

Exelon Nuclear

2014 ILT NRC Exam Scenario

Scenario Number:

**NRC Scenario 3**

Revision Number: 00

Date: 10/17/13

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

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Facility: Quad Cities Scenario No.: **2014 NRC Scenario 3** Op-Test No.: ILT 12-1  
 Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions:

The plant is starting up at 100% power. Severe Thunderstorm Warning has been issued. QCOA 0010-10 in progress.

Turnover: Perform the Acoustic Monitor Test for SRVs 3A, 3B, and 3C.

Event No.	Malf. No.	Event Type*	Event Description
1	None	BOP N	Perform the Acoustic Monitor Test
2	RH19BR (Remote Function)	SRO TS	Breaker failure on a Drywell Spray Valve <b>TS</b>
3	RD07	ATC C	CRD Pump Trip (QCOA 0300-01)
4	RD04	ATC C	Rod Drift Out <b>TS</b> (QCOA-0300-11)
5	DIHS156041A LOHS156041A4 (Overrides)	BOP C	Gland Exhauster trip/start standby
6	MC08	ATC R	Emergency Power Reduction on Loss of Main Condenser vacuum (Recoverable)
7	MS04C	Crew M	A Steam line leak in the Drywell results in a reactor scram per QCOA 0201-01 and entry into QGA 100 and 200.
8	DIHS11001S17A (Override)	Crew M	Drywell Spray valves fail to open, Emergency Depressurization per QGA 500-1 when PSP exceeded.
9	MS16	Crew M	Venting to stay under PCPL

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

ES-301-4 Quantitative attributes:  
 Total Malfunctions (5-8): **7**  
 Malfunction(s) after EOP (1-2): **E8**  
 Abnormal Events (2-4): **E3-6**  
 Major Transient(s) /E-Plan entry (1-2): **E7, 8**  
 EOPs (1-2): **QGA 200/ 100**  
 EOP Contingencies (0-2): **E8, 9**  
 Critical Tasks (2-3): **2**

ES-301-5 Quantitative attributes:  
 BOP Normal: **E1**  
 ATC Reactivity (1 per set): **E6**  
 BOP I/C (4 per set): **E5**  
 ATC I/C (4 per set): **E3 & 4**  
 SRO-I I/C (4 per set inc 2 as ATC): **E3-5**  
 SRO Tech Spec (2 per set): **E2 & 4**  
 ALL Major Transients (2 per set) **E7-9**

- Initial Conditions:
  - Unit 1 is operating at 100% power.
- Event 1: The BOP performs a partial Acoustic monitor test, QCOS 0203-01 for SRVs 3A, 3B, and 3C.
- Event 2: The breaker to a Drywell Spray Valve is found Deenergized due to an electrical fault. The SRO must address:
  - TRM 3.6.a Condition A
  - T.S. 3.6.1.3 Power operated PCIV
  - T.S. 3.3.3.1 PAM Instrument
- Event 3: 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 4: Control Rod J-7 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 J-7 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 running Gland Seal Exhauster will trip. The BOP will start the standby Exhauster and adjust Gland Exhaust pressure.
- Event 6: An air leak will result in lowering Main Condenser Vacuum. The crew performs QOA 3300-02 and Emergency Power Reduction. Prompt action by Equipment Operators to re-fill a loop seal line will stabilize Main Condenser Vacuum.
- Event 7: Drywell Pressure starts to rise when a LOCA is initiated. A manual scram should be attempted per QCOA 0201-01 before Drywell Pressure exceeds 2.5 psig. After Drywell Pressure exceeds 2.5 psig, QGA 100 and 200 are performed. The crew restores RPV Water Level and attempts to control Drywell Pressure and Temperature with Containment Sprays.
- Event 8: Div II DW sprays are not available from event 2 (RHR 23B bkr trip) and Div I DW sprays are not available (S17 switch problem), requiring the crew to Blowdown in order to avoid exceeding Pressure Suppression Pressure (PSP).
- Event 9: During the blowdown, a relief valve tailpipe will rupture and torus to DW vacuum breakers will fail open directly pressurizing containment. The crew will be required to vent containment to avoid exceeding PCPL.

**CRITICAL TASKS:**

**Critical Task #1** When Drywell temperature CANNOT be maintained < 280 F OR Torus pressure CANNOT be maintained < the Pressure Suppression Pressure Limit, (PSP), INITIATE an Emergency Depressurization..

