul style="list-style-type: none"> Flow rate indication of injection from at least one low-head ECCS pump |
| Justification for the chosen performance limit | <p>The crew has had ample opportunity to recognize the need for SI and the fact that SI has not automatically actuated.</p> <p>Given the postulated plant conditions, transition from E-0 to ES-0.1 constitutes an error in using the E-0 procedure. The crew is in the wrong procedure; however, the crew is allowed to recover from this error up through Step 3.a of ES-0.1.</p> <p>The ERG network is designed to "catch" errors in procedure usage. Step 3.a is designed to get the crew back to E-0, if that is in fact where the crew should be. If the crew members pass through Step 3.a and remain in ES-0.1, they have missed the last step that would return them to the correct procedure.</p> | <p>"before completion of Attachment A of E-0" is in accordance with the PWR Owners Group Emergency Response Guidelines. It allows enough time for the crew to take the correct action while at the same time preventing avoidable adverse consequences.</p> |
| PWR Owners Group Appendix | CT-2, Manually actuate SI | CT-5, Manually start at least one low-head ECCS pump |

Scenario #2 Event Description
Callaway 2019-1 NRC ES-D-1, Rev. 1

| | | |
|---|---|--|
| Critical Tasks | Trip all RCPs within 5 minutes of meeting RCP trip criteria. | |
| EVENT | 5 | |
| Safety significance | Failure to trip the RCPs under the postulated plant conditions leads to core uncover and to fuel cladding temperatures in excess of 2200°F, which is the limit specified in the ECCS acceptance criteria. Thus, failure to perform the task represents misoperation or incorrect crew performance in which the crew has failed to prevent "degradation of...{the fuel cladding} ...barrier to fission product release" and which leads to "violation of the facility license condition." | |
| Cueing | <p>Indications of a SBLOCA AND Indication and/or annunciation of safety injection AND Indication and/or annunciation that at least one CCP/SI pump is running AND Indication that the RCP trip criteria are met</p> <p>Note: The 5 minute trip criteria will start once the first CCP or SI pump is started.</p> | |
| Performance indicator | <p>Manipulation of controls as required to trip all RCPs</p> <ul style="list-style-type: none"> RCP breaker position lights indicate breaker open | |
| Performance feedback | <p>Indication that all RCPs are stopped</p> <ul style="list-style-type: none"> RCP breaker position lights RCP flow decreasing RCP motor amps decreasing | |
| Justification for the chosen performance limit | In a letter to the NRC titled "Justification of the Manual RCP Trip for Small Break LOCA Events" (OG-117, March 1984) (also known as the Sheppard letter), the WOG provided the required assurance based on the results of the analyses performed in conjunction with WCAP-9584. The WOG showed that for all Westinghouse plants, more than two minutes were available between onset of the trip criteria and depletion of RCS inventory to the critical inventory. In fact, additional analyses sponsored by the WOG in connection with OG-117 conservatively showed that manual RCP trip could be delayed for five minutes beyond the onset of the RCP trip criteria without incurring any adverse consequence. | |
| PWR Owners Group Appendix | CT-16, MANUALLY TRIP RCPS | |

Scenario #2 Event Description
Callaway 2019-1 NRC ES-D-1, Rev. 1

| References |
|--|
| OTG-ZZ-00003, Plant Startup hot Zero Power to 30% Power – IPTE |
| OTO-SA-00001, EFSAS Verification and Restoration |
| OTO-BB-00002, RCP Off Normal |
| OTO-AD-00001, Steam Dump Malfunction |
| E-0, Reactor Trip or Safety Injection |
| E-1, Loss of Primary or Secondary Coolant |
| ES-1.3, Transfer to Cold Leg Recirculation |
| Technical Specification 3.7.4 Atmospheric Steam Dump Valves |
| Technical Specification 3.7.5 AFW System |
| Technical Specification 3.4.4 RCS Loops – Modes 1 and 2 |
| ODP-ZZ-00025, EOP/OTO User's Guide |

PRA Systems, Events or Operator Actions

- Small LOCA is a 16% contribution to CDF
- Medium LOCA is a 19% contribution to CDF

Top 10 Callaway Risk Important Systems (F-V)

8. Residual Heat Removal (EJ)

Scenario Simulator Lesson Plan
Callaway 2019-1 NRC Scenario #2, Rev. 1

Scenario Setup Guide:

- Load 18-05 (IC163 is setput for the following conditions)
- Initialize at 10-8 AMPS with the following rod positions:
 - ALL SHUTDOWN BANKS to 228 STEPS.
 - CONTROL BANKS A & B to 228 STEPS.
 - CONTROL BANK C to 215 STEPS.
 - CONTROL BANK D to ~84 STEPS.

=====SCENARIO PRELOADS / SETUP ITEMS=====

Pre-Load: Block Auto SI both trains, RHR pumps (both) Fail to start on sequencer

- Expert Command: insert SIS_A_Block_Auto 0 delay=0 ramp=0 on=0 off=0
- Expert Command: insert SIS_B_Block_Auto 0 delay=0 ramp=0 on=0 off=0
- Expert Command: insert PEG01C_PEG01A_SEQ 2 delay=0 ramp=0 on=0 off=0
- Expert Command: insert PEG01D_PEG01B_SEQ 2 delay=0 ramp=0 on=0 off=0

===== EVENT 1 =====

N/A

===== EVENT 2 =====

EVENT 2: Inadvertant Start of B MDAFP

To insert the Inadvertant Start of B MDAFP

- Expert Command: insert X18I101A 1 delay=0 ramp=0 on=0 off=0

To delete the Inadvertant Start of B MDAFP

- Expert Command: delia X18I101A 2 delay=2

=====EVENT 3 =====

Fail ASD A open w/ manual control

- Expert Command: insert ABPV0001A_1 1 delay=0 ramp=30 on=0 off=0
- Expert Command: insert ANNUN_F109 1 delay=1 ramp=0 on=0 off=0

=====EVENT 4 =====

RCP A shaft vibration

- CRCPV2_1 Value = 20 Ramp =120

Scenario Simulator Lesson Plan
Callaway 2019-1 NRC Scenario #2, Rev. 1

=====EVENT 5=====

RCS Leak that becomes a DBA LOCA ((7500 gpm over 6 minutes then to 285000 gpm over the next 2 minutes)

- Expert Command: insert BB001_A 7500 delay=0 ramp=360 on=0 off=0

Leak rate rises to 285000 gpm over next 2 minutes (after a delay of 360 from the first BB001 insertion)

- Expert Command: insert BB001_A 285000 delay=0 ramp=120 on=0 off=0

=====EVENT 6=====

Both Trains of Safety Injection Fail to automatically actuate (Preloaded)

=====EVENT 7=====

Both RHR Pumps fail to auto start (Preloaded)

Event Description:

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

Booth Operator:

- N/A

Indications Available

- Raising Nuclear Instrument Count rates
- DPRI rod positions
- Individual rod position step counters

OTG-ZZ-00003

| | | |
|---------------------|------------|---|
| OTG-ZZ-00003 | CRS | Implement OTG-ZZ-00003, PLANT STARTUP HOT ZERO POWER TO 30% POWER - IPTE |
| | | |
| | RO | Step 5.2.7. PERFORM the following: a. INITIATE raising Reactor power to less than 1%. |
| | | |
| | RO | Verify SE-HS-9 is in the Man Position and then using SF-HS-2 to the withdraw position (Down direction) withdraw rods in increments to raise power to ~1%. |
| | | |
| | | |
| NOTE | | At Lead Examiner's discretion move to the next Event |

Event Description:

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

Booth Operator:

- IMFs
 - To insert the Inadvertant Start of B MDAFP
 - Expert Command: insert X18I101A 1 delay=0 ramp=0 on=0 off=0
 - To delete the Inadvertant Start of B MDAFP
 - Expert Command: delia X18I101A 2 delay=2

Indications Available

- Annunciator 129B, MD AFP Start
- Annunciator 128A, AFW Pump Discharge Pressure Low
- Annunciator 108C & 111C, SG A & D Level Deviation
- Rising SG level on A and D SGs.
- AFW Flow indication to A and D SGs.

OTA-RK-00026, Addendum 129B MDAFP Start

| | | |
|-------------------|------------|--|
| Annun 129B | CRS | Implement OTA-RK-00026, Addendum 129B MDAFP Start |
| | | |
| | | CAUTION: The pump should be running if this annunciator is lit and can not be secured until the actuation signal is reset. |
| | | |
| | BOP | Step 3.1 - CHECK MDAFP is running by monitoring pump suction and discharge pressures. |
| | | |
| | | NOTE: MDAFAS is generated by the following conditions: <ul style="list-style-type: none"> • LoLo SG Level • Trip of both MFPs • AMSAC |
| | | |
| NOTE | | It is acceptable and expected that the crew places the "B" MDAFP HS (AL HIS 22A) in PTL and / or take the "B" MDAFP FCV to the A and D SGs (AL HK-7A & 5A respectively) to Manual and Close |
| | | |
| Annun 129B | BOP | Step 3.2 - IF MDAFW Pump A or B automatically started, Go To OTO-SA-00001, Engineered Safety Features Actuation Verification and Restoration. |

| | | | | | | | | | |
|--------------------|----------|---------------------------------|---|---------|---|------|----|----|----|
| Op Test No.: | 2019-1 | Scenario # | 2 | Event # | 2 | Page | 10 | of | 34 |
| Event Description: | | | | | | | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | | | | | | | |

| | | |
|---------------------------|------------|---|
| | | |
| OTO-SA-00001 | BOP | <p>Step 1 - CHECK Applicable ESF Components - PROPER EMERGENCY ALIGNMENT</p> <ul style="list-style-type: none"> • Refer To the following Attachment(s) as necessary: <p>As there was no specific attachment for an individual AFW pump start to verify per step 1, the BOP (with CRS direction or concurrence) proceeds to Step 2.</p> |
| | | |
| | | <p>NOTE</p> <p>Attachments AO, ESFAS Actuation Signals, AP, Control Interlocks, AQ, Protective Interlocks, and AR, Permissives provides ESFAS Actuation, Control Interlocks, and Protective Interlocks information.</p> |
| | | |
| | BOP | <p>Step 2. Go To The Appropriate Attachment When Restoration Is Desired:</p> <p>Proceeds to Attachment I, AFAS Actuation Recovery</p> |
| | | |
| OTO-SA-00001 Att I | BOP | <p>NOTE</p> <p>Perform Steps of this Attachment that are applicable to the signal being reset.</p> |
| | | |
| | BOP | <p>Step I1 - CHECK MD AFAS - CAUSED BY TRIP OF BOTH MAIN FEED PUMPS</p> <p>Proceeds to RNO which directs Step I3.</p> |
| | | |
| | BOP | <p>Step I3 - CHECK All MD AFAS Signals - CLEAR</p> <p>See Attachment AO, SSPS / ESFAS Actuation Signals</p> <p>All Signals are Clear</p> |
| | | |
| OTO-SA-00001 Att I | BOP | <p>Step I4 - RESET MD AFAS:</p> <ul style="list-style-type: none"> • SA HS-12 • SA HS-16 |

| | | |
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| Op Test No.: <u>2019-1</u> Scenario # <u>2</u> Event # <u>2</u> Page <u>11</u> of <u>34</u> | | |
| Event Description: | | |
| Proc /Time | Position | Applicant's Actions or Behavior |

| | | |
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| | | |
| | BOP | Step I5 - CHECK MD AFAS Reset Using Any Of The Following: <ul style="list-style-type: none"> • SA036 • SAQ11A and SAQ11B (NTACT) |
| NOTE | | The remaining steps of Attachment I address the TDAFP pump and are not listed here as they are N/A. |
| | | |
| | CRS | <i>This event will not be measured as a Technical Specification opportunity due to the fact that the initial conditions of 2 different scenarios have this specific T.S. condition not met.</i> |
| | | |
| NOTE | | At Lead Examiner's discretion move to the next Event. |

| | | | | | | | | | |
|--------------------|----------|---------------------------------|---|---------|---|------|----|----|----|
| Op Test No.: | 2019-1 | Scenario # | 2 | Event # | 3 | Page | 12 | of | 34 |
| Event Description: | | | | | | | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | | | | | | | |

| | | |
|---|-----------------|---|
| Booth Operator: <ul style="list-style-type: none"> IMFs <ul style="list-style-type: none"> Expert Command: insert ABPV0001A_1 1 delay=0 ramp=30 on=0 off=0 Expert Command: insert ANNUN_F109 1 delay=1 ramp=0 on=0 off=0 | | |
| Indications Available Annunciator 109F, Steam Generator Power Operated Relief Valve Open | | |
| OTO-AB-00001 | | |
| OTO-AB-00001 | CRS | Implement OTO-AB-00001, Steam Dump Malfunction |
| | | |
| | RO | Step 1 - CHECK Reactor Power - LESS THAN 100%. <ul style="list-style-type: none"> SE NI-41B SE NI-42B SE NI-43B SE NI-44B BB TI-411A (ΔT) BB TI-421A (ΔT) BB TI-431A (ΔT) BB TI-441A (ΔT) |
| | | |
| | BOP | Step 2 - CHECK At Least One SG ASD - FAILED OPEN |
| | | |
| | BOP | Step 3 - PLACE The Affected SG ASD Controller In Manual And CLOSE The Valve: <ul style="list-style-type: none"> AB PIC-1A (SG A) |
| | | |
| | RO / BOP | Step 4 - NOTIFY Count Room Technician Of Opening And Closing Times Of The SG ASD |
| | | |
| | BOP | Step 5 - Go To Step 17 |
| | | |
| | CRS | Step 17 - INITIATE Actions To Repair The Failed Component |
| | | |
| | CRS | Step 18 - REVIEW Technical Specification 3.7.4 |

| | | |
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| Op Test No.: <u>2019-1</u> Scenario # <u>2</u> Event # <u>3</u> Page <u>13</u> of <u>34</u> | | |
| Event Description: | | |
| Proc /Time | Position | Applicant's Actions or Behavior |

| | | |
|---------------------|--|---|
| OTO-AB-00001 | | <i>The CRS should declare Tech Spec 3.7.4 Condition A is not met with required action A.1 to restore required ASD line to operable status within 7 days.</i> |
| | | |
| NOTE | | At Lead Examiner's discretion move to the next Event |

| | | | |
|----------------------------|---------------------|---------------------------------|-----------------------------|
| Op Test No.: <u>2019-1</u> | Scenario # <u>2</u> | Event # <u>4</u> | Page <u>14</u> of <u>34</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

Booth Operator:

- IMF CRCPV2_1 Value = 20 Ramp =120

Indications Available

Annunciators

- 70A, Reactor Coolant Pump Vibration Danger
- 70B, Reactor Coolant Pump Vibration/System Alert

OTO-BB-00002

| | | |
|----------------------------------|------------|---|
| OTO-BB-00002 | CRS | Implement OTO-BB-00002, RCP Off-Normal |
| | | NOTE RCPs that lose Seal Injection AND CCW To Thermal Barrier Heat Exchanger must have at least one restored within 6 minutes or the RCP MUST be secured. |
| | | |
| | BOP | Step 1 - CHECK All RCPs - RUNNING |
| | | |
| | BOP | Step 2 - Go To One Of The Following Attachments, As Applicable: <ul style="list-style-type: none"> • Attachment A, RCP High Vibration |
| | | |
| OTO-BB-00002 Attachment A | | NOTE RCP vibration can be monitored using Group Display RCPVIB or monitoring RP312, BB YI-471. |
| | BOP | Step A1 - CHECK RCP Vibration Level: <ul style="list-style-type: none"> • ALL RCPs vibration on the frame - LESS THAN 5 MILS • ALL RCPs vibration on the shaft - LESS THAN 20 MILS PERFORM ONE of the following: <ul style="list-style-type: none"> • IF Reactor power is less than 48% (P-8 extinguished), THEN Go To Attachment E, RCP Trip. |
| | | |
| Evaluator NOTE | | When the BOP proceeds around back to verify vibration data, provide cue sheet on Vibrations levels. (The cue sheet is located at the end of the scenario) |
| | | |

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| Op Test No.: <u>2019-1</u> | Scenario # <u>2</u> | Event # <u>4</u> | Page <u>15</u> of <u>34</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

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| OTO-BB-00002 Attachment E | RO / BOP | <p>NOTE</p> <p>Tripping an RCP with Reactor Power less than 48%:</p> <ul style="list-style-type: none"> • Will result in problems controlling the SG level in the stagnant loop. Control of SG level in the stagnant loop may be accomplished with the MFRV Bypass valve. • May result in problems controlling the Pressurizer pressure. Control of Pressurizer pressure may be accomplished by cycling of Pressurizer heaters. |
| | | |
| | BOP | Step E1 - TRIP The Affected RCP |
| | | |
| | BOP | <p>Step E2 - Check RCP A – RUNNING</p> <p>NO Go To the RNO</p> |
| | | |
| | RO | <p>Step E2 RNO - PLACE Pressurizer Spray Loop 1 Controller in Manual at zero output.</p> <ul style="list-style-type: none"> • BB PK-455B for A RCP |
| | | |
| | BOP | Step E3 - Check RCP B - RUNNING |
| | | |
| | RO | <p>Step E4 - DEFEAT Tavg And ΔT For Idle RCS Loop: E4.</p> <ul style="list-style-type: none"> • BB TS-412T for Tavg • BB TS-411F for ΔT |
| | | |
| | BOP | <p>Step E5 - CHECK No. 1 Seal Leakoff Flow Was LESS THAN 6 GPM Prior To Securing The RCP:</p> <ul style="list-style-type: none"> • BG FR-157 • BG FR-156 • BG FR-155 • BG FR-154 |
| | | |

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| Op Test No.: <u>2019-1</u> | Scenario # <u>2</u> | Event # <u>4</u> | Page <u>16</u> of <u>34</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

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| OTO-BB-00002 Attachment E | BOP | Step E6 - CHECK No. 1 Seal Leakoff Flow Was GREATER THAN 0.8 GPM Prior To Securing The RCP: <ul style="list-style-type: none"> • BG FR-157 • BG FR-156 • BG FR-155 • BG FR-154 |
| | | |
| | BOP | Step E7 - CHECK Steam Generator NR Levels Within One Of The Following: <ul style="list-style-type: none"> • Trending to between 45% and 55% OR <ul style="list-style-type: none"> • Between 45% and 55% |
| | | |
| | RO | Step E8 - CHECK Pressurizer Pressure Within One Of The Following: <ul style="list-style-type: none"> • Trending to between 2220 psig and 2250 psig OR <ul style="list-style-type: none"> • Between 2220 psig and 2250 psig |
| | | |
| | CRS | Step E9 - Refer To Technical Specification 3.4.4 <i>The CRS should declare Tech Spec 3.4.4 Condition A is not met with required action A.1 to be in MODE 3 within 6 hours.</i> |
| | | |
| | BOP | Step E10 - TRANSITION To Mode 3 Within 6 hours Using Any Of The Following: <ul style="list-style-type: none"> • OTO-MA-00008, Rapid Load Reduction • OTG-ZZ-00004, Power Operation • OTG-ZZ-00005, Plant Shutdown 20% Power to Hot Standby |
| | | |
| NOTE | | At Lead Examiner's discretion move to the next Event |

| | | | |
|----------------------------|---------------------|----------------------------------|-----------------------------|
| Op Test No.: <u>2019-1</u> | Scenario # <u>2</u> | Event # <u>5 & 6 & 7</u> | Page <u>17</u> of <u>34</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

Booth Operator:

For Event 5, IMF:

- Expert Command: insert BB001_A 7500 delay=0 ramp=360 on=0 off=0

Leak rate rises to 285000 gpm over next 2 minutes (after a delay of 360 from the first BB001 insertion)

- Expert Command: insert BB001_A 285000 delay=0 ramp=120 on=0 off=0

For Event 6 and Event 7 are preloaded:

- Expert Command: insert SIS_A_Block_Auto 0 delay=0 ramp=0 on=0 off=0
- Expert Command: insert SIS_B_Block_Auto 0 delay=0 ramp=0 on=0 off=0
- Expert Command: insert PEG01C_PEJ01A_SEQ 2 delay=0 ramp=0 on=0 off=0
- Expert Command: insert PEG01D_PEJ01B_SEQ 2 delay=0 ramp=0 on=0 off=0

Note: it takes approximately 23 minutes from the time of the LOCA until RWST lowers to 36%, the ES-1.3 transition criteria.

