Exelon Nuclear

2014 ILT NRC Exam Scenario

Scenario Number:

NRC Scenario 1

Revision Number: 00

Date: 10/17/13

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.: **2014 NRC Scenario 1** Op-Test No.: ILT 12-1
Examiners: _____ Operators:_____
_____ _____
_____ _____

Initial Conditions:
The plant is operating at 75% power

Turnover:
Reverse Main condenser flow and Insert control rods for FCL adjustment.

Event No.	Malf. No.	Event Type*	Event Description
1	None	BOP N	Reverse Main Condenser flow
2	None	ATC R	Lower Reactor power with control rods for Flow Control Line adjustment
3	RD02R2619	ATC C	Recoverable Stuck Rod / Raise CRD Drive Pressure (QCOA 0300-02)
4	NM10A	ATC I	RBM Channel 7 fails high **TS**
5	HP10	BOP I	Spurious HPCI Initiation **TS** (QCOA 2300-01)
6	AIPIC1874011	BOP C	Drywell N2 controller failure (DW pressure rises)
7	ED02 ED03D ED04K DG03A	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): **5**
Malfunction(s) after EOP (1-2): **2**
Abnormal Events (2-4): **E3, 4, 5,& 6**
Major Transient(s) /E-Plan entry (1-2):**E7 & 8**
EOPs (1-2): QGA 100 and 200
EOP Contingencies (0-2): **None**
Critical Tasks (2-3): **2**

ES-301-5 Quantitative attributes:
BOP Normal: **E1**
ATC Reactivity (1 per set): **E2**
BOP I/C (4 per set): **E5 & 6**
ATC I/C (4 per set): **E3 & 4**
SRO-I I/C (4 per set inc 2 as ATC): **E3-6**
SRO Tech Spec (2 per set): **E4 & 5**
ALL Maior Transients (2 per set) **E7 & 8**

SUMMARY:

- Initial conditions:
  - Unit 1 is operating at 75% power preparing to reverse Main Condenser Flow when Engineering indicates they are ready.
- Event 1: When Engineering is ready, the BOP operator reverses Main Condenser Flow.
- Event 2: Lower Reactor power with control rods for Flow Control Line adjustment.
- Event 3: Recoverable Stuck Rod / Raise CRD Drive Pressure.
- Event 4: RBM Channel 7 fails high. The ATC and SRO Respond per QCAN 901-5 A-7 to bypass the faulty RBM after the SRO references Technical Specifications.
- Event 5: 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 6: Drywell N2 controller fails, causing the makeup valve to open fully. The BOP can take manual control of the valve and close it to stabilize Drywell pressure. Without operator action, Drywell pressure will continue to rise and eventually exceed the Drywell High Pressure alarm setpoint.
- Event 7: A Loss of the RAT occurs and Bus 13-1 locks out. The transient initiates a small LOCA in the Drywell requiring a reactor scram. The U1 Diesel cannot be started and 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: QGA 100 and 200 are performed due to the LOCA. 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: 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.

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.

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

EXERCISE PERFORMANCE OBJECTIVES

SR-4400-P02	Given an operating reactor plant, reverse main condenser circ water flow in accordance with QCOP 4400-09.
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-0700-P10	Given an operating reactor plant with control rod moves occurring to adjust FCL, operate and monitor the RBM in accordance with QCOP 0700-05.
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.
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-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-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)


2014 NRC Scenario 1.cae


Scenario 1 ReMA.doc


Scenario 1 QCGP 3-1.pdf


Scenario 1 QCOP 4400-09.pdf

Simulator setup:

1. Reset to IC-20 (Approximately 75% power).
2. Go to **RUN.**
3. Insert rod E-9 to position 14.
4. Verify the following RWM Sequence is loaded: PHESU
    a. Mark up the Control Rod Move Sheet to reflect all rods withdrawn up to Step 42.
    b. Markup Step 42 with all Rods withdrawn through FCL step 40. Rod E-9 is at position 14.

