**Appendix D** **Scenario Outline** **Form ES-D-1**

Facility: Quad Cities Unit 1 & 2 Scenario No.: 1 Time Start: _____

Examiners: _____ Operators: (SRO)_____

_____ (ATC)_____

_____ (BOP)_____

**Initial Conditions:** Reactor Power is at 81% and 100% rod line. Torus cooling is running with 1D RHR pump and 1B and 1C RHRSW pumps running to the 1B RHR Heat exchanger. APRM 2 is Inoperable and bypassed due to a failed power supply. Maintenance repair is complete. IMDI&C is presently reviewing closeout paperwork. Outboard Drywell Isolation Spray Valve, MO1-1001-23A, is OOS because the motor tripped on overcurrent during valve testing. Inboard Drywell Isolation Spray Valve, MO1-1001-26A, is closed as per TS LCO 3.6.1.3, Condition A. Because Drywell Spray Subsystem A is Inoperable, TRM 3.6.a, Condition A, has been entered.

**Turnover:** Raise reactor power to 88-90% using recirculation flow. Secure RHR Torus Cooling.

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 | N/A | R (ATC) | Raise recirculation flow to achieve 88% power IAW QCOP 0202-03 and QCGP 3-1. |
| 2 | N/A | N (BOP) | Shut down RHR Torus Cooling |
| 3 | Nm1413249d | I/C (ATC)<br>T/S (SRO) | Fail LPRM 32-49-D DOWNSCALE. **TS 3.3.1.1** |
| 4 | rr19A | I/C (ATC)<br>TS (SRO) | ATWS/ECCS/RFP/HPCI/RCIC/TURB transmitter 1-0263-23A slowly fails downscale. **TS 3.3.2.2, 3.3.4.1, 3.3.5.1, 3.3.5.2** |
| 5 | ms04c | M (all) | Rising Containment pressure and temperature due to a LOCA. Initiate an Emergency Depressurization when torus pressure cannot be maintained or when drywell temperature cannot be restored. Includes a failure of Drywell Spray. |
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* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (T)echnical Specification

**Simulator Setup and Turnover Information**

**The simulator setup is contained in IC #130, which MUST be copied onto the S: drive iaw special instructions (see M. Jensen or D. Decker)**

**Commands to be utilized DURING the scenario are contained in the CAEP file**
***nrc scenario 1.cae***

**LOAD the DEFAULT RWM sequence for Unit Shutdown:**

- **LOAD0601SU2957 (verify RWM load name is "U1SUSI")**

**Verify the following commands / overrides are inserted as part of the IC:**

- **Dihs1100126b close (overrides 1001-26B closed)**
- **Dihs1100123a close (overrides 1001-23A closed)**
- **Dihs1100126a close (overrides 1001-26A closed)**
- **Lohs1100123a1 off (turns 1001-23A green light indication off)**
- **Lohs110012ga1 off (turns 1001-26A green light indication off)**

**The following two commands,** *if present in the IC***, should be DELETED from the command summary** *(These were initially part of scenario, but are no longer necessary.)*

**dmf rp10a (Delete the Group III isolation failure if present)**
**dmf rp10b (Delete the Group III isolation failure if present)**

**Hang OOS INFO cards on 1001-23A and 1001-26A**
**Bypass APRM #2 and hang EST tag.**

**Need to have blank EST and LPRM Bypass card available for use during the scenario**
**Need to have LPRM LOG available**

**CREW TURNOVER**

**81% power on FCL 96%**
**Rod step 35 is at Target-Out**

**The Fourth Condensate / Condensate Booster Pump and third Reactor Feed Pump were started at the end of the last shift (QCGP 3-1 step F.3.g.(6))**

**TRM 3.6.a day 2 of 7 for DW sprays (QCAP 230-19 completed)**
**TS 3.6.1.3 A for PCIV 1-1001-23A**

**APRM #2 is bypassed. IM's replaced a power supply and are preparing to perform post-maintenance testing.**

**Online Risk is GREEN.**
**Protected Systems: None.**

**Direction for the oncoming shift:**

- **Raise Reactor Recirc flow to achieve Reactor power of 88-90 percent IAW QCGP 3-1 and QCOP 0202-03 and then await QNE instructions for Control Rod withdraw to raise FCL.**
- **Secure Torus from Suppression Pool Cooling IAW QCOP 1000-09.**

Quad Cities Scenario No.: **1** Event No.: **1** Page 1 of 1

Event Description:

Raise recirculation flow to achieve 88-90% power IAW QCOP 0202-03 and QCGP 3-1.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | SRO | Provides SRO oversight for reactor power increase using core |
| | | |
| | SRO | Directs RO to perform QCOP 0202-03 IAW step F.3 or QCGP 3-1 IAW step F.3.e.2. |
| | | |
| | **NOTE** | **Recirc flow control should be in MASTER Mode at the beginning of this scenario.** |
| | | |
| | ATC | Depresses RAISE pushbutton on 1-0262-22, MASTER SPEED |
| | | |
| | ATC | Raises Recirculation flow to increase power. |
| | | |
| | BOP/ATC | Adjusts pressure set and load set as necessary by depressing the Increase pushbutton on Pressure Setpoint Select on Panel 901-7. |
| | | |
| | **NOTE** | **Crew can proceed to Event 2.** |
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Quad Cities Scenario No.: **1** Event No.: **2** Page 1 of 1

Event Description:

Shut down RHR Torus Cooling

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | **NOTE** | **Crew can perform Event 1 concurrently with Event 2.** |
| | | |
| | SRO | Provides SRO oversight for shut down of RHR Torus Cooling. |
| | | |
| | BOP | Obtains a copy of procedure QCOP 1000-09. |
| | | |
| | BOP | Throttles closed MO 1-1001-36A/B |
| | | |
| | BOP | Stops running RHR pump and fully closes MO 1-1001-36A/B |
| | | |
| | BOP | Closes MO 1-1001-34A/B |
| | | |
| | BOP | Opens MO 1-1001-16A/B |
| | BOP | Opens MO 1-1001-18A/B |
| | BOP | Secure RHRSWPs. Close 1-1001-5A/B valves. |
| | | |

**NOTE:**

**After BOP secures RHRSW pumps and lineup, crew can proceed to next event.**

Quad Cities Scenario No.: **1** Event No.: 3 Page 1 of 3

Event Description:

Fail LPRM 32-49-D downscale. **TS 3.3.1.1 Condition A**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: When directed by the lead Examiner: Fail LPRM 32-49D downscale by inserting:<br>**imf nm14l3249d 0** | | |
| | ATC | Reports LPRM DOWNSCALE alarm to SRO. |
| | | |
| | ATC | References QCAN 901(2)-5 E-7. |
| | | |
| | ATC | Reports LPRM 32-49-D is DOWNSCALE. |
| | | |
| | ATC | Selects rod near LPRM location; reports all other "C" level detectors in area read normally. |
| | | |
| | ATC/ BOP | Demands OD-8 printout. |
| | | |
| | SRO | Refers to QCOP 0700-03. |
| | | |
| | SRO | Directs actions of QCOP 0700-03. |
| | | |
| | ATC | Selects 1D on APRM 3 and verifies "0" output on meter. |
| | | |
| | SRO | Fills out LPRM bypass card and log per QCOP 0700-03, Attachment B. |
| | | |

Quad Cities Scenario No.: **1** Event No.: **3** Page 2 of 3

Event Description:

Fail LPRM 16-33-C downscale. **TS 3.3.1.1 Condition A**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | ATC | Reports APRM 3 will have only ONE "D" level input when LPRM is bypassed. |
| | | |
| | ATC | Reports APRM 3 will have less than minimum number of inputs. |
| | CUE | IMD reports APRM #2 has been repaired but not tested. |
| | ATC | Unbypasses Channel #2 APRM, Bypasses Channel #3 APRM. |
| | SRO | Recognizes entry in TS LCO 3.3.1.1, condition "A". |
| | | |
| | SRO | Refers to QCOP 0700-10 and/or QCAN 901-5, H2 to address OPRMs. |
| | | |
| | ATC | Determines appropriate OPRM affected. |
| | | |
| | SRO | Refers to QCAP 0230-19 for APRM outage report. |
| | | |
| | ATC | Bypass LPRM 32-49-D on APRM 3 per QCOP 0700-03. (Turns switch on back panel down 2 notches.) |
| | | |
| | BOP | Verifies count meter drops 5%. |
| | | |

Quad Cities Scenario No.: **1** Event No.: **3** Page 3 of 3

Event Description:

Fail LPRM 16-33-C downscale. **TS 3.3.1.1 Condition A**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | ATC/ BOP | Resets LPRM alarm on APRM by depressing the trip reset on APRM channel 3 meter. |
| | | |
| | ATC | Verifies full core display alarm light off and LPRM alarm clears. |
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| | **NOTE** | **Crew can proceed to Event 4.** |
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Quad Cities Scenario No.: **1** Event No.: 4 Page 1 of 3

Event Description:

ATWS/ECCS/RFP/HPCI/RCIC/TURB transmitter 1-0263-23A slowly fails downscale.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: When directed by the Lead Examiner, insert malfunction to fail LT 1-0263-23A downscale over 3 minutes: **imf rr19A 0 3:** | | |
| | ATC | Recognizes LI 1-0263-100 is trending downscale. |
| | | |
| | ATC | Verifies RPV level is stable by cross checking to other RPV level instruments, FRV position and steam flow/feed flow mismatch. |
| | | |
| | ATC | Reports 901-3, G-15, Reactor Vessel Low Low Level is alarming and refers to QCAN. |
| | | |
| | SRO | Acknowledge and direct. |
| | | |
| | ATC/ BOP | Verifies no ECCS system or RCIC has started. |
| | | |
| | ATC/ BOP | Determine if any instrument testing is being performed. |
| | | |
| | ATC | Inform SRO to perform QCOS 1600-06. |
| | | |
| | SRO | Acknowledge and direct. |
| | | |

Quad Cities Scenario No.: **1** Event No.: 4 Page 2 of 3

Event Description:

ATWS/ECCS/RFP/HPCI/RCIC/TURB transmitter 1-0263-23A slowly fails downscale.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | BOP | Refers to QCOA 0600-12, FWLC System Trouble, for DFWLC system alarm. |
| | | |
| | ATC/ BOP | Verifies RPV level is stable. |
| | | |
| | CREW | Contact Maintenance to inform them of failure. |
| | | |
| | ATC | Acknowledges OS alarm IAW QCOP 0600-21. |
| | | |
| | SRO | Refers to TS, QCAP 0230-19, QCOS 1600-05 and QCOS 1600-06. |
| | | |
| | SRO | Determines the following TS LCOs apply:<br>● TS 3.3.2.2; (RFP / Main Turbine high level trip) **(2 hr LCO)**<br>● TS 3.3.4.1; (ATWS ARI initiation) **(Tracking LCO)**<br>● TS 3.3.5.1, Function 1.a; (Core Spray initiation) **(Tracking LCO)**<br>● TS 3.3.5.1, Function 2.a; (EDG initiation) **(Tracking LCO)**<br>● TS 3.3.5.1, Function 3.c; (HPCI high level trip) **(24 hr LCO)**<br>● TS 3.3.5.1, Function 4.a; (LPCI initiation) **(Tracking LCO)**<br>● TS 3.3.5.1, Function 5.a; (ADS initiation) **(Tracking LCO)**<br>● TS 3.3.5.2; Function 1 (RCIC initiation) **(Tracking LCO)**<br>● TS 3.3.5.2, Function 2 (RCIC high level trip) **(24 hr LCO)** |
| | | |

Quad Cities Scenario No.: **1** Event No.: **4** Page 3 of 3

Event Description:

ATWS/ECCS/RFP/HPCI/RCIC/TURB transmitter 1-0263-23A slowly fails downscale.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
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| | **NOTE** | **Crew can proceed to Event 5.** |
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Quad Cities Scenario No.: **1** Event No.: 6 Page 1 of 6

Event Description:

Rising Containment pressure and temperature due to a LOCA. Initiate an Emergency Depressurization when torus pressure cannot be maintained or when drywell temperature cannot be restored. Includes a failure of Drywell Spray.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: When directed by the Lead Examiner, insert a Main Steam Line break inside the containment<br>**imf ms04C .5 4: (0.5% ramped over 4 minutes)**<br>When Torus pressure reaches 5 psig, modify the leak to 6% ramped over 4 minutes<br>**mmf ms04C 6 4:** | | |
| | ATC/BOP | Reports to SRO alarm 901-3 A-16, PRIM CNMT HI PRESS, actuated and refers to annunciator procedure. |
| | | |
| | ATC/BOP | Reports drywell pressure rising. |
| | | |
| | SRO | Refers to QCOA 0201-01. |
| | | |
| | ATC/BOP | Performs actions to:<br>● Investigate cause of increasing Drywell pressure;<br>● Attempt to isolate leak;<br>● If a reactor scram or Group II isolation occur, refer to appropriate QGA. |
| | | |
| | ATC/BOP | Notifies Radiation Protection of elevated drywell pressure. |
| | | |
| | ATC/BOP | Monitor leak rate. |
| | | |
| | ATC/BOP | Starts another drywell cooler before drywell pressure reaches 2.5 psig. |
| | | |
| | SRO | Briefs crew on expected auto actions at 2.5 psig. |

Quad Cities Scenario No.: **1** Event No.: 6 Page 2 of 6

Event Description:

Rising Containment pressure and temperature due to a LOCA. Initiate an Emergency Depressurization when torus pressure cannot be maintained or when drywell temperature cannot be restored. Includes a failure of Drywell Spray.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | SRO | Orders Reactor scrammed on high drywell pressure |
| | SRO | Enters QGA 100 and QGA 200 when drywell pressure reaches 2.5 psig. |
| | ATC | Scrams the reactor, reports all rods in. |
| | SRO | Re-enters QGA 100. |
| | | |
| | ATC/BOP | Verifies isolations, ECCS starts, and DG starts (as applicable). |
| | | |
| | ATC/BOP | Reports ECCS auto started. |
| | | |
| | ATC/BOP | Reports Group II isolation occurred properly. |
| | | |
| | ATC/BOP | Controls HPCI injection manually or trip latches HPCI. |
| | | |
| | ATC/BOP | Reports Diesels auto started. |
| | | |
| | ATC/BOP | Controls level 0 - 48 inches. |
| | | |
| | **NOTE** | **HPCI, RCIC, and FW high level trips are disabled due to previous failure of transmitter 1-0263-23A.** |
| | | |
| | ATC/BOP | Confirms pressure is stabilized to below 1060 psig with ADS. |
| | | |
| | ATC/BOP | Initiates RPV cooldown at $\leq$100 °F/hr with bypass valves, (if MSIVs are opened), or ADS valves as appropriate. |

Quad Cities Scenario No.: **1** Event No.: 6 Page 3 of 6

Event Description:

Rising Containment pressure and temperature due to a LOCA. Initiate an Emergency Depressurization when torus pressure cannot be maintained or when drywell temperature cannot be restored. Includes a failure of Drywell Spray.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | SRO | May "Anticipate Blowdown" and direct rapid RPV depressurization using Main Turbine bypass valves when entry into QGA 500-1 RPV Blowdown is anticipated due to rising Containment pressures and DW temperature. |
| | ATC | Closes 1A and 1B FWRV isolation valves. |
| | ATC/BOP | Opens all Turbine Bypass valves using the bypass jack. |
| | | |
| | ATC/BOP | Reports load shed has occurred tripping RBCCW pumps and drywell coolers. |
| | | |
| | SRO | Directs actions of QCOP 5750-19 to restore RBCCW and DW coolers. |
| | | |
| | ATC/BOP | Verifies Bus 18 and 19 voltage >450 volts. |
| | | |
| | ATC/BOP | Takes the U1 DIV I DW CLR/RBCCW/FPC TRIP BYPASS switch to BYPASS position. |
| | | |
| | ATC/BOP | Takes the U1 DIV II DW CLR/RBCCW/FPC TRIP BYPASS switch to BYPASS position. Checks Drywell temperature is less than 260 °F. |
| | | |
| | ATC/BOP | Starts 1A and 1B RBCCW pump. |
| | | |
| | ATC/BOP | Starts drywell coolers one at a time. |
| | | |

Quad Cities Scenario No.: **1** Event No.: 6 Page 4 of 6

Event Description:

Rising Containment pressure and temperature due to a LOCA. Initiate an Emergency Depressurization when torus pressure cannot be maintained or when drywell temperature cannot be restored. Includes a failure of Drywell Spray.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | ATC/BOP | Starts Drywell Booster Fan. |
| | | |
| | SRO | Directs actions of QGA 200. |
| | | |
| | SRO | Directs torus sprays when torus pressure is >2.5 psig. |
| | | |
| | ATC/BOP | Verifies torus level < 27 feet. |
| | | |
| | ATC/BOP | Initiates torus sprays. |
| | | |
| | SRO | Verifies drywell parameters are within DSIL curve when torus pressure exceeds 5 psig. |
| | | |
| | SRO | Directs DW sprays. |
| | | |
| | ATC/BOP | Verifies Torus level <17 feet. |
| | | |
| | ATC/BOP | Verifies recirc pumps tripped. |
| | | |
| | ATC/BOP | Trips all drywell coolers when directed by SRO. |
| | | |

Quad Cities Scenario No.: **1** Event No.: 6 Page 5 of 6

Event Description:

Rising Containment pressure and temperature due to a LOCA. Initiate an Emergency Depressurization when torus pressure cannot be maintained or when drywell temperature cannot be restored. Includes a failure of Drywell Spray.
**CT denotes Critical Task**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | ATC/BOP | Attempts to initiate drywell sprays. |
| | | |
| | ATC/BOP | Reports unable to initiate drywell sprays. |
| | | |
| | SRO/BOP | Directs NLO investigate 26B valve breaker. |
| | | |
| | SRO | Directs restart of DW coolers |
| | | |
| | ATC/BOP | Restart drywell coolers |
| | | |
| | ATC/BOP | Starts torus cooling. |
| | | |
| | ATC/BOP | Monitors torus level. |
| | | |
| | ATC/BOP | Starts CAMs, monitors drywell and torus hydrogen and oxygen concentration. |
| **CT** | SRO | Enters QGA 500-1 to blowdown the vessel when it is determined drywell temperature cannot be restored below 280 degrees F or torus cannot be maintained within PSP limits. |
| | | |
| | SRO | Directs actions of QGA 500-1. |
| | | |
| | SRO/ ATC/BOP | Report Drywell pressure above 2.5 psig. |