Indications Available

Multiple

E-0, Reactor Trip or Safety Injection

| | | |
|------------|------------|--|
| | | NOTE: Steps 1 through 4 are immediate action steps. |
| E-0 | RO | Step 1 - CHECK Reactor Trip: <ul style="list-style-type: none"> • Rod Bottom Lights - ALL LIT • Reactor Trip and Bypass Breakers - OPEN • Neutron Flux - LOWERING |
| | | |
| | BOP | Step 2 - CHECK Turbine Trip: <ul style="list-style-type: none"> • All Turbine Stop valves - CLOSED |
| | | |
| | BOP | Step 3 - CHECK Power to AC Emergency Buses: <ol style="list-style-type: none"> AC emergency buses – AT LEAST ONE ENERGIZED AC emergency buses – BOTH ENERGIZED |
| | | |

| | | | | | | | | | |
|--------------------|----------|---------------------------------|---|---------|-----------|------|----|----|----|
| Op Test No.: | 2019-1 | Scenario # | 2 | Event # | 5 & 6 & 7 | Page | 18 | of | 34 |
| Event Description: | | | | | | | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | | | | | | | |

| | | |
|---------------|------------|--|
| E-0 | RO | <p>Step 4 - Check SI Status:</p> <p>a. Check if SI is actuated</p> <ul style="list-style-type: none"> • Ann 88A thru 88D Lit – OR- • SB069 SI Actuate Red light is lit – OR- • LOCA Sequencers alarms 30A & 31A <p>b. CHECK both Trains of SI-Actuated</p> <ul style="list-style-type: none"> • ANN 30A lit • ANN 31A lit • SB069 SI Actuate Red light lit SOLID <p>Go To RNO and transition to ES-0.1</p> |
| NOTE | | <p>Based on the timing on the malfunction and ramp rate and when the crew manually initiates SI, ES-0.1 Steps 1&2 are listed in case the transition occurs and then E-0 Steps 1-4 are relisted to aid the evaluator. See explanation for CT-2, Manually initiate SI before a description of the bounding "before a transition to E-1, E-2, E-3 or FRG" - ES-0.1 steps 1-2 is excluded from that requirement. I.e. the crew may transition to ES-0.1 and then back to E-0 without manually initiating SI and still meet the requirements of the CT.</p> |
| ES-0.1 | | ES-0.1 Reactor Trip Response |
| | RO | <p>FOLDOUT PAGE ACTION #1 - SI ACTUATION CRITERIA</p> <p>IF either condition listed below occurs, THEN ACTUATE SI and Go To E-0, Reactor Trip Or Safety Injection, Step 1:</p> <ul style="list-style-type: none"> • RCS subcooling - LESS THAN 30°F <p>OR</p> <ul style="list-style-type: none"> • PZR level - CANNOT BE MAINTAINED GREATER THAN 6% |
| | BOP | <p>FOLDOUT PAGE ACTION #3 - RCS TEMPERATURE CONTROL CRITERIA:</p> <p>IF a Loss of Offsite Power has occurred, THEN CLOSE MSIVs.</p> |
| | RO | <p>Step 1a - CHECK RCS Temperature Control: CHECK RCPs - ANY RUNNING</p> |

| | | |
|---|----------|---------------------------------|
| Op Test No.: <u>2019-1</u> Scenario # <u>2</u> Event # <u>5 & 6 & 7</u> Page <u>19</u> of <u>34</u> | | |
| Event Description: | | |
| Proc /Time | Position | Applicant's Actions or Behavior |

| | | |
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| ES-0.1 | RO | <p>Step 1 RNO a- TRANSFER Condenser Steam Dump to Steam Pressure Mode:</p> <ol style="list-style-type: none"> 1) Check Condenser - AVAILABLE <ul style="list-style-type: none"> • C-9 interlocks LIT • MSIVs - ANY OPEN 2) PLACE Steam Header Pressure Controller in MANUAL and ZERO OUTPUT: <ul style="list-style-type: none"> • AB PK-507 3) PLACE Steam Dump Select switch in STM PRESS position: <ul style="list-style-type: none"> • AB US-500Z 4) PLACE Steam Header Pressure Controller in AUTO: <ul style="list-style-type: none"> • AB PK-507 |
| | | |
| | RO | <p>Step 1b - CHECK RCS temperature response – NORMAL</p> <ul style="list-style-type: none"> • RCS AVERAGE TEMPERATURE STABLE AT OR TRENDING TO 557°F IF ANY RCP RUNNING <p>OR</p> <ul style="list-style-type: none"> • RCS COLD LEG TEMPERATURES STABLE AT OR TRENDING TO 557°F IF NO RCP RUNNING |
| | | |
| | BOP | <p>Step 2a - CHECK Status Of AC Buses: CHECK Generator Output Breakers – OPEN</p> <ul style="list-style-type: none"> • MA ZL-3A (V55) • MA ZL-4A (V53) |
| | | |
| | BOP | <p>Step 2b - CHECK All AC Buses - ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> • PA01 • PA02 • NB01 • NB02 |
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| ES-0.1 | BOP | <p>Step 2 RNO b - ENSURE both PZR PORVs are in AUTO unless closed due to low PZR pressure:</p> <p>1) ENSURE both PZR PORVs are in AUTO unless closed due to low PZR pressure:</p> <ul style="list-style-type: none"> • BB HIS-455A • BB HIS-456A <p>2) ENSURE both PORV Block Valves are energized and OPEN unless closed to isolate an open</p> <ul style="list-style-type: none"> • BB HIS-8000A • (NG01BBR3) • BB HIS-8000B • (NG02BDF1) <p>3) IF any AC emergency bus(es) are NOT energized by offsite power, THEN ENSURE DGs have assumed the following loads:</p> <ul style="list-style-type: none"> • CCP(s) • ESW Pump(s) • CCW Pump(s) (One per Train) • Containment Cooler Fan(s) • MD AFW Pump(s) • Control Room AC Unit(s) • Class 1E Electrical Equipment Room AC Unit(s) |
| | | |
| E-0, Reactor Trip or Safety Injection | | |
| E-0 | | NOTE: Steps 1 through 4 are immediate action steps. |
| | RO | <p>Step 1 - CHECK Reactor Trip:</p> <ul style="list-style-type: none"> • Rod Bottom Lights - ALL LIT • Reactor Trip and Bypass Breakers - OPEN • Neutron Flux - LOWERING |
| | | |
| | BOP | <p>Step 2 - CHECK Turbine Trip:</p> <ul style="list-style-type: none"> • All Turbine Stop valves - CLOSED |
| | | |
| | BOP | <p>Step 3 - CHECK Power to AC Emergency Buses:</p> <ul style="list-style-type: none"> c. AC emergency buses – AT LEAST ONE ENERGIZED d. AC emergency buses – BOTH ENERGIZED |
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| E-0 | RO | Step 4 - Check SI Status: <ul style="list-style-type: none"> c. Check if SI is actuated <ul style="list-style-type: none"> • Ann 88A thru 88D Lit – OR- • SB069 SI Actuate Red light is lit – OR- • LOCA Sequencers alarms 30A & 31A d. CHECK both Trains of SI-Actuated <ul style="list-style-type: none"> • ANN 30A lit • ANN 31A lit • SB069 SI Actuate Red light lit SOLID |
| CRITICAL TASK | | Manually actuate at least one train of SIS-actuated safeguards equipment before transition to E-1, E-2 or E-3 series or transition to any FRG. |
| | BOP | Step 5 - PERFORM Attachment A, Automatic Action Verification, While Continuing With This Procedure. |
| E-0 Attachment A | RO | Step A1 - Check Charging Pumps: <ul style="list-style-type: none"> a. CCPs – Both Running <ul style="list-style-type: none"> • BG HIS-1A • BG HIS-2A b. Stop NCP using BG HIS-3 |
| | RO | Step A2 - CHECK SI and RHR Pumps: <ul style="list-style-type: none"> • SI Pumps – BOTH RUNNING <ul style="list-style-type: none"> • EM HIS-4 • EM HIS-5 • RHR Pumps – BOTH RUNNING <ul style="list-style-type: none"> • EJ HIS-1 • EJ HIS-2 |
| CRITICAL TASK | | Manually start at least one RHR Pump before completion of E-0 Attachment A |

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| | RO | <p>Step A3 - CHECK ECCS flow:</p> <ul style="list-style-type: none"> a. CCPs to Boron Inj Header – FLOW INDICATED <ul style="list-style-type: none"> • EM FI-917A • EM FI-917B b. RCS pressure – Less than 1700 psig c. SI Pump Discharge - FLOW INDICATED <ul style="list-style-type: none"> • EM FI-918 • EM FI-922 d. RCS pressure – LESS THAN 325 PSIG e. RHR To Accumulator Injection Loop - FLOW INDICATED <ul style="list-style-type: none"> • EJ FI-618 • EJ FI-619 |
| | | |
| | RO | <p>Step A4 - CHECK ESW Pumps – BOTH RUNNING</p> <ul style="list-style-type: none"> • EF HIS-55A • EF HIS-56A |
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| E-0 Attachment A | | |
| | RO | <p>Step A5 - CHECK CCW Alignment:</p> <ul style="list-style-type: none"> a. CCW Pumps – one running in each train <ul style="list-style-type: none"> • Red Train: EG HIS-21 or EG HIS-23 • Yellow Train: EG HIS-22 or EG HIS-24 b. CCW Service Loop Supply and Return valves for one operating CCW pump – OPEN <ul style="list-style-type: none"> • EG ZL-15 and EG ZL-53 • OR • EG ZL-16 and EG ZL-54 c. OPEN CCW to RHR HX valves: <ul style="list-style-type: none"> • EG HIS-101 • EG HIS-102 d. CLOSE Spent Fuel Pool HX CCW Outlet Valves: <ul style="list-style-type: none"> • EC HIS-11 • EC HIS-12 e. STOP Spent Fuel Pool Cooling Pump(s): <ul style="list-style-type: none"> • EC HIS-27 • EC HIS-28 f. RECORD the time spent fuel pool cooling pump secured g. MONITOR time CCW flow isolated to SFP HX < 4 hours |
| | | |
| | RO | <p>Step A6 - CHECK Containment Cooler Fans running in slow speed</p> <ul style="list-style-type: none"> • GN HIS-9 • GN HIS-17 • GN HIS-5 • GN HIS-13 |
| | | |
| | RO | <p>Step A7 - CHECK Containment H2 Mixing Fans in slow speed</p> <ul style="list-style-type: none"> • GN HIS-2 • GN HIS-4 • GN HIS-1 • GN HIS-3 |
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| E-0 Attachment A | RO | Step A8 - CHECK if Containment Spray should be actuated <ul style="list-style-type: none"> Containment Pressure > 27 psig -OR- GN PR-934 indicates cmt pressure has been > 27 psig - OR- Annunciator 59A CSAS LIT - OR- Annunciator 59B CISB LIT RNO: Go to step A9 |
| | | |
| | RO | Step A9 - CHECK if Main Steamlines should be Isolated <ol style="list-style-type: none"> Check the following: <ul style="list-style-type: none"> Containment pressure > 17 psig -OR- GN PR-934 indicates cmt pressure has been > 17 psig -OR- Steamline pressure < 615 psig -OR- AB PR-514 or 535 shows pressure has been < 615 psig -OR- CHECK MSIVs and Bypass valves - CLOSED |
| | | |
| | RO | Step A10 - CHECK ECCS Valves in proper alignment <ol style="list-style-type: none"> ESFAS Status Panels SIS sections: <ul style="list-style-type: none"> SA066X WHITE lights – ALL LIT SA066Y WHITE lights – ALL LIT |
| | | |
| | RO | Step A11 - CHECK Containment Isolation Phase A: <ol style="list-style-type: none"> ESFAS status panels CISA sections: <ul style="list-style-type: none"> SA066X WHITE lights – ALL LIT SA066Y WHITE lights – ALL LIT |
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| E-0 Attachment A | RO | Step A12 - CHECK SG Blowdown Isolation: <ul style="list-style-type: none"> a. ESFAS status panels SGBSIS sections: <ul style="list-style-type: none"> • SA066X WHITE lights – ALL LIT • SA066Y WHITE lights – ALL LIT |
| | | |
| | RO | Step A13 - CHECK Both Trains of CRVIS <ul style="list-style-type: none"> a. ESFAS status panels CRVIS sections: <ul style="list-style-type: none"> • SA066X WHITE lights – ALL LIT • SA066Y WHITE lights – ALL LIT |
| | | |
| | RO | Step A14 - CHECK Containment Purge Isolation: <ul style="list-style-type: none"> a. ESFAS status panels CPIS sections: <ul style="list-style-type: none"> • SA066X WHITE lights – ALL LIT • SA066Y WHITE lights – ALL LIT |
| | | |
| | RO | Step A15 - NOTIFY CRS of the following: <ul style="list-style-type: none"> • Unanticipated manual actions taken • Failed Equipment Status • Attachment A completion |
| | | |
| E-0 | BOP | Step 6 - CHECK Generator Output Breakers – OPEN <ul style="list-style-type: none"> • MA ZL-3A (V55) • MA ZL-4A (V53) |
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Event Description:

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| E-0 | BOP | <p>Step 7 - CHECK Feedwater Isolation:</p> <ul style="list-style-type: none"> a. MFPs Tripped <ul style="list-style-type: none"> a. ANN 120A, MFP A Trip – LIT b. ANN 123A, MFP B Trip b. Main Feedwater Reg Valves – CLOSED <ul style="list-style-type: none"> • AE ZL-510 • AE ZL-520 • AE ZL-530 • AE ZL-540 c. Main Feedwater Reg Bypass Valves – CLOSED <ul style="list-style-type: none"> • AE ZL-550 • AE ZL-560 • AE ZL-570 • AE ZL-580 d. Feedwater Isolation Valves – CLOSED <ul style="list-style-type: none"> • AE HIS-39 • AE HIS-40 • AE HIS-41 • AE HIS-42 |
| | | |
| | BOP | <p>Step 8 - CHECK AFW Pumps:</p> <ul style="list-style-type: none"> a. MD AFW Pumps – BOTH RUNNING <ul style="list-style-type: none"> • AL HIS-23A • AL HIS-22A b. TDAFP -Running if Necessary |
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| E-0 | BOP | <p>Step 9 - CHECK AFW Valves – proper emergency alignment</p> <ul style="list-style-type: none"> MD AFW Flow Control Valves – THROTTLED <ul style="list-style-type: none"> AL HK-7A AL HK-9A AL HK-11A AL HK-5A TD AFW Flow Control Valves – FULL OPEN <ul style="list-style-type: none"> AL HK-8A AL HK-10A AL HK-12A AL HK-6A TD AFW Loop Steam Supply Valves – BOTH OPEN IF NECESSARY <ul style="list-style-type: none"> AB HIS-5A AB HIS-6A |
| | | |
| | BOP | Step 10 - CHECK Total AFW Flow > 270,000 lbm/hr |
| | | |
| | BOP | <p>Step 11 - CHECK PZR PORVs and Spray Valves:</p> <ol style="list-style-type: none"> PZR PORVs – CLOSED <ol style="list-style-type: none"> BB HIS-455A BB HIS-456A PZR PORVs – Both in AUTO <ul style="list-style-type: none"> BB HIS-455A BB HIS-456A PORV Block Valves – BOTH OPEN <ul style="list-style-type: none"> BB HIS-8000A BB HIS-8000B Normal PZR Spray valves – CLOSED <ul style="list-style-type: none"> BB ZL-455B BB ZL-455C |
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| E-0 | BOP | <p>Step 12 - CHECK if RCPs should be stopped:</p> <ul style="list-style-type: none"> a. RCPs – ANY RUNNING b. ECCS Pumps – AT LEAST ONE RUNNING <ul style="list-style-type: none"> • CCP OR • SI Pump c. RCS Pressure < 1425 psig. d. Stop all RCPs |
| CRITICAL TASK | | <p>Trip all RCPs within 5 minutes of meeting RCP trip criteria.</p> <p>This CT "time clock starts" when the crew manually initiates SI and when RCS pressure lowers to or less than 1425 psig during the performance of E-0. This is only applicable during the performance of E-0 and does not apply during the performance of E-2, and ES-1.1. This action can be performed per E-0 foldout page #1 or Step #12 of E-0.</p> |
| | BOP | <p>Step 13 - CHECK RCS Temperatures:</p> <ul style="list-style-type: none"> • Any RCP Running – RCS Tavg stable at 557°F or trending to 557°F -OR- • NO RCPs running - RCS COLD LEG TEMPERATURES STABLE AT 557°F OR TRENDING TO 557°F |
| | BOP | <p>Step 14 - CHECK if any SG is faulted:</p> <ul style="list-style-type: none"> a. Check pressures in all SGs: RNO: GO TO Step #15 <ul style="list-style-type: none"> • Any SG pressure lowering in an uncontrolled manner or completely depressurized. b. Go to E-2, Faulted SG Isolation Step 1 |

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| E-0 | BOP | <p>Step 15 - CHECK If SG Tubes Are Intact:</p> <ul style="list-style-type: none"> Levels in all SGs: <ul style="list-style-type: none"> NO SG NARROW RANGE LEVEL RISING IN AN UNCONTROLLED MANNER SG Steamline N16 radiation - NORMAL <ul style="list-style-type: none"> N16 161 (SG A) N16 162 (SG B) N16 163 (SG C) N16 164 (SG D) Condenser Air Removal radiation - NORMAL BEFORE ISOLATION <ul style="list-style-type: none"> GEG 925 SG Blowdown and Sample radiation - NORMAL BEFORE ISOLATION <ul style="list-style-type: none"> BML 256 SJL 026 SG ASD radiation - NORMAL <ul style="list-style-type: none"> AB RIC-111 (SG A) AB RIC-112 (SG B) AB RIC-113 (SG C) AB RIC-114 (SG D) Turbine Driven Auxiliary Feedwater Pump Exhaust radiation - NORMAL <ul style="list-style-type: none"> FC RIC-385 |
| | | |
| | RO | <p>Step 16 – CHECK If RCS Is Intact: <i>RNO GO TO E-1, Loss of Reactor or Secondary Coolant Step 1.</i></p> <ul style="list-style-type: none"> Containment Pressure - NORMAL <ul style="list-style-type: none"> GN PI-934 GN PI-935 GN PI-936 GN PI-937 GN PR-934 Containment Normal Sump Level - NORMAL <ul style="list-style-type: none"> LF LI-9 LF LI-10 Containment Radiation - NORMAL BEFORE ISOLATION <ul style="list-style-type: none"> GTG 313 GTG 323 GTA 591 GTA 601 |

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| E-1, Loss of Reactor or Secondary Coolant | | |
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| E-1 | | NOTE: Seal injection flow should be maintained to all RCPs. |
| | | |
| | RO | Step 1 - CHECK If RCPs Should Be Stopped: <ul style="list-style-type: none"> a. RCPs - ANY RUNNING b. ECSS pumps - AT LEAST ONE RUNNING <ul style="list-style-type: none"> • CCP OR • SI Pump c. RCS pressure - LESS THAN 1425 PSIG d. STOP all RCPs |
| | | |
| | | NOTE The ESFAS SG pressure transmitters may be inaccurate if a secondary line break occurs in Area 5. The pressure indicators on the SG ASD controllers are NOT affected and should be used for comparison. |
| E-1 | BOP | Step 2 - CHECK If Any SG Is Faulted: <ul style="list-style-type: none"> a. CHECK pressures in all SGs: <ul style="list-style-type: none"> • ANY SG PRESSURE LOWERING IN AN UNCONTROLLED MANNER OR • ANY SG COMPLETELY DEPRESSURIZED b. CHECK all faulted SG(s) - ISOLATED <ul style="list-style-type: none"> • Steamlines • Feedlines |
| | | |
| | BOP | Step 3 - CHECK Intact SG Levels: <ul style="list-style-type: none"> a. Narrow range levels - GREATER THAN 7% [25%] b. CONTROL feed flow to maintain narrow range levels between 7% [25%] and 52% |
| | | |
| | BOP | Step 3 RNO a - MAINTAIN total feed flow greater than 270,000 lbm/Hr until narrow range level is greater than 7% [25%] in at least one SG. |
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| E-1 | BOP | <p>Step 4 - CHECK Secondary Radiation - NORMAL</p> <p>a. PERFORM the following:</p> <ul style="list-style-type: none"> PERFORM EOP Addendum 11, Restoring SG Sampling After SI Actuation DIRECT Chemistry to periodically sample all SGs for activity DIRECT Radiation Protection to survey steamlines in Auxiliary Building Area 5 as necessary <p>b. CHECK unisolated secondary radiation monitors:</p> <ul style="list-style-type: none"> SG Sample radiation: SJL 026 SG ASD radiation: AB RIC-111 (SG A) AB RIC-112 (SG B) AB RIC-113 (SG C) AB RIC-114 (SG D) Turbine Driven Auxiliary Feedwater Pump Exhaust radiation: FC RIC-385 <p>c. Secondary radiation - NORMAL</p> |
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| | | <p>CAUTION</p> <p>If any PZR PORV opens because of high PZR pressure, Step 5.b should be repeated after pressure lowers to less than the PORV setpoint.</p> |
| | | |
| | RO / BOP | <p>Step 5 - CHECK PZR PORVs And Block Valves:</p> <p>a. Power to Block Valves - AVAILABLE</p> <ul style="list-style-type: none"> BB HIS-8000A BB HIS-8000B <p>b. PZR PORVs - CLOSED</p> <ul style="list-style-type: none"> BB HIS-455A BB HIS-456A <p>c. Block Valves - BOTH OPEN</p> <ul style="list-style-type: none"> BB HIS-8000A BB HIS-8000B |
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| E-1 | RO | <p>Step 6 - CHECK If ECCS Flow Should Be Reduced:</p> <p>a. RCS subcooling – GREATER THAN 30°F [50°F]</p> <p>b. Secondary heat sink:</p> <ul style="list-style-type: none"> Narrow range level in at least one intact SG - GREATER THAN 7% [25%] <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Total feed flow to intact SGs – GREATER THAN 270,000 LBM/HR <p>c. RCS pressure - STABLE OR RISING</p> <p>d. PZR level - GREATER THAN 9% [29%]</p> <p>There are one or more of the above SI termination that are NOT MET and the crew should implement the RNO which is to go to Step 7</p> |
| | | |
| | RO | <p>Step 7 - CHECK If Containment Spray Should Be Stopped:</p> <p>a. Spray Pumps - ANY RUNNING</p> <p>No RNO - Go To Step 8. OBSERVE CAUTIONS prior to Step 8.</p> |
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| | | <p>CAUTIONS</p> <ul style="list-style-type: none"> If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment. If RCS pressure lowers in an uncontrolled manner to less than 325 PSIG, the RHR pumps must be manually restarted to supply water to the RCS. |
| | | |
| | RO | <p>Step 8 - CHECK If RHR Pumps Should Be Stopped:</p> <p>a. CHECK RCS pressure:</p> <p>1) Pressure - GREATER THAN 325 PSIG</p> <p>2) Pressure - STABLE OR RISING</p> <p>No RNO Go To Step 9.</p> |
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| E-1 | RO | <p>Step 9 - CHECK SG And RCS Pressures:</p> <ul style="list-style-type: none"> CHECK pressure in all SGs - STABLE OR RISING CHECK RCS pressure - STABLE OR LOWERING |
| | | |
| | BOP | <p>Step 10 - CHECK If Diesel Generators Should Be Stopped:</p> <p>a. AC emergency buses - ENERGIZED BY OFFSITE POWER</p> <ul style="list-style-type: none"> NB01 NB02 <p>b. RESET SI if necessary:</p> <ul style="list-style-type: none"> SB HS-42A SB HS-43A <p>c. LOAD equipment on AC emergency bus(es) as necessary using EOP Addendum 8, Loading Equipment On AC Emergency Buses</p> <p>d. STOP any unloaded DG(s) and PLACE in standby:</p> <p>1) PUSH START/RESET button:</p> <ul style="list-style-type: none"> KJ HS-8A KJ HS-108A <p>2) PUSH STOP button:</p> <ul style="list-style-type: none"> KJ HS-8A KJ HS-108A <p>3) PERFORM EOP Addendum 9, Placing DGs In Standby</p> |
| | | |
| | | <p>CAUTION</p> <p>Failure of one train of UHS Cooling (Bypass Valve or a Fan) can cause the UHS to exceed its design temperature of 92.3°F.</p> <p>NOTES</p> <ul style="list-style-type: none"> UHS Cooling Tower Bypass Valves are designed to close at 84°F ESW return temperature. The UHS Cooling Tower Bypass Valves will reopen when temperature lowers to 78°F. UHS Fans auto start in slow speed with ESW return temperature to the UHS cooling tower of 95°F and fast speed with ESW cooling tower return temperature of 105°F. The reset temperature is designed to shift the fans back to slow speed once ESW return temperature lowers to 102.5°F. The UHS Fans will auto shift to stop from slow speed when ESW return temperature lowers to 92.5°F. |
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| E-1 | BOP | <p>Step 11 - CHECK Ultimate Heat Sink - NORMAL</p> <p>a. NG07 and NG08 Bus annunciators - CLEAR</p> <ul style="list-style-type: none"> • 30E, NG07 Bus UV/OV • 31E, NG08 Bus UV/OV <p>b. DETERMINE ESW Return Temperature:</p> <ul style="list-style-type: none"> • Computer point EFT0067A, UHS Cool Twr In Temp A OR • Computer point EFT0068A, UHS Cool Twr In Temp B <p>c. CHECK UHS Cooling Tower Bypass Valve</p> <p>1) COMPARE UHS Cooling Tower Bypass Valve Position to ESW Return Temperature:</p> <ul style="list-style-type: none"> • IF ESW Return temperature is $\geq 84^{\circ}\text{F}$, the Cooling Tower Bypass Valve is CLOSED • IF ESW Return temperature is $< 78^{\circ}\text{F}$, the Cooling Tower Bypass Valve is OPEN <p>2) UHS Cooling Tower Bypass Valves- NORMAL</p> <ul style="list-style-type: none"> • EF HIS-65A (A Train) • EF HIS-66A (B Train) <p>CAUTION</p> <p>Dual indication for UHS Fan Speed lights is indicative of fans in the same train running at different speeds and that a problem exists.</p> <p>d. CHECK UHS Cooling Tower Fans Speeds</p> <p>1) Compare UHS Fan Speed to ESW Return Temperature</p> <ul style="list-style-type: none"> • If ESW Return temperature is $\geq 95^{\circ}\text{F}$ both Cooling Tower Fans are ON in Slow Speed. • If ESW Return temperature is $\geq 105^{\circ}\text{F}$ both Cooling Tower Fans are ON in Fast Speed. • If ESW Return temperature is restored to $\leq 102.5^{\circ}\text{F}$ both Cooling Tower Fans are ON in Slow Speed. • If ESW Return temperature is restored to $\leq 92.5^{\circ}\text{F}$ both Cooling Tower Fans are OFF. <p>2) UHS Cooling Tower Fan Status - NORMAL</p> |
| | | |