(Commands to be utilized during this scenario are contained in the CAEP file:
2014 NRC Scenario 1.cae)

5. Insert Commands for setup:
    - **imf rd02r2619 16** (Control Rod G-5 stuck at position 16)
    - **trgset 1 "rdpdrivedelta > 340"** (Set trigger 1 as CRD drive Pressure > 340#)
    - **trg 1 "dmf rd02r2619"** (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.)
    - **trgset 7 "zlohs1130161 (2)"** (When RCIC Steam to Turbine Valve Red light comes on)
    - **imf hp08 (3)** (HPCI Aux Oil Pump overload on trigger 3)

6. Verify the following commands for scenario performance:
    - **imf nm10a 100** (RBM 7 fails high)
    - **imf hp10** (HPCI inadvertent initiation)
    - **ior aipic1874011a 100 2:** (DW nitrogen makeup fails upscale on a 2 minute ramp)
    - **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 to normal power as requested)
    - **irf rp03r mg_set** and **irf rp28r reset** (Restores B RPS to normal power as requested)
    - **irf rp02r alt** (Restores A RPS to alternate power as requested)
      The following two are duplicates because the candidates may need to restore RPS A more than once
    - **irf rp02r mg_set** and **irf rp29r reset** (Restores A RPS to normal power as requested)
    - **irf rp02r alt** (Restores A RPS to alternate power as requested)
    - **bat_ sv** (silence vacuum breakers when requested)

(Continued)

7. Take the following equipment OOS (hang OOS Card):
   - None

8. Complete the following Control Panel setup items:
   - Verify the LOCA TRIP ENABLED labels are above the 1A and 1C Circ Water Pumps.
   - Display the Power/Flow Map on Monitor 3.
   - Clear all SBO Panel alarms.

9. Provide a current revision of the following procedures, signed off as specified:
   - QCOP 4400-09 (no steps signed off)
   - QCGP 3-1 with the following marked up: Circle all steps up to F.1. N/A step F.2.a. Sign off steps F.3.a, F.3.b (1) through (6)(a)., N/A step F.3. b (6)(b) and (c), Sign off steps F.3.c, d and e(1), leave F.3.e(2) blank, sign off steps F.3.e(3), e(3)(a), F.3.f.(1) through (7), leave F.3.f.(7)(a) blank, N/A step F.3.f.(8), sign off step F.3.g.(1), N/A step F.3.g.(1)(a), sign off steps F.3.g.(2), (2)(a), (2)(b), (3), (4), (5)(a) and (5)(b). All other steps remain blank.

10. Provide scenario 1 REMA.

11. Perform the applicable steps of TQ-QC-201-0113 “Simulator Exam Security Actions Checklist”.

12. Ensure (1) orange ring is available to provide equipment status.

13. Ensure 2 EST’s are available to provide equipment status.

LIST OF POTENTIAL PROCEDURES

Annunciator Procedures

- 901-3 A-16, PRI CNMT HIGH PRESSURE, Rev.14
- 901-3 B-9, HPCI MOTOR OVERLOAD, Rev. 4
- 901-3 D-12, HPCI PUMP LOW FLOW, Rev. 7
- 901-4 G-15, RCIC TRIP THROTTLE VALVE CLOSED, Rev. 2
- 901-5 A-7, RBM HIGH OR INOP, Rev. 5
- 901-5 D-13 CHANNEL 4-6 APRM HI-HI OR INOP, Rev. 10
- 901-5 C-3, ROD OUT BLOCK, Rev. 11
- 901-5 C-6 APRM DOWNSCALE, Rev. 5
- 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. 94
QCGP 4-1, Control Rod Movements and Control Rod Sequence, Rev. 44
QCGP 2-3, Reactor Scram, Rev. 80
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. 18
QCOA 0700-03, Loss of Neutron Flux Indication. Rev. 8
QCOA 1000-04, LPCI Automatic Initiation, Rev. 17
QCOA 1300-01, RCIC Turbine Trip/Isolation Recovery, Rev. 15
QCOA 2300-01, HPCI Automatic Initiation, Rev. 21
QCOA 6100-03, Loss of Offsite Power, Rev. 38
QCOA 6100-04, Station Blackout, Rev. 19
QCOP 0280-01, Reactor manual Control Operation, Rev. 18
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 2300-06, HPCI System Manual Startup, Rev. 32
QCOP 2900-02, SSMP System Startup, Rev. 25
QCOP 4400-09, Circulating Water System Flow Reversal, Rev. 25
QCOP 6500-08, 4KV Bus Crosstie Operation, Rev. 26
QCOP 6620-14, Energizing Bus 14-1 From SBO DG 1, Rev. 17
QCOP 7000-01, Reactor Protection System MG Sets, Rev 50
QOP 0700-05, Rod Block Monitor, Rev. 15

CREW TURNOVER

1. **Plant Conditions:**

   a.) Unit 1 is at 75% power with a reactor startup in progress.