Quad Cities Scenario No.: **1** Event No.: 6 Page 6 of 6

Event Description:

Rising Containment pressure and temperature due to a LOCA. Initiate an Emergency Depressurization when torus pressure cannot be maintained or when drywell temperature cannot be restored. Includes a failure of Drywell Spray.
**CT denotes Critical Task**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | ATC/BOP | Prevent injection from Core Spray and LPCI not needed for Core Cooling by diverting LPCI flow to Torus cooling and/or placing pumps in PTL. |
| | | |
| | ATC/BOP | Reports torus level > 5 feet. |
| | | |
| **CT** | ATC/BOP | Opens all ADS valves, leaves switches in MAN. |
| | | |
| | ATC/BOP | Verifies all ADS valves open by acoustic monitor indication. |
| | | |
| | ATC/BOP | Trips RFPs due to level exceeding +48 inches. |
| | | |
| | SRO | Stays in QGA 500-1 for pressure control. |
| | | |
| | ATC/BOP | Monitors level instrument watching for indications of saturation |
| | | |
| | ATC/BOP | Reports RCIC isolated on low RPV pressure. |
| | | |
| | ATC/BOP | Reports HPCI isolated on low RPV pressure |
| | | |
| | **NOTE** | **End of Event 6.** |
| | | |

Facility: Quad Cities Unit 1 & 2 Scenario No.: **2** Time Start: _____

Examiners: _____ Operators: (SRO)_____

_____ (ATC)_____

_____ (BOP)_____

Initial Conditions: Unit is shutting down. The shift is ready to begin step F.3 of QCGP 2-1 and 4-1. RHRSW "B" is OOS. 1A Core Spray is Inoperable due to replacement of its motor. In TS LCO 3.5.1, Condition B, day 2 of 7. De-inerting of the Drywell is complete and de-inerting of the Torus through the Reactor Building vents is in progress. In the 10th hour of a 24 hour LCO for both TS LCO 3.6.2.5, Condition A, and 3.6.3.1, Condition A.

Turnover: QCGP 2-1 has been completed up to and including Step F.2.

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 | N/A | R (ATC) | Continue plant shutdown by inserting rods IAW step F.4 of QCGP 2-1 and 4-1. |
| 2 & 3 | NM08B | I/C (ATC)<br>TS (SRO) | APRM channel #2 fails upscale with a failure to ½ scram.<br>**TS 3.3.1.1** |
| 4 | | TS (SRO) | Large Lube Oil Leak from Unit 1 EDG. Unit 1 EDG to be declared INOPERABLE. **TS 3.8.1, 3.5.1, 3.0.3** |
| 5 | ano9013b13 | I/C (BOP)<br>T/S (SRO) | ADS Timer initiation. Invalid signal.<br>**TS 3.3.5.1, 3.5.1** |
| 6 | rr10a | M (All) | Recirculation Suction line break. |
| 7 | ed02 | I/C (BOP) | Station Blackout occurs. Take actions to monitor plant parameters and restore electrical power IAW QCOA 6100-04, QCOA 6100-03 and/or QCOP 6500-08. |
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* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (T)echnical Specification

**Simulator Setup and Turnover Information**

**The simulator setup is contained in IC #131, which MUST be copied onto the S: drive iaw special instructions (see M. Jensen or D. Decker)**

**Commands to be utilized DURING the scenario are contained in the CAEP file**

- ***nrc scenario 2.cae***

**LOAD the correct RWM sequence for Unit Shutdown:**

- **LOAD0601SD (verify RWM load name is "U1SIM"**

**Verify the following commands / overrides are inserted as part of the IC:**

- **rp02a RPS A1 auto-scram failure**
- **rp02c RPS A2 auto-scram failure**
- **dg03a U1 EDG failure to start**
- **dg03b ½ EDG failure to start**
- **ed02 Loss of T12 (LOOP) tied to go insert when TRIGGER 2 goes true**
- **TRIGGER 2 Goes true upon DW pressure exceeding 2.4 psig**
  - **pcpdwg.gt.2.4.**
- **dihs1140225a close (CS 25A c/s overridden to CLOSE)**
- **dihs114024a close (CS 4A c/s overridden to CLOSE)**
- **dihs114023a close (CS 3A c/s overridden to CLOSE)**
- **dihs1140224a close (CS 24A c/s overridden to CLOSE)**
- **dihs1140238a close (CS 8A c/s overridden to CLOSE)**
- **1A CS pump in PTL hang info card**
- **lohs1140225a1 off (CS 25A closed light OFF) hang info card**
- **lohs114024a1 off (CS 4A closed light OFF) hang info card**
- **lohs114023a1 off (CS 3A closed light OFF) hang info card**
- **lohs1140224a1 off (CS 24A closed light OFF) hang info card**
- **lohs1140238a1 off (CS 38A closed light OFF) hang info card**
- **TRIGGERS 5 & 6 set to go true IF RPS test switch A2 is operated**
  - **zdihs10590302c (5 and 6) with commands dmf rp02a and dmf rp02c respectively**
- **TRIGGERS 7 & 8 set to go true IF RPS test switch A1 is operated**
  - **zdihs10590302a (7 and 8 ) with commands dmf rp02a and dmf rp02c respectively**

**Turnover INFO**

**Unit is shutting down for a regularly scheduled refueling outage per QCGP 2-1 and QCGP 4-1. Aux Power transfer per QCGP 2-1 step F.3 has been completed.**

**Rod step 13 is partially inserted**
**Recirc Pumps are at minimum.**
**Reactor power is 16 %**

**1A CS loop is OOS for motor replacement**

- **TS 3.5.1 Condition B day 2 of 7**
-

**Containment De-inerting is in progress per QCOP 1600-08 step F.3**

- **DW is de-inerted**
- **Torus de-inerting is in progress**
- **TS 3.6.2.5 (DW to Torus d/p) 10 hours into a 24 hour applicability statement**
- **TS 3.6.3.1 (Primary Containment oxygen concentration) 10 hours into a 24 hour applicability statement**

**Online Risk is YELLOW due to YELLOW SFAT for Low Pressure Injection.**
**Protected Systems include: B Loop LPCI/SDC Injection Valves, 1B Core Spray Loop**

**Direction for the oncoming shift:**

- **Continue power reduction as directed by QCGP 2-1 step F.4**

Quad Cities Scenario No.: **1** Event No.: **1** Page 1 of 1

Event Description: Continue plant shutdown by inserting rods IAW step F.4 of QCGP 2-1 and 4-1.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | SRO/US | Directs and supervises. |
| | | |
| | **NOTE** | **First rod to be inserted by the ATC will be rod D-6.** |
| | | |
| | ATC | Continue to insert rods in sequence per QCGP 4-1. |
| | | |
| | BOP | Monitors and assists as directed. |
| | | |
| | **NOTE** | **After 3 rods are inserted, crew can proceed to Event 2.** |
| | | |
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| Quad Cities | Scenario No.: **2** Event No.: **2** & 3 | Page 1 of 2 |
|---|---|---|
| Event Description: APRM channel #2 fails upscale with a failure to ½ scram. | | |

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: When directed by the Lead Examiner, fail APRM 2 upscale.<br>**imf nm08b 100** | | |
| | ATC | Reports APRM #2 failed upscale. |
| | | |
| | ATC/BOP /SRO | Determines that a ½ scram was not inserted. |
| | SRO | Reviews QCOA 0700-03. |
| | **CUE** | **If QCOA 0500-01 is entered, then simulate half scram when RPS test switch 1-590-302 A-D is placed in TRIP.** |
| | | |
| | ATC | Manually inserts a ½ scram on the affected (A) channel. |
| | | |
| | ATC/BOP /SRO | Verifies the APRM #2 channel is failed by checking the back panel indications. |
| | | |
| | ATC/BOP | Refers to QCOA 0700-03. |
| | | |
| | SRO | Directs APRM #2 bypassed IAW QCOP 0700-04, Step F.3. |
| | | |
| | SRO | Verifies minimum number of OPERABLE APRMs per TS 3.3.1.1, Condition A, and TRM Section 3.3.a. |
| | | |
| | ATC | Places APRM Bypass joystick to bypass APRM CH 2. |
| | | |
| | ATC/BOP | Verifies B-14, D-2, H-1, C-14 are reset on the 901-5 panel. |
| | | |