**Critical task #2:** Before Torus pressure reaches the Primary Containment Pressure Limit (PCPL), INITIATE venting of the containment irrespective of offsite radioactivity release rates. (BWROG PC-7.2 LOCA VENT PC VENT)

## EXERCISE PERFORMANCE OBJECTIVES

SR-0203-P04	Given an operating plant, perform the Monthly Safety and Relief Valve Acoustic Monitor Surveillance in accordance with QCOS 0203-01
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-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-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.
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-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-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-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-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-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-0001-P23	Given a reactor plant with rising containment pressure and temperature due to a LOCA or steam leak, initiate an emergency depressurization when torus pressure cannot be maintained below the Pressure Suppression Pressure (QGA Figure L) or when drywell temperature cannot be restored and held below 280 degrees in accordance with QGA 200 and QGA 500-1.
SR-0001-P24	Given a reactor plant with rising containment pressure due to a LOCA or steam leak, vent the containment irrespective of off-site radioactivity release rates before torus pressure reaches the Primary Containment Pressure Limit (QGA Figure D) in accordance with QGA 200 and QCOP 1600-13. (Important PRA task. Failure to control containment venting or restore IA for venting results in core damage in 20 of top 100 Core Damage Sequences)
SR-0001-P25	Given a reactor plant with the inability to stay below the Primary Containment Pressure Limit (QGA Figure D), prevent injection from sources outside the primary containment not needed for core cooling or to shut down the reactor in accordance with QGA 100, QGA 101, QGA 200, or QGA 500-4.

**Simulator Setup:**

1. Reset to IC-21 ( $\approx$ 100% power).
2. Go to **RUN**.
3. Verify the following RWM Sequence is loaded: PHESSS
  - a. Mark up the Control Rod Move Sheet to reflect all rods withdrawn up to Step 20.
  - b. Markup Step 20 FCL Rods G-9, J-7, and J-9 at position 06.

(The following commands to be utilized for this scenario are contained in the CAEP file:  
2014 NRC Scenario 3.cae)

## 4. Insert Commands for setup:

- **imf ser0986 (3) on** (On Trigger 3, Gland Exhauster Trip 901-7 E-12 ON)
- **ior dihs156041a (3) trip** (On Trigger 3, 1A Gland Exhauster handswitch to TRIP)
- **ior lohs156041a4 (3) on** (On Trigger 3, 1A Gland Exhauster Amber Trip light ON)
- **ior dihs11001s17a off** (Division I Containment Spray Permissive overridden off)
- **trgset 5 "zdihs10287303A(1)"** (set trigger 5 true when the 3A control switch is taken to manual)
- **imf ms06a (5) 100** (erode the 3A relief valve seat 100% when trigger 5 is true)
- **imf ms16a** (fails 3A relief valve tailpipe)

## 5. Verify the following commands for scenario performance:

- **irf rh19br open** (opens breaker for 1-1001-23B valve)
- **imf rd07a** (1A CRD pump trip)
- **imf rd04r3427** (Control rod J-7 drifts out of the core)
- **irf rd06r3427r inop** (closes 1-305-105 valve for HCU 34-27)
- **dmf rd04r3427** (deletes rod drift for J-7)
- **trg! 3** (Trigger 3 used to initiate Event 4 Gland Exhauster Trip)
- **imf mc08 100 25:** (Main Condenser air inleakage)
- **dmf mc08** (deletes Condenser air inleakage)
- **imf ms04c 0.5 10:** (Main Steam break in Drywell at 0.5% severity over 10 min)
- **irf rh20ar open** (As requested, open the breaker for MO 1-1001-26A vlv)
- **irf rh19ar open** (As requested, open the breaker for MO 1-1001-23A vlv)
- **trg! 5** (Trigger 5 used to erode the 3A relief seat 100%)



2014 NRC Scenario  
3.cae



Scenario 3 ReMA.doc



Scenario 3 QCOA  
0010-10.pdf



Scenario 3 QCOS  
0203-01.pdf

- **Simulator Setup:**

6. 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.
7. Provide the scenario 3 REMA.
8. Perform the applicable steps of TQ-QC-201-0113 "Simulator Exam Security Actions Checklist".
9. Provide a marked up copy of:
  - QCOA 0010-10 with steps D.1, D.2, D.3, D.6, and D.9 signed off. Steps D.4, D.5, D.7, D.8 and D.10 are marked at N/A.
  - QCOS 0203-01 (Partial), Test the Acoustic monitors on "A", "B" and "C" relief valves only. Sign prerequisite step as Unit Supervisor.
10. Provide the 901-16 key (scram test panel key) to the lead evaluator for event 4.
11. Place protected equipment placards on the following:
  - U1 HPCI
  - U1 RCIC
12. Verify 3 orange rings are available to support equipment status.
13. Ensure a step stool is available to support the acoustic monitor surveillance.

