

| Facility: | Callaway | Date of Examination: | 11/26/07 |
|---|------------|-----------------------------------|---|
| Examination Level: | RO | Operating Test Number: | N07-1 |
| Administrative Topic (see Note) | Type Code* | Describe activity to be performed | |
| Conduct of Operations | N, R | 2.1.21 (3.1) | Ability to obtain and verify controlled procedure copy |
| | | JPM: | Procedure accumulation/verification |
| Conduct of Operations | N, S | 2.1.25 (2.8) | Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data |
| | | JPM: | Evaluate Main Generator Performance |
| Equipment Control | M, R | 2.2.13 (3.6) | Knowledge of Tagging and Clearance Procedures |
| | | JPM: | Tagout the C Air Compressor |
| Radiation Control | N, R | 2.3.2 (2.5) | Knowledge of Facility ALARA Program |
| | | JPM: | Calculate Stay Time |
| NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required. | | | |
| *Type Codes & Criteria: | | | |
| (C)ontrol room | | | |
| Class(R)oom | | | |
| (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) | | | |
| (N)ew or (M)odified from bank (≥ 1) | | | |
| (P)revious 2 exams (≤ 1 ; randomly selected) | | | |
| (S)imulator | | | |

RO Admin JPM Summary

- A1a This is a new JPM. The operator will be provided with a task list for their upcoming shift and several procedures, and told that the previous Shift Manager has assembled the necessary procedures to complete the tasks assigned to the shift. The operator will be asked to verify that the proper procedures have been accumulated for the assigned tasks. At least one of the procedures provided to the operator will be an old revision of the procedure. A second procedure will be the correct revision, but not have the proper markings. A third procedure will be associated with an assigned task, but the procedure for the wrong train. Six tasks will be assigned, and only five procedures will be provided, requiring the operator to gather one procedure. The operator will need to verify which procedures are necessary, accumulate the one not present, and verify that those possessed are current in accordance with APA-ZZ-00100, "Use and Adherence to procedures and Written Instructions" and APA-ZZ-00200, "Document Control."
- A1b This is a new JPM. The operator will be brought to the Simulator and asked to verify that the Main Generator is operating properly in accordance with Section 5.1 of OTG-ZZ-00004, "Power Operation." The operator will need to compare the observed operational parameters with the figures provided in section 10 of the Core Data Book. Once determined that the Main Generator is operating properly, the operator will be given a VAR Loading direction by the Transmission Dispatcher, and the operator will be asked if the request can be complied with. The operator will need to again compare the request with the observed operational parameters, against the limitations of the figures provided in section 10 of the Core Data Book in accordance with Step 3.19 of OTN-AC-00001, "Main Turbine and Generator Systems," and determine that the request cannot be complied with.
- A2 This is a modified JPM using Bank JPMs ILE-A003-RO and ILE-A012-RO as its basis. The operator will be directed to prepare a Tagout (WPA) for the C Air Compressor in accordance with APA-ZZ-00310, "Workman's Protection Assurance." This task has appeared on both the 2004 and 2005 NRC Exam as an Administrative JPM, however, the component requested to be removed from service is completely different, and not included in the facility Exam Bank, rendering this JPM, in essence a new JPM.
- A3 This is a modified JPM using Bank JPM ILE-A020-RO as its basis. The operator will be given several Radiation Work Permits to choose from, survey maps of an area where work is required, and alarming dosimetry, the operator will be required to determine their allowed stay time prior to reaching the dosimetry alarm setpoint. This task has appeared on the 2005 NRC Exam as an Administrative JPM, however, the survey maps, assigned work, and alarm setpoints are such that the JPM is completely different, and not included in the facility Exam Bank.

| Facility: | Callaway | Date of Examination: | 11/26/07 |
|---|------------|-----------------------------------|---|
| Examination Level: | SRO | Operating Test Number: | N07-1 |
| Administrative Topic (see Note) | Type Code* | Describe activity to be performed | |
| Conduct of Operations | N, R | 2.1.21 (3.2) | Ability to obtain and verify controlled procedure copy JPM: Procedure accumulation/verification |
| Conduct of Operations | N, S | 2.1.25 (3.1) | Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data JPM: Evaluate Main Generator Performance |
| Equipment Control | M, R | 2.2.13 (3.8) | Knowledge of Tagging and Clearance Procedures JPM: Review a prepared Tagout for the C Air Compressor |
| Radiation Control | M, R | 2.3.2 (2.9) | Knowledge of Facility ALARA Program JPM: Calculate Stay Time |
| Emergency Plan | M, R | 2.4.44 (4.1) | Knowledge of Emergency Plan Protective Action Recommendations JPM: Make Protective Action Recommendations during a General Emergency |
| NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required. | | | |
| *Type Codes & Criteria: (C)ontrol room Class(R)oom (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1 ; randomly selected) (S)imulator | | | |