   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.

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2.) Significant problems/abnormalities:

   a.) None

3.) Evolutions/maintenance for the oncoming shift:

   a.) Engineering is doing an evaluation on Circ Water and wants to monitor some parameters during Condenser Flow Reversal. When they report that they are ready, reverse Main Condenser Flow per QCOP 4400-09. Backpressure is not expected to exceed 6" Hg. All involved personnel have been briefed on the evolution.

   b.) Lower Reactor power with control rods for Flow Control Line adjustment to 92%.

Quad Cities	Scenario No.: 1	Event No.: **1**	Page 1 of 1
Event Description: Reverse Main Condenser Flow from South to North			

Time	Position	Applicant's Actions or Behavior
SIMOP ROLE PLAY: Contact the Unit Supervisor as the WEC Supervisor (phone 2300): "Engineering is ready to monitor Circ Water, Condenser Flow Reversal may proceed."		
	SRO	Directs Main Condenser flow reversal per QCOP 4400-09.
SIMOP: Role Play the Equipment Operator stationed at MCC 16-3 and the WEC or Engineering as necessary.		
	BOP	Establish communications with the Equipment Operator stationed at MCC 16-3.
	BOP	(Continuous) Monitors Condenser Backpressure and Condensate Temperatures.
	BOP	Verifies OFFGAS FLOW TO MAIN CHIMNEY on FR-1-5440-7 (901-54 panel) is >15 scfm.
	BOP	Verifies Annunciator 901-7 C-1, "COND FLOW REV VLVS ON LOCAL CONT," is NOT in alarm.
	BOP	Opens South SJAE Suction valves using the Test switch on the 901-7 panel by placing the switch to the "SOU" position.
	BOP	Places the Circulating Water Flow Selector switch to the "NORTH" position when the South SJAE valves are fully open.
	BOP	Verifies the following: • SJAE Suction valves change over • Condenser differential pressure has reversed and vacuum is stable
	ATC	Monitors reactor and RPV parameters.
End of Event 1		

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

Event Description: Lower Reactor power with control rods for Flow Control Line adjustment

Time	Position	Applicant's Actions or Behavior
SIMOP ROLE PLAY: If the crew does not promptly begin the task, call the control room as the Shift Manager and ask them to begin.		
LEAD EVALUATOR ROLE PLAY: If the crew decides to verify they are within the thermal limits, role play as the QNE and state thermal limits have been verified. Qualified Verifier (QV) as necessary.		
	SRO	Directly supervises control rod moves and directs the RO to begin the Flow Control Line adjustment to 92%.
	ATC	(CONTINUOUS) Monitors reactor parameters.
	ATC	Selects an in-sequence control rod.
	ATC	On the RWM verifies proper rod is selected, it's current position and bounds.
	ATC	Communicates to the QV. "Ready to Insert Rod L-7 from position 16 to position 14 using single notch."
	QV/BOP	Replies: "Rod L-7 is selected. Understand Inserting L-7 from position 16 to position 14 using single notch."
	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.
End of Event 2		

Quad Cities	Scenario No.: 1	Event No.: **3**	Page 1 of 1
Event Description: Recoverable Stuck Rod / Raise CRD Drive Pressure			

Time	Position	Applicant's Actions or Behavior
EVALUATOR NOTE: Control Rod G-5 will not move from position 16 with normal drive water pressure; CRD Drive Pressure indication is on 901-5, 1-340-4. Expected Annunciator(s): None Automatic Actions: None		
	ATC	Reports CR G-5 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.
SIMOP: When CRD drive water pressure is greater than 340 psid, verify Event **Trigger 1** goes active to delete malfunction **dmf rd02r2619**		
	ATC	Attempts to insert Control Rod G-5 and identifies normal control rod movement.
	ATC	Continues normal control rod insertion.
	ATC	Restores drive water pressure to normal.
	QV/BOP	Provides peer check as required.
	BOP	Monitors balance of plant parameters.
LEAD EVALUATOR: If the crew does not continue to lower power to adjust the FCL, prompt the crew. This is necessary for moving to the next event.		
End of Event 3		

Quad Cities	Scenario No.: 1	Event No.: **4**	Page 1 of 1
Event Description: RBM Channel 7 fails high			