## LIST OF POTENTIAL PROCEDURES

## Annunciator Procedures

- 901-3 A-16 PRIMARY CONTAINMENT HIGH PRESSURE, Rev. 14
- 901-3 E-14 ACOUSTIC MON SAFETY RLF VALVES OPEN, Rev. 7
- 901-3 G-4 DRYWELL HIGH PRESSURE, Rev. 8
- 901-5, B-2, CRD PP TRIP, Rev. 7
- 901-5, F-2, CRD CHARGING WATER LOW PRESSURE, Rev. 5
- 901-5 A-3, ROD DRIFT, Rev. 7
- 901-5 D-11 PRIMARY CNMT HIGH PRESS, Rev. 11
- 901-7 E-12 GLAND STEAM EXH MOTOR TRIP, Rev. 3

QCGP 1-1, Normal Unit Startup, Rev. 94

QCGP 2-3, Reactor Scram, Rev. 80

QCGP 3-1, Reactor Power Operations, Rev. 74

QCGP 4-1, Control Rod Movement and Control Rod Sequence, Rev. 44

QGA 100, RPV Control, Rev. 9

QGA 200, Primary Containment Control, Rev. 9

QGA 500-1, RPV Blowdown, Rev. 13

QCOA 0300-01, CRD Pump Failure, Rev. 18

QCOA 0300-11, Control Rod Drift, Rev. 23

QCOP 0300-01, CRD System Startup, Rev. 26

QCOP 0300-07, CRD Directional Control Valve Disarmament/Armament, Rev. 6

QCOS 0300-14, Control Rod Drive Inoperable Outage Report, Rev. 11

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

QCOP 0203-01, Reactor Pressure Control Using Manual Relief Valve Actuation, Rev. 14

QCOP 1000-30, Post-Accident RHR Operation, Rev. 29

QCOP 1600-13, Post Accident Venting of the Primary Containment Rev, 25

QCOP 3700-02, RBCCW System Startup and Operation, Rev. 26

QOP 5600-01, Gland Seal System Rev, 18

QCOP 5750-19, Drywell Cooler Operation, Rev. 10

**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 YELLOW.

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

- A Severe Thunderstorm Warning has been issued. QCOA 0010-10 is in progress. The Shift manager is working through OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines.

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

- a.) Perform QCOS 0203-01, Acoustic Monitor Test for the 3A, 3B and 3C Relief Valves.

**4.) Protected equipment:**

- a.) Unit 1 HPCI.
- b.) Unit 1 RCIC.



Quad Cities		Scenario No.: 3	Event No.: 1	Page 1 of 2
Event Description: Perform the Acoustic Monitor Test				
Time	Position	Applicant's Actions or Behavior		
	SRO	Directs BOP to perform partial QCOS 0203-01 to test the Acoustic monitors on 3A, 3B and 3C Relief Valves and supervises as necessary.		
	BOP	Performs partial QCOS 0203-01 to test the Acoustic monitors on "A", "B" and "C" relief valves only.		
	BOP	(H.1) Selects desired valve.		
	BOP	(H.2) Places display switch in "I", checks and records "INPUT" values.		
	BOP	(H.3) Determines THRESHOLD setpoint.		
	BOP	Places display switch in "T".		
	BOP	Records THRESHOLD setpoint.		
	BOP	Returns display switch to "I".		
	BOP	(H.4) Tests alarms and indications.		
	BOP	Places and holds TEST/RESET switch in TEST.		
	BOP	Verifies Input level greater than Threshold setpoint.		
	BOP	Verifies Open (Red) comes ON and Closed (Green) goes OFF as Threshold setpoint is reached.		
	BOP	Verifies MEMORY (Amber) light comes ON.		
	BOP	Verifies annunciator at Panel 901-3 E-14 ACOUSTIC MON SAFETY RLF VALVES OPEN is received.		
	BOP	Verifies Process Computer Alarm SAFETY/ELECTROMAGNETIC VLV 203-XX OPEN.		
	BOP	Releases TEST/RESET switch.		
	BOP	Verifies Open (Red) light is OFF.		
	BOP	Verifies Closed (Green) is ON.		
	BOP	Verifies annunciator at Panel 901-3 E-14 can be cleared.		
	BOP	Records satisfactory annunciator response.		
	BOP	Verifies PPC Alarm SAFETY/ELECTROMAGNETIC VLV 203-3A(3B)(3C) CLOSED.		

Quad Cities		Scenario No.: 3	Event No.: 1	Page 2 of 2
Event Description: Perform the Acoustic Monitor Test				
Time	Position	Applicant's Actions or Behavior		
	BOP	Records satisfactory Computer Alarm response.		
	BOP	Momentarily places TEST/RESET switch in RESET.		
	BOP	Verifies MEMORY (Amber) light goes OUT.		
	BOP	(H.5) Verifies proper operation of acoustic monitor: <ul style="list-style-type: none"> <li>○ Input level less than 0.09 prior to testing.</li> <li>○ Acoustic Monitor alarms when Threshold setpoint is exceeded.</li> <li>○ Threshold Setpoint is greater than or equal to 0.09 and less than or equal to .11 when display switch is in the "T" position.</li> </ul>		
	BOP	(H.6) Records discrepancies as necessary.		
	BOP	Repeats Steps H.1 through H.6 for remaining valves.		
	ATC	Monitors Reactor and Reactor Pressure Vessel indications.		
<b>End of Event 1</b>				

