

Exelon Nuclear

2012 ILT NRC Exam Scenario

Scenario Number:

**NRC Scenario 1**

Revision Number: 01

Date: 04/04/12

Developed By: \_\_\_\_\_  
Instructor Date

Validated By: \_\_\_\_\_  
SME or Instructor Date

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Approved By: \_\_\_\_\_  
Training Department Date

Facility: Quad Cities Scenario No.: **2012 NRC Scenario 1** Op-Test No.: ILT 10-1  
 Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions:

A Startup is in progress at 7% Power in RUN (After a forced outage for a Recirc pump seal repair)

Turnover:

Establish Drywell inerting. Continue the startup by withdrawing control rods to open the Turbine Bypass Valves further.

Event No.	Malf. No.	Event Type*	Event Description
1	None	BOP N	Establish the Drywell Inerting lineup per QCOP 1600-20
2	dihs10700ap4md 4 (Override) NM08E	ATC I	Multiple APRM Failures. APRM 4 fails inoperable. Later, APRM 5 Fails slowly Downscale <b>TS</b> (QCOA 0700-03)
3	None	ATC R	Withdraw control rods to achieve 2-4 Turbine Bypass Valves open
4	RD02R4211	ATC C	Recoverable Stuck Rod / Raise CRD Drive Pressure (QCOA 0300-02)
5	MC15R (Remote Function)	BOP I	Loss of SJAE Steam (Recoverable) (QCOA 5400-04)
6	SER0698	SRO TS	Target Rock Relief bellows failure <b>TS</b>
7	ED02 ED03D ED04K DG03B	Crew M	Station Blackout is entered. The SBO diesel will be used to reenergize Bus 14-1. (QCOA 6100-04)
8	RR10A HP08 RC01	Crew M	The transient initiates a small LOCA in the Drywell; QGA 100 and 200 are performed. RCIC trips, the SSMP must be manually initiated, and local action is necessary to make HPCI available. When essential bus power is restored, the challenges to the Primary Containment will be addressed.

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

ES-301-4 Quantitative attributes:

Total Malfunctions (5-8): **6**  
 Malfunction(s) after EOP (1-2): **2, E8**  
 Abnormal Events (2-4): **E2, 4, 5, & 7**  
 Major Transient(s) /E-Plan entry (1-2): **E7**  
 EOPs (1-2): QGA 100 and 200  
 EOP Contingencies (0-2): **None**  
 Critical Tasks (2-3): **3**

ES-301-5 Quantitative attributes:

BOP Normal: **E1**  
 ATC Reactivity (1 per set): **E3**  
 BOP I/C (4 per set): **E5**  
 ATC I/C (4 per set): **E2 & 4**  
 SRO-I I/C (4 per set inc 2 as ATC): **E2,4&5**  
 SRO Tech Spec (2 per set): **E2 & E6**  
 ALL Major Transients (2 per set) **E7**

**SUMMARY:**

- Initial conditions:
  - The plant is operating at 7% power just after the Mode Switch was taken to RUN. (After a forced outage for a Recirc pump seal repair)
- Event 1: The BOP establishes the Drywell Inerting lineup per QCOP 1600-20.
- Event 2: Multiple APRM Failures. Part 1: APRM 4 fails inoperable, resulting in a ½ Scram and Rod Block. Since no other Channel B APRMs are out of service, APRM 4 can be bypassed and the ½ Scram reset. (Note: This event continues after the stuck rod is resolved in Event 4.)
- Event 3: The crew resumes control rod withdrawal to achieve 2 to 4 Turbine Bypass Valves opened per QCGP 1-1 Step F.6.kk.
- Event 4: During rod withdrawal, one rod will not move from position 08. When the ATC raises CRD drive water pressure, the rod can be withdrawn. Drive water pressure should then be returned to normal.
- Event 2, Part 2: APRM 5 will fail downscale over a 1-minute period. The failure will result in a Rod Block and downscale alarms. The SRO must address Tech Specs 3.3.1.1, RPS Instrumentation, for a second APRM inoperable on RPS Channel B and address TRM 3.3.a for Rod Block Instrumentation. If directed, the ATC will manually insert a B RPS ½ Scram.
- Event 5: Loss of SJAE steam results in the North Condenser Suction valves closing. (Condenser vacuum remains stable at low power) The BOP and SRO work through QCAN 901-7 A-14, QCOA 3300-02 and QCOA 5400-04 to identify the loss of steam to the in service SJAE. Bypassing the steam supply PCV will be successful. The BOP will reopen the SJAE Suction Valves.
- Event 6: The Bellows Failure annunciator will alarm for the Target Rock Relief Valve, which makes the Safety Function of this valve inoperable. The SRO will address Tech Specs for one or more Safety valves inoperable, 3.4.3 Condition C.
- Event 7: A Loss of Offsite Power occurs. Bus 13-1 locks out and the U1 Diesel cannot be started. When Bus 14-1 to Bus 24-1 crosstie fails, Station Blackout is entered. The SBO diesel must be used to reenergize Bus 14-1, which may be used to backfeed Bus 14 and Bus 19.
- Event 8: The transient initiates a small LOCA in the Drywell; QGA 100 and 200 are performed. The crew will attempt to manually initiate RCIC but it will trip on a mechanical overspeed fault that cannot be reset. Local action is necessary to make HPCI available. The crew will start the SSMP to maintain RPV Water level. When essential bus power is restored, the challenges to the Primary containment will be addressed.
- Approximate Run Time: 1.5 Hours

**CRITICAL TASKS:**

**Critical task #1:** Restore electrical power using the SBO DGs accordance with QCOA 6100-04.

**Critical task #2:** Given a shutdown reactor with a LOCA in progress, restore and maintain RPV water level with available high-pressure systems IAW with QGA 100 before RPV water level reaches TAF.

**Critical task #3:** When Torus pressure exceeds 5 psig, INITIATE drywell sprays while in the safe region of the drywell spray initiation limit (DSIL). (BWROG PC-5.1 INIT DW SPRAY)

**(Conditional Critical Task)** If RPV water level lowers to less than -59 inches, inhibit ADS in accordance with QGA 100.

**EXERCISE PERFORMANCE OBJECTIVES**

SR-1600-P01	Given a reactor plant during a startup, inert the primary containment using the electric vaporizers and the reactor building ventilation system in accordance with QCOP 1600-20.
SR 0700-P07	Given an operating reactor plant with an APRM failure, take actions to bypass the failed APRM and meet TS requirements in accordance with QCOP 0700-04 and QCAP 0230-19. (SOER 90-3 r1)
SR-0002-P04	Given a reactor plant at power, perform a power change discernible on neutron monitors using control rods in accordance with QCOP 0280-01, QCGP 3-1 and QCGP 4-1.
SR- 0300-P05	Given a reactor plant during a startup with a stuck control rod, restore the ability to drive the control rod or declare the rod inoperable in accordance with QCOA 0300-02.
SR-3300-P09	Given a reactor plant at power with a loss of condenser vacuum, take action to attempt to locate and correct the cause for lowering vacuum in accordance with QOA 3300-02 and/or QOA 5450-05. (PRA Initiating Event %TC - Loss of Vacuum accounts for 4.2% of total CDF and initiates 4 of the top 100 Core Damage Sequences)
SR-0001-P45	Given a reactor plant in a QGA condition, verify the proper actuation of containment isolations and ECCS and emergency DG starts in accordance with QGA 100 or QGA 101.
SR-0002-P03	Given a reactor plant at power with a reactor scram, place the plant into a stable condition in accordance with QCGP 2-3.
SR-0203-P07	Given a reactor plant in a QGA condition, inhibit ADS in accordance with QGA 100 or QGA 101. (Important PSA task / Inhibiting ADS terminates 5 of top 200 Core Damage Sequences)
SR-0001-P01	Given the plant with a loss of normal feedwater resulting in the inability to restore RPV water level above 0 inches, inject with Alternate Injection Systems (QGA Detail E) to attempt to hold RPV water level above -142 inches in accordance with QGA 100.
SR-1000-P02	Given a reactor plant in an accident condition (QGA), operate torus sprays in accordance with QCOP 1000-30 and appropriate QGA. (Important PRA Operator Action - starting containment sprays has a RAW value of 82.5)
SR-1000-P04	Given a reactor plant with rising containment pressures due to a LOCA or steam leak and RHR is not needed for core cooling, verify parameters are in the safe region of the Drywell Spray Initiation Limit (QGA Figure K), verify tripped or trip recirc pumps and drywell coolers, and attempt to initiate drywell sprays when torus pressure exceeds 5 psig in accordance with QGA 200 and QCOP 1000-30. (Important PRA Operator Action - starting containment sprays has a RAW value of 82.5)
SR-1000-P05	Given a reactor plant in an accident condition where RHR-LPCI mode has started automatically, determine if LPCI has responded correctly to a valid initiation and throttle flow to restore RPV water level in accordance QCOA 1000-04.
SR-6100-P08	Given an operating reactor plant when a station blackout occurs, take actions to monitor plant parameters and restore electrical power using the emergency DGs, SBO DGs, or unit 4KV crossties in accordance with QCOA 6100-04, QCOA 6100-03 and/or QCOP 6500-08.

## Simulator setup:

1. Reset to IC-14 (Approximately 7% power).
2. Go to **RUN**.
3. Verify the following RWM Sequence is loaded: **C22SU**
  - a. Mark up the Control Rod Move Sheet to reflect all rods withdrawn up to Step 17
  - b. Markup Step 17 Rods E-9 and L-7 at position 12.
4. Transfer the Mode Switch to RUN per QCGP 1-1 Step F.6.ii:
  - a. Place the Mode Switch in RUN
  - b. Place all IRM/APRM Recorders to APRM.
  - c. Place all IRM/RBM Recorders to RBM.
  - d. Withdraw IRM detectors.
  - e. Verify all APRM/RBM Recorders on LOW Speed.
5. Select the 1A RFP for STANDBY.

(Commands to be utilized during this scenario are contained in the CAEP file:  
2012 NRC Scenario 1.cae)

6. Insert Commands for setup:
  - **imf rd02r1827 08** (Control Rod E-7 stuck at position 08)
  - **trgset 1 "rdpdrivedelta > 340"** (Set trigger 1 as CRD drive Pressure > 340#)
  - **trg 1 "dmf rd02r1827"** (Delete stuck rod on Trigger 1)
  - **imf ed04k** (Bus 14-1 to 24-1 crosstie breaker failure)
  - **imf dg03a** (U1 EDG start failure)
  - **imf ed03d(3)** (On Event Trigger 3, Bus 13-1 Lockout)
  - **imf ed02(3)** (On Event Trigger 3, Loss of RAT)
  - **imf rr10a(3 3:) 0.13 7:30** (On Event Trigger 3, Recirc Suction Line Break at 0.13% severity on a 7.5 min ramp after a 3 minute delay)
  - **imf rc01(7 :10)** (RCIC trips on Overspeed 10 seconds after initiation.)
  - **imf hp08** (HPCI Aux Oil Pump overload during auto start)
  - **trgset 7 "zlohs1130161(2)"** (When RCIC Steam to Turbine Valve Red light comes on)
  - **irf hv01r ro** (Rack out 1A DW/Torus Purge Fan breaker for inerting)
7. Verify the following commands for scenario performance:
  - **irf pc02r open** (Opens the 1-8799-85 Cold Valve)
  - **ior aofr187408 100 1:** (Provides indication of nitrogen flow in inerting lineup)
  - **ior dihs10700ap4md 3** (Overrides APRM 4 MS to ZERO, in effect APRM INOP)
  - **imf nm08e 0 1:** (APRM 5 downscale failure on a 1 minute ramp)
  - **irf mc15r closed** (Closes the steam supply to the B (in-service) SJAE)
  - **mrf mc15r open** (Re-opens the steam supply to B SJAE, in effect bypassing PCV)
  - **imf ser0698** (Target Rock Relief bellows failure annunciator on)
  - **trg! 3** (Initiates the Station Blackout and then a LOCA 3 minutes later)
  - **irf ed34r close** (Bus 24-1 to bus 14-1 breaker on U2 as requested)
  - **dmf hp08** (Upon request, deletes HPCI Aux Oil Pump fault, allows HPCI auto start)
  - **irf rp02r mg\_set** and **irf rp29r reset** (Restores A RPS as requested)
  - **irf rp03r mg\_set** and **irf rp28r reset** (Restores B RPS as requested)
  - **bat G-11\_and\_C-13\_off** (Overrides Annunciators 901-3 G-11 and C-13 as requested)

(Continued)

8. Take the following equipment OOS (hang OOS Card):
  - None
9. Complete the following Control Panel setup items:
  - Remove the LOCA TRIP ENABLED labels from above the Circ Water Pumps.
  - Display the Power/Flow Map on Monitor 3.
  - Clear all SBO Panel alarms.
10. Verify Shell Warming in service per QCOP 5600-04, completed to Step F.2.j.
11. Complete the following lineup for Drywell Inerting:
  - On Panel 901-4,:
    - AO 1-4723 RES SPLY, hang an Equip Status Tag stating that Inst Air is valved in as a backup to Drywell Pneumatic System.
  - At Panel 901-3:
    - Close AO 1-1601-21 DW PRG VLV
    - Close AO 1-1601-22 DW OR TORUS PRG VLV
    - Close AO 1-1601-23 DW VENT VLV
    - Close AO 1-1601-24 VENT TO RX BLDG EXH SYS
    - Set PIC 1-1640-11 Containment Pressure to 20% open
  - On Panel 912-5
    - Verify 1B Drywell/Torus Purge Fan is OFF
    - Take the 1A Drywell/Torus Purge Fan Handswitch to OFF
    - Verify GREEN Flag for 1A Drywell/Torus Purge Fan Handswitch
    - Hang an Equipment Status Tag on the 1A Drywell/Torus Purge Fan
12. Verify Feedwater Heating Lineup
  - At Panel 901-6
    - Unisolate LP Heater String #2 and #3
    - Close LP Heater String Bypass MO 1-3403
    - Close Cond Demin Bypass Valve MO 1-3303
  - On the PPC screen, verify flows of online Cond Demins at approximately 2300 gpm.
13. Provide a current revision of the following procedures, signed off as specified:
  - (Entire) QCGP 1-1 signed off up to Step F.6.kk.
  - QCGP 4-1 signed off up to Step F.2.c
  - QCOP 0280-01 signed off up to Step F.2
  - QCOP 1600-20, signed off up to step F.9.
  - QCOP 5600-04, signed off with F.2.j in progress and F.2.k signed off
14. Provide a “ Reactor Startup” REMA.
15. Provide blank ESTs for use during the scenario. (See Event 2 Part 1)
16. Perform the applicable steps of TQ-QC-201-0113 “Simulator Exam Security Actions Checklist”.