SRO Admin JPM Summary

- A1a This is a new JPM. The operator will be provided with a task list for their upcoming shift and several procedures, and told that the previous Shift Manager has assembled the necessary procedures to complete the tasks assigned to the shift. The operator will be asked to verify that the proper procedures have been accumulated for the assigned tasks. At least one of the procedures provided to the operator will be an old revision of the procedure. A second procedure will be the correct revision, but not have the proper markings. A third procedure will be associated with an assigned task, but the procedure for the wrong train. Six tasks will be assigned, and only five procedures will be provided, requiring the operator to gather one procedure. The operator will need to verify which procedures are necessary, accumulate the one not present, and verify that those possessed are current in accordance with APA-ZZ-00100, "Use and Adherence to procedures and Written Instructions" and APA-ZZ-00200, "Document Control."
- A1b This is a new JPM. The operator will be brought to the Simulator and asked to verify that the Main Generator is operating properly in accordance with Section 5.1 of OTG-ZZ-00004, "Power Operation." The operator will need to compare the observed operational parameters with the figures provided in section 10 of the Core Data Book. Once determined that the Main Generator is operating properly, the operator will be given a VAR Loading direction by the Transmission Dispatcher, and the operator will be asked if the request can be complied with. The operator will need to again compare the request with the observed operational parameters, against the limitations of the figures provided in section 10 of the Core Data Book in accordance with Step 3.19 of OTN-AC-00001, "Main Turbine and Generator Systems," and determine that the request cannot be complied with.
- A2 This is a modified JPM using Bank JPMs ILE-A007-SRO and ILE-A013-SRO as its basis. The operator will be provided with a prepared Tagout for the C Air Compressor, and directed to review the Tagout in accordance with APA-ZZ-00310, "Workman's Protection Assurance," for adequacy. The prepared Tagout will have one or more administrative errors that the operator will need to identify. This task has appeared on the 2005 NRC Exam as an Administrative JPM, however, the component requested to be removed from service is completely different, and not included in the facility Exam Bank, rendering this JPM, in essence a new JPM.
- A3 This is a modified JPM using Bank JPM ILE-A020-RO as its basis. The operator will be given several Radiation Work Permits to choose from, survey maps of an area where work is required, and alarming dosimetry, the operator will be required to determine their allowed stay time prior to reaching the dosimetry alarm setpoint. This task has appeared on the 2005 NRC Exam as an Administrative JPM, however, the survey maps, assigned work, and alarm

setpoints are such that the JPM is completely different, and not included in the facility Exam Bank.

- A4 This is a new JPM. The operator will be placed in a post-accident condition with a Large Break LOCA with a release from the Containment. The operator will be given an emergency classification of General Emergency, the wind direction, and then asked to determine the Initial PAR in accordance with EIP-ZZ-00212, "Protective Action Recommendations." Following the initial recommendation, two Subsequent PARs will be required after wind direction and projected dose assessments change.

Rev 2

| | | | |
|--|--|----------------------|-----------------|
| Facility: | Callaway | Date of Examination: | 11/26/07 |
| Exam Level (circle one): | <i>RO (only)</i> /SRO(I) / SRO (U) | Operating Test No.: | N07-1 |
| Control Room Systems [®] (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U, including 1 ESF) | | | |
| | System / JPM Title | Type Code* | Safety Function |
| a. | 004 Chemical & Volume Control System Emergency Boration Per ES-0.1 – Rods Not Inserted | S, M, A, L | 1 |
| b. | 006 Emergency Core Cooling System Raising Accumulator Level | S, M | 2 |
| c. | 010 Pressurizer Pressure Control System Initiate Cold Overpressure Mitigation With PORV Malfunction | S, M, A, L | 3 |
| d. | 059 Main Feedwater System Transfer A MFP Speed Control/Shutdown Pump | S, M | 4S |
| e. | 026 Containment Spray System Manually Actuate Containment Spray System | S, N, A, L | 5 |
| f. | 062 AC Electrical Distribution System Transfer NB02 From NE02 to Alternate Source | S, N, A | 6 |
| g. | 073 Process Radiation Monitoring System Radiation Monitor Source Check | S, M | 7 |
| h. | <i>008 Component Cooling Water System</i> <i>Shift Non-Essential CCW Supply Loops</i> | S, M, A | 8 |
| In-Plant Systems [®] (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U) | | | |
| i. | 103 Containment System Locally Close Valves for CIS-A | M, A, R, E | 5 |
| j. | APE 068 Control Room Evacuation Control Room Evacuation – No Fire | D, R, E | 8 |
| k. | EPE 055 Station Blackout Locally Start (NE02) Emergency Diesel | D, E | 6 |

| <p>@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.</p> | |
|---|---------------------------------|
| * Type Codes | Criteria for RO / SRO-I / SRO-U |
| (A)lternate path | 4-6 (6) /4-6 (5) / 2-3 (2) |
| (C)ontrol room | |
| (D)irect from bank | ≤ 8 (2) / ≤ 8 (2) / ≤ 4 (2) |
| (E)mergency or abnormal in-plant | ≥ 1 (3) / ≥ 1 (3) / ≥ 1 (2) |
| (L)ow-Power / Shutdown | ≥ 1 (2) / ≥ 1 (2) / ≥ 1 (2) |
| (N)ew or (M)odified from bank including 1(A) | ≥ 2 (9) / ≥ 2 (8) / ≥ 1 (3) |
| (P)revious 2 exams (randomly selected) | ≤ 3 (1) / ≤ 3 (1) / ≤ 2 (1) |
| (R)CA | ≥ 1 (2) / ≥ 1 (2) / ≥ 1 (1) |
| (S)imulator | |

JPM Summary

JPM A This is a modified JPM that will use Bank JPM URO-AEO01C151J as its basis. The Operator will be placed in a post-reactor trip situation in ES-0.1, Reactor Trip Response, at Step 5, and asked to check all control rods fully inserted. The operator will discover that two controls rods are stuck out. The operator will transition to EOP Addendum 4, "Emergency Boration." When the operator attempts to initiate Emergency Boration at Step 2 of EOP Addendum 4, both Boric Acid Pumps will fail to start, rendering the JPM an Alternate Path JPM. The operator will be required to implement the Step 2 RNO which requires aligning boration from either the RWST or the Normal or Alternate Boration Flowpath. Since boration from the Normal or Alternate Boration Flowpath requires the Boric Acid Transfer Pumps, the success path will be boration from the RWST.