Quad Cities	Scenario No.: 3	Event No.: 2	Page 1 of 1
Event Description: Breaker failure on a Drywell Spray Valve			
Time	Position	Applicant's Actions or Behavior	
<p><b>SIMOP:</b> When directed by the Lead Examiner, trip the MO 1-1001-23B breaker by inserting remote function <b>irf rh19br open</b>, Then contact the Control Room an EO in the Reactor Building with the following report:                  The breaker for MO-1-1001-23B is tripped and there is an acrid odor near MCC 19-4. <u>There is no fire.</u> If requested to reset and close the breaker, indicate the breaker will not reset.                  As an EO, if directed to contact EMD, tell them you will contact EMD.                  If EMD is contacted by the control room, tell them you will start a troubleshooting work package.</p>			
	ATC	Monitors Reactor and Reactor Pressure Vessel indications.	
	BOP	Confirms that the "B" RHR Loop Outboard Drywell Spray Valve appears De-energized.	
	BOP	Monitors Balance-of-Plant equipment.	
	SRO	Enters the following Tech Spec / TRM conditions: <ul style="list-style-type: none"> <li>• Drywell Spray Valve MO 1-1001-23B is inoperable resulting in a 7 Day LCO per TLCO 3.6.a Condition A.</li> <li>• As a power operated PCIV, it has been closed and deactivated within 4 hours per TS 3.6.1.3 Condition A.</li> <li>• TS 3.3.3.1 PAM Instrumentation for PCIV Position indication has also been satisfied by the closed/deactivated valves per Table 3.3.3.1-1 Note (a).</li> </ul>	
<b>End of Event 2</b>			

Quad Cities		Scenario No.: 3	Event No.: 3	Page 1 of 2
Event Description: CRD Pump Trip (QCOA 0300-01)				
Time	Position	Applicant's Actions or Behavior		
<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". Performs actions per the QCAN.		
	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		
	ATC	Verifies current is less than 34 amps on the 1-302-1B (QCAN 901-5 B-2).		
	ATC	Throttles MO 1-301-2B to maintain 1400-1500 psig discharge pressure.		
	ATC	Closes 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 (1-301-254A) and OPEN the MIN FLOW ISOLATION Valve on B CRD Pump (1-301-254B).		
<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.				

Quad Cities		Scenario No.: 3	Event No.: 3	Page 2 of 2
Event Description: CRD Pump Trip (QCOA 0300-01)				
Time	Position	Applicant's Actions or Behavior		
	ATC	May adjust CRD Drive Water Press to 260-350 psig per QCOP 0300-01 step G.21.		
	ATC	Throttles MO 1-302-8, DRIVE PRESS VLV (throttles closed valve to raise pressure).		
	SRO	May direct an orange ring be placed on the 1A CRD Pump control switch.		
<b>SIMOP ROLE PLAY:</b> If also requested to check the 1A CRD pump breaker at Bus 13, wait 3 minutes and report "the breaker tripped on overcurrent".				
<b>End of Event 3</b>				

Quad Cities	Scenario No.: 3	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 J-7 (HCU 34-27): <b>imf rd04r3427</b>			
Key Parameter Response: Rod J-7 position changing on Full Core Display; Rated thermal power rising.			
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 J-7 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 J-7 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 and QNE.	
	BOP	Demands an OD-20.	
	ATC	Releases RMCS, observes rod J-7 begins to drift out from position 00, then applies continuous insert signal to keep rod J-7 at position 00.	
	ATC	Reports control rod J-7 will NOT latch at position 00.	
	SRO	Directs control rod J-7 scrambled using the Rod Scram Test Switch.	
<b>BOP EVALUATOR:</b> Provide the "Scram Test Panel Key" (901-16 panel key) to the BOP.			
	BOP	Places the individual Control Rod Scram Test Switch for J-7 into the scram position at the 901-16 panel.	
	ATC	Confirms blue scram light for control rod J-7 is lit and releases RMCS.	
	BOP	Dispatches EO to close the 1-305-105, CRD EXH VLV, for HCU 34-27.	

Quad Cities	Scenario No.: 3	Event No.: 4	Page 2 of 2
Event Description: Rod Drift Out			
Time	Position	Applicant's Actions or Behavior	
<p><b>SIMOP ROLE PLAY:</b> As EO dispatched to the North CRD Bank, wait 2 minutes, then insert the Remote Function to close the 1-305-105 valve: <b>irf rd06r3427r inop</b> and delete the Rod Drift Out Malfunction: <b>dmf rd04r3427</b>. Call the NSO to report that "the 1-305-105 valve for HCU 34-27 is closed."</p>			
	SRO	Declares control rod J-7 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 0300-07	
<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 the report and state that you will start troubleshooting.</p>			
	SRO	Enters QCOS 0300-14 to track inoperable rod and electrically disarm.	
	ATC	May adjust CRD Drive Water Press to 260-350 psig per QCOP 0300-01.	
	ATC	Throttles MO 1-302-8, DRIVE PRESS VLV (throttles closed valve to raise pressure).	
<b>End of Event 4</b>			