Quad Cities Scenario No.: **2** Event No.: **2** Page 2 of 2

Event Description: APRM channel #2 fails upscale with a failure to ½ scram.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | ATC/BOP | Verifies OPRM INOP LED lit and 901-5, H-1 alarms. |
| | | |
| | ATC/BOP | Hangs an EST or AR tag on bypass joystick. |
| | | |
| | SRO | Refers to QCAP 0230-19. |
| | | |
| | ATC/SRO | Contacts Maintenance to investigate the APRM and RPS failures. |
| **NOTE: The crew may go to the back panels to investigate cause of failure to receive a ½ SCRAM. If relay 590-107E is checked, indicate that it looks as if the glass is discolored and that there is an acrid odor.. IF the crew does not check this relay, when Maintenance investigates, report the same.** | | |
| | SRO | Checks Tech Specs to insure requirements of TS 3.3.2.1 (Rod Block Actuation) and TRM 3.3.a are met. |
| | | |
| | **NOTE** | **Crew can proceed to Event 4. The following step resets the half scram. This can occur while Event 4 is running.** |
| | | |
| | **CUE** | **Report to SRO that Maintenance has determined that the failure to scram was due to an APRM CH 2 circuit failure.** |
| | | |
| | SRO | Directs the ½ scram per QCOP 500-3. |
| | | |
| | ATC | Resets the ½ scram per QCOP 500-3. |
| | | |
| | **CUE** | **Crew can proceed to Event 4.** |
| | | |

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Quad Cities Scenario No.: **2** Event No.: **4** Page 1 of 1

Event Description: Large Lube Oil Leak from Unit 1 EDG. Unit 1 EDG to be declared INOPERABLE. TS 3.8.1, 3.7.1, 3.4.7

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | **CUE** | **NLO calls Control Room and reports a large lube oil leak from the Unit 1 EDG. The oil appears to be leaking from the engine sump and is NOT going into the floor-drain** |
| | | |
| | SRO | Enters into LCO 3.8.1, Condition B. |
| | | |
| | BOP | Positions Unit 1 EDG Control Switch to STOP. |
| | | |
| | SRO | Recognizes that SR 3.8.1.1 is required to be performed within 1 hour and once per 8 hours thereafter. |
| | | |
| | SRO | Recognizes, per TS Action 3.8.1, B.2, that "B" Core Spray Subsystem is to be declared INOPERABLE since "A" Core Spray Subsystem is INOPERABLE. |
| | | |
| | **NOTE** | **TS Action 3.8.1, B.2, needs to be met within 4 hours. Therefore, entry into TS 3.5.1, Condition I, does not need to be taken immediately, but the candidate should be aware that entry is required within 4 hours. May be addressed as follow-up question.** |
| | | |
| | SRO | Recognizes that entry into LCO 3.5.1, Condition I, is required. Condition I requires entry into TS LCO 3.0.3. |
| | | |
| | **CUE** | **Crew can proceed to Event 5.** |
| | | |

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Quad Cities Scenario No.: **2** Event No.: **5** Page 1 of 1

Event Description: ADS Timer Initiation. Invalid signal.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: When directed by the Lead Examiner, insert ADS timer started alarm.<br>**imf ano9013b13 on** | | |
| | BOP | Reports that ADS "A" has initiated. |
| | | |
| | BOP | Refer to QCAN 901(2)-3 B-13 to respond to ADS initiation. |
| | | |
| | BOP | Confirms that Drywell pressure is < 2.43 psig. |
| | | |
| | BOP | Confirms that Rx Low-Low Level > -56.78 inches. |
| | | |
| | BOP | Depresses and holds pushbutton TIMER RESET for 3 seconds. |
| | | |
| | BOP | Verifies that alarm does NOT clear. |
| | | |
| | BOP | Places AUTO BLOWDOWN INHIBIT keylock switch to INHIBIT. |
| | | |
| | SRO | Acknowledge and direct. |
| | | |
| | SRO | Refers to Technical Specification 3.3.5.1 and 3.5.1. |
| | | |
| | **CUE** | **Crew can proceed to Event 6.** |
| | | |
| | ATC | Monitor and assist. |
| | | |

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| Quad Cities | Scenario No.: **2** Event No.: ~~6~~ | Page 1 of 2 |
|---|---|---|
| Event Description: Suction Line break in the Recirculation Piping. | | |

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: When directed by the Lead Examiner, insert a suction line break in the A recirc loop. **imf rr10a 0.2**<br>**NOTE: Station Blackout (Event 7) will occur automatically when DW pressure exceeds 2.4 psig.** | | |
| | CREW | Recognizes increase in drywell pressure. |
| | | |
| | SRO | Directs scram due to increasing drywell pressure. |
| | | |
| | ATC | Manually scrams the reactor. |
| | | |
| | ATC | Reports Mode Switch in Shutdown and all rods are in. |
| | | |
| | ATC/BOP | Injects with RCIC, HPCI, or the SSMP to control reactor water level. |
| | | |
| | SRO | Enters QGA 100 and 200 due to High Drywell pressure. (2.5 psig) |
| | | |
| | ATC/BOP | Verifies isolations and auto initiations at 2.5 psig. |
| | | |
| | ATC/BOP | Dispatches operators to locally monitor containment parameters. |
| | | |
| | ATC/BOP | Dispatches operators to restore A & B RPS to normal. |
| | | |
| | ATC/BOP | Starts RHR Pump. |
| | | |

Quad Cities Scenario No.: **2** Event No.: 6 Page 2 of 2

Event Description: Suction Line break in the Recirculation Piping.
**CT denotes Critical Task**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | ATC/BOP | Backfeed MCCs 13-1 and 14-1. |
| | | |
| | ATC/BOP | While loading Bus 13-1 and 14-1, verifies that loading is less than 600 Amps. |
| | | |
| | SRO | Orders Torus sprays when Torus pressure exceeds 2.5 psig |
| | | |
| | ATC/BOP | Starts torus sprays. (when power is restored in event 7) |
| | | |
| | SRO | VERIFIES DW coolers and Reactor Recirc pumps OFF prior to ordering DW sprays. |
| | | |
| CT | SRO | Orders DW sprays when Torus pressure exceeds 5 psig after verifying DW pressure and temperature are within the limitations of the DSIL curve. (occurs AFTER power is restored in event 7) |
| | | |
| CT | ATC/BOP | Starts drywell spray. |
| | | |
| **NOTE: Due to 600 amp load limitations on the crosstie breakers, the SRO may not order backfeed of Busses 13 and 14. IF not, then the next step will be NA.** | | |
| | ATC/BOP | Starts RHRSW pump from either (or both) 13 (A, B) or 14 (C, D). |
| | | |
| | **CUE** | **End of Event 6** |
| | | |

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Quad Cities Scenario No.: **2** Event No.: ~~7~~ Page 1 of 4

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Event Description: Station Blackout occurs. Take actions to monitor plant parameters and restore electrical power IAW QCOA 6100-04, QCOA 6100-03 and/or QCOP 6500-08.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | ATC | Reports that reactor has scrammed. Reports that all rods are in. |
| | | |
| | SRO | Directs operators to take actions of QCOA 6100-3, LOSS OF OFF-SITE POWER. |
| | | |
| | BOP | Attempts to start the Unit 1 and the 1/2 diesel generator. |
| | | |
| | **CUE** | **Air system to 1/2 EDG is ruptured.** |
| | | |
| | BOP/ SRO | Dispatches an operator to start the Unit 1 and the 1/2 diesel generator locally. |
| | | |
| | BOP/ATC | Places the following breakers in PTL IAW QCOA 6100-03:<br>- T11 to B11, B12, B13, B14<br>- T12 to B11, B12, B13, B14<br>- B13 to T15<br>- B14 to T16, T17<br>- B14 to B14-1<br>- B13 to B13-1<br>- B13-1 to T10<br>- B13 to T1A |
| | | |
| | SRO/BOP/ ATC | Dispatches NLO to investigate loss of T-12. |
| | | |
| | **CUE** | **There was a lightning strike on T-12.** |
| | | |

Quad Cities Scenario No.: **2** Event No.: **7** Page 2 of 4

Event Description: Station Blackout occurs. Take actions to monitor plant parameters and restore electrical power IAW QCOA 6100-04, QCOA 6100-03 and/or QCOP 6500-08.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | BOP/ATC | Operates HPCI/RCIC/SSMUP as necessary to maintain RPV level and pressure. |
| | | |
| | BOP/ATC | Verifies RB ventilation is isolated. |
| | | |
| | BOP/ATC | Verifies Gen H2 Main seal oil pump or emergency H2 seal oil pump is running. |
| | | |
| | SRO | Notifies U-2 SRO to restore power to both SBO 125 VDC battery chargers within 1 hour per QCOA 6100-17. |
| | | |
| SIMOP: When 23-1 to 13-1 crosstie is requested then close the breaker on 23-1 with the command:<br>**irf ed56r close** | | |
| **NOTE: Energizing either 13-1 OR 14-1 will provide AC power to one safety-related division. Therefore, completing either Critical Task (CT) would suffice.** | | |
| **CT** | BOP/ATC | Places the following breakers/control switches in PTL and restores Bus 13-1 from Bus 23-1 IAW QCOP 6500-08, if 1/2 DG is not available.<br>- B13-1 & B61<br>- 1/2 DG to B13-1<br>- B13 to B13-1<br>- "A" CS pump<br>- "A" & "B" RHR pumps |
| | | |
| | BOP/ATC | Verifies Bus 18 is energized |
| | | |

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| Quad Cities | Scenario No.: **2** | Event No.: 7 | Page 3 of 4 |
|---|---|---|---|

