Facility: DAEC Scenario No.: 1 Op-Test No.: 2007-01

Examiners: _____ Operators: _____

**Initial Conditions:** The plant is operating at 57% power near the end of the current fuel cycle when the crew takes the shift. The plant was down in power due to a steam leak on the B Reactor Feed pump casing. Repairs are complete and all clearances have been cleared. The plant is in a normal configuration with "B" Well Pump I/S, "B" Side HWC OOS for troubleshooting by I&C and the "A" SBLC Pump out of service.

**Turnover:** The plant is operating at 57% power near the end of the current fuel cycle. The plant is in a normal configuration. The "B" Side Condensate and Feed Pump is to be placed back in service to support raising power per IPOI 3.

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1. | N/A | N-BOP<br>N -SRO | Startup second Condensate and Feed Pump IAW OI-644. |
| 2. | N/A | R-RO<br>R-SRO | Raise Power using Reactor Recirc. |
| 3. | rr17a | I-RO<br>I-SRO | "A" Reactor Recirc Pump speed controller fails upscale. |
| 4. | RC08 | C-BOP<br>C-SRO<br>(TS) | RCIC has a spurious start. The BOP trips RCIC and the SRO enters TS. |
| 5. | SW21b | C-BOP<br>C-SRO | The "B" Well Water pump trips. This will require the crew to enter AOP 408 for loss of well water. |
| 6. | Ed13a | C-RO<br>C-SRO<br>(TS) | 125 VDC Div I panel 1D11 trips. The SRO will declare Div 1-125 VDC distribution subsystem INOP IAW with Tech Specs. |
| 7. | ed01(a-e)<br>dg02b | M<br>(ALL) | Station Blackout and subsequent reactor scram. The "A" DG will not get a start signal due to the loss of 125 VDC (event 6). The "B" DG starts but fails to pick up the dead bus because of a breaker malfunction. |
| 8. | hp03 | C-RO | HPCI inverter failure; HPCI either starts automatically or is started by the crew, however HPCI must tripped |
| 9. | Rr15a | M<br>(ALL) | Leak in containment causes increasing drywell temperature and pressure resulting in EOP-2 entry. Loss of All Feed leads to Alternate Level Control in EOP-1; ED is required. |

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

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| | **EXAMINATION SCENARIO GUIDE (ESG)** |

SITE: DAEC

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| START 2ND CONDT & FW PUMPS, RAISE POWER, RR CONTROLLER FAILS UP, RCIC SPURIOUS START, B WW PUMP TRIP, LOSS OF 1D11, STATION BLACKOUT, HPCI INVERTER FAILS, LOCA/ALC ED, SBDG COMES BACK | ESG ILT 01 | REV. 0 |

PROGRAM: OPERATIONS #:

COURSE: INITIAL LICENSED OPERATOR #: 50007

TOTAL TIME: 120 MINUTES

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

# 4 TURNOVER INFORMATION

⇒ Day of week and shift

- Wednesday
- Day Shift

⇒ Weather conditions

- Hot
- Severe weather predicted later tonight

⇒ (Plant power levels) 58%

- MWT 1119
- MWE 349
- CORE FLOW 29.2

⇒ Thermal Limit Problems/Power Evolutions

- Startup the 2nd Condensate and Feedwater Pumps
- Once both condensate and feedwater pumps are running, continue to raise RR flow to reach 35 Mlbm flow, then hold for Xenon (per the REs).
- The Reactor Engineers informed us that we DON'T have to run a 3D case every 5%, we will run one once we reach 35 Mlbm.
- RE wants to use a slow ramp rate (2-3 MWe per minute)

⇒ Plant Risk Status

- CDF 2.09E-5
- Color Yellow

⇒ Existing LCOs, date of next surveillance

- A SBLC Pump out for pre-planned maintenance

⇒ STPs in progress or major maintenance

- Reactor power was reduced yesterday due to a leak on the casing of the "B" RFP. The leak has been repaired.

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment

- "B" HWC FIC - I & C is troubleshooting the "B" HWC FIC. When you get the step to place the "B" HWC system in service, circle the step and wait for I & C to get done with their troubleshooting. Then you can perform the step as written (OI 644, section 3.8, step 27).

⇒ Comments, evolutions, problems, core damage frequency, etc.

- "B" Well Water pump is running to support the start of the "B" RFP.
- All 5 Condensate Demins are IN SERVICE
- Load dispatcher would like power to be raised expeditiously.
- OCC is manned, but will disband as soon as the 2nd RFP is started.