## LIST OF POTENTIAL PROCEDURES

## Annunciator Procedures

- 901-3 A-16, PRI CNMT HIGH PRESSURE, Rev.12
  - 901-4 G-15, RCIC TRIP THROTTLE VALVE CLOSED, Rev. 2
  - 901-4 F-18 TARGET ROCK VALVE 3A BELLOWS FAILURE, Rev. 7
  - 901-5 D-13 CHANNEL 4-6 APRM HI-HI OR INOP, Rev. 9
  - 901-5 C-3, ROD OUT BLOCK, Rev. 11
  - 901-5 C-6 APRM DOWNSCALE, Rev. 5
  - 901-7 A-7, TURB BRG OIL LOW PRESS, Rev. 5
  - 901-7 E-9, TURNING GEAR OIL PUMP AUTO TRIP, Rev. 3
  - 901-7 G-9, TURB BRG LIFT PUMP AUTO TRIP, Rev. 4
  - 901-8 A-4, DIESEL GEN 1/2 TROUBLE, Rev. 5
  - 901-8 A-7, DIESEL GEN 1 TROUBLE, Rev. 5
  - 901-8 C-7, DIESEL GEN 1 FAIL TO START, Rev. 3
  - 901-8 E-2, RESERVE TRANS 12 TRIP, Rev. 3
  - 901-8 G-2, RESERVE AUX TRANS 12 LOW VOLTAGE, Rev. 4
  - 901-8 F-3, 4KV BUS OVERCUR TRIP, Rev. 5
- QCGP 1-1, Normal Unit Startup, Rev. 87
- QCGP 4-1, Control Rod Movements and Control Rod Sequence, Rev. 38
- QCGP 2-3, Reactor Scram, Rev. 74
- QGA 100, RPV Control, Rev. 9
- QGA 200, Primary Containment Control, Rev. 9
- QCOA 0201-01, Increasing Drywell Pressure, Rev. 23
- QCOA 0300-02, Inability to Drive a Control Rod: Control Rod Stuck, Rev. 17
- QCOA 0700-03, Loss of Neutron Flux Indication. Rev. 8
- QCOA 1000-04, LPCI Automatic Initiation, Rev. 15
- QCOA 1300-01, RCIC Turbine Trip/Isolation Recovery, Rev. 15
- QCOA 6100-03, Loss of Offsite Power, Rev. 27
- QCOA 6100-04, Station Blackout, Rev. 15
- QOA 6700-01, 480 V Bus 15, 16, or 17 Failure, Rev. 11
- QCOP 0280-01, Reactor manual Control Operation, Rev. 16
- QCOP 0700-04 APRM System Operation, Rev. 16
- QCOP 1000-30, Post-Accident RHR Operation, Rev. 26
- QCOP 1300-02, RCIC System Manual Startup, Rev. 29
- QCOP 1600-20, Nitrogen Inerting of Primary Containment Using the Vaporizer(s) and  
Reactor Building Ventilation System, Rev. 28
- QCOP 2300-06, HPCI System Manual Startup, Rev. 31
- QCOP 2700-02, Hydrogen Water Chemistry System Shutdown, Rev. 14
- QCOP 2900-02, SSMP System Startup, Rev. 23
- QCOP 5600-04, Main Turbine Warming, Rev. 21
- QCOP 6500-08, 4KV Bus Crosstie Operation, Rev. 24
- QCOP 6620-14, Energizing Bus 14-1 From SBO DG 1, Rev. 14

**CREW TURNOVER****1. Plant Conditions:**

- a.) Unit 1 is at 7% power with the Mode Switch in RUN.
  - (1) After a forced outage for a Recirc pump seal repair
- b.) Unit 2 is at 100% power.
- c.) Technical Specification limitations:
  - (1) Unit 1: None
  - (2) Unit 2: None
- d.) On Line Risk is GREEN.

**2.) Significant problems/abnormalities:**

- a.) None

**3.) Evolutions/maintenance for the oncoming shift:**

- a.) Resume QCOP 1600-20. The EO just opened the breaker for the 1A DW/TORUS PURGE FAN per Step F.6.d and verified that Nitrogen Vaporizer valves in the 1/2 DG Room are closed per Step F.8. Establish inerting of the Drywell.
- b.) Continue Reactor startup per QCGP 1-1. Currently withdrawing Control Rods to achieve 2-4 Bypass valves open per Step F.6.kk.
  - Step 17 Rods E-9 and L-7 at position 12.
- c.) Continue Shell Warming per QCOP 5600-04. Step F.2.k was last performed 30 minutes ago.
- d.) EOs on shift:
  - Burke
  - Parrish
  - Foster
  - Richardson
  - Hughes
  - Brewer
  - Decker
  - Schmidt



Quad Cities		NRC Scenario No.: 1 Event No: 1	Page 1 of 1
Event Description: Establish the Drywell Inerting lineup per QCOP 1600-20			
Time	Position	Applicant's Actions or Behavior	
<b>SIMOP ROLE PLAY:</b> Equipment Operators supporting Containment Inerting as necessary			
	SRO	Directs and supervises the initiation of Drywell inerting	
	ATC	Monitors Panel 901-5 parameters during Startup	
	BOP	Verifies AO 1-1699-7 VENT TO RX BLDG is OPEN	
	BOP	Opens AO 1-1601-24 VENT TO RX BLDG EXH SYS	
	BOP	Opens AO 1-1601-23 DW VENT VLV	
	BOP	Opens AO 1-1601-21 DW PRG VLV	
	BOP	Opens AO 1-1601-55 N2 PRG VAP VLV	
	BOP	Directs the EO to perform step F.11, F.12, and F.13 at the Bulk Nitrogen Storage Tank Skid	
<b>SIMOP ROLE PLAY:</b> EO as necessary to acknowledge this directive. Wait 3 minutes and then establish N2 Vaporizer flow by opening the 1-8799-85 Cold Valve: <b>irf pc02r open</b> And by providing indication of nitrogen flow: <b>ior aofr187408 100 1:</b>			
<b>End of Event 1</b>			

Quad Cities		NRC Scenario No.: 1 Event No: 2, Part 1		Page 1 of 2	
Event Description: Loss of APRM 4					
Time	Position	Applicant's Actions or Behavior			
<b>SIMOP:</b> When directed by the Lead examiner, fail APRM 4 INOP: <b>ior dihs10700ap4md 3</b>					
Key Parameter Response: APRM 4 recorder indicates DOWNSCALE, APRM 4 white DNSCL OR INOP light, 4 White Scram solenoid Group B lights out Expected Annunciator(s): 901-5 D-13 CHANNEL 4-6 APRM HI-HI OR INOP 901-5 B-11 CHANNEL A/B NEUTRON MONITOR (Red) 901-5 D-15 CHANNEL B REACTOR SCRAM 901-5 C-3 ROD OUT BLOCK Automatic Actions: ½ Scram, Rod Block					
	ATC	Responds to unexpected annunciators and informs the Unit Supervisor			
	ATC	Acknowledges annunciator 901-5 D-13, "APRM HI-HI OR INOP" and reports APRM 4 indicates Downscale or Inop			
	SRO	Enters and directs actions of QCOA 0700-03			
	SRO	Directs crew to hold Reactor power constant			
	BOP	Verifies APRM 4 indicates INOP in the 901-37 panel			
	SRO	Refers to T.S. 3.3.1.1. and TRM 3.3.a and determines that minimum operable channels requirement is met			
	SRO	Directs APRM Ch 4 to be bypassed			
	ATC	Bypasses APRM 4 per QCOP 0700-04			
		Position APRM 4 bypass joystick to BYPASS			
		Verify white BYPASS light comes on for APRM 4			
		Places an EST on APRM bypass joystick for APRM 4			
	ATC	Resets the ½ Scram per QCOP 0500-03			
	ATC	Momentarily places the Scram Reset Switch to position GR 2+3 then to position GR 1+4			
	ATC	Verifies annunciator 901-5 D-15 clears			
	ATC	Verifies Scram Solenoid Group Channel A and Channel B (white) indicating lights lit			
	ATC	Verifies computer points W536 and 537 indicate reset			
	ATC	Resets APRM, Rod Block and RPS annunciators			
	ATC/BOP	Contacts Instrument Maintenance to troubleshoot APRM 4			
<b>SIMOP:</b> Role-Play IM as necessary. A Work Order will be prepared. If asked, report that no additional information is needed prior to bypassing the APRM.					
	Crew	May place an EST Tag or an Orange Ring on the APRM joystick			
	SRO	May refer to QCAP 0230-19, Equipment Operability			
<b>End of Event 2, Part 1</b>					

Quad Cities	NRC Scenario No.: 1	Event No: 3	Page 1 of 1
Event Description: Raise power using control rods (Notch Withdrawal)			
Time	Position	Applicant's Actions or Behavior	
<b>EVALUATOR NOTE:</b> After Rod L-09 is withdrawn to position 12, the next rod (E-7) will stick at position 08 to initiate Event 4. When the problem with E-7 has been resolved, resume rod withdrawal per this event.			
<b>SIMOP ROLE PLAY:</b> Qualified Verifier (QV) as necessary. If the crew does not promptly begin the task, call the control room as the Shift Manager and ask them to begin.			
	SRO	Directly supervises control rod moves and directs the RO to begin the load increase	
	ATC	(CONTINUOUS) Monitors reactor parameters	
	ATC	Selects an in-sequence control rod	
	ATC	On the RWM verifies proper rod selected, its current position and bounds	
	ATC	Communicates to the QV. "Ready to withdraw Rod ___-___ from position ___ to position ___ using single notch withdrawal."	
	QV	Replies: "Rod ___-___ is selected. Understand withdrawing ___-___ from position ___ to position ___ using single notch withdrawal."	
	ATC	Replies: "That is correct"	
	ATC	Verifies control rod and moves it to the desired position	
	ATC/BOP	Place keeps rod moves in the rod movement book	
	ATC	Repeats above steps as necessary	
	BOP	Monitors balance of plant parameters	
<b>End of Event 3</b>			

Quad Cities		NRC Scenario No.: 1 Event No: 4	Page 1 of 1
Event Description: Recoverable Stuck Rod / Raise CRD Drive Pressure			
Key Parameter Response: Control Rod E-7 will not move from position 08 with normal drive water pressure; CRD Drive Pressure indication on 901-5, 1-340-4			
Expected Annunciator(s): None			
Automatic Actions: None			
	ATC	Reports CR E-7 will not move.	
	SRO	Directs RO to perform the actions of QCOA 0300-02	
	ATC	Verifies no Rod Block exists	
	ATC	Verifies no RWM select block exists	
	ATC	Verifies the proper control rod is selected	
	ATC	Raises CRD drive water pressure in 50 psig increments by throttling closed on the 1-302-8 valve	
<b>SIMOP:</b> When CRD drive water pressure is greater than 340 psid, verify Event <b>Trigger 1</b> goes active to delete malfunction <b>dmf rd02r1827</b> .			
	ATC	Attempts to withdraw Control Rod E-7	
	ATC	Continues normal control rod withdrawal	
	ATC	Restores drive water pressure to normal	
	QV/BOP	Provides peer check as required	
	BOP	Monitors balance of plant parameters	
<b>End of Event 4</b>			

Quad Cities		NRC Scenario No.: 1 Event No: 2, Part 2	Page 2 of 2
Event Description: Loss of APRM 5			
Time	Position	Applicant's Actions or Behavior	
<b>SIMOP:</b> At the direction of the Lead Examiner, insert malfunction: <b>nm08e 0 1:</b> to fail APRM 5 Downscale over a 1 minute period.			
Key Parameter Response: APRM 5 recorder indication trending lower			
Expected Annunciator(s): 901-5 C-6, APRM DOWNSCALE 901-5 C-3, ROD OUT BLOCK			
Automatic Actions: Rod Block			
	ATC	Responds to unexpected annunciators and informs the Unit Supervisor	
	ATC	Acknowledges annunciator 901-5 C-6, APRM DOWNSCALE and 901-5 C-3, Rod Out Block. and reports APRM 5 indicates trending downscale	
	ATC	Confirms APRM 5 indicates DNSCL or INOP at 901-5	
	SRO	Enters and directs actions of QCOA 0700-03	
	SRO	Directs crew to hold Reactor power constant	
	BOP	Verifies APRM 5 indicates downscale at the 901-37 panel	
	ATC/BOP	Contacts Instrument Maintenance to troubleshoot APRM 5	
<b>SIMOP ROLE PLAY:</b> The IM Foreman as necessary. You will have to get some test equipment and get a work package started.			
	SRO	Reviews Tech Specs. Applicable T.S. – 3.3.1.1 for RPS trip functions. Determines that the minimum number of APRM channels for T.S. is NOT met. TRM Section 3.3.a for Rod Block functions is met.	
	SRO	May direct that a Channel B ½ Scram be inserted per QCOP 0500-04. (12 Hour Action Statement)	
	ATC	When directed, depresses the B RPS Manual Scram Pushbutton	
	ATC	Verifies the Scram Solenoid Group Channel B lamps are off	
	SRO	May refer to QCAP 0230-19	
<b>End of Event 2, Part 2</b>			

Quad Cities		NRC Scenario No.: 1 Event No: 5		Page 1 of 2	
Event Description: Loss of SJAE Steam					
<b>Time</b>	<b>Position</b>	<b>Applicant's Actions or Behavior</b>			
<b>SIMOP:</b> When directed by the Lead examiner, implement the loss of SJAE steam by using the Remote Function to close the steam supply: <b>irf mc15r closed</b>					
Key Parameter Response: North SJAE Suction Valves close					
Expected Annunciator(s):901-7 A-14 AIR EJECTOR NORTH SUCTION VALVES CLOSED					
Automatic Actions: North SJAE Suction Valves close					
	BOP	Responds to annunciator 901-7, A-14 and informs the US			
	BOP	Verifies North Suction Valves Close			
	BOP	Attempts to re-open North Suction Valves by taking the SJAE SUCT VLV switch to OPEN			
	BOP	Trips Hydrogen Water Chemistry System			
	BOP	Trips HWCS by one of the following: <ul style="list-style-type: none"> <li>• Touch SHUTDOWN on PLC Screen and CONFIRM</li> <li>• Depress TRIP on HWCS Control Console</li> </ul>			
	BOP	Verify HWCS tripped: <ul style="list-style-type: none"> <li>• Amber TRIP indicator light ON</li> <li>• Blue ENABLE READY light OFF</li> <li>• Annunciator B-1, H2 SYSTEM SHUTDOWN active</li> <li>• Hydrogen flow approximately 0 (zero)</li> </ul>			
	BOP	Monitor Main Condenser Vacuum and enters QCOA 3300-02			
	SRO	Enters and directs actions of QCOA 3300-02			
	SRO	May set Scram Criteria at 7 inches Hg Condenser backpressure			
	BOP	Checks Offgas Rad Levels			
	BOP	May check fuse F-2 at 901-7, TB-H			
<b>EVALUATOR:</b> If necessary, cue candidate that fuse F-2 at 901-7, TB-H is intact (not blown)					
<b>Event 5 Continued</b>					

Quad Cities	NRC Scenario No.: 1	Event No: 5	Page 2 of 2
Event Description: Loss of SJAE Steam			
Time	Position	Applicant's Actions or Behavior	
	BOP	Refers to QCOA-5400-04 for loss of pressure to Dilution Steam or SJAE	
	SRO	Enters and directs actions of QCOA 5400-04	
	BOP	Dispatches an EO to start Sparge Air to the in-service Off-gas Train	
<b>SIMOP ROLE PLAY:</b> When dispatched to start Sparge Air to the in-service Off-gas Train, acknowledge this directive.			
	SRO/BOP	Dispatches the Field Supervisor or an EO to investigate the SJAE Primary/Secondary Steam supply	
<b>SIMOP ROLE PLAY:</b> As the FS/EO dispatched to investigate the SJAE Primary/Secondary Steam supply, wait 2 minutes and then report: <ul style="list-style-type: none"> <li>• Dilution Steam pressure is normal, 125 psig</li> <li>• As found Primary/Secondary SJAE Steam pressure is 20 psig</li> </ul>			
	BOP	Directs the EO to adjust SJAE controller to maintain 120 to 135 psig	
<b>SIMOP ROLE PLAY:</b> As the EO dispatched to adjust SJAE controller, wait 1 minute and then report that: <ul style="list-style-type: none"> <li>• SJAE pressure cannot be adjusted using the pressure controller</li> </ul>			
	BOP	When SJAE pressure cannot be adjusted, directs bypassing the in-service SJAE PCV	
<b>SIMOP ROLE PLAY:</b> As the FS/EO dispatched to the SJAE Controller: Bypass the SJAE as directed using Remote Function: <b>mrf mc15r open.</b> Wait 2 minutes and report that bypassing the SJAE PCV has been successful and that 120-135 psig is being controlled manually.			
	SRO/BOP	Re-enter QCAN 901-7, A-14	
	BOP	Re-opens North Suction Valves by taking the SJAE SUCT VLV switch to OPEN	
	BOP	Cancels the directive to start Sparge Air to the in-service Off-gas Train	
<b>SIMOP ROLE PLAY:</b> When the directive to start Sparge Air is cancelled, acknowledge this directive.			
	ATC	Stops control rod withdrawal and monitors reactor parameters	
<b>End of Event 5</b>			