Event Description: Station Blackout occurs. Take actions to monitor plant parameters and restore electrical power IAW QCOA 6100-04, QCOA 6100-03 and/or QCOP 6500-08.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: When 24-1 to 14-1 crosstie is requested then close the breaker on 24-1 with the command:<br>**irf ed34r close** | | |
| | | |
| | BOP/ATC | Cross connect buses 18 and 19 OR may wait and verify bus 19 is energized after bus 14-1 is crosstied. |
| | | |
| **CT** | BOP/ATC | Places the following breakers/control switches in PTL and restores Bus 24-1 IAW QCOP 6500-08, if Unit One DG is not available:<br>- B14 & B61<br>- U1 DG to B14-1<br>- B14 to B14-1<br>- "B" CS pump<br>- "C" & "D" pumps |
| | | |
| | BOP/ATC | Verifies Bus 19 is energized (if not cross connected earlier) |
| | | |
| | SRO | Directs Operators to backfeed Bus 13 from 13-1 and Bus 14 from 14-1 IAW QCOA 6100-03 when AC power is available. |
| | | |
| | BOP/ATC | Places the following breakers/control switches in PTL:<br>- A, B, & C circulating water pumps<br>- A, B, C, & D condensate pumps<br>- A & B CRD pumps<br>- A, B, C, & D RHR SW pumps<br>- A, B, & 1/2 SW pumps |
| | | |
| | | |
| | | |

Quad Cities Scenario No.: **2** Event No.: 7 Page 4 of 4

Event Description: Station Blackout occurs. Take actions to monitor plant parameters and restore electrical power IAW QCOA 6100-04, QCOA 6100-03 and/or QCOP 6500-08.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | BOP/ATC | Energizes 480 VAC busses as necessary. |
| | | |
| | BOP/ATC | Restarts RBCCW system as soon as possible. |
| | | |
| | BOP/ATC | Starts drywell coolers and booster fans as load will permit (unless off due to DW spray initiation) |
| | | |
| | BOP/ATC | Completes the actions of QCOA 6100-3. |
| | | |
| | SRO | Reviews GSEP MS1 Loss of ALL AC Power for ≥15 minutes if neither B13-1 nor B14-1 is energized within 15 minutes OR MA1 if either B13-1 or B14-1 is energized within 15 minutes. (At direction of Lead Examiner, may ask as follow-up if busses are not de-energized > 15 minutes) |
| | | |
| | **CUE** | **End of Event 7** |
| | | |

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**Appendix D** **Scenario Outline** **Form ES-D-1**

Facility: Quad Cities Unit 1 & 2 Scenario No.: **3** Time Start: _____

Examiners: _____ Operators: (SRO)_____

_____ (ATC)_____

_____ (BOP)_____

Initial Conditions: Reactor power is at 48%.

Turnover: The shift will start the B SBGT system perform its monthly Operability Surveillance.

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 | N/A | N (BOP) | Start the Standby Gas Treatment System for QCOS 7500-05 |
| 2 | N/A | TS (SRO) | 1C RHRSW Inoperable (All oil has leaked out of bearing)<br>**TS 3.7.1** |
| 3 | rd07a | I/C (ATC) | Control Rod Drive Pump Failure. |
| 4 | rd04r3023 | I/C (ATC) | Rod drift from 00 to 02 after CRD pump start. |
| 5 | | I/C (BOP/ATC) TS (SRO) | Loss of Power to Bus 13-1 with a failure of the EDG to start.<br>**TS 3.8.1.A, 3.8.1.B, 3.8.1.D, and 3.8.1.B (Unit 2)** |
| 6 | eg07a | I/C (BOP) I/C (ATC)<br>R (ATC) | Turbine Generator slowly loses stator water cooling. Both ATC and BOP need to take actions IAW QCOA 5300-01.<br>Emergency down power by inserting control rods. |
| 7 | ms09d | M (all) I/C (all) | MSL break with a failure to receive a Group 1 isolation on low steam pressure, close the MSIVs to limit plant cooldown to less than 100 degrees per hour, and recognize that a TS Safety Limit has been violated if pressure drops below 785 psig with power above 25%. |
| | | | |
| | | | |
| | | | |
| | | | |

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

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**Simulator Setup and Turnover Information**

**The simulator setup is contained in IC #132, which MUST be copied onto the S: drive iaw special instructions (see M. Jensen or J. Swain)**

**Commands to be utilized DURING the scenario are contained in the CAEP file**

- ***nrc scenario 3.cae***

**LOAD the DEFAULT RWM sequence for Unit Shutdown:**

- **LOAD0601SU2957 (verify RWM load name is "U1SUSI")**

**Verify the following commands / overrides are inserted as part of the IC:**

- **dg04b true** **(1/2 EDG auto start failure)**
- **rp06a** **(Group I isolation failure)**
- **rp06b** **(Group I isolation failure)**
- **rp06c** **(Group I isolation failure)**
- **rp06d** **(Group I isolation failure)**
- **ms02d** **(1D MSIV failure to close)**
- **ms02H** **(2D MSIV failure to close)**
- **rd02r3023 02** **(Rod H6 stuck at position 02)**
- **dihs15300cpb trip** **(1B Stator CW pump c/s overridden to trip)**

**Turnover INFO**

**Reactor Power is at 48%**
**FCL is 69%**
**Rod step 32 is at Target Out.**

**Online Risk is GREEN.**
**Protected Systems include: None.**

**Direction for the oncoming shift:**

- **QCOS 7500-05 is due for the ½ B SBGT train.**
- **Holding power for QNE to adjust rod sequence.**

Quad Cities Scenario No.: **3** Event No.: **1** Page 1 of 1

Event Description:

Start the Standby Gas Treatment System for QCOS 7500-05.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | BOP | Verifies U-1 RB INLET DMPR TO SBGT AND/OR U-2 RB INLET DMPR TO SBGT, 1-7503 AND 2-7503, are open. |
| | | |
| | BOP | Starts "B" SGTS by positioning "B" train mode selector switch to START. |
| | | |
| | BOP | Verifies 1-7504B closed. |
| | | |
| | BOP | Verifies 1-7505B and 1-7507B open.. |
| | | |
| | BOP | Verifies the SBGT fan and air heater are ON. |
| | | |
| | US | Directs start and supervises. |
| | | |
| | ATC | Monitors panels and assists as directed. |
| | | |
| | **CUE** | **Crew can proceed to event 2.** |
| | | |

Quad Cities Scenario No.: **3** Event No.: **2** Page 1 of 1

Event Description:

1C RHRSW Inoperable (All oil has leaked out of bearing) **TS 3.7.1**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: To add realism, call as the NLO on rounds and inform the ATC/BOP that you will be entering the RHRSW vaults. THEN insert alarm, **imf ano9017a8 ON** (and delete same) twice prior to making the call below. | | |
| | **CUE** | **Operator reports that the outboard bearing sight glass for the 1C RHRSW high pressure pump is broken and all the oil has drained out.** |
| | | |
| | SRO | Orders the BOP to place the control switch for 1C RHRSW pump in PTL |
| | | |
| | BOP | May place the control switch for the 1C RHRSW pump in PTL |
| | | |
| | SRO | Recognize that entry into LCO 3.7.1 is required and Action A.1 taken. 30 day LCO. |
| | | |
| | **CUE** | **Crew can proceed to event 3.** |
| | | |

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Quad Cities Scenario No.: **3** Event No.: **3** Page 1 of 2

Event Description:

Control Rod Drive Pump Failure (A Pump).

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: At the direction of the Lead Examiner, trip the 1A CRD pump.<br>**imf rd07a** | | |
| | ATC | Report that A CRD Pump has tripped. |
| | | |
| | ATC | Verify MO 1(2)-301-2B, 1(2) B PMP DISCH VLV is closed. |
| | | |
| | **NOTE** | **TS 3.1.5 may be referred to if accumulator pressure falls below 940 psig.** |
| | | |
| | ATC | Start B CRD pump. |
| | | |
| | ATC | Throttle MO 1(2)-301-2B is to maintain 1400-1500 psig discharge pressure. |
| | | |
| | **CUE** | **1A CRD Pump tripped on overcurrent.** |
| | | |
| | ATC | Close MO 1(2)-301-2A, 1(2) A CRD PMP DSCH VLV. |
| | | |
| | ATC/SRO | Dispatch an operator to verify proper operation of the running pump. AND to determine cause for the 1A CRD pump trip |
| | | |
| | ATC / SRO | Dispatch an operator to the breaker for 1A CRD pump to investigate cause of trip |
| | | |
| | ATC | Directs NLO to Close 1(2)-301-254A, 1(2)A CRD PUMP MIN FLOW ISOLATION VLV. |
| | | |

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Quad Cities Scenario No.: **3** Event No.: **3** Page 2 of 2

Event Description:

Control Rod Drive Pump Failure (A Pump).