Modifications from the Bank JPM:

- Two rods are stuck out rather than 3 rods.

This task was not performed as a JPM on either the 2004 or 2005 Callaway NRC Exams.

JPM B This is a modified JPM that will use Bank JPM URO-SEP02C66J as its basis. The operator will be placed in a Mode 3 situation, with the C Accumulator at 28%. The operator will be directed to raise the C Accumulator Level in accordance with Section 5.1 of OTN-EP-00001, Addendum 1, "SI Accumulator Level Control," using the A SI Pump. The operator will be directed to fill the C SI Accumulator to 40%, and must maintain level $\leq 85\%$.

Modifications from the Bank JPM:

- The A SI Pump rather than the B SI Pump will be used.
- The C SI Accumulator rather than the A SI Accumulator will require filling.
- The plant will be in Mode 3 rather than Mode 1.
- Removed the Alternate Path nature of the Bank JPM

A closely related, but different, task (Raising Accumulator N2 Pressure) is performed in Simulator Scenario N07-1-4 associated with this Operating Test. The tasks implement sections of two different procedures (OTN-EP-00001 Addendum 1 vs. Addendum 2). Furthermore, this task was not performed as a JPM on either the 2004 or 2005 Callaway NRC Exams.

JPM C This is a modified JPM that will use Bank JPM URO-SBB2C65J as its basis. The Operator will be placed in a Mode 4 situation and directed to ARM the Pressurizer Power Operated Relief Valves for Cold Overpressure Mitigation in accordance with Section 5.6 of OTN-BB-00005, "Pressurizer and Pressurizer Pressure Control." When the Train B COM Switch is placed in ARM, Pressurizer PORV BB-HIS-456A will open, rendering this JPM and Alternate Path JPM. The operator will need to verify that RCS Pressure is less than the PORV Setpoint, and close the PORV Block Valve.

Modifications from the Bank JPM:

- Train B rather than Train A PORV is used for the failed open PORV.

This task is not performed in any portion of a Simulator Scenario associated with this Operating Test. This JPM was selected as the Back-up Simulator JPM on the 2004 Callaway NRC Exam.

Rev 2

JPM D This is a modified JPM that will use Bank JPM URO-SAE02C62J as its basis. The operator will be placed in a 50% power, two Main Feed Pump situation, and told that the A MFP Speed Controller FC SK-509B has been malfunctioning causing large rapid changes in pump speed, and it has been determined that the A MFP Speed Controller FC SK-509B requires corrective maintenance. The operator will be directed to transfer the A MFP from Auto to Manual on the GE Controller (FC HK-88) in accordance with section 3.3 of OTN-AE-00001, Addendum 2 "Main Feedpump Operations," to allow the required maintenance. Following the transfer, the operator will be directed to remove the A MFP from service in accordance with section 3.5.2 of OTN-AE-00001, Addendum 2 "Main Feedpump Operations," due to slightly elevated bearing temperatures.

Modifications from the Bank JPM:

- A MFP is used rather than B.
- JPM includes the additional task of pump shutdown on the back up speed controller. This task is not performed in any portion of a Simulator Scenario associated with this Operating Test, and was not performed as a JPM on either the 2004 or 2005 Callaway NRC Exams.

JPM E This is a New JPM. The operator will be placed in a Post-Reactor Trip situation and told that the crew has progressed from E-0 to E-2 due to a small Steam Break inside Containment. Just after entry into E-2 the small steam break degraded rapidly into a large steam line rupture. The crew has now left E-2 for FR-Z.1 due to an Orange Path condition on the Containment Critical Safety Function. The operator will be asked to perform the required steps of FR-Z.1. Although Containment Pressure will be > 27 psig, automatic actuation of Containment Spray (CS) will fail. Additionally, the CS manual actuators will fail to operate requiring that the operator take manual action to start the CS Pumps and open the discharge valves. The failure of the automatic actions will render this JPM an Alternate Path JPM. This task is not performed in any portion of a Simulator Scenario associated with this Operating Test, and was not performed as a JPM on either the 2004 or 2005 Callaway NRC Exams.

JPM F This is a New JPM. The operator will be placed in a Post-Reactor Trip Mode 4 situation and told that off-site power has previously been lost, and that NB01 and NB02 are being powered from their respective Emergency Diesel Generators. With off-site power now restored, the operator will be asked to restore offsite power in accordance with EOP Addendum 7, "Restoring Offsite Power." The operator will be required to use this EOP Addendum to analyze the status of Offsite Power, and select an appropriate power restoration procedure. A lockout of ESF Transformer XNB02 will render the JPM an Alternate Path JPM. The operator will need to determine that Offsite Power can be restored to NB02 using the Alternate ESF Transformer XNB01, and that the appropriate procedure to use is OTN-NE-00001, Addendum 6, "Transferring Bus NB02 From NE02 to Normal or Alternate Source." This task is not performed in any portion of a Simulator Scenario associated with this Operating Test, and was not performed as a JPM on either the 2004 or 2005 Callaway NRC Exams.