Quad Cities	2012 NRC Scenario No: 1	Event No: 6	Page 1 of 1
Event Description: Target Rock Relief bellows failure			
Time	Position	Applicant's Actions or Behavior	
<b>SIMOP:</b> When directed by the Lead Examiner Insert Malfunction: <b>imf ser0698 on</b>			
Key Parameter Response: Annunciator only, no change to Drywell parameters			
Expected Annunciator(s): 901-4 F-18 TARGET ROCK VALVE 3A BELLOWS FAILURE			
Automatic Actions: None			
	BOP	Responds to Annunciator and informs the Unit Supervisor	
	BOP	Verifies that the 3A SRV has not lifted	
	BOP	Verifies the 3A SRV indicates closed on the Acoustic Monitor	
	BOP	Verifies Point 9 not increasing on TR 1-260-20 (Panel 901-21)	
	BOP	Monitor for increased leakage into the Primary Containment	
	BOP	Monitor Drywell Air Temperatures	
	BOP	Monitor Drywell Pressure	
	SRO	Identify that the bellows leak makes the Target Rock inoperable as a Safety valve	
	SRO	Enters Tech Spec 3.4.3 Condition C for one or more Safety Valves inoperable; be in mode 3 in 12 hours and in Mode 4 in 36 hours (Note: TS 3.4.3 Condition A applies only to the relief function of the Target Rock valve and TS 3.5.1 applies only to the ADS function of the Target Rock Valve and are therefore not applicable)	
	ATC	Monitors Reactor and Reactor Pressure Vessel indications	
<b>End of Event 6</b>			



Quad Cities	NRC Scenario No.: 1	Event No.: 7	Page 1 of 5
Event Description: Station Blackout Initial Actions			
Time	Position	Applicant's Actions or Behavior	
<b>SIMOP:</b> When directed by the Lead Evaluator, initiate the Station Blackout using manual Trigger 3: <b>trg! 3</b>			
Key Parameter Response: 0 Voltage on 4KV Busses, Transformer 12 Breakers to Busses 11, 12, 13, & 14 indicate OPEN, Loss of lighting in Control Room/Simulator, No output voltage on U1 EDG, ½ EDG output breaker open			
Expected Annunciator(s): (Not a complete list)			
901-8 A-7, DIESEL GEN 1 TROUBLE			
901-8 C-7, DIESEL GEN 1 FAIL TO START			
901-8 E-2, RESERVE TRANS 12 TRIP			
901-8 G-2, RESERVE AUX TRANS 12 LOW VOLTAGE			
901-8 F-3, 4KV BUS OVERCUR TRIP			
Automatic Actions: Reactor Scram, Group 1 Isolation, (Note: Faults prevent EDGs from restoring power)			
	SRO	Directs ATC to Perform QCGP 2-3	
	ATC	Places RX MODE switch to SHUTDOWN position	
	ATC	Verifies the SDV vent and drain valves are closed	
	ATC	Verifies all Control Rods are fully inserted	
	ATC	Makes scram report	
<b>QGA 100</b>			
	ATC	When RPV Water Level lowers to less than 0 inches, notifies the US of the QGA 100 entry	
	SRO	Enters and directs QGA 100 actions	
	SRO	Directs ATC/BOP to verify 0 inches isolations and auto-starts	
	ATC/BOP	Verifies Group 2 Isolation (Containment Auxiliaries)	
	ATC/BOP	Verifies Group 3 Isolation (RWCU)	
	ATC/BOP	Verifies RB vent isolation and SBGT start	
	ATC/BOP	Verify Drywell Inerting lineup has isolated	
	ATC	Stabilize RPV Pressure less than 1060 psig with ADS valves	
	SRO	Directs RPV Water Level be maintained 0 inches to 48 inches with high pressure systems	
	ATC	(CONTINUOUS) Monitors and maintains RPV water level and pressure	
	ATC	Maintains RPV water level with high pressure systems	
<b>Event 7 Continued</b>			

Quad Cities	NRC Scenario No.: 1	Event No.: 7	Page 2 of 5
Event Description: Station Blackout / Crosstie Operations			
Time	Position	Applicant's Actions or Behavior	
	BOP	Responds to Annunciators and reports the Loss of T-12 and the failure of the U1 EDG to start	
	SRO/BOP	Verify applicable actions of QCOA 6100-03, Loss of Offsite Power, have been performed	
	BOP	Attempts to start U1 EDG from panel 901-8	
	BOP	Dispatches an operator to attempt to start U1 EDG locally	
<b>SIMOP ROLE PLAY:</b> The EO dispatched to the U1 EDG; Wait 3 minutes then report that the U1 EDG is cranking but not starting and it has used up most of its starting air. Mechanical Maintenance has been contacted and they are on the way.			
	BOP	Dispatch an operator to investigate the loss of T-12	
<b>SIMOP ROLE PLAY:</b> The EO dispatched to T-12; Wait 5 minutes and then report that you cannot determine why T-12 tripped and that you have contacted OAD.			
	BOP	May dispatch an EO to investigate the loss of Bus 13-1	
<b>SIMOP ROLE PLAY:</b> The EO dispatched to Bus 13-1. Wait 5 minutes and then report that Bus 13-1 is locked out on an overcurrent trip.			
	BOP	Recognizes the Bus Lockout on Bus 13-1 and informs the US	
	SRO/BOP	If Bus 13-1 or Bus 14-1 are not energized and power is available from a non-EDG source on Unit 2, attempt to re-energize busses per QCOP 6500-08, 4KV Bus Crosstie Operation	
	BOP	Attempt to crosstie Bus 14-1 to Bus 24-1 as follows:	
	BOP	Take the following Control Switches to PTL: <ul style="list-style-type: none"> <li>○ U1 EDG to Bus 14-1 GCB</li> <li>○ Bus 14-1 &amp; Bus 61 Tie Breaker</li> <li>○ Busses 14 and 14-1 Tie GCB</li> <li>○ 1B Core Spray Pump</li> <li>○ 1C RHR Pump</li> <li>○ 1D RHR Pump</li> </ul>	
<b>Event 7 Continued</b>			

Quad Cities		NRC Scenario No.: 1 Event No.: 7		Page 3 of 5	
Event Description: Station Blackout / Crosstie Operations					
<b>Time</b>	<b>Position</b>	<b>Applicant's Actions or Behavior</b>			
	BOP	Request U2 to close the Bus 24-1 to Bus 14-1 Tie Breaker			
<p><b>SIMOP:</b> Role Play as necessary and use the following Remote function to close the tie breaker and then report that it has been closed: <b>irf ed34r close</b></p> <p>NOTE: This Remote Function is necessary to provide correct indications on Unit 1. However, (Setup) Malfunction <b>ed04k</b> will prevent Bus 14-1 to Bus 24-1 crosstie on Unit 1.</p>					
	BOP	Place Synch Switch to ON for Bus 14-1 and Bus 24-1 Tie Breaker			
	BOP	Attempt to close Bus 14-1 and Bus 24-1 Tie Breaker and recognize the failure			
	BOP	Inform the Unit supervisor of the Bus 14-1 failure			
	SRO/BOP	Evaluate status. If Unit is Blacked Out, exit QCOA 6100-03 and perform QCOA 6100-04 Station Blackout.			
<b>CT1</b>	SRO	Direct starting and loading of the SBO Diesel per the Hard Card to Bus 14-1			
<b>Event 7 Continued</b>					

Quad Cities		NRC Scenario No.: 1 Event No.: 7	Page 4 of 5
Event Description: Station Blackout / SBO Startup to Bus 14-1			
Time	Position	Applicant's Actions or Behavior	
CT1	BOP	When directed, energizes Bus 14-1 from the SBO DG per QCOP 6620-14 Hard Card	
	BOP	Places or verifies the following control switches PTL: <ul style="list-style-type: none"> <li>o U1 Diesel Gen to Bus 14-1 GCB</li> <li>o Busses 14-1 and 24-1 Tie GCB</li> <li>o Busses 14 and 14-1 Tie GCB</li> <li>o Bus 13-1 &amp; Bus 61 Tie Breaker</li> <li>o 1B Core Spray Pump</li> <li>o 1C RHR Pump</li> <li>o 1D RHR Pump</li> </ul>	
	BOP	Place the SBO DG 1 Mode Switch in SBO mode	
	BOP	Momentarily place SBO DG 1 C/S to START	
	BOP	Verify Voltage 3900-4580, Freq 58.8-61.2, RPM 900	
	BOP	Close the DG BKR on the DCS screen	
	BOP	Close the Bus 14-1 & Bus 61 Tie Breaker	
	BOP	Close Bus 14-1 Feed from the DCS Screen	
	BOP	Verify Busses 14-1 and 19 are energized	
	BOP	Remove ECCS pumps from PTL as directed by the Unit Supervisor, allowing 5 seconds between starts	
	BOP	Verify proper DCS Panel indications for SBO operation	
	SRO	May direct the BOP to Backfeed Bus 14 from Bus 14-1	
	BOP	If directed to backfeed Bus 14:	
	BOP	Place 1B Service Water Pump control switch in PTL	
	BOP	Place 1C & 1D Condensate Pump control switches in PTL	
	BOP	Place SYNCHROSCOPE switch for BUSSES 14 AND 14-1 TIE GCB to ON	
	BOP	Close BUSSES 14 AND 14-1 TIE GCB	
	BOP	Verifies BUS 14 is energized	
	BOP	Place SYNCHROSCOPE switch for BUSSES 14 AND 14-1 TIE GCB to OFF	
<b>Event 7 Continued</b>			

Quad Cities		NRC Scenario No.: 1 Event No.: 7	Page 5 of 5
Event Description: Station Blackout / Re-energizing Bus 14 and 480 V Busses			
Time	Position	Applicant's Actions or Behavior	
	SRO	Directs the BOP to crosstie Busses 18 and 19 per the Hard Card	
	BOP	When directed, crossties Busses 18 and 19 per the Hard Card	
	BOP	Verifies Bus 19 is energized	
	BOP	Opens Bus 13-1 to XFMR 18 GCB	
	BOP	Closes Busses 18 and 19 TIE BKR at Bus 18	
	BOP	Closes Busses 18 and 19 TIE BKR at Bus 19	
	BOP	Verifies both Busses 18 and 19 are energized	
<p><b>SIMOP:</b> If RPS restoration is requested, Role Play as necessary. Wait 3 minutes and then use the following commands to restore RPS:  A RPS: <b>irf 02r mg_set</b> and <b>irf r29r reset</b>  B RPS: <b>irf 03r mg_set</b> and <b>irf r28r reset</b>  Then contact the Control Room to report completion of RPS restoration.</p>			
	BOP	May direct the EO to re-energize RPS A and RPS B Busses per QCOP 7000-01	
	SRO	May direct the BOP to re-energize Bus 16 and/or Bus 17 per the Hard Card	
	BOP	When directed, re-energizes Bus 16 per the Hard Card	
	BOP	Closes the Bus 14 to XFMR 16 GCB	
	BOP	When directed, re-energizes Bus 17 per the Hard Card	
	BOP	Closes the Bus 14 to XFMR 17 GCB	
	SRO	May direct the BOP to re-energize Bus 15 from Bus 16 or Bus 17 per the Hard Card	
	BOP	When directed, re-energizes Bus 15 per the Hard Card	
	BOP	Verifies open transformer main feed to Bus 15	
	BOP	Verifies open Bus 15 to Bus 17 and Bus 15 to Bus 16 crosstie breakers	
	BOP	Closes Bus 16 or Bus 17 to Bus 15 crosstie breaker	
<b>End of Event 7</b>			

Quad Cities		NRC Scenario No.: 1 Event No.: 8	Page 1 of 5
Event Description: LOCA in the Drywell / Initial Actions			
Time	Position	Applicant's Actions or Behavior	
<b>SIMOP:</b> Verify the LOCA malfunction goes active 3 minutes after the SBO event: <b>imf rr10a 0.13 7:30</b> (Recirc Suction Line LOCA at 0.13% severity on a 7.5 minute ramp)			
Key Parameter Response: Rising Drywell Pressure Expected Annunciator(s): 901-03B A-16, PRI CNMT HIGH PRESSURE Automatic Actions: None due to the SBO and system malfunctions			
	BOP	Responds to annunciator 901-3, A-16, PRI CNMT HIGH PRESSURE	
	SRO	Enters and directs QCOA 0201-01	
	SRO/ATC	Notifies Radiation Protection of elevated containment pressure	
	SRO	May make a PA announcement to evacuate Reactor Building	
<b>QGA 200</b>			
	ATC/BOP	Reports Drywell pressure above 2.5 psig.	
	SRO	Re-enters QGA 100 and enters QGA 200 on high drywell pressure	
	SRO	Directs BOP/ATC to verify 2.5 psig isolations/actuators	
	BOP/ATC	Verifies 2.5 psig isolations/actuators	
	ATC/BOP	(For systems that have power) Core Spray, HPCI and RHR running	
<b>Event 8 Continued</b>			

Quad Cities		NRC Scenario No.: 1 Event No.: 8	Page 2 of 5
Event Description: LOCA in the Drywell / QGA 100 actions			
Time	Position	Applicant's Actions or Behavior	
	SRO	Directs QGA 100 RPV Control actions	
CT2	SRO	Directs ATC to maintain RPV water level with high pressure systems	
CT2	ATC	Maintains RPV water level with high pressure systems	
	ATC/BOP	Recognizes and reports to US that the HPCI Initiation has failed (Aux Oil Pump lockout)	
	ATC/BOP	Dispatches an EO to troubleshoot HPCI and/or the Aux Oil Pump breaker	
<p><b>SIMOP:</b> If requested to troubleshoot HPCI Aux Oil Pump breaker, Role Play as necessary. <b>Wait until the SBO Diesel is providing power</b> and at least 2 minutes, then delete malfunction <b>dmf hp08</b> and report that the Aux Oil Pump Breaker is reset.</p>			
	ATC	When Aux Oil Pump is restored, restarts HPCI	
	ATC	If necessary, depresses the HPCI TURB TRIP RESET pushbutton	
	ATC	Depresses the HPCI MANUAL INITIATION pushbutton and/or verifies HPCI Auto Start	
	ATC	Adjust HPCI Flow Controller in Manual or AUTO as necessary	
	ATC	May place HPCI in Trip-Latch if HPCI makeup is unnecessary	
	ATC	Starts RCIC per QCOP 1300-02	
	ATC	Depresses the RCIC MANUAL INITIATION pushbutton for at least 30 seconds and recognizes the failure to start	
	ATC	Responds to Annunciator 901-4 G-15	
	ATC	Dispatches an EO to investigate the Trip Throttle Valve failure	
<p><b>SIMOP ROLE PLAY:</b> As the EO dispatched to RCIC: Wait 2 minutes and then report that the RCIC Trip Throttle overspeed mechanism will not reset.</p>			
	SRO	Directs ATC to stabilize RPV Pressure with ADS valves (following LOOP event)	
	ATC	Stabilizes RPV Pressure with ADS valves as directed	
	SRO	If RPV water level cannot be maintained greater than -59 inches directs ADS inhibited	
	BOP/ATC	When directed, inhibits ADS	
<b>Event 8 Continued</b>			

Quad Cities		NRC Scenario No.: 1 Event No.: 8		Page 3 of 5	
Event Description: LOCA in the Drywell / QGA 100 actions					
Time	Position	Applicant's Actions or Behavior			
	ATC/BOP	May start SSMP per QCOP 2900-02			
		Switches power supply to Bus 24-1			
		Verify CLOSED the RESERVE FEED CONTROL from Bus 24-1 to Bus 31, GCB 151-2425			
		OPEN the NORMAL FEED CONTROL from Bus 14-1 to Bus 31, ACB 151-3101			
		CLOSE the RESERVE FEED CONTROL from Bus 24-1 to Bus 31, ACB 151-3102			
		Verify Pump suction pressure is available			
		OPEN MOV 1/2-2901-7, Throttled Test Valve			
		Start the SSMP			
		Verify increasing Pump Discharge Pressure			
		Place the FCV in AUTO			
		Slowly increase flow controller setpoint to 400 gpm			
		OPEN MOV 1-2901-8, U1 Reactor Supply Valve			
		CLOSE MOV 1/2-2901-7, Throttled Test Valve			
		Directs and Equipment Operator to close the Service Water to SSMP Room Cooler Bypass, 1/2-2999-9			
<b>SIMOP ROLE PLAY:</b> As Equipment Operator dispatched to close 1/2-2999-9. After 5 minutes, report that 1/2-2999-9 is CLOSED.					
	SRO	May direct use of alternate injection systems			
	ATC	May restart the B CRD Pump per QCAN 901-5 B-2 (After power is restored)			
	ATC	Close the Pump Discharge Valve MO 1-301-2A/B			
	ATC	Start the available CRD Pump			
	ATC	Throttle open the Pump Discharge Valve MO 1-301-2A/B			
	ATC	May start available SBLC pump			
<b>Event 8 Continued</b>					