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | ATC | Directs NLO Open 1(2)-301-254B, 1(2)B CRD PUMP MIN FLOW ISOLATION VLV. |
| | | |
| | BOP | Monitor panels and assist as directed. |
| | | |
| | **NOTE** | **It may take approximately 10 minutes for CRD parameters to return to normal.** |
| | | |
| | **CUE** | **Crew can proceed to event 4.** |
| | | |
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Quad Cities Scenario No.: **3** Event No.: **4** Page 1 of 1

Event Description:

Rod drift from 00 to 02 after CRD pump start.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: At the direction of the Lead Examiner, cause Control Rod H-6 to drift outward (note, it will stick at position 02)<br>**imf rd04r3023** | | |
| | ATC | Reports rod drift / misposition. |
| | | |
| | ATC | References QCOA 0300-04 to respond to rod misposition. |
| | | |
| SIMOP: **After** Control Rod H6 stops at position 02, **then delete** the drift and stuck rod (IN THAT ORDER)<br>**dmf rd04r3023 AND dmf rd02r3023** | | |
| | ATC | Inserts the mispositioned control rod to its targeted position. |
| | | |
| | ATC/SRO | Notifies QNE of the rod mispositioning. |
| | | |
| | SRO | Directs actions/procedure. |
| | | |
| | BOP | Monitors and assists. |
| | | |
| | **CUE** | **Crew can proceed to Event 5.** |
| | | |

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Quad Cities Scenario No.: **3** Event No.: **5** Page 1 of 3

Event Description:

Loss of Power to Bus 13-1 with a failure of the EDG to start. . **TS 3.8.1.A, 3.8.1.B, 3.8.1.D, and 3.8.1.B (Unit 2)**

**CT denotes Critical Task**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: When directed by the Lead Examiner, trip the feed breaker from 13 to 13-1 by inserting the following commands simultaneously in rapid succession:<br>**ior loil1650013122 ON**<br>**ior lohs1650013272 ON**<br>**ior dihs165001327 trip** | | |
| | BOP | Reports that power has been lost to Bus 13-1. |
| | | |
| | BOP | Reports that the 1/2 DG failed to start and energize Bus 13-1. |
| | | |
| CT | BOP | Manually starts the 1/2 DG and energizes Bus 13-1 IAW QCOA. 6600-02. |
| | | |
| | BOP | Reports that the 1/2 DG was manually started and 13-1 is energized. |
| | | |
| | BOP | Verifies Bus 18 is energized. |
| | | |
| | SRO | Recognize that entry into TS LCO 3.8.1, Conditions A, B, and D is required. Also, entry into TS 3.8.1, Condition B, for Unit 2 is required. |
| | | |
| | BOP/SRO | Dispatches operator to evaluate status of the ½ DG and the feeder breaker to 13-1. |
| | | |
| | BOP/ATC | Reports Loss of Feedwater Heating. Increases reactor power IAW QCOA 3500-01 |

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Quad Cities Scenario No.: **3** Event No.: **5** Page 2 of 3

Event Description:

Loss of Power to Bus 13-1 with a failure of the EDG to start. **TS 3.8.1.A, 3.8.1.B, 3.8.1.D, and 3.8.1.B (Unit 2)**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | BOP | Restarts Instrument Air Compressors. |
| | | |
| | BOP | Restore power to RPS. |
| | | |
| | BOP | Dispatches operator to locally open FW heating normal drains. |
| | | |
| | ATC | Monitors panels and assists as directed. |
| | | |
| | US | Directs entry into procedure. |
| | | |
| | BOP/SRO | Reopens Drywell O2 analyzer valves. |
| | | |
| | BOP | Restarts the Drywell unit coolers. |
| | | |
| | ATC | Re-energizes RPS. |
| | | |
| | BOP | Reports loss of 1/2 IAC due to Loss of Power. Air header pressure is lowering. |
| | | |
| | BOP | Starts Unit 2 IAC and Unit 1B IAC. |
| | | |
| | ATC | Resets ½ scram and reports all rods in. |
| | | |

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Quad Cities Scenario No.: **3** Event No.: **5** Page 3 of 3

Event Description:

Loss of Power to Bus 13-1 with a failure of the EDG to start. **TS 3.8.1.A, 3.8.1.B, 3.8.1.D, and 3.8.1.B (Unit 2)**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| SIMOP: As directed by the candidates, the following commands will be utilized during the recovery from the loss of RPS. Not all commands may be requested or used.<br>**irf rp29r reset** (A RPS to normal)<br>**irf rp02r alt** (A RPS to alt power)<br>**irf rp30r reset** (A RPS reset)<br><br>Feedwater Heater Latching<br>**(as indicated in CAEP file) Wait one minute between heater latch-ups**<br><br>Restart ECCS Keep-Fill<br>**irf cs04r norm**<br><br>If additional actions requested, discuss with Lead Examiner to determine proper response. | | |
| | | |
| | BOP/ATC | Recognizes loss of feedwater heating and references QCOA 3500-01. |
| | | |
| | **CUE** | **Crew can proceed to event 6.** |
| | | |
| | | |
| | | |

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Quad Cities Scenario No.: **3** Event No.: **6** Page 1 of 2

Event Description:

Turbine Generator slowly loses stator water cooling. Both ATC and BOP need to take actions IAW QCOA 5300-01.
**CT denotes Critical Task**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: At the direction of the Lead Examiner insert slow-failure of the 1A stator water pump over 10 minutes<br>**imf eg07a 100 10:** | | |
| | ATC/BOP | Reports GEN STATOR COOLING PANEL TROUBLE alarm and refers to the annunciator procedure. |
| | | |
| | BOP/SRO | Immediately dispatches an operator to the stator cooling water panel and the pumps. |
| | | |
| | **CUE** | **A stator pump "grinding sound."** |
| | | |
| | BOP | Checks Load Set for runback. |
| | | |
| | SRO | Directs the actions of QCOA 5300-01. |
| | | |
| | ATC/BOP | Reports unable to start standby stator cooling water pump. |
| | | |
| **CT** | BOP/ATC | Initiates emergency power reduction per QCGP 3-1. Inserts all CRAM rods. |
| | | |
| | ATC | Checks power/flow curve. |
| | | |
| | BOP | Reduces VARS on generator to zero. |
| | | |
| | | |

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Quad Cities Scenario No.: **3** Event No.: **6** Page 2 of 2

Event Description:

Turbine Generator slowly loses stator water cooling. Both ATC and BOP need to take actions IAW QCOA 5300-01.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | SRO | Sets scram criteria:<br>- 9th bypass valve open; or<br>- reactor pressure increasing; or<br>- oscillations on neutron monitoring |
| | | |
| | **CUE** | **Stator cooling flow is decreasing.** |
| | | |
| | BOP/SRO | Dispatches an operator to the stator cooling panel to check stator cooling water conductivity. |
| | | |
| | **CUE** | **Conductivity is 0.1 umho.** |
| | | |
| **NOTE: Per QCOA 5300-01, the turbine generator must be tripped within 1 hr.** | | |
| | | |
| | ATC | Continues to insert in-sequence CRDs. |
| | | |
| | BOP | Checks stator amps < 7380 after runback. |
| | | |
| | ATC | Reduces reactor power with recirculation flow and rods to <33.5% core thermal power in prep for taking off the generator. |
| | | |
| | **CUE** | **Crew can proceed to event 7.** |
| | | |

Quad Cities Scenario No.: **3** Event No.: **7** Page 1 of 3

Event Description:

MSL break with a failure to receive a Group 1 isolation on low steam pressure, close the MSIVs to limit plant cooldown to less than 100 degrees and recognize that a TS Safety Limit has been violated if pressure drops below 785 psig with power above 25%.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: At the direction of the Lead Examiner, insert a large (10%) MSL break in the steam tunnel<br>**imf ms09d 10 0:** | | |
| | ATC | Reports that pressure is decreasing. |
| | | |
| | ATC/BOP | Reports high area temperature in the MSIV Room. |
| | | |
| | SRO | Orders the reactor to be scrammed. |
| | | |
| | ATC/BOP | Reports that reactor has been scrammed and all rods are in. |
| | | |
| **Note: IF the Operators promptly order the scram and move the Reactor Mode Switch to Shutdown, the Group 1 signal will be bypassed (and will not have failed). Likewise, the safety limit may never be violated, if power is reduced to < 25% by the scram, prior to pressure lowering to 785 psig..** | | |
| | BOP | Reports there is a Group I failure to isolate. |
| | | |
| | SRO | Recognizes a safety limit has been violated if power is >25% with reactor pressure <785 psig. |
| | | |
| **CT** | SRO | Orders BOP to close the MSIV's |
| | | |
| | | |

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Quad Cities Scenario No.: **3** Event No.: **7** Page 2 of 3

Event Description:

MSL break with a failure to receive a Group 1 isolation on low steam pressure, close the MSIVs to limit plant cooldown to less than 100 degrees and recognize that a TS Safety Limit has been violated if pressure drops below 785 psig with power above 25%.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| **CT** | BOP | Attempts to close MSIVs using QCOA 0250-02:<br>- Attempts to close MSIVs from control switch on 901-3 panel |
| | | |
| **CT** | BOP | Reports that the Inboard AND Outboard MSIV's on the D Main Steam line FAILED to close. |
| | | |
| | BOP | Dispatches NLO to close 1-4799-35 INST AIR TO OUTBD MSIVs, RCIC AND HPCI SHUTOFF VALVE to isolate Instrument Air to close MSIVs;<br>- Dispatches operators to remove fuses for MSIVs at Panels 901-40 and 901-41. |
| | | |
| | SRO | Enters into QGA-100 at 0 inches. |
| | | |
| | ATC | Maintains reactor water level between 0 and 48 inches. |
| | | |
| | BOP | Reports that MSIV Room temperatures are greater than Max Safe. |
| | | |
| | SRO | Enters into QGA 300. |
| | | |
| | NOTE: | If a 2nd "Max Safe" is reached (in RCIC/HPCI Rooms), SRO will enter into QGA 500-1, Blowdown. |
| | | |

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Quad Cities Scenario No.: **3** Event No.: **7** Page 3 of 3

Event Description:

MSL break with a failure to receive a Group 1 isolation on low steam pressure, close the MSIVs to limit plant cooldown to less than 100 degrees and recognize that a TS Safety Limit has been violated if pressure drops below 785 psig with power above 25%.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | SRO | Refers to QCOA 0201-05, Leaks Outside Primary Containment. |
| | | |
| | SRO | Enters QGA 200 on Low Torus Level. |
| | | |
| | **CUE** | **End of Event 7. End of Scenario 3.** |
| | | |

Facility: Quad Cities Unit 1 & 2 Scenario No.: **4** Time Start: _____

Examiners: _____ Operators: (SRO)_____

_____ (ATC)_____

_____ (BOP)_____

Initial Conditions: Reactor Power is 29%. 1B Recirculation Pump is tripped, but it is ready to be started. 1/2 SW pump is running.

