Facility:	DAEC	Scenario No.:	1	Op Test No.:	2009-01
Examiners:		Operators:			

Initial Conditions:

- The plant is operating at 70% power due to a downpower for maintenance.

Turnover:

- Perform Main Turbine Operational Tests IAW NS-930001 Sections 7.3, 7.4 and 7.5
- Return to full power using Recirc following completion of the test
  - 3D Monicore Official Case has been printed and the P1 check per IPOI-3 is complete
  - Per RE guidance raise power to 80% for pre-conditioning

Critical Tasks:

1. ED due to low vessel level
2. Start the "B" SBDG to repower a vital bus for RPV reflood

Event No.	Malf. No.	Event Type*	Event Description
1.	N/A	N - BOP N - SRO	Perform Main Turbine Operational Tests (NS-930001)
2.	N/A	R - RO R - SRO	Raise power with Reactor Recirc
3.	RP02A	I – ALL TS - SRO	"A" RPS MG set trip TS 3.3.8.2. Condition A 72 hours to remove in service power supply
4.	RD26B	I - RO I - SRO	"B" CRD pump requires removal from service due to high vibration

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

Event No.	Malf. No.	Event Type*	Event Description
5.	DG07A	C - BOP C – SRO TS - SRO	A SBDG Start due to lightning strike in switchyard – SBDG voltage regulator fails TS 3.8.1.B. – 7 day
6.	SW21A	C - BOP C - SRO	"A" Well Water Pump trips.
7.	ED01A,F, ED08C	M - ALL	Loss of offsite power and reactor scram. "B" DG fails to auto start. RCIC trips, Drywell leak
8.	HP02	C - BOP C - SRO	HPCI Injection valve closes. ED required
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

DAEC 2009 NRC Scenario #1

The plant is operating at 70% power. Main Turbine Operational tests are scheduled to be performed. The crew will perform the Main Turbine Operational tests and once the tests are complete the RO will raise power with reactor recirc.

After power is raised, the “A” RPS MG set trip. The RO will respond to the half scram and reset when required. The BOP operator will take actions to transfer the RPS power supply. The SRO must address TS for one RPS channel inoperable.

Once TS are addressed for the RPS issue, the “B” CRD pump will experience high vibrations requiring removal from service. The standby pump will be started.

Then, a start of the “A” SBDG will occur due to a lightning strike in the switchyard. When the SBDG starts the voltage regulator will fail and the SBDG must be removed from service. The SRO must address TS for one SBDG inoperable. After TS are addressed,, a trip of “A” Well Water Pump occurs. The BOP takes action IAW the AOP to start the standby pump to compensate for rising drywell pressure and temperature.

Once those actions are addressed, a Loss of Offsite Power and subsequent reactor scram occurs. Additionally, a leak will occur in the drywell. The “B” DG fails to auto start and must be manually started (**CRITICAL TASK**). Additionally, RCIC trips and the HPCI injection valve fails closed. EOPs will be entered on low reactor level and high drywell pressure.

An Emergency Depressurization will be required as vessel level continues to lower (**CRITICAL TASK**). “B” RHR and “B” Core Spray must be used to reflood the vessel.

The scenario may be terminated when RPV level has recovered to the normal band.

	EXAMINATION SCENARIO GUIDE (ESG)

SITE: DAEC

Main Turbine Operational Tests / Increase Power with Recirc / A RPS MG Set Trip / B CRD pump malfunction / A SBDG Spurious start - voltage regulator failure / A Well Water Pump Trip / Loss of Offsite Power / Rx Scram / B SBDG fails to auto start / RCIC Trip / HPCI injection valve closes	ESG NRC 09-01	REV 0

PROGRAM: OPERATIONS **#:**

COURSE: INITIAL LICENSED OPERATOR **#:** 50007

TOTAL TIME: 90 MINUTES

Developed by:	*Instructor*	*Date*
Validated by:	*SME/Instructor*	*Date*
Reviewed by:	*Operations Manager*	*Date*
Approved by:	*Training Supervisor-Operations*	*Date*

GUIDE REQUIREMENTS

Goal of Training:	The goal of this scenario is to evaluate ILT students during the NRC Exam with 3 man crew.
Learning Objectives:	There are no formal learning objectives
Prerequisites:	None
Training Resources:	Simulator Simulator Booth Instructor Phone Talker Simulator Floor Instructor
References:	None
Commitments:	None
Evaluation Method:	Dynamic Simulator
Operating Experience:	None
Related PRA Information:	**Initiating Event with Core Damage Frequency:** N/A due to exam security **Important Components:** N/A due to exam security **Important Operator Actions with Task Number:** N/A due to exam security

SCENARIO SUMMARY

The plant is operating at approximately 70% power. Main Turbine Operational tests are scheduled to be performed. The crew will perform the Main Turbine Operational tests and once the tests are complete the RO will raise power with reactor recirculation.

After power is raised, the A RPS MG set will trip. The BOP operator will take actions to transfer the RPS power supply. The RO will respond to the half scram and reset after the RPS has been transferred to the alternate power supply. The SRO must address Technical Specifications for one RPS channel inoperable.

Once Technical Specifications are addressed for the RPS issue, the B CRD pump will experience high vibrations which will require removing the pump from service. The B CRD pump will be started and the A CRD pump will be secured.

The A SBDG will spuriously start due to a lightning strike in the switchyard. When the A SBDG starts the voltage regulator shows signs of having failed, and the SBDG must be removed from service. The SRO must address Technical Specifications for one SBDG inoperable. After Technical Specifications are addressed, a trip of 'A' Well Water Pump occurs. The BOP takes action IAW the AOP to start the standby pump to compensate for rising drywell pressure and temperature.

Once those actions are addressed, a Loss of Offsite Power and subsequent reactor scram occurs. After the scram, a leak will occur in the drywell. The 'B' SBDG fails to auto start and must be manually started (**CRITICAL TASK**). Additionally, RCIC trips and the HPCI injection valve fails closed. EOPs will be entered on low reactor level and high drywell pressure.

An Emergency Depressurization will be required as vessel level continues to lower (**CRITICAL TASK**). 'B' RHR and 'B' Core Spray must be used to reflood the vessel.

The scenario may be terminated when RPV level has recovered to the normal band.

SCENARIO OUTLINE:

BOOTH INSTRUCTOR ACTIONS

1 SIMULATOR SET UP: (perform set up per the "Simulator Setup Checklist", including entering actions items per the "Simulator Input Summary.")

Start Sim View / Data Capture Program for EXAM ONLY

1.1 General Instructions

a. Restore the IC for ILT Scenario 1 (N-1) from the "Thumb Drive" that it is stored on. This Thumb Drive also has the malfunction and override files on it.
   a) Log onto one of the Computer Terminals using the logon from Lowell
   b) If the malfunction file is the "exam" file, go to c), otherwise:
      (1) With a file manager, go to the \\greg\c$\opensim directory, and copy the "Malfunc-New.dat" file into that directory.
      (2) Rename the "Malfunc.dat" file to "Malfunc-OLD.dat"
      (3) Rename the "Malfunc-NEW.dat" file to "Malfunc.dat"
   c) Make a copy of the exam scenario IC file and rename it as "d_ic.000"
   d) Copy the IC file from the thumb drive to the \\greg\ryandev\ops\ic directory. This makes the exam IC number 000.
   e) Reset to IC 000.
      (1) Verify Malfunctions
      (2) Verify Overrides
      (3) Verify Remote functions
      (4) Verify event trigger definitions and accept all triggers

b. If the thumb drive is not available, then reset to IC 23 and set the Malfunctions, Remotes, Overrides, and Triggers as per the tables below.
c. Verify Rod Line >85% then lower flow if necessary to 70% power
d. Verify Alternate RPS aligned to 1B32 using remote function
e. Verify strip chart recorders are ON. If not perform 4.4.4 of OI 831.4 (PPC)
f. Set APRM Gains using remote function NM02
g. Verify APRM recorders are set to the APRM scale and are set in SLOW speed.
h. Verify Pull Sheet setup matches current step and rod position
i. Provide marked up copy of IPOI 3 marked up through Step 4.0 (16)
j. Provide marked up copy of NS-930001 ready to perform Sections 7.3, 7.4 and 7.5
k. Markup AOP 903 for the Severe Thunderstorm Watch – all actions performed up to transitioning out of section.
l. Place SPMET1 on a computer terminal (IAW AOP 903).

1.2 EVENT TRIGGER DEFINITIONS:

Trigger No.	Trigger Logic Statement	Trigger Word Description
4	Logic: ZAODGFDG1 .GE. 0.2 Command: DMF DG07A	When SBDG Freq comes on scale, delete start signal so SBDG will continue to run
11	ZLORCHS2404(2) .GE. 1	RCIC MO2404 open
13	RRLTAF .GT. 170 .AND. YCAB161 .GT. 1000	RPVWL >170 and HPCI injecting >1000gpm

1.3 MALFUNCTIONS:

Time	Malf. No.	Malfunction Title	Delay	Ramp	ET	Initial Value	Final Value
Setup	DG05A	1G21'A' Diesel Generator V/R Oscillates In AUTO				100	100
Setup	STDG02	Trip Override – 'B' SBDG 1G21 Fails To Auto Start				True	TRUE
As Dir	RP02A	RPS EPA Breaker Trip – RPS A EPA BKR			1	False	TRUE
As Dir	RD26B	CRD Pump 'B' High Vibration			7	False	TRUE
As Dir	DG07A	1G21 'A' Diesel Generator Spurious Actuation			3	False	TRUE
As Dir	SW21A	Well Water Pump Trip – Pump A 1P58A			5	False	TRUE
As Dir	ED01A	Loss of Off Site Power Sources – Bkr M			9	False	TRUE
As Dir	ED01F	Loss of Startup Transformer 1X3 Lockout Relay 386S			9	False	TRUE
As Dir	ED08C	4kv/480v Bus Fault Bus 1A3			9	False	TRUE
As Dir	RC01	RCIC Overspeed Trip			11	False	TRUE
As Dir	RC02	RCIC Turbine Trip			11	False	TRUE
As Dir	HP02	HPCI Turbine Trip			13	False	TRUE
As Dir	RR15A	Recirc LOOP Rupt – Design Bases LOCA at 100%		00:15:00	30	0	20

OVERRIDES:

Time	Override No.	Override Title	Delay	Ramp	ET	Initial Value	Final Value

1.5 REMOTE FUNCTIONS:

Time	Remote No.	Remote Title	Delay	Ramp	ET	Initial Value	Final Value
AS DIR	AN06	Remote Func Feedback AN06-Ack Switch 1C93			19	Norm	Ack
AS DIR	RD15	Local Reset of CRD Pump Vib Alarm			26	Norm	Ack

FLOOR INSTRUCTOR ACTIONS

Simulator Pre-brief:

2.1 Individual position assignments

2.2 Simulator training changes since last module (N/A)

2.3 Simulator hardware and software modifications/problems that may impact training

TURNOVER INFORMATION

⇒ Day of week and shift
- ♦ Today
- ♦ Day Shift

⇒ Weather conditions
- ♦ Hot, Humid
- ♦ A Severe Thunderstorm Watch is in effect for the next 3½ hours. All AOP 903 actions are complete.

⇒ (Plant power levels) ≈70%
- ♦ MWT ≈1347
- ♦ MWE ≈426
- ♦ CORE FLOW ≈34.5

⇒ Thermal Limit Problems/Power Evolutions

⇒ Plant Risk Status
- ♦ CDF Baseline
- ♦ Color Green

⇒ Existing LCOs, date of next surveillance
- ♦ None

⇒ STPs in progress or major maintenance
- ♦ Perform Main Turbine Operational tests NS-930001, Section 7.3, 7.4 and 7.5

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment
- ♦ None

⇒ Comments, evolutions, problems, core damage frequency, etc.
- ♦ Perform Main Turbine Operational tests NS-930001, Section 7.3, 7.4 and 7.5
- ♦ Following test completion and Per RE guidance raise power to 80% with Recirc flow for pre-conditioning then hold for RE review.

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Shift Turnover	COMPLETE TURNOVER: • Provide Shift Turnovers to the **SRO** and **RO**s. a. Review applicable current Plant Status b. Review relevant At-Power Risk status c. Review current LCOs not met and Action Requirements d. Verify crew performs walk down of control boards and reviews turnover checklists	Get familiar with plant conditions. • **SRO** will provide beginning of shift brief to coordinate the tasks that were identified on the shift turnover.
EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event #1 Perform Main Turbine operational tests IAW NS - 930001	**Booth Instructor** respond as plant personnel and respond as necessary:	**SRO** Directs BOP to perform NS-930001, Main Turbine Operational Tests, Sections 7.3, 7.4 and 7.5 **RO** Monitors Reactor power , pressure and level **BOP** Performs Sections 7.3, 7.4 and 7.5 of NS-930001 as follows: **7.3 OVERSPEED TRIP DEVICE AND MECHANICAL TRIP VALVE TEST (TEST A)** **NOTE:** The purpose of this test is to demonstrate the operability of the Overspeed Trip Device and Mechanical Trip Valve. 7.3.1 - Verify PRIMARY SPEED SIGNAL LOST light on first hit panel in 1C49 is OFF. **NOTE:** The following procedural steps are performed at 1C07. 7.3.2 - In the MECHANICAL TRIP TEST area, momentarily depress the LOCKED OUT push-button. 7.3.3 - Confirm the following: a. LOCKED OUT light ON b. Annunciator MECHANICAL TRIP LOCKOUT (1C07A, A-8) is activated.

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event 1 Continued		**(BOP Actions Continued)** **NOTE:** If this test is suspended before actual testing of the Mechanical Trip Valve takes place, the Mechanical Trip Lockout can be removed by depressing the NORMAL push-button. 7.3.4 Depress and hold the OIL TRIP push-button until the TRIPPED light in the MECHANICAL TRIP area turns ON (several seconds). 7.3.5 Depress and hold (through Step 7.3.6.b) the PUSH TO RESET pushbutton and confirm the following in the MECHANICAL TRIP area: a. RESETTING light ON b. TRIPPED light OFF c. RESET light ON 7.3.6 After an approximately 10 second time delay, confirm the following in the MECHANICAL TRIP TEST area: a. LOCKED OUT light OFF b. NORMAL light ON c. RESETTING light OFF 7.3.7 Confirm annunciator MECHANICAL TRIP LOCKOUT (1C07A, A-8) is reset. 7.3.8 Verify acceptance of test results by initialing this step. (Any of the following indications, a through d, would indicate unsatisfactory results.) a. Depressing the OIL TRIP push-button with no resultant TRIPPED indicator for the Mechanical Trip Valve. b. RESETTING light does not come ON when PUSH TO RESET push-button is depressed. c. RESETTING light remains ON after test. d. LOCKED OUT light remains ON after test. 7.3.9 Should the results of this test be unsatisfactory, notify Maintenance immediately.

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event 1 Continued		**(BOP Actions Continued)** **7.4 POWER/LOAD UNBALANCE AND RELAY CIRCUITS TEST** **NOTE:** The purpose of this test is to demonstrate operability of the Power/Load Unbalance Circuit that protects the Main Turbine against rapid acceleration due to loss of load when operating above 40% turbine load. All procedural steps are performed at 1C49, Bay 1 TEST AND ADJUST. 7.4.1 Verify Prerequisite 6.5 has been satisfied. 7.4.2 Depress the POWER LOAD UNBALANCE-PUSH TO TEST push-button. 7.4.3 Confirm that yellow back-lighting for the POWER LOAD UNBALANCE-PUSH TO TEST push-button turns ON. 7.4.4 Release the POWER LOAD UNBALANCE-PUSH TO TEST pushbutton and confirm that the yellow back-lighting turns off. **7.5 MASTER TRIP 24 VDC SOLENOID VALVES TEST** **NOTE:** The purpose of this test is to demonstrate operability of the two Master Trip Solenoid Valves that must function properly when a trip occurs. All steps in Section 7.5 are performed at 1C07, in the MASTER TRIP SOLENOID TEST area of the panel, unless stated otherwise. 7.5.1 Verify that all 6.6 prerequisites have been satisfied. 7.5.2 Depress and hold (until Step 7.5.5) TEST TRIP A push-button. 7.5.3 Confirm TEST TRIP A white back-light turns OFF. 7.5.4 Confirm TEST TRIP SOLENOID AMPS for VALVE A indicates approximately zero amps.

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event 1 Continued		**(BOP Actions Continued)** 7.5.5 Release TEST TRIP A push-button. 7.5.6 Confirm TEST TRIP A white back-light is ON. 7.5.7 Confirm TEST TRIP SOLENOID AMPS for VALVE A indicates between 1 and 2 amps. **CAUTION:** If a malfunction is observed during the test of one Master Trip Solenoid Valve, the other valve should NOT be tested until repairs are made. 7.5.8 Depress and hold (until Step 7.5.11) TEST TRIP B push-button. 7.5.9 Confirm TEST TRIP B white back-light turns OFF. 7.5.10 Confirm TEST TRIP SOLENOID AMPS for VALVE B indicates approximately zero amps. 7.5.11 Release TEST TRIP B push-button. 7.5.12 Confirm TEST TRIP B white back-light is ON. 7.5.13 Confirm TEST TRIP SOLENOID AMPS for VALVE B indicates between 1 and 2 amps. **REPORTS to CRS That the tests are completed SAT**
EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

Event #2
Increase Power with Reactor Recirc
	Booth Instructor respond as plant personnel and respond as necessary:
	
	Role Play: If necessary, call in as Real Time Desk to prompt crew to increase power
		SRO
		• Provides a reactivity brief (may be performed before scenario begins).
		• Communicates with Real Time Desk.
		• Provide direct oversight of power increase.
		