Quad Cities		NRC Scenario No.: 1 Event No.: 8	Page 4 of 5
Event Description: LOCA in the Drywell / QGA 200 actions			
Time	Position	Applicant's Actions or Behavior	
<b>EVALUATOR NOTE:</b> The QGA 200 actions will most likely be taken after power has been restored with the SBO Diesel.			
	BOP	(Continuous) Monitors and reports Primary Containment Parameters and trends	
	SRO/BOP	May dispatch an EO to Aux Electric Room to 2201-5 rack to monitor Reactor water level and Drywell Pressure during the Station Blackout	
	SRO	Directs the actions of QGA 200 PRIMARY CONTAINMENT CONTROL	
	SRO	Verifies Torus Water level less than 27 ft.	
	SRO	May direct BOP/ATC to monitor SBO loading.	
	BOP/ATC	Monitor SBO loading as directed	
	SRO	Directs BOP to initiate Torus Sprays	
	BOP	Uses QCOP 1000-30 to Start RHR	
	BOP	Takes the available RHR Pumps out of PTL	
	BOP	Places the Containment Cooling Permissive Switch 17 to ON for the B RHR Loop	
	BOP	Places the RHR SW Start Permissive Switch 19 to MANUAL OVERRIDE for the B RHR Loop	
	BOP	Starts Torus Spray	
	BOP	Opens Torus Test or Spray Valve, MO 1-1001-34B	
	BOP	Opens Torus Spray Shutoff Valve, MO 1-1001-37B	
	BOP	Throttles Torus H2O Test Valve MO 1-1001-36B to establish RHR Discharge Pressure of 100-250 psig	
	BOP	(If power is restored) Uses QCOP 1000-30 to start RHR Service Water	
	BOP	Opens The available RHR HX SW Discharge Valve MO 1-1001-5B to approximately 40%	
	BOP	Starts 1C/D RHR SW Pump(s)	
	BOP	Adjusts MO 1-1001-5B to maintain RHR SW Pressure 15-20 psig higher than RHR and less than 3600 gpm per pump	
	BOP	Throttles RHR HX Bypass Valve MO 1-1001-16B as necessary	
<b>Event 8 Continued</b>			

Quad Cities		NRC Scenario No.: 1 Event No.: 8	Page 5 of 5
Event Description: LOCA in the Drywell / QGA 200 actions			
Time	Position	Applicant's Actions or Behavior	
	SRO	Verifies Torus level less than 17 ft. and inside DW Spray Initiation Limit curve	
	SRO	Verifies Recirc pumps and DW coolers tripped	
<b>CT3</b>	SRO	Directs BOP to initiate DW Sprays	
<b>CT3</b>	BOP	Initiates Drywell Sprays	
		Opens Outboard Spray Isolation, MO 1-1001-23B	
		Opens Inboard Spray Isolation, MO 1-1001-26B	
		Opens Torus Test or Spray Valve, MO 1-1001-34B	
		Adjusts Torus H2O Test Valve MO 1-1001-36B to maintain RHR Discharge Pressure 100-250 psig and RHR SW Pressure 15-20 psig higher than RHR pressure	
<b>SIMOP:</b> If asked to override the DW-Torus vacuum breaker alarms, 901-3 C-13 and G-11, activate the following Batch File: <b>bat G-11_and_C-13_off</b>			
	SRO	May Direct Torus Cooling initiation	
	BOP	Starts Torus Cooling as directed	
		Opens Torus Test or Spray Valve, MO 1-1001-34B	
		Opens Torus H2O Test Valve, MO 1-1001-36B	
		Adjusts Torus H2O Test Valve MO 1-1001-36B to maintain RHR SW Pressure 15-20 psig higher than RHR pressure and RHR pressure between 100 and 250 psig	
		Closes MO 1-1001-16B	
	BOP	(Continuous) Monitors Torus Water level and, if less than -2 inches, notifies US of QGA entry	
	SRO	If Torus Water Level lowers to less than -2 inches, re-enters QGA 200	
<b>End of Event 8</b>			
<b>SIMOP:</b> When Drywell sprays have been initiated and RPV Water level has been restored or as directed by the Lead Evaluator, place the simulator in <b>FREEZE</b> .			

(Final)

Exelon Nuclear

2012 ILT NRC Exam Scenario

Scenario Number:

**NRC Scenario 2**

Revision Number: 00

Date: 04/04/12

Developed By: \_\_\_\_\_  
Instructor Date

Validated By: \_\_\_\_\_  
SME or Instructor Date

Reviewed By: \_\_\_\_\_  
Operations Representative Date

Approved By: \_\_\_\_\_  
Training Department Date

Facility: Quad Cities Scenario No.: **2012 NRC Scenario 2** Op-Test No.: ILT 10-1  
 Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions:

The plant is operating at 100% power.  
 The 1A EHC Pump is out of Service.  
 1B Service Water Pump is out of service.

Turnover: QCIS 0600-01, Unit 1 Reactor Pressure 0 to 1200 psig Indication Calibration, is in progress.

Event No.	Malf. No.	Event Type*	Event Description
1	None	BOP N	QCIS 0600-01 performed from the DFWLC OWS
2	None	ATC R	Lower power with Rods and Recirc for Load Following
3	SW02A	BOP C	Service Water Pump degradation (QCOA-3900-01)
4	RD04	ATC C	Rod Drift Out <b>TS</b> (QCOA-0300-11)
5	None	SRO TS	Torus Water Level PAM Instrument inoperable <b>TS</b>
6	PC05 RR03A RD13A	Crew M	A RBCCW leak in the drywell requires a manual scram (QCOA-3700-06). After RPS has been tripped, approximately 1/2 of the control rods remain withdrawn. (Hydraulic ATWS)
7	TC05B	Crew M	QGA 101 Level/Power Control. Turbine Bypass valves become unavailable, requiring manual RPV Pressure control with Relief Valves
8	SL01	ATC C	Malfunction after Major: Failure of 1 <sup>st</sup> SBLC Pump to start

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

ES-301-4 Quantitative attributes:  
 Total Malfunctions (5-8): **5**  
 Malfunction(s) after EOP (1-2): **E7&8**  
 Abnormal Events (2-4): **E 3, 4, & 6**  
 Major Transient(s) /E-Plan entry (1-2): **E6**  
 EOPs (1-2): **QGA 100 & 101**  
 EOP Contingencies (0-2): **E7**  
 Critical Tasks (2-3): **3**

ES-301-5 Quantitative attributes:  
 BOP Normal: **E1**  
 ATC Reactivity (1 per set): **E2**  
 BOP I/C (4 per set): **E3**  
 ATC I/C (4 per set): **E4 & 8**  
 SRO-I I/C (4 per set inc 2 as ATC): **E3,4 & 8**  
 SRO Tech Spec (2 per set): **E4 & 5**  
 ALL Major Transients (2 per set) **E6**

**SUMMARY:**

- Initial Conditions:
  - The plant is operating at 100% power.
  - The 1A EHC Pump is out of service.
  - The 1B Service Water pump is out of service.
- Event 1: The BOP performs QCIS 0600-01 from the DFWLC OWS and returns FWLC to 3-Element.
- Event 2: SRO and ATC insert control rods and lower Recirc Pump Speed and Reactor Power for Load Following.
- Event 3: The 1A Service Water Pump capacity will degrade to the point that the low-pressure alarm is received in the Control Room. Reports from the Equipment Operator confirm a problem with the pump. The BOP will start the ½ or the 2A Service Water Pump and secure the 1A pump.
- Event 4: Control Rod B-6 drifts out from position 00. The ATC and SRO respond per QCANs and QCOA 300-11. The rod should be inserted and scrammed. The SRO will declare control rod B-6 inoperable per TS 3.1.3, Condition C, requiring the inoperable rod to be fully inserted within 3 hours and disarmed within 4 hours.
- Event 5: The IMD Supervisor calls the US to report that an unqualified replacement part was recently used for the Torus Level Transmitter for Control Room Narrow Range indications. Determines that TS 3.3.3.1 Condition A applies; 30 days to restore the PAM instrument to operable
- Event 6: A RBCCW leak in the Drywell requires the crew to manually scram the reactor per QCOA 3700-06. After RPS has been tripped, approximately ½ of the control rods remain withdrawn. (Hydraulic ATWS)
- Event 7: The crew terminates and prevents injection per QGA 101 (Level/Power Control). During this period, the running EHC pump trips which closes the Turbine Bypass valves. The crew must manually control RPV Pressure with Relief Valves. Torus Cooling will be placed in service.
- Event 8: When SBLC is initiated for the ATWS, the 1<sup>st</sup> pump selected will fail to start. The ATC will recognize this malfunction and start the other SBLC Pump.
- Scenario ends when actions are being taken to shutdown the reactor and RPV water level is being controlled in the specified band.
- Approximate Run Time: 1.5 Hours

**CRITICAL TASKS:**

**Critical Task #1** With a reactor scram required and the reactor not shutdown, TAKE ACTION TO REDUCE POWER by injecting boron (prior to exceeding 110°F torus temperature) and/or inserting control rods, to prevent exceeding primary containment design limits. (BWROG RPV-6.1 ATWS PWR/LVL S/D REACTOR)

**Critical task #2:** During at ATWS with conditions met to perform power/level control, TERMINATE AND PREVENT INJECTION, with the exception of boron, CRD and RCIC into the RPV until conditions are met to re-establish injection.

**Critical task #3:** When conditions are met to re-establish injection, use available injection systems to MAINTAIN RPV water level above the Minimum Steam Cooling RPV Water Level (-166").

**(Conditional Critical Task)** If RPV water level lowers to less than -59 inches, inhibit ADS in accordance with QGA 100 or QGA 101.

## EXERCISE PERFORMANCE OBJECTIVES

SR-0202-P25	Given an operating reactor plant, perform the following RRCS operations on the Operator Work Station (OWS) in accordance with QCOP 0202-36: - Activate/restore from 'calibrate mode' for analog inputs
SR-0002-P05	Given a reactor plant at power, perform a power change discernible on neutron monitors using recirc flow in accordance with QCOP 0202-03 and QCGP 3-1.
SR-3900-P02	Given a reactor plant at power when a loss of service water occurs, take action to scram and control RPV parameters in accordance with QCOA 3900-01, 3700-01 and 3800-03.
SR-0300-P03	Given an operating reactor plant with a drifting control rod, insert/disarm the drive and attempt to determine the cause in accordance with QCOA 0300-04 and QCOA 0300-11.
SR-3700-P03	Given a reactor plant at power and indications of an RBCCW leak inside primary containment, trip the recirc pumps and isolate the RBCCW leak in accordance with QCOA 3700-06.
SR-1100-P02	Given a reactor plant with an ATWS, inject boron prior to exceeding 110 degrees torus water temperature OR if core instability is observed in accordance with QGA 101 and QCOP 1100-02.
SR-0002-P03	Given a reactor plant at power with a reactor scram, place the plant into a stable condition in accordance with QCGP 2-3.
SR-0001-P11	Given a reactor plant with an ATWS, take action to reduce heat input into the containment in accordance with QGA 101. (ATWS is a key event in 1 of the 100 most probable PRA Core Damage Sequences)
SR-0203-P07	Given a reactor plant in a QGA condition, inhibit ADS in accordance with QGA 100 or QGA 101. (Important PSA task / Inhibiting ADS terminates 5 of top 200 Core Damage Sequences)
SR-0001-P14	Given a reactor plant with an ATWS with RPV level lowered and being maintained between -166 inches and the level to where it was lowered and SBLC tank level has dropped by 16 percent, raise RPV injection rate to attempt to restore RPV water level to between +0 and +48 inches; stop injection if power starts and continues to rise in accordance with QGA 101.
SR-1000-P01	Given a reactor plant, start the RHRSW system and RHR system in torus cooling in accordance with QCOP 1000-4 and QCOP 1000-9 or QCOP 1000-30. (Important PRA Operator Action - starting torus cooling in conjunction with other actions has a RAW of 4320) (Recovery of torus cooling after failure terminates 19 of top 100 core damage sequences)

1. Reset to IC-21 (100% power).
2. Go to **RUN**.
3. Verify the following RWM Sequence is loaded: **C22SU**
4. Take the following equipment out of service:
  - Start the 1B EHC pump, take the 1A EHC Pump to PTL and hang an OOS INFO card on 1A EHC pump.
  - Take 1B Service Water Pump to PTL and hang an OOS INFO card.
  - Set up for QCIS 0600-01 as follows:
    - Place FWLC in Single Element.
    - At OWS, place 1-PT-0647-B in "Activate" per QCIS 0600-01, Step 5.7.3.
    - Leave computer screens on RRCS Overview and FWLC Overview.

(The following commands to be utilized for this scenario are contained in the CAEP file: 2012 NRC Scenario 2.cae)

5. Insert Commands for setup:
  - **imf rd13a 100** (SDV North Hydraulic lock)
  - **trgset 8 "rdv10305118.lt.0.99"** (When B RPS is tripped)
  - **imf tc05b(8 5:)** (5 minutes after Trigger 8, 1B EHC pump trips)
  - **ior dihs13901b ptl** (Override B Service Water Pump in PTL)
  - **imf sl01a** (1A SBLC Pump trip)
  - **imf sl01b** (1B SBLC Pump trip)
  - **trgset 10 "(zaoai111403b.le.0.01).and. zaoai111403a.le.0.01)"** (Both Squib lights off)
  - **trgset 11 "(zaoai111403b.le.0.01).and. zaoai111403a.le.0.01)"** (Both Squib lights off)
  - **trg 10 "dmf sl01a"** (On Trigger 10, pump trip is deleted, selected pump starts)
  - **trg 11 "dmf sl01b"** (On Trigger 11, pump trip is deleted, selected pump starts)
6. Verify the following commands for scenario performance:
  - **imf sw02a 34 1:** (1A SWP capacity degrades to 34% severity on a 1 min ramp)
  - **imf rd04r1431** (Rod D-8 drift Out)
  - **irf rd06r1431r inop** (Disables rod D-8 at HCU)
  - **dmf rd04r1431** (Deletes Rod Drift Out Malfunction)
  - **imf pc05 40** (RBCCW leak in Drywell at 40% severity)
  - **irf rd04r close** (As requested, close the CRD 1-301-25 valve)
  - **irf qg09r 1** (As requested, install MSIV Lo-Lo Level Isolation bypass jumpers)
  - **irf qg08r 1** (As requested, install jumpers to bypass all scrams)
  - **irf qg14r 1** (As requested, pull ARI fuses)
7. Verify SBO alarms clear.
8. Provide the "Scram Key", Panel 901-16, to the BOP Evaluator.
9. Provide a prepared copy of a 100% OD-20 to the Lead Evaluator.
10. Provide a "Holding Load" and a "Load Following" REMA.

(Continued)

11. Provide a current revision of the following procedures, left unmarked.
  - QCGP 3-1, Reactor Power Operations
  - QCGP 4-1, Control Rod Movements and Control Rod Sequence
  - QCOP 0280-01, Reactor Manual Control Operation
  - QCOP 0202-03, Reactor Recirculation System Flow Controller Operation
12. Provide a current revision of the following procedures, signed off as specified:
  - QCIS 0600-01 (TIC 3412), Unit 1 Reactor Pressure 0 to 1200 psig Indication Calibration, marked up to Step 5.7.16
13. Provide blank ESTs for use during the scenario.
14. Perform the applicable steps of TQ-QC-201-0113 "Simulator Exam Security Actions Checklist".