JPM G This is a modified JPM that will use Bank JPM URO-SSP03C15J as its basis. The operator will be placed at a simulated 100% power steady-state condition and directed to perform a source check of Radiation Monitors BM-RE-52 (SG Blowdown Discharge Channel), GT-RE-21B (Unit Vent), and GH-RE-10B (Radwaste Building Vent) in accordance with section 6.0 of OSP-SP-00001, "Radiation Monitors Source Check." The operator will be required to complete Attachment 1 of OSP-SP-00001, "Radiation Monitors Check Source Test."

Rev 2

Modifications from the Bank JPM:

- Includes GT-RE-21B and GH-RE-10B, as well as BM-RE-52, while Bank JPM includes only BM-RE-52.

This task is not performed in any portion of a Simulator Scenario associated with this Operating Test, and was not performed as a JPM on either the 2004 or 2005 Callaway NRC Exams.

JPM H This is a modified JPM that will use Bank JPM URO-SEG02C21J as its basis. The operator will be placed in a 50% situation. The operator will be told that the CCW Train B is in service, supplying the service loop. The operator will be directed to start the A Train CCW Pump with the least run time and shift the Service Loop to CCW Train A in accordance with section 5.7 of OTN-EG-00001, "Component Cooling Water System." The operator will be told that it is not desired to secure CCW Train B. When the operator is directed by the procedure to ensure that the A CCW Surge Tank is > 50%, the level will be about 48% and require filling. Before continuing with the procedure the operator will need to refill the A CCW Surge in accordance with steps 5.1.8.f-g of OTN-EG-00001. This will render the JPM an Alternate Path JPM.

Modifications from the Bank JPM:

- A CCW Surge Tank will require filling.
- Performed at 50% instead of Mode 2.

This task is not performed in any portion of a Simulator Scenario associated with this Operating Test, and was not performed as a JPM on either the 2004 or 2005 Callaway NRC Exams.

For time considerations during implementation of the Control Room (i.e. Simulator) portion of the Walk-through portion of the Operating Test, the following JPMS will be administered simultaneously:

- JPMS A-B
- JPMS C-F
- JPMS D-H
- JPMS E-G

JPM I This is a modified JPM that will use Bank JPM URO- AEO05PI023J as its basis. The operator will be placed in a Station Blackout situation, and directed to locally ensure that the CIS Phase A Valves Outside Containment in the South Piping Pen Room are closed in accordance with EOP Addendum 25, "Containment Isolation Phase A Valves." One of the valves, KAHV0029, REACTOR BLDG INST AIR SUPPLY OUTSIDE CTMT ISO, will be found open rendering this JPM an Alternate Path JPM. The operator will need to locally close KAHV0029.

Modifications from the Bank JPM:

- This JPM requires that the operator locate and ensure six valves rather than three are closed.
- The valve that is stuck open is KAHV0029 rather than KCHV0253.

This task was not performed as a JPM on either the 2004 or 2005 Callaway NRC Exams. The JPM will be performed starting in the RCA.

JPM J This is Bank JPM URO-AEO2015J. The operator will be placed in a situation where a reactor startup was in progress when a bomb was discovered in the Control Room, requiring its evacuation. The Operator will be told that a Control Room Evacuation is in

progress in accordance with OTO-ZZ-00001, "Control Room Inaccessibility," and that the reactor has been tripped with all Control Rods verified fully inserted. The operator will be directed to perform Attachment G of OTO-ZZ-00001, "Control Room Inaccessibility." The JPM will be performed starting in the RCA.

JPM K This is Bank JPM URO-AEO05037J. The operator will be placed in a Station Blackout situation where ECA-0.0, "Loss of All AC Power," has been entered. The Operator will be told that neither EDG could be started from the Control Room, and that other operators are attempting to start NE01 locally. The operator will be directed to locally start NE02 in accordance with EOP Addendum 21, "Local Start of Emergency DGs."

| Facility: Callaway | | Scenario No.: 1 | | Op Test No.: N07-1-1 | |
|--|----------------|--|---|-----------------------------|--|
| Examiners: _____ | | Operators: _____ | | _____ | |
| _____ | | _____ | | _____ | |
| _____ | | _____ | | _____ | |
| Initial Conditions: | | The Plant is at 100% power Steady-State (BOL), and been for the last 14 days following Refueling Outage. | | | |
| Turnover: | | The following equipment is Out-Of-Service: A MDAFW Pump (Expected back in 24 hours), Containment Pressure channel PT-934 failed last shift (I&C is investigating) and MCB Annunciator 16A, "XPB03/04 XFMR LOCKOUT," has alarmed spuriously several times over the last hour (I&C is investigating). The Turbine Bearing Monitoring System on the Plant Computer is inoperable. | | | |
| Event No. | Malf. No. | Event Type* | Event Description | | |
| 1 | NA | N-RO N-SRO | Swap Charging Pumps | | |
| 2 | MSS01C | I-BOP I (TS)-SRO | Steam Generator Pressure Instrument Fails | | |
| 3 | CCW06B | C-RO C (TS)-SRO | Failure of B CCW Pump, and Failure of Auto Start of same Train Standby Pump | | |
| 4 | CCW11D | C-RO C-SRO | CCW System Leak (Recoverable) | | |
| 5 | NA | R-RO C-BOP C-SRO | Condenser Tube Leak/ Rapid Downpower | | |
| 6 | | I-BOP I-SRO | MFP Master Speed Controller Fails | | |
| 7 | TUR01 CRF13 | M-RO M-BOP M-SRO | Inadvertent Turbine Trip/without Auto Reactor Trip (ATWS) | | |
| 8 | | C - RO | DRPI Failures on Reactor Trip | | |
| 9 | PRS09 | M-RO M-BOP M-SRO | Pressurizer Steam Space Break | | |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | | | |

Callaway 2007 NRC Scenario #1

The Plant is at 100% power Steady-State (BOL), and been for the last 14 days following Refueling Outage.

The following equipment is Out-Of-Service: A MDAFW Pump (Expected back in 24 hours), Containment Pressure channel PT-934 failed last shift (I&C is investigating) and MCB Annunciator 16A, "XPB03/04 XFMR LOCKOUT," has alarmed spuriously several times over the last hour (I&C is investigating). The Turbine Bearing Monitoring System on the Plant Computer is inoperable.

Shortly after taking the watch, the operator will be directed to place the A CCP in service and remove the NCP from service in accordance with Section 5.1 of OTN-BG-00001, Addendum 1, "Shifting From the NCP to One of the CCPs."

Shortly after this, the C Steam Generator Pressure Channel AB-PT-534 will fail low. This will cause the compensation input into C Steam Flow Transmitter AB-FT-534 to also fail low. The operator will respond in accordance with OTO-AE-00002, "Steam Generator Water Level Malfunctions," and defeat the failed channel. The operator will address Technical Specification 3.3.2, "ESFAS Instrumentation."

Subsequently, the B CCW Pump will trip and the D CCW pump will fail to auto start. The Operator will manually start the D CCW Pump, and address OTA-RK-00020, Addendum 53B, "CCW Pump B/D Trouble." The operator will address Technical Specification 3.7.7. The mechanical shock to the CCW System will cause a 300 gpm Leak into the Radwaste header which will need to be isolated. The leak will be isolated in accordance with OTO-EG-00001, "CCW System Malfunction."

Following this, a Condenser Tube Leak will develop (LER 2007-2). The operator will take action for Action Level 3 being exceeded in accordance with APA-ZZ-01021, "Secondary Chemistry Program." A Rapid Downpower will be initiated in accordance with OTO-MA-00008 at 5%/minute. During the downpower, the MFP master Speed Controller will fail such that the BOP must take manual control of MFP speed and control this manually during the transient in accordance with OTO-AE-00001, "Feedwater System Malfunction."

Following this, the Turbine will trip without a corresponding Reactor Trip, and the Reactor will have to be tripped manually. The operator will enter E-0, "Reactor Trip or Safety Injection," and then transition to ES-0.1, "Reactor Trip Response." On the trip, DRPI for Control Rods H-14 and K-10 will fail (LER 2007-02) and its position will be indeterminate. The operator will need to commence Emergency Boration.

Shortly after the trip, a Pressurizer Steam Space break will develop requiring Safety Injection actuation. The operator will return to E-0, "Reactor Trip or Safety Injection," and transition to E-1, "Loss of Reactor or Secondary Coolant." The crew will trip the RCPs when the trip criteria are met, and ultimately transition to ES-1.2, "Post-LOCA Cooldown and Depressurization."

The scenario will terminate at Step 13 of ES-1.2, after the crew decides to start an RCP.

Critical Tasks:

E-0 A

Manually trip the reactor before RCS Pressure reaches 2460 psig.

E-1 C

Trip all RCPs within 5 minutes of reaching the trip criteria.

| Facility: Callaway | | Scenario No.: 2 | | Op Test No.: N07-1-2 | |
|--|-----------|--|--|-----------------------------|--|
| Examiners: _____ | | Operators: _____ | | _____ | |
| Examiners: _____ | | Operators: _____ | | _____ | |
| Examiners: _____ | | Operators: _____ | | _____ | |
| Initial Conditions: | | The Plant is at 50% power Steady-State (5 days), MOL, following a downpower from 100% for high vibrations in the B MFP. The B MFP was removed from service and repaired, and has just been restarted. I&C is working in Protection Racks, expected to be out in about 30 minutes. Letdown flow is 75 gpm for I&C calibration work on BG-FI-132, which is now complete. Chemistry has requested that Letdown be increased from 75 to 120 gpm. | | | |
| Turnover: | | The following equipment is Out-Of-Service: B MDAFW Pump (Expected back in 6 hours) due to a pinhole leak on the ESW System suction line, Containment Radiation Monitor GTRIC0059 (Out indefinitely) and MCB Annunciator 103D, "FW HTR DUMP VLV OPEN," has been in an erroneous constant alarm condition for several hours (I&C is investigating). The Turbine Bearing Monitoring System on the Plant Computer is inoperable. | | | |
| Event No. | Malf. No. | Event Type* | Event Description | | |
| 1 | NA | N-RO N-SRO | Increase letdown from 75 gpm to 120 gpm | | |
| 2 | FWM02D | I- BOP I (TS)- SRO | SG Narrow Range Level Transmitter fails high | | |
| 3 | CRF04 | R - RO C (TS)-SRO | Dropped Rod | | |
| 4 | EPS03F | C-RO C-BOP C-SRO | Loss of Train A Off-Site Power | | |
| 5 | PCS08B | C | A ESW Pump fails to auto start | | |
| 6 | FWM12C | C | TDAFW Pump trip | | |
| 7 | ABHS79 | M-RO M-BOP M-SRO | Inadvertent MSI | | |
| 8 | FWM12A | C-BOP C-SRO | A MDAFW Pump fails to start | | |
| 9 | EPS04D | C | Overcurrent isolation on PB04 | | |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | | | |

Callaway 2007 NRC Scenario #2

The Plant is at 50% power Steady-State (5 days), MOL, following a downpower from 100% for high vibrations in the B MFP. The B MFP was removed from service and repaired, and has just been restarted. I&C is working in Protection Racks, expected to be out in about 30 minutes. Letdown flow is 75 gpm for I&C calibration work on BG-FI-132, which is now complete. Chemistry has requested that Letdown be increased from 75 to 120 gpm.

The following equipment is Out-Of-Service: B MDAFW Pump (Expected back in 6 hours) due to a pinhole leak on the ESW System suction line, Containment Radiation Monitor GTRIC0059 (Out indefinitely) and MCB Annunciator 103D, "FW HTR DUMP VLV OPEN," has been in an erroneous constant alarm condition for several hours (I&C is investigating). The Turbine Bearing Monitoring System on the Plant Computer is inoperable.

Shortly after taking the watch, the operator will increase letdown flow from 75 to 120 gpm in accordance with section 5.6 of OTN-BG-00001, Addendum 4, "Operation of CVCS Letdown." After this, the operator will be directed to prepare for load increase to 100%.

Just after the Letdown flow adjustment, the controlling Narrow Range Level transmitter (LT-549) on the D SG will fail high causing the FRV to go closed. The operator will respond in accordance with OTO-AE-00002, "Steam Generator Water Level Control malfunctions," take manual control of the FRV, and defeat the failed channel. The operator will address Technical Specifications 3.3.1, "RTS Instrumentation," and 3.3.2, "ESFAS Instrumentation."

Shortly after this, Control Rod H-2 from Control Bank C will drop into the core. The operator will respond in accordance with OTO-SF-00001, "Rod Control Malfunctions," and address Technical Specification 3.1.6, "Control Bank Insertion Limits." The Rod Control problem will be corrected by I&C and the dropped rod will be recovered.

Following this, a Loss of A Train Off-Site Power (NB01) will occur. The operator will respond in accordance with OTO-NB-00001, "Loss of Power to NB01." It is expected that NB01 will undergo load shed, the A EDG will start, and Shutdown Sequencer actuation for the A Train will occur. The A ESW Pump will not auto start and the operator will need to manually start the pump. The TDAFW Pump will start and a SG/Blowdown/Sample Isolation will occur. 60 Seconds after the TDAFW auto start the pump will trip on overspeed (The Pump will not be able to be restored to service). The operator may address Technical Specifications 3.7.5, "Auxiliary Feedwater System," and 3.7.8, "Essential Service Water System."

During the partial LOP recovery, an inadvertent MSIV will occur, causing the reactor to trip. The operator will respond in accordance with E-0, "Reactor Trip or Safety Injection," and then transition to ES-0.1, "Reactor Trip Response." On the Reactor Trip, the A MDAFW Pump will fail to start, leaving the crew without a source of feed flow. A Red Path will exist on Heat Sink and transition will be made to FR-H.1, "Response to Loss of Secondary Heat Sink."

After transition to FR-H.1, and overcurrent lockout condition will occur on PB04, and the bus will deenergize. Attempts within FR-H.1 to restore via the Main Feed System will fail, and the crew will be required to establish a source of feed flow from the Condensate System using EOP Addendum 31, "Establishing Condensate System Flow."

Once feed has been established the operator will transition back to ES-0.1, "Reactor Trip Response." The scenario will terminate at Step 7 of ES-0.1.

Critical Tasks:

ECA-0.0 F

Manually start the ESW Pump such that the EDG does not fail because of damage caused by engine overheating.

FR-H.1 A

Establish feedwater flow into at least one Steam Generator before RCS bleed and feed is required.