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| Shift Turnover | COMPLETE TURNOVER:<br><br>• Provide Shift Turnovers to the **SRO** and **RO**s.<br>a. Review applicable current Plant Status<br>b. Review relevant At-Power Risk status<br>c. Review current LCOs not met and Action Requirements<br>d. Verify crew performs walk down of control boards and reviews turnover checklists | Get familiar with plant conditions.<br><br>• **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**<br><br>Startup second Condensate and Feed Pump IAW OI-644. | **Booth Instructor** respond as plant personnel and respond as necessary:<br><br>Role play as the inplant operators to assist the crew to start the "B" Condensate Pump and the "B" Reactor Feedwater Pump.<br><br>When directed to open the B Condensate Pump discharge valve (V-06-04) USE **Remote FW05** or the SimVue page**.**<br><br>Turnover Info – All Condt/Demins ON.<br><br>**Role Play:** When directed to OPEN CRD pressure isolation valves 1P-1803A-V05 and 1P-1803B-V07, wait two minutes, and inform the crew that both of those valves are OPEN (simulator does not model) | **SRO**<br><br>Gives Pre-job brief to coordinate and discuss evolution<br><br>Communicate with the Event Response Team<br><br>May call Chemistry and direct to verify proper operation of AE-8912A, RR Water O2 Analyzer<br><br>**EXAMINER NOTE**: Per IPOI-3 Step 4.0 (6) Continuous Recheck Statement, if condensate pressure exceeds 575 psig, a CAP must be written to System engineering to trend in regard to condensate system piping design pressure.<br><br>**RO**<br><br>Monitoring critical parameters – reactor power, pressure, level<br><br>Peer checker for BOP operator<br><br>**BOP**<br><br>Reviewing OI-644 –Condensate and Feedwater.<br><br>Reviewing IPOI-3 –Power Operations.<br><br><u>Starts the "B" condensate pumps per OI-644 section 3.8.</u><br>• Start B CONDENSATE PUMP 1P 8B using handswitch HS 1411 on 1C06.<br>• Concurrently perform the following substeps: |

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #1 (CONT)** | **Role Play:** When directed to verify closed the seal water isolation valve V06-11, wait two minutes and inform the crew that both valves are CLOSED (simulator does not model). (Valve V06-12 is already closed)<br><br>**Role Play:** When directed to verify the Shaft Driven Aux Oil Pump (SDAOP) running, inform the crew the SDAOP is running with adequate flows and pressure. (local oil pressure is pegged high) | **BOP Actions (CONT)**<br>• Slowly open fully V 06 04 [V 06 05] 1P 8B[1P 8A] Condensate Pump Discharge Valve.<br>• Place FIC 1428 CONDENSATE RECIRC FLOW CONTROL in MANUAL and throttle CV 1428 to maintain condensate pressure between 550 and 570 psig as indicated on PI 1433 (on 1C06).<br>• Verify closed seal water isolation valves V-06-11, V-06-12.<br><br><u>Starts the "B" RFP per OI-644 Section 3.8.</u>.<br>• At 1C06, verify that FIC 1611 B RX FEED PUMP 1P 1B RECIRC FLOW CONTROL is in AUTO, then set recirc flow to 1500 gpm.<br>• At 1C06, verify that the handswitch for CV 1611 Reactor Feed Pump 1P 1B RECIRC Valve is placed in the "AUTO" position.<br>• Start B REACTOR FEED PUMP 1P 1Busing handswitch HS 1616 on 1C06.<br>• Slowly adjust FIC 1611 B RX FEED PUMP 1P-1B RECIRC FLOW CONTROL indicators to a flow of 2800 gpm over a two minute period.<br>• Stop B[A] RFP AUX LUBE OIL PUMP 1P-2B by performing the following:<br>• Place handswitch HS 1648 on 1C06 in the STOP position.<br>• After B RFP AUX LUBE OIL PUMP 1P-2B has stopped, place handswitch HS 1648 in the AUTO position.<br>• Verify the B FEED REG VALVE CONTROLLER HC 1621 is in MANUAL.<br>• Select 'V' on both the display for HC1621 and the MASTER FEED REG VALVE CONTROLLER, LC 4577.<br>**BOP Actions (CONT)**<br>• Match the Feedwater Reg Valve controller top meter display with the MASTER FEED REG VALVE CONTROLLER top meter display by adjusting the |

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #1 (CONT)** | | potentiometer on HC 1621.<br>• Verify proper response of both Feedwater Regulating valves by monitoring ZI 1621 and ZI 1579.<br>• Select AUTO on HC 1621[1579].<br>• Verify HC 1621[1579] and LC 4577 are in AUTO and selected to 'S'. |