Quad Cities		Scenario No.: 3	Event No.: 5	Page 1 of 1
Event Description: Gland Exhauster trip/start standby				
Time	Position	Applicant's Actions or Behavior		
<p><b>SIMOP:</b> When directed by the Lead Examiner, trip the running Gland Exhauster: <b>trg! 3</b> Verify the following commands go active: <b>imf ser901-7e12 (3) on, ior dihs156041a (3) trip, and ior lohs156041a4 (3) on</b></p>				
<p>Key Parameter Response: 1A Exhauster Amber Trip light on and Red Running light off: Lowering Vacuum on Gland Seal Exhaust Vacuum indication, 1-5140-70</p> <p>Expected Annunciator(s): 901-7 E-12 GLAND STEAM EXH MOTOR TRIP</p> <p>Automatic Actions: None</p>				
	BOP	Responds to annunciator and informs the Unit Supervisor.		
	BOP	Identifies and reports the loss of 1A Gland Steam Exhauster.		
	SRO	Directs BOP to perform the actions of QCAN 901-7 E-12.		
	SRO/BOP	Dispatches an EO and or EMD to the tripped breaker.		
<p><b>SIMOP ROLE PLAY:</b> As the EO, wait 3 minutes after being dispatched to MCC 15-1 and call back to report the breaker is tripped, there is no obvious problem at the breaker and you have contacted EMD to investigate.</p>				
	BOP	Starts the 1B Gland Steam Exhauster.		
	BOP	Throttles the MO 1-5405B to obtain 10 inches to 15 inches of vacuum as indicated on the 1-5140-70 per QOP 5600-01 step F.1 or F.2.		
	BOP	Throttles closed MO 1-5405A, (holds control switch for 25 sec after full closed indication is received).		
	ATC	Monitors Panel 901-5 parameters.		
	SRO	May direct an orange ring be placed on the 1A Gland Stm Exhauster motor control switch.		
<p><b>SIMOP ROLE PLAY:</b> If summoned to the control room as EMD, tell the crew the problem appears to be with the control switch and it should be left as is until further troubleshooting can be done.</p>				
<b>End of Event 5</b>				



Quad Cities	Scenario No.: 3	Event No.: 6	Page 1 of 2
Event Description: Emergency Power Reduction on Loss of Main Condenser Vacuum			
Time	Position	Applicant's Actions or Behavior	
<p><b>SIMOP:</b> When directed by the Lead Examiner, initiate a loss of vacuum: <b>imf mc08 100 25:</b> (Note: Approximately 90 seconds to receive the 901-3 D-2 alarm)</p>			
<p>Key Parameter Response: Main Condenser backpressure rising on PR 1-5640-79; Generator Mwe lowering</p> <p>Expected Annunciator(s): 901-3 D-2 OFF GAS HI RADIATION 901-7 H-3 CONDENSER LO VACUUM 24 IN HG (in 8.5 minutes with no operator action) 901-5 F-5 CONDENSER VACUUM LO (in 9 minutes with no operator action)</p> <p>Automatic Actions: (If alarms not addressed) Reactor Scram and Turbine trip</p>			
	BOP	Respond to annunciator 901-3 D-2 and informs the Unit Supervisor.	
	SRO	Directs that reactor power be held constant until the cause of the high radiation is determined.	
<p><b>EVALUATOR NOTE:</b> QCAN 901-3 D-2 lists Condenser Air in-leakage as a probable cause for this alarm. The next 3 actions may not be performed if the crew recognizes those indications.</p>			
	BOP	Monitor SJAE and Main Steam Line radiation levels.	
	BOP	Monitor Area Radiation Monitors.	
	BOP/SRO	Notify Chemistry and Qualified Nuclear Engineer of abnormal Offgas activity.	
	CREW	Monitors Condenser Backpressure and informs the US that backpressure is rising.	
	BOP/SRO	Dispatches Equipment Operators and/or Field Supervisor to investigate.	
<p><b>SIMOP ROLE PLAY:</b> In-plant operators as necessary to acknowledge directives.</p>			
	BOP/SRO	Enter QCOA 3300-02, Loss of Condenser Vacuum.	
	SRO	Directs Emergency Power Reduction by reducing total core flow or inserting CRAM rods. (See next Page)	
	ATC	Reduces Reactor Recirculation flow using the Master Controller or Individual Controllers as necessary to attempt to maintain Main Condenser backpressure $\leq 6.0$ in Hg.	
	ATC	(For FCL $>59.4\%$ ) Does not reduce core flow to the point of entry into Instability Region 2.	