		RO
		• <u>Raises power with Recirc Pump Flow Controllers IAW IPOI-3, Section 4.</u>
		  • To raise recirc flow, verify the digital display to the S PERCENT SPEED DEMAND variable by pressing the display switch, then rotate the A[B] MG SET SPEED CONTROL SIC 9245A[B] knobs on 1C04 clockwise in small equal increments.
		  • Keep loop flows balanced by comparing the Recirc Pump discharge flow on FI 4634A vs. FI 4634B or A pump (red channel) vs B pump (black channel) on FR-4635
		• Monitors critical plant parameters – power, pressure, level
		
		BOP
		• Monitors balance of plant equipment.
		• Provides peer check for RO during power increase.

EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

Event #3 "A" RPS MG Set Trip	**Booth Instructor:** respond as plant personnel and respond as necessary: When directed: **INSERT TRIGGER 1** This inserts MF RP02A, which will trip the "A" RPS MG Set. **Role Play:** When contacted by control room to investigate, wait 2 minutes and report that: • The A RPS MG set is running. • A2 EPA has tripped free – no lights, smells bad, no fire or smoke **ROLE PLAY:** As in plant operator report that alternate RPS is aligned to 1B32 **NOTE: When operator moves toward restoring RWCU, go to next event**	**CREW** Recognizes ½ scram on "A" side – Multiple Annunciators including, Annunciator 1C05A A2 – "A" RPS Auto Scram Diagnoses Loss of RPS **SRO** • Enters AOP 358 "Loss of RPS AC Power" • Sends operator to investigate the trip. • Refers to TS 3.3.8.2. Condition A – 72 hours to remove in service power supply (condition met with EPA tripped) • Enters TS 3.6.1.3 – 4 hr LCO for Primary Cont. Isolation Valves **NOTE:** The affected valves are already in their required (closed) position due to the loss off RPS. The action has been met. • Enters TRM 3.3.4 Condition A - for Reactor Water conductivity monitoring • Directs transferring RPS to alternate power supply • Contacts Duty Manager • Directs OI 358 RPS Appendix 4, RPS POWER SUPPLY TRANSFER HALF SCRAM RECOVERY CHECKLIST. **BOP** Transfers "A" RPS to alternate power supply per AOP 358 as follows: • **IF:** an alternate RPS power supply is available as indicated by observing A-MG [B-MG] or ALT XFMR white light ON at 1C15 or 1C17 • **THEN:** place handswitch C71B-S1A [C71B-S1B] RPS ALTERNATE POWER TRANSFER switch to A-MG [B-MG] **OR** ALT position as required and verify selected position white light remains on.

SCENARIO TIMELINE

Event #3 (cont)	**Evaluator Note:** Continue to next event once RWCU restoration step is reached.	**BOP (cont)**
		• Perform OI 358 RPS Appendix 4, RPS POWER SUPPLY TRANSFER HALF SCRAM RECOVERY CHECKLIST as follows.
		  • At Panel 1C36, reset the fuel pool exhaust radiation monitor RIS-4131A[B].
		  • At Panel 1C36, reset the carbon bed vault radiation monitor RM-4138.
		  • Reenergize the RWCU isolation valve(s) as necessary and/or restart the RWCU System as necessary per OI 261 (Group 5).
		RO
		Resets the ½ scram per ARP 1C-05A A2 – Step 4.1.b - Resets the half scram when the failure has been repaired and/or the trip signal has cleared.
		  • Turn the REACTOR SCRAM RESET switch C71A-S5 first to Group 1 and 4 [Group 2 and 3] then to Group 2 and 3 [Group 1 and 4] to reset the scram signal.
		Verify the following:
		  • The eight white SCRAM GROUP indicating lights are ON.
		  • "A" RPS MANUAL SCRAM (1C05A, A-3) annunciator is reset.
		  • "B" RPS MANUAL SCRAM (1C05B, A-3) annunciator is reset.
		  • Annunciator 1C05A, E-4 is reset.
		  • Annunciator 1C05B, E-4 is reset.
		Momentarily press the PCIS DIV 1 RESET and DIV 2 RESET pushbutton switches A71B-S32 and A71B-S33 and verify the following annunciators are reset:
		  • PCIS GROUP “1” ISOLATION INITIATED (1C05B, A-8)
		  • PCIS GROUP “2” ISOLATION INITIATED (1C05B, B-8)
		RO (cont)
		  • PCIS GROUP "4" ISOLATION INITIATED (1C05B, D-8)
		  • PCIS GROUP "5" ISOLATION INITIATED (1C05B, E-8)

SCENARIO TIMELINE

Event #4
"B" CRD pump requires removal from service due to high vibration
	Booth Instructor: respond as plant personnel and respond as necessary:
	When directed by Lead Evaluator:
	INSERT EVENT TRIGGER 7
	This starts the B CRD pump vibrations.
	
	Booth Instructor respond as plant personnel and respond as necessary:
	Role Play: As field operator directed to check the "B" CRD pump, report it is running hotter than normal.
	Role Play: As field operator directed to go to the CRD pump, report that the "A" CRD Pump oil level is good and that the "A" CRD Pump 1P-209A Discharge Isolation V-17-8 is full open.
	Role Play: As field operator, if requested, report that the standby pump has started and is operating normally.
	NOTE: If directed to reset the CRD high vibration alarm then
	INSERT EVENT TRIGGER 26
	This will reset the B CRD vibe alarm.
	NOTE: Crew may notify personnel to insure the switchgear room is clear before cycling the CRD Pump Breaker.
		CREW
		• Responds to Annunciator 1C05A (C-7) "B" CRD 1P209B High Vibration
		
		SRO
		• Directs RO/BOP to carry out the ARP actions
		• Notifies Duty Manager
		RO
		• Refers to OI 255 – CRD Hydraulic System, Section 6.1 and starts the standby pump as follows:
		  • Notifies field operator to verify adequate oil level in standby CRD Pump 1P-209A.
		  • Verify standby CRD Pump 1P-209A Discharge Isolation V-17-8 full open.
		  • At 1C05, starts "A" CRD PUMP 1P-209A by momentarily placing hand switch HS-1807A on 1C05 in the START position.
		
		Stops the B pump as follows
		• Stops "B" CRD PUMP 1P-209B by momentarily placing hand switch HS-1807B on 1C05 in the STOP position.
		• Notifies CRS/Crew that the CRD Pumps have been swapped.
		
		BOP
		• Monitors BOP equipment
		• May make PA announcement for start of pump

EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

Event #5
"A" SBDG starts
	Booth Instructor: respond as plant personnel and respond as necessary:
	When directed:
	INSERT TRIGGER 3
	This starts the "A" SBDG
	Verify Trigger 4 goes TRUE when SBDG comes on scale to DMF DG07A so SBDG will keep running
	When directed to acknowledge 1C93 alarm:
	INSERT EVENT TRIGGER 19
	This acknowledges the local 1C93 alarm.
	
	Role Play: Report to control room as security that a lightning strike was seen in the east side of the yard by the startup transformer
	Role Play: Report as "A" SBDG and local alarm indicates starting air pressure low
	Role Play: Report as Aux Operator that no problems exist in the switchyard
	Role Play: IF asked, report as chemistry that you have not bromated in the past 12 hours
	If requested, SBDG Operating Checklist OI 324A9 (Attachment 9).
		CREW
		Responds to Annunciators:
		• 1C08A (A-10) "A" SBDG 1G-21 Running &
		• 1C08A (C-11) – "A" Diesel Gen Panel 1C-93 Trouble
		• 1C08A (C-12) – "A" SBDG 1G-21 Engine Cranking
		• 1C07A (A-11) – HVAC 1C23 trouble
		Recognizes start of "A" SBDG
		Observes that SBDG voltage is swinging
		SRO
		• May direct placing the A SBDG in PTL IAW the Alarm Response actions
		  • May enter TS 3.7.3.A – 7 day LCO for ESW inoperable
		  NOTE: This is a very recent TS interpretation, this may not have been reviewed with the applicants
		• Directs shutting down SBDG IAW OI 324
		• Notifies Duty Manager
		• Enters TS 3.8.1.B. – 7 day
		• Directs performance of TS surveillance 3.8.1-1 within one hour
		BOP
		• Directs field operator to check on the running SBDG
		• Places A DIESEL GENERATOR 1G-21 CONTROL hand switch HS-3231A on 1C08 in the PTL position
		  OR
		• Shuts down the SBDG as follows IAW OI 324:
		  • Place A DIESEL GENERATOR 1G-21 CONTROL hand switch HS-3231A on 1C08 in the STOP position, hold for 5 to 10 seconds, and then return to AUTO.
		• IAW ARP - May dispatch an operator to check the A ESW pump operation
		RO
		Continues to monitor reactor power, pressure and level

EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

Event #6 "A" Well Water Pump trip	**Booth Instructor:** respond as plant personnel and respond as necessary: When directed: **INSERT EVENT TRIGGER 5** This inserts the A Well Water trip. **Role Play:** When contacted by control room, acknowledge request to check out "A" well house. Report back after 5 minutes that nothing abnormal was observed at the well house. **Role Play:** When directed to check the breaker for the "A" Well, report back after 5 minutes that the breaker is tripped, but you have no indications why. **Role Play:** When contacted, acknowledge as Duty Manager the requests by the SRO to check out the SBDG and Well Pump issues **Examiner Note**: May use QRC to start ESW pumps	**CREW** Responds to Annunciator 1C23C F-1 "A Well Water Pump High/Low Flow **SRO** • Enters AOP 408 "WELL WATER SYSTEM ABNORMAL OPERATION" • Directs starting of additional Well Water pump and restores system parameters • Directs monitoring of Drywell pressure & temperature • Notifies Duty Manager **RO** • Monitors reactor power pressure and level • Monitors Drywell pressure & temperature **BOP** Per AOP 408 immediate actions: • Ensures ESW is running to provide cooling to the Control Building Chillers and to reduce demand on the Well Water System. (The ESW pump must correspond to the running Control Building Chiller(s)) • Starts a standby Well Water Pump, and adjusts flow at the back panel.
EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

Event #7 & #8 Loss of Offsite Power, B SBDG fails to auto start, RCIC trips, Drywell leak, HPCI injection valve closes	**Booth Instructor:** Insert the next malfunction at the direction of the Lead examiner When Directed: **INSERT TRIGGER 9** This starts the LOOP event. **EXAMINER NOTE:** The following steps are related to the Loss of Offsite Power and initial level and power restoration **EXAMINER NOTE:** The BOP may start the B SBDG prior to the SRO directing the action. **BOOTH NOTE**: Verify **TRIGGER 11** goes TRUE to trip RCIC when RCIC is started **Role Play:** When directed to reset the RCIC mechanical overspeed device, wait 5 minutes and report that the overspeed device will NOT reset.	**Crew** Responds to Loss of Offsite Power Indications **SRO** • Enters EOP 1 on RPV level <170 inches • Directs initial RPV level band 170” to 211” using available systems • **Directs starting the B SBDG and verifying it loads the Bus (CRITICAL TASK #1)** • Directs Reactor pressure control using SRVs • Enters AOP 304.1 “LOSS OF 4160V NON-ESSENTIAL ELECTRICAL POWER” • Enters AOP 301 “LOSS OF ESSENTIAL ELECTRICAL POWER” • Directs Defeat 11 **RO** • Places Mode switch to Shutdown • Verifies and reports all rods in • Provides RPV level and pressure status • Reports RPV level dropped below 170” (EOP 1 entry) **BOP** • May report MSIV closure (Group I Isolation) • Diagnoses Startup Transformer lockout • Diagnoses that the B SBDG failed to start

SCENARIO TIMELINE

Events #7 & #8 (Continued)	**NOTE:** Next Page begins actions for Drywell leak and loss of high pressure feed	• **STARTS B SBDG and verifies it loads BUS 1A4**
		• **(CRITICAL TASK #1)**
		• Installs Defeat 11
		  • At Panel 1C35, place CV-4371A GROUP 3 OVERRIDE keylock switch S583B in OVERRIDE OPEN position and confirm amber light is ON.
		  • Confirm CV-4371A opens by observing valve position indicating lights on 1C35 (red light is ON and the green light is OFF).
		
		RO/BOP
		• Attempts to maintain RPV level in the band initially directed by SRO (170" to 211")
		• Attempts to place RCIC in service IAW the QRC but diagnoses that RCIC trips
		• Places HPCI in service to restore RPV level to the directed band

SCENARIO TIMELINE

Events #7 & #8 (Continued) The LOCA is intended to be inserted after the initial post scram activities start to calm down.	**EXAMINER NOTE:** The following steps are related to the drywell leak and loss of high pressure feed **Booth Instructor:** When level is >170" and HPCI is injecting, **VERIFY TRIGGER 13 GOES TRUE** to trip HPCI. **Booth Instructor:** When directed: **INSERT EVENT TRIGGER 30** This starts the LOCA event	**CREW** Recognizes rising Drywell Pressure Recognizes HPCI System trips on 211" and will not reset **SRO** • Enters Alternate Level Control leg of EOP 1 • Directs injection of Standby Liquid • May direct starting "B" CRD pump • Enters EOP 2 on rising DW pressure • Directs Torus Spray when Containment Pressure is >2.0 psig • Directs lockout of ADS • May direct Defeat 4 • May Enter EOP 3 if Steam Tunnel temperature rises above Max Normal • Directs Drywell Spray when Containment Pressure is >11.0 psig OR before Drywell temperature reaches 280 degrees • **Directs Emergency Depressurization per EOP-ED after RPV level drops to +15 inches but before RPV level reaches -25 inches** • **Directs opening 4 ADS SRVs** • **(CRITICAL TASK #2)** • Directs RPV level restoration with B Core Spray and B RHR pumps **RO** • Monitors and reports RPV level trend • As directed, injects to the RPV with B Standby Liquid • As directed, starts the "B" CRD pump

SCENARIO TIMELINE

Events #7 & #8 (Continued)		**BOP**
		• Installs Defeat 4 as time permits
		• Sprays the torus when directed
		  • Places Containment Spray Enable Switch HS-2001C[1903C] in the MAN position
		  • Places keylock HS-2005[HS-1932] Outboard Torus Cooling/Spray Valve Handswitch in OPEN and verify MO-2005[MO-1932] opening.
		  • Throttles open MO-2006[MO-1933], Torus spray Valve.
		• Locks out ADS as directed
		• Sprays the Drywell when directed
		  • Opens MO-2000[MO-1902], Inboard Drywell Spray Valve.
		  • Throttles open MO-2001[MO-1903], Outboard Drywell Spray
		  • Verifies MO-2005[MO-1932] Outboard Torus Cooling/ Spray Valve open.
		  • Throttle MO-2001[MO-1903] Outboard Drywell spray valve as necessary to maintain 4800 gpm per operating RHR pump and desired spray flow.
		Opens 4 ADS SRVs
		(CRITICAL TASK #2)
		• Injects to the RPV with B Core Spray and B RHR once RPV pressure lowers below pump shutoff head
		• When level is above TAF, throttles injection to control RPV level.

	Scenario Termination Criteria	The scenario may be terminated after the ED is performed and level is being controlled.

***** END OF SCENARIO *****

SEG Validation Checklist

2009 NRC Exam Scenario #1

THIS SECTION IS ONLY REQUIRED FOR EVALUATED SCENARIOS.

- ☐ Correct IC or plant status identified.
- ☐ Shift turnover forms filled out (both CRS/OSM and NSOE) if required.
- ☐ Additional documents are prepared (STPs, Work Orders, LCO Paperwork).
- ☐ Tasks and Objectives have been verified to be correct.
- ☐ Plant PRA initiating events, important equipment and important tasks are identified.
- ☐ SOMS tags identified and included in setup instructions.
- ☐ Special setup instructions identified; handswitch manipulations, procedure markups, alarm borders, 3D case available, computer points substituted, etc.
- ☐ Setup files correctly called out.
- ☐ Malfunction list is accurate.
- ☐ Override list is accurate.
- ☐ Remote function list is accurate.
- ☐ Event triggers are accurate.
- ☐ Time/Notes section is accurate and includes all reasonable cues that may be given to initiate an action. Cues are unambiguous and provide a definitive moment to take action.

Instructor Activity section is accurate and complete:

- ☐ Actions are clearly defined for Booth or Floor instructor.
- ☐ Role-playing is clearly noted.
- ☐ The sequence of events is completely and concisely narrated even if it takes no instructor action.
- ☐ Automatic actions that require verification are noted.
- ☐ Reasonable alternate paths are considered and included.
- ☐ Event trigger activation is distinguished from narrative text (**Bold font**)
- ☐ Noun descriptions of actions that occur on event trigger initiation are complete, for example "…set **ET 3** to **TRUE** which activates malfunction **SW21C** resulting in a loss of the C Well Water Pump."
- ☐ Other simulator control actions are clearly distinguished from narrative text, for example "…after drywell temperature reaches 280 deg. F **SNAP** the simulator to **IC 0**."
- ☐ Student and Instructor copies of worksheets or other training activities are verified correct and electronically attached to the file if appropriate.