Annunciator Procedures:

- 901-4 A-17 DRYWELL FLOOR DRAIN SUMP HIGH LEVEL, Rev. 7
- 901-5 A-3, ROD DRIFT, Rev. 7
- 912-1 B-3 SERVICE WATER LOW PRESSURE, Rev. 6
- 912-1 F-1 RX BUILDING CW EXP TANK HI/LO LEVEL, Rev. 3

QCGP 2-3, Reactor Scram, Rev. 74

QCGP 3-1, Reactor Power Operations, Rev. 66

QGA 100, RPV Control, Rev. 9

QGA 101, RPV Control (ATWS) Rev. 13

QGA 200, Primary Containment Control, Rev. 9

QCOA 3900-01, Service Water System Failure, Rev. 16

QCOA 0300-11, Control Rod Drift, Rev. 22

QCOA 3700-04, RBCCW Expansion Tank high/Low Level, Rev. 7

QCOA 3700-06, RBCCW Line Break Inside Containment, Rev. 6

QCOP 0201-16, Terminate and Prevent RPV Injection, Rev. 5

QCOP 0300-28, Alternate Control Rod Insertion, Rev. 30

QCOP 0203-01, Reactor Pressure Control Using Manual Relief Valve Actuation, Rev. 13

QCOP 1100-02, Injection of Standby Liquid Control, Rev. 12

QCIS 0600-01, Unit 1 Reactor Pressure 0 to 1200 psig Indication Calibration, Rev. 6

**CREW TURNOVER****1.) Plant Conditions:**

- a.) Unit 1 is at 100% Power.
- b.) Unit 2 is at 100% Power.
- c.) Technical Specification limitations:
  - (1) Unit 1: None
  - (2) Unit 2: None
- d.) On Line Risk is GREEN.

**2.) Significant problems/abnormalities:**

- a.) 1A EHC pump is Out-of-Service for motor bearing replacement.
- b.) The 1B Service Water pump is Out-of-Service for repair of cracked terminal leads.

**3.) Evolutions/maintenance for the oncoming shift:**

- a.) There is a potential that QC Unit 1 may have to drop load for load following.
  - “Load Holding” and “Load Following” REMAs are provided.
- b.) BOP, assist with completion QCIS 0600-01 (TIC 3412) Unit 1 Reactor Pressure 0 to 1200 psig Indication Calibration, starting at Step 5.7.16.
  - The TIC was written to allow the BOP (rather than the “Unit NSO”) to support this operation.
  - BOP place FWLC back in 3-Element per QCOP 0600-12.
- c.) When the surveillance is completed and FWLC is back in 3-Element control, reduce load on Unit 1 by 50 MWe.
  - Unit 1 will be at reduced power for greater than 1 hour.
- d.) EOs on shift:
  - Burke
  - Parrish
  - Foster
  - Richardson
  - Hughes
  - Brewer
  - Decker
  - Schmidt

Quad Cities		NRC Scenario No.: 2 Event No: 1	Page 1 of 1
Event Description: QCIS 0600-01 performed from the DFWLC OWS			
<b>Time</b>	<b>Position</b>	<b>Applicant's Actions or Behavior</b>	
	SRO	Directs and supervises the completion of QCIS 0600-01	
	BOP	Navigate to the screen titled "FWLC_2 Measuring Points"	
	BOP	Verify correct 1-PT-0647-B parameter pressure indication for current plant status	
	BOP	Select box on screen corresponding to 1-PT-0647-B parameter	
	BOP	Select "Deactivate" at bottom of AS500 OS screen	
	BOP	Verify box associated with parameter in deactivate mode is clear in color	
	BOP	Places FWLC in 3-Element per QCOP 0600-12	
	BOP	Verifies FWLC system is not in "Forced 1-Element" control mode on OWS	
	BOP	Momentarily depress the THREE pushbutton on the RX LEVEL MASTER CONTROLLER, 1-0640-18 and verifies the correct pushbutton indication	
	ATC	Monitors reactor controls and indications	
<b>End of Event 1</b>			

Quad Cities		NRC Scenario No.: 2 Event No: 2	Page 1 of 1
Event Description: Lower power with Recirc for Load Following			
Time	Position	Applicant's Actions or Behavior	
	ATC/BOP	Dispatch an EO to set the mechanical travel stop for the Stator cooling TCV in the FULL-UP position	
<b>SIMOP ROLE PLAY:</b> As the dispatched EO. Wait 2 minutes and then report that the mechanical travel stop for the Stator cooling TCV are in the FULL-UP position.			
	SRO	Provides SRO oversight for lowering reactor power	
	SRO	Deactivates the Holding Load REMA and activates the Load Drop REMA. (Notch control rods to lower FCL prior to reducing flow.)	
<b>Lead Examiner Role Play:</b> Qualified Verifier (QV) as necessary. (If OD-20 does not work properly, after operators have demanded an OD-20 from the PPC, provide a prepared copy of a 100% OD-20.			
	ATC/BOP	May demand an OD-20 in order to verify initial conditions for the REMA.	
	ATC	On the RWM verifies proper rod selected, its current position & bounds	
	ATC	Communicates to the QV. "Ready to insert Rod __-__ from position __ to position __ (continuous or notching)."	
	QV	Replies: "Rod __-__ is selected. Understand inserting rod __-__ from position __ to position __ (continuous or notching)."	
	ATC	Replies: "That is correct"	
	ATC	Verifies control rod and moves it to the desired position	
	ATC/BOP	Place keeps rod moves in the rod movement book	
	ATC	Repeats above steps as necessary	
	ATC	Depresses LOWER pushbutton on Recirc MASTER SPEED DEMAND	
	ATC	Verifies Reactor pressure (PR 640-28 preferred) in the acceptable region of the CORE Power vs. Reactor Pressure Curve	
	ATC	Closely monitors power decrease on APRMs	
	ATC	Verifies POWERPLEX is operating and monitors outputs for peaking	
	ATC	Verifies Reactor Recirc Pumps remain at approximately equal flows	
	BOP	Adjusts LOAD SET as necessary by performing steps on Att. D step 2 for DEHC on the 901-7 panel	
	BOP	Provides peer check as requested for power changes	
<b>End of Event 2</b>			

Quad Cities		NRC Scenario No.: 2 Event No: 3		Page 1 of 1	
Event Description: Service Water Pump Degradation					
Time	Position	Applicant's Actions or Behavior			
<b>SIMOP:</b> When directed by the Lead Examiner Insert Malfunction: <b>imf sw02a 34 1:</b>					
Key Parameter Response: Service Water Pressures on Panel 912-1; 1/2 -3940-4 & 18					
Expected Annunciator(s): 912-1 B-3 SERVICE WATER LOW PRESSURE					
Automatic Actions: None (Note: The normal standby pump, 1B, is out of Service)					
	BOP	Responds to annunciator and informs the Unit Supervisor			
	BOP	Identifies and reports that Service Water pressure is at the alarm point but steady			
	SRO	Supervises actions of the QCAN and/or QCOA 3900-01			
	SRO	May set Scram Criteria at 80 psig Service Water Header Pressure			
	BOP	Dispatches an EO to investigate			
<b>SIMOP ROLE PLAY:</b> As the EO dispatched to the Crib House: Wait 2 minutes and then report that that "the 1A Service Water Pump is very noisy and feels warmer than normal." Recommend securing the 1A Service Water Pump.					
If asked, report that the 1A SW pump discharge pressure is 75 psig. Report all other running SW pump discharge pressures at 115 psig.					
	BOP	Monitors Service Water pressure on PI 1/2-3940-18			
	BOP	Recognizes that the 1B pump will not start at 75 psig as header pressure lowers			
	SRO	May direct starting the ½ or 2A SWP			
	BOP	Verifies closed the FIRE PROT SW SPLY VLV, MO-1/2-3906			
	BOP	Starts standby Service Water Pumps to restore normal system pressure			
	BOP	Secures the 1A SWP and may place its control switch in PTL			
	ATC	Monitors Panel 901-5 indications			
<b>End of Event 3</b>					

Quad Cities		NRC Scenario No.: 2 Event No: 4	Page 1 of 2
Event Description: Rod Drift Out			
Time	Position	Applicant's Actions or Behavior	
<b>SIMOP:</b> When directed by the Lead examiner initiate the Rod Drift Out on rod D-8 (14-31): <b>imf rd04r1431</b>			
Key Parameter Response: Rod D-8 position changing on Full Core Display; Rated thermal power rising (up to 5%) Expected Annunciator(s): 901-5 A-3, ROD DRIFT Automatic Actions: None			
	ATC	Acknowledges annunciator 901-5 A-3, "Rod Drift," and reports control rod D-8 is drifting out	
	SRO	Directs actions of QCOA 0300-11, "Control Rod Drift"	
	SRO	May give Scram Criteria of 2 or more Control Rods drifting	
	ATC	Bypasses RWM and inserts control rod D-8 using the RMCS to position 00 (Immediate operator action)	
<b>SIMOP ROLE PLAY:</b> If contacted as Shift Manager and/or QNE in the next steps, Role play as necessary to acknowledge the report.			
	SRO	Notifies Shift Manager	
	SRO	Notifies QNE	
	BOP	Demands an OD-20	
	ATC	Releases RMCS, observes rod D-8 begins to drift out from position 00, then applies continuous insert signal to keep rod D-8 at position 00	
	ATC	Reports control rod D-8 will NOT latch at position 00	
	SRO	Directs control rod D-8 scrambled using the Rod Scram Test Switch	
<b>BOP EVALUATOR:</b> Provide the "Scram Key" to the BOP.			
	BOP	Places the individual Control Rod Scram Test Switch for D-8 into the scram position at the 901-16 panel	
	ATC	Confirms blue scram light for control rod D-8 is lit and release RMCS	
<b>Event 4 Continued</b>			

Quad Cities		NRC Scenario No.: 2 Event No: 4	Page 2 of 2
Event Description: Rod Drift Out			
Time	Position	Applicant's Actions or Behavior	
	BOP	Dispatches EO to close the 1-305-105, CRD EXH VLV, for HCU 14-31	
<p><b>SIMOP ROLE PLAY:</b> As EO dispatched to the North CRD Bank, wait approximately 2 minutes, then insert the Remote Function to close the 1-305-105 valve: <b>irf rd06r1431r inop</b> and delete the Rod Drift Out Malfunction: <b>dmf rd04r1431</b>. Call the NSO to report that "the 1-305-105 valve for HCU 14-31 is closed."</p>			
	SRO	Declares control rod D-8 inoperable and enters TS 3.1.3, Condition C, which is 3 hours to fully insert and 4 hours to disarm and may direct an EO to disarm the Control Rod per QCOP 300-07	
<p><b>SIMOP ROLE PLAY:</b> If contacted as an EO to disarm the rod, acknowledge the direction.</p>			
<p><b>SIMOP ROLE PLAY:</b> If contacted as System Engineer; Acknowledge report and state that you will start troubleshooting</p>			
	SRO	Enters QCOS 0300-14 to track inoperable rod and electrically disarm	
<b>End of Event 4</b>			

Quad Cities	NRC Scenario No.: 2	Event No: 5	Page 1 of 1
Event Description: Torus Water Level PAM Instrument inoperable			
Time	Position	Applicant's Actions or Behavior	
<p><b>SIMOP ROLE PLAY:</b> When directed by the lead examiner, as IMD Supervisor, notify the Unit Supervisor that a vendor has reported the following:</p> <p>“A recently installed replacement part in the instrument loop for LI 1-1640-10A, TORUS LVL, is <u>un-qualified</u>. The indication probably reads correctly now but its performance cannot be assured during an accident.”</p> <p>If asked about its affect on other indicators/recorders, state that “the LI 1-1640-10A is the ONLY indicator affected.”</p>			
	SRO	Refers to QCOS 1600-05 and Technical Specifications 3.3.3.1 for Post Accident Monitoring requirements	
	SRO	Determines that TS 3.3.3.1 Condition A applies; 30 days to restore the PAM instrument to operable	
	ATC	Monitors Panel 901-5 controls and indications	
	BOP	Monitors Balance of Plant parameters	
<b>End of Event 5</b>			



Quad Cities		NRC Scenario No.: 2 Event No: 6		Page 1 of 4	
Event Description: RBCCW Leak Inside Drywell / Manual Scram / Hydraulic ATWS					
<b>Time</b>	<b>Position</b>	<b>Applicant's Actions or Behavior</b>			
<b>SIMOP:</b> When directed by the Lead Examiner initiate a Reactor Building Closed Cooling Water leak in the Drywell: <b>imf pc05 40</b>					
Key Parameter Response: Drywell Pressure rises from 1.23 psig to 1.26 psig in first 4 min.					
Expected Annunciator(s): 901-4 A-17 DRYWELL FLOOR DRAIN SUMP HIGH LEVEL (Alarms in ≈4 minutes) 912-1 F-1 RX BUILDING CW EXP TANK HI/LO LEVEL (alarms in ≈5 minutes and clears ≈4 minutes after RBCCW to DW is isolated)					
Automatic Actions: None					
	BOP	Responds to unexpected annunciator 901-4 A-17 and informs the US			
	SRO	May direct pumping of DW Floor Drain Sumps			
	BOP	If directed, pumps DW Floor Drain Sumps per QCAN 901-4 A-17			
	BOP	Notes DW FDS Running Total			
	BOP	Opens DW FDS Discharge Valves AO-2001-3 & 4			
	BOP	Verifies Pump starts			
	BOP	Verifies Pump discharge Valve lineup and discharge flow			
	BOP	Responds to unexpected annunciator 912-1 F-1 and informs the US			
	BOP/ATC	Checks Event recorder (SER Point for RBCCW Expansion Tank low Level) to determine which unit is affected and whether level is high or low			
	SRO	Enters and directs QCOA 3700-04			
	BOP/ATC	Dispatches an EO to determine which unit is affected			
<b>SIMOP ROLE PLAY:</b> As the dispatched EO; Wait 2 minutes to report that Unit 1 RBCCW Expansion Tank level is at 20 inches and lowering slowly.					
<b>Event 6 Continued</b>					

Quad Cities		NRC Scenario No.: 2 Event No: 6	Page 2 of 4
Event Description: RBCCW Leak Inside Drywell / Manual Scram / Hydraulic ATWS			
Time	Position	Applicant's Actions or Behavior	
	BOP/ATC	Notifies Chemistry that RBCCW draining or filling is taking place	
<b>SIMOP ROLE PLAY:</b> As the contacted Chemistry Tech; Acknowledge this report			
	BOP/ATC	Directs the EO to determine LCV 1-3701 operation	
<b>SIMOP ROLE PLAY:</b> As the dispatched EO; If asked about the Level Control Valve that the Makeup Valve is open but not keeping up.			
	BOP/ATC	Directs the EO to check the RBCCW System for leaks	
<b>SIMOP ROLE PLAY:</b> As the dispatched EO; If directed to inspect RBCCW for leaks, Acknowledge this directive, wait 5 minutes and then report no RBCCW leaks have been found			
	Crew	May identify slightly higher Drywell pressure	
	SRO	May enter QCOA 0201-01 for rising Drywell pressure	
	SRO	May set Scram Criteria at 2 psig Drywell pressure	
<b>Evaluator Note:</b> DW FDS high level, RBCCW Expansion Tank Low Level and DW Pressure rising are 3 of 6 Symptoms listed for QCOA 3700-06 entry.			
	SRO	Enters and directs QCOA 3700-06, RBCCW Line Break Inside Drywell	
	SRO	Directs the ATC/BOP to manually scram the reactor and trip the Recirc Pumps	
	SRO	Directs the BOP to close the RBCCW Supply and Return Valves to the Drywell	
	ATC	Depresses both Manual Scram pushbuttons	
	ATC/BOP	Trips both Recirc Pumps	
	BOP	At Panel 912-1, takes Unit 1 RBCCW switch to CLOSE and verifies that the 3 associated valves close (MO-1-3702, 3703 & 3706)	
<b>Event 6 Continued</b>			

Quad Cities		NRC Scenario No.: 2 Event No: 6	Page 3 of 4
Event Description: RBCCW Leak Inside Drywell / Manual Scram / Hydraulic ATWS			
Time	Position	Applicant's Actions or Behavior	
	ATC	Reports control rods did <u>NOT</u> insert	
	SRO	Enters QGA 100, transitions to QGA 101	
	ATC	Places the Mode Switch in SHUTDOWN	
	ATC	Arms and depresses ARI	
	SRO	Directs BOP to inhibit ADS	
	BOP	Inhibits ADS	
	SRO	Directs BOP to place both Core Spray pumps in PTL	
	BOP	Places both Core Spray pumps in PTL	
	SRO	Directs actions for Power Leg of QGA 101	
	SRO	Directs control rod insertion per QCOP 0300-28	
	ATC	May dispatch EO to close the 1-301-25, U-1 CRD CHARGING WTR SV if control rods cannot be inserted	
<b>SIMOP ROLE PLAY:</b> If requested as EO, close the 1-301-25 valve using: <b>irf rd04r close</b>			
	ATC	Inserts all CRAM rods to position 00	
	ATC	Continues to insert control rods spiraling outward from center of core	
	SRO	Directs actions of QGA 101 Level Control Leg	
	SRO	Directs verification of auto actions and isolations for 0 inches RPV water level	
	BOP	Verifies auto actions and isolations for 0 inches RPV water level	
	SRO	Directs isolations bypassed per QCOP 0250-02	
	BOP	Contacts EO/SS to bypass RPV low water level MSIV and high offgas radiation isolations per QCOP 0250-02	
<b>SIM OP:</b> If requested, bypass isolations per QCOP 0250-02: <b>irf qg09r 1</b> Wait 1 minute and report completion			
<b>Event 6 Continued</b>			