Quad Cities		Scenario No.: 3	Event No.: 6	Page 2 of 2
Event Description: Emergency Power Reduction on Loss of Main Condenser Vacuum				
Time	Position	Applicant's Actions or Behavior		
	ATC	If MANUAL RUNBACK pushbuttons are used to reduce Reactor Recirculation flow:		
		Depress buttons no more than 3 times within a 5 second period.		
		Verify MANUAL pushbutton is lit on both A and B Speed Controllers.		
		Verify speed demand on both A and B Controllers decreases by 10% for each time the pushbutton was depressed.		
	ATC	May insert CRAM rods to maintain FCL within the MELLLA boundary.		
	SRO	May set scram criteria of 7.5 in./Hg Main Condenser backpressure.		
	BOP/SRO	Dispatches Equipment Operators and/or Field Supervisor to investigate.		
	BOP	May notify Chemistry to review CY-QC-110-608 for aligning RB sample panel drains with lowering vacuum.		
<b>SIMOP ROLE PLAY:</b> If contacted as Chemistry, state you will review CY-QC-110-608.				
<b>SIMOP ROLE PLAY:</b> When Emergency Power Reduction has been performed to the satisfaction of the Lead Examiner, <u>AND</u> If an EO/FS has been dispatched, then delete the in-leakage malfunction at 4 inches backpressure: <b>dmf mc08</b>				
<u>AND</u>				
As EO/FS report that "the Main Condenser Loop Seals have been re-filled."				
	BOP	Confirms that Condenser Backpressure is returning to normal.		
	SRO	Directs the suspension of Emergency Power Reduction.		
	ATC	Holds Recirc Flow as directed.		
	SRO	Contacts Power Team and informs them of current power level and contacts QNE for assistance in determining thermal limits and recovery actions for control rods.		
<b>SIMOP ROLE PLAY:</b> Acknowledge reports from the Unit Supervisor.				
<b>End of Event 6</b>				

Quad Cities	Scenario No.: 3	Event No.: 7	Page 1 of 3
Event Description: Main Steam Break/Rising DW pressure/ Rx scram			
Time	Position	Applicant's Actions or Behavior	
<b>SIMOP:</b> When directed by the Lead Examiner, insert a Main Steam Line break inside containment: <b>imf ms04c 0.5 10:</b> (0.5% severity over 10 minutes).			
Key Parameter Response: Drywell Pressure Rising; Control rods insert			
Expected Annunciator(s): 901-3 A-16 PRIMARY CONTAINMENT HIGH PRESSURE 901-5 D-11 PRIMARY CNMT HIGH PRESS			
Automatic Actions: (Not a complete list) Group 2 Isolation, CR and RB Vents isolate, SBGTS starts, ECCS systems initiate, EDGs start			
	BOP/ATC	Informs the US that alarm 901-3 A-16 is in and reports DW pressure value and trend.	
	SRO	May set Scram Criteria of 2 psig.	
	SRO	Directs BOP to take actions per QCOA 0201-01.	
	BOP	Enters and performs QCOA 0201-01.	
	BOP	May start the 7th Drywell Cooler.	
	CREW	Notifies Radiation Protection of rising DW pressure, evacuates the RB and requests RP to establish access control.	
<b>SIMOP ROLE PLAY:</b> If directed as RP, state you will set up access control for the RB.			
	ATC	As directed, inserts and manual reactor scram.	
	ATC	Takes the Reactor Mode Switch to SHUTDOWN.	
	ATC	Verifies all Control Rods are fully inserted.	
	ATC	Makes scram report including entry into QGA 100 on RPV Water Level < 0 inches.	
	ATC	Attempts to maintain RPV level 0 to +48" with preferred injection systems.	
		Verifies DFWLC in Single Element.	
		May isolate Feed Water Reg Valve(s).	
		May place Low Flow Feed Reg Valve in Service.	
		May secure unnecessary Feed and Condensate Pumps.	
	ATC	(CONTINUOUS) Monitors RPV water level and pressure.	

Quad Cities	Scenario No.: 3	Event No.: 7	Page 2 of 3
Event Description: Main Steam Break/Rising DW pressure/ Rx scram			
Time	Position	Applicant's Actions or Behavior	
	ATC	Verifies Main Turbine trips, all SV's, CV's, ISV's, IV's and extraction steam check valves close.	
	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 tripped.	
	ATC	Verifies all 4 KV buses powered from T-12.	
	ATC	Verifies both Recirc Pumps running at minimum speed in Manual (may be tripped due to DW pressure).	
	ATC	Starts the Control Room AFU Booster Fan within 40 minutes.	
	ATC	Dispatches EO to reset the Generator 86 Relays and open the Main Disconnects (QCGP 2-3 attachment A step 11).	
<b>SIMOP ROLE PLAY:</b> As EO, acknowledge the directive to reset Generator 86 Relays and open the Main Disconnects as necessary.			
	SRO	Enters QGA 100, RPV Control and QGA 200, Primary Containment Control, on 2.5 psig DW pressure.	
	SRO	Directs ATC/BOP to verify 0 "and 2.5 psig isolations and auto-starts.	
	ATC/BOP	Verifies RPV Pressure < 1060 psig with the Turbine Bypass Valves.	
	ATC/BOP	Verifies Group 2 and 3 Isolations, RB vent isolation and SBGT start.	
	BOP	Monitors and reports Primary Containment parameters and trends.	
	ATC/BOP	Reports ECCS auto started.	
	ATC/BOP	Controls HPCI injection manually or trip latches HPCI after SRO concurrence.	
	ATC/BOP	Verifies Diesels auto started and dispatches EO to verify proper operation.	
<b>SIMOP ROLE PLAY:</b> As EO, acknowledge the directive to verify proper operation of U1 and 1/2 EDGs.			
	BOP	As directed, verifies 1A and 1B CAMs operating.	