SEG Validation Checklist

2009 NRC Exam Scenario #1

Expected Student Response Section is accurate and complete:

- ☐ Critical tasks are accurate and clearly identified. Probable critical tasks are also listed with logical connection to the scenario; for example "If the crew fails to get all the rods inserted before ED the critical task becomes…" (N/A as appropriate)
- ☐ Tasks are clearly noted and properly numbered as appropriate.
- ☐ Knowledge objectives are clearly noted and properly numbered as appropriate.
- ☐ Expected as well as probable student responses are listed with logical connection to the scenario. (N/A as appropriate)
- ☐ Actions are appropriately delineated by position(s); OSM, CRS, STA, RO, NSOE, Fire Brigade Leader, At the Controls Operator, etcetera. (N/A as appropriate)
- ☐ Success paths are procedurally driven unless specific training not requiring procedures is desired and delineated. Procedural discrepancies are identified and corrected before training is given.
- ☐ Responses for all communications to simulated personnel outside the Control Room are included, based on procedural guidance and standard operating practices.
- ☐ Actions are listed using a logical order; by position and chronology. (N/A as appropriate)
- ☐ Operating Experience, Human Performance Tools and Operator Fundamentals topics are included when appropriate.
- ☐ Crew Performance Criteria follow the same chronology as the student responses, are complete and accurate. (For ESGs only)
- ☐ For Walkthrough and Training Mode Scenarios with pre-planned pauses, sufficient information is presented to allow the instructor to meet the goal of the training.

Turnover information (as required) is correct:

- ☐ Day and shift are appropriate.
- ☐ Weather conditions do not conflict with malfunctions.
- ☐ Power levels are correct.
- ☐ Thermal limit problems and power evolutions are realistic and include a reason for any downpower.
- ☐ Existing LCOs include start date, remaining time and actions.
- ☐ Plant Risk Assessment (CDF and Color).
- ☐ STPs are appropriate for day and shift.
- ☐ Core Damage Frequency has been properly calculated and listed to 3 decimal places.
- ☐ Maintenance is realistic for plant conditions.
- ☐ Comments, evolutions, problems, etc, includes extra personnel (licensed/non-licensed if necessary), any condition that affects the flow of the scenario and any condition that does not fit in another category.

SME/Instructor	Date
SME/Instructor	Date

SEG Validation Checklist

2009 NRC Exam Scenario #1

Crew:		Instructors:	
OSM	_____	Booth	_____
CRS	_____	Floor	_____
STA	_____	Extra	_____
1C05	_____		
1C03	_____		
BOP	_____		

Crew Comment:

_____

_____

_____

Resolution:

_____

_____

_____

Crew Comment:

_____

_____

_____

Resolution:

_____

_____

_____

NOTE: Following approval of SEGs, this page may be discarded.

SEG Validation Checklist

2009 NRC Exam Scenario #1

Crew Comment:

Resolution:

Crew Comment:

Resolution:

Crew Comment:

Resolution:

NOTE: Following approval of SEGs, this page may be discarded.

Facility:	DAEC	Scenario No.:	2	Op Test No.:	2009-01
Examiners:		Operators:			

Initial Conditions:

- The plant is at 70% power for a rod sequence exchange
- The sequence exchange will commence when informed by the RE
- All systems are operable

Turnover:

- Perform STP 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker operability test

Critical Tasks:

1. Terminate and Prevent injection under ATWS conditions
2. Insert all control rods to shutdown the reactor under all conditions
3. Spray the drywell to control drywell parameters while in the safe region of the DWSIL curve

Event No.	Malf. No.	Event Type*	Event Description
1.	NA	N – BOP N - SRO	Perform STP 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker Operability Test
2.	RR35A	C – RO C – SRO TS - SRO	“A” Recirc Pump High Vibration – removal from service TS 3.4.1. condition D (Single Loop)
3.	HP01	C – BOP C – SRO TS - SRO	HPCI spurious start. TS 3.5.1.F.1 and 2.

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

Event No.	Malf. No.	Event Type*	Event Description
4.	NA	R – RO R - SRO	Power reduction required by RE due to previous events to ensure margin to thermal limits – control rods using reverse pull sheet
5.	MS02	C – BOP C - SRO	Steam leak in primary containment will require the BOP to vent the drywell
6.	ED13A	C – ALL TS - SRO	125VDC Div1 Panel 1D11 trips causing an RPV level event. Manual action will be required to control level TS 3.8.7 condition B (Distribution Systems – Operating)
7.	RR35B RP05F	M - All	"B" Recirc high vibration & pump trip, Reactor Scram, Hydraulic ATWS, several rods must be manually inserted. Drywell pressure degrades due to small break, requiring entry to EOP-2
8.	RH10A/ B/C/D	C – BOP C – SRO	RHR pumps fail to auto start on high drywell pressure
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

DAEC 2009 NRC Scenario #2

The plant is at 70% power. The RO will perform STP 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker Operability Test.

Then, the "A" Recirc Pump will experience high vibrations requiring action to trip the pump. The crew takes actions IAW the ARP and maintains RPV level following the transient The SRO makes preparations to perform STP 3.4.1-02, Single Loop Operability, and addresses Technical Specifications (TS 3.4.1 Condition D)

A spurious start of HPCI will occur and require the BOP to trip the pump. The SRO will address Technical Specifications (TS 3.5.1 Condition F). Once the HPCI issue is addressed, the crew will be informed by reactor engineering that a power reduction is required due to previous two events. The RO will insert control rods per the pull sheet.

Then, a small Steam Leak inside Primary Containment will occur, requiring the crew to vent the drywell per OI-573. A loss of the 125 VDC panel 1D11 then occurs. This leads to an RPV level transient. The crew responds to the FWLC failure and places control circuitry to Level "A." The SRO declares the Div 1 125 VDC distribution subsystem inoperable and addresses Technical Specifications (TS 3.8.7 Condition B).

The "B" Recirc pump experiences vibration issues and will trip (if not tripped by the operators) and the reactor will be scrammed. The control rods will not insert due to hydraulic ATWS. EOP 1 will be entered due to scram required with power above 5% or unknown. The operators take actions to maintain RPV level and stabilize RPV pressure during an ATWS and ATWS Power/Level control will be entered. The crew will be required to terminate and prevent injection (**CRITICAL TASK**). Repeated manual scram will insert all control rods (**CRITICAL TASK**). Additionally, a small leak in the drywell will develop and the RHR pumps will fail to auto start. The crew will enter EOP 2 and control the containment parameters by spraying the Torus and DW (**CRITICAL TASK – to spray DW**).

The scenario may be terminated when the reactor is shutdown, containment parameters are improving and RPV level is restored to the normal band.

	EXAMINATION SCENARIO GUIDE (ESG)

SITE: DAEC

TORUS TO DW VACUUM BRKR TEST / A RECIRC PUMP HI VIBRATION / HPCI SPURIOUS START / POWER REDUCTION / VENT THE DRYWELL / 125 VDC PANEL 1D11 TRIP /B RECIRC PUMP TRIP / HYDRAULIC ATWS / SMALL LOCA / RHR PUMPS FAIL TO AUTO START	ESG NRC 09-02	REV. 0

PROGRAM: OPERATIONS **#:**

COURSE: INITIAL LICENSED OPERATOR **#:** 50007

TOTAL TIME: 90 MINUTES

Developed by:	*Instructor*	*Date*
Validated by:	*SME/Instructor*	*Date*
Reviewed by:	*Operations Manager*	*Date*
Approved by:	*Training Supervisor-Operations*	*Date*

GUIDE REQUIREMENTS

Goal of Training:	The goal of this scenario is to evaluate ILT students during the NRC Exam with 3 man crew.
Learning Objectives:	There are no formal learning objectives
Prerequisites:	None
Training Resources:	Simulator Simulator Booth Instructor Phone Talker Simulator Floor Instructor
References:	None
Commitments:	None
Evaluation Method:	Dynamic Simulator
Operating Experience:	None
Related PRA Information:	**Initiating Event with Core Damage Frequency:** N/A due to exam security **Important Components:** N/A due to exam security **Important Operator Actions with Task Number:** N/A due to exam security

SCENARIO SUMMARY:

The plant is at 70% power. The BOP will perform STP 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker Operability Test.

Then, the "A" Recirc Pump will experience high vibrations requiring action to trip the pump. The crew takes actions IAW the ARP and maintains RPV level following the transient. The SRO makes preparations to perform STP 3.4.1-02, Single Loop Operability, and addresses Technical Specifications (TS 3.4.1 Condition D)

A spurious start of HPCI will occur and require the BOP to trip the pump. The SRO will address Technical Specifications (TS 3.5.1 Condition F). Once the HPCI issue is addressed, the crew will be informed by reactor engineering that a power reduction is required due to previous two events. The RO will insert control rods per the pull sheet.

Then, a small Steam Leak inside Primary Containment will occur, requiring the crew to vent the drywell per OI-573. A loss of the 125 VDC panel 1D11 then occurs. This leads to an RPV level transient. The crew responds to the FWLC failure and places control circuitry to Level "A." The SRO declares the Div 1 125 VDC distribution subsystem inoperable and addresses Technical Specifications (TS 3.8.7 Condition B).

The "B" recirc pump experiences vibration issues and will trip (if not tripped by the operators) and the reactor will be scrammed. The control rods will not insert due to hydraulic ATWS. EOP 1 will be entered due to scram required with power above 5% or unknown. The operators take actions to maintain RPV level and stabilize RPV pressure during an ATWS and ATWS Power/Level control will be entered. The crew will be required to terminate and prevent injection (**CRITICAL TASK**). Repeated manual scram will insert all control rods (**CRITICAL TASK**). Additionally, a small leak in the drywell will develop and the RHR pumps will fail to auto start. The crew will enter EOP 2 and control the containment parameters by spraying the Torus and DW (**CRITICAL TASK – to spray DW**).

The scenario may be terminated when the reactor is shutdown, containment parameters are improving and RPV level is restored to the normal band.

SCENARIO OUTLINE:

BOOTH INSTRUCTOR ACTIONS

1 SIMULATOR SET UP: (perform set up per the "Simulator Setup Checklist", including entering actions items per the "Simulator Input Summary.")

Start Sim View / Data Capture Program.

1.1 General Instructions

a. Restore the IC for ILT Scenario 2 (N-2) from the "Thumb Drive" that it is stored on. This Thumb Drive also has the malfunction and override files on it.
   - a) Log onto one of the Computer Terminals using the logon from Lowell
   - b) If the malfunction file is the "exam" file, go to c), otherwise:
     - (1) With a file manager, go to the \\greg\c$\opensim directory, and copy the "Malfunc-New.dat" file into that directory.
     - (2) Rename the "Malfunc.dat" file to "Malfunc-OLD.dat"
     - (3) Rename the "Malfunc-NEW.dat" file to "Malfunc.dat"
   - c) Make a copy of the exam scenario IC file and rename it as "d_ic.000"
   - d) Copy the IC file from the thumb drive to the \\greg\ryandev\ops\ic directory. This makes the exam IC number 000.
   - e) Reset to IC 000.
     - (1) Verify Malfunctions
     - (2) Verify Overrides
     - (3) Verify Remote functions
     - (4) Verify event trigger definitions and accept all triggers

b. If the thumbdrive is not available, then reset to IC 23 and set the Malfunctions, Remotes, Overrides, and Triggers as per the tables below.

c. Verify load is less than 450 MWe, and MO-9147 and MO-9148 2nd Stage Reheat High Load valves are closed

d. Verify strip chart recorders are ON. If not perform 4.4.4 of OI 831.4 (PPC)

e. Set APRM Gains using remote function NM02

f. Verify Pull Sheet setup matches current step and rod position

g. Provide signed on copy of STP 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker Operability Test

h. Have copies of STP 3.4.1-02 and STP 3.4.2-03 ready for RR trip event

i. Control panel setups, including valves/equipment to tag out: None

j. Markup AOP 903 for the Severe Thunderstorm Watch – all actions performed up to transitioning out of section.

k. Place SPMET1 on a computer terminal (IAW AOP 903).

1.2 EVENT TRIGGER DEFINITIONS:

Trigger No.	Trigger Logic Statement	Trigger Word Description
27	Logic: PCPDWG .GE. 1.4 Command: DMF MS02	Deletes leak in DW to **PREVENT** press going up to >1.8. Sim booth can then control ms02 to control pressure for venting.

1.3 MALFUNCTIONS:

Time	Malf. No.	Malfunction Title	Delay	Ramp	ET	Initial Value	Final Value
Setup	RH10A	RHR A Pump fail to auto-actuate				TRUE	TRUE
Setup	RH10B	RHR B Pump fail to auto-actuate				TRUE	TRUE
Setup	RH10C	RHR C Pump fail to auto-actuate				TRUE	TRUE
Setup	RH10D	RHR D Pump fail to auto-actuate				TRUE	TRUE
Setup	RP05F	Hydraulic lock scram discharge volume				TRUE	TRUE
As Dir	RR35A	Recirc Pump Vibes High – Pump A		10:00	5	50	100
As Dir	RR05A	Recirc pump shaft seizure – pump A	15:00		5	FALSE	TRUE
As Dir	HP01	Inadvertent HPCI initiation			1	FALSE	TRUE
As Dir	ED13A	125 VDC distribution panel fault – PNL 1D11			7	FALSE	TRUE
As Dir	RR35B	Recirc Pump Vibes High – Pump B		5:00	9	50	100
As Dir	RR05B	Recirc pump shaft seizure – pump B	5:00		9	FALSE	TRUE
As Dir	MS02	Steam leak inside the primary containment (VI)		5:00	3	0	0.4
As Dir	MS03A	MSL rupture inside primary containment – Stm line A		10:00	11	0	10
As Dir	EG05	Generator field breaker fails open			17	FALSE	TRUE

OVERRIDES:

Time	Override No.	Override Title	Delay	Ramp	ET	Initial Value	Final Value
SETUP	RD HS-1830	DRV WTR Pressure CTRL VLV				NORM	NORM
SETUP	SL HS-2613	SBLC				OFF	OFF

1.5 REMOTE FUNCTIONS:

Time	Remote No.	Remote Title	Delay	Ramp	ET	Initial Value	Final Value
AS DIR	RP02	ATWS TEST SWITCH HS-1863A (RUN, TEST)	60		13	RUN	TEST
AS DIR	RP03	ATWS TEST SWITCH HS-1864A (RUN, TEST)	70		13	RUN	TEST
AS DIR	FW10	CONDENSATE FILTER DEMIN E EFF VLV CV-1719E			15	100	0
AS DIR	AN01	REMOTE FUNC FEEDBACK AN01-ACK SWITCH 1C80	30		15	NORM	ACK

FLOOR INSTRUCTOR ACTIONS

2 Simulator Pre-brief:

2.1 Individual position assignments

2.2 Simulator Training changes since last module (N/A)

2.3 Simulator hardware and software modifications/problems that may impact training

TURNOVER INFORMATION

⇒ Day of week and shift
- ♦ Today
- ♦ Day Shift

⇒ Weather conditions
- ♦ Hot, Humid
- ♦ A Severe Thunderstorm Watch is in effect for the next 3½ hours. AOP 903 Actions are completed.

⇒ (Plant power levels) Approx. 70%
- ♦ MWT ~1390
- ♦ MWE ~450
- ♦ CORE FLOW ~45 Mlbm/hr

⇒ Thermal Limit Problems/Power Evolutions

⇒ Plant Risk Status
- ♦ CDF Baseline
- ♦ Color Green

⇒ Existing LCOs, date of next surveillance

⇒ STPs in progress or major maintenance
- ♦ None

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment
- ♦ None

⇒ Comments, evolutions, problems, core damage frequency, etc.
- ♦ The plant is at about 70% power for a rod sequence exchange, which will be performed per RE guidance.
- ♦ First perform STP 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker operability test

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Shift Turnover	COMPLETE TURNOVER: • Provide Shift Turnovers to the **SRO** and **RO**s. a. Review applicable current Plant Status b. Review relevant At-Power Risk status c. Review current LCOs not met and Action Requirements d. Verify crew performs walk down of control boards and reviews turnover checklists	Get familiar with plant conditions. • **SRO** will provide beginning of shift brief to coordinate the tasks that were identified on the shift turnover.
EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Event #1
Perform STP 3.6.1.7-01 – DW to Suppression Chamber vacuum Breaker operability test
	Booth Instructor respond as plant personnel and respond as necessary:
	
	Examiner Note: The steps are the same for each vacuum breaker CV-4327A thru G (no "E" vacuum breaker)
	
	Role Play: When asked, state that another operator will perform the post surveillance test checklist
	
	Role Play: When asked to check Drywell N2 Makeup system accumulator pressure, acknowledge request and report back after 5 minutes that pressure is 100 psig.
		SRO
		Directs BOP to perform 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker operability test
		RO
		Monitors Reactor power, pressure and level
		BOP
		
		<u>Performs STP 3.6.1.7-01 as follows (for each vacuum breaker):</u>
		
		• Cycle CV-4327A open and closed by depressing and releasing TEST pushbutton INTERNAL VACUUM BREAKER CV-4327A, and perform confirmations as required below:
		  • Confirm the upper CLOSED light deenergizes as the valve opens and energizes when the valve closes.
		  • Confirm the lower CLOSED light deenergizes as the valve opens and energizes when the valve closes.
		  • Confirm the OPEN light energizes as the valve opens and deenergizes as the valve closes
		• Verifies all valves indicate closed
		• Contacts field operator to check PI-4372 and record Drywell N2 Makeup system accumulator pressure.
		• Notifies SRO that the test is completed

EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Event #2
"A" Recirc Hi Vibes - Pump trips
	Booth Instructor: respond as plant personnel and respond as necessary
	
	INSERT TRIGGER 5 - IMF RR35A
	This starts the "A" Recirc Pump High Vibration & Shaft Seizure event
	
	ROLE PLAY: If asked about filter demin alarm – tell the operator that a low flow exists on "E" demin, its in HOLD and I will acknowledge the 1C80 alarm. Use remote functions to comply crew directions on condensate demins and alarm status.
	