| | | | |
|----------------------------|---------------------|----------------------------------|-----------------------------|
| Op Test No.: <u>2019-1</u> | Scenario # <u>2</u> | Event # <u>5 & 6 & 7</u> | Page <u>35</u> of <u>34</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
|-----|-------------|--|
| E-1 | RO / BOP | <p>Step 12 - INITIATE Evaluation Of Plant Status:</p> <p>a. CHECK cold leg recirculation capability:</p> <ul style="list-style-type: none"> • Train A - AVAILABLE <ul style="list-style-type: none"> • RHR Pump A (EJ HIS-1) • CCW Pump A (EG HIS-21) Or CCW Pump C (EG HIS-23) • RWST To RHR Pump A Suction (BN HIS-8812A) • Containment Recirc Sump To RHR Pump A Suction (EJ HIS-8811A) • CCW To RHR HX A (EG HIS-101) • Train B - AVAILABLE <ul style="list-style-type: none"> • RHR Pump B (EJ HIS-2) • CCW Pump B (EG HIS-22) or CCW Pump D (EG HIS-24) • RWST To RHR Pump B Suction (BN HIS-8812B) • Containment Recirc Sump To RHR Pump B Suction (EJ HIS-8811B) • CCW To RHR HX B (EG HIS-102) <p>b. CHECK Auxiliary Building radiation - NORMAL</p> <ul style="list-style-type: none"> • Aux Building Process Radiation monitor: <ul style="list-style-type: none"> • GLP 604 • Aux Building Area Radiation monitors <p>c. OBTAIN samples:</p> <ol style="list-style-type: none"> 1) DIRECT Chemistry to initiate post accident sampling: <ul style="list-style-type: none"> • RCS boron concentration • RCS activity • Containment atmosphere 2) PLACE Hydrogen Analyzers In Service using EOP Addendum 16, Placing Hydrogen Analyzers In Service 3) CONSULT Plant Engineering Staff for assessing additional sampling requirements for fuel damage <p>d. EVALUATE plant equipment for long term recovery as necessary:</p> <p>e. START additional plant equipment to assist in recovery as directed by SM/CRS</p> |
| | | |
| | RO / BOP | <p>Step 13 - CHECK If RCS Cooldown And Depressurization Is Required:</p> <ol style="list-style-type: none"> a. RCS pressure – GREATER THAN 325 PSIG <p>GO TO RNO</p> |

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| Op Test No.: <u>2019-1</u> | Scenario # <u>2</u> | Event # <u>5 & 6 & 7</u> | Page <u>36</u> of <u>34</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

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|---|---------------------|--|
| | | |
| E-1 | RO / BOP | <p>Step 13a RNO - a. CHECK RHR Pump Flow:</p> <ul style="list-style-type: none"> • EJ FI-618 • EJ FI-619 <p>IF either RHR Pump Flow is greater than 850 GPM, THEN Go To Step 14.</p> <p>GO TO Step 14</p> |
| | | |
| | RO / BOP | <p>Step 14 - CHECK If Transfer To Cold Leg Recirculation Is Required:</p> <p>a. RWST level - LESS THAN 36%</p> <p>RNO a. Return To Step 11.</p> <p>b. Go To ES-1.3, Transfer To Cold Leg Recirculation, Step 1</p> |
| | | |
| NOTE | | <p>Until RWST lowers to 36% as shown by Annunciator 47C, (RWST LoLo 1), the crew will be in a "do loop" form E-1 step #11 to Step 14 RNO.</p> |
| | | |
| ES-1.3, Loss of Reactor or Secondary Coolant | | |
| ES-1.3 | RO / BOP | <p>CAUTIONS</p> <ul style="list-style-type: none"> • ECCS recirculation flow to RCS must be maintained at all times. • If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment. • Switchover to recirculation raises Auxiliary Building radiation levels. Radiation Protection must go with the operator to monitor radiation levels when performing local actions. <p>NOTES</p> <ul style="list-style-type: none"> • Steps 1 through 4 should be performed without delay. • FR Procedures should NOT be implemented prior to completion of step 4. • Valves within the same step should be actuated sequentially without waiting for the previous valve to fully stroke. |
| | | |

| | | | | | | | | | |
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| Op Test No.: | <u>2019-1</u> | Scenario # | <u>2</u> | Event # | <u>5 & 6 & 7</u> | Page | <u>37</u> | of | <u>34</u> |
| Event Description: | | | | | | | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | | | | | | | |

| | | |
|---------------|------------|--|
| ES-1.3 | RO | Step 1 - RESET SI: <ul style="list-style-type: none"> • SB HS-42A • SB HS-43A |
| | | |
| | BOP | Step 2 - CHECK CCW Flow To RHR Heat Exchangers: <ol style="list-style-type: none"> CHECK CCW To RHR HX valves - OPEN <ul style="list-style-type: none"> • EG HIS-101 • EG HIS-102 CHECK Spent Fuel Pool HX CCW Outlet Valves - CLOSED <ul style="list-style-type: none"> • EC HIS-11 • EC HIS-12 CHECK CCW Pumps – ONE RUNNING IN EACH TRAIN <ul style="list-style-type: none"> • Red Train: <ul style="list-style-type: none"> • EG HIS-21 or EG HIS-23 • Yellow Train: <ul style="list-style-type: none"> • EG HIS-22 or EG HIS-24 |
| | | |
| | | CAUTION Any pumps taking suction from the RWST should be stopped if RWST level lowers to 6%. |
| | | |

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| Op Test No.: <u>2019-1</u> | Scenario # <u>2</u> | Event # <u>5 & 6 & 7</u> | Page <u>38</u> of <u>34</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
|---------------|---------------------|---|
| ES-1.3 | RO / BOP | <p>Step 3 a - f- ALIGN ECCS For Cold Leg Recirculation:</p> <p>a. CHECK Containment Normal Sump Level - GREATER THAN 73 INCHES:</p> <ul style="list-style-type: none"> • LF LI-9 • LF LI-10 <p>b. CHECK RHR pump automatic suction switchover – COMPLETE</p> <p>1) RHR Pump A:</p> <ul style="list-style-type: none"> • Containment Recirc Sump To RHR Pump A Suction - OPEN • EJ HIS-8811A • RWST To RHR Pump A Suction - CLOSED • BN HIS-8812A <p>2) RHR Pump B:</p> <ul style="list-style-type: none"> • Containment Recirc Sump To RHR Pump B Suction - OPEN • EJ HIS-8811B • RWST To RHR Pump B Suction - CLOSED • BN HIS-8812B <p>c. CHECK RHR Pumps – BOTH RUNNING</p> <ul style="list-style-type: none"> • EJ HIS-1 • EJ HIS-2 <p>d. CHECK both the following conditions - SATISFIED</p> <ul style="list-style-type: none"> • RCS pressure - LESS THAN 1700 PSIG • SI Pump Discharge – FLOW INDICATED <ul style="list-style-type: none"> • EM FI-918 • EM FI-922 <p>e. CLOSE SI Pump Recirc To RWST valves:</p> <ul style="list-style-type: none"> • CLOSE BOTH the following: • EM HIS-8814A (SI Pump A) <p>AND</p> <ul style="list-style-type: none"> • EM HIS-8814B (SI Pump B) <p>OR</p> <ul style="list-style-type: none"> • PERFORM the following: <p>1) PLACE Power Lockout For BN HIS-8813 in NON ISO position:</p> <ul style="list-style-type: none"> • BN HIS-8813A <p>2) CLOSE BN HIS-8813</p> <p>3) PLACE Power Lockout For BN HIS-8813 in ISO position:</p> <ul style="list-style-type: none"> • BN HIS-8813A |
|---------------|---------------------|---|

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| Op Test No.: <u>2019-1</u> | Scenario # <u>2</u> | Event # <u>5 & 6 & 7</u> | Page <u>39</u> of <u>34</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

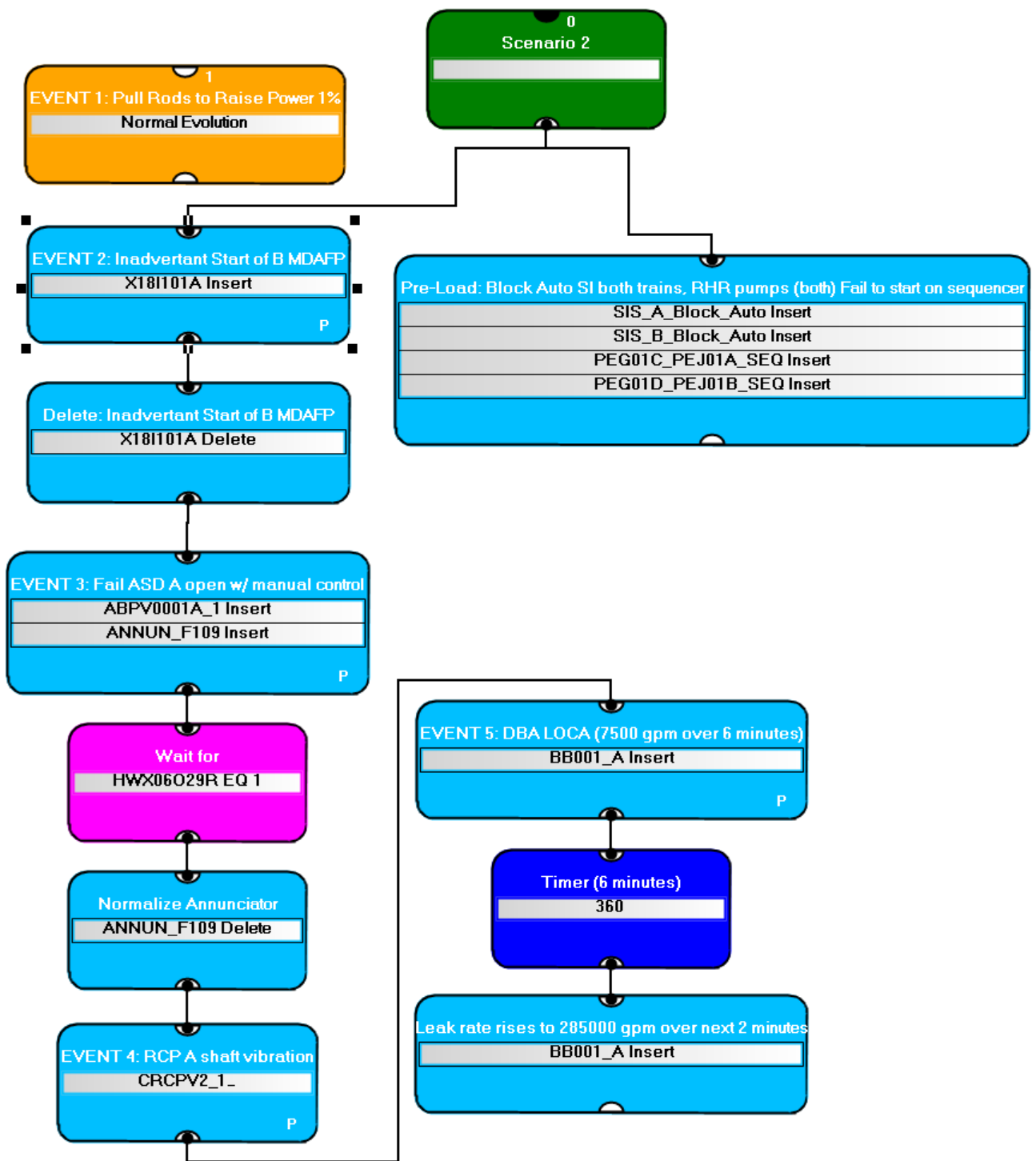
| | | |
|---------------|---------------------|---|
| ES-1.3 | RO / BOP | <p>Step 3 g - n - ALIGN ECCS For Cold Leg Recirculation:</p> <p>g. OPEN the following suction crosstie valves:</p> <ul style="list-style-type: none"> • CVCS To SI Pump A Suction valves: <ul style="list-style-type: none"> • EM HIS-8807A • EM HIS-8807B <p>h. CHECK CVCS To SI Pump Isolation valve - OPEN</p> <ul style="list-style-type: none"> • ESFAS status panel SIS section SA066Y location 2Q, CVCS To SI Pmp Iso Vlv EM HV-8924, WHITE light – LIT <p>i. OPEN the following suction crosstie valves:</p> <ul style="list-style-type: none"> • RHR To Charging Pumps: <ul style="list-style-type: none"> • EJ HIS-8804A • RHR To SI Pump B Suction: <ul style="list-style-type: none"> • EJ HIS-8804B <p>j. CHECK if any SI Pump - RUNNING</p> <ul style="list-style-type: none"> • EM HIS-4 • EM HIS-5 <p>k. MONITOR SI pump flow AND CLOSE RWST To SI Pump suction valves:</p> <ul style="list-style-type: none"> • BN HIS-8806A • BN HIS-8806B <p>l. MONITOR CCP discharge flow AND CLOSE CCP Suction From RWST valves:</p> <ul style="list-style-type: none"> • BN HIS-112D • BN HIS-112E <p>m. CHECK at least one flow path from recirculation sump to RCS - ESTABLISHED</p> <p>n. CHECK RHR Pump Room Coolers - RUNNING</p> <ul style="list-style-type: none"> • ESFAS status panels SIS sections: <ul style="list-style-type: none"> • SA066X WHITE light 8B (SGL10A) - LIT • SA066Y WHITE light 8B (SGL10B) - LIT |
| | | |
| | RO / BOP | Step 4 - START ECCS Pumps As Necessary |
| | | |
| | | <p>NOTE</p> <p>Plant Computer System TOC SUMPBLK is available for indication of sump blockage.</p> |
| | | |
| | RO / BOP | Step 5 - MONITOR ECCS Pumps – NOT AFFECTED BY SUMP BLOCKAGE DURING ALL SUBSEQUENT MITIGATION AND FR PROCEDURES |

| | | | | | | | | | |
|--------------------|----------|---------------------------------|---|---------|-----------|------|----|----|----|
| Op Test No.: | 2019-1 | Scenario # | 2 | Event # | 5 & 6 & 7 | Page | 40 | of | 34 |
| Event Description: | | | | | | | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | | | | | | | |

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| | | |
| ES-1.3 | RO / BOP | <p>Step 6 - ALIGN Containment Spray System For Recirculation If Necessary:</p> <p>a. Containment Spray Pumps - ANY RUNNING – RNO</p> <ul style="list-style-type: none"> • EN HIS-3 • EN HIS-9 <p>IF containment spray pump(s) were NOT stopped due to loss of RWST suction, THEN Go To Step 7.</p> |
| | | |
| | | <p>NOTE</p> <p>Switchover to Cold Leg Recirculation raises Auxiliary Building radiation levels. Utilize resources such as the Technical Support Center(TSC) or Dose Assessment Technician(DAT) to determine higher than normal radiation levels.</p> |
| | | |
| | RO / BOP | <p>Step 7 - MONITOR For ECCS Leaks:</p> <p>a. Auxiliary Building Area Radiation Monitors - NORMAL</p> <ul style="list-style-type: none"> • SD RE-12 through SD RE-28 <p>b. Auxiliary Building Process Radiation Monitors - NORMAL</p> <p>c. Auxiliary Building Sump Levels - NORMAL</p> <ul style="list-style-type: none"> • RHR Pump Room • CRW • DRW |
| | | |
| | RO / BOP | <p>Step 8 - CHECK Spent Fuel Pool Status:</p> <p>a. MONITOR spent fuel pool temperature on EC TI-42</p> <p>b. CHECK time since CCW flow isolated to SFP HX - 4 HOURS</p> <p>RNO b. WHEN time requirement is satisfied, THEN PERFORM Step 8.c.</p> <p>CONTINUE with Step 9.</p> |
| | | |
| | RO / BOP | Step 9 - Determine IF RWST Refill Should be initiated |
| | | |
| Booth Operator / NOTE | | Step 9 and its assessments are performed by the TSC, role play as necessary and state that the ERO organization will perform this assessment. |

| | | |
|---|----------|---------------------------------|
| Op Test No.: <u>2019-1</u> Scenario # <u>2</u> Event # <u>5 & 6 & 7</u> Page <u>41</u> of <u>34</u> | | |
| Event Description: | | |
| Proc /Time | Position | Applicant's Actions or Behavior |

| | | |
|---------------|---------------------|---|
| | | |
| ES-1.3 | RO / BOP | <p>Step 10 - DETERMINE If Transfer To Hot Leg Recirculation Will Be Required:</p> <p>a. WHEN TSC is activated, request Plant Engineering Staff to begin monitoring for Vessel Blockage.</p> <p>b. CHECK if entry for this procedure is from either of the following:</p> <ul style="list-style-type: none"> ● E-0, Reactor Trip Or Safety Injection <li style="text-align: center;">OR ● E-1, Loss Of Reactor Or Secondary Coolant |
| | | |
| | RO / BOP | <p>Step 11 - Return To Procedure And Step In Effect</p> <p>Crew returns to E-1 and step in effect.</p> |
| | | |
| NOTE | | The scenario can be terminated at the discretion of the Lead Examiner |



RCP Vibration Cue sheet

| <u>RCP</u> | <u>Shaft Vibration</u> | <u>Frame Vibration</u> |
|------------|------------------------|------------------------|
| A | 22.6 mils | 0.9 mils |
| B | 5.0 mils | 0.9 mils |
| C | 5.0 mils | 0.9 mils |
| D | 5.0 mils | 0.9 mils |

| | | |
|--|-----------------------|---------------------|
| Facility: Callaway | Scenario No. 3, Rev 1 | Op-Test No.: 2019-1 |
| Examiners: _____ | | Operators: _____ |
| _____ | | _____ |
| _____ | | _____ |
| Initial Conditions: 100% | | |
| Turnover: 'A' MDAFP is out of service for breaker maintenance. | | |

| Event No. | Malf. No. | Event Type* | Event Description |
|-----------|---|------------------------------|---|
| 1 | AC / FCV0049MANTYP AC / FCV0049TASTEM SB / HWXSP3F07W | SRO (R) RO (R) BOP (C) | Main Turbine Control Valve #3 fails closed OTO-MA-00001, Turbine Load Reject |
| 2 | SF / SFB08_DR | SRO (C) RO (C) BOP (C) | Dropped rod OTO-SF-00001, Rod Control Malfunctions (Tech Spec 3.1.4) |
| 3 | TVHM1705 RCCFUELFail | SRO (C) RO (C) | RCS High Activity OTO-BB-00005 / Place 120 gpm Letdown in-service (Tech Spec 3.4.16) |
| 4 | AE / AEPT0508A, B, C FC / FCXY0001A_2 FC / FCXY0003A_1 FC / FCXY0002A_2 | SRO (I) RO (I) BOP (I) | DFWCS failure – loss of MFW with a manual reactor trip required (failure of the automatic reactor trip), E-0 Reactor Trip or Safety Injection |
| 5 | AB / AB002_D SA / SA075A_MSLIS SA / SA075B_MSLIS SA / SAS9XX_4 SA / SAS9XX_8 SA / x25I132C=0 | SRO (M) RO (M) BOP (M) | 'D' SG Fault, E-2 Faulted SG Isolation with a failure of the automatic SL isolation and failure of 'D' MSIV to close with Fast Close PB |

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

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

Scenario #3 Event Description
Callaway 2019-1 NRC ES-D-1, Rev. 1

The Plant is stable at 100% with the 'A' MDAFP out of service.

After the reactivity brief is complete, Main Turbine Control Valve #3 will fail closed and crew will take actions per OTO-MA-00001. The crew will stabilize the plant and adjust Tavg and turbine controls in response.

After the plant is stabilized, a dropped rod occurs as indicated by DRPI and Control Rod Alarms. The crew will establish conditions for rod recovery per OTO-SF-00001, identify Technical Specifications and begin restoration. Technical Specification 3.1.4 is not met.

Once the plant is stable, a report from Chemistry indicates high activity in the RCS and Annunciator 61B alarms. The Crew will enter OTO-BB-00005, RCS High Activity and establish 120 gpm letdown flow IAW OTN-BG-00001 Addendum 04, Operation of CVCS Letdown. Technical Specification 3.4.16 is not met.

After the plant is stabilized, a failure of the DFWCS occurs resulting in both main feed pump speed lowering and therefore flow lowering to the point that a manual reactor trip is required (auto trip will not work). The crew will enter E-0, Reactor Trip or Safety Injection, and perform the immediate actions.