Time	Position	Applicant's Actions or Behavior
SIMOP: When rod J-11, has been inserted to position 14, initiate the RBM Upscale malfunction nm10a at 100% severity: **imf nm10a 100**		
Key Parameter Response: Rod Out Permissive light is OFF; RBM CH 7 indicates upscale Expected Annunciator(s): 901-05 A-7 RBM HIGH OR INOP 901-05 C-3 ROD OUT BLOCK Automatic Actions: Rod Block		
	ATC	Responds to unexpected annunciators and informs the Unit Supervisor.
	ATC	Determines RBM channel 7 is UPSCALE.
	ATC	Verifies that a ROD BLOCK is in effect.
	ATC/BOP	May verify RBM 7 is upscale at the 901-37 panel meter.
	ATC	Verifies the correct rod was being inserted.
	ATC	May depress the PUSH SETUP button.
	ATC	May attempt to re-null the RBM by selecting an edge rod and then re-selecting the desired rod.
	SRO	Contacts Instrument Maintenance to investigate the upscale failure of RBM 7.
SIMOP ROLE PLAY: As Instrument Maintenance, inform the Unit Supervisor you will start a work package to troubleshoot and replace components as needed. It will take approx. 2 hours to complete the package and 1 shift to complete the work.		
	SRO	Directs RBM 7 bypassed per QOP 0700-05.
	ATC	Bypasses RBM 7 by placing the RBM BYPASS joystick to the CH 7 position and logs the time.
	SRO	Enters TS 3.3.2.1 Control Rod Block Instrumentation, Condition A for one rod block monitor inoperable.
EVALUATOR NOTE: The crew may return to Event 3 to continue the reactivity manipulation.		
End of Event 4		

Quad Cities	Scenario No.: 1	Event No.: **5**	Page 1 of 1
Event Description: Inadvertent HPCI Initiation			

Time	Position	Applicant's Actions or Behavior
SIMOP: At the direction of the Lead Examiner, insert malfunction: **imf hp10** (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: • Report Drywell pressure normal • Reports RPV water level normal by all indicators
	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	Enters TS 3.5.1 Cond G, HPCI System Inop. Also enters 14 day ATR LCO for HPCI Inoperable.
SIMOP ROLE PLAY: If contacted as Maintenance to investigate the HPCI start, inform the CR you will start a troubleshooting work package. If dispatched as an EO to investigate the HPCI start, wait 5 minutes and report there is no indication for why HPCI started.		
EVALUATOR NOTE: 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.
End of Event 5		

Quad Cities	Scenario No.: 1	Event No.: **6**	Page 1 of 1
Event Description: Drywell N_2 controller failure			

Time	Position	Applicant's Actions or Behavior
NOTE: It takes 8 minutes from the time of initiation until the 901-3 A-16 alarms. **SIMOP:** When directed by the lead examiner, fail the 1-1640-11 controller using the following command: **ior aipic1874011a 100 2:**		
Key Parameter Response: Containment Pressure Controller Position at 100% Expected Annunciator(s): 901-3 A-16 PRI CNMT HIGH PRESSURE Automatic Actions: None		
	BOP	May identify that Drywell pressure is rising and report to the Unit supervisor.
	BOP	Announces rising drywell pressure and/or alarm 901-3 A-16 at 1.44 psig. if/ when it alarms.
	SRO	Directs BOP to perform actions of QCAN 901-3 A-16 and/or QCOA 0201-01, Increasing Drywell Pressure.
	SRO	May set scram criteria of ~2.0 psig.
	CREW	May notify Rad Protection of high containment pressure.
	SRO	IF Drywell pressure reaches 1.5 psig enters TS 3.6.1.4 Condition A. 1 hour to reduce drywell pressure to ≤1.5 psig.
	BOP	May start last Drywell Cooler fan IAW QCOA 0201-01.
	BOP	Reports drywell pressure controller has failed.
	BOP	May take manual control of the drywell pressure controller and close it.
	BOP	Closes the MO 1-1601-57 valve, N_2 Makeup Valve.
	BOP	Contacts IMD to investigate controller failure.
SIMOP ROLE PLAY: If contacted as IMD, inform the CR you will find your supervisor and come to the control room.		
	SRO	IF drywell pressure exceeded 1.5 psig considers venting the drywell.
	ATC	Monitors DW pressure as BOP investigates and prepares for reactor scram.
Lead Evaluator: Drywell venting is not part of the scenario. Do not wait until it is done to move on.		
End of Event 6		