	Role Play: When asked as field operator to check out problem with "A" recirc pump.
	Report back after 2 minutes that a DANGER vibration alarm is lit on the **IN-LINE** monitor and the reading is 20 mils.
		CREW
		Responds to indications of "A" Recirc Pump trouble
		Ann: 1C04A (B-4) – "A" Recirc Pump Motor High Vibration
		Ann: 1C80 (C-1) – Filter demin 1T-13E Low Flow (*occurs after pump trip*)
		SRO
		• Directs response IAW the ARP
		• Enters AOP 264 "Loss of Recirc Pumps
		• Enters AOP 255.2 Power/Reactivity Abnormal change
		• Complies with Technical Specification 3.4.1 Condition D. requirements for Recirculation Loops Operating. (24 hours to complete single loop operation surveillances)
		• Directs preparations for STP 3.4.1-02, Single Loop Operation
		• Contacts Duty Manager
		RO
		• IAW the ARP
		  • Checks computer points B079 (temperature) and B551
		  • Dispatches a field operator to local panel 1C466C to check vibration indication IAW ARP direction
		When a vibration level of >19 mils is confirmed:
		  • Reduce the speed of both Recirc M-G sets to maintain vibration <19 mils.
		  • If unable to reduce vibration to < 19 mils, reduce the A Recirc speed to minimum.
		  • Trip the A RECIRC MG SET MOTOR BREAKER 1A104 (HS at 1C04)

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Event #2 (cont)	**ROLE PLAY:** If asked following the pump trip, Fan 1V-SF-12 is RUNNING with the hand switch HS-6534B in AUTO
	
	ROLE PLAY: If the crew allows the pump to trip, when asked about relays state that the drive motor overload has picked up.
		RO (cont)
		
		For the Recirc Pump that tripped, perform the following:
		• Verify open A[B] RECIRC PUMP DISCH BYP valve MO-4629
		• Close MO-4627
		• After 5 minutes, reopens “A” RECIRC PUMP DISCHARGE valve MO-4627
		• Controls reactor level and maintains in the Green Band (186” to 195”)
		• IAW AOP 255.2, Places one APRM recorder in each trip system to fast speed to monitor for APRM undamped oscillations greater than normal.
		
		BOP
		• IAW the ARP
		  • Checks computer points B079 (temperature) and B551
		  • Dispatches a field operator to local panel 1C466C to check vibration and temperature indication IAW ARP direction
		• Monitors BOP equipment

EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Event #3
 	
HPCI spurious start.
	Booth Instructor:
	
	When directed by examiner:
	
	INSERT EVENT TRIGGER 1
	
	This starts HPCI inadvertent start.
	
	Role Play:
	
	When contacted about the HPCI injection, report as the RE that you will investigate the issue.
	
	NOTE: Because HPCI is secured with an initiation signal sealed in 1C03C, D-11 may alarm on HPCI Vacuum Tank Hi Lvl.
	
	Role Play: When called as field operator, inform the crew that you will check out the Level 2 switches suspected of causing the HPCI spurious start. After two minutes, report that the level switches all indicate normally.
	
	NOTE: The E41A-K6 and K7 (initiation relays) have actuated (back panels).
	
	Role Play: When called as Duty Manager, inform the crew that you will get a team to investigate the issue.
		CREW
		
		Recognizes spurious start of HPCI
		
		SRO
		
		• Directs tripping HPCI after verifying that HPCI operation is no longer required by assuring that by 2 independent indications adequate core cooling is assured (OI 152, Section 7.3)
		• Enters AOP 255.2 Power/Reactivity Abnormal Change
		• Contacts Reactor Engineering, Duty Manager
		• Enters TS 3.5.1.F.1 and 2. - verify RCIC is operable and enter 14 day LCO to return HPCI to operability
		• Conducts Crew Brief once conditions are stable
		
		BOP
		
		• Refers to OI 152 QRC 2 to trip HPCI:
		  • Depresses and hold HS-2259, Remote Turbine trip PB
		  • Verify HV 2201, HPCI Turbine Stop Valve, closes
		  • When HPCI speed is zero rpm, place 1P-218, Aux Oil Pump, in Pull-To-Lock
		  • Verify HV-2200, HPCI Turbine Control Valve , closes
		  • Verify annunciator 1C03C (A6) is activated.
		  • Release HS-2259, HPCI Remote Turbine trip PB
		
		RO
		
		• Continues to monitor reactor power, pressure and level
		• May need to control level adjusting level setpoint

EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event #4 Power Reduction with control rods	**ROLE PLAY:** Call in to the control room as the reactor engineer and state that a power reduction is required due to the previous two events. You've been monitoring the core and the margin to thermal limits is now very slim. In order to avoid TS actions, it is now required to reduce power by inserting rods 2 steps using a reverse sequence in the pull sheet. DO NOT change recirc flow. We will monitor the thermal limits and let you know if a further reduction is necessary **NOTE:** The request may need to be emphasized if the crew has an extended reactivity brief	**SRO** • Provides a reactivity brief • Communicates with Real Time Desk. • Provide direct oversight of power decrease. **RO** • Lowers power as directed by SRO using RE guidance – reverse pull sheet sequence • Monitors critical plant parameters – power, pressure, level **BOP** • Monitors balance of plant equipment. • Provides peer check for RO during power increase.
EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event #5 Steam leak in primary containment requires venting the drywell	**Booth Instructor:** respond as plant personnel and respond as necessary: When directed by examiner: **INSERT EVENT TRIGGER 3** This inserts a small steam leak into the DW. Verify that **Event Trigger 27** (**DMF MS02**) goes true when DW/P reaches 1.5 psig. **Role Play:** Acknowledge request by control room to check areas for leaks due to control room annunciator 1C-35A C4" DW/TORUS 1C-219A GAS/PART/IODINE HI RAD OR DNSCL" After 5 minutes, report back that you have observed no apparent reason for the alarm **BOOTH INSRUCTOR:** Re-Insert MS02 @ 0.1 if pressure is lowering before venting. May change in 0.1 increments if necessary. **When venting starts,** Re-insert MS02 @ 0.1	**Crew** Recognizes Drywell pressure is increasing. **SRO** • Enters AOP-573 and direct crew actions to vent the primary containment to maintain 1 to 1.5 psig. • Contacts the Duty Manager. **BOP** • Starts SBGT per the QRC (OR OI 170) **IMMEDIATE ACTIONS** • **Start SBGT Train A[B]** using one of the following methods: o If using the test pushbuttons, **depress PB-5831A[B]**, SBGT Train A[B] Test Pushbutton. o If initiating a secondary containment isolation, proceed as follows**:** • **Momentarily depress** PB-7606A[B] A[B] Group 3 Initiation pushbutton. • **Verify** Lockout Relay **L/R-5830A[B]** is TRIPPED. • **Verify AV-5801A[B]**, Cooldown/ Outside Air Valve, is **CLOSED**. • **Verify AV-5825A[B]**, Intake Valve, is **OPEN**. • **Confirm EC-5805A[B]**, Constant Heater, is **ON** when >2400 scfm. • **Confirm TDIC-5805A[B]**, Variable Heater ΔT Controller, is controlling at approximately **16°ΔT**. • **Verify AV-5815A[B]**, Fan Inlet Valve, is **OPEN**. • **Verify 1V-EF-15A[B]**, Exhaust Fan, is **RUNNING**. • **Verify AV-5817A[B]**, Discharge Valve, is **OPEN**. • **Position switches at 1C03 as follows:** **Switch** / **Description** / **Position** **HS-4303** / **Outbd Drywell Vent Isol CV-4303** / **Auto Open** **HS-4310** / **Inbd DW Vent Bypass Isol CV-4310** / **Auto Open** • **NOTE: May open CV-4302 to augment the venting**
EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Event #6
 	
125VDC Div1 Panel 1D11 trips
	Booth Instructor: respond as plant personnel and respond as necessary:
	
	When directed by examiner:
	
	INSERT EVENT TRIGGER 7
	
	This inserts a fault to trip 1D11
	
	BOOTH INSTRUCTOR:
	
	If level increases to a scram, then set Event Trigger 9 to TRUE and move to next event.
	
	NOTE: If the RO does not place the level controller to "A" a scram will occur.
	
	ROLE PLAY: If asked as field operator to investigate issue, report after 2 minutes that 1D10 CKT 6 has tripped free and there is no sign of smoke or fire at the breaker.
		CREW
		
		Responds to Numerous Annunciators including 1C08A D-9 A DG Control Power Failure
		
		SRO
		
		• Enters AOP 302.1–Loss of 125 VDC Power, Tab 1–Loss of 125vdc Div 1
		• May direct, as time permits, the RO to transfer to "A" level control to control reactor level and try to maintain normal band.
		• Enters TS LCO 3.8.7.B – 8 Hr LCO (1D11)
		• Directs transferring non-essential power to the startup transformer.
		
		RO
		
		• Takes manual control of FW and attempts to restore reactor water level to the normal band.
		• Place the "A" level controller in service with handswitch
		
		BOP
		
		• Monitors BOP Equipment
		• Transfers non-essential power to the startup transformer per OI 304.1, section 4.2. as follows.
		  • Place the BUS 1A2 TRANSFER breaker mode selector switch in the MANUAL position.
		  • Select Phase 1 with the BUS 1A2 STARTUP XFMR AMPERES meter switch and observe the ammeter reading. Select Phase 1 with the BUS 1A2 AUX XFMR AMPERES meter switch.
		  • Place the control switch 4KV BREAKER 1A202 STARTUP XFMR TO BUS 1A2 momentarily in the CLOSE position. Observe that the red (breaker closed) and the white (closing spring charged) indicating lights are ON

EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event #7 & #8 "B" Recirc HI Vibration, Pump Trip, Reactor Scram, Hydraulic ATWS, Small LOCA, All RHR pumps fail to start on LO-LO-LO level signal	**Booth Instructor:** When directed by examiner: **INSERT EVENT TRIGGER 9** This inserts a high vibrations on B Recirc pump **Role Play:** When asked as field operator to check out problem with "A" recirc pump. Report back after 2 minutes that a DANGER vibration alarm is lit on the **IN-LINE** monitor and the reading is 20 mils. **NOTE:** If the plant scrams on level, from previous event, the actions listed for the recirc pump vibrations do not apply **Role Play:** After request to install Defeat 12, wait approximately 2 minutes and inform control room that it is installed. **Use Trigger 13** **NOTE:** SBLC will fail to start and inject	**CREW** Responds to "B" Recirc Pump Hi vibrations ANN: 1C04B (B-1) "B" Recirc Pump Motor High Vibration **SRO** • Directs ARP actions to address "B" Recirc Pump Hi Vibration • Directs Reactor Scram prior to manually tripping 'B' Recirc Pump due to increasing "B" Recirc Pump Hi Vibration • <u>If "B" Recirc Pump has automatically tripped, recognizes operating in natural circulation and directs Reactor Scram</u> • Enters EOP 1 then transitions to EOP ATWS when informed not all rods are FULL In • Directs Lockout of ADS • Directs Defeat 15 – allows MSIVs to remain open on lo-lo-lo level • Directs Initiation of ARI • **Directs Condensate and Feed injection be terminated and prevented & Verifies that HPCI is Locked Out (from previous event) (CRITICAL TASK #1)** • Directs Defeat 12 – allows scram/reset/scram actions to insert control rods by resetting the ARI solenoids • Directs Start of Standby Liquid Control **NOTE: SBLC will fail to inject** • Direct installation of Defeat 11 • Directs a level band per ATWS EOP • **Directs performance of Hydraulic ATWS RIPs** **(CRITICAL TASK #2 – this must be directed to enable the RO to insert rods)** • When turbine trips, directs sending field operator to open field breaker (will not trip due to 125 VDC issue)

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

	BOOTH INSTRUCTOR:
	After the first scram for hydraulic RIPs:
	INSERT EVENT TRIGGER 11
	This inserts a small steam leak in the containment.
		RO
		• IAW the ARP for Recirc Pump High Vibration
		  • Checks computer points B079 (temperature) and B551
		  • Dispatches a field operator to local panel 1C466C to check vibration indication IAW ARP direction
		• When a vibration level of >19 mils is confirmed
		  • Reduce the speed of both Recirc M-G sets to maintain vibration <19 mils.
		  • If unable to reduce vibration to < 19 mils, reduce the A Recirc speed to minimum.
		  • Trips the A RECIRC MG SET MOTOR BREAKER 1A104.
		• As directed, inserts manual scram with PBs
		• Places mode switch in shutdown
		• Recognizes not all rods are in and informs SRO of Hydraulic ATWS
		• Initiates ARI
		• Takes actions to insert control rods
		• Starts Standby Liquid Control
		NOTE: SBLC will fail to inject
		• **Terminates and prevents Feedwater and Condensate injection by placing FRV controllers to manual and dialed down. (CRITICAL TASK #1)**
		• Takes actions to insert control rods
		
		BOP
		• Locks out ADS
		• If asked, verifies HPCI is locked out
		• Install Defeat 15
		• Installs Defeat 12
		• Installs Defeat 11
		• **Performs Hydraulic ATWS RIPs (CRITICAL TASK #2 – Must be performed to enable RO to insert control rods)**

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
	Examiner Note: The drywell leak will increase creating containment issues. These steps address the crew response actions **Booth Instructor:** **When** the crew resets RPS for the third scram attempt (for the scram-reset-scram RIP), **THEN** DMF RP05F. This will allow the rods to insert when the third scram is put in.	**CREW** Recognizes rising drywell pressure/temperature Recognizes failure of RHR pumps to auto start on RPV Lo-Lo-Lo Level **SRO** • Enters EOP 2 on high drywell pressure OR High Torus Level • When informed that all rods are full in, Exits EOP ATWS • Re-enters EOP-1, then directs RPV level band of 170" to 211" • Directs Torus Spray when Containment Pressure is >2.0 psig **Directs Drywell Spray when Torus Pressure is > 11.0 psig OR before Drywell temperature reaches 280 degrees (CRITICAL TASK #3)** **RO** **Performs scram-reset-scram to insert control rods** **Informs SRO when all rods are in (CRITICAL TASK #2)** Restores RPV level to a band of 170" to 211"

		BOP
		• Starts all RHR pump which had failed to auto start on Lo-Lo-Lo RPV level
		• Sprays the torus when directed
		  • Places Containment Spray Enable Switch HS-2001C[1903C] in the MAN position
		  • Places keylock HS-2005[HS-1932] Outboard Torus Cooling/Spray Valve Handswitch in OPEN and verify MO-2005[MO-1932] opening.
		  • Throttles open MO-2006[MO-1933], Torus spray Valve.
		
		• **Sprays the Drywell when directed (CRITICAL TASK #3)**
		  • Opens MO-2000[MO-1902], Inboard Drywell Spray Valve.
		  • Throttles open MO-2001[MO-1903], Outboard Drywell Spray

	Scenario Termination Criteria	**All Control Rods inserted, DW spray in service, RPV level restored to 170" - 211"**

***** END OF SCENARIO *****

SEG Validation Checklist

2009 NRC Exam Scenario #2

THIS SECTION IS ONLY REQUIRED FOR EVALUATED SCENARIOS.

- ☐ Correct IC or plant status identified.
- ☐ Shift turnover forms filled out (both CRS/OSM and NSOE) if required.
- ☐ Additional documents are prepared (STPs, Work Orders, LCO Paperwork).
- ☐ Tasks and Objectives have been verified to be correct.
- ☐ Plant PRA initiating events, important equipment and important tasks are identified.
- ☐ SOMS tags identified and included in setup instructions.
- ☐ Special setup instructions identified; handswitch manipulations, procedure markups, alarm borders, 3D case available, computer points substituted, etc.
- ☐ Setup files correctly called out.
- ☐ Malfunction list is accurate.
- ☐ Override list is accurate.
- ☐ Remote function list is accurate.
- ☐ Event triggers are accurate.
- ☐ Time/Notes section is accurate and includes all reasonable cues that may be given to initiate an action. Cues are unambiguous and provide a definitive moment to take action.

Instructor Activity section is accurate and complete:

- ☐ Actions are clearly defined for Booth or Floor instructor.
- ☐ Role-playing is clearly noted.
- ☐ The sequence of events is completely and concisely narrated even if it takes no instructor action.
- ☐ Automatic actions that require verification are noted.
- ☐ Reasonable alternate paths are considered and included.
- ☐ Event trigger activation is distinguished from narrative text (**Bold font**)
- ☐ Noun descriptions of actions that occur on event trigger initiation are complete, for example "…set **ET 3** to **TRUE** which activates malfunction **SW21C** resulting in a loss of the C Well Water Pump."
- ☐ Other simulator control actions are clearly distinguished from narrative text, for example "…after drywell temperature reaches 280 deg. F **SNAP** the simulator to **IC 0**."
- ☐ Student and Instructor copies of worksheets or other training activities are verified correct and electronically attached to the file if appropriate.

SEG Validation Checklist

2009 NRC Exam Scenario #2

Expected Student Response Section is accurate and complete:

- ☐ Critical tasks are accurate and clearly identified. Probable critical tasks are also listed with logical connection to the scenario; for example "If the crew fails to get all the rods inserted before ED the critical task becomes…" (N/A as appropriate)
- ☐ Tasks are clearly noted and properly numbered as appropriate.
- ☐ Knowledge objectives are clearly noted and properly numbered as appropriate.
- ☐ Expected as well as probable student responses are listed with logical connection to the scenario. (N/A as appropriate)
- ☐ Actions are appropriately delineated by position(s); OSM, CRS, STA, RO, NSOE, Fire Brigade Leader, At the Controls Operator, etcetera. (N/A as appropriate)
- ☐ Success paths are procedurally driven unless specific training not requiring procedures is desired and delineated. Procedural discrepancies are identified and corrected before training is given.
- ☐ Responses for all communications to simulated personnel outside the Control Room are included, based on procedural guidance and standard operating practices.
- ☐ Actions are listed using a logical order; by position and chronology. (N/A as appropriate)
- ☐ Operating Experience, Human Performance Tools and Operator Fundamentals topics are included when appropriate.
- ☐ Crew Performance Criteria follow the same chronology as the student responses, are complete and accurate. (For ESGs only)
- ☐ For Walkthrough and Training Mode Scenarios with pre-planned pauses, sufficient information is presented to allow the instructor to meet the goal of the training.