Upon the Rx trip, the 'D' SG develops a fault which can be seen by the crew as RCS pressure and temperature lower. A transition should be made to E-2, Faulted Steam Generator Isolation, at E-0 step#14. When performing E-2, the crew should determine that the automatic steamline isolation failed to occur and manually initiate it. Additionally, the MSIV fast closed Pushbuttons (AB HS 79/80) will fail to close "D" MSIV. "D" MSIV can be closed with its individual pushbutton.

Once the faulted Steam Generator is isolated and, after the secondary side blows dry, SI termination criteria should be met. The crew will transition to ES-1.1, SI Termination from E-2.

The scenario is complete when the Boron Injection Header is isolated per step 6 of ES-1.1, SI Termination.

Scenario #3 Event Description
Callaway 2019-1 NRC ES-D-1, Rev. 1

Critical Tasks:

| | | |
|---|--|--|
| Critical Tasks | Manually trip the reactor before any SG level indicates less than 10% WR | Isolate the faulted 'D' SG before transition out of E-2 |
| EVENT | 4 | 5 |
| Safety significance | Failure to manually trip the reactor causes a challenge to the subcriticality CSF beyond that irreparably introduced by the postulated conditions. Additionally, it constitutes an incorrect performance that "necessitates the crew taking compensating action that would complicate the event mitigation strategy" and demonstrates the inability of the crew to "recognize a failure or an incorrect automatic actuation of an ESF system or component." | Failure to isolate a faulted SG that can be isolated causes challenges to CSFs beyond those irreparably introduced by the postulated conditions. Failure to isolate a faulted SG can result in challenges to the following CSFs: <ul style="list-style-type: none"> • Integrity • Subcriticality • Containment (if the break is inside containment) |
| Cueing | Indication and/or annunciation that plant parameter(s) exist that should result in automatic reactor trip but reactor does not automatically trip <ul style="list-style-type: none"> • SG lev low low RX trip annunciator (85A) | Both of the following: <ul style="list-style-type: none"> • Steam pressure and flow rate indications that make it possible to identify 'D' SG as faulted AND <ul style="list-style-type: none"> • Valve position and flow rate indication that AFW continues to be delivered to the faulted 'D' SG |
| Performance indicator | Manipulation of control room reactor trip switches as required to trip the reactor <ul style="list-style-type: none"> • Reactor trip and bypass breakers indicate open | ISOLATE AFW flow to faulted SG(s): <ul style="list-style-type: none"> • CLOSE associated MD AFP Flow Control Valve(s): <ul style="list-style-type: none"> ◦ AL HK-5A (SG D) • CLOSE associated TD AFP Flow Control Valve(s): <ul style="list-style-type: none"> ◦ AL HK-6A (SG D) • CLOSE Steamline Low Point Drain valve from faulted SG(s): <ul style="list-style-type: none"> ◦ AB HIS-10 (SG D) • FAST CLOSE all MSIVs and Bypass valves: <ul style="list-style-type: none"> ◦ AB HS-79 ◦ AB HS-80 • Close "D" MSIV using individual MSIV handswitch |
| Performance feedback | Indications of reactor trip <ul style="list-style-type: none"> • Control rods at bottom of core • Neutron flux decreasing | Crew will observe the following: <ul style="list-style-type: none"> • Any depressurization of intact SGs stops • AFW flow rate indication to faulted SG of zero |
| Justification for the chosen performance limit | Not tripping the reactor prior to any SG reaching dryout conditions when it is possible to do so forces an immediate extreme challenge to the subcriticality CSF, availability of the heat sink, and containment. Additionally, the incorrect performance of failing to trip the reactor necessitates the crew taking compensating action that seriously complicates the event mitigation strategy. This misoperation constitutes a "significant reduction of safety margin beyond that irreparably introduced by the scenario." | "before transition out of E-2" is in accordance with the PWR Owners Group Emergency Response Guidelines. It allows enough time for the crew to take the correct action while at the same time preventing avoidable adverse consequences. |
| PWR Owners Group Appendix | CT-1, Manually trip the reactor | CT-17 Isolate faulted SG |

Scenario #3 Event Description
Callaway 2019-1 NRC ES-D-1, Rev. 1

| | | |
|---|---|--|
| Critical Tasks | Trip all RCPs within 5 minutes of meeting RCP trip criteria. | |
| EVENT | 5 | |
| Safety significance | Failure to trip the RCPs under the postulated plant conditions leads to core uncover and to fuel cladding temperatures in excess of 2200°F, which is the limit specified in the ECCS acceptance criteria. Thus, failure to perform the task represents misoperation or incorrect crew performance in which the crew has failed to prevent "degradation of...{the fuel cladding} ...barrier to fission product release" and which leads to "violation of the facility license condition." | |
| Cueing | <p>Indications of a SBLOCA AND Indication and/or annunciation of safety injection AND Indication and/or annunciation that at least one CCP/SI pump is running AND Indication that the RCP trip criteria are met</p> <p>Note: The 5 minute trip criteria will start once the first CCP or SI pump is started.</p> | |
| Performance indicator | <p>Manipulation of controls as required to trip all RCPs</p> <ul style="list-style-type: none"> RCP breaker position lights indicate breaker open | |
| Performance feedback | <p>Indication that all RCPs are stopped</p> <ul style="list-style-type: none"> RCP breaker position lights RCP flow decreasing RCP motor amps decreasing | |
| Justification for the chosen performance limit | In a letter to the NRC titled "Justification of the Manual RCP Trip for Small Break LOCA Events" (OG-117, March 1984) (also known as the Sheppard letter), the WOG provided the required assurance based on the results of the analyses performed in conjunction with WCAP-9584. The WOG showed that for all Westinghouse plants, more than two minutes were available between onset of the trip criteria and depletion of RCS inventory to the critical inventory. In fact, additional analyses sponsored by the WOG in connection with OG-117 conservatively showed that manual RCP trip could be delayed for five minutes beyond the onset of the RCP trip criteria without incurring any adverse consequence. | |
| PWR Owners Group Appendix | CT-16, MANUALLY TRIP RCPS | |

Scenario Procedure References
Callaway 2019-1 NRC Scenario #3, Rev. 1

| References |
|---|
| OTO-SF-00001, Rod Control Malfunctions |
| OTO-MA-00001, Turbine Load Reject |
| OTO-BB-00005, RCS High Activity |
| OTN-BG-00001 Addendum 04, Operation of CVCS Letdown |
| E-0, Reactor Trip or Safety Injection |
| E-2, Faulted Steam Generator Isolation |
| ES-1.1, SI Termination |
| Technical Specification 3.1.4, Rod Group Alignment Limits |
| Technical Specification 3.4.16, RCS Specific Activity |
| ODP-ZZ-00025, EOP/OTO User's Guide |

PRA Systems, Events or Operator Actions

1. Secondary Line Breaks (10% contribution to CDF)
2. Loss of MFW (1% contribution to CDF)

Scenario Simulator Lesson Plan
Callaway 2019-1 NRC Scenario #3, Rev. 1

Scenario Setup Guide:

Establish the initial conditions of IC#10,

- Load 18-05
- Place "A" MDAFP in PTL and hang a WIP tag on hand switch.
- Run the following 18-05 SIFTs
 - 20180059
 - 20180049
 - 20180060
 - 20180010

=====SCENARIO PRELOADS / SETUP ITEMS=====

Setup: Rack out NB0105, Prevent Auto Rx Trip, MSLIS, "D" MSIV failure to close

- Expert Command: insert AL01NB0105TA_BKPOS 3 delay=0 ramp=0 on=0 off=0
- Expert Command: insert SF006 0 delay=0 ramp=0 on=0 off=0
- Expert Command: insert SA075A_MSLIS 0 delay=0 ramp=0 on=0 off=0
- Expert Command: insert SA075B_MSLIS 0 delay=0 ramp=0 on=0 off=0
- Expert Command: insert SAS9XX_4 1 delay=0 ramp=0 on=0 off=0
- Expert Command: insert SAS9XX_8 1 delay=0 ramp=0 on=0 off=0

===== EVENT 1 =====

CV #3 fails closed

- Expert Command: insert ACFCV0049ZMANTYP 1 delay=0 ramp=0 on=0 off=0
- Expert Command: insert ACFCV0049TASTEM 0 delay=0 ramp=10 on=0 off=0
- Expert Command: insert HWXSP3F07W 1 delay=0 ramp=0 on=0 off=0

===== EVENT 2 =====

Drop CB rod B8

- SFB08_DR Value = 1

=====EVENT 3=====

Minor fuel failure for Hi RCS Activity

- Expert Command: insert TVHM1705 0.1 delay=0 ramp=0 on=0 off=0
- Expert Command: insert RCCFUELFail 3E-8 delay=0 ramp=0 on=0 off=0

Scenario Simulator Lesson Plan
Callaway 2019-1 NRC Scenario #3, Rev. 1

=====EVENT 4=====

DFW Control Station fails, AE PDI-508 fails high

- Expert Command: insert AEPT0508A 1200 delay=0 ramp=300 on=0 off=0
- Expert Command: insert AEPT0508B 1200 delay=0 ramp=300 on=0 off=0
- Expert Command: insert AEPT0508C 1200 delay=0 ramp=300 on=0 off=0
- Expert Command: insert FCXY0001A_2 1 delay=120 ramp=0 on=0 off=0
- Expert Command: insert FCXY0003A_1 1 delay=120 ramp=0 on=0 off=0
- Expert Command: insert FCXY0002A_2 1 delay=0 ramp=0 on=0 off=0

=====EVENT 5=====

Fault D SG (outside CTMT) when Rx trips

- AB002_D Value = 2000 Condition = sfawctrd560517dpos eq 0.0

Event Description:

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

Booth Operator:

- IMFs:
 - Expert Command: insert ACFCV0049ZMANTYP 1 delay=0 ramp=0 on=0 off=0
 - Expert Command: insert ACFCV0049TASTEM 0 delay=0 ramp=10 on=0 off=0
 - Expert Command: insert HWXSP3F07W 1 delay=0 ramp=0 on=0 off=0

Indications Available

Annunciators:

- Multiple Indications of lowering turbine load
- 78C, Power Range Lower Detector Flux Deviation
- 77A, Reactivity Deviation
- Control Bank D stepping inward
- SB069, Turb Auto top 63 AST 3, LIT

OTO-MA-00001

| | | |
|--|------------|--|
| | CRS | Implement OTO-MA-00001, Turbine Load Rejection |
| | | |
| | RO | Step 1 - PLACE Rod Control In AUTO: SE HS-9 Note: Previous event procedural placed the rods in Manual and when placed back in AUTO for this event, there will be a demand and rods will step in quickly and then slower. |
| | | |
| | RO | Step 2 - CHECK Rod Control System Responding To RCS Tav/Tref Deviation By Ensuring One Of The Following: <ul style="list-style-type: none"> • Control Rods are inserting AND RCS Tavg trending to within 5°F of Tref OR <ul style="list-style-type: none"> • RCS Tavg within 5°F of Tref |
| | | |
| | BOP | Step 3 - CHECK Stator Cooling Status: <ul style="list-style-type: none"> • Inlet Pressure – GREATER THAN 50 PSIG <ul style="list-style-type: none"> ○ CE PI-26 • Conductivity - LESS THAN 8.0 µmhos/cm <ul style="list-style-type: none"> ○ CEC0006 ○ CEC0007 • Outlet Temperature – LESS THAN 76°C <ul style="list-style-type: none"> ○ CE TI-38A • Annunciator 130E, GEN AUX TROUBLE - EXTINGUISHED |
| | | |

| | | | | | | | | | |
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| Event Description: | | | | | | | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | | | | | | | |

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| OTO-MA-00001 | RO | Step 4 - CHECK Both Of The Following Annunciator Windows - EXTINGUISHED <ul style="list-style-type: none"> • 82B, OTΔT Rod Stop • 82C, OPΔT Rod Stop |
| | | |
| | BOP | Step 5 -CHECK All Circulating Water Pumps – RUNNING <ul style="list-style-type: none"> • Circ Water Pump A • Circ Water Pump B • Circ Water Pump C |
| | | CAUTION Turbine Runback and Setback functions will be defeated upon transfer to Standby Operation. However, Trip Protective functions will still be enabled. |
| | | |
| | BOP | Step 6 - CHECK Main Turbine Control System Responding To A Turbine Load Rejection: Turbine Load STABLE OR LOWERING AS EXPECTED following a Turbine Runback OR Setback |
| | | |
| | BOP | Step 7 - CHECK If Plant Parameters Can Be MAINTAINED BELOW The Operating Curve In Curve Book Figure 10-7. |
| | | |
| | BOP | Step 8 - CHECK Stator Cooling Water Inlet Pressure - LESS THAN 50 PSIG : CE PI-26 RNO – Go To Step 18. |
| | | |
| | BOP | Step 18 - MAINTAIN Main Generator MVARs Within One Of The Following: <ul style="list-style-type: none"> • (-)100 to +100 MVARs OR <ul style="list-style-type: none"> • Limits of Curve Book, Figure 10-1 through 10-6 |
| | | |
| | BOP | Step 19 - CHECK HP Heaters Bypass Valve - CLOSED: <ul style="list-style-type: none"> • AE HIS-38 |

| | | | |
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| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

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| OTO-MA-00001 | | CAUTIONS <ul style="list-style-type: none"> If a Turbine Admission Valve is not fully closed performing Attachment B, Turbine Steam Admission Valve Failure, will fail affected valve closed. Closing Turbine Admission Valves may affect reactivity. NOTE Placing the Turbine on Load Set for a Control Valve failure will allow other Control Valves to respond. |
| | | |
| | BOP | Step 20 – IF Turbine Steam Admission Valve Failure Has Occurred Perform the Following: <ol style="list-style-type: none"> If a Control Valve has failed Place the Turbine on Load Set: <ol style="list-style-type: none"> Slowly LOWER Load using the DECREASE LOAD pushbutton until all of the following are met: <ul style="list-style-type: none"> Load Limit Limiting Light – EXTINGUISHED Decrease Loading Rate "OFF" Light-LIT Loading Rate Limit %/MIN "1/2" Light-LIT ROTATE Load Limit Set potentiometer fully clockwise SELECT Decrease Loading Rate – ON IF possible Close the affected Turbine Steam Admission Valve. MAINTAIN the affected Turbine Steam Admission Valve closed by performing ATTACHMENT B, Turbine Steam Admission Valve Failure. MONITOR Turbine Vibration and Exhaust Hood temperature. MONITOR MSR levels and temperatures. IMPLEMENT APA-ZZ-00152, Emergent Issues Response CONTACT Main Turbine System Engineer. |
| | | |
| OTO-MA-00001 ATT B | RO/ BOP | Step B5 - IF ACFCV0049, MN TURB CTRL VLV #3 has failed, PERFORM THE FOLLOWING: DISCONNECT the Electrical Connection (Amphenol) at CHFY0043 (CV #3 SPLY SERVO) This is the only applicable step from Attachment B – the crew will direct I&C to prepare a package for removal of the Amphenol |
| | | |

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| Event Description: | | |
| Proc /Time | Position | Applicant's Actions or Behavior |

| | | |
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| Booth Operator | | Role Play as Secondary OT and Acknowledge request to disconnect amphenol at CHFY0043 (CV #3 SPLY SERVO) |
| | | |
| OTO-MA-00001 | | Step 21 – CHECK IF Rod Control Should Be Placed In MANUAL: a. CHECK C-5, Impulse Press Rod Stop – LIT b. PLACE Rod Control in MANUAL: SE HS-9 |
| | | |
| NOTE | | At Lead Examiner's discretion move to the next Event |

Event Description:

| Proc /Time | Position | Applicant's Actions or Behavior |
|------------|----------|---------------------------------|
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Booth Operator:

- IMF SFB08_DR Value = 1

Indications Available

Annunciator(s):

- 78A, Power Range Channel Deviation
- 78C, Power Range Lower Detector Flux Deviation (In and then clears)
- 78F, Power Range Tilt
- 77A, Reactivity Deviation
- 79C, Control Rod Deviation
- 80C, Rod Position Indication Rod Deviation
- 81B, Rod at Bottom

OTO-SF-00001

| | | |
|--|------------|---|
| | CRS | Implement OTO-SF-00001, Rod Control Malfunctions |
| | | |
| | RO | Step 1 - CHECK Both Of The Following Are Met For Indication Of Multiple Dropped Rods: <ul style="list-style-type: none"> • Annunciator 81A, Two/More Rods At Bottom - LIT • Rod Bottom lights for greater than one rod – LIT RNO Go To Step 3 |
| | | |
| | RO | Step 3 - CHECK Main Turbine Runback Or Load Reject - IN PROGRESS RNO Go To Step 5 |
| | | |
| | RO | Step 5 - PLACE Rod Control in MANUAL: <ul style="list-style-type: none"> • SE HS-9 |
| | | |
| | RO | Step 6 - CHECK Control Rods Motion – STOPPED Only 1 rod dropped into the core and therefore there should be NO rod motion |
| | | |

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| Op Test No.: <u>2019-1</u> | Scenario # <u>3</u> | Event # <u>2</u> | Page <u>13</u> of <u>33</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
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| OTO-SF-00001 | RO | <p>Step 7 - CHECK Instruments Indications - NORMAL</p> <p>a. RCS Tavg:</p> <ul style="list-style-type: none"> • BB TI-412 • BB TI-422 • BB TI-432 • BB TI-442 <p>b. HP Turbine First Stage Pressure:</p> <ul style="list-style-type: none"> • AC PI-505 • AC PI-506 <p>c. Power Range Nuclear Instrument:</p> <ul style="list-style-type: none"> • SE NI-41B • SE NI-42B • SE NI-43B • SE NI-44B |
| | | <p>NOTES:</p> <p>An Urgent Failure in the Logic Cabinet prevents all automatic and manual rod motion in overlap.</p> <p>An Urgent Failure in a Power Cabinet prevents all rod motion by the rods powered from the failed cabinet.</p> |
| | | |
| | RO | <p>Step 8 - CHECK Annunciator 79A, Rod Ctrl Urg Fail – LIT</p> <p>79A is not LIT and Go To RNO</p> |
| | | |
| | BOP | <p>Step 8 RNO - PERFORM The Following:</p> <p>a. MAINTAIN RCS Tavg/Tref deviation within 1.5°F using either of the following:</p> <p>IF Tref greater than Tave, THEN ADJUST Turbine load.</p> <p>OR</p> <p>IF Tave greater than Tref, THEN ADJUST RCS boron concentration.</p> <p>b. Go To Step 10.</p> <p>As Tref > Tavg, the BOP should adjust turbine Load</p> |
| | | |

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| Op Test No.: <u>2019-1</u> | Scenario # <u>3</u> | Event # <u>2</u> | Page <u>14</u> of <u>33</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
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| OTO-SF-00001 | RO | Step 10 - CHECK Both Of The Following Are - EXTINGUISHED <ul style="list-style-type: none"> Annunciator 81B, Rod At Bottom All Rod Bottom lights RNO - Go To Attachment A, Dropped/Misaligned Control Rod. |
| | | |
| OTO-SF-00001 ATT A | RO | Step A1 - CHECK Reactor Power – LESS THAN 5%. NO RNO – Go To Step A3 |
| | | |
| | BOP | Step A3 - CONTACT I&C To Determine The Reason For The Dropped/Misaligned Rod |
| | | |
| Booth Operator | | Role Play as I&C and state "will develop a troubleshooting package to determine the reason. Estimated time for the package to be executed is 2 hours." |
| | | |
| | RO/CRS | Step A4 - CHECK Shutdown Margin Is Within The Limits Provided In The COLR Within 1 Hour |
| | | |
| Booth Operator | | Role Play as Reactor Engineers and state " Reactor Engineering will check that SDM is within the Limits of the COLR and report back to you" |
| | | |
| | RO | Step A5 - CHECK Axial Flux Difference (AFD) - WITHIN THE LIMITS OF CURVE BOOK, FIGURE 1-1, AXIAL FLUX DIFFERENCE LIMITS |
| | | |

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| Op Test No.: <u>2019-1</u> | Scenario # <u>3</u> | Event # <u>2</u> | Page <u>15</u> of <u>33</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
|-------------|------------|---|
| | RO | <p>Step A6 - CHECK QPTR - LESS THAN OR EQUAL TO 1.02</p> <ul style="list-style-type: none"> • REU1151 • REU1152 • REU1153 • REU1154 • REU1159 • REU1160 • REU1161 • REU1162 <p>QPTR is within limits</p> |
| | RO | <p>Step A7 - CHECK Dropped/Misaligned Rod Can Be Recovered In Less Than 1 Hour</p> <p>Proceed to the RNO as the cue from I&C was ~2 hours</p> |
| | BOP | <p>Step A7 RNO - REDUCE Reactor Power to less than or equal to 75% within 2 hours per one of the following:</p> <ul style="list-style-type: none"> • OTO-MA-00008, Rapid Load Reduction. <p>OR</p> <ul style="list-style-type: none"> • OTG-ZZ-00004, Power Operation. |
| | CRS | REVIEW Applicable Technical Specifications |
| | | <i>The CRS should declare Tech Spec 3.1.4 Condition B not met. If plant conditions (PR NI) show QPTR >1.02, then T.S. 3.2.4 Condition A is not met and Required Actions A.1, A.2, A.3, A.4, A.5, and A.6 are appropriate.</i> |
| NOTE | | <p>At Lead Examiner's discretion move to the next Event.</p> <p>Event 3 is triggered the same time event 2 is and the indication appear (annunciator) ~ 10 minutes later. This is done as it take time for the fuel failure to buildup in the RCS and affect the CVCS letdown rad monitor. It may be necessary to evaluate T.S post scenario via candidate questioning.</p> |

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| Op Test No.: <u>2019-1</u> | Scenario # <u>3</u> | Event # <u>3</u> | Page <u>16</u> of <u>33</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

Booth Operator:

- Verify the following malfunctions are active:
 - Expert Command: insert TVHM1705 0.1 delay=0 ramp=0 on=0 off=0
 - Expert Command: insert RCCFUELFAIL 3E-8 delay=0 ramp=0 on=0 off=0