Quad Cities		Scenario No.: 3	Event No.: 7	Page 3 of 3
Event Description: Main Steam Break/Rising DW pressure/ Rx scram				
Time	Position	Applicant's Actions or Behavior		
	SRO	May direct actions to start all available drywell cooling.		
	ATC/BOP	As directed, restores RBCCW and DW coolers per QCOP 5750-19		
		Verifies Bus 18 and 19 voltage >450 volts		
		Takes the U1 DIV I DW CLR/RBCCW/FPC TRIP BYPASS switch to BYPASS position		
		Takes the U1 DIV II DW CLR/RBCCW/FPC TRIP BYPASS switch to BYPASS position		
		Checks Drywell temperature is less than 260 °F		
		Starts 1A and 1B RBCCW pump		
		Starts drywell coolers one at a time		
		Starts Drywell Booster Fan		
	SRO	Verifies Torus level <27 ft.		
	SRO	Before Torus Pressure reaches 5 psig, directs BOP to place Torus Sprays on IAW QCOP 1000-30		
	BOP	Maintains the following during Post-Accident RHR Operation: <ul style="list-style-type: none"> <li>• RHR Service Water Pressure 15-20 psig &gt; RHR Pressure</li> <li>• RHR Service Water flow &lt;3600 gpm/pump</li> <li>• RHR Pressure 100-250 psig</li> </ul>		
	BOP	Prepares RHR for Operation		
		Verifies RHR Pumps running		
		Places LOOP A/B CONTAINMENT COOLING PERMISSIVE Switch 17 to ON		
		Places LOOP A/B RHR SW START PERMISSIVE Switch 19 to MANUAL OVERRIDE		
<b>End of Event 7</b>				

Quad Cities		Scenario No.: 3	Event No.: 8	Page 1 of 3
Event Description: Main Steam Break/ QGA 200 actions/ Failed Drywell sprays				
Time	Position	Applicant's Actions or Behavior		
	BOP	Starts RHR Service Water.		
		Opens MO 1-1001-5A/B to approximately 40%.		
		Starts A/B RHR SW Pump.		
		Throttles MO 1-1001-5A/B as necessary.		
		Throttles MO 1-1001-16A/B as necessary.		
	BOP	Initiates Torus Cooling per QCOP 1000-30 and as directed, initiates Torus Sprays.		
		Opens MO 1-1001-34B.		
		Opens MO 1-1001-37B.		
	BOP	Opens/Throttles MO 1-1001-36B as necessary to maintain RHR Discharge Pressure.		
	SRO	Directs BOP to secure Torus Sprays before Torus Pressure drops to 0 psig.		
	BOP	Recognizes and reports that the A Loop RHR valves will not open.		
	BOP	May contact EMD to assist with troubleshooting LOOP A CONTAINMENT COOLING PERMISSIVE Switch 17.		
<b>SIMOP ROLE PLAY:</b> If directed as EMD or IMD to troubleshoot LOOP A CONTAINMENT COOLING PERMISSIVE Switch 17, inform the operator you will locate your supervisor and come to the control room (No EMD or IMD personnel will enter the simulator).				
	BOP	Reports Torus pressure >5 psig.		
	SRO	Verifies Torus level >17 ft.		
	SRO	Verifies inside DW Spray Initiation Limit Curve.		
	SRO	Verifies Recirc pumps are tripped and directs Drywell coolers tripped if restarted.		
	BOP	Trips drywell coolers.		
	SRO	Directs BOP to start DW Sprays.		