Turnover information (as required) is correct:

- ☐ Day and shift are appropriate.
- ☐ Weather conditions do not conflict with malfunctions.
- ☐ Power levels are correct.
- ☐ Thermal limit problems and power evolutions are realistic and include a reason for any downpower.
- ☐ Existing LCOs include start date, remaining time and actions.
- ☐ Plant Risk Assessment (CDF and Color).
- ☐ STPs are appropriate for day and shift.
- ☐ Core Damage Frequency has been properly calculated and listed to 3 decimal places.
- ☐ Maintenance is realistic for plant conditions.
- ☐ Comments, evolutions, problems, etc, includes extra personnel (licensed/non-licensed if necessary), any condition that affects the flow of the scenario and any condition that does not fit in another category.

SME/Instructor	Date
SME/Instructor	Date

SEG Validation Checklist

2009 NRC Exam Scenario #2

Crew:		Instructors:	
OSM	_____	Booth	_____
CRS	_____	Floor	_____
STA	_____	Extra	_____
1C05	_____		
1C03	_____		
BOP	_____		

Crew Comment:

_____

_____

_____

Resolution:

_____

_____

_____

Crew Comment:

_____

_____

_____

Resolution:

_____

_____

_____

NOTE: Following approval of SEGs, this page may be discarded.

SEG Validation Checklist

2009 NRC Exam Scenario #2

Crew Comment:

Resolution:

Crew Comment:

Resolution:

Crew Comment:

Resolution:

NOTE: Following approval of SEGs, this page may be discarded.

Facility: DAEC Scenario No.: 2a Op Test No.: 2009-01

Examiners: _____ Operators: _____

Initial Conditions:
- The plant is at 70% power for a rod sequence exchange
- The sequence exchange will commence when informed by the RE
- All systems are operable

Turnover:
- Perform STP 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker operability test

Critical Tasks:
1. Terminate and Prevent injection under ATWS conditions
2. Insert all control rods to shutdown the reactor under all conditions
3. Spray the drywell to control drywell parameters while in the safe region of the DWSIL curve

Event No.	Malf. No.	Event Type*	Event Description
1.	NA	N – BOP N - SRO	Perform STP 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker Operability Test
2.	RR35A	C – RO R – RO C – SRO R – SRO TS - SRO	"A" Recirc Pump High Vibration – removal from service TS 3.4.1. condition D (Single Loop) NOTE: Crew response to event resulted in an emergent Reactivity Maneuver. Event 4 was deleted as a result.
3.	HP01	C – BOP C – SRO TS - SRO	HPCI spurious start. TS 3.5.1.F.1 and 2.

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

Event No.	Malf. No.	Event Type*	Event Description
~~4.~~	~~NA~~	~~R – RO~~ ~~R - SRO~~	~~Power reduction required by RE due to previous events to ensure margin to thermal limits – control rods using reverse pull sheet~~ NOTE: This event was deleted. See NOTE in Event 2
5.	MS02	C – BOP C - SRO	Steam leak in primary containment will require the BOP to vent the drywell
6.	ED13A	C – ALL TS - SRO	125VDC Div1 Panel 1D11 trips causing an RPV level event. Manual action will be required to control level TS 3.8.7 condition B (Distribution Systems – Operating)
7.	RR35B RP05F	M - All	"B" Recirc high vibration & pump trip, Reactor Scram, Hydraulic ATWS, several rods must be manually inserted. Drywell pressure degrades due to small break, requiring entry to EOP-2
8.	RH10A/ B/C/D	C – BOP C – SRO	RHR pumps fail to auto start on high drywell pressure
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

DAEC 2009 NRC Scenario #2

The plant is at 70% power. The RO will perform STP 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker Operability Test.

Then, the "A" Recirc Pump will experience high vibrations requiring action to trip the pump. The crew takes actions IAW the ARP and maintains RPV level following the transient The SRO makes preparations to perform STP 3.4.1-02, Single Loop Operability, and addresses Technical Specifications (TS 3.4.1 Condition D)

A spurious start of HPCI will occur and require the BOP to trip the pump. The SRO will address Technical Specifications (TS 3.5.1 Condition F). Once the HPCI issue is addressed, the crew will be informed by reactor engineering that a power reduction is required due to previous two events. The RO will insert control rods per the pull sheet.

Then, a small Steam Leak inside Primary Containment will occur, requiring the crew to vent the drywell per OI-573. A loss of the 125 VDC panel 1D11 then occurs. This leads to an RPV level transient. The crew responds to the FWLC failure and places control circuitry to Level "A." The SRO declares the Div 1 125 VDC distribution subsystem inoperable and addresses Technical Specifications (TS 3.8.7 Condition B).

The "B" Recirc pump experiences vibration issues and will trip (if not tripped by the operators) and the reactor will be scrammed. The control rods will not insert due to hydraulic ATWS. EOP 1 will be entered due to scram required with power above 5% or unknown. The operators take actions to maintain RPV level and stabilize RPV pressure during an ATWS and ATWS Power/Level control will be entered. The crew will be required to terminate and prevent injection (**CRITICAL TASK**). Repeated manual scram will insert all control rods (**CRITICAL TASK**). Additionally, a small leak in the drywell will develop and the RHR pumps will fail to auto start. The crew will enter EOP 2 and control the containment parameters by spraying the Torus and DW (**CRITICAL TASK – to spray DW**).

The scenario may be terminated when the reactor is shutdown, containment parameters are improving and RPV level is restored to the normal band.

	EXAMINATION SCENARIO GUIDE (ESG)

SITE: DAEC

TORUS TO DW VACUUM BRKR TEST / A RECIRC PUMP HI VIBRATION / HPCI SPURIOUS START / ~~POWER REDUCTION /~~ VENT THE DRYWELL / 125 VDC PANEL 1D11 TRIP /B RECIRC PUMP TRIP / HYDRAULIC ATWS / SMALL LOCA / RHR PUMPS FAIL TO AUTO START	ESG NRC 09-02A	REV. 0

PROGRAM: OPERATIONS **#:**

COURSE: INITIAL LICENSED OPERATOR **#:** 50007

TOTAL TIME: 90 MINUTES

Developed by:	*Instructor*	*Date*
Validated by:	*SME/Instructor*	*Date*
Reviewed by:	*Operations Manager*	*Date*
Approved by:	*Training Supervisor-Operations*	*Date*

GUIDE REQUIREMENTS

Goal of Training:	The goal of this scenario is to evaluate ILT students during the NRC Exam with 3 man crew.
Learning Objectives:	There are no formal learning objectives
Prerequisites:	None
Training Resources:	Simulator Simulator Booth Instructor Phone Talker Simulator Floor Instructor
References:	None
Commitments:	None
Evaluation Method:	Dynamic Simulator
Operating Experience:	None
Related PRA Information:	**Initiating Event with Core Damage Frequency:** N/A due to exam security **Important Components:** N/A due to exam security **Important Operator Actions with Task Number:** N/A due to exam security

SCENARIO SUMMARY:

The plant is at 70% power. The BOP will perform STP 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker Operability Test.

Then, the "A" Recirc Pump will experience high vibrations requiring action to trip the pump. The crew takes actions IAW the ARP and maintains RPV level following the transient. The SRO makes preparations to perform STP 3.4.1-02, Single Loop Operability, and addresses Technical Specifications (TS 3.4.1 Condition D)

A spurious start of HPCI will occur and require the BOP to trip the pump. The SRO will address Technical Specifications (TS 3.5.1 Condition F). ~~Once the HPCI issue is addressed, the crew will be informed by reactor engineering that a power reduction is required due to previous two events. The RO will insert control rods per the pull sheet.~~

Then, a small Steam Leak inside Primary Containment will occur, requiring the crew to vent the drywell per OI-573. A loss of the 125 VDC panel 1D11 then occurs. This leads to an RPV level transient. The crew responds to the FWLC failure and places control circuitry to Level "A." The SRO declares the Div 1 125 VDC distribution subsystem inoperable and addresses Technical Specifications (TS 3.8.7 Condition B).

The "B" recirc pump experiences vibration issues and will trip (if not tripped by the operators) and the reactor will be scrammed. The control rods will not insert due to hydraulic ATWS. EOP 1 will be entered due to scram required with power above 5% or unknown. The operators take actions to maintain RPV level and stabilize RPV pressure during an ATWS and ATWS Power/Level control will be entered. The crew will be required to terminate and prevent injection (**CRITICAL TASK**). Repeated manual scram will insert all control rods (**CRITICAL TASK**). Additionally, a small leak in the drywell will develop and the RHR pumps will fail to auto start. The crew will enter EOP 2 and control the containment parameters by spraying the Torus and DW (**CRITICAL TASK – to spray DW**).

The scenario may be terminated when the reactor is shutdown, containment parameters are improving and RPV level is restored to the normal band.

SCENARIO OUTLINE:

BOOTH INSTRUCTOR ACTIONS

1 SIMULATOR SET UP: (perform set up per the "Simulator Setup Checklist", including entering actions items per the "Simulator Input Summary.")

Start Sim View / Data Capture Program.

1.1 General Instructions

a. Restore the IC for ILT Scenario 2 (N-2) from the "Thumb Drive" that it is stored on. This Thumb Drive also has the malfunction and override files on it.
   - a) Log onto one of the Computer Terminals using the logon from Lowell
   - b) If the malfunction file is the "exam" file, go to c), otherwise:
     - (1) With a file manager, go to the \\greg\c$\opensim directory, and copy the "Malfunc-New.dat" file into that directory.
     - (2) Rename the "Malfunc.dat" file to "Malfunc-OLD.dat"
     - (3) Rename the "Malfunc-NEW.dat" file to "Malfunc.dat"
   - c) Make a copy of the exam scenario IC file and rename it as "d_ic.000"
   - d) Copy the IC file from the thumb drive to the \\greg\ryandev\ops\ic directory. This makes the exam IC number 000.
   - e) Reset to IC 000.
     - (1) Verify Malfunctions
     - (2) Verify Overrides
     - (3) Verify Remote functions
     - (4) Verify event trigger definitions and accept all triggers

b. If the thumbdrive is not available, then reset to IC 23 and set the Malfunctions, Remotes, Overrides, and Triggers as per the tables below.

c. Verify load is less than 450 MWe, and MO-9147 and MO-9148 2nd Stage Reheat High Load valves are closed

d. Verify strip chart recorders are ON. If not perform 4.4.4 of OI 831.4 (PPC)

e. Set APRM Gains using remote function NM02

f. Verify Pull Sheet setup matches current step and rod position

g. Provide signed on copy of STP 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker Operability Test

h. Have copies of STP 3.4.1-02 and STP 3.4.2-03 ready for RR trip event

i. Control panel setups, including valves/equipment to tag out: None

j. Markup AOP 903 for the Severe Thunderstorm Watch – all actions performed up to transitioning out of section.

k. Place SPMET1 on a computer terminal (IAW AOP 903).

1.2 EVENT TRIGGER DEFINITIONS:

Trigger No.	Trigger Logic Statement	Trigger Word Description
27	Logic: PCPDWG .GE. 1.4 Command: DMF MS02	Deletes leak in DW to **PREVENT** press going up to >1.8. Sim booth can then control ms02 to control pressure for venting.

1.3 MALFUNCTIONS:

Time	Malf. No.	Malfunction Title	Delay	Ramp	ET	Initial Value	Final Value
Setup	RH10A	RHR A Pump fail to auto-actuate				TRUE	TRUE
Setup	RH10B	RHR B Pump fail to auto-actuate				TRUE	TRUE
Setup	RH10C	RHR C Pump fail to auto-actuate				TRUE	TRUE
Setup	RH10D	RHR D Pump fail to auto-actuate				TRUE	TRUE
Setup	RP05F	Hydraulic lock scram discharge volume				TRUE	TRUE
As Dir	RR35A	Recirc Pump Vibes High – Pump A		10:00	5	50	100
As Dir	RR05A	Recirc pump shaft seizure – pump A	15:00		5	FALSE	TRUE
As Dir	HP01	Inadvertent HPCI initiation			1	FALSE	TRUE
As Dir	ED13A	125 VDC distribution panel fault – PNL 1D11			7	FALSE	TRUE
As Dir	RR35B	Recirc Pump Vibes High – Pump B		5:00	9	50	100
As Dir	RR05B	Recirc pump shaft seizure – pump B	5:00		9	FALSE	TRUE
As Dir	MS02	Steam leak inside the primary containment (VI)		5:00	3	0	0.4
As Dir	MS03A	MSL rupture inside primary containment – Stm line A		10:00	11	0	10
As Dir	EG05	Generator field breaker fails open			17	FALSE	TRUE

OVERRIDES:

Time	Override No.	Override Title	Delay	Ramp	ET	Initial Value	Final Value
SETUP	RD HS-1830	DRV WTR Pressure CTRL VLV				NORM	NORM
SETUP	SL HS-2613	SBLC				OFF	OFF

1.5 REMOTE FUNCTIONS:

Time	Remote No.	Remote Title	Delay	Ramp	ET	Initial Value	Final Value
AS DIR	RP02	ATWS TEST SWITCH HS-1863A (RUN, TEST)	60		13	RUN	TEST
AS DIR	RP03	ATWS TEST SWITCH HS-1864A (RUN, TEST)	70		13	RUN	TEST
AS DIR	FW10	CONDENSATE FILTER DEMIN E EFF VLV CV-1719E			15	100	0
AS DIR	AN01	REMOTE FUNC FEEDBACK AN01-ACK SWITCH 1C80	30		15	NORM	ACK

FLOOR INSTRUCTOR ACTIONS

2 Simulator Pre-brief:

2.1 Individual position assignments

2.2 Simulator Training changes since last module (N/A)

2.3 Simulator hardware and software modifications/problems that may impact training

TURNOVER INFORMATION

⇒ Day of week and shift
- ♦ Today
- ♦ Day Shift

⇒ Weather conditions
- ♦ Hot, Humid
- ♦ A Severe Thunderstorm Watch is in effect for the next 3½ hours. AOP 903 Actions are completed.

⇒ (Plant power levels) Approx. 70%
- ♦ MWT ~1390
- ♦ MWE ~450
- ♦ CORE FLOW ~45 Mlbm/hr

⇒ Thermal Limit Problems/Power Evolutions

⇒ Plant Risk Status
- ♦ CDF Baseline
- ♦ Color Green

⇒ Existing LCOs, date of next surveillance

⇒ STPs in progress or major maintenance
- ♦ None

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment
- ♦ None

⇒ Comments, evolutions, problems, core damage frequency, etc.
- ♦ The plant is at about 70% power for a rod sequence exchange, which will be performed per RE guidance.
- ♦ First perform STP 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker operability test

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Shift Turnover	COMPLETE TURNOVER: • Provide Shift Turnovers to the **SRO** and **RO**s. a. Review applicable current Plant Status b. Review relevant At-Power Risk status c. Review current LCOs not met and Action Requirements d. Verify crew performs walk down of control boards and reviews turnover checklists	Get familiar with plant conditions. • **SRO** will provide beginning of shift brief to coordinate the tasks that were identified on the shift turnover.
EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Event #1
Perform STP 3.6.1.7-01 – DW to Suppression Chamber vacuum Breaker operability test
	Booth Instructor respond as plant personnel and respond as necessary:
	
	Examiner Note: The steps are the same for each vacuum breaker CV-4327A thru G (no "E" vacuum breaker)
	
	Role Play: When asked, state that another operator will perform the post surveillance test checklist
	
	Role Play: When asked to check Drywell N2 Makeup system accumulator pressure, acknowledge request and report back after 5 minutes that pressure is 100 psig.
		SRO
		Directs BOP to perform 3.6.1.7-01 – DW to Suppression Chamber Vacuum Breaker operability test
		RO
		Monitors Reactor power, pressure and level
		BOP
		
		<u>Performs STP 3.6.1.7-01 as follows (for each vacuum breaker):</u>
		
		• Cycle CV-4327A open and closed by depressing and releasing TEST pushbutton INTERNAL VACUUM BREAKER CV-4327A, and perform confirmations as required below:
		  • Confirm the upper CLOSED light deenergizes as the valve opens and energizes when the valve closes.
		  • Confirm the lower CLOSED light deenergizes as the valve opens and energizes when the valve closes.
		  • Confirm the OPEN light energizes as the valve opens and deenergizes as the valve closes
		• Verifies all valves indicate closed
		• Contacts field operator to check PI-4372 and record Drywell N2 Makeup system accumulator pressure.
		• Notifies SRO that the test is completed

EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Event #2
"A" Recirc Hi Vibes - Pump trips
	Booth Instructor: respond as plant personnel and respond as necessary
	
	INSERT TRIGGER 5 - IMF RR35A
	This starts the "A" Recirc Pump High Vibration & Shaft Seizure event
	
	ROLE PLAY: If asked about filter demin alarm – tell the operator that a low flow exists on "E" demin, its in HOLD and I will acknowledge the 1C80 alarm. Use remote functions to comply crew directions on condensate demins and alarm status.
	