Indications Available

Annunciator 61B, Process Radiation High

OTO-BB-00005

| | | |
|---------------------|------------|--|
| | CRS | Implement OTO-BB-00005, RCS High Activity |
| | | |
| OTO-BB-00005 | RO | <p>Step 1 - MAXIMIZE Letdown Flow Through CVCS Letdown Mixed Bed Demineralizer:</p> <ol style="list-style-type: none"> a. ENSURE Letdown System Containment Isolation Valves - OPEN: <ul style="list-style-type: none"> • BG HIS-8152 • BG HIS-8160 b. ENSURE RCS Letdown To Regenerative Heat Exchanger Valves - OPEN: <ul style="list-style-type: none"> • BG HIS-459 • BG HIS-460 c. ESTABLISH 120 gpm Charging Header flow while maintaining seal injection flow: <ul style="list-style-type: none"> • BG HC-182 • BG FK-124 (NCP) d. PLACE Letdown Hx Outlet Pressure Controller in Manual at 75% or greater: <ul style="list-style-type: none"> • BG PK-131 e. OPEN Letdown Throttle Isolation Valve(s) to establish desired letdown flow: <ul style="list-style-type: none"> • BG HIS-8149AA (45 gpm) f. ADJUST Letdown Hx Outlet Pressure Controller to establish desired pressure and PLACE in Automatic: <ul style="list-style-type: none"> • BG PK-131 g. ADJUST Charging flow as necessary to maintain Pressurizer level. h. PLACE Pressurizer Level Master Controller in MANUAL to obtain an output of 64% - 68% demand: <ul style="list-style-type: none"> • BB LK-459 i. WHEN PZR Level is being maintained at PROGRAM, THEN PLACE the following in AUTO as required: <ul style="list-style-type: none"> • BG FK-124 • BB LK-459 |
| | | <p>NOTE</p> <p>RCS coolant and seal injection filters D/P will rise if a crud burst has occurred.</p> |
| | | |

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| Proc /Time | Position | Applicant's Actions or Behavior | | | | | | | |

| | | |
|---------------------|------------|--|
| OTO-BB-00005 | RO | Step 2 - MONITOR D/P On RCS Coolant And Seal Injection Filters |
| | | |
| Booth Driver | | Role Play as Primary OT and acknowledge request to monitor D/P on RCS Coolant and Seal Injection filters |
| | | |
| | RO | Step 3 - DIRECT Chemistry To Sample RCS For Activity |
| | | |
| Booth Driver | | Role Play as Chemistry report that "TIME Compression on the RCS Sample results - the last RCS sample is 65uCi/gm of Dose Equivalent Iodine" |
| | | |
| | RO | Step 5 - DIRECT Chemistry To Determine If Decontamination Factor (DF) of CVCS Letdown Mixed Bed Demineralizer Is Acceptable Per CDP-ZZ-00800, Callaway Resin Monitoring Program |
| | | |
| | RO | Step 6 - CHECK DF Of Inservice CVCS Letdown Mixed Bed Demineralizer - ACCEPTABLE |
| | | |
| | CRS | Step 7 - REVIEW Technical Specifications 3.4.16 |
| | | <i>The CRS should declare Tech Spec 3.4.16 Condition A not met. Required Action A.1, Verify Dose Equivalent I-131 is ≤ 60uCi/gm. Within 4 hours AND A.2 Restore Dose Equivalent I-131 to within limit in 48 hours. It may be necessary to evaluate T.S post scenario via candidate questioning.</i> |
| | | |
| NOTE | | At Lead Examiner's discretion move to the next Event. The crew may start a down power due to RCS Activity / Dropped Rod failures. It is recommended to insert the next malfunction before the down power begins such that it is NOT masked. |

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| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

Booth Operator:

- Expert Command: insert AEPT0508A 1200 delay=0 ramp=300 on=0 off=0
- Expert Command: insert AEPT0508B 1200 delay=0 ramp=300 on=0 off=0
- Expert Command: insert AEPT0508C 1200 delay=0 ramp=300 on=0 off=0
- Expert Command: insert FCXY0001A_2 1 delay=120 ramp=0 on=0 off=0
- Expert Command: insert FCXY0003A_1 1 delay=120 ramp=0 on=0 off=0
- Expert Command: insert FCXY0002A_2 1 delay=0 ramp=0 on=0 off=0

For D SG Faulted (outside CTMT) upon reactor trip:

- AB002_D Value = 2000 Condition = sfawctrd560517dpos eq 0.0

The failure of the Automatic Reactor Trip, automatic SLIS, and "D" MSIV to close on Fast Pushbuttons are preloaded.

Indications Available

Annunciators 108C through 111C, SG A through D Level Deviation

OTO-AE-00001 / E-0 / E-2

| | | |
|----------------------|------------|--|
| Booth Driver | | AS a contingency, have the malfunction for A MFP trip ready to insert if the loss of the DFW control station is arrest by utilizing DFWCS Display #2 (usual alarm display) and selecting Manual on the MFP controls. Note: The event may be moving fast enough that OTO-AE-00001 is not implement as the crew inserts a manual reactor trip (Auto trip is disabled) |
| | CRS | Implement OTO-AE-00001, Feedwater System Malfunction |
| CRITICAL TASK | | Manually trip the reactor before any SG level indicates less than 10% WR |
| OTO-AE-00001 | BOP | Step 1 - CHECK BOTH Main Feed Pumps – TRIPPED a. Manually TRIP the Reactor b. Go To E-0, Reactor Trip Or Safety Injection |
| | BOP | Step 2 - CHECK ONE Main Feed Pump - TRIPPED |
| | BOP | Step 3 - Check Reactor Power - LESS THAN 70% |

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| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
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| | | E-0, Reactor Trip or Safety Injection |
| E-0 | RO | NOTE: Steps 1 through 4 are immediate action steps. |
| | | |
| | RO | Step 1 - CHECK Reactor Trip: <ul style="list-style-type: none"> • Rod Bottom Lights - ALL LIT • Reactor Trip and Bypass Breakers - OPEN • Neutron Flux - LOWERING |
| | | |
| | BOP | Step 2 - CHECK Turbine Trip: <ul style="list-style-type: none"> • All Turbine Stop valves - CLOSED |
| | | |
| | BOP | Step 3 - CHECK Power to AC Emergency Buses: <ol style="list-style-type: none"> AC emergency buses – AT LEAST ONE ENERGIZED AC emergency buses – BOTH ENERGIZED |
| | | |
| | BOP | Step 4 - Check SI Status: <ol style="list-style-type: none"> Check if SI is actuated <ul style="list-style-type: none"> • Ann 88A thru 88D Lit – OR- • SB069 SI Actuate Red light is lit – OR- • LOCA Sequencers alarms 30A & 31A CHECK both Trains of SI-Actuated <ul style="list-style-type: none"> • ANN 30A lit • ANN 31A lit • SB069 SI Actuate Red light lit SOLID |
| | | |
| | BOP | Step 5 - PERFORM Attachment A, Automatic Action Verification, While Continuing With This Procedure. |
| | | |

| | | | |
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| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
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| E-0 FOLDOUT PAGE | | <p>2. FAULTED SG ISOLATION CRITERIA</p> <p>IF any SG pressure is lowering in an uncontrolled manner OR is completely depressurized, THEN PERFORM the following as desired:</p> <ul style="list-style-type: none"> • FAST CLOSE MSIVs. • Manually CLOSE or locally ISOLATE any failed open ASD(s). • ISOLATE feed flow to faulted SG(s). <p>MAINTAIN total feed flow greater than 270,000 lbm/Hr until narrow range level is greater than 7% [25%] in at least one SG.</p> |
| E-0 Attachment A | RO | <p>Step A1 - Check Charging Pumps:</p> <p>a. CCPs – Both Running</p> <ul style="list-style-type: none"> • BG HIS-1A • BG HIS-2A <p>b. Stop NCP using BG HIS-3</p> |
| E-0 Attachment A | RO | <p>Step A2 - CHECK SI and RHR Pumps:</p> <ul style="list-style-type: none"> • SI Pumps – BOTH RUNNING <ul style="list-style-type: none"> • EM HIS-4 • EM HIS-5 • RHR Pumps – BOTH RUNNING <ul style="list-style-type: none"> • EJ HIS-1 • EJ HIS-2 |

Event Description:

| Proc /Time | Position | Applicant's Actions or Behavior |
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| | | |
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| | RO | <p>Step A3 - CHECK ECCS flow:</p> <ul style="list-style-type: none"> a. CCPs to Boron Inj Header – FLOW INDICATED <ul style="list-style-type: none"> • EM FI-917A • EM FI-917B b. RCS pressure – Less than 1700 psig c. SI Pump Discharge - FLOW INDICATED <ul style="list-style-type: none"> • EM FI-918 • EM FI-922 d. RCS pressure – LESS THAN 325 PSIG e. RHR To Accumulator Injection Loop - FLOW INDICATED <ul style="list-style-type: none"> • EJ FI-618 • EJ FI-619 |
| | | |
| | RO | <p>Step A4 - CHECK ESW Pumps – BOTH RUNNING</p> <ul style="list-style-type: none"> • EF HIS-55A • EF HIS-56A |
| | | |

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| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

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| E-0 Attachment A | | <p>Step A5 - CHECK CCW Alignment:</p> <ul style="list-style-type: none"> a. CCW Pumps – one running in each train <ul style="list-style-type: none"> • Red Train: EG HIS-21 or EG HIS-23 • Yellow Train: EG HIS-22 or EG HIS-24 b. CCW Service Loop Supply and Return valves for one operating CCW pump – OPEN <ul style="list-style-type: none"> • EG ZL-15 and EG ZL-53 • OR • EG ZL-16 and EG ZL-54 c. OPEN CCW to RHR HX valves: <ul style="list-style-type: none"> • EG HIS-101 • EG HIS-102 d. CLOSE Spent Fuel Pool HX CCW Outlet Valves: <ul style="list-style-type: none"> • EC HIS-11 • EC HIS-12 e. STOP Spent Fuel Pool Cooling Pump(s): <ul style="list-style-type: none"> • EC HIS-27 • EC HIS-28 f. RECORD the time spent fuel pool cooling pump secured g. MONITOR time CCW flow isolated to SFP HX < 4 hours |
| | | |
| | RO | <p>Step A6 - CHECK Containment Cooler Fans running in slow speed</p> <ul style="list-style-type: none"> • GN HIS-9 • GN HIS-17 • GN HIS-5 • GN HIS-13 |
| | | |
| | RO | <p>Step A7 - CHECK Containment H2 Mixing Fans in slow speed</p> <ul style="list-style-type: none"> • GN HIS-2 • GN HIS-4 • GN HIS-1 • GN HIS-3 |
| | | |

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| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

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|---------------------------------|-----------|---|
| E-0 Attachment A | RO | <p>Step A8 - CHECK if Containment Spray should be actuated</p> <ul style="list-style-type: none"> Containment Pressure > 27 psig -OR- GN PR-934 indicates ctmt pressure has been > 27 psig - OR- Annunciator 59A CSAS LIT - OR- Annunciator 59B CISB LIT <p>RNO: Go to step A9</p> |
| | | |
| | RO | <p>Step A9 - CHECK if Main Steamlines should be Isolated</p> <p>a. Check the following:</p> <ul style="list-style-type: none"> Containment pressure > 17 psig -OR- GN PR-934 indicates ctmt pressure has been > 17 psig -OR- Steamline pressure < 615 psig -OR- AB PR-514 or 535 shows pressure has been < 615 psig -OR- <p>b. CHECK MSIVs and Bypass valves - CLOSED</p> |
| | | |
| | RO | <p>Step A10 - CHECK ECCS Valves in proper alignment</p> <p>a. ESFAS Status Panels SIS sections:</p> <ul style="list-style-type: none"> SA066X WHITE lights – ALL LIT SA066Y WHITE lights – ALL LIT |
| | | |
| | RO | <p>Step A11 - CHECK Containment Isolation Phase A:</p> <p>a. ESFAS status panels CISA sections:</p> <ul style="list-style-type: none"> SA066X WHITE lights – ALL LIT SA066Y WHITE lights – ALL LIT |
| | | |

| | | | |
|----------------------------|---------------------|---------------------------------|-----------------------------|
| Op Test No.: <u>2019-1</u> | Scenario # <u>3</u> | Event # <u>4&5</u> | Page <u>24</u> of <u>33</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
|---------------------------------|------------|---|
| E-0 Attachment A | RO | Step A12 - CHECK SG Blowdown Isolation: <ul style="list-style-type: none"> a. ESFAS status panels SGBSIS sections: <ul style="list-style-type: none"> • SA066X WHITE lights – ALL LIT • SA066Y WHITE lights – ALL LIT |
| | | |
| | RO | Step A13 - CHECK Both Trains of CRVIS <ul style="list-style-type: none"> a. ESFAS status panels CRVIS sections: <ul style="list-style-type: none"> • SA066X WHITE lights – ALL LIT • SA066Y WHITE lights – ALL LIT |
| | | |
| | RO | Step A14 - CHECK Containment Purge Isolation: <ul style="list-style-type: none"> a. ESFAS status panels CPIS sections: <ul style="list-style-type: none"> • SA066X WHITE lights – ALL LIT • SA066Y WHITE lights – ALL LIT |
| | | |
| | RO | Step A15 - NOTIFY CRS of the following: <ul style="list-style-type: none"> • Unanticipated manual actions taken • Failed Equipment Status • Attachment A completion |
| | | |
| E-0 | BOP | Step 6 - CHECK Generator Output Breakers – OPEN <ul style="list-style-type: none"> • MA ZL-3A (V55) • MA ZL-4A (V53) |
| | | |

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|----------------------------|---------------------|---------------------------------|-----------------------------|
| Op Test No.: <u>2019-1</u> | Scenario # <u>3</u> | Event # <u>4&5</u> | Page <u>25</u> of <u>33</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
|----------------------|------------|---|
| E-0 | BOP | <p>Step 7 - CHECK Feedwater Isolation:</p> <ul style="list-style-type: none"> a. MFPs Tripped <ul style="list-style-type: none"> • ANN 120A, MFP A Trip – LIT • ANN 123A, MFP B Trip b. Main Feedwater Reg Valves – CLOSED <ul style="list-style-type: none"> • AE ZL-510 • AE ZL-520 • AE ZL-530 • AE ZL-540 c. Main Feedwater Reg Bypass Valves – CLOSED <ul style="list-style-type: none"> • AE ZL-550 • AE ZL-560 • AE ZL-570 • AE ZL-580 d. Feedwater Isolation Valves – CLOSED <ul style="list-style-type: none"> • AE HIS-39 • AE HIS-40 • AE HIS-41 • AE HIS-42 |
| | | |
| | BOP | <p>Step 8 - CHECK AFW Pumps:</p> <ul style="list-style-type: none"> a. MD AFW Pumps – BOTH RUNNING <ul style="list-style-type: none"> • AL HIS-23A • AL HIS-22A b. TDAFP -Running if Necessary |
| | | |
| CRITICAL TASK | | <p>Trip all RCPs within 5 minutes of meeting RCP trip criteria.</p> <p>This is only applicable during the performance of E-0 and does not apply during the performance of E-2, and ES-1.1. This action can be performed per E-0 foldout page #1 or Step #12 of E-0. If during the performance of E-0, RCS pressure lowers to or less than 1425 psig and a SI or CCP is running, the crew has 5 minutes to trip all RCPs.</p> |
| | | |

| | | | |
|----------------------------|---------------------|---------------------------------|-----------------------------|
| Op Test No.: <u>2019-1</u> | Scenario # <u>3</u> | Event # <u>4&5</u> | Page <u>26</u> of <u>33</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
|------------|------------|---|
| E-0 | BOP | <p>Step 9 - CHECK AFW Valves – proper emergency alignment</p> <ul style="list-style-type: none"> MD AFW Flow Control Valves – THROTTLED <ul style="list-style-type: none"> AL HK-7A AL HK-9A AL HK-11A AL HK-5A TD AFW Flow Control Valves – FULL OPEN <ul style="list-style-type: none"> AL HK-8A AL HK-10A AL HK-12A AL HK-6A TD AFW Loop Steam Supply Valves – BOTH OPEN IF NECESSARY <ul style="list-style-type: none"> AB HIS-5A AB HIS-6A |
| | | |
| | BOP | Step 10 - CHECK Total AFW Flow > 270,000 lbm/hr |
| | | |
| | RO | <p>Step 11 - CHECK PZR PORVs and Spray Valves:</p> <ol style="list-style-type: none"> PZR PORVs – CLOSED <ul style="list-style-type: none"> BB HIS-455A BB HIS-456A PZR PORVs – Both in AUTO <ul style="list-style-type: none"> BB HIS-455A BB HIS-456A PORV Block Valves – BOTH OPEN <ul style="list-style-type: none"> BB HIS-8000A BB HIS-8000B Normal PZR Spray valves – CLOSED <ul style="list-style-type: none"> BB ZL-455B BB ZL-455C |
| | | |

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|----------------------------|---------------------|---------------------------------|-----------------------------|
| Op Test No.: <u>2019-1</u> | Scenario # <u>3</u> | Event # <u>4&5</u> | Page <u>27</u> of <u>33</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
|------------|------------|---|
| E-0 | RO | <p>Step 12 - CHECK if RCPs should be stopped:</p> <ol style="list-style-type: none"> RCPs – ANY RUNNING ECCS Pumps – AT LEAST ONE RUNNING <ul style="list-style-type: none"> CCP OR SI Pump RCS Pressure < 1425 psig. Stop all RCPs |
| | | |
| | RO | <p>Step 13 - CHECK RCS Temperatures:</p> <ul style="list-style-type: none"> Any RCP Running – RCS Tavg stable at 557°F or trending to 557°F <p>-OR-</p> <ul style="list-style-type: none"> NO RCPs running - RCS COLD LEG TEMPERATURES STABLE AT 557°F OR TRENDING TO 557°F <p>Go To RNO</p> |
| | | |
| | RO | <p>Step 13 RNO - IF temperature is less than 557°F AND lowering, THEN PERFORM the following:</p> <ol style="list-style-type: none"> STOP dumping steam. IF cooldown continues, THEN CONTROL total feed flow: <ul style="list-style-type: none"> MAINTAIN total feed flow greater than 270,000 lbm/Hr until narrow range level is greater than 7% [25%] in at least one SG. IF cooldown continues, THEN FAST CLOSE all MSIVs and Bypass valves: <ul style="list-style-type: none"> AB HS-79 AB HS-80 |
| | | |
| | BOP | <p>Step 14 - CHECK if any SG is faulted:</p> <ol style="list-style-type: none"> Check pressures in all SGs: RNO: GO TO Step #15 <ul style="list-style-type: none"> Any SG pressure lowering in an uncontrolled manner or completely depressurized. Go to E-2, Faulted SG Isolation Step 1 |
| | | |
| E-2 | | E-2, Faulted SG Isolation |

| | | | |
|----------------------------|---------------------|---------------------------------|-----------------------------|
| Op Test No.: <u>2019-1</u> | Scenario # <u>3</u> | Event # <u>4&5</u> | Page <u>28</u> of <u>33</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
|----------------------|------------|--|
| CRITICAL TASK | | <p>Isolate the faulted 'D' SG before transition out of E-2</p> <p>Note: "D" MSIV may have been closed during the performance of E-0.</p> <p>Note: The Automatic SLIS is blocked requiring the candidates to manually initiate SLIS. When the Fast Close PB to close all MSIVs is depressed, the "D" MSIV will not close. The "D" MSIV can be closed with its individual handswitch (See Step #1 RNO).</p> |
| E-2 | | <p>CAUTIONS</p> <ul style="list-style-type: none"> At least one SG must be maintained available for RCS cooldown. Any faulted SG or secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown. |
| | BOP | <p>Step 1 - CHECK MSIVs And Bypass Valves – CLOSED</p> <p>Go To RNO (if not previously closed)</p> |
| | BOP | <p>Step 1 RNO - FAST CLOSE all MSIVs and Bypass valves:</p> <ul style="list-style-type: none"> AB HS-79 AB HS-80 <p>IF valve(s) will NOT fast close, THEN CLOSE MSIV(s) and bypass valves as necessary</p> |
| | BOP | <p>Step 2 - CHECK If Any SG Secondary Pressure Boundary Is Intact:</p> <p>a. CHECK pressures in all SGs - ANY STABLE OR RISING</p> |
| | | <p>NOTE</p> <p>The ESFAS SG pressure transmitters may be inaccurate if a secondary line break occurs in Area 5. The pressure indicators on the SG ASD controllers are NOT affected and should be used for comparison.</p> |
| | | |

| | | | |
|----------------------------|---------------------|---------------------------------|-----------------------------|
| Op Test No.: <u>2019-1</u> | Scenario # <u>3</u> | Event # <u>4&5</u> | Page <u>29</u> of <u>33</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
|------------|------------|---|
| E-2 | BOP | <p>Step 3 - IDENTIFY Faulted SG(s):</p> <p>a. CHECK pressures in all SGs:</p> <ul style="list-style-type: none"> • ANY SG PRESSURE LOWERING IN AN UNCONTROLLED MANNER <p>OR</p> <ul style="list-style-type: none"> • ANY SG COMPLETELY DEPRESSURIZED <p>"D" SG identified as the faulted SG</p> |
| | | |
| | | CAUTION - If the turbine-driven AFW pump is the only available source of feed flow, steam supply to the turbine-driven AFW pump must be maintained from at least one SG. |
| | | |
| | BOP | <p>Step 4 - ISOLATE Faulted SG(s):</p> <p>a. ISOLATE AFW flow to faulted SG(s):</p> <ul style="list-style-type: none"> • CLOSE associated MD AFP Flow Control Valve(s): • AL HK-5A (SG D) • CLOSE associated TD AFP Flow Control Valve(s): • AL HK-6A (SG D) <p>b. CHECK ASD from faulted SG(s)- CLOSED</p> <ul style="list-style-type: none"> • AB PIC-4A (SG D) <p>c. Locally CLOSE TDAFP Steam Supply From Main Steam Loop Manual Isolation valve from faulted SG(s):</p> <ul style="list-style-type: none"> • ABV0085 (SG B) • ABV0087 (SG C) (step is N/A as it's the D SG) <p>d. CHECK Main Feedwater valves to faulted SG(s) – CLOSED</p> <ul style="list-style-type: none"> • Main Feedwater Reg Valve: • AE ZL-540 (SG D) • Main Feedwater Reg Bypass valve: • AE ZL-580 (SG D) • Feedwater Isolation Valve: • AE HIS-42 (SG D) <p>e. CHECK SG Blowdown Containment Isolation Valve from faulted SG(s) - CLOSED</p> <ul style="list-style-type: none"> • BM HIS-4A (SG D) <p>f. CLOSE Steamline Low Point Drain valve from faulted SG(s):</p> <ul style="list-style-type: none"> • AB HIS-10 (SG D) |
| | | |
| | BOP | <p>Step 5 - CHECK CST To AFP Suction Header Pressure – GREATER THAN 2.75 PSIG</p> |

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|----------------------------|---------------------|---------------------------------|-----------------------------|
| Op Test No.: <u>2019-1</u> | Scenario # <u>3</u> | Event # <u>4&5</u> | Page <u>30</u> of <u>33</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