| Facility: Callaway | | Scenario No.: 3 | | Op Test No.: N07-1-3 | |
|--|------------------|---|---|-----------------------------|--|
| Examiners: _____ | | Operators: _____ | | _____ | |
| _____ | | _____ | | _____ | |
| _____ | | _____ | | _____ | |
| Initial Conditions: | | The Plant is at 100% power Steady-State after 306 continuous days on line. The B EDG is synchronized and loaded onto NB02 for the monthly surveillance in accordance with OTN-NE-0001B, "Standby Diesel Generator System – Train B," and is now ready to be shutdown. | | | |
| Turnover: | | The following equipment is Out-Of-Service: A Charging Pump (Expected back in 6 hours), RWST Level channel BN-LI-930 has failed low, and MCB Annunciator 134E, MNXFMR TROUBLE has been in constant alarm for the past two hours (I&C is investigating). The Turbine Bearing Monitoring System on the Plant Computer is inoperable. | | | |
| Event No. | Malf. No. | Event Type* | Event Description | | |
| 1 | | N-BOP C (TS)-SRO | Shutdown the B EDG | | |
| 2 | PCS02A | I-BOP I (TS)-SRO | 1 st Stage Pressure Channel Failure | | |
| 3 | CCW04A | I-RO I-SRO | Letdown HX Temperature Control Valve Controller fails | | |
| 4 | CVC06F | C-RO C-SRO | #2 Seal Failure on B RCP/ Orderly Plant Shutdown | | |
| 5 | TUR02F TUR02G | R-RO C-BOP C-SRO | High Vibration on Main Turbine/Rapid Load Reduction | | |
| 6 | NA | M-RO M-BOP M-SRO | Manual Rx Trip | | |
| 7 | MSS12 | NA | Steam Break in Turbine Building/ MSI Fails to Auto Actuate | | |
| 8 | CCW12A CCW12B | C-BOP | Failure of A CCW Pump, and Failure of Auto Start of same Train Standby Pump | | |
| 9 | | NA | #1 Seal Failure/High Vibrations on B RCP | | |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | | | |

Callaway 2007 NRC Scenario #3

The Plant is at 100% power Steady-State after 306 continuous days on line. The B EDG is synchronized and loaded onto NB02 for the monthly surveillance in accordance with OTN-NE-0001B, "Standby Diesel Generator System – Train B," and is now ready to be shutdown.

The following equipment is Out-Of-Service: A Charging Pump (Expected back in 6 hours), RWST Level channel BN-LI-930 has failed low, and MCB Annunciator 134E, MNXFMR TROUBLE has been in constant alarm for the past two hours (I&C is investigating). The Turbine Bearing Monitoring System on the Plant Computer is inoperable.

Shortly after taking the watch, the BOP will be directed to shutdown the B EDG in accordance with Section 5.6 of OTN-NE-0001B, "Standby Diesel Generator System – Train B." During the shutdown it will be discovered that the Diesel Engine trips when the output breaker is opened. The B EDG will be declared inoperable and Technical Specification 3.8.1 will be addressed.

After this, the First Stage Pressure Transmitter, PT-505, will fail low. The operator will respond in accordance with OTO-AC-00003, "Turbine Impulse Pressure Channel Failure." The operator will address Technical Specification 3.3.1, "RTS Instrumentation," and defeat the failed channel.

Following this the Letdown HX Temperature Control Valve Controller fails such that BGTV0130 goes fully closed. The operator will respond in accordance with OTA-RK-00018, Addendum 39B, "LTDN HX DISCH TEMP HI," and take manual control of the controller to re-establish CCW flow to the Letdown HX. It is expected that VCT temperature will rise.

Shortly after this, a #2 Seal failure will occur on RCP B. It is expected that Annunciator 73A, "RCP #2 Seal Flow Hi," will alarm, and the operator will respond in accordance with OTO-BB-00002, "RCP Off Normal." The operator will decide that a #2 Seal Failure of the B RCP has occurred and that an orderly (6-hour) shutdown must be performed using either OTO-MA-00008, "Rapid Load Reduction," or OTG-ZZ-00004, "Power Operation."

During the load reduction high vibration alarms will occur on the Main Turbine. The operator will respond in accordance with OTO-AC-00002, "Turbine Vibration." Turbine bearing vibration will continue from 10-11 mils vibration throughout the load reduction.

Eventually, the Turbine vibrations will exceed the setpoint at which the Turbine must be tripped. The operator will trip the reactor, and the turbine and enter E-0, "Reactor Trip or Safety Injection."

Shortly after reactor trip a steam break will occur in the Turbine hall. The Main Steamline Isolation signal will fail to automatically actuate, and require manual actuation by the operator. The plant will cooldown and depressurize to the point where SI is required. On the SI actuation the A CCW Pump will trip with a simultaneous failure of the C CCW Pump to auto start. The operator will need to start the C CCW Pump manually.

The operator will transition from E-0, "Reactor Trip or Safety Injection," to ES-1.1, "SI Termination," or from E-0, "Reactor Trip or Safety Injection," to E-2, "Faulted Steam Generator Isolation," to E-1, "Loss of Reactor or Secondary Coolant," to ES-1.1, "SI Termination."

During the implementation of the Emergency Operating Procedures, a #1 Seal Failure will occur on the B RCP, along with high vibrations. The pump will need to be stopped in accordance with OTO-BB-00002, "RCP Off Normal."

The scenario will terminate at step 15 of ES-1.1, after the CCP suction has been aligned to the VCT.

Critical Tasks:

E-0 P

Manually actuate Main Steamline Isolation before a severe challenge develops to either the subcriticality or the integrity Critical Safety Function, or before transition to ECA-2.1, whichever happens first.