Quad Cities	Scenario No.: 3	Event No.: 8	Page 2 of 3
Event Description: Main Steam Break/ QGA 200 actions/ Failed Drywell sprays			
Time	Position	Applicant's Actions or Behavior	
	BOP	As directed, initiates <u>Drywell Sprays</u> per QCOP 1000-30.	
		Attempts to open MO 1-1001-23A.	
	BOP	Reports MO 1-1001-23A failed to open from the 901-3 panel.	
	BOP/SRO	Directs EO, with RP assistance, to open one RHR drywell spray valve (23A, 23B, 26A or 26B) by verifying the circuit breaker is open then manually hand cranking the valve open.	
<p><b>SIMOP ROLE PLAY:</b> If requested to locally operate the Drywell Spray valves, <b>wait 3 min.</b> and then open only the breakers directed using the following remotes:</p> <ul style="list-style-type: none"> <li>• <b>irf rh19ar open</b> (MO 1-1001-23A)</li> <li>• <b>irf rh20ar open</b> (MO 1-1001-26A)</li> </ul>			
<p><b>SIMOP ROLE PLAY:</b> If asked for status of opening the DW spray valves indicate you are having trouble moving the handwheel and you have requested assistance from another EO.</p>			
	SRO	May direct actions to start all available drywell cooling.	
	ATC/BOP	As directed, restores RBCCW and DW coolers per QCOP 5750-19.	
	SRO	Enters QGA 500-1 to blowdown the vessel when it is determined drywell temperature cannot be restored below 280°F or torus pressure cannot be maintained within PSP limits.	
<b>CT1</b>	SRO	Directs actions of QGA 500-1 (actions in steps below).	
	ATC/BOP	Prevents injection from Core Spray and LPCI not needed for Core Cooling by diverting LPCI flow to Torus cooling and/or placing pumps in PTL.	
	ATC	Maintains Rx water level with Feed/Condensate.	
	SRO	Verifies torus level > 5 feet.	
<b>CT1</b>	ATC/BOP	Opens all ADS valves, leaves switches in MAN IAW QCOP 0203-01, Manual Relief Valve Actuation, using hard card.	
	BOP	Verifies all ADS valves open by acoustic monitor indication on the 901-21 panel.	
	ATC	Trips RFPs due to level exceeding +48 inches.	
	ATC/BOP	Monitors RPV water level instruments for indications of saturation.	

Quad Cities			Scenario No.: 3	Event No.: 8	Page 3 of 3
Event Description: Main Steam Break/ QGA 200 actions/ Failed Drywell sprays					
Time	Position	Applicant's Actions or Behavior			
<b>End of Event 8</b>					



Time	Position	Applicant's Actions or Behavior
Quad Cities                      Scenario No.: 3                      Event No.: 9                      Page 1 of 2  Event Description: ADS Tailpipe Rupture and Venting of Containment to Stay Below PCPL		
<b>SIM OP:</b> When the "A" ADS valve is opened, verify <b>trigger 5</b> goes true rupturing the tailpipe. If trigger 5 is not true, manually insert <b>trg! 5</b> .		
	BOP	Reports Drywell and Torus pressure are rising rapidly.
	BOP	Reports Torus <u>AND</u> Drywell pressure are > 25 psig.
<b>CT2</b>	SRO	Directs BOP to vent the Torus per QCOP 1600-13, and also states it is "OK to exceed release rates."
	BOP	May start all available Turbine Building and Radwaste Exhaust Fans.
	BOP	Verifies the following valves are closed: <ul style="list-style-type: none"> <li>• AO 1-1601-23</li> <li>• AO 1-1601-24</li> <li>• AO 1-1601-60</li> <li>• AO 1-1601-61</li> <li>• AO 1-1601-62</li> <li>• AO 1-1601-63</li> </ul>
	BOP	Evacuates the Reactor <u>AND</u> Turbine Building.
<b>CT2</b>	BOP	Places MASTER VENT MODE switch in the APCV position.
	BOP	Verifies the AO 1-1699-7 valve closed.
<b>CT2</b>	BOP	Places the AO 1-1601-24, CIS OVERRIDE, switch in OVERRIDE position for 1 second.
<b>CT2</b>	BOP	Simultaneously places the AO 1-1601-23 <u>AND</u> AO 1-1601-60 CIS OVERRIDE switches to the OVERRIDE position and holds them for 1 second.
<b>CT2</b>	BOP	Opens the AO 1-1601-24.
	SRO	Directs BOP to vent to maintain Torus pressure in a specified band below PCPL.
<b>CT2</b>	BOP	Verifies Torus level is < 27 ft and opens AO 1-1601-60.

Quad Cities		Scenario No.: 3	Event No.: <b>9</b>	Page 2 of 2
Event Description: ADS Tailpipe Rupture and Venting of Containment to Stay Below PCPL				
<b>Time</b>	<b>Position</b>	<b>Applicant's Actions or Behavior</b>		
<b>CT2</b>	BOP	Initiates venting by cycling the AO 1-1699-6 and monitoring Drywell and Torus pressure.		
	BOP	Monitors the ½-1740-19, CHIMNEY GAS ACTIVITY, on the 912-4 panel.		
<b>LEAD EVALUATOR:</b> At the discretion of the Lead Evaluator, freeze the simulator.				
<b>End of Scenario</b>				