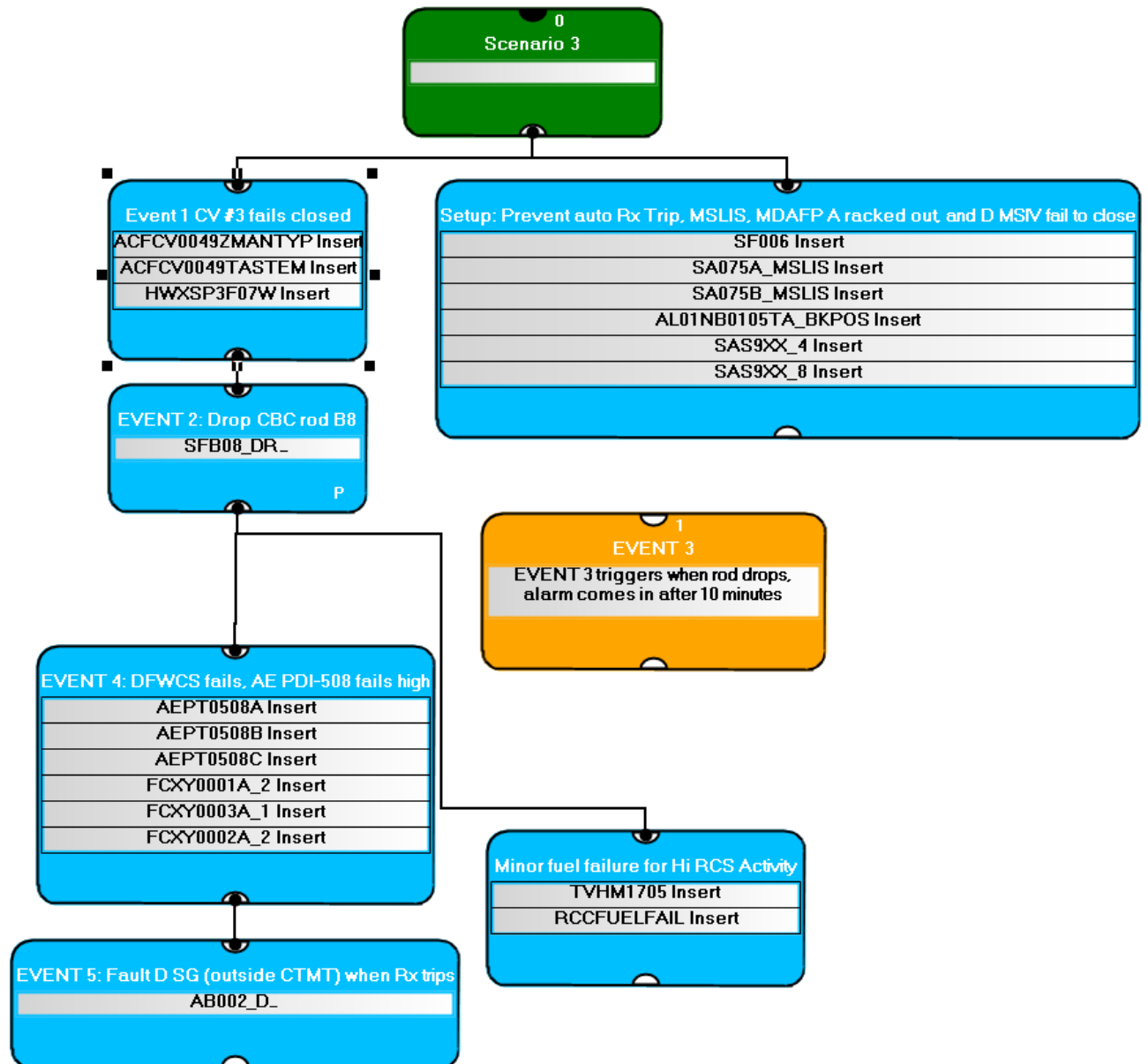
| | | |
|------------|------------|---|
| | | |
| E-2 | | <p>NOTE</p> <p>Subsequent actions should NOT be delayed while awaiting SG sampling. Sampling of the SGs is repeated in E-1, Loss Of Reactor Or Secondary Coolant.</p> |
| | | |
| | BOP | <p>Step 6 - CHECK Secondary Radiation:</p> <p>a. PERFORM the following:</p> <ul style="list-style-type: none"> PERFORM EOP Addendum 11, Restoring SG Sampling After SI Actuation DIRECT Chemistry to periodically sample all SGs for activity DIRECT Radiation Protection to survey steamlines in Auxiliary Building Area 5 as necessary <p>b. CHECK unisolated secondary radiation monitors:</p> <ul style="list-style-type: none"> SG Sample radiation: <ul style="list-style-type: none"> SJL 026 SG ASD radiation: <ul style="list-style-type: none"> AB RIC-114 (SG D) Turbine Driven Auxiliary Feedwater Pump Exhaust radiation: <ul style="list-style-type: none"> FC RIC-385 <p>c. Secondary radiation – NORMAL</p> <p>d. Levels in all SGs: - NO SG LEVEL RISING IN AN UNCONTROLLED MANNER</p> |
| | | |
| | RO | <p>Step 7 - CHECK If ECCS Flow Should Be Reduced:</p> <p>a. RCS subcooling – GREATER THAN 30°F [50°F]</p> <p>b. Secondary heat sink: Narrow range level in at least one intact SG - GREATER THAN 7% [25%]</p> <p>OR</p> <p>Total feed flow to intact SGs – GREATER THAN 270,000 LBM/HR</p> <p>c. RCS pressure - STABLE OR RISING</p> <p>d. PZR level – GREATER THAN 9% [29%]</p> |
| | | CAUTION - If offsite power is lost after SI reset, manual action may be required to restart safeguards equipment. |
| | | |
| | RO | <p>Step 8 - RESET SI:</p> <ul style="list-style-type: none"> SB HS-42A SB HS-43A |

| | | | |
|----------------------------|---------------------|---------------------------------|-----------------------------|
| Op Test No.: <u>2019-1</u> | Scenario # <u>3</u> | Event # <u>4&5</u> | Page <u>31</u> of <u>33</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
|---------------|------------|---|
| | | |
| E-2 | RO | Step 9 - STOP All But One CCP: <ul style="list-style-type: none"> • BG HIS-1A OR • BG HIS-2A |
| | | |
| | CRS | Step 10 - Go To ES-1.1, SI Termination, Step 3 |
| ES-1.1 | | ES-1.1, SI Termination |
| | | |
| | RO | Step 3 - RESET Containment Isolation Phase A And Phase B: <ul style="list-style-type: none"> • Phase A (CISA): <ul style="list-style-type: none"> • SB HS-53 • SB HS-56 • Phase B (CISB): <ul style="list-style-type: none"> • SB HS-52 • SB HS-55 |
| | | |
| | BOP | Step 4 - ESTABLISH Instrument Air To Containment: <ol style="list-style-type: none"> CHECK if ESW To Air Compressor valves - OPEN <ul style="list-style-type: none"> • EF HIS-43 & EF HIS-44 START Air Compressor(s): <ul style="list-style-type: none"> • KA HIS-3C • KA HIS-2C OPEN Instrument Air Supply Containment Isolation valve: <ul style="list-style-type: none"> • KA HIS-29 |
| | | |
| | BOP | Step 5 - CHECK RCS Pressure - STABLE OR RISING |
| | | |

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|----------------------------|---------------------|---------------------------------|-----------------------------|
| Op Test No.: <u>2019-1</u> | Scenario # <u>3</u> | Event # <u>4&5</u> | Page <u>32</u> of <u>33</u> |
| Event Description: | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | |

| | | |
|---------------|------------|---|
| ES-1.1 | BOP | <p>Step 6 – ISOLATE Boron Injection Header</p> <ol style="list-style-type: none"> CCP – Suction Aligned to RWST RESET CCP Recirc valves: <ul style="list-style-type: none"> ● BG HS-8110 ● BG HS-8111 CHECK CCP Recirc valves – OPEN <ul style="list-style-type: none"> ● BG HIS-8110 ● BG HIS-8111 CLOSE Boron Injection Header Inlet valves: <ul style="list-style-type: none"> ● EM HIS-8803A ● EM HIS-8803B CLOSE Boron Injection Header Outlet valves: <ul style="list-style-type: none"> ● EM HIS-8801A ● EM HIS-8801B |
| | | |
| NOTE | | The scenario can be terminated at the discretion of the Lead Examiner |



| | | |
|--|-----------------------|---------------------|
| Facility: Callaway | Scenario No. 4, Rev 1 | Op-Test No.: 2019-1 |
| Examiners: _____ | | Operators: _____ |
| _____ | | _____ |
| _____ | | _____ |
| Initial Conditions: 48% | | |
| Turnover: 'A' MDAFP is out of service for breaker maintenance. | | |

| Event No. | Malfunction No. | Event Type* | Event Description |
|-----------|---|------------------------------|---|
| 1 | AE / AELT0519 | SRO (I) BOP (I) | SG Level Instrument Fails to 75% OTO-AE-00002, Steam Generator Water Level Control Instrument Malfunctions (Tech Specs 3.3.1 and 3.3.2) |
| 2 | SE / SEN0044 | SRO (R) RO (R) BOP (I) | Power Range Channel N44 fails high. OTO-SE-00001, Nuclear Instrument Malfunction (Tech Spec 3.3.1) |
| 3 | NB / XNB02_4 EF / PEF01B | SRO (C) BOP (C) RO (C) | Loss of ESF transformer XNB02 causing a Loss of NB02/ EDG "B" starts, ESW Pump "B" trips. OTO-NB-00002, Loss of Power to NB02 |
| 4 | MD / MDCB1 MD / MDLC1 MD / MT7 MD / MDMT8 # MD / MDESFB | SRO (C) BOP (C) RO (C) | Loss of offsite power / RX Trip / E-0, Reactor Trip or Safety Injection |
| 5 | NB / NB04RL186 NB / NB01_F | SRO (M) RO (M) BOP (M) | NB01 Bus Lockout / Loss of All AC Power / ECA-0.0 Loss of All AC Power / Restore Power with AEPS with COOP power unavailable |
| 6 | AL / PAL02_3 | SRO (C) BOP (C) | TDAFW fails to Auto Start |

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

Note: Grid voltage swings accomplished by adjusting GRID_VOLTAGE (Grid Voltage Multiplier) under external parameters in browser

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

Scenario #4 Event Description
Callaway 2019-1 NRC ES-D-1, Rev. 1

The Plant is stable at 50% with the 'A' MDAFP out of service.

After the reactivity brief is complete, 'A' SG controlling level channel slowly fails to 75%. The crew will respond using OTO-AE-00002, Steam Generator Water Level Control Instrument Malfunctions, to control SG level. Technical Specification 3.3.1 and 3.3.2 are not met.

After Tech Specs are addressed, Power Range Nuclear Instrument Channel N44 fails high causing an automatic rod insertion. The crew should respond to the rod insertion by placing rods in manual. The crew will enter OTO-SE-00001, Nuclear Instrument Malfunction, to bypass channel N44 and restore control rods to desired position. Technical Specification 3.3.1 is not met.

After Tech Specs are addressed, a fault on ESF Transformer XNB02 occurs, resulting in a loss of power to Bus NB02. "B" EDG starts, but Essential Service Water Pump "B" trips shortly following pump start, forcing the crew to trip the affected Diesel and enter OTO-NB-00002, Loss of Power to NB02.

8 minutes after the ESW Pump "B" trip, offsite power will begin to fluctuate and a Loss of offsite power will occur resulting in a Reactor Trip. 2 minutes after the reactor trip, NB01 lockout occurs due to a bus fault and the crew will transition to ECA-0.0, Loss of All AC Power.

The crew will manually start the TDAFW and restore power to NB02 using EOP Addendum 39, Alternate Emergency Power Supply.

The scenario can be terminated after power has been restored to NB02 using EOP Addendum 39 without Central Electric COOP power available requiring the AEPS DGS to be started.

Scenario #4 Event Description
Callaway 2019-1 NRC ES-D-1, Rev. 1

Critical Tasks:

| | | |
|---|--|---|
| Critical Tasks | Establish greater than 270,000 lbm/hr AFW flow rate to the SGs prior to SG dryout occurring. | Energize NB02 AC Emergency Bus using EOP Addendum 39 with Central Electric COOP unavailable |
| EVENT | 6 | 5 |
| Safety significance | Failure to establish minimum AFW flow in this scenario is a violation of the basic objective of ECA-0.0 and of the assumptions of the analyses upon which ECA-0.0 is based. Without AFW flow, the SGs could not support any significant plant cooldown. Thus, the crew would lose the ability to delay the adverse consequences of core uncover. | In the scenario, failure to energize at least one ac emergency bus results in the needless continuation of a situation in which the pumped ECCS capacity and the emergency power capacity are both in a completely degraded status, as are all other active safeguards requiring electrical power. Although the completely degraded status is not due to the crew's action (was not initiated by operator error), continuation in the completely degraded status is a result of the crew's failure to energize at least one ac emergency bus. |
| Cueing | Indication of ATWS (the reactor is not tripped and that a manual reactor trip is not effective) with no AFW flow indication present | Indication and/or annunciation that all ac emergency buses are de-energized <ul style="list-style-type: none"> • Bus energized lamps extinguished • Circuit Breaker Position • Bus Voltage • EDG status |
| Performance indicator | Manipulation of the: <ul style="list-style-type: none"> • TDAFW Steam Supply valve(s): <ul style="list-style-type: none"> ◦ AB HIS-5A(SG B) ◦ AB HIS-6A(SG C) • TDAFP Mechanical Trip/Throttle valve: <ul style="list-style-type: none"> ◦ FC HIS-312A | Manipulation of controls as required to energize at least one ac emergency bus from the AEPS: <ul style="list-style-type: none"> • Using PBXY0001, Open AEPS FDR BKR TO PA501 VIA Central Electric Reform Feeder Breaker To XFMR <ul style="list-style-type: none"> ◦ PA50101 • Close NB02 AEPS Supply BKR NB0214 <ul style="list-style-type: none"> ◦ NB HIS-68 |
| Performance feedback | Crew will observe the following: <ul style="list-style-type: none"> • Greater than 270,000 lbm/hr AFW flow to the SGs. | Indication that NB02 is energized: <ul style="list-style-type: none"> • NB02 Bus energized light • NB02 bus voltage |
| Justification for the chosen performance limit | Without AFW flow, decay heat would open the SG safety valves and would rapidly deplete the SG inventory, leading to a loss of secondary heat sink, or SG dryout. Decay heat would then increase RCS temperature and pressure until the pressurizer PORVs open, imposing a larger LOCA than RCP seal leakage. | Failure to perform the critical task prior to the completion of EOP Addendum 39 results in needless degradation of RCS barrier (and to fission product release, specifically of the RCS barrier at the point of the RCP seals. Failure to perform the critical task means that RCS inventory lost through the RCP seals cannot be replaced. It also means that the RCP seals remain without cooling and gradually deteriorate. As the seals deteriorate the rate of RCS inventory loss increases. |
| PWR Owners Group Appendix | CT - 23, Establish AFW flow during SBO | CT - 24, Energize at least one ac emergency bus |

Scenario #4 Event Description
Callaway 2019-1 NRC ES-D-1, Rev. 1

| References |
|---|
| OTO-AE-00002, Steam Generator Water Level Control Instrument Malfunctions |
| OTO-SE-00001, Nuclear Instrument Malfunction |
| OTO-NB-00002, Loss of Power to NB02. |
| EOP Addendum 39, Alternate Emergency Power Supply |
| E-0, Reactor Trip or Safety Injection |
| ECA-0.0, Loss of All AC Power |
| Technical Specification 3.3.1, Reactor Trip System Instrumentation |
| Technical Specification 3.3.2, EFSAS Instrumentation |
| ODP-ZZ-00025, EOP/OTO User's Guide |

PRA Systems, Events or Operator Actions

1. SBO (Loss of All AC) is a 19% contribution to CDF

PRA Systems, Events or Operator Actions

2. Alternate Electric Power Supply (PA) is #6 of the Top #10 Callaway Risk Important Systems

Scenario Simulator Lesson Plan
Callaway 2019-1 NRC Scenario #4, Rev. 1

Scenario Setup Guide:

Establish the initial conditions of IC#4

- Load 18-05
- Reactor Power is ~48% at BOL being maintained constant per load dispatcher.
- Ensure Control Rods are in Auto.
- Ensure AE LT 551 is selected for control for "A" SG
- Place "A" MDAFP in PTL and hang a WIP tag on hand switch.
- Run the following 18-05 SIFTs
 - 20180059
 - 20180049
 - 20180060

=====SCENARIO PRELOADS / SETUP ITEMS=====

Setup: Rack out NB0105, Fail auto-start of TDAFWP

- Expert Command: insert AL01NB0105TA_BKPOS 3 delay=0 ramp=0 on=0 off=0
- Expert Command: insert PAL02_3 1 delay=0 ramp=0 on=0 off=0

Note: See diagram of scenario manager file attached at the end of this file as necessary

=====EVENT 1 =====

AELT0551 slow fail to 75

- SG A CHANNEL 1 (RED) NARROW RANGE LEV XMTR Failure Value = 65.6875 ramp=60

=====EVENT 2 =====

PR NI-44 fails high

- SEN0044 Value = 200 ramp=60

=====EVENT 3 =====

XNB02 Lockout, B ESW pump trip 10 sec after start

- Expert Command: insert XNB02_4 1 delay=0 ramp=0 on=0 off=0
- Expert Command: insert PEF01B 1 cd='hwx19o241r eq 1' delay=10 ramp=0 on=0 off=0

Scenario Simulator Lesson Plan
Callaway 2019-1 NRC Scenario #4, Rev. 1

=====EVENT 4 =====

Switchyard Voltage fluctuations followed by a Loss of Switchyard and Rx Trip (480 seconds after "B" ESW pump trips)

Grid Voltage fluctuations:

- Expert Command: insert GRID_VOLTAGE 0.9 delay=0 ramp=10 on=0 off=0
- Expert Command: insert GRID_VOLTAGE 1.04347 delay=10 ramp=10 on=0 off=0
- Expert Command: insert GRID_VOLTAGE 1.16 delay=20 ramp=10 on=0 off=0
- Expert Command: insert GRID_VOLTAGE 1.04347 delay=30 ramp=10 on=0 off=0
- Expert Command: insert GRID_VOLTAGE 0.86 delay=40 ramp=10 on=0 off=0
- Expert Command: insert GRID_VOLTAGE 1.04347 delay=50 ramp=10 on=0 off=0
- Expert Command: insert GRID_VOLTAGE 1.3 delay=60 ramp=10 on=0 off=0
- Expert Command: insert GRID_VOLTAGE 1.04347 delay=70 ramp=10 on=0 off=0

Loss of Switchyard (80 seconds after Grid Volts is complete)

- Expert Command: insert MDCB1 1 delay=2 ramp=0 on=0 off=0
- Expert Command: insert MDLC1 1 delay=3 ramp=0 on=0 off=0
- Expert Command: insert MDMT7 1 delay=4 ramp=0 on=0 off=0
- Expert Command: insert MDMT8 1 delay=5 ramp=0 on=0 off=0
- Expert Command: insert MDESFB 1 delay=0 ramp=0 on=0 off=0

=====EVENT 5 =====

NB01 Lockout (120 seconds after RX Trip)

- Expert Command: insert NB01_F 1 delay=0 ramp=0 on=0 off=0
- Expert Command: insert NB04RL186_FTVSP 1 delay=0 ramp=0 on=0 off=0

=====EVENT 6=====

Preloaded - Fail auto-start of TDAFWP

Event Description:

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

Booth Operator:

- IMF AELT0551 Value = 65.6875 ramp=60

Indications Available:

Annunciator 108C, SG Generator A Level Deviation

OTO-AE-00002, Steam Generator Water Level Control Malfunctions

| | | |
|--|------------|--|
| | CRS | Implement OTO-AE-00002 |
| | | |
| | BOP | Step 1 - CHECK SG Water Level Control Instruments - NORMAL <ul style="list-style-type: none"> SG A: AE LI-519 / AE LI-551 Go to RNO |
| | | |
| | BOP | Step 1 RNO - Take MANUAL Control of Affected SG MFRV or MFRV Bypass and MAINTAIN SG Level: <ul style="list-style-type: none"> SG A: AE FK-510, SG A MFW REG VLV CTRL Manual pushbutton depressed on AE FK-510 and light becomes LIT |
| | | |
| | BOP | Step 2 - For The Failed Instrument, SELECT An Operable Channel: <ul style="list-style-type: none"> SG A: AE LS-519C / AE FS-510C / AB FS-512C AND <ul style="list-style-type: none"> On DFWCS, SELECT appropriate Level, FW Flow or Steam Flow on AE SS-500 AE LI 519 selected on AND on DFWCS FW flow selected |
| | | |
| | BOP | Step 3 - RESTORE Affected SG NR Level to between 45% and 55% <p>Raise pushbutton depressed on AEFK-510 until Feedwater flow higher than steam flow on "A" SG. Level restored between 45% to 55% before proceeding on to step #4.</p> |
| | | |

Event Description:

| Proc /Time | Position | Applicant's Actions or Behavior |
|------------|----------|---------------------------------|
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| | | |
|-------------|-----------------|--|
| | BOP | Step 4 - RETURN Affected SG MFRV or MFRV Bypass to AUTO Control: <ul style="list-style-type: none"> SG A: AE FK-510 Auto button depressed |
| | | |
| | RO / BOP | Step 5 - REVIEW Attachment A, Effects Of Instrument Failure. |
| | | |
| | CRS | Step 6 - REVIEW Applicable Technical Specifications |
| | | <p><i>The CRS should declare Tech Spec 3.3.1 and 3.3.2 not met.</i></p> <p><i>Specifically, 3.3.1 Condition A and per the Table Function 14a&b which requires 3.3.1 Condition E 72 hrs to place the channel in trip OR be in MODE 3 in 78 hrs.</i></p> <p><i>3.3.1 Condition S&T are required to verify interlocks is in required state for existing unit conditions within 1 hour or be in Mode 3/2 (respectively) within 7 hours.</i></p> <p><i>3.3.2 Condition A and per the Table Function 5c & e plus 6d. Function 5e and 6d require 3.3.2 Condition D 72 hrs to place the channel in trip OR be in MODE 3 in 78 hrs AND MODE 4 in 84 hours. 3.3.2 Condition I is required from 3.3.2 function 5c which requires 72 hrs to place the channel in trip OR be in MODE 3 in 78 hrs.</i></p> |
| | | |
| NOTE | | At Lead Examiner's discretion move to the next Event |