Quad Cities	Scenario No.: 1	Event No.: **7**	Page 1 of 6
Event Description: Station Blackout / Loss of T12 and Bus 13-1			

Time	Position	Applicant's Actions or Behavior
SIMOP: When directed by the Lead Evaluator, initiate the Station Blackout using manual Trigger 3: **trg! 3** (Note: Initially there is a loss of T12 and bus 13-1, but after 3 minutes a LOCA is inserted leading to a loss of T11 and the Blackout.)		
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)		
	BOP	Responds to Annunciators and reports the Loss of T-12, Bus 13-1 and 18.
	BOP	Dispatches an operator to investigate the loss of T-12 and performs applicable actions of QOA 6100-01, Loss of T-12.
SIMOP ROLE PLAY: 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.
SIMOP ROLE PLAY: As the EO dispatched to Bus 13-1, wait 5 minutes and then report that Bus 13-1 is locked out on an overcurrent trip.		
	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.

Quad Cities	Scenario No.: 1	Event No.: **7**	Page 2 of 6
Event Description: Station Blackout / Loss of T12 and Bus 13-1			

Time	Position	Applicant's Actions or Behavior
SIMOP: If RPS restoration is requested, Role Play as necessary. Wait 3 minutes and then use the following commands to restore RPS: A RPS (normal power): **irf 02r mg_set** and **irf r29r reset** A RPS (alternate power): **irf rp02r alt** Then contact the Control Room to report completion of RPS restoration.		
	BOP	May direct the EO to re-energize RPS A per QCOP 7000-01.
SIMOP: Verify the LOCA malfunction goes active 3 minutes after loss of T12: **imf rr10a 0.13 7:30** (Recirc Suction Line LOCA at 0.13% severity on a 7.5 minute ramp)		
	BOP	Responds to annunciator 901-3, A-16, PRI CNMT HIGH PRESSURE.
	SRO	Enters and directs QCOA 0201-01 and sets scram criteria.
	SRO/ATC	Notifies Radiation Protection of elevated containment pressure.
	SRO/BOP	May make a PA announcement to evacuate the Reactor Building.
	ATC	Manually scrams the reactor and Places RX MODE switch to SHUTDOWN position.
	SRO	Directs ATC to Perform QCGP 2-3.
	ATC	Verifies all Control Rods are fully inserted.
	ATC	Verifies the SDV vent and drain valves are closed.
	ATC	Makes scram report.
QGA 100		
	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 (actions in the steps listed below).
	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	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 and directs a pressure band.

Quad Cities	Scenario No.: 1	Event No.: **7**	Page 3 of 6
Event Description: Station Blackout / Loss of T12 and Bus 13-1			

Time	Position	Applicant's Actions or Behavior
	ATC	(CONTINUOUS) Monitors and maintains RPV water level using high pressure systems.
	ATC	(CONTINUOUS) Maintains RPV pressure within the directed pressure band.
Station Blackout		
	BOP	Reports the failure of the U1 EDG to start.
	BOP	Attempts to start U1 EDG from panel 901-8.
	SRO/BOP	Verifies applicable actions of QCOA 6100-03, Loss of Offsite Power, have been performed.
	BOP	Dispatches an operator to attempt to start U1 EDG locally.
SIMOP ROLE PLAY: 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. If dispatched as an EO to Bus 14-1, wait 2 minutes and report no flags are up and supply breakers are tripped.		
	SRO/BOP	If Bus 14-1 is not energized and power is available from a non-EDG source on Unit 2, attempt to re-energize the bus 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: o U1 EDG to Bus 14-1 GCB o Bus 14-1 & Bus 61 Tie Breaker o Busses 14 and 14-1 Tie GCB o 1B Core Spray Pump o 1C & 1D RHR Pump
	BOP	Request U2 to close the Bus 24-1 to Bus 14-1 Tie Breaker.
SIMOP: Role Play as necessary and use the following Remote function to close the tie breaker between bus 24-1 and 14-1 and then report that it has been closed: **irf ed34r close** NOTE: This Remote Function is necessary to provide correct indications on Unit 1. However, (Setup) Malfunction **ed04k** will prevent Bus 14-1 to Bus 24-1 crosstie on Unit 1.		