	Role Play: When asked as field operator to check out problem with "A" recirc pump.
	Report back after 2 minutes that a DANGER vibration alarm is lit on the **IN-LINE** monitor and the reading is 20 mils.
		CREW
		Responds to indications of "A" Recirc Pump trouble
		Ann: 1C04A (B-4) – "A" Recirc Pump Motor High Vibration
		Ann: 1C80 (C-1) – Filter demin 1T-13E Low Flow (*occurs after pump trip*)
		SRO
		• Directs response IAW the ARP
		• Enters AOP 264 "Loss of Recirc Pumps
		• Enters AOP 255.2 Power/Reactivity Abnormal change
		• Complies with Technical Specification 3.4.1 Condition D. requirements for Recirculation Loops Operating. (24 hours to complete single loop operation surveillances)
		• Directs preparations for STP 3.4.1-02, Single Loop Operation
		• Contacts Duty Manager
		RO
		• IAW the ARP
		  • Checks computer points B079 (temperature) and B551
		  • Dispatches a field operator to local panel 1C466C to check vibration indication IAW ARP direction
		When a vibration level of >19 mils is confirmed:
		  • Reduce the speed of both Recirc M-G sets to maintain vibration <19 mils.
		  • If unable to reduce vibration to < 19 mils, reduce the A Recirc speed to minimum.
		  • Trip the A RECIRC MG SET MOTOR BREAKER 1A104 (HS at 1C04)

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Event #2 (cont)	**ROLE PLAY:** If asked following the pump trip, Fan 1V-SF-12 is RUNNING with the hand switch HS-6534B in AUTO
	
	ROLE PLAY: If the crew allows the pump to trip, when asked about relays state that the drive motor overload has picked up.
		RO (cont)
		
		For the Recirc Pump that tripped, perform the following:
		• Verify open A[B] RECIRC PUMP DISCH BYP valve MO-4629
		• Close MO-4627
		• After 5 minutes, reopens “A” RECIRC PUMP DISCHARGE valve MO-4627
		• Controls reactor level and maintains in the Green Band (186” to 195”)
		• IAW AOP 255.2, Places one APRM recorder in each trip system to fast speed to monitor for APRM undamped oscillations greater than normal.
		
		BOP
		• IAW the ARP
		  • Checks computer points B079 (temperature) and B551
		  • Dispatches a field operator to local panel 1C466C to check vibration and temperature indication IAW ARP direction
		• Monitors BOP equipment

EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Event #3
 	
HPCI spurious start.
	Booth Instructor:
	
	When directed by examiner:
	
	INSERT EVENT TRIGGER 1
	
	This starts HPCI inadvertent start.
	
	Role Play:
	
	When contacted about the HPCI injection, report as the RE that you will investigate the issue.
	
	NOTE: Because HPCI is secured with an initiation signal sealed in 1C03C, D-11 may alarm on HPCI Vacuum Tank Hi Lvl.
	
	Role Play: When called as field operator, inform the crew that you will check out the Level 2 switches suspected of causing the HPCI spurious start. After two minutes, report that the level switches all indicate normally.
	
	NOTE: The E41A-K6 and K7 (initiation relays) have actuated (back panels).
	
	Role Play: When called as Duty Manager, inform the crew that you will get a team to investigate the issue.
		CREW
		
		Recognizes spurious start of HPCI
		
		SRO
		
		• Directs tripping HPCI after verifying that HPCI operation is no longer required by assuring that by 2 independent indications adequate core cooling is assured (OI 152, Section 7.3)
		• Enters AOP 255.2 Power/Reactivity Abnormal Change
		• Contacts Reactor Engineering, Duty Manager
		• Enters TS 3.5.1.F.1 and 2. - verify RCIC is operable and enter 14 day LCO to return HPCI to operability
		• Conducts Crew Brief once conditions are stable
		
		BOP
		
		• Refers to OI 152 QRC 2 to trip HPCI:
		  • Depresses and hold HS-2259, Remote Turbine trip PB
		  • Verify HV 2201, HPCI Turbine Stop Valve, closes
		  • When HPCI speed is zero rpm, place 1P-218, Aux Oil Pump, in Pull-To-Lock
		  • Verify HV-2200, HPCI Turbine Control Valve , closes
		  • Verify annunciator 1C03C (A6) is activated.
		  • Release HS-2259, HPCI Remote Turbine trip PB
		
		RO
		
		• Continues to monitor reactor power, pressure and level
		• May need to control level adjusting level setpoint

EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
~~**Event #4**~~ ~~Power Reduction with control rods~~	~~**ROLE PLAY:** Call in to the control room as the reactor engineer and state that a power reduction is required due to the previous two events.~~ ~~You've been monitoring the core and the margin to thermal limits is now very slim. In order to avoid TS actions, it is now required to reduce power by inserting rods 2 steps using a reverse sequence in the pull sheet. DO NOT change recirc flow.~~ ~~We will monitor the thermal limits and let you know if a further reduction is necessary~~ ~~**NOTE:** The request may need to be emphasized if the crew has an extended reactivity brief~~	~~**SRO**~~ ~~• Provides a reactivity brief~~ ~~• Communicates with Real Time Desk.~~ ~~• Provide direct oversight of power decrease.~~ ~~**RO**~~ ~~• Lowers power as directed by SRO using RE guidance – reverse pull sheet sequence~~ ~~• Monitors critical plant parameters – power, pressure, level~~ ~~**BOP**~~ ~~• Monitors balance of plant equipment.~~ ~~• Provides peer check for RO during power increase.~~
~~**EXAMINER NOTE: Continue to next event at examiners direction**~~		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event #5 Steam leak in primary containment requires venting the drywell	**Booth Instructor:** respond as plant personnel and respond as necessary: When directed by examiner: **INSERT EVENT TRIGGER 3** This inserts a small steam leak into the DW. Verify that **Event Trigger 27** (**DMF MS02**) goes true when DW/P reaches 1.5 psig. **Role Play:** Acknowledge request by control room to check areas for leaks due to control room annunciator 1C-35A C4" DW/TORUS 1C-219A GAS/PART/IODINE HI RAD OR DNSCL" After 5 minutes, report back that you have observed no apparent reason for the alarm **BOOTH INSRUCTOR:** Re-Insert MS02 @ 0.1 if pressure is lowering before venting. May change in 0.1 increments if necessary. **When venting starts,** Re-insert MS02 @ 0.1	**Crew** Recognizes Drywell pressure is increasing. **SRO** • Enters AOP-573 and direct crew actions to vent the primary containment to maintain 1 to 1.5 psig. • Contacts the Duty Manager. **BOP** • Starts SBGT per the QRC (OR OI 170) **IMMEDIATE ACTIONS** • **Start SBGT Train A[B]** using one of the following methods: o If using the test pushbuttons, **depress PB-5831A[B]**, SBGT Train A[B] Test Pushbutton. o If initiating a secondary containment isolation, proceed as follows**:** • **Momentarily depress** PB-7606A[B] A[B] Group 3 Initiation pushbutton. • **Verify** Lockout Relay **L/R-5830A[B]** is TRIPPED. • **Verify AV-5801A[B]**, Cooldown/ Outside Air Valve, is **CLOSED**. • **Verify AV-5825A[B]**, Intake Valve, is **OPEN**. • **Confirm EC-5805A[B]**, Constant Heater, is **ON** when >2400 scfm. • **Confirm TDIC-5805A[B]**, Variable Heater ΔT Controller, is controlling at approximately **16°ΔT**. • **Verify AV-5815A[B]**, Fan Inlet Valve, is **OPEN**. • **Verify 1V-EF-15A[B]**, Exhaust Fan, is **RUNNING**. • **Verify AV-5817A[B]**, Discharge Valve, is **OPEN**. • **Position switches at 1C03 as follows:** **Switch** / **Description** / **Position** **HS-4303** / **Outbd Drywell Vent Isol CV-4303** / **Auto Open** **HS-4310** / **Inbd DW Vent Bypass Isol CV-4310** / **Auto Open** • **NOTE: May open CV-4302 to augment the venting**
EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Event #6
 	
125VDC Div1 Panel 1D11 trips
	Booth Instructor: respond as plant personnel and respond as necessary:
	
	When directed by examiner:
	
	INSERT EVENT TRIGGER 7
	
	This inserts a fault to trip 1D11
	
	BOOTH INSTRUCTOR:
	
	If level increases to a scram, then set Event Trigger 9 to TRUE and move to next event.
	
	NOTE: If the RO does not place the level controller to "A" a scram will occur.
	
	ROLE PLAY: If asked as field operator to investigate issue, report after 2 minutes that 1D10 CKT 6 has tripped free and there is no sign of smoke or fire at the breaker.
		CREW
		
		Responds to Numerous Annunciators including 1C08A D-9 A DG Control Power Failure
		
		SRO
		
		• Enters AOP 302.1–Loss of 125 VDC Power, Tab 1–Loss of 125vdc Div 1
		• May direct, as time permits, the RO to transfer to "A" level control to control reactor level and try to maintain normal band.
		• Enters TS LCO 3.8.7.B – 8 Hr LCO (1D11)
		• Directs transferring non-essential power to the startup transformer.
		
		RO
		
		• Takes manual control of FW and attempts to restore reactor water level to the normal band.
		• Place the "A" level controller in service with handswitch
		
		BOP
		
		• Monitors BOP Equipment
		• Transfers non-essential power to the startup transformer per OI 304.1, section 4.2. as follows.
		  • Place the BUS 1A2 TRANSFER breaker mode selector switch in the MANUAL position.
		  • Select Phase 1 with the BUS 1A2 STARTUP XFMR AMPERES meter switch and observe the ammeter reading. Select Phase 1 with the BUS 1A2 AUX XFMR AMPERES meter switch.
		  • Place the control switch 4KV BREAKER 1A202 STARTUP XFMR TO BUS 1A2 momentarily in the CLOSE position. Observe that the red (breaker closed) and the white (closing spring charged) indicating lights are ON

EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event #7 & #8 "B" Recirc HI Vibration, Pump Trip, Reactor Scram, Hydraulic ATWS, Small LOCA, All RHR pumps fail to start on LO-LO-LO level signal	**Booth Instructor:** When directed by examiner: **INSERT EVENT TRIGGER 9** This inserts a high vibrations on B Recirc pump **Role Play:** When asked as field operator to check out problem with "A" recirc pump. Report back after 2 minutes that a DANGER vibration alarm is lit on the **IN-LINE** monitor and the reading is 20 mils. **NOTE:** If the plant scrams on level, from previous event, the actions listed for the recirc pump vibrations do not apply **Role Play:** After request to install Defeat 12, wait approximately 2 minutes and inform control room that it is installed. **Use Trigger 13** **NOTE:** SBLC will fail to start and inject	**CREW** Responds to "B" Recirc Pump Hi vibrations ANN: 1C04B (B-1) "B" Recirc Pump Motor High Vibration **SRO** • Directs ARP actions to address "B" Recirc Pump Hi Vibration • Directs Reactor Scram prior to manually tripping 'B' Recirc Pump due to increasing "B" Recirc Pump Hi Vibration • <u>If "B" Recirc Pump has automatically tripped, recognizes operating in natural circulation and directs Reactor Scram</u> • Enters EOP 1 then transitions to EOP ATWS when informed not all rods are FULL In • Directs Lockout of ADS • Directs Defeat 15 – allows MSIVs to remain open on lo-lo-lo level • Directs Initiation of ARI • **Directs Condensate and Feed injection be terminated and prevented & Verifies that HPCI is Locked Out (from previous event) (CRITICAL TASK #1)** • Directs Defeat 12 – allows scram/reset/scram actions to insert control rods by resetting the ARI solenoids • Directs Start of Standby Liquid Control **NOTE: SBLC will fail to inject** • Direct installation of Defeat 11 • Directs a level band per ATWS EOP • **Directs performance of Hydraulic ATWS RIPs** **(CRITICAL TASK #2 – this must be directed to enable the RO to insert rods)** • When turbine trips, directs sending field operator to open field breaker (will not trip due to 125 VDC issue)

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

	BOOTH INSTRUCTOR:
	After the first scram for hydraulic RIPs:
	INSERT EVENT TRIGGER 11
	This inserts a small steam leak in the containment.
		RO
		• IAW the ARP for Recirc Pump High Vibration
		  • Checks computer points B079 (temperature) and B551
		  • Dispatches a field operator to local panel 1C466C to check vibration indication IAW ARP direction
		• When a vibration level of >19 mils is confirmed
		  • Reduce the speed of both Recirc M-G sets to maintain vibration <19 mils.
		  • If unable to reduce vibration to < 19 mils, reduce the A Recirc speed to minimum.
		  • Trips the A RECIRC MG SET MOTOR BREAKER 1A104.
		• As directed, inserts manual scram with PBs
		• Places mode switch in shutdown
		• Recognizes not all rods are in and informs SRO of Hydraulic ATWS
		• Initiates ARI
		• Takes actions to insert control rods
		• Starts Standby Liquid Control
		NOTE: SBLC will fail to inject
		• **Terminates and prevents Feedwater and Condensate injection by placing FRV controllers to manual and dialed down. (CRITICAL TASK #1)**
		• Takes actions to insert control rods
		
		BOP
		• Locks out ADS
		• If asked, verifies HPCI is locked out
		• Install Defeat 15
		• Installs Defeat 12
		• Installs Defeat 11
		• **Performs Hydraulic ATWS RIPs (CRITICAL TASK #2 – Must be performed to enable RO to insert control rods)**

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
	Examiner Note: The drywell leak will increase creating containment issues. These steps address the crew response actions **Booth Instructor:** **When** the crew resets RPS for the third scram attempt (for the scram-reset-scram RIP), **THEN** DMF RP05F. This will allow the rods to insert when the third scram is put in.	**CREW** Recognizes rising drywell pressure/temperature Recognizes failure of RHR pumps to auto start on RPV Lo-Lo-Lo Level **SRO** • Enters EOP 2 on high drywell pressure OR High Torus Level • When informed that all rods are full in, Exits EOP ATWS • Re-enters EOP-1, then directs RPV level band of 170" to 211" • Directs Torus Spray when Containment Pressure is >2.0 psig **Directs Drywell Spray when Torus Pressure is > 11.0 psig OR before Drywell temperature reaches 280 degrees (CRITICAL TASK #3)** **RO** **Performs scram-reset-scram to insert control rods** **Informs SRO when all rods are in (CRITICAL TASK #2)** Restores RPV level to a band of 170" to 211"

		BOP
		• Starts all RHR pump which had failed to auto start on Lo-Lo-Lo RPV level
		• Sprays the torus when directed
		  • Places Containment Spray Enable Switch HS-2001C[1903C] in the MAN position
		  • Places keylock HS-2005[HS-1932] Outboard Torus Cooling/Spray Valve Handswitch in OPEN and verify MO-2005[MO-1932] opening.
		  • Throttles open MO-2006[MO-1933], Torus spray Valve.
		
		• **Sprays the Drywell when directed (CRITICAL TASK #3)**
		  • Opens MO-2000[MO-1902], Inboard Drywell Spray Valve.
		  • Throttles open MO-2001[MO-1903], Outboard Drywell Spray

	Scenario Termination Criteria	**All Control Rods inserted, DW spray in service, RPV level restored to 170" - 211"**

***** END OF SCENARIO *****

SEG Validation Checklist

2009 NRC Exam Scenario #2

THIS SECTION IS ONLY REQUIRED FOR EVALUATED SCENARIOS.

- ☐ Correct IC or plant status identified.
- ☐ Shift turnover forms filled out (both CRS/OSM and NSOE) if required.
- ☐ Additional documents are prepared (STPs, Work Orders, LCO Paperwork).
- ☐ Tasks and Objectives have been verified to be correct.
- ☐ Plant PRA initiating events, important equipment and important tasks are identified.
- ☐ SOMS tags identified and included in setup instructions.
- ☐ Special setup instructions identified; handswitch manipulations, procedure markups, alarm borders, 3D case available, computer points substituted, etc.
- ☐ Setup files correctly called out.
- ☐ Malfunction list is accurate.
- ☐ Override list is accurate.
- ☐ Remote function list is accurate.
- ☐ Event triggers are accurate.
- ☐ Time/Notes section is accurate and includes all reasonable cues that may be given to initiate an action. Cues are unambiguous and provide a definitive moment to take action.

Instructor Activity section is accurate and complete:

- ☐ Actions are clearly defined for Booth or Floor instructor.
- ☐ Role-playing is clearly noted.
- ☐ The sequence of events is completely and concisely narrated even if it takes no instructor action.
- ☐ Automatic actions that require verification are noted.
- ☐ Reasonable alternate paths are considered and included.
- ☐ Event trigger activation is distinguished from narrative text (**Bold font**)
- ☐ Noun descriptions of actions that occur on event trigger initiation are complete, for example "…set **ET 3** to **TRUE** which activates malfunction **SW21C** resulting in a loss of the C Well Water Pump."
- ☐ Other simulator control actions are clearly distinguished from narrative text, for example "…after drywell temperature reaches 280 deg. F **SNAP** the simulator to **IC 0**."
- ☐ Student and Instructor copies of worksheets or other training activities are verified correct and electronically attached to the file if appropriate.