Turnover: Unit Supervisor has directed the restart of 1B Recirculation Pump.

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1 | N/A | R (ATC) | Lower A Recirculation pump speed. |
| 2 | N/A | N (BOP) | Start 1B recirculation pump and monitor parameters IAW QCOP 0202-02. |
| 3 | N/A | TS (SRO) | OPRM Part 21 Inoperability. **TS 3.3.1.3.A and 3.3.1.3.B** |
| 4 | imf rd03r2227 | I/C (ATC)<br>TS (SRO) | Rod drifts from position 48 to 46. Upon return to 48, rod is found uncoupled and over-travels to position 49. Rod F-7 (22-27).<br>**TS 3.1.3** |
| 5 | sw01c | I/C (BOP) | Trip of 1/2 Service Water Pump. 1B fails to start. Manual start 1A or 2A Service Water Pump. |
| 6 | imf fw17c | I/C (ATC) | "C" Condensate / Condensate Booster Pump trip with a failure of the standby to start. |
| 7 | mc08 | M (all) | Loss of condenser vacuum leads to ATWS. Bypass valves eventually close due to lowering vacuum. SRVs used for pressure control. |
| | | | |
| | | | |
| | | | |

**Simulator Setup and Turnover Information**

**The simulator setup is contained in IC #133, which MUST be copied onto the S: drive iaw special instructions (see M. Jensen or J. Swain)**

**Commands to be utilized DURING the scenario are contained in the CAEP file**

- ***nrc scenario 4.cae***

**LOAD the DEFAULT RWM sequence for Unit Shutdown:**

- **LOAD0601SU2957 (verify RWM load name is "U1SUSI")**

**Verify the following commands / overrides are inserted as part of the IC:**

- **sw01b (1B SW pump tripped)**
- **rd13a 100 (North Scram Discharge volume hydraulic lock)**
- **rd13b 100 (South Scram Discharge volume hydraulic lock)**
- **imf rd02r2227 46 (CONTROL ROD F-7 STUCK AT 46)**
- **imf rd01r2227 (CONTROL ROD F-7 UNCOUPLED)**
- **ior lohs13302d4 on (overrides D condensate pump standby light ON)**
- **ior dihs13302 p2d_off (prevents auto-start of D standby condensate pump**
- **irf sw19r 0 (Service Water isolated to the 1B MG-Set oil cooler)**

**Turnover INFO**

**Reactor Power is at 29%**
**FCL is 49%**
**Rod step 29 is at Target Out.**

**1B Reactor Recirc pump tripped due to field breaker failure 18 hours ago. All repairs and testing have been completed. Adjustments for "Single Loop" operation have all been implemented. TS LCO 3.4.1 is met. QCOP 0202-02 steps through F.6 are completed for the startup of the 1B Recirc pump.**

**Online Risk is GREEN.**
**Protected Systems include: None.**
**NOTE: Because the 1B RFP is an assumed running pump, the proper risk color is obtained by taking out the 1A Rx Feed Pump.**

**Direction for the oncoming shift:**

- **Hold power constant for QNE to adjust rod sequence.**
- **Start the 1B Recirculation Pump.**

Quad Cities Scenario No.: **4** Event No.: **1** Page 1 of 1

Event Description: Lower A Recirculation pump speed.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | SRO | Directs the restart of the 1B recirculation pump per QCOP 0202-02. |
| | | |
| | ATC | Verifies on the speed controller it is in Manual and start permissive is not met as indicated by speed demand set. |
| | | |
| | ATC | Lowers 1A recirculation pump speed. |
| | | |
| | **CUE** | **Crew can proceed to event 2.** |
| | | |

Quad Cities Scenario No.: **4** Event No.: **2** Page 1 of 3

Event Description: Start 1B recirculation pump and monitor parameters IAW QCOP 0202-02.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | BOP | Performs steps F.7 and F.9 of QCOP 0202-02. |
| | | |
| | SRO | Verifies acceptance criteria in steps F.7.e and F.9.d. |
| | | |
| | BOP | Starts the MG set by closing the drive motor breaker and verifies the speed controller indication increases to a peak of 80 percent speed, then decreases to minimum speed. |
| **SIMOP: As soon as the MG set is started, OPEN the SW isolation valve to the oil cooler. mrf sw19r 100** | | |
| | BOP | Verifies the generator field breaker closes as indicated by the red GEN FIELD BKR A/B indicating light. |
| | | |
| | BOP | Records the time the recirculation pump starts. |
| | | |
| | BOP | Opens the MO 1-202-5B Pump Discharge Valve until flow is seen or dual valve position. |
| | | |

Quad Cities Scenario No.: **4** Event No.: **2** Page 2 of 3

Event Description: Start 1B recirculation pump and monitor parameters IAW QCOP 0202-02.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | BOP | If dual valve position indication or flow response is not observed in 2 minutes, the ATC trips the pump. (not expected) |
| | | |
| | BOP | Jogs the discharge valve open for ½ second intervals until pump flow reaches 8000 gpm. After each jog, observes APRM and flow response. |
| | | |
| | BOP | Jogs the discharge valve open for 1 second intervals from 8000 gpm to 12000 gpm. After each jog, observes APRM and flow response. |
| | | |
| | BOP | Jogs the discharge valve open for 3 second intervals from 12000 gpm to 16000 gpm or until no further flow response is seen. After each jog, observes APRM and flow response. |
| | | |
| | BOP | Fully opens discharge valve MO 1-202-5B ensuring control switch is left in the STOP position. |
| | | |
| | ATC/BOP | Verifies instrumentation readings per QCOP 0202-02, step F.13. |
| | | |
| | BOP | Performs step F.14 of QCOP 0202-02. |
| | | |
| | BOP | Reference performing jet pump operability per QCOS 0202-07 and QCOS 0202-05 or QCOS 0202-06 within 4 hours. |
| | | |

Quad Cities Scenario No.: **4** Event No.: **2** Page 3 of 3

Event Description: Start 1B recirculation pump and monitor parameters IAW QCOP 0202-02.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | | |
| | | |
| | ATC | Balance loop flows per QCOP 0202-03. |
| | | |
| | **CUE** | **Crew can proceed to event 3.** |
| | | |
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Quad Cities Scenario No.: **4** Event No.: **3** Page 1 of 1

Event Description: Engineering reports that a Part 21 has been issued on OPRMs that renders all the OPRMs inoperable. **TS 3.3.1.3.A, 3.3.1.3.B**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | **CUE** | **As the Engineering manager, report that a Part 21 notification was just issued on OPRMs that renders all the OPRMs incapable of causing an automatic reactor scram.** |
| | | |
| | SRO | Recognizes that entry into TS 3.3.1.3.A and 3.3.1.3.B is required. |
| | | |
| | | |
| | **CUE** | **Crew can proceed to event 4.** |
| | | |
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Quad Cities Scenario No.: **4** Event No.: **4** Page 1 of 3

Event Description:

Rod drifts from position 48 to 46. Upon return to 48, rod is found uncoupled and over-travels to position 49. Rod F-7 (22-27). **TS 3.1.3**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: When directed by the Lead Examiner, insert a rod drift on Control Rod F-7<br>**imf rd03r2227** | | |
| | | |
| | ATC | Reports that rod F-7 is drifting in, and stops at position 46. |
| | | |
| | ATC | Enters QCOA 0300-11 Rod Drift and determines that Control Rod F-7 has latched at a known position (46). Exits QCOA 0300-11 and enters QCOA 0300-04. |
| | | |
| | **CUE** | **If Operator dispatched to investigate rod drift, report that HCU appears normal, fuses are normal, and there are no hot pipes.** |
| | | |
| | **CUE** | **IF requested, as QNE, provide a Special Maneuver sheet** |
| | ATC | Disables RWM Blocks IAW QCOP 0207-01, Step F.16 |
| | ATC | Uses QCOA 0300-04 returns Control Rod F-7 to position 48. |
| | | |
| | ATC | Determines that Control Rod is uncoupled (withdraws past 48 and goes to over-travel. (Annunciator 901-5 A2 Rod Overtravel alarms. |
| | | |
| | ATC | Enters QCOA 0300-03 uncoupled control rod |
| | | |
| | **CUE:** | **AS QNE, report that Control Rod F-7 has NOT previously uncoupled during this operating cycle.** |
| | | |