Quad Cities	Scenario No.: 1	Event No.: **7**	Page 4 of 6
Event Description: Station Blackout / Loss of T12 and Bus 13-1			

Time	Position	Applicant's Actions or Behavior
	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.
CT1	SRO	Direct starting and loading of the SBO Diesel per the Hard Card to Bus 14-1.
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: o U1 Diesel Gen to Bus 14-1 GCB o Busses 14-1 and 24-1 Tie GCB o Busses 14 and 14-1 Tie GCB o Bus 13-1 & Bus 61 Tie Breaker o 1B Core Spray Pump o 1C RHR Pump o 1D RHR Pump
	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.
Note: If buses 18 and 19 were previously crosstied, buses 18 and 19 will be energized when the SBO powers bus 14-1.		
	SRO	May direct the BOP to crosstie Busses 18 and 19 per the Hard Card.

Quad Cities	Scenario No.: 1	Event No.: **7**	Page 5 of 6
Event Description: Station Blackout / Loss of T12 and Bus 13-1			

Time	Position	Applicant's Actions or Behavior
	BOP	May crosstie 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.
	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.
	BOP	May direct the EO to re-energize RPS A and RPS B Busses per QCOP 7000-01.
SIMOP: If RPS restoration is requested, Role Play as necessary. Wait 3 minutes and then use the following commands to restore RPS: A RPS: **irf 02r mg_set** and **irf r29r reset** B RPS: **irf 03r mg_set** and **irf r28r reset** Then contact the Control Room to report completion of RPS restoration.		
	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.

Quad Cities	Scenario No.: 1	Event No.: **7**	Page 6 of 6
Event Description: Station Blackout / Loss of T12 and Bus 13-1			

Time	Position	Applicant's Actions or Behavior
	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.
End of Event 7		

Quad Cities	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
QGA 200		
	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/actuations.
	BOP/ATC	Verifies 2.5 psig isolations/actuations.
	ATC/BOP	Verifies Core Spray and RHR running when power is restored.
	SRO	Directs QGA 100 RPV Control actions (actions in steps below).
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	Attempts to inject with HPCI by removing HPCI from trip-latch.
	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.
SIMOP: If requested to troubleshoot HPCI failure to start, Role Play as necessary. **Wait until the SBO Diesel is providing power** and at least 2 minutes, then delete malfunction **dmf hp08** and report that the Aux Oil Pump Breaker is reset.		
	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/BOP	Dispatches an EO to investigate the Trip Throttle Valve failure.

Quad Cities	Scenario No.: 1	Event No.: **8**	Page 2 of 5
Event Description: LOCA in the Drywell / Initial Actions			

Time	Position	Applicant's Actions or Behavior
SIMOP ROLE PLAY: As the EO dispatched to RCIC: Wait 2 minutes and then report that the RCIC Trip Throttle overspeed mechanism will not reset.		
	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.
	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.
SIMOP ROLE PLAY: As Equipment Operator dispatched to close 1/2–2999-9. After 5 minutes, report that 1/2–2999-9 is CLOSED.		
LEAD EVALUATOR/SIMOP: If requested to silence the vacuum breaker alarms, run batch file **bat SV** to silence alarms and inform the requestor.		
	SRO	May direct use of alternate injection systems.

Quad Cities	Scenario No.: 1	Event No.: **8**	Page 3 of 5
Event Description: LOCA in the Drywell / Initial Actions			

Time	Position	Applicant's Actions or Behavior
	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.
EVALUATOR NOTE: 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 (actions in the steps below).
	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.

Quad Cities	Scenario No.: 1	Event No.: **8**	Page 4 of 5
Event Description: LOCA in the Drywell / Initial Actions			

Time	Position	Applicant's Actions or Behavior
	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.
	SRO	Verifies Torus level less than 17 ft. and inside DW Spray Initiation Limit curve.
	SRO	Verifies Recirc pumps and DW coolers tripped.
	SRO	Directs BOP to initiate DW Sprays.
	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.
	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.

Quad Cities	Scenario No.: 1	Event No.: **8**	Page 5 of 5
Event Description: LOCA in the Drywell / Initial Actions			

Time	Position	Applicant's Actions or Behavior
	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.
End of Event 8		
SIMOP: When Drywell sprays have been initiated and RPV Water level has been restored or as directed by the Lead Evaluator, place the simulator in **FREEZE.**		

(Final)