E-0 K

Manually start at least the minimum number of CCW pumps required to provide adequate component cooling for the operating safeguards train before plant and scenario specific criteria are exceeded.

| Facility: Callaway | | Scenario No.: 4 | | Op Test No.: N07-1-4 | |
|--|-----------|---|--|-----------------------------|--|
| Examiners: _____ | | Operators: _____ | | _____ | |
| Examiners: _____ | | Operators: _____ | | _____ | |
| Examiners: _____ | | Operators: _____ | | _____ | |
| Initial Conditions: | | The Plant is at 2% power during a Technical Specification required shutdown. The Turbine has been taken off line, and it is intended to shutdown the Reactor, and then maintain NOT/NOP. The plant is in Technical Specification LCO 3.8.1, two hours into Action G, with both the A and B EDGs inoperable. A Containment minipurge is in progress for a planned Containment Entry. The Startup feedwater Pump Prestart checks have been performed in accordance with OTN-AE-00001, Addendum 1, "S/U MFP Operations." | | | |
| Turnover: | | The following equipment is Out-Of-Service: A EDG (Expected back in 2 hours), B EDG (expected back in 4 hours), Loop Flow channel FT-444 and MCB Annunciator 130E, GEN AUX TROUBLE has been in constant alarm over the last hour four hours (I&C is investigating). The Turbine Bearing Monitoring System on the Plant Computer is inoperable. | | | |
| Event No. | Malf. No. | Event Type* | Event Description | | |
| 1 | MSS09A | I-BOP I-SRO | Controlling Steam Dump Valves fail open | | |
| 2 | NA | R-RO N-SRO | Complete Reactor Shutdown | | |
| 3 | NIS02B | I-RO I (TS)-SRO | Intermediate Range Channel Failure | | |
| 4 | EPP02 | C (TS)-SRO | N2 Leak on B Accumulator | | |
| 5 | FWM10A | C-BOP C-SRO | Feed Pump Trip | | |
| 6 | MSS03B | M-RO M-BOP M-SRO | Faulted SG (B) inside Containment | | |
| 7 | SBI001 | C-RO | Failure of Auto SI | | |
| 8 | SBI003 | C-BOP | Failure of Minipurge isolation valves to close on CI | | |
| 9 | RCS02B | NA | SGTR (600 gpm) on B SG | | |
| * (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor | | | | | |

Callaway 2007 NRC Scenario #4

The Plant is at 2% power during a Technical Specification required shutdown. The Turbine has been taken off line, and it is intended to shutdown the Reactor, and then maintain NOT/NOP. The plant is in Technical Specification LCO 3.8.1, two hours into Action G, with both the A and B EDGs inoperable. A Containment minipurge is in progress for a planned Containment Entry. The Startup feedwater Pump Prestart checks have been performed in accordance with OTN-AE-00001, Addendum 1, "S/U MFP Operations."

The following equipment is Out-Of-Service: A EDG (Expected back in 2 hours), B EDG (expected back in 4 hours), Loop Flow channel FT-444 and MCB Annunciator 130E, GEN AUX TROUBLE has been in constant alarm over the last hour four hours (I&C is investigating). The Turbine Bearing Monitoring System on the Plant Computer is inoperable.

Shortly after taking the watch, the Controlling Steam Dump Valves fail open. The operator will respond in accordance with OTO-AB-00001, "Steam Dump Malfunction." The operator will be required to close the valves manually to control the cooldown, and maintain temperature manually.

Following this, the operator will begin a normal reactor shutdown in accordance with step 5.2.13 of OTG-ZZ-00005, "Plant Shutdown 20% Power to Hot Standby." During the shutdown Intermediate Range channel N35 will fail. The operator will respond in accordance with OTO-SE-00001, "Nuclear Instrument Malfunction," and address Technical Specification 3.3.1.

After this, a nitrogen leak will develop on the B Accumulator. The operator will respond in accordance with OTA-RK-00018, Addendum 44B, "Accumulator Tank B Pressure High or Low." The crew will investigate and determine a slow N₂ leak has occurred, and seek to add Nitrogen in accordance with OTN-EP-00001, Addendum 2, "Accumulator Safety Injection System." The operator will address Technical Specification 3.5.1, "Accumulators."

After the Accumulator Technical Specification is addressed, and the AFAS is blocked, the A Main Feed Pump will trip. The operator will respond in accordance with OTA-RK-00026, Addendum 120A, "Main Feedwater Pump A Trip." The operator will place the S/U MFP in service in accordance with OTN-AE-00001, "Feedwater System."

Shortly afterwards, a major Steam Rupture will occur on the "B" Steam Generator inside Containment, initiating a Safety Injection signal. The automatic SI actuation will fail and require the operator to actuate SI manually. Additionally, the mini-Purge isolation valves will fail to close on Containment Isolation, and must be closed manually. The Operator will enter E-0, "Reactor Trip or Safety Injection," and transition to E-2, "Faulted Steam Generator Isolation."

Following isolation of the B Steam Generator, the operator will transition to E-1 "Loss of Reactor or Secondary Coolant." At this time, with a high differential pressure across the Steam generator tubesheet, a 600 gpm Tube Rupture will occur on the "D" Steam Generator. The operator will transition to E-3, Steam Generator Tube Rupture.

The scenario will terminate at Step 5 of E-3, after the crew decides to transition to ECA-3.1, "SGTR with Loss of Reactor Coolant – Subcooled Recovery Desired."

Critical Tasks:

E-0 D

Manually actuate at least one train of SIS-Actuated Safeguards before transition to E-2.

E-0 R

Close Containment Minipurge isolation valves such that at least one valve is closed on each purge penetration before transition out of E-0.

E-2 A

Isolate the Faulted Steam Generator Before Transition out of E-2.