Quad Cities Scenario No.: **4** Event No.: **4** Page 2 of 3

Event Description:

Rod drifts from position 48 to 46. Upon return to 48, rod is found uncoupled and over-travels to position 49. Rod F-7 (22-27). **TS 3.1.3**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | ATC | Disables RWM blocks to full or bypasses RWM and unsuccessfully attempts to re-couple control rod by inserting to 46 and withdrawing to 48 per QCOP 0207-02. |
| | | |
| | SRO | Contacts QNE to determine if attempt should be made to re-couple at a position other than 46. |
| | | |
| | **CUE:** | **As QNE, direct the SRO to attempt to re-couple ONE TIME at position 44.** |
| | | |
| | **CUE** | **IF requested, as QNE, provide a Special Maneuver sheet** |
| | | |
| | ATC | Unsuccessfully attempts to re-couple control rod by inserting to 44 and withdrawing to 48. Determines that rod is still uncoupled. |
| | | |
| | SRO | Recognize that entry into TS LCO 3.1.3, Condition C requires Control Rod F-7 to be inserted to position 00 within 4 hours and disarmed within 4 hours. |
| | | |
| | **CUE** | **As QNE, provide a Special Maneuver sheet** |
| | | |
| | SRO | Directs ATC to insert Control Rod F-7 to position 00 |
| | | |
| | ATC | Takes Control Rod F-7 OOS on the RWM per QCOP 0207-01 |
| | | |

Quad Cities Scenario No.: **4** Event No.: **4** Page 3 of 3

Event Description:

Rod drifts from position 48 to 46. Upon return to 48, rod is found uncoupled and over-travels to position 49. Rod F-7 (22-27). **TS 3.1.3**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | ATC | Inserts Control Rod F-7 to position 00. |
| | | |
| | **BOP** | Dispatches NLO's to locally disarm Rod F-7 per QCOP 0300-07 |
| | | |
| | **CUE** | **Crew can proceed to event 5.** |
| | | |
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Quad Cities Scenario No.: **4** Event No.: **5** Page 1 of 1

Event Description:

Trip of 1/2 Service Water Pump. 1B fails to start. Manual start 1A or 2A Service Water Pump.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: When directed by the Lead Examiner, trip the 1/2 Service water pump. **imf sw01c**. | | |
| | BOP | Report that 1/2 Service Water Pump has tripped and 1B Service Water Pump did not auto start. |
| | | |
| | BOP | May attempt to start 1B SW pump. Determines that 1B SW pump will not start. |
| | | |
| | BOP | Start Service Water Pump 1A or 2A. |
| | | |
| | BOP | Verifies adequate Service Water pressure. |
| | | |
| SIMOP: Use command **bat fire** to acknowledge the fire alarm. Report that the ½ A and B Fire Diesels are running. | | |
| | | |
| | BOP/SRO | Dispatches Operator to tripped motor to check for high temperature or shaft binding. |
| | | |
| | BOP/SRO | Dispatches Operator to Service Water Pump 1B breaker to check relay targets for cause of trip. |
| | | |
| | BOP | If Service Water Pump trip resulted in auto-start of Fire Pumps, return Fire Pumps to Standby Lineup per QCOP 4100-03. |
| | | |
| | **CUE** | **Crew can proceed to event 6.** |
| | | |

Quad Cities Scenario No.: **4** Event No.: **6** Page 1 of 1

Event Description:
"C" Condensate / Condensate Booster Pump trip with a failure of the standby to start.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP: When directed by the Lead Examiner, trip the 1C Condensate Pump.<br>**imf fw17C** | | |
| | ATC | Reports that 1C Condensate / Condensate Booster Pump has tripped. |
| | | |
| | ATC | Recognizes that standby Condensate / Condensate pump fails to start. |
| | | |
| | ATC | Starts 1B or 1D Condensate / Condensate Booster Pump. |
| | | |
| | SRO | Recognizes scram criteria and orders scram IF reactor water level is below 11 inches or above 44 inches |
| | | |
| | ATC | Monitors RWL. |
| | | |
| | **CUE** | **Crew can proceed to event 7.** |
| | | |
| | | |

Quad Cities Scenario No.: **4** Event No.: **7** Page 1 of 4

Event Description: Loss of condenser vacuum leads to ATWS. Bypass valves eventually close due to lowering vacuum. SRVs used for pressure control.
**CT denotes Critical Task**

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| SIMOP When directed by the Lead Examiner, insert air-inleakage into the main condenser. Leakage starts at 25% and is immediately modified to 50% over 5 minutes.<br>**imf mc08 25**<br>**mmf mc08 50 5:** | | |
| | BOP | Reports that condenser vacuum is lowering. |
| | | |
| | SRO | Directs emergency power reduction. |
| | | |
| | ATC/BOP | Reduces recirculation pumps to minimum speed. |
| | | |
| | ATC | Reduces power by rod insertion or Recirc speed reduction |
| | | |
| | SRO | Directs a manual scram prior to condenser vacuum reaching automatic scram setpoint (6.5 inches). |
| | | |
| | ATC | Inserts manual scram and reports that the Mode Switch is in Shutdown. |
| | | |
| **CT** | ATC | Reports that a manual scram is inserted but rods are NOT in. |
| | | |
| | SRO | Enter QGA 101. |
| | | |
| | ATC | Actuates ARI pushbuttons. |
| | | |
| **CT** | SRO | Directs that ADS is inhibited and prevent Core Spray Injection. |
| | | |

Quad Cities Scenario No.: **4** Event No.: **7** Page 2 of 4

Event Description: Loss of condenser vacuum leads to ATWS. Bypass valves eventually close due to lowering vacuum. SRVs used for pressure control.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| **CT** | BOP | Inhibits ADS. |
| | | |
| **CT** | ATC/BOP | Places Core Spray Pumps in PTL. |
| | | |
| | SRO | Directs the tripping of both Recirculation Pumps. |
| | | |
| | ATC/BOP | Trips both recirculation pumps. |
| SIMOP When requested to close the 0301-25 valve use command:<br>**irf rd04r close**<br>When requested to bypass all RPS scram signals use command<br>**irf qg08r activate** | | |
| | SRO | Orders ATC/BOP (and/or U2 ANSO) to perform QCOP 0300-28 to insert Control Rods |
| | | |
| | ATC | Attempts rod insertion IAW QCOP 0300-28. |
| | | |
| | SRO | Directs initiation of Torus Cooling on both loops. |
| | | |
| | BOP | Initiates Torus Cooling on both loops per QCOP 1000-30. |
| SIMOP: When requested to perform QCOP 0250-02 to bypass –59 isolation, use command<br>**irf qg09r activate** | | |
| | SRO | Dispatches operator to bypass isolations IAW QCOP 0250-02. |
| | | |
| | **CUE** | **Reports that isolations are bypassed.** |

Quad Cities Scenario No.: **4** Event No.: **7** Page 3 of 4

Event Description: Loss of condenser vacuum leads to ATWS. Bypass valves eventually close due to lowering vacuum. SRVs used for pressure control.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| **CT** | SRO | Directs crew to terminate and prevent all injection sources. |
| | | |
| **CT** | ATC/BOP | Trip-Latches HPCI to prevent injection |
| | | |
| **CT** | ATC/BOP | Places A and B FWRV and the Low Flow FRVs in manual and closed position. |
| | | |
| | ATC/BOP | Shuts FRV MO isolation valves. |
| | | |
| | SRO | Orders level reduction for power control. |
| | | |
| | ATC/BOP | Reduces reactor water level. |
| | | |
| | **NOTE:** | **Turbine will trip at 10 inches condenser backpressure and bypass valves will close at 23 inches.** |
| | | |
| | SRO | Orders transition to ADS valves for pressure control as pressure continues to drop. |
| | | |
| **CT** | SRO | Directs ATC to record SBLC tank level and inject SBLC. |
| | | |
| **CT** | ATC | Records tank level and injects SBLC. |
| | | |

Quad Cities Scenario No.: **4** Event No.: **7** Page 4 of 4

Event Description: Loss of condenser vacuum leads to ATWS. Bypass valves eventually close due to lowering vacuum. SRVs used for pressure control.

| Time | Position | Applicant's Actions or Behavior |
|---|---|---|
| | | |
| | SRO | Enters QGA 100 at 0 inches and enters back into QGA 101. |
| | | |
| | SRO | Establishes level band of –35 to -166 inches. IF ADS valve open prior to reaching –35 inches, SRO will allow level to continue to drop until power < 5% or RWL reaches –142 and then establishes level band of –166 to –142 or the value it was when power went below 5% |
| | | |
| | ATC/BOP /SRO | Dispatches operator to close the Charging Header isolation valve 1-0301-25 |
| | | |
| | SRO | Monitors Torus temperature. |
| | | |
| **CT** | ATC/BOP | Maintains reactor water level in band directed by the SRO using any combination of:<br>Feedwater, RCIC, SSMP, HPCI, |
| | | |
| | ATC | Continues to drive rods in to reduce power. |
| | | |
| | **CUE** | **End of Event 7. End of scenario 4.** |
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