SEG Validation Checklist

2009 NRC Exam Scenario #2

Expected Student Response Section is accurate and complete:

- ☐ Critical tasks are accurate and clearly identified. Probable critical tasks are also listed with logical connection to the scenario; for example "If the crew fails to get all the rods inserted before ED the critical task becomes…" (N/A as appropriate)
- ☐ Tasks are clearly noted and properly numbered as appropriate.
- ☐ Knowledge objectives are clearly noted and properly numbered as appropriate.
- ☐ Expected as well as probable student responses are listed with logical connection to the scenario. (N/A as appropriate)
- ☐ Actions are appropriately delineated by position(s); OSM, CRS, STA, RO, NSOE, Fire Brigade Leader, At the Controls Operator, etcetera. (N/A as appropriate)
- ☐ Success paths are procedurally driven unless specific training not requiring procedures is desired and delineated. Procedural discrepancies are identified and corrected before training is given.
- ☐ Responses for all communications to simulated personnel outside the Control Room are included, based on procedural guidance and standard operating practices.
- ☐ Actions are listed using a logical order; by position and chronology. (N/A as appropriate)
- ☐ Operating Experience, Human Performance Tools and Operator Fundamentals topics are included when appropriate.
- ☐ Crew Performance Criteria follow the same chronology as the student responses, are complete and accurate. (For ESGs only)
- ☐ For Walkthrough and Training Mode Scenarios with pre-planned pauses, sufficient information is presented to allow the instructor to meet the goal of the training.

Turnover information (as required) is correct:

- ☐ Day and shift are appropriate.
- ☐ Weather conditions do not conflict with malfunctions.
- ☐ Power levels are correct.
- ☐ Thermal limit problems and power evolutions are realistic and include a reason for any downpower.
- ☐ Existing LCOs include start date, remaining time and actions.
- ☐ Plant Risk Assessment (CDF and Color).
- ☐ STPs are appropriate for day and shift.
- ☐ Core Damage Frequency has been properly calculated and listed to 3 decimal places.
- ☐ Maintenance is realistic for plant conditions.
- ☐ Comments, evolutions, problems, etc, includes extra personnel (licensed/non-licensed if necessary), any condition that affects the flow of the scenario and any condition that does not fit in another category.

SME/Instructor	Date
SME/Instructor	Date

SEG Validation Checklist

2009 NRC Exam Scenario #2

Crew:		Instructors:	
OSM	_____	Booth	_____
CRS	_____	Floor	_____
STA	_____	Extra	_____
1C05	_____		
1C03	_____		
BOP	_____		

Crew Comment:

_____

_____

_____

Resolution:

_____

_____

_____

Crew Comment:

_____

_____

_____

Resolution:

_____

_____

_____

NOTE: Following approval of SEGs, this page may be discarded.

SEG Validation Checklist

2009 NRC Exam Scenario #2

Crew Comment:

Resolution:

Crew Comment:

Resolution:

Crew Comment:

Resolution:

NOTE: Following approval of SEGs, this page may be discarded.

Facility:	DAEC	Scenario No.:	3	Op Test No.:	2009-01
Examiners:		Operators:			

Initial Conditions:

- Startup in progress, reactor power is about 4%
- "D" IRM is bypassed
- RWM is bypassed

Turnover:

- Continue the startup IAW IPOI 2 until one bypass valve is at least 40% open
- Perform RCIC System STP 3.5.3-06 – Post Startup Operability Test
  - The test is complete through Step 7.1.5
  - The walkdown inspection criteria of NS500002 has been completed for the current cycle.
- "D" IRM is bypassed due to welding in the vicinity of the "D" IRM preamp
- RWM is inoperable, TS 3.3.2.1 Condition C was entered and Required Actions C.2.1.1 and C.2.2 are met. STP 3.3.2.1-04 is being performed by a qualified STA.

Critical Tasks:

1. Manually scram the reactor due to lowering Torus level IAW EOP 2
2. ED due to low Torus level and ensure 4 SRVs are open

Event No.	Malf. No.	Event Type*	Event Description
1	NA	R – RO R - SRO	Continue startup

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

Event No.	Malf. No.	Event Type*	Event Description
2	RD03	C – RO C - SRO TS - SRO	A Control Rod in step 23 will uncouple and over-travel out. The RO successfully recouples the rod The SRO will address TS 3.1.3 Condition C – until recoupled
3	NA	N – BOP N - SRO	Perform RCIC System STP 3.5.3-06 – Post Startup Operability Test
4	MS29B	C – BOP C – SRO TS - SRO	RCIC isolation signal. Fails to auto isolate. The SRO will address TS 3.6.1.3 Condition A – PCIS and TS 3.5.3 Condition A – RCIC
5	NM04B	I – RO I – SRO TS - SRO	"B" IRM fails upscale. The RO will be required to contact I & C, unbypass "D" IRM, bypass "B" IRM and reset the half scram. The SRO will address TS 3.3.1.1 Condition A for 2 IRMs Inop until only 1 is bypassed
6	ED08A	C – ALL TS - SRO	Bus 1A1 lockout trip TS 3.4.1 Condition D
7	PC14	M - ALL	An unisolable Torus Leak develops Field operators to check areas for the leak, and may fill torus with Core Spray and/or HPCI
8	AD HS-4405	C – BOP C - SRO	One SRV fails to open during the ED. The BOP must open a LLS SRV to meet ED criteria
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

DAEC 2009 NRC Scenario #3

A reactor startup is in progress with power at about 4%. The crew will continue the startup. Then, a control rod overtravel will occur when it is withdrawn to 48. The RO successfully recouples the rod IAW the AOP. The startup continues and when one bypass valve is open >40% the crew perform RCIC System STP 3.5.3-06 – Post Startup Operability Test.

Following the completion of the test indications of a RCIC Steam Line break will occur and RCIC will fail to auto isolate as required. The BOP must isolate RCIC. The SRO will address TS. The startup will then continue.

While moving control rods “B” IRM fails upscale resulting in a half scram. The SRO will contact maintenance to determine status of work in the area of the D IRM and when informed of work completion will unbypass the “D” IRM. Once that occurs, the RO will bypass “B” IRM and reset the half scram. The SRO will address TS 3.8.1.1 Condition A for 2 IRMs Inop until only 1 IRM remains bypassed.

After the IRM TS are addressed, a lockout trip will occur on the 1A1 4KV Bus. The crew will take remedial actions IAW the AOP.

The Torus will then develop an unisolable leak. As torus level lowers the crew will attempt to make up torus level but will be unsuccessful and a manual scram will be required (**CRITICAL TASK**). An Emergency Depressurization will then be required and one ADS SRV will fail to open requiring an LLS SRV to be opened (**CRITICAL TASK**).

The scenario may be terminated after the ED is performed and RPV level is returning to the normal band.

	EXAMINATION SCENARIO GUIDE (ESG)

SITE: DAEC

CONTINUE STARUP FROM 4% POWER, CONTROL ROD OVERTRAVEL, RCIC SYSTEM STP, RCIC ISOLATION FAILURE, IRM UPSCALE TRIP, BUS 1A1 LOCKOUT TRIP, TORUS LEAK, MANUAL SCRAM, ED, ONE ADS SRV FAILS	ESG ILT 09-03	REV 0

PROGRAM: OPERATIONS **#:**

COURSE: INITIAL LICENSED OPERATOR **#:** 50007

TOTAL TIME: 90 MINUTES

Developed by:		
	Instructor	*Date*
Validated by:		
	SME/Instructor	*Date*
Reviewed by:		
	Operations Manager	*Date*
Approved by:		
	Training Supervisor-Operations	*Date*

GUIDE REQUIREMENTS

Goal of Training:	The goal of this scenario is to evaluate ILT students during the NRC Exam with 3 man crew.
Learning Objectives:	There are no formal learning objectives
Prerequisites:	None
Training Resources:	Simulator Simulator Booth Instructor Phone Talker Simulator Floor Instructor
References:	IPOI 2, Startup, Rev 111
Commitments:	None
Evaluation Method:	Dynamic Simulator
Operating Experience:	None
Related PRA Information:	**Initiating Event with Core Damage Frequency:** N/A due to exam security **Important Components:** N/A due to exam security **Important Operator Actions with Task Number:** N/A due to exam security

SCENARIO SUMMARY:

A reactor startup is in progress with power at about 4%. The crew will continue the startup. Then, a control rod overtravel will occur when it is withdrawn to 48. The RO successfully recouples the rod IAW the AOP. The startup continues and when one bypass valve is open >40% the crew perform RCIC System STP 3.5.3-06 – Post Startup Operability Test.

Following the completion of the test, indications of a RCIC Steam Line break will occur and RCIC will fail to auto isolate as required. The BOP must isolate RCIC. The SRO will address Technical Specifications. The startup will then continue.

While moving control rods “B” IRM fails upscale resulting in a half scram. The SRO will contact maintenance to determine status of work in the area of the D IRM and when informed of work completion will un-bypass the “D” IRM. Once that occurs, the RO will bypass “B” IRM and reset the half scram. The SRO will address TS 3.8.1.1 Condition A for 2 IRMs INOP until only 1 IRM remains bypassed.

After the IRM Technical Specifications are addressed, a lockout trip will occur on the 1A1 4KV Bus. The crew will take remedial actions IAW the AOP.

The Torus will then develop an unisolable leak. As torus level lowers the crew will attempt to make up torus level but will be unsuccessful and a manual scram will be required (**CRITICAL TASK**). An Emergency Depressurization will then be required and one ADS SRV will fail to open requiring an LLS SRV to be opened (**CRITICAL TASK**).

The scenario may be terminated after the ED is performed and RPV level is returning to the normal band.

SCENARIO OUTLINE:

BOOTH INSTRUCTOR ACTIONS

1 SIMULATOR SET UP: (perform set up per the "Simulator Setup Checklist", including entering actions items per the "Simulator Input Summary.")

Start Sim View / Data Capture Program.

1.1 General Instructions

a. Restore the IC for ILT Scenario 3 (N-3) from the "Thumb Drive" that it is stored on. This Thumb Drive also has the malfunction and override files on it.
   a) Log onto one of the Computer Terminals using the logon from Lowell
   b) If the malfunction file is the "exam" file, go to c), otherwise:
      (1) With a file manager, go to the \\greg\c$\opensim directory, and copy the "Malfunc-New.dat" file into that directory.
      (2) Rename the "Malfunc.dat" file to "Malfunc-OLD.dat"
      (3) Rename the "Malfunc-NEW.dat" file to "Malfunc.dat"
   c) Make a copy of the exam scenario IC file and rename it as "d_ic.000"
   d) Copy the IC file from the thumb drive to the \\greg\ryandev\ops\ic directory. This makes the exam IC number 000.
   e) Reset to IC 000.
      (1) Verify Malfunctions
      (2) Verify Overrides
      (3) Verify Remote functions
      (4) Verify event trigger definitions and accept all triggers

b. If the thumbdrive is not available, then reset to IC 11 and set the Malfunctions and overrides as per the tables below.
c. Verify strip chart recorders are ON. If not perform 4.4.4 of OI 831.4 (PPC)
d. Ensure pressure set is set at greater than or equal to 940 (needed for STP)
e. Provide marked up copy of STP 3.5.3-06 ready to perform marked through step 7.1.5. Also complete Section 7.1.26.
f. Verify Pull Sheet setup shows current step and rod position (Step 23 @ 46)
g. Provide marked up copy of IPOI 2 marked up TO Step 4.3(11)(b)
h. Have copy of STP 3.4.02, Single Loop Operation, ready in case they ask for it at Event 6
i. Place maintenance border for 'D' IRM Bypass switch and place 'D' IRM in bypass
j. Place RWM in bypass
k. Verify that the APRM recorders are on IRM range, and 1 recorder on each side in fast.
l. Markup AOP 903 to have all actions done, waiting for the severe weather to either be upgraded or downgraded by the NWS.
m. Have SPMET1 on the far PPC terminal.

1.2 EVENT TRIGGER DEFINITIONS:

Trigger No.	Trigger Logic Statement	Trigger Word Description
11	ZAOFWPI4564 .LE. 0.45	Indicated RPV pressure less than ~500 psig
1	ycab160 .ge. 400	RCIC Flow >400 gpm

1.3 MALFUNCTIONS:

Time	Malf. No.	Malfunction Title	Delay	Ramp	ET	Initial Value	Final Value
Setup	RD031803	Control Rod Uncoupled-Rod 18-03				TRUE	TRUE
Setup	MS31A	Group 6 Isolation Valve(s) Fail(s) To Close - MO2400				TRUE	TRUE
Setup	MS31B	Group 6 Isolation Valve(s) Fail(s) To Close - MO2401				TRUE	TRUE
As Dir	RC06	RCIC Steam Supply Line Break (RCIC Room)	45 secs		1	0	100
As Dir	NM04B	IRM Channel Fails-CHNL B			3	AS IS	100
As Dir	ED08A	4.16kv/480V Bus Fault-Bus1A1			7	FALSE	TRUE
As Dir	PC14	Primary Containment Torus Leakage		900	9	0	100
As Dir	TC02B	B EHC Pump Trip			11	FALSE	TRUE

OVERRIDES:

Time	Override No.	Override Title	Delay	Ramp	ET	Initial Value	Final Value
SETUP	AD HS-4405	ADS PSV4405,C MSL,1140 PSI (Auto, Open)				AUTO	AUTO

1.5 REMOTE FUNCTIONS:

Time	Remote No.	Remote Title	Delay	Ramp	ET	Initial Value	Final Value
	CS01	A Core Spray CST Suction Valve V-21-01		180	20	0	20
	CS02	B Core Spray CST Suction Valve V-21-02		180	22	0	20

FLOOR INSTRUCTOR ACTIONS

2 Simulator Pre-brief:

2.1 Individual position assignments

2.2 Simulator training changes since last module (N/A)

2.3 Simulator hardware and software modifications/problems that may impact training

TURNOVER INFORMATION

⇒ Day of week and shift
- ♦ Today
- ♦ Day Shift

⇒ Weather conditions
- ♦ Hot, Humid
- ♦ A Severe Thunderstorm Watch is in effect for the next 3 1/2 hours. AOP actions are complete.

⇒ (Plant power levels) 4%
- ♦ MWT 90.5
- ♦ MWE 0
- ♦ CORE FLOW 12.5

⇒ Thermal Limit Problems/Power Evolutions

⇒ Plant Risk Status
- ♦ CDF Baseline
- ♦ Color Green

⇒ Existing LCOs, date of next surveillance:
- ♦ 3.3.2.1 Condition C – Required Action C.2.1.1 is met AND Required Action C.2.2 is met by performing STP 3.3.2.1-04
- ♦ 3.5.1 Condition B – Required Action B.1, Day 1 of 7

⇒ STPs in progress or major maintenance
- ♦ RCIC System STP 3.5.3-06 – Post Startup Operability Test – complete through step 7.1.5
- ♦ RWM STP 3.3.2.1-04 Control Rod Movement Verification being performed by an additional STA.

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment
- ♦ "D" IRM is bypassed due welding in the Reactor Building in the vicinity of the preamp. WCC will inform you when the work is complete.

⇒ Comments, evolutions, problems, core damage frequency, etc.
- ♦ The plant is operating at approximately 4% power
- ♦ An additional STA is performing STP 3.3.2.1-04 Control Rod Movement Verification
- ♦ Perform RCIC System STP 3.5.3-06 – Post Startup Operability Test:
  - The test is complete through step 7.1.5 and Step 7.1.26 is also complete and needs to be performed as soon as the bypass valve is opened greater than 40%
  - The walkdown inspection criteria of NS 500002 has been completed for the current cycle
  - An extra operator will perform the STP to monitor Torus temperature during the RCIC run and will notify the control room of any temperature issue.
- ♦ Torus Cooling is in service to support the RCIC run; the risk evaluation for going to run with Torus Cooling in service is complete and approved.
- ♦ IPOI 2 is in progress at step 4.3(11)(b)
- ♦ Continue the startup

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Shift Turnover	COMPLETE TURNOVER: • Provide Shift Turnovers to the **SRO** and **RO**s. a. Review applicable current Plant Status b. Review relevant At-Power Risk status c. Review current LCOs not met and Action Requirements d. Verify crew performs walk down of control boards and reviews turnover checklists	Get familiar with plant conditions. • **SRO** will provide beginning of shift brief to coordinate the tasks that were identified on the shift turnover.

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event #1 Continue the startup	**Booth Instructor** respond as plant personnel and respond as necessary:	**SRO** Directs Operators to increase power IAW IPOI and RE guidance **RO** Continues control rod withdrawal while monitoring critical plant parameters **BOP** Monitors balance of plant equipment/plant status
EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event #2 Control Rod 18-03 overtravel out	**Booth Instructor:** respond as plant personnel and respond as necessary: **Booth Instructor:** When the operator positions rod to 46, THEN **DMF RD031803** **Role Play:** As RE, request that the control room attempt to recouple rod Inform crew that the startup may continue once the rod is recoupled. **Evaluator Note:** After rod recoupled, control rod motion will continue until #1 Bypass valve is >40% open	**CREW** Responds to Annunciators 1C-05 D6- Rod Drift & D7 – Rod 18-03 Overtravel **SRO** • Directs response IAW the ARP • Refers to TS 3.1.3.C - Technical Specifications for Control Rod Operability require that an uncoupled Control Rod be fully inserted within 3 hours and disarmed within 4 hours. If this cannot be accomplished, the Reactor shall be in Mode 3 in the following 12 hours. • Notifies RE & Duty Manager **RO** Takes the following actions IAW the ARP: <u>If Rod is uncoupled, attempt to recouple the rod.</u> • Insert the associated CRD to Position 46 or as directed by the CRS and Reactor Engineer. • Verify Rod Overtravel Out, 1C05A, D-7 alarm clears. • Take the Rod Drift Alarm Reset/Test handswitch to Reset. • Verify Rod Drift, 1C05A, D-6 alarm clears. • Withdraw the associated CRD to Position 48. • If the associated CRD remains coupled, give the associated CRD a withdraw signal and observe the CRD remains at position 48 and does not overtravel. <u>If the control rod recouples:</u> • Contact the Reactor Engineer. • If in Mode 1 or 2, perform a coupling check and log the results. • Inform the CRS that the rod is re-coupled **BOP** Performs peer check of RO actions.
EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event #3 Perform RCIC System STP 3.5.3-06 – Post Startup Operability Test	**Booth Instructor** respond as plant personnel and respond as necessary: **NOTE:** Provide copy of STP completed through step 7.1.5 **ROLE PLAY:** As HP, inform control room you are standing by for RCIC run.	**SRO** • Directs continuation of RCIC System STP 3.5.3-06 – Post Startup Operability Test • Enters TS 3.5.3 Condition A @ STP step 5.1.18 **RO** • Monitors critical parameters – reactor power, pressure, level • Peer checker for BOP operator **BOP** Notifies HPs of RCIC run. Continues RCIC STP at procedure step 7.1.6 as follows: 7.1.6 Verify TEST MODE TURBINE SPEED ADJUST is fully counterclockwise. 7.1.7 Verify handswitch AC POWER TO TURBINE SPEED TEST CKT is in OFF. 7.1.8 Verify the AC POWER TO TURBINE SPEED TEST CKT light is off. 7.1.9 Verify handswitch TURBINE SPEED TEST SELECT is in NORMAL. 7.1.10 Verify FLOW CONTROL FIC-2509 is set at 415 gpm. 7.1.11 Verify MO-2512 RCIC INJECT valve is closed. 7.1.12 Verify MO-2511 PUMP DISCHARGE valve is open. 7.1.13 At 1C03, verify open REDUNDANT SHUTOFF MO-2316. NOTE: Located on HPCI Panel Section 7.1.14 Open MO-2426 LUBE OIL COOLER SUPPLY valve.