Quad Cities		NRC Scenario No.: 2 Event No: 6	Page 4 of 4
Event Description: RBCCW Leak Inside Drywell / Manual Scram / Hydraulic ATWS			
Time	Position	Applicant's Actions or Behavior	
	ATC	Directs operator to bypass all reactor scrams per QCOP 0300-28	
<b>SIMOP ROLE PLAY:</b> If requested, wait approx. 2 minutes and bypass all reactor scrams using: <b>irf qg08r 1</b> Then report completion.			
	ATC	(If RPV Water Level drops below -59 inches) Dispatches EO to de-energize ARI by removing fuses in 2201-70A and 2201-70B panels per QCOP 0300-28	
<b>SIMOP ROLE PLAY:</b> If requested as EO, pull the ARI fuses in the 2201-70A and 2201-70B panels in Aux Electric Room using: <b>irf qg14r 1</b> Then report completion.			
	ATC	Verifies scram is reset and inserts another manual scram	
	ATC	Verifies NO control rod movement and resets reactor scram	
	ATC	Directs personnel to individually scram control rods from the 901-16 panel	
<b>SIMOP ROLE PLAY:</b> Attempt to individually scram 3 control rods, then contact the ATC operator and report, "Control rods will not insert from the 901-16 panel."			
<b>CT1</b>	SRO	Directs SBLC Injection prior to exceeding 110°F Torus Water Temperature	
<b>CT1</b>	ATC	Initiates SBLC Injection as directed (See Event 8)	
<b>End of Event 6</b>			

Quad Cities		NRC Scenario No.: 2 Event No: 7	Page 1 of 3
Event Description: QGA 101 Level/Power Control			
Time	Position	Applicant's Actions or Behavior	
	SRO	Verifies reactor power greater than 5% and RPV water level greater than -35 inches	
<b>CT2</b>	SRO	Directs all injection except boron, CRD, and RCIC terminated and RPV water level lowered to at least -35 inches. (Terminate and prevent from 901-3 and 901-5)	
<b>CT2</b>	BOP	Performs Terminate and Prevent Injection from Panel 901-3	
	BOP	Places HPCI in Trip-Latch	
	BOP	(If RHR is running) Verifies RHR Discharge Pressure < Reactor Pressure by throttling RHR 36A/B, or places RHR Pumps in Pull-To-Lock	
<b>CT2</b>	ATC	Performs Terminate and Prevent Injection from Panel 901-5	
	ATC	Places A and B Feed Reg Valve Controllers in MANUAL and reduces output to 0 (zero)	
	ATC	Places the Low Flow Feed Reg Valve Controller in MANUAL and reduces output to 0 (zero)	
	ATC	Closes A and B Feed Reg Valve isolations, MO-1-3206-A/B	
	ATC/BOP	Reports RPV Water level when Rx power less than 5%, RPV water level at TAF or ADS valves are closed with DW pressure less than 2.5 psig.	
	SRO	Establishes a RPV Water level control band below -35 inches	
	ATC/BOP	Maintains RPV water level as directed.	
<b>Event 7 Continued</b>			

Quad Cities		NRC Scenario No.: 2 Event No: 7	Page 2 of 3
Event Description: QGA 101 Level/Power Control			
Time	Position	Applicant's Actions or Behavior	
CT3	SRO	Directs RPV water level maintained between -166 inches and the level to which it was lowered	
CT3	ATC/BOP	(CONTINUOUS) Maintains level between -166 inches and level lowered to with Preferred Injection systems	
<b>EVALUATOR NOTE:</b> Depending on how long the scenario continues, the Hot Shutdown Boron Weight may not be injected. If it is not, the following two steps will not be performed.			
	SRO	When Hot Shutdown Boron Weight has been injected (SBLC tank lowers by 16% in approximately 21 minutes), directs RPV water level restoration to the band of 0-48 inches	
	ATC	Restores RPV water level to the band of 0-48 inches	
	SRO	Directs actions for Pressure Leg of QGA 101	
	CREW	(CONTINUOUS) Monitor RPV pressure	
	CREW	Determines RPV pressure rising out of the established range	
	BOP/ATC	May report that the Turbine Bypass valves have closed and ADS valves cycled to control RPV pressure	
	BOP/ATC	Diagnoses the loss of Turbine Bypass Valves due to the (only available) EHC Pump tripping	
	SRO	Directs BOP to lower RPV pressure to 940 psig using ADS valves	
	SRO	Establishes a RPV Pressure control band and directs BOP to control RPV pressure in that band using ADS valves (typically 800-1000 psig)	
	BOP	Opens ADS valves to lower RPV pressure to $\leq$ 940 psig.	
	BOP	(CONTINUOUS) Operates ADS valves as necessary to maintain the established pressure band	
	BOP	(CONTINUOUS) Monitor and reports Torus Water Temperature	
	BOP	Informs the Unit Supervisor if Torus Water Temperature exceeds 95°F EOP Entry Condition	
	SRO	Enters and directs actions of QGA 200 as necessary	
<b>Event 7 Continued</b>			

Quad Cities		NRC Scenario No.: 2 Event No: 7	Page 3 of 3
Event Description: QGA 101 Level/Power Control			
Time	Position	Applicant's Actions or Behavior	
	BOP	Places RHR in the Torus Cooling Mode as directed	
	BOP	If per QCOP 1000-30 Hard Card, establishes RHRSW flow	
	BOP	Places RHR LOOP A/B CONTAINMENT CLG permissive switch 17 to the ON position	
	BOP	Places RHR LOOP A/B RHR SW START PERMISSIVE SWITCH 19 to the MANUAL OVERRIDE position	
	BOP	Throttles open MO-1-1001-5A/B RHR SW HX Discharge Valve, to approximately 40% open	
	BOP	Starts the first RHRSW Pump in each loop	
	BOP	Throttles MO-1-1001-5A/B to establish less than 3600 gpm/pump	
	BOP	Throttle closed MO 1-1001-16A/B (HX Bypass) on each Loop	
	BOP	May start the second RHRSW Pump in each loop and adjusts as necessary	
	BOP	Starts Torus Cooling as directed	
	BOP	Verifies RHR Pumps running	
	BOP	Opens Torus Test or Spray Valve, MO 1-1001-34A/B	
	BOP	Opens Torus H2O Test Valve, MO 1-1001-36A/B	
	BOP	Adjusts Torus H2O Test Valve MO 1-1001-36A/B to maintain RHR SW Pressure 15-20 psig higher than RHR pressure and RHR pressure between 100 and 250 psig	
	BOP	Closes MO 1-1001-16A/B	
<b>End of Event 7</b>			

Quad Cities		NRC Scenario No.: 2 Event No: 8	Page 1 of 1
Event Description: Failure 1 <sup>st</sup> SBLC Pump to start			
Time	Position	Applicant's Actions or Behavior	
<b>SIMOP:</b> Verify that the 1 <sup>st</sup> SBLC pump selected for injection does NOT start but the 2 <sup>nd</sup> SBLC pump does start.			
	ATC	Reports SBLC tank level and selects a SBLC pump for injection by placing the control switch to SYS 1 <u>or</u> SYS 2	
	ATC	May report that the SBLC pump has failed to inject	
<b>CT1</b>	ATC	Selects the other SBLC pump	
	ATC	Verifies and reports the 2 <sup>nd</sup> SBLC pump is injecting	
	ATC	Squib B light is off	
	ATC	Flow Light is on	
	ATC	RWCU System isolated	
	ATC	SBLC Tank level lowering	
	ATC	Pump discharge pressure slightly high than reactor pressure	
	ATC	Annunciator 901-5 H-6 SBLC Squib valve circuit failure is on	
	ATC	Neutron flux is decreasing	
	ATC	Monitors SBLC Tank level for 16% decrease (in approximately 21 minutes)	
	BOP	Performs other operator actions of QGA 101	
<b>End of Event 8</b>			
<b>SIMOP:</b> When RPV water level is being restored and/or at the discretion of the Lead Examiner, place the simulator in <b>FREEZE</b> .			

(Final)



Exelon Nuclear

2012 ILT NRC Exam Scenario

Scenario Number:

**NRC Scenario 3**

Revision Number: 00

Date: 04/04/12

Developed By: \_\_\_\_\_  
Instructor Date

Validated By: \_\_\_\_\_  
SME or Instructor Date

Reviewed By: \_\_\_\_\_  
Operations Representative Date

Approved By: \_\_\_\_\_  
Training Department Date

Facility: Quad Cities Scenario No.: **2012 NRC Scenario 3** Op-Test No.: ILT 10-1  
 Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
Initial Conditions:  
 The plant is operating at 75% power.  
 Turnover: Perform the SSMP POV Test.

Event No.	Malf. No.	Event Type*	Event Description
1	LOHS1290181" (Override)	BOP N	Perform the SSMP POV Test (QCOS 2900-03) <b>TS</b>
2	RD07	ATC C	CRD Pump Trip (QCOA 0300-01)
3	HP10	BOP I	Inadvertent HPCI Initiation <b>TS</b> (QCOA 2300-01)
4	SW12A	BOP C	The running TBCCW pump begins to fail (QCOA 3800-03)
5	ED03B	ATC R	Loss of Bus 12, Respond to loss of B Recirc Pump <b>TS</b> (QCOA 6500-02 & QCOA 0202-04) Insert control rods to exit Instability Region 2
6	RR10A ED03A	Crew M	Large Line Break LOCA. When the plant trips, Bus 11 trips and the remaining Feed Pumps will be lost.
7	RC04	ATC C	RCIC Auto Initiation fails, requiring manual RCIC initiation
8	HP01	Crew M	HPCI trips and Alternate Level Control per QGA100 second leg actions are taken. The crew Emergency Depressurizes per QGA 500-1 at TAF and restores RPV level with Low-pressure systems.

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

<u>ES-301-4 Quantitative attributes:</u> Total Malfunctions (5-8): <b>8</b> Malfunction(s) after EOP (1-2): <b>E7 &amp; E8</b> Abnormal Events (2-4): <b>E2,3,4,&amp;5</b> Major Transient(s) /E-Plan entry (1-2): <b>E6</b> EOPs (1-2): <b>QGA100/200</b> EOP Contingencies (0-2): <b>E8</b> Critical Tasks (2-3): <b>3</b>	<u>ES-301-5 Quantitative attributes:</u> BOP Normal: <b>E1</b> ATC Reactivity (1 per set): <b>E5</b> BOP I/C (4 per set): <b>E3&amp;4</b> ATC I/C (4 per set): <b>E2&amp;7</b> SRO-I I/C (4 per set inc 2 as ATC): <b>E2,3,4&amp;7</b> SRO Tech Spec (2 per set): <b>E1, 3, &amp; 5</b> ALL Major Transients (2 per set) <b>E6</b>
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**SUMMARY:**

- Initial Conditions:
  - The plant is operating at 75% power.
- Event 1: The BOP performs SSMP Power Operated Valve Test per QCOS 2900-03. The 1-2901-08 valve stroke time exceeds its IST limit requiring the SRO to reference TS 3.7.9 Condition A, enter a 14-Day LCO to restore operability.
- Event 2: The A CRD Pump trips. The ATC Operator and US respond per QCOA 0300-01 to start the B CRD Pump and open its discharge valve.
- Event 3: The BOP responds to an inadvertent HPCI Initiation per QCOA 2300-01. When HPCI has been trip-latched to prevent restart, the SRO should reference TS 3.5.1 Condition G.
- Event 4: The running TBCCW pump begins to fail. The BOP and SRO respond to low pressure in the TBCCW header per the QCAN and QCOA 3800-03 to stabilize the system.
- Event 5: The BOP responds to a loss of Bus 12 per QCOA 6500-02. The ATC/BOP respond to loss of B Recirc Pump per QCOA 0202-04. The ATC and SRO insert control rods to exit Instability Region 2.
- Event 6: A LOCA inside the Drywell begins. The crew enters and performs QGA 100 and 200. Bus 11 and the remaining Feed Pumps are lost when the UAT trips. Operators will control containment parameters without further challenge.
- Event 7: RCIC auto initiation and the Initiation Pushbutton will fail. The ATC must manually initiate RCIC per the QCOP 1300-02 Hard Card for RPV water level control.
- Event 8: HPCI fails and the remaining high-pressure systems will not be able to maintain RPV Water level above Top of Active Fuel. The crew will perform Emergency Depressurization and then restore RPV Water Level with available low-pressure systems.
- Approximate Run Time: 1.5 Hour

**CRITICAL TASKS:**

**Critical task #1:** Given the plant with the inability to maintain level above –59 inches, INHIBIT ADS, to prevent an uncontrolled depressurization IAW QGA 100.

**Critical task #2:** When Torus pressure exceeds 5 psig, INITIATE drywell sprays while in the safe region of the drywell spray initiation limit (DSIL). (BWROG PC-5.1 INIT DW SPRAY)

**Critical task #3:** Given the plant with an inability to maintain RPV water Level above –142 inches with an injection source lined-up and running, initiate an emergency depressurization before RPV water level drops to –166 inches in accordance with QGA 100 and QGA 500-1.

## EXERCISE PERFORMANCE OBJECTIVES

SR-0300-P04	Given an operating reactor plant with a CRD pump trip, start the standby CRD pump in accordance with QCOA 0300-01.
SR-0002-P05	Given a reactor plant at power, perform a power change discernible on neutron monitors using recirc flow in accordance with QCOP 0202-03 and QCGP 3-1.
SR-3800-P01	Given a reactor plant at power when a total loss of TBCCW occurs, take action to determine the cause and to remove TBCCW cooled loads from service in accordance with QCOA 3800-3.
SR-0202-P19	Given an operating reactor plant following a loss of single reactor recirculation pump, take action to establish conditions for operating single loop for greater than 24 hours in accordance with QCOP 0202-07 and QCOS 0202-09.
SR-0002-P03	Given a reactor plant at power with a reactor scram, place the plant into a stable condition in accordance with QCGP 2-3.
SR-0203-P07	Given a reactor plant in a QGA condition, inhibit ADS in accordance with QGA 100 or QGA 101. (Important PSA task / Inhibiting ADS terminates 5 of top 200 Core Damage Sequences)
SR-0001-P45	Given a reactor plant in a QGA condition, verify the proper actuation of containment isolations and ECCS and emergency DG starts in accordance with QGA 100 or QGA 101.
SR-1000-P02	Given a reactor plant in an accident condition (QGA), operate torus sprays in accordance with QCOP 1000-30 and appropriate QGA. (Important PRA Operator Action - starting containment sprays has a RAW value of 82.5)
SR-1000-P04	Given a reactor plant with rising containment pressures due to a LOCA or steam leak and RHR is not needed for core cooling, verify parameters are in the safe region of the Drywell Spray Initiation Limit (QGA Figure K), verify tripped or trip recirc pumps and drywell coolers, and attempt to initiate drywell sprays when torus pressure exceeds 5 psig in accordance with QGA 200 and QCOP 1000-30. (Important PRA Operator Action - starting containment sprays has a RAW value of 82.5)
SR-2900-P02	Freq: LIC=A) (ILT-MP) Given Unit 1 in a QGA condition with the SSMP in a standby lineup, start the SSMP from the 912-8 panel and inject to Unit 1 in accordance with QCOP 2900-02. (Important PRA Operator Action – Proper operation of SSMP terminates 19 of the top 100 Core Damage Sequences) (Switching SSMP between units, aligning FPS to SSMP, and switching AC buses)
SR-1000-P05	Given a reactor plant in an accident condition where RHR-LPCI mode has started automatically, determine if LPCI has responded correctly to a valid initiation and throttle flow to restore RPV water level in accordance QCOA 1000-04.
SR-0001-P02	Given the plant with an inability to maintain RPV water level above -142 inches with an injection source lined-up and running, initiate an emergency depressurization before RPV water level drops to -166 inches in accordance with QGA 100 and QGA 500-1. (Important PRA Operator Action - emergency depressurization terminates 19 of top 100 Core Damage Sequences)

1. Reset to IC-20.
2. Go to RUN.
3. Verify the following RWM Sequence is loaded: **C22SU**
4. Initial the Control Rod Move Sheet as necessary to update to the current rod positions.