Event Description:

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

Booth Operator:

- IMF SEN0044 Value = 200 ramp=60

Indications Available

Annunciators:

- 77A, Reactivity Deviation
- 78A, Power Range Channel Deviation
- 82A, Power Range Over Power Rod Stop
- 83C, Reactor Partial Trip

OTO-SE-00001, Nuclear Instrument Malfunction

| | | |
|--|------------|---|
| | | |
| | CRS | Implement OTO-SE-00001 |
| | | |
| | RO | Step 1 - CHECK Power Range Nuclear Instruments – NORMAL Go To RNO |
| | | |
| | RO | Step 1 RNOa - ENSURE Rod Control in MANUAL: SE HS-9 SE HS -9 placed in Manual |
| | | |
| | RO | Step 1 RNO b - IF any MFW Reg Valve Bypass Valves are being used to feed a Steam Generator, THEN PERFORM the following: 1) PLACE the affected valve in MANUAL: AE LK-550 (SG A) AE LK-560 (SG B) AE LK-570 (SG C) AE LK-580 (SG D) 2) CONTROL Steam Generator NR Level between 45% and 55%. This step is N/A |
| | | |
| | RO | Step 1 RNO c - Go To Attachment A, Power Range Instrument Malfunction. Proceed to Attachment A |
| | | |

Event Description:

| Proc /Time | Position | Applicant's Actions or Behavior |
|------------|----------|---------------------------------|
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| | | |
|--|-----------------|--|
| | RO | Step A1 - STOP Any Main Turbine Load Changes No load changes were in progress |
| | | |
| | RO | Step A2 - MAINTAIN RCS Tavg Within 1.5°F Of Tref Using Manual Control Rods |
| | | |
| | RO / BOP | Step A2 RNO - RESTORE RCS Tavg to within 1.0°F of Tref using any of the following: <ul style="list-style-type: none"> • ADJUST Turbine load • ADJUST RCS Boron concentration BOP began a Turbine load reduction while RO monitors Tavg vs Tref |
| | | |
| | RO | Step A3 - CHECK The Following Permissives Are In The Correct State Within One Hour Of The Power Range Channel Failure Per Attachment H, Permissives: P-7, P-8, P-9, P-10 Proper status and time recorded |
| | NOTE | At this power level, P7 & P10 should be LIT and P8 & P9 are NOT LIT |
| | | |
| | RO | Step A4 - SELECT An Operable Channel On NIS Recorder: SE NR-45 PR SENI43, or 42, or 41 selected |
| | | |

Event Description:

| Proc /Time | Position | Applicant's Actions or Behavior |
|------------|------------|---|
| | BOP | <p>Step A5a - BYPASS The Malfunctioning Power Range Channel By Selecting The Affected Channel On The Following Switches:</p> <p>a. On the Detector Current Comparator drawer:</p> <ul style="list-style-type: none"> • PLACE Upper Section switch to the failed channel. • PLACE Lower Section switch to the failed channel. • PLACE Rod Stop Bypass switch to the failed channel. • PLACE Power Mismatch Bypass switch to the failed channel. <p>On the NI Backpanel control board, these above switches selected to SE NI 44.</p> |
| | BOP | <p>Step A5b - On the Comparator and Rate Drawer, PLACE Comparator Channel Defeat switch to the failed channel.</p> <p>Comparator Channel Defeat switch placed to SE NI 44.</p> |
| | RO | <p>Step A5c - ENSURE the following Annunciators are extinguished:</p> <ul style="list-style-type: none"> • Annunciator 78A, PR Channel Dev • Annunciator 78B, PR Upper Detector Flux Dev • Annunciator 78C, PR Lower Detector Flux Dev • Annunciator 82A, PR Over Pwr Rod Stop <p>Annunciators verified as NOT LIT</p> |

Event Description:

| Proc /Time | Position | Applicant's Actions or Behavior |
|------------|-----------------|---|
| | RO / BOP | <p>Step A5d - DELETE applicable computer points from processing for the Bypassed Channel in order to maintain the AFD Monitor OPERABLE:</p> <ol style="list-style-type: none"> 1) At a PPC terminal with a security level 0-3, TYPE "DFP" (Delete From Processing) -Select OK. 2) ENSURE the "Delete From Processing" dialog box is displayed. 3) ENTER each computer Point ID for the bypassed channel separately in the "Point ID" field: <ul style="list-style-type: none"> • N44 - REN0052A, REN0047A, REN0048A 4) ENTER your initials in the "Modified by" field. 5) ENTER "OTO-SE-00001" in the "Reason" field. 6) CLICK the "Execute" button. 7) CLICK the CANCEL button to close the "Delete From Processing" dialog box. 8) At the PPC terminal, TYPE "SHOW <point id>" and verify the value displayed is "DEL". <p>SE NI 44 removed from PPC scanning</p> |
| | RO | <p>Step A6 - CHECK Control Rod Insertion From Instrument Failure</p> <p>Yes – proceeded to step A7</p> |
| | RO / CRS | <p>Step A7 - RESTORE Control Rods As Determined By CRS</p> <p>RO restored rods such that Tavg matches Tref</p> |
| | RO | <p>Step A8 - CHECK Tavg To Tref Within 0.3°F.</p> |
| | RO | <p>Step A9 - RESTORE Rod Control To AUTO: SE HS-9</p> <p>SE HS 9 placed in Manual</p> |
| | CRS | <p>Review Applicable Tech Specs</p> |

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Event Description:

| Proc /Time | Position | Applicant's Actions or Behavior |
|------------|----------|---------------------------------|
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| | | |
|-------------|--|---|
| | | <i>The CRS should declare Tech Spec 3.3.1 Condition A and per the Table Function 2a & 3 & 6 which requires 3.3.1 Condition D and E: Condition D1.1. is N/A due to power level D.1.2 72 hrs to place the channel in trip OR D.2 be in MODE 3 in 78 hrs. Condition E requires 72 hrs to place the channel in trip OR be in MODE 3 in 78 hrs.</i> |
| | | |
| NOTE | | At Lead Examiner's discretion move to the next Event |

Event Description:

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

Booth Operator:

- Insert the following:
 - Expert Command: insert XNB02_4 1 delay=0 ramp=0 on=0 off=0
 - Expert Command: insert PEF01B 1 cd='hwx19o241r eq 1' delay=10 ramp=0 on=0 off=0

Indications Available

Annunciation 22A, XNB02 Transformer Lockout

OTO-NB-00002, Loss of Power to NB02

| | | |
|-----------------------|-------------|---|
| | | |
| | BOP | Step 1 – CHECK 4160 VAC Bus NB02 - DEENERGIZED 4.16 KV Bus NB02 light - EXTINGUISHED <ul style="list-style-type: none"> • NB ZL-6 4.16 KV Bus NB02 Voltage indicates zero <ul style="list-style-type: none"> • NB EI-2 Both are LIT and proceeds to RNO |
| | BOP | Step 1 RNO - Go To Attachment A, Power Restored to NB02. |
| | BOP | Step A1 - CHECK 4160 VAC Bus NB02 – ENERGIZED 4.16 KV Bus NB02 light - LIT <ul style="list-style-type: none"> • NB ZL-6 4.16 KV Bus NB02 Voltage indicates approximately 4160 volts: <ul style="list-style-type: none"> • NB EI-2 |
| | NOTE | When the ESW pump trips and the crew must secure the B EDG, Continuous Action Step #A1 will direct the crew back to Step#1 of the procedure. |
| Booth Operator | | When dispatched as an OT, wait 3 minutes and report that the "B" ESW pump is hot to the touch. |
| | BOP | Step A2 - CHECK EDG B - RUNNING |
| | | |

Event Description:

| Proc /Time | Position | Applicant's Actions or Behavior |
|-------------|------------|---|
| | BOP | <p>Step A3 – CHECK ESW Flow - ALIGNED TO EDG B</p> <p>ESW Pump B – RUNNING</p> <ul style="list-style-type: none"> • EF HIS-56A <p>ESW Train B to UHS - OPEN</p> <ul style="list-style-type: none"> • EF HIS-38 <p>Proceed to RNO</p> |
| | BOP | <p>Step A3 RNO - PERFORM the following:</p> <ol style="list-style-type: none"> ATTEMPT to align ESW flow to EDG B. IF ESW flow can not be established to EDG B AND control of the EDG is from the Control Room, THEN PRESS DG NE02 Stop switch to stop EDG B: <ul style="list-style-type: none"> ○ KJ HS-108A IF ESW flow can not be established to EDG B AND control of the EDG is local, THEN PERFORM the following: <ol style="list-style-type: none"> PLACE NE02 Local Master Transfer Switch to LOCAL/MAN position: <ul style="list-style-type: none"> ○ KJ HS-109 PRESS DG train B local STOP push-button to stop the EDG: <ul style="list-style-type: none"> ○ KJ HS-108B <p>"B" EDG secured from the control room - KJ HS-108A STOP pushbutton depressed. Per CAS step #A1, returned to Step #1</p> |
| | BOP | <p>Step 1 – CHECK 4160 VAC Bus NB02 - DEENERGIZED</p> <p>4.16 KV Bus NB02 light - EXTINGUISHED</p> <ul style="list-style-type: none"> • NB ZL-6 <p>4.16 KV Bus NB02 Voltage indicates zero</p> <ul style="list-style-type: none"> • NB EI-2 <p>Both are EXTINGUISHED and proceed to step 2</p> |
| | BOP | <p>Step 2 - CHECK Turbine Driven Auxiliary Feedwater Pump - SECURED.</p> |
| NOTE | | Due to the preloaded failure, the TDAFP failed to start |

Event Description:

| Proc /Time | Position | Applicant's Actions or Behavior |
|------------|------------|--|
| | BOP | <p>Step 3 – CHECK Reactor Power – LESS THAN 100%</p> <ul style="list-style-type: none"> • SE NI-41B • SE NI-42B • SE NI-43B • SE NI-44B • BB TI-411A (ΔT) • BB TI-421A (ΔT) • BB TI-431A (ΔT) • BB TI-441A (ΔT) <p>Power is less than 100% and proceed to step 4</p> |
| | BOP | <p>Step 4 – CHECK CCW Pump A Or C - RUNNING</p> <ul style="list-style-type: none"> • EG HIS-21 • EG HIS-23 |
| | BOP | <p>Step 5 – CHECK CCW Service Loop Is Being Supplied From Train A:</p> <ul style="list-style-type: none"> • EG ZL-53 - OPEN • EG ZL-15 – OPEN <p>Valves are NOT open (RED LIGHT OFF) and proceed to RNO</p> |
| | BOP | <p>Step 5 RNO a. – PERFORM The Following: CLOSE both CCW Surge Tank Vent Control valves:</p> <ul style="list-style-type: none"> • EG HIS-9 • EG HIS-10 |
| | BOP | <p>Step 5 RNO b&c - OPEN the following: CCW Train A Supply/Return valves:</p> <ul style="list-style-type: none"> • EG HS-15 <p>ESW Train A to CCW Hx A:</p> <ul style="list-style-type: none"> • EF HIS-51 |

Event Description:

| Proc /Time | Position | Applicant's Actions or Behavior |
|-----------------------|------------|---|
| | BOP | Step 5 RNO d - DISPATCH an operator to locally close the following valves: <ul style="list-style-type: none"> EGHV0016, CCW Train B Supply/Return Isolation (AB2026, RM1402) EGHV0054, CCW Train B Supply Isolation (AB2026, RM1401) |
| Booth Operator | | Role Play as Primary OT and wait 2 minutes then report the valves are closed after directed to close EGHV0016 and EGHV0054. |
| | BOP | Step 5 RNO e- WHEN EGHV0016 and EGHV0054 are closed, THEN OPEN both CCW Surge Tank Vent Control Valves: <ul style="list-style-type: none"> EG HIS-9 EG HIS-10 |
| | RO | Step 6 - CHECK If CCW aligned to the RCPs |
| | RO | Step 7 - CHECK NCP Or CCP A – RUNNING <ul style="list-style-type: none"> BG HIS-3 (NCP) OR <ul style="list-style-type: none"> BG HIS-1A (CCP A) |
| | RO | Step 8 - CHECK RCP Seal Injection Flow - BETWEEN 8 GPM AND 13 GPM PER PUMP |
| | BOP | Step 9 - CHECK RHR - IN SERVICE PRIOR TO EVENT NO - RNO Go To Step 12 |
| | BOP | Step 12 - CHECK Steam Generator NR Level Within One Of The Following: <ul style="list-style-type: none"> Trending to between 45% and 55% OR <ul style="list-style-type: none"> Between 45% and 55% RNO – Throttle or Secure the "B" MDAFP to SG A&D and verify MFP in service feeding all SGs |

Event Description:

| Proc /Time | Position | Applicant's Actions or Behavior |
|------------|------------|--|
| | | |
| | RO | Step 13 - CHECK Pressurizer Level Within One Of The Following: <ul style="list-style-type: none"> • Trending to Program Level OR <ul style="list-style-type: none"> • At Program Level |
| | | |
| | BOP | Step 14 - CHECK Pressurizer Pressure Within One Of The Following: <ul style="list-style-type: none"> • Trending to between 2220 psig and 2250 psig OR <ul style="list-style-type: none"> • Between 2220 psig and 2250 psig |
| | | |
| | BOP | Step 15 - ENSURE the following 4160 VAC bus NB02 loads shed: (LSELS actuation, handswitch light green): <ul style="list-style-type: none"> • ESW Pump B - EF HIS-56A • CCW Pump B/D - EG HIS-22 & EG HIS-24 • SI Pump B - EM HIS-5 • Ctmt Spray Pump B: - EN HIS-9 • RHR Pump B: - EJ HIS-2 |
| | | |
| | BOP | Step 16 - OPEN NB02 Normal And Alternate Feeder Breakers: <ul style="list-style-type: none"> • NB HIS-4, NB02 Normal Supply Breaker NB0209 • NB HIS-5, NB02 Alternate Supply Breaker NB0212 |
| | | |
| | BOP | Step 17 - CHECK EDG B – RUNNING NO but don't perform the RNO as the EDG was secured per procedure earlier |
| | | |
| | BOP | Step 18 - CHECK NB02 Emergency Supply Breaker – CLOSED NO but don't perform the RNO as the EDG was secured per procedure earlier |
| | | |
| | BOP | Step 19 - CHECK 4160 VAC Bus NB02 - ENERGIZED NO Perform the RNO |

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

| | | |
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| | BOP | Step 19 RNO - Perform the following: Place 'B' CCW Train Pump handswitches in Pull-To-Lock until power is restored to NB02: <ul style="list-style-type: none"> EG HIS-22 EG HIS-24 |
| | | |
| | BOP | Step 20 - CHECK Any Service Air Compressor – RUNNING NO – proceed to RNO and START Service Air Compressor A or C. |
| | | |
| | BOP | Step 20 - CHECK Panel PN08 Transferred To Emergency Source (PG20GER5) <ul style="list-style-type: none"> Annunciator 14F, PN07/09 PN08/10 Xfr - LIT |
| | | |
| | BOP | Step 21 - CHECK SFP Cooling Pump A – RUNNING <ul style="list-style-type: none"> EC HIS-27 |
| | | |
| NOTE | | At Lead Examiner's discretion move to the next Event |

| | | | | | | | | | |
|--------------------|----------|---------------------------------|---|---------|-------|------|----|----|----|
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| Event Description: | | | | | | | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | | | | | | | |

| | | |
|--|------------|---|
| Booth Operator: | | |
| <ul style="list-style-type: none"> IMF for switchyard voltage swings followed a 80 second delay and a then loss of the switchyard | | |
| Indications Available | | |
| Annunciator 134D, Switchyard Voltage High Low | | |
| E-0, Reactor Trip or Safety Injection | | |
| | | <i>NOTE: Steps 1 through 4 are immediate action steps.</i> |
| E-0 | RO | Step 1 - CHECK Reactor Trip: <ul style="list-style-type: none"> Rod Bottom Lights - ALL LIT Reactor Trip and Bypass Breakers - OPEN Neutron Flux - LOWERING |
| | | |
| | BOP | Step 2 - CHECK Turbine Trip: <ul style="list-style-type: none"> All Turbine Stop valves - CLOSED |
| | | |
| | BOP | Step 3 - CHECK Power to AC Emergency Buses: <ol style="list-style-type: none"> AC emergency buses – AT LEAST ONE ENERGIZED - YES AC emergency buses – BOTH ENERGIZED - NO |
| | | |
| E-0 | RO | Step 4 - Check SI Status: <ol style="list-style-type: none"> Check if SI is actuated <ul style="list-style-type: none"> Ann 88A thru 88D Lit – OR- SB069 SI Actuate Red light is lit – OR- LOCA Sequencers alarms 30A & 31A CHECK both Trains of SI-Actuated <ul style="list-style-type: none"> ANN 30A lit ANN 31A lit SB069 SI Actuate Red light lit SOLID Go To RNO and transition to ES-0.1 |
| ES-0.1 | | ES-0.1 Reactor Trip Response |
| ES-0.1 | BOP | FOLDOUT PAGE ACTION #3 - RCS TEMPERATURE CONTROL CRITERIA: IF a Loss of Offsite Power has occurred, THEN CLOSE MSIVs. |
| | | |

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

| | | |
|---------|----|--|
| | RO | Step 1a - CHECK RCS Temperature Control: CHECK RCPs - ANY RUNNING |
| | | |
| | RO | Step 1 RNO a- TRANSFER Condenser Steam Dump to Steam Pressure Mode: 1) Check Condenser - AVAILABLE <ul style="list-style-type: none"> C-9 interlocks LIT MSIVs - ANY OPEN 2) PLACE Steam Header Pressure Controller in MANUAL and ZERO OUTPUT: <ul style="list-style-type: none"> AB PK-507 3) PLACE Steam Dump Select switch in STM PRESS position: <ul style="list-style-type: none"> AB US-500Z 4) PLACE Steam Header Pressure Controller in AUTO: <ul style="list-style-type: none"> AB PK-507 |
| | | |
| | RO | Step 1b - CHECK RCS temperature response – NORMAL <ul style="list-style-type: none"> RCS AVERAGE TEMPERATURE STABLE AT OR TRENDING TO 557°F IF ANY RCP RUNNING OR <ul style="list-style-type: none"> RCS COLD LEG TEMPERATURES STABLE AT OR TRENDING TO 557°F IF NO RCP RUNNING |
| | | |
| | | Step 2a - CHECK Status Of AC Buses: CHECK Generator Output Breakers – OPEN <ul style="list-style-type: none"> MA ZL-3A (V55) MA ZL-4A (V53) |
| | | |
| | | Step 2b - CHECK All AC Buses - ENERGIZED BY OFFSITE POWER <ul style="list-style-type: none"> PA01 PA02 NB01 NB02 |
| NOTE | | At some time during the performance of ES-0.1, NB01 bus will lockout and the crew will transition to ECA-0.0, Loss of ALL AC Power. |
| | | |
| ECA-0.0 | | ECA-0.0, Loss of All AC Power |
| | | NOTES: |

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

| | | |
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| | | <ul style="list-style-type: none"> Steps 1 and 2 are immediate action steps. CSF status trees should be monitored for information only. Functional Restoration Procedures should NOT be implemented. |
| | | |
| | RO | Step 1 - CHECK Reactor Trip: <ul style="list-style-type: none"> Reactor Trip and Bypass Breakers - OPEN Neutron Flux - LOWERING |
| | | |
| | BOP | Step 2a - All Turbine Stop valves - CLOSED |
| | | |
| | RO | Step 3 - CHECK If RCS Is Isolated: Letdown isolation valves - CLOSED a. CLOSE valve(s) as necessary. 1) Letdown Throttle Isolation valves: <ul style="list-style-type: none"> BG HIS-8149AA BG HIS-8149BA BG HIS-8149CA 2) RCS Letdown to Regen HX valves: <ul style="list-style-type: none"> BG HIS-459 BG HIS-460 b. PZR PORVs - CLOSED <ul style="list-style-type: none"> BB HIS-455A BB HIS-456A c. RCS To Excess Letdown HX valves - CLOSED <ul style="list-style-type: none"> BG HIS-8153A BG HIS-8154A BG HIS-8153B BG HIS-8154B d. Reactor Head Vent Valves - CLOSED <ul style="list-style-type: none"> BB HIS-8001A BB HIS-8002A BB HIS-8001B BB HIS-8002B |
| ECA-0.0 | | |
| | BOP | Step 4 - CHECK AFW Flow - GREATER THAN 270,000 LBM/HR |

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

| | | |
|----------------------|------------|--|
| | | a. IF Aux Feedwater suction header pressure lowers to 11.5 PSIG, THEN CHECK HCST has aligned by performing EOP Addendum 42, HCST Alignment. |
| NOTE | | The TDAFP failed to start earlier in the scenario but is available and can be started at this point per the RNO. |
| | | |
| CRITICAL TASK | | <p>Establish greater than 270,000 lbm/hr AFW flow rate to the SGs prior to SG dryout occurring.</p> <p>Note: This can be done with any combination of TDAFP, NSAFP per EOP 38, or the "B" MDAFP after power is restored to NB02.</p> |
| | BOP | <p>Step 4 RNO - PERFORM the following:</p> <p>1. CHECK TDAFW Pump running.</p> <p>IF TDAFW Pump is NOT running, THEN START TDAFW Pump:</p> <p>a) OPEN AFP Turbine Loop Steam Supply valve(s):</p> <ul style="list-style-type: none"> AB HIS-5A (SG B) AB HIS-6A (SG C) <p>b) OPEN TDAFW Pump Mechanical Trip/Throttle valve:</p> <ul style="list-style-type: none"> FC HIS-312A <p>2. ENSURE TDAFW Pump Valves in proper emergency alignment:</p> <p>a) TDAFW Pump Flow Control Valves are OPEN or THROTTLED:</p> <ul style="list-style-type: none"> AL HK-8A for S/G A AL HK-10A for S/G B AL HK-12A for S/G C AL HK-6A for S/G D <p>b) ESFAS status panel SA066X AFAS section WHITE valve light is LIT:</p> <ul style="list-style-type: none"> AP-V015 (15C) |
| | | |
| ECA-0.0 | RO | <p>Step 5 - TRY To Restore Power To Any AC Emergency Bus:</p> <p>a. ENERGIZE AC emergency bus with diesel generator:</p> <p>1) CHECK both DGs - RUNNING</p> <ul style="list-style-type: none"> KJ HS-8A KJ HS-108A <p>2) CHECK AC emergency buses - AT LEAST ONE ENERGIZED</p> <ul style="list-style-type: none"> NB01 OR NB02 <p>b. CHECK AC emergency buses - AT LEAST ONE ENERGIZED</p> |

| | | | | | | | | | |
|--------------------|----------|---------------------------------|---|---------|-------|------|----|----|----|
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| Event Description: | | | | | | | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | | | | | | | |

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| | | <ul style="list-style-type: none"> NB01 OR NB02 <p>NO Go to RNO.</p> <p>NOTE: As Neither Bus can be powered from their respective EDGs, Step 5b will be performed which will require using the RNO</p> |
| | | |
| Booth Operator | | Role Play as secondary OT when directed to secure "A" EDG. Wait 3 minutes and locally place Master Transfer Switch KJ-HS-9 in LOC/MAN and (Remote Function KJHS0009) and trip the EDG (Remote Function KJHS0008) |
| | | |
| | RO | <p>Step 5 RNO b. - IF at least one AC emergency bus can NOT be readily energized from the Control Room, THEN PERFORM the following:</p> <p>1) IF offsite power source is NOT available, THEN RESTORE power to one NB Bus using EOP Addendum 39, Alternate Emergency Power Supply.</p> <p>2) OPEN Control Room cabinet doors using EOP Addendum 20, Control Room Cabinet Door List.</p> <p>3) COORDINATE with an Operations Tech to locally shed non-essential DC and AC loads using Attachment B, DC and AC Load Shedding.</p> <p>4) ADJUST SG ASDs controller setpoint to 1000 psig.</p> <p>5) Go To Step 6. OBSERVE CAUTIONS prior to Step 6.</p> |
| ECA-0.0 | | |
| Booth Operator | | Role Play as Field Supervisor and confirm an extra RO will perform EOP ADD 20, Control Room Doors. |
| | | |
| EOP ADD 39, AEPS | RO | <p>NOTES</p> <p>Figure 1, Alternate Emergency Power Supply One Line Diagram, is available for reference.</p> <p>Attachment F, AEPS Diesel Generator Alarms and Trips, is available for reference.</p> |

| | | | | | | | | | |
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| Event Description: | | | | | | | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | | | | | | | |

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| | | |
| | RO | <p>Step 1 - EVALUATE Plant Status To Determine Which AC Emergency Bus To Energize:</p> <p>Based on NB01 Lockout, NB02 should be selected</p> |
| | | |
| Booth Operator | | If asked to investigate NB01 Bus Lockout, wait 3 minutes and report Lockout on NB0112, Normal Feeder Breaker due to overcurrent. |
| | | |
| | RO | <p>Step 2 - IF ALIGNING Power To "A" TRAIN, THEN PLACE The Following Equipment Switches In PULL-TO-LOCK Position:</p> <p>Go To RNO which directs going to Step 5</p> |
| | RO | <p>Step 5 - IF ALIGNING Power To "B" TRAIN, THEN PLACE The Following Equipment Switches In PULL-TO-LOCK Position:</p> <ul style="list-style-type: none"> • CCP: BG HIS-2A • SI Pump: EM HIS-5 • RHR Pump: EJ HIS-2 • Containment Spray Pump: EN HIS-9 • CCW Pumps: EG HIS-22 & EG HIS-24 • Containment Cooler Fans: GN HIS-9 GN HIS-17 • Motor Driven AFW Pump: AL HIS-22A • Control Room AC Unit: GK HIS-40 • Class 1E Electrical Equipment Room AC Unit: GK HIS-103 |
| | | |
| EOP ADD 39 | RO | <p>Step 6 - ALIGN Train "B" AC Emergency Bus NB02 For Alternate Emergency Power Supply:</p> <p>a. PLACE NB02 Emergency Supply Breaker NB0211 in PULL-TO-LOCK</p> <ul style="list-style-type: none"> • NE HIS-26 <p>b. PLACE NB02 Alternate Supply Breaker NB0212 in PULL-TO-LOCK</p> <ul style="list-style-type: none"> • NB HIS-5 <p>c. PLACE NB02 Normal Supply Breaker NB0209 in PULL-TO-LOCK</p> <ul style="list-style-type: none"> • NB HIS-4 <p>d. PLACE NB02 AEPS Supply Breaker NB0214 in PULL-TO-LOCK</p> |

| | | | | | | | | | |
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| Proc /Time | Position | Applicant's Actions or Behavior | | | | | | | |

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| | | <ul style="list-style-type: none"> NB HIS-68 |
| | | |
| | RO | Step 7 - PERFORM Attachment B, Energizing NB02 From Alternate Emergency Power Supply (AEPS) |
| | | |
| EOP ADD 39, ATT B | RO | <p>CAUTION - Starting an ESW pump with less than three AEPS DGs OR less than 6 MW power from Central Electric Power Reform Substation may trip supply breakers.</p> <p>NOTES - Each AEPS DG is rated for continuous 2000 KW. The limiting component for power is breaker PA50101. The overcurrent device will trip PA50101 at 660 Amps (Approximately 15 MW).</p> |
| | | |
| | RO | <p>Step B1 - CHECK PB05 – ENERGIZED</p> <p>a. CHECK PB05 Energized by Central Electric Power Reform Substation</p> <p>b. NOTIFY Central Electric Power Transmission System Operator (TSO) of Callaway's required approximately 6 MW for emergency power from the Reform Substation.</p> |
| | | |
| Booth Operator | | Role Play as CE Power TSO, and state "NO Power is available to Callaway based on Grid overloading and surging demand" |
| | | |
| | RO | <p>Step B1.b RNO - IF Central Electric Power cannot provide a minimum of 6 MW Go To Attachment C, Placing Alternate Emergency Power Supply DGs on PA501 Bus, Step C1</p> <p>Proceeds to Attachment C and Step C1</p> |
| | | |

Event Description:

| Proc /Time | Position | Applicant's Actions or Behavior |
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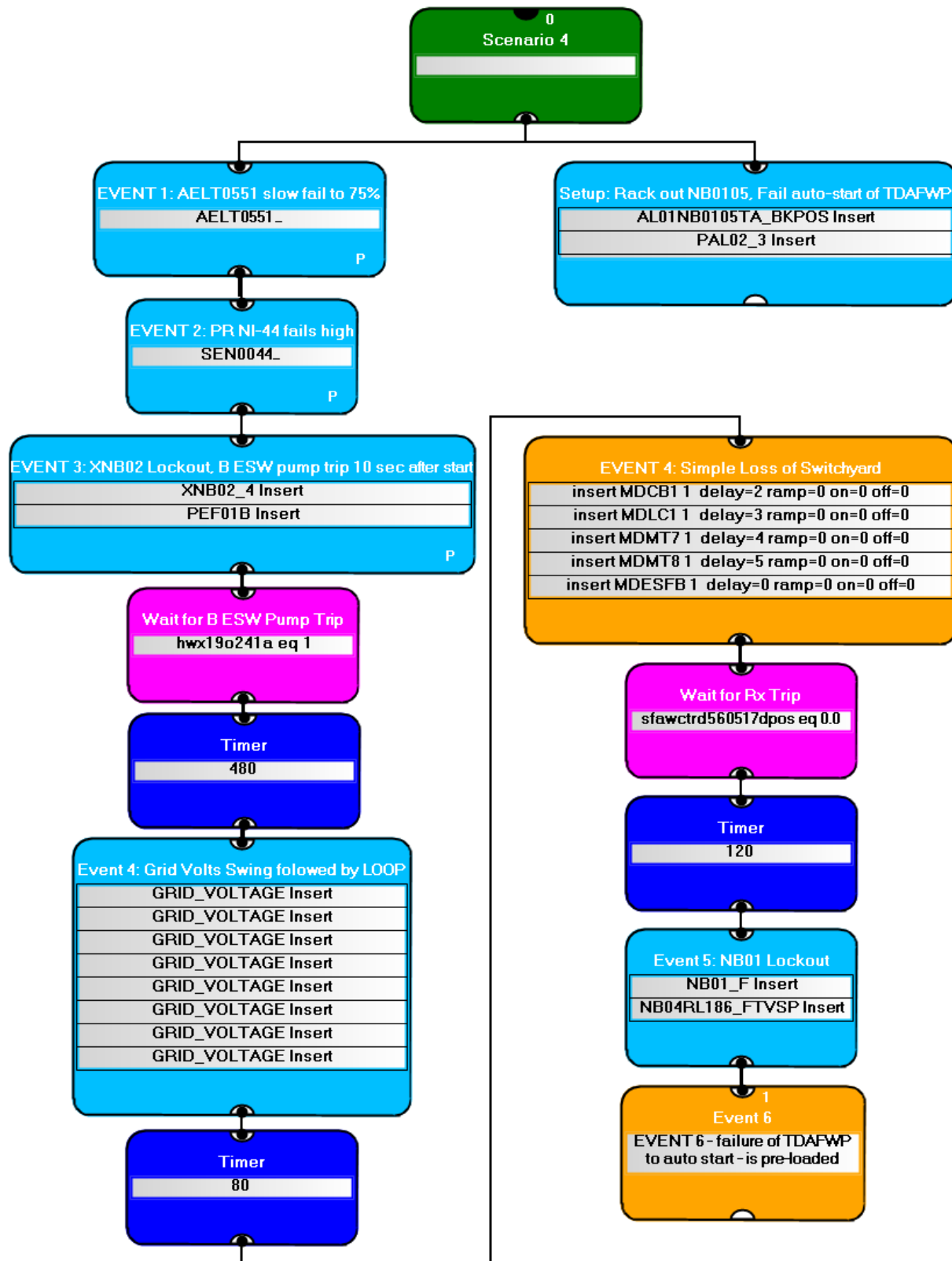
| | | |
|------------------------------|-----------|--|
| EOP ADD 39, ATT C | RO | <p>Notes:</p> <ul style="list-style-type: none"> • Opening Breaker PA50101 will cause breakers PA50103 and PB0501 to Open and the AEPS DGs to start. The AEPS DG output breakers will close and PA50103 and PB0501 will auto reclose. This will restore power to PB05. • Attachment F, AEPS Diesel Generator Alarms and Trips, is available for reference. • Attachment G, Alternate Emergency Power Supply Breaker Trip Interlocks, is available for reference. • Keys that are necessary in the following steps are located at the Main Access Facility (MAF) with tag #263. |
| | | |
| | RO | <p>Step C1 - Using PBXY0001 PLACE AEPS FDR BKR TO PA501 VIA Central Electric Reform Feeder - OPEN</p> <ul style="list-style-type: none"> • PA50101 <p>On PBXY0001, open PA50101 by selected breaker and pushing open and confirming selection.</p> |
| | | |
| | RO | <p>Step C2 - Using PBXY0001 CHECK ALL AEPS DGs – RUNNING USING PBXY0002 ENSURE ALL</p> <ul style="list-style-type: none"> • EDGPA5001, AEPS D/G #1 • EDGPA5002, AEPS D/G #2 • EDGPA5003, AEPS D/G #3 • EDGPA5004, AEPS D/G #4 |
| | | |
| | RO | <p>Step C3 - Using PBXY0001 CHECK ALL Running AEPS D/G Output Breakers - CLOSED:</p> <ul style="list-style-type: none"> • PA50104, AEPS FDR BKR TO EDGPA5001 • PA50105, AEPS FDR BKR TO EDGPA5002 • PA50106, AEPS FDR BKR TO EDGPA5003 • PA50107, AEPS FDR BKR TO EDGPA5004 |
| | | |
| | RO | <p>Step C4 - Using PBXY0001 CHECK The Following Breakers – CLOSED</p> |

| | | | | | | | | | |
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| Proc /Time | Position | Applicant's Actions or Behavior | | | | | | | |

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| | | a. Feeder Breaker PA50103, AEPS FDR BKR TO XFMR XPB05 b. Feeder Breaker PB0501, AEPS FDR BKR To PB05 FROM PA50103 |
| | | |
| | RO | Step C5 - RETURN To Procedure Section And Step In Effect: Attachment B, Energizing NB02 From Alternate Emergency Power Supply (AEPS), Step B2 |
| | | |
| EOP ADD 39, ATT B | RO | Step B2 - PLACE ESW PUMP B In PULL-TO-LOCK • EF HIS-56A |
| | | |
| | RO | Step B3 - Using PBXY0001 CLOSE AEPS FDR BKR PB0502 TO NB0214 • PB0502 At the PBXY0001 console, the close button is tapped and then confirmed to close PB0502. |
| | | |
| | | NOTES Handswitch NB HIS-68 must be held in the CLOSE position for a minimum of 3 seconds to allow the Undervoltage relay to reset. Ensure NB02 Auto-Sequenced equipment has been placed in PULL-TO-LOCK position prior to re-energization. |
| | | |
| | RO | Step B4 - CLOSE NB02 AEPS SUPPLY BKR NB0214 • NB HIS-68 |
| | | |

| | | | | | | | | | |
|--------------------|----------|---------------------------------|---|---------|-------|------|----|----|----|
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| Event Description: | | | | | | | | | |
| Proc /Time | Position | Applicant's Actions or Behavior | | | | | | | |

| | | |
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| | | NOTE An AEPS DG at full load uses 139 gal/hr fuel. At this rate, the low fuel level alarm will be received in approximately 19 hours and will be empty in 25 hours. |
| | | |
| | | Step B5 - MONITOR AEPS System Using PBXY0001: <ul style="list-style-type: none"> • Watts • Amps • Volts • Fuel (DG only) |
| | | |
| CRITICAL TASK | | Energize NB02 AC Emergency Bus utilizing the AEPS EDGs due to unavailability of Central Electric COOP prior EOP Addendum 39 completion. |
| | | |
| The scenario can be terminated at the discretion of the Lead Examiner | | |



| Facility: Callaway | | Date of Exam: Week of 3/4/19 | | Operating Test No.: 2019-1 | | | | | | | | | | | | | | | |
|---|---|---|-------------|-----------------------------------|-------------------|-------------|-------------|------------------|-------------|-------------|---------------|-------------|---------------|-----|---|--------------------------------|---|--|--|
| A P P L I C A N T | E V E N T T Y P E | Scenarios: Team 1: S1, S2, S3 and Team 2: S4, S5, S6 | | | | | | | | | | | | | | T O T A L # | M I N I M U M(*) R I U | | |
| | | 1 | | | 2 | | | 3 | | | 4 | | | | | | | | |
| | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | | | | | | |
| | | S R O | A T C | B O P | S R O | A T C | B O P | S R O | A T C | B O P | S R O | A T C | B O P | | | | | | |
| | | S1 S4 | S2 S5 | S3 S6 | S2 S5 | S3 S6 | S1 S4 | S3 S6 | S1 S4 | S2 S5 | # | # | # | | | | | | |
| SRO-I S1 S4 | RX | 4 | | | | | | | 1 | | 2 | 2 | | 2 | 1 | 1 | 0 | | |
| | NOR | 1 | | | | | | | | | | | | 1 | 1 | 1 | 1 | | |
| | I/C | 2,3,5 | | | | | 2,3,4 | | 2,3,4 | | 1,3,4 ,6 | 3,4, | 1,2,3, 4,6 | 9 | 4 | 4 | 2 | | |
| | MAJ | 6,7 | | | | 5 | | 5 | | 5 | 5 | 5 | 4 | 2 | 2 | 1 | | | |
| | TS | 2,3 | | | | | | | | | 1,2 | | | 2 | 0 | 2 | 2 | | |
| SRO-I S2 S5 | RX | | 4 | | 1 | | | | | | | | | 2 | 1 | 1 | 0 | | |
| | NOR | | | | | | | | | | | | | 0* | 1 | 1 | 1 | | |
| | I/C | | 2,3,5 | | 2,3, 4,6, 7 | | | | | 1,2, 4, | | | | 11* | 4 | 4 | 2 | | |
| | MAJ | | 6,7 | | 5 | | | | 5 | | | | 4 | 2 | 2 | 1 | | | |
| | TS | | | | 3,4 | | | | | | | | 2 | 0 | 2 | 2 | | | |
| SRO-I S3 S6 | RX | | | | | 1 | | 1 | | | | | | 2 | 1 | 1 | 0 | | |
| | NOR | | | 1 | | | | | | | | | | 1 | 1 | 1 | 1 | | |
| | I/C | | | 4,5 | | 6,7 | | 2,3,4 | | | | | | 7 | 4 | 4 | 2 | | |
| | MAJ | | | 6,7 | | 5 | | 5 | | | | | 4 | 2 | 2 | 1 | | | |
| | TS | | | | | | | 2,3 | | | | | 2 | 0 | 2 | 2 | | | |

Instructions:

- Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the at-the-controls (ATC) and balance-of-plant (BOP) positions. Instant SROs (SRO-I) must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an SRO-I *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
- Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional I/C malfunctions on a one-for-one basis.
- Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

All 4 scenarios and their attributes are listed as they are labeled for ease of comparison. The Total Columns is summed for Scenario #1 through 3 while Scenario #4 and its attributes are shown as the spare. This in no way means that Callaway Energy Center desires Scenario #4 as the spare; specifically Callaway Energy Center would like the Chief Examiner to determine which scenario to designate as the spare based on the ES-D1's provided and their above attributes. Callaway Energy Center will then update this ES-301-5 per NRC direction.

| Facility: Callaway | | Date of Exam: Week of 3/4/19 | | Operating Test No.: 2019-1 | | | | | | | | | | | | | |
|---|---|---|-------------------|-----------------------------------|-------------------|--------------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|------------------|--------------------------------|------------------------------------|---|---|
| A P P L I C A N T | E V E N T T Y P E | Scenarios: Team 3 S7, S8, U1, R1 | | | | | | | | | | | | T O T A L # | M I N I M U M(*) | | |
| | | 1 | | | 2 | | | 3 | | | 4 | | | | | | |
| | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | CREW POSITION | | | | | | |
| | | S R O U1 | A T C S7 | B O P S8 | S R O S7 | A T C3 S8 | B O P R1 | S R O S8 | A T C R1 | B O P S7 | S R O # | A T C # | B O P # | | R | I | U |
| SRO-I S7 | RX | | 4 | | 1 | | | | | | 2 | 2 | | 2 | 1 | 1 | 0 |
| | NOR | | | | | | | | | | | | | 0* | 1 | 1 | 1 |
| | I/C | | 2,3,5 | | 2,3,4 ,6,7 | | | | | 1,2, 4, | 1,3,4,6 | 3,4, | 1,2,3, 4,6 | 11* | 4 | 4 | 2 |
| | MAJ | | 6,7 | | 5 | | | | | 5 | 5 | 5 | 5 | 4 | 2 | 2 | 1 |
| | TS | | | | 3,4 | | | | | | 1,2 | | | 2 | 0 | 2 | 2 |
| SRO-I S8 | RX | | | | | 1 | | 1 | | | | | | 2 | 1 | 1 | 0 |
| | NOR | | | 1 | | | | | | | | | | 1 | 1 | 1 | 1 |
| | I/C | | | 4,5 | | 6,7 | | 2,3,4 | | | | | | 7 | 4 | 4 | 2 |
| | MAJ | | | 6,7 | | 5 | | 5 | | | | | | 4 | 2 | 2 | 1 |
| | TS | | | | | | | 2,3 | | | | | | 2 | 0 | 2 | 2 |
| SRO-U U1 | RX | 4 | | | | | | | | | | | | 1 | 1 | 1 | 0 |
| | NOR | 1 | | | | | | | | | | | | 1 | 1 | 1 | 1 |
| | I/C | 2,3,5 | | | | | | | | | | | | 3 | 4 | 4 | 2 |
| | MAJ | 6,7 | | | | | | | | | | | | 2 | 2 | 2 | 1 |
| | TS | 2,3 | | | | | | | | | | | | 2 | 0 | 2 | 2 |
| RO R1 | RX | | | | | | | 1 | | | | | | 1 | 1 | 1 | 0 |
| | NOR | | | | | | | | | | | | | 0* | 1 | 1 | 1 |
| | I/C | | | | | | 2,3, 4 | | 2,3,4 | | | | | 6* | 4 | 4 | 2 |
| | MAJ | | | | | | 5 | | 5 | | | | | 2 | 2 | 2 | 1 |
| | TS | | | | | | | | | | | | | 0 | 0 | 2 | 2 |

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the at-the-controls (ATC) and balance-of-plant (BOP) positions. Instant SROs (SRO-I) must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an SRO-I *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional I/C malfunctions on a one-for-one basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

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|---|---------------|-------------------------------------|-----------|-------------|---------------|----------------------------|-----------|-------------|--|
| Facility: Callaway | | Date of Examination: Week of 3/4/19 | | | | Operating Test No.: 2019-1 | | | |
| Competencies | APPLICANTS | | | | | | | | |
| | RO | | | | SRO-I & U | | | | |
| | SCENARIO | | | | SCENARIO | | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | |
| Interpret/Diagnose Events and Conditions | 2,3,4,5,6,7 | 2,3,4,5,6,7 | 1,2,3,4,5 | 1,2,3,4,5,6 | 2,3,4,5,6,7 | 2,3,4,5,6,7 | 1,2,3,4,5 | 1,2,3,4,5,6 | |
| Comply with and Use Procedures (1) | 1,2,3,4,5,6,7 | 1,2,3,4,5,6,7 | 1,2,3,4,5 | 1,2,3,4,5,6 | 1,2,3,4,5,6,7 | 1,2,3,4,5,6,7 | 1,2,3,4,5 | 1,2,3,4,5,6 | |
| Operate Control Boards (2) | 1,2,3,4,5,6,7 | 1,2,3,4,5,6,7 | 1,2,3,4,5 | 1,2,3,4,5,6 | 1,2,3,4,5,6,7 | 1,2,3,4,5,6,7 | 1,2,3,4,5 | 1,2,3,4,5,6 | |
| Communicate and Interact | 2,3,4,5,6,7 | 1,2,3,4,5,6,7 | 1,2,3,4,5 | 1,2,3,4,5,6 | 1,2,3,4,5,6,7 | 1,2,3,4,5,6,7 | 1,2,3,4,5 | 1,2,3,4,5,6 | |
| Demonstrate Supervisory Ability (3) | Note 3 | | | | 1,2,3,4,5,6,7 | 1,2,3,4,5,6,7 | 1,2,3,4,5 | 1,2,3,4,5,6 | |
| Comply with and Use TS (3) | | | | | 2,3 | 3,4 | 2,3 | 1,2 | |
| Notes: (1) Includes TS compliance for an RO. (2) Optional for an SRO-U. (3) Only applicable to SROs. | | | | | | | | | |

Instructions:

Check the applicants' license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant. (This includes all rating factors for each competency.) (Forms ES 303 1 and ES 303 3 describe the competency rating factors.)