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event 3 - continued		7.1.15 Perform the following: a. Place CV-2435 in the OPEN/AUTO-CL position and confirm valve indicates open. b. Start VACUUM PUMP 1P-227. 7.1.16 Commence monitoring Torus water level and temperature by performing STP 3.6.2.1-01 (Suppression Pool Water Temperature Surveillance), Section 7.1. **EXAMINER NOTE:** Operator may make page announcement to clear personnel from RCIC area and will inform CRS as required in next step that RCIC is now considered inoperable 7.1.17 Verify unnecessary/unauthorized personnel are clear of the RCIC Room (unless exempt per Step 2.1.9). 7.1.18 Performance of Step 7.1.19 makes the RCIC System inoperable. Ensure Steps 7.1.19 through 7.1.32 are completed within the time allowed by Prerequisite 6.2.1. Record the date and time below and inform the CRS of the start of the inoperability condition. Date / Time: _____ / _____ CAUTION Operation of the RCIC turbine below 2000 rpm should be minimized to avoid cycling the turbine exhaust check valve and to assure adequate turbine lube oil pressure. 7.1.19 Open TEST BYPASS MO-2515 to 44-46% open as indicated on ZI-2515 RCIC TEST BYP MO-2515 POSITION. a. Record RCIC Start Time: _____ 7.1.20 Open MO-2404 using handswitch MO2404 TURBINE STEAM SUPPLY.

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event 3 - continued	**BOOTH INSTRUCTOR:** NOTE: After RCIC is injecting > 400 gpm, and after a 45 second time delay, ensure: **EVENT TRIGGER 1 goes ACTIVE** This starts the RCIC steam line leak. Go to the next event for details.	7.1.21 Adjust MO-2515 until the following parameters are established: a. Pump flow is > 400 gpm as indicated on FI-2509 PUMP DISCHARGE FLOW b. Pump discharge pressure is > 1105 psig 7.1.22 Confirm the following: a. CV-2410, RCIC STEAM LINE DRAIN ISOL valve closes. b. CV-2411, RCIC STEAM LINE DRAIN ISOL valve closes. c. CV-2436, CLOSED RADWASTE DISCH ISOL valve closes. d. CV-2435, CLOSED RADWASTE DISCH ISOL valve closes. e. TURBINE CONTROL VALVE HV-2406 is throttling. 7.1.23 Record the following: a. PUMP DISCHARGE PRESS PI-2506 _____ psig b. PUMP DISCHARGE FLOW FI-2509 _____ gpm c. RCIC TURBINE SPEED SI-2457 _____ rpm d. RCIC TEST BYP MO-2515 POSITION ZI-2515 _____ % e. TURBINE EXHAUST PRESS PI-2423 _____ psig f. STEAM INLET PRESSURE PI-2403 _____ psig
EXAMINER NOTE: This event automatically transfers to the next event upon steam line leak.		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event #4 RCIC isolation signal. Fails to auto isolate.	**Booth Instructor:** respond as plant personnel and respond as necessary: **NOTE: This event was initiated during the previous event.** **Role Play:** When contacted as the Duty Manager, **ensure** the crew will continue the startup while the organization evaluates the extent of the damage to RCIC.	**CREW** Responds to Annunciators: 1C04C A5 – RCIC MO-2405 TURBINE TRIP 1C04C A7 – RCIC A LOGIC MAN/AUTO ISOL INITIATED 1C04C A8 – RCIC B LOGIC MAN/AUTO ISOL INITIATED **SRO** • Direct response IAW ARP • Directs verification of isolation • TS 3.6.1.3 Condition A – Isolate & Deactivate affected line within 4 hours • TS 3.5.3 Condition A – RCIC Inop – restore in 14 days and verify HPCI operable immediately • Contacts Duty Manager **RO** Monitors critical plant parameters **BOP** • Recognizes RCIC Trip • Diagnoses failure of MO-2400 and MO-2401 to isolate and manually closes at least one valve
EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Event #5 "B" IRM fails upscale.	**Booth Instructor:** respond as plant personnel and respond as necessary: When directed by the lead evaluator: **INSERT EVENT TRIGGER 3** This inserts the IRM B failure. **Role Play:** When contacted regarding welding status. Inform the control room that they completed the work 5 minutes ago. **Role Play**: As necessary for other notifications.	**CREW** Responds to Annunciators: 1C-05B B3 - IRM B, D, OR F UPSCALE TRIP OR INOP 1C-05B A2 - "B" RPS AUTO SCRAM **SRO** • Directs actions IAW the ARP • Enters TS 3.3.1.1 Condition A for 2 IRMs Inop • Contacts I&C to check status on IRM "D" • Directs un-bypassing IRM "D" • Direct bypassing IRM "B" • Direct reset of ½ scram • Exits TS once only 1 IRM is bypassed • Contacts Duty Manager/Maintenance to determine welding status **RO** • Reviews ARP actions • Unbypasses IRM "D" • Bypasses IRM "B" • Resets ½ Scram **BOP** • Monitors BOP equipment • Checks IRM back panel indication
EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Event #6
LOSS OF 4160V BUS 1A1
	Booth Instructor: respond as plant personnel and respond as necessary:
	When directed by the lead evaluator:
	INSERT EVENT TRIGGER 7
	This inserts the Bus 1A1 Lockout.
	
	Role Play: When contacted by MCR to investigate 1A1 loss, Report back in 5 minutes that the bus has a lockout and BKR 1A102 has an overcurrent flag
		CREW
		Responds to Annunciator
		1C08A A2 - BUS 1A1 LOCKOUT TRIP OR LOSS OF VOLTAGE
		SRO
		• Directs actions IAW ARP
		• Enters AOP 304.1 – Loss of Non essential Bus
		• May Enter AOP 264 – Loss of Recirc Pump
		• Contacts Duty Manager
		• Refers to TS 3.4.1 Condition D – single loop surveillance within 24 hours
		RO
		• Monitors critical plant parameters
		• Responds to the recirc Pump trip IAW AOP 264
		• For the Recirc Pump that tripped, performs the following:
		  • Verify open A[B] RECIRC PUMP DISCH BYP valve MO-4629[4630].
		  • Close A[B] RECIRC PUMP DISCHARGE valve MO-4627[4628].
		  • After 5 minutes, reopen A[B] RECIRC PUMP DISCHARGE valve MO-4627[4628] (unless the A[B] Pump has to be isolated).
		BOP
		For LOSS of 1A1 ONLY, perform the following:
		<u>Crosstie 1B1 and 1B2 by performing the following:</u>
		• Momentarily place control switch FEEDER BREAKER 1B101 XFMR 1X11 to LC 1B1 to the TRIP position.

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
	Booth Instructor: When the operator goes to the back panel to Start the Offgas Glycol Pump: **INSERT EVENT TRIGGER 9** This will initiate the Torus Leak. Details are in the next event.	**BOP (cont)** • Momentarily place control switch TIE BREAKER 1B107 LC 1B1/1B2 in the CLOSE position. <u>Crosstie 1B5 and 1B6 by performing the following:</u> • Momentarily place control switch FEEDER BREAKER 1B501 XFMR 1X51 to LC 1B5 to the TRIP position. • Momentarily place control switch TIE BREAKER 1B505 LC 1B5/1B6 in the CLOSE position. • Place BUS 1A1 TRANSFER switch in MANUAL. • Verify Offgas Closed Cooling Water Pump 1P-105A[B] in service. • Start Offgas Glycol Pump 1P-243A[B].
EXAMINER NOTE: Continue to next event at examiners direction		

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Events #7 & 8 Unisolable Torus leak, SRV fails to open	**Booth Instructor:** respond as plant personnel and respond as necessary: **Role Play:** When called by MCR to find out were the leak is, respond in 5 minutes that from the catwalk you've seen water on the floor of the west side of the Torus room but cannot determine where its coming from. You'll continue to check *NW corner room is B –CS (V-21-2)* *SE corner room is A – CS (V-21-1)* **Role Play:** When contacted by CR to perform OI 151 – Fill Torus with Core Spray, acknowledge request and report back in 5 minutes that Core Spray is aligned to fill the Torus. Use triggers to insert REMOTES: #20 = cs01 for A Core Spray #22 = cs02 for B Core Spray **Booth Instructor:** If Anticipate ED is directed, and RPV pressure drops to ~500 psig, Verify Event Trigger 11 goes active to trip "B" EHC pump	**CREW** Respond to annunciator 1C03B D9 – Torus Hi/Lo water level Diagnoses Torus Low level **SRO** • Directs actions IAW the ARP (ARP refers to EOP) • Enters EOP 2 – Primary Containment Control due to LOW Torus Level <10.1 feet • May direct raising Torus level with Core Spray IAW OI 151 and/or HPCI IAW OI 152 • Directs contacting field operator to check areas for leaks **When it is determined that Torus level cannot be maintained >7.1 feet, directs a manual scram and an EOP 1 entry** **(CRITICAL TASK #1)** • Directs maintaining RPV level between 170" and 211" • Directs a RPV pressure band to maintain • Enters EOP 3 – Secondary Containment – due to Torus Area level > Max Normal **Determines that Torus level is continuing to lower and BEFORE Torus level drops to 7.1 feet, Directs Emergency Depressurization. Open 4 SRVs** **(CRITICAL TASK #2)**

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE

Events #7 & 8 (cont.)		**RO**
		• Monitors critical plant parameters
		• As directed, **Inserts manual scram (CRITICAL TASK #1)**
		• Takes IPOI 5 “Reactor Scram” Actions
		• Initiates a backup manual reactor scram.
		• Place THE MODE SWITCH in the SHUTDOWN position.
		• Verify <u>all</u> control rods fully inserted by one or both of the following means:
		  • Verifies the Refuel One Rod Select Permissive:
		  o Position THE MODE SWITCH to REFUEL.
		  o Turn Rod Select Power off and then on.
		  o Verify the white Refuel Select Permissive light is lit.
		  o Return THE MODE SWITCH to SHUTDOWN.
		  • On the FULL CORE DISPLAY, verify the green FULL IN light for each rod is on.
		• Maintains RPV level as directed
		BOP
		  • Contacts field operators to check for leaks
		  • Monitors reactor pressure and maintains in the band directed by the SRO
		  • If directed, attempts to makeup Torus level with HPCI IAW OI 152 Section 12.1 as follows:
		  • Verify the CST has at least 75,000 gallons of water available for use by the HPCI and RCIC Systems on demand. This corresponds to approximately 9.5 ft. with one CST or 5.2 ft. with two CSTs.

SCENARIO TIMELINE

TIME/NOTES	INSTRUCTOR ACTIVITY	EXPECTED STUDENT RESPONSE
Events #7 & 8 (cont.)		**BOP (Cont)** • With HS-2318A in the OVERRIDE position, HPCI shall be considered inoperable and the requirements of Technical Specifications complied with. • Position HS-2318A EMERGENCY TORUS FILL PERMISSIVE on 1C03 to OVERRIDE. • Open MO-2318 MIN FLOW BYPASS valve with HS-2318 on 1C03. • Observe Torus level, UR-4325 at 1C03. • Observe CST Levels LI-5216A and LI-5217A on 1C06 while draining CSTs. **When Directed attempts to open 4 ADS SRVs to emergency depressurize and recognizes that only 3 opened. Then takes action to open an additional LLS SRV** **(CRITICAL TASK #2)** • Informs SRO when 4 SRVs are open **RO** • Restore and maintain RPV level between 170” and 211”
	Scenario Termination Criteria	The scenario may be terminated after the ED is performed and RPV level is returning to the normal band

***** END OF SCENARIO *****

SEG Validation Checklist

SEG _____ 2009 NRC Exam Scenario #3_____ Rev. _____0_____

- ☐ Correct IC or plant status identified.
- ☐ Shift turnover forms filled out (both CRS/OSM and NSOE) if required.
- ☐ Additional documents are prepared (STPs, Work Orders, LCO Paperwork).
- ☐ Tasks and Objectives have been verified to be correct.
- ☐ Plant PRA initiating events, important equipment and important tasks are identified.
- ☐ SOMS tags identified and included in setup instructions.
- ☐ Special setup instructions identified; handswitch manipulations, procedure markups, alarm borders, 3D case available, computer points substituted, etc.
- ☐ Setup files correctly called out.
- ☐ Malfunction list is accurate.
- ☐ Override list is accurate.
- ☐ Remote function list is accurate.
- ☐ Event triggers are accurate.
- ☐ Time/Notes section is accurate and includes all reasonable cues that may be given to initiate an action. Cues are unambiguous and provide a definitive moment to take action.

Instructor Activity section is accurate and complete:

- ☐ Actions are clearly defined for Booth or Floor instructor.
- ☐ Role-playing is clearly noted.
- ☐ The sequence of events is completely and concisely narrated even if it takes no instructor action.
- ☐ Automatic actions that require verification are noted.
- ☐ Reasonable alternate paths are considered and included.
- ☐ Event trigger activation is distinguished from narrative text (**Bold font**)
- ☐ Noun descriptions of actions that occur on event trigger initiation are complete, for example "…set **ET 3** to **TRUE** which activates malfunction **SW21C** resulting in a loss of the C Well Water Pump."
- ☐ Other simulator control actions are clearly distinguished from narrative text, for example "…after drywell temperature reaches 280 deg. F **SNAP** the simulator to **IC 0**."
- ☐ Student and Instructor copies of worksheets or other training activities are verified correct and electronically attached to the file if appropriate.

SEG Validation Checklist

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Expected Student Response Section is accurate and complete:

- ☐ Critical tasks are accurate and clearly identified. Probable critical tasks are also listed with logical connection to the scenario; for example "If the crew fails to get all the rods inserted before ED the critical task becomes…" (N/A as appropriate)
- ☐ Tasks are clearly noted and properly numbered as appropriate.
- ☐ Knowledge objectives are clearly noted and properly numbered as appropriate.
- ☐ Expected as well as probable student responses are listed with logical connection to the scenario. (N/A as appropriate)
- ☐ Actions are appropriately delineated by position(s); OSM, CRS, STA, RO, NSOE, Fire Brigade Leader, At the Controls Operator, etcetera. (N/A as appropriate)
- ☐ Success paths are procedurally driven unless specific training not requiring procedures is desired and delineated. Procedural discrepancies are identified and corrected before training is given.
- ☐ Responses for all communications to simulated personnel outside the Control Room are included, based on procedural guidance and standard operating practices.
- ☐ Actions are listed using a logical order; by position and chronology. (N/A as appropriate)
- ☐ Operating Experience, Human Performance Tools and Operator Fundamentals topics are included when appropriate.
- ☐ Crew Performance Criteria follow the same chronology as the student responses, are complete and accurate. (For ESGs only)
- ☐ For Walkthrough and Training Mode Scenarios with pre-planned pauses, sufficient information is presented to allow the instructor to meet the goal of the training.

Turnover information (as required) is correct:

- ☐ Day and shift are appropriate.
- ☐ Weather conditions do not conflict with malfunctions.
- ☐ Power levels are correct.
- ☐ Thermal limit problems and power evolutions are realistic and include a reason for any downpower.
- ☐ Existing LCOs include start date, remaining time and actions.
- ☐ Plant Risk Assessment (CDF and Color).
- ☐ STPs are appropriate for day and shift.
- ☐ Core Damage Frequency has been properly calculated and listed to 3 decimal places.
- ☐ Maintenance is realistic for plant conditions.
- ☐ Comments, evolutions, problems, etc, includes extra personnel (licensed/non-licensed if necessary), any condition that affects the flow of the scenario and any condition that does not fit in another category.

SME/Instructor	Date
SME/Instructor	Date

SEG Validation Checklist

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Crew:		Instructors:	
OSM		Booth	
CRS		Floor	
STA		Extra	
1C05			
1C03			
BOP			

Crew Comment:

Resolution:

Crew Comment:

Resolution:

NOTE: Following approval of SEGs, this page may be discarded.

SEG Validation Checklist

SEG 2009 NRC Exam Scenario #3 **Rev. 0**

Crew Comment:

Resolution:

Crew Comment:

Resolution:

Crew Comment:

Resolution:

NOTE: Following approval of SEGs, this page may be discarded.