(The following commands to be utilized for this scenario are contained in the CAEP file:  
2012 NRC Scenario 3.cae)

5. Insert Commands for setup:
  - **ior lohs1290181 on** (SSMP Inject MOV 1-2901-8 Green Light on)
  - **trgset 1 “zdihs129018(2).eq.1** (When MOV 1-2901-8 switch is taken to OPEN)
  - **trg 1 “ior lohs1290181(1 :35) off”** (MOV 1-2901-8 Green light off in 35 seconds)
  - **trgset 3 “tcvsv3.le.0.1”** (Set Event trigger 3 as #3 Stop valve closure/Turbine trip)
  - **imf ed03a (3 0)** (On Event Trigger 3, Loss of Bus 11)
  - **trgset 6 “pcpdwg .ge. 2.5”** (Set Event Trigger 6 as Drywell Pressure  $\geq 2.5$  psig)
  - **imf hp01(6 2:)** (On Trigger 6, HPCI Turbine Trip after a 2 minute delay)
  - **imf rc04** (RCIC Auto Start & Initiation Pushbutton Failure)
6. Verify the following commands for scenario performance:
  - **dor lohs1290181** (Deletes MOV 1-2901-8 Green light override)
  - **imf rd07a** (A CRD Pump Trip)
  - **imf hp10** (HPCI inadvertent initiation)
  - **imf sw12a 100 10:** (1A TBCCW Pump degradation at 100% severity on a 10 min ramp)
  - **imf ed03b** (Loss of Bus 12)
  - **imf rr10a 1 20:** (Recirc Suction Pipe Rupture Loop A at 1% severity on a 20 min ramp)
  - **bat G-11\_and\_C-13\_off** (Overrides Annunciators 901-3 G-11 and C-13 as requested)
7. Verify SBO alarms clear.
8. Provide a “40% load Drop” REMA.
9. Provide a current revision of the following procedures, signed off as specified:
  - QCOS 2900-03 with Prerequisites and authorization signed off.
    - Attach the applicable IST Data sheet.
    - **PROVIDE A STOPWATCH.**
10. Need to have blank EST available for use during the scenario.
- 11 Perform the applicable “Post Simulator Exam Security Actions” of TQ-QC-201-0113 “Simulator Exam Security Actions Checklist”.

Annunciator Procedures

- 901-3 A-9 HPCI TURBINE TRIPPED, Rev. 5
- 901-3 D-12 HPCI PUMP LOW FLOW, Rev. 7
- 901-3 A-16 PRI CNMT HIGH PRESSURE, Rev. 12
- 901-4 B-6 RECIRC DRIVE B TRIP, Rev. 8
- 901-5, B-2, CRD PP TRIP, Rev. 5
- 901-5, F-2, CRD CHARGING WATER LOW PRESSURE, Rev. 5
- 901-5 E-8 RX VESSEL HIGH LEVEL, Rev. 9
- 901-8 E-1 4KV BUS 11&12 LOW VOLTAGE, Rev. 4
- 901-8 F-3 4KV BUS OVERCUR TRIP, Rev. 5
- 912-1 D-2 TURB BLDG CLG WATER LOW PRESSURE, Rev. 3

QCGP 2-3, Reactor Scram, Rev. 74

QCGP 3-1, Reactor Power Operations, Rev. 66

QCGP 4-1, Control rod Movements and Control Rod Sequence, Rev. 38

QGA 100, RPV Control, Rev. 9

QGA 200, Primary Containment Control, Rev. 9

QGA 500-1, RPV Blowdown, Rev. 13

QCOA 0201-01, Increasing Drywell pressure, Rev. 23

QCOA 0202-04, Reactor Recirc Pump Trip – Single Pump, Rev. 38

QCOA 0300-01, CRD Pump Failure, Rev. 16

QCOA 0400-02, Core Instabilities, Rev. 21

QCOP 1400-02, Core Spray System Automatic Initiation, Rev. 11

QCOA 3800-03, Total Failure of the TBCCW System, Rev. 9

QCOA 6500-2, 4KV Bus Failure, Rev. 12

QCOP 0300-16, Addition of Water to Reactor Vessel using CRD Hydraulic System, Rev. 7

QCOP 1000-30, Post-Accident RHR Operation, Rev. 26

QCOP 1100-02, Injection of Standby Liquid Control, Rev. 12

QCOP 1300-02, RCIC System Manual Startup, Rev. 29

QCOP 2900-02, Safe Shutdown Makeup Pump system Startup, Rev. 23

QCOS 2900-03, SSMP Power Operated Valve Test, Rev. 17

**CREW TURNOVER****1. Plant Conditions:**

- a.) Unit 1 is at 75% Power, still holding after Turbine testing.
- b.) Unit 2 is at 100% Power.
- c.) Technical Specification limitations:
  - (1) Unit 1: None
  - (2) Unit 2: None
- d.) On Line Risk is GREEN.

**2.) Significant problems/abnormalities:**

- a.) None

**3.) Evolutions/maintenance for the oncoming shift:**

- a.) Holding power while waiting for QNE to check predictor codes, prior to power ascension.
- b.) Perform SSMP Power Operated Valve Test per QCOS 2900-03.
- c.) EOs on shift:
  - Burke
  - Parrish
  - Foster
  - Richardson
  - Hughes
  - Brewer
  - Decker
  - Schmidt

Quad Cities		NRC Scenario No: 3 Event No: 1	Page 1 of 1
Event Description: SSMP POV Test			
Time	Position	Applicant's Actions or Behavior	
	SRO	Directs BOP to perform QCOS 2900-03	
	ATC	Monitors Reactor and Reactor Pressure Vessel indications	
	BOP	Opens and times MO ½-2901-7 (THROTTLED TEST VALVE)	
	BOP	Records opening time of MO ½-2901-7 valve	
	BOP	Verifies MO ½-2901-7 opening time meets IST criteria	
	BOP	Closes and times MO ½-2901-7	
	BOP	Records closing time of MO ½-2901-7	
	BOP	Verifies MO ½-2901-7 closing time meets IST criteria	
<p><b>SIMOP:</b> The setup overrides MO 1-2901-8 Green light ON. When MO 1-2901-8 handswitch is taken to OPEN, Event Trigger 1 goes True to modify the override to OFF in 35 seconds. This effectively extends the stroke time from 27 seconds to 35 seconds.</p> <p>After MO 1-2901-8 indicates OPEN and before the BOP closes it, delete the Override on the Green Light : <b>dor lohs1290181</b></p>			
	BOP	Opens and times MO 1-2901-8 (U1 REACTOR SUPPLY VALVE)	
	BOP	Records opening time of MO 1-2901-8	
	BOP	Identifies that MO 1-2901-8 opening time exceeds its IST value and informs the US	
	BOP	Closes MO 1-2901-8	
	SRO	References TS 3.7.9 Condition A, enter a 14-Day LCO to restore operability	
	SRO	May abort surveillance due to failure of MO 1-2901-8	
	BOP	Opens and times MO 2-2901-8 (U2 REACTOR SUPPLY VALVE)	
	BOP	Records opening time of MO 2-2901-8	
	BOP	Verifies MO 2-2901-8 opening time meets IST criteria	
	BOP	Closes MO 2-2901-8	
	BOP	Verifies SSMP in a standby lineup at Local Panel / Dispatches an EO	
<b>SIMOP ROLE-PLAY:</b> As the dispatched EO "The SSMP standby lineup has been verified".			
<b>End of Event 1</b>			



Quad Cities		NRC Scenario No: 3 Event No: 2		Page 1 of 1	
Event Description: CRD Pump Trip					
<b>Time</b>	<b>Position</b>	<b>Applicant's Actions or Behavior</b>			
<b>SIMOP:</b> When directed by the Lead Examiner, trip the 1A CRD Pump: <b>imf rd07a</b>					
Key Parameter Response: 1A CRD Pump indication lights off, Lowering CRD pressures					
Expected Annunciator(s): 901-5, B-2, CRD PP TRIP 901-5, F-2, CRD CHARGING WATER LOW PRESSURE					
Automatic Actions: None					
	ATC	Acknowledges annunciator 901-5 B-2, "CRD PP TRIP," and reports the "1A CRD pump has tripped"			
	SRO	Enters and directs QCOA 0300-01			
	SRO	May set scram criteria of "2 or more accumulator trouble alarms <u>AND</u> charging water header pressure less than 940 psig for 20 minutes" (This scram criteria comes from TS 3.1.5 Conditions B & D)			
	ATC	Verifies the MO 1-301-2B, 1B PMP DISCH VLV, is closed for the standby pump			
	ATC	Starts the 1B CRD pump and verifies current is less than 34 amps on the 1-302-1B			
	ATC	Throttles MO 1-301-2B to maintain 1400-1500 psig discharge pressure			
	ATC	Closes the MO 1-301-2A on the tripped pump			
	ATC	Dispatches EO to verify proper operation of running pump			
	BOP	Monitors Balance-of-Plant equipment			
<b>SIMOP ROLE PLAY:</b> As EO dispatched to the CRD pump, wait 2 minutes and report the 1B CRD pump sounds normal, no leaks, and oil levels are in band.					
	ATC	Dispatches EO to CLOSE the MIN FLOW ISOLATION Valve on A CRD Pump and OPEN the MIN FLOW ISOLATION Valve on B CRD Pump			
<b>SIMOP ROLE PLAY:</b> As EO dispatched to the CRD pump, wait 2 minutes and report the 1B CRD pump Min Flow valve is Open and the 1A CRD Pump Min Flow Valve is Closed.					
	ATC	May adjust CRD Drive Water Pressure to 260-350 psig per QCOP 0300-1			
<b>SIMOP ROLE PLAY:</b> If also requested to check the 1A CRD pump breaker at Bus 13, report "the breaker tripped on overcurrent".					
<b>End of Event 2</b>					

Quad Cities		NRC Scenario No: 3 Event No: 3	Page 1 of 1
Event Description: Inadvertent HPCI Initiation			
Time	Position	Applicant's Actions or Behavior	
<b>SIMOP:</b> At the direction of the Lead Examiner, insert malfunction: <b>imf hp10</b> (Inadvertent HPCI Initiation.)			
Key Parameter Response: HPCI Turbine speed ≈4000 rpm, Turb Steam Supply 1-2301-3 Valve open, Pump Discharge 1-2301-8 valve open, RPV water level rising			
Expected Annunciator(s): 901-3 F-9 HPCI OIL FILTER HIGH DP 901-3 D-12 HPCI PUMP LOW FLOW 901-5 D-7 LPRM HIGH 901-5 E-8 RX VESSEL HIGH LEVEL			
Automatic Actions: HPCI system responds as designed to an Auto Initiation signal			
	BOP	Responds to Annunciator 901-3 D-12, HPCI PUMP LOW FLOW	
	BOP	Reports alarm to US; refers to annunciator procedure	
	BOP	Reports HPCI System initiating	
	CREW	Determine that HPCI injection is not necessary: <ul style="list-style-type: none"> <li>• Report Drywell pressure normal</li> <li>• Reports RPV water level normal by all indicators</li> </ul>	
	ATC	Monitors RPV water level and APRMs	
	SRO	Directs actions of QCOA 2300-01	
	SRO	Determines initiation is NOT valid and directs the BOP to trip-latch REMOTE HPCI TURB TRIP pushbutton	
	BOP	Actuates the trip-latch REMOTE HPCI TURB TRIP pushbutton	
	BOP	Reports HPCI is tripped	
	BOP	Place MO 1-2301-14 MIN FLOW BYP VLV in P-T-L	
	BOP	Contacts EMD/IMD to investigate HPCI auto-start	
	SRO	If HPCI injects, refers to QCOA 0400-01, Reactivity Addition. (No further actions necessary after HPCI is Trip-Latched)	
	SRO	Enters TS 3.5.1 Cond G, HPCI System Inop, a 14 day LCO	
<b>ROLE PLAY:</b> As Maintenance and EOs as necessary.			
<b>EVALUATOR NOTE:</b> Notifications, event reporting and risk assessment change are not evaluated here.			
	BOP/SRO	(CONTINUOUS) If HPCI operation is subsequently required after it has been trip latched, then release the REMOTE HPCI TURB TRIP pushbutton and place the MIN FLOW BYP VLV in NORMAL	
<b>End of Event 3</b>			

Quad Cities		NRC Scenario No: 3 Event No: 4		Page 1 of 1	
Event Description: 1A TBCCW Pump degradation					
<b>Time</b>	<b>Position</b>	<b>Applicant's Actions or Behavior</b>			
<b>SIMOP:</b> When directed by the Lead examiner initiate the 1A TBCCW pump degradation at 100% over 10 minutes: <b>imf sw12a 100 10:</b>					
Key Parameter Response: TBCCW Header pressure lowering					
Expected Annunciator(s): 912-1 D-2 TURB BLDG CLG WATER LOW PRESSURE					
Automatic Actions: None					
	BOP	Acknowledges annunciator 912-1 D-2, "Turb Bldg Cooling Water Low Pressure" and reports the U-1 TBCCW Discharge Header pressure is 35 psig and lowering			
	BOP	Starts the 1B TBCCW pump per QCAN 912-1 D-2 and reports TBCCW Discharge Header pressure is stable at 40 psig			
	BOP	Dispatches EO to the 1A TBCCW pump to investigate			
<b>SIMOP ROLE PLAY:</b> As the EO dispatched to the 1A TBCCW pump, wait 2 minutes and report "The 1A TBCCW pump is running hot and sounding noisy. Recommend securing the 1A TBCCW Pump. No leaks were found." If asked, report the 1B TBCCW pump is operating properly.					
	BOP	Secures the 1A TBCCW pump and verifies TBCCW discharge header pressure is stable at approximately 40 psig. May place the 1A TBCCW Pump in PTL			
	SRO	May reference QCOA 3800-03 for Total Loss of TBCCW			
	SRO	May set scram criteria of 35 psig TBCCW Header pressure			
	ATC	Monitors Reactor controls and indications			
<b>End of Event 4</b>					

Quad Cities		NRC Scenario No: 3 Event No: 5		Page 1 of 2
Event Description: Respond to Loss of Bus 12 and B Recirc Pump				
Time	Position	Applicant's Actions or Behavior		
<b>SIMOP:</b> When directed by the Lead examiner trip Bus 12: <b>imf ed03b</b>				
Key Parameter Response: Loss of B RFP and B Recirc Pump, BUS 12 LIVE white light out, Loss of voltage on Bus 12				
Expected Annunciator(s): 901-8 E-1 4KV BUS 11&12 LOW VOLTAGE 901-8 F-3 4KV BUS OVERCUR TRIP 901-6 E-7 & F-7 RFP AUTO START & RFP AUTO TRIP 901-4 B-6 RECIRC DRIVE B TRIP				
Automatic Actions: Trip of all Bus 12 loads, 1C RFP starts				
	BOP	Responds to Panel 901-8 annunciators, diagnoses the loss of Bus 12 and informs the US		
	SRO	Enters and directs QCOA 6500-02		
	BOP	Performs actions of QCOA 6500-02		
	BOP	Recognizes that Bus 12 did not transfer to the UAT		
	BOP	Recognizes 901-8 F-3 4KV BUS OVERCUR TRIP and does NOT attempt to transfer to the UAT		
	BOP	Attempts to determine the cause of the Bus 12 overcurrent by dispatching an EO to investigate		
<b>SIMOP ROLE PLAY:</b> As EO dispatched to Bus 12: Wait 2 minutes and then report that the T12 to Bus 12 feed breaker target shows instantaneous overcurrent and there is the odor of burnt insulation, but no fire. EMD has been contacted.				
	BOP	Verifies the UAT load: To Bus 11 less than 4100 amps, to Bus 14 less than 2950 amps		
	ATC	Responds to Annunciator 901-6 E-7 & F-7		
	ATC	Verifies RPV Water Level is being maintained		
	SRO	Enters and directs actions of QCOA 0202-04		
	SRO	May set Scram Criteria of observed core oscillations or trip of the 1A Recirc Pump		
	SRO	May set Scram Criteria based on RPV Water level less than +11 inches or greater than +44 inches		
	ATC	Performs actions of QCOA 0202-04 for single Loop Operations		
	ATC	Monitors for indications of thermal hydraulic instabilities on SRM period or LPRM levels		
<b>Event 5 Continued</b>				

Quad Cities		NRC Scenario No: 3 Event No: 5	Page 2 of 2
Event Description: Loss of Bus 12 / Insert Control Rods to Exit Instability Region 2			
Time	Position	Applicant's Actions or Behavior	
	SRO	Enters and directs QCOA 0400-02, Core Instabilities	
	ATC	Per QCOA 0400-02, determines operating position on the Power Flow Map as inside Instability region 2 (Core Flow $\approx$ 41 Mlb/Hr, Reactor Power $\approx$ 56%, FCL $\approx$ 98%)	
	SRO	Directs actions to lower the Flow Control Line as necessary to avoid Instability Regions 1 or 2	
	SRO	Supervises control rod insertion	
	ATC	Monitors for core oscillations	
	ATC	If necessary, bypasses RWM IAW QCOA 0202-04	
	ATC	Continuously inserts control rods until Reactor operation is outside of Instability Region 2 In-Sequence rods inserted to Target-In position (Approximately 7 rods)	
	ATC/BOP	Responds to Annunciator 901-4 B-6	
	ATC/BOP	Verifies A Recirc Pump flow Control is in MANUAL	
	ATC/BOP	Verifies A Recirc Pump speed is less than 78%	
	ATC/BOP	Performs actions of QCOA 0202-04 for Single Loop Operation	
	ATC/BOP	Closes the 1-0202-5B valve B Recirc Pump Discharge Valve	
	ATC/BOP	After 5 minutes, re-opens the 1-0202-5B valve	
	SRO	Enters Tech Spec 3.4.1 Condition C, which allows 24 hours to satisfy the requirements of the LCO for Single Loop Operation	
	SRO	May contact QNE to adjust thermal limits for Single Loop Ops	
<b>SIMOP ROLE PLAY:</b> QNE as necessary if directed to adjust thermal limits			
	Crew	May contact Chemistry to perform sampling to verify chemistry control limits	
<b>SIMOP ROLE PLAY:</b> Chemistry necessary if directed to perform sampling			
	BOP	Verifies Reactor feed Pump response	
	BOP	Verifies the 1B RFP Aux Oil Pump auto starts	
	BOP	Verifies the 1C RFP (Standby Pump) auto starts	
	BOP	Verifies no indicated flow on the 1B RFP	
	BOP	May direct realignment of Zinc Injection per QCOP 3200-11	
<b>SIMOP ROLE PLAY:</b> Plant support personnel as necessary when directed to realign Zinc Injection.			
<b>End of Event 5</b>			

Quad Cities	NRC Scenario No: 3	Event No: 6	Page 1 of 5
Event Description: LOCA in the Drywell / Initial Actions			
Time	Position	Applicant's Actions or Behavior	
<b>SIMOP:</b> When directed by the Lead examiner initiate the Recirc Suction Line LOCA at 1% severity on a 20 minute ramp: <b>imf rr10a 1 20:</b>			
Key Parameter Response: Rising Drywell Pressure			
Expected Annunciator(s): 901-3 A-16, PRI CNMT HIGH PRESSURE			
Automatic Actions: Reactor Scram Initiation of SBGT, HPCI, LPCI, Core Spray, EDGs Isolation of Group 2 & 3 valves, Reactor Bldg and Control Room Ventilation			
	BOP	Responds to annunciator 901-3, A-16, PRI CNMT HIGH PRESSURE	
	SRO	Enters and directs QCOA 0201-01	
	BOP	May start the seventh DW cooler	
	SRO	May set Scram Criteria of 2.0 psig in Drywell	
	SRO	Directs ATC to Perform QCGP 2-3	
	ATC	(When directed) Depresses RX SCRAM CH A and CH B Pushbuttons	
	ATC	Places RX MODE switch to SHUTDOWN position	
	ATC	Verifies the SDV vent and drain valves are closed	
	ATC	Verifies all Control Rods are fully inserted	
	ATC	Makes scram report	
	ATC	Informs US of QGA 100 entry on RPV Water Level less than 0 inches	
	SRO	Enters QGA 100 when RPV Water Level less than 0 inches	
	SRO	Directs ATC/BOP to verify 0 inches isolations	
	ATC	Verifies Group 3 (RWCU) Isolation	
	BOP	Verifies Group 2 Isolations, RB vent isolation and SBGT start	
	SRO	Directs ATC to maintain RPV water level with high pressure systems	
	ATC	Attempts to maintain RPV level 0 to +48 inches with high-pressure injection systems	
	ATC	Verifies DFWLC in Single Element	
	ATC	May isolate Feed Water Reg Valve(s)	
	ATC	May place Low Flow Feed Reg Valve in Service	
	ATC	May secure unnecessary Feed and Condensate Pumps	
<b>Event 6 Continued</b>			

Quad Cities		NRC Scenario No: 3 Event No: 6	Page 2 of 5
Event Description: LOCA in the Drywell / Initial Actions			
Time	Position	Applicant's Actions or Behavior	
	ATC	(CONTINUOUS) Monitors RPV water level and pressure	
	ATC	Recognizes loss of Bus 11 and all Feed Pumps and informs the US	
	ATC	May direct the EO to investigate the loss of Bus 11	
<b>SIMOP ROLE PLAY:</b> As EO if dispatched to Bus 11: Wait 2 minutes and then report that the T12 to Bus 11 feed breaker target shows instantaneous overcurrent. EMD has been contacted.			
	ATC	Verifies automatic insertion of SRMs AND IRMs	
<b>EVALUATOR NOTE:</b> The remaining steps from QCGP 2-3 may not be taken due to the pace of the scenario because the UAT trips when the Turbine Trips			
	ATC	Verifies Main Turbine trips, all SV's, CV's, ISV's, IV's and extraction steam check valves close	
	ATC	Verifies Hood Spray AO 1-3399-559 is open	
	ATC	Verifies Main Generator Output Breakers tripped after 30 seconds and places control switches in PTL	
	ATC	Verifies Main Generator Field and Exciter Field Breakers (alarm 901-8 H-9) tripped	
<b>QGA 200</b>			
	BOP/ATC	Reports Drywell pressure above 2.5 psig.	
	SRO	Re-enters QGA 100 and enters and directs QGA 200 on High Drywell Pressure	
	SRO	Directs ATC and BOP to verify 2.5 psi actuations	
	BOP	Verifies EDGs, Core Spray, HPCI and RHR running	
	CREW	Makes a PA announcement to evacuate Reactor Building	
<b>Event 6 Continued</b>			

Quad Cities		NRC Scenario No: 3 Event No: 6	Page 3 of 5
Event Description: LOCA in the Drywell / QGA 100 actions			
Time	Position	Applicant's Actions or Behavior	
	SRO	Directs QGA 100 RPV Control actions	
CT1	SRO	Directs that ADS be inhibited	
CT1	ATC/BOP	Inhibits ADS	
	ATC	Attempts to start RCIC (See Event 7)	
	ATC	Starts SSMP per QCOP 2900-02 / Hard Card	
	ATC	Verifies the NORMAL FEED CONTROL from Bus 14-1 to Bus 31, ACB 151-3101 is available	
	ATC	Verify Pump suction pressure is available	
	ATC	OPEN MOV 1/2-2901-7, Throttled Test Valve	
	ATC	Start the SSMP	
	ATC	Verify increasing Pump Discharge Pressure	
	ATC	Place the FCV in AUTO	
	ATC	Slowly increase flow controller setpoint to 400 gpm	
	ATC	OPEN MOV 1-2901-8, U1 Reactor Supply Valve	
	ATC	CLOSE MOV 1/2-2901-7, Throttled Test Valve	
	ATC	Directs and Equipment Operator to close the Service Water to SSMP Room Cooler Bypass, 1/2-2999-9	
<b>SIMOP ROLE PLAY:</b> As Equipment Operator dispatched to close 1/2-2999-9. After 5 minutes, report that 1/2-2999-9 is CLOSED.			
<b>EVALUATOR NOTE:</b> HPCI trips 2 minutes after 2.5 psig in DW. Also, the exhaust drain pot high level alarms after Event 3, in which case operators may choose not to re-start HPCI.			
	BOP/ATC	Operators may release the Trip-Latch on HPCI	
	BOP/ATC	Verify automatic actions for HPCI Initiation	
	BOP/ATC	Adjust HPCI Flow Controller for maximum injection flow as necessary	
	SRO	Directs crew to stabilize RPV Pressure with Turbine Bypass Valves/ADS Valves	
	ATC/BOP	Stabilizes RPV Pressure with Turbine Bypass Valves/ADS valves as directed	
	SRO	Directs a cooldown at less than 100°F/Hr with Turbine Bypass Valves/ADS Valves	
	ATC/BOP	Initiates a RPV cooldown as directed	
<b>Event 6 Continued</b>			



Quad Cities		NRC Scenario No: 3 Event No: 6	Page 4 of 5
Event Description: LOCA in the Drywell / QGA 200 actions			
Time	Position	Applicant's Actions or Behavior	
	BOP	(Continuous) Monitors and reports Primary Containment Parameters and trends	
	SRO	Directs the actions of QGA 200 PRIMARY CONTAINMENT CONTROL	
	SRO	Verifies Torus water level less than 27 ft.	
	SRO	Directs BOP to initiate Torus Sprays	
	BOP	Uses QCOP 1000-30 to Start RHR	
	BOP	Verifies RHR Pumps running	
	BOP	Places the Containment Cooling Permissive Switch 17 to ON for the available RHR Loop	
	BOP	Places the RHR SW Start Permissive Switch 19 to MANUAL OVERRIDE for the available RHR Loop	
	BOP	Starts Torus Spray	
	BOP	Opens Torus Test or Spray Valve, MO 1-1001-34A/B	
	BOP	Opens Torus Spray Shutoff Valve, MO 1-1001-37A/B	
	BOP	Throttles Torus H2O Test Valve MO 1-1001-36A/B to establish RHR Discharge Pressure of 100-250 psig	
	SRO	Verifies Torus level less than 17 ft. and inside DW Spray Initiation Limit curve	
	SRO	Verifies Recirc pumps and DW coolers tripped	
<b>CT2</b>	SRO	Directs BOP to initiate DW Sprays	
<b>CT2</b>	BOP	Initiates Drywell Sprays	
	BOP	Opens Outboard Spray Isolation, MO 1-1001-23A/B	
	BOP	Opens Inboard Spray Isolation, MO 1-1001-26A/B	
	BOP	Opens Torus Test or Spray Valve, MO 1-1001-34A/B	
	BOP	Adjusts Torus H2O Test Valve MO 1-1001-36A/B to maintain RHR SW Pressure 15-20 psig higher than RHR and RHR Discharge Pressure of 100-250 psig	
<b>SIMOP:</b> If asked to override the DW-Torus vacuum breaker alarms, 901-3 C-13 and G-11, activate the following Batch File: <b>bat G-11_and_C-13_off</b>			
<b>Event 6 Continued</b>			

Quad Cities		NRC Scenario No: 3 Event No: 6	Page 5 of 5
Event Description: LOCA in the Drywell / QGA 200 actions			
Time	Position	Applicant's Actions or Behavior	
	SRO	May Direct Torus Cooling initiation	
	BOP	Uses QCOP 1000-30 to start RHR Service Water	
	BOP	Opens the available RHR HX SW Discharge Valve MO 1-1001-5A/B to approximately 40% open	
	BOP	Starts Loop A/B RHR SW Pump(s)	
	BOP	Adjusts MO 1-1001-5A/B to maintain RHR SW Pressure 15-20 psig higher than RHR and less than 3600 gpm per pump	
	BOP	Throttles RHR HX Bypass Valve MO 1-1001-16A/B as necessary	
	BOP	Starts Torus Cooling as directed	
	BOP	Opens Torus Test or Spray Valve, MO 1-1001-34A/B	
	BOP	Opens Torus H2O Test Valve, MO 1-1001-36A/B	
	BOP	Adjusts Torus H2O Test Valve MO 1-1001-36A/B to maintain RHR SW Pressure 15-20 psig higher than RHR pressure and RHR pressure between 100 and 250 psig	
	BOP	Closes MO 1-1001-16A/B	
<b>End of Event 6</b>			

Quad Cities		NRC Scenario No: 3 Event No: 7	Page 1 of 1
Event Description: RCIC Auto Start Failure			
Time	Position	Applicant's Actions or Behavior	
	SRO	Directs QGA 100 RPV Control actions	
	ATC	Depresses the RCIC MANUAL INITIATION pushbutton for at least 30 seconds and recognizes that RCIC has failed to initiate	
	ATC	Manually starts RCIC per QCOP 1300-02	
	ATC	Starts the Turbine Vacuum Pump	
	ATC	Opens MO 1-1301-62, Turbine Cooling Water Valve	
	ATC	Verifies open MO 1-1301-48, Pump Discharge Valve	
	ATC	Opens MO 1-1301-49, Pump Discharge Valve	
	ATC	Opens MO 1-1301-60, Min Flow Valve	
	ATC	Opens MO 1-1301-61, Steam to Turbine Valve	
	ATC	Adjust RCIC Flow Controller in Manual or AUTO as necessary	
	BOP	Addresses challenges to Primary Containment	
<b>End of Event 7</b>			

Quad Cities		NRC Scenario No: 3 Event No: 8		Page 1of 2
Event Description: Alternate Level Control / Emergency Depressurization				
Time	Position	Applicant's Actions or Behavior		
<b>EVALUATOR NOTE:</b> HPCI trips 2 minutes after Drywell exceeds 2.5 psig.				
Key Parameter Response: RPV water level lowering, HPCI speed indication reading 0				
Expected Annunciator(s): 901-3 A-9 HPCI TURBINE TRIPPED				
Automatic Actions: None				
	BOP/ATC	(Continuous) Monitor and report RPV water level and trends		
	BOP/ATC	Recognizes the loss of HPCI and informs the Unit Supervisor		
	BOP/ATC	May dispatch an EO to investigate		
<b>SIMOP ROLE PLAY:</b> As EO dispatched to HPCI, Wait 5 minutes and then report that there is no obvious problem with HPCI.				
	SRO	Direct use of Alternate Injection Systems		
	ATC	If directed, starts SBLC for injection per QCOP 1100-02		
	ATC	As directed, starts both SBLC pumps by selecting Either SYS 1&2 or SYS 2&1		
	ATC	Verifies applicable Squib light off		
	ATC	Verifies Flow Light On		
	ATC	Verifies Tank level decreasing		
	ATC	Verifies pump discharge pressure greater than or equal to Reactor Pressure		
	ATC	Verifies Annunciator 901-5 H-6 is on		
<b>Event 8 Continued</b>				

Quad Cities		NRC Scenario No: 3 Event No: 8	Page 2 of 2
Event Description: Alternate Level Control / Emergency Depressurization			
Time	Position	Applicant's Actions or Behavior	
	ATC	Reports when RPV water level reaches -142 inches	
	SRO	Before RPV water level drops to -166 inches, enters QGA 500-1	
<b>CT3</b>	SRO	Directs actions of QGA 500-1	
	SRO	Verifies Torus level greater than 5 feet	
<b>CT3</b>	ATC/BOP	Opens all ADS valves, leaves switches in MAN	
	BOP	Verifies all ADS valves open by acoustic monitor indication on the 901-21 panel	
	SRO	Directs ATC/ BOP actions to restore RPV water level with Low Pressure systems	
	SRO	Directs BOP to secure Drywell, Torus Sprays, and Torus Cooling and inject at maximum	
	ATC/BOP	Restore RPV water level as directed	
	ATC/BOP	Control injection from Core Spray and LPCI after Reactor Water Level is greater than -142 inches	
	ATC/BOP	Monitors level instrument watching for indications of saturation and informs SRO	
	SRO	When Reactor Water Level is greater than -142 inches, directs re-initiation of containment sprays	
	BOP	Re-initiates containment sprays as directed	
<b>End of Event 8</b>			
<b>SIMOP:</b> When Blowdown has been performed and/or the discretion of the Lead Examiner, Place the simulator in <b>FREEZE</b> .			

(Final)