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #2**<br><br>Raises Power 10% using Recirculation Flow | **Booth Instructor** respond as plant personnel and respond as necessary:<br><br>If 1C04B (C-1), B RR Pump Motor Oil Hi/LO Level annunciator comes in:<br><br>**Role Play** as the 2nd Assistant, and when directed to investigate, wait 2 minutes and inform MCR that B RR pump has high level of oil in the upper bearing. | **SRO**<br><br>Provides a reactivity brief.<br><br>Communicates with Real Time Desk and System Operating Center.<br><br>Provide direct oversight of power increase.<br><br>**RO**<br><br>Raises power with Recirc Pump Flow Controllers IAW IPOI-3, Section 4.<br><br>1. To raise recirc flow, set 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.<br><br>2. Keep loop flows balanced by comparing the Recirc Pump discharge flow on FI 4634A vs. FI 4634B or Pen 1 vs. Pen 2 on FR 4635.<br><br>Monitors critical plant parameters – power, pressure, level<br><br>**BOP**<br><br>Monitors balance of plant equipment.<br><br>Provides peer check for RO during power increase. |

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #3**<br><br>"A" Reactor Recirc Pump speed controller fails upscale | **Booth Instructor,** after a measurable power rise, and at the direction of the Lead Evaluator:<br><br>**SINCE** the initial value of the ramp has changed (RR FCVs have been adjusted)… Look at the current value of the RR17B malfunction, **DOUBLE CLICK** on RR17B, and set the ramp as follows:<br><br>Trigger 1, 350 sec Ramp Time, Initial value to current value, final value of 100.<br><br>**THEN:**<br><br>**Set Event Trigger 1 TRUE**<br>**IMF RR17B to 100 over 350 sec**<br><br>This will cause the "B" Recirc M-G speed controller to ramp up slowly | **RO** will determine that power is going up by itself, and determine that the "B" Recirc M-G speed controller is ramping up by itself. He will take the following actions to stop the run away:<br><br>• Lock the scoop tube of the "B" recirc M-G speed controller. [**Critical**]<br><br>• Enter AOP 255.2, "Power/Reactivity Abnormal Change."<br><br>**SRO** will direct and the **ROs** will perform the following actions per AOP 255.2:<br><br>• Take any necessary steps to bring the reactor power/reactivity transient under control, including, but not limited to:<br><br>o The Scoop Tube Lockup stopped the event<br><br>**SRO** will determine if the recirc pump speed mis-match will put them out of compliance with the LPCI Loop Select limits.<br><br>• TS SR 3.4.1.1 states that the speed of the faster pump shall be ≤ 122% of the speed of the slower pump when operating at ≥ 69.4% RTP.<br><br>• Based on the calculation, the SRO will determine if he is in compliance with TS 3.4.1 Condition C. If not, then has 2 hours to restore the mis-match within limits, or Trip one of the recirc pumps.<br><br>• Plot the current position on the power to flow map.<br><br>**SRO** will activate the Event Response Team and ensure that a WRC is written to help mitigate the event. Call Ops Management and REs.<br><br>**Crew** (**IF the Recirc Flow is outside of the Mismatch limits**), will discuss how they will restore the mismatch to within it's limits.<br><br>• Either raise the speed of the unlocked Recirc Pump to match the locked Recirc Pump. **OR**<br><br>• Send a licensed operator to the Recirc M-G Set room and take manual control of the locked Recirc Pump and lower it to within the limits. |
| **If called as:**<br><br>**MISC**<br><br>**I&C**<br><br>**WCC**<br><br>**ERT** | **Booth Instructor** respond as plant personnel and respond as necessary:<br><br>Respond that you will look at the MOORE controller logic for speed control and get back to them soon.<br><br>Report that you will call in a licensed operator to take manual control of the locked up recirc scoop tube but it will be about an hour.<br><br>Go along with what the crew wants to do, and tell them that ERT will take over the repairs of the "B" speed control problem. | |

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #4**<br><br>RCIC spurious start | **Booth Instructor:**<br><br>After the crew has addressed the RR Flow Controller event:<br><br>**Set Event Trigger 2 TRUE**<br>**IMF RC08**<br><br>This will initiate the RCIC Spurious Start<br><br>After the crew trips the RCIC system:<br><br>**Set Event Trigger 3 TRUE**<br>**IMF RC10B**<br><br>This will insert malfunction for thermal overload for MO-2405 (prevents RCIC from being used for injection)<br><br>**NOTE**: This thermal overload will NOT reset.<br><br>**Booth Instructor** responds as plant personnel as necessary.<br><br>**Role Play:** When called as ERT, inform the crew that the ERT will investigate any potential issue with Tech Specs on the Level 2 switches that caused the RCIC spurious start. | **CREW**<br><br>Recognizes RCIC start<br><br>**SRO**<br><br>Determines Adequate Core Cooling exists by two independent indications and direct that RCIC be tripped.<br><br>Re-enter AOP 255.2, if the crew had exited this procedure already.<br><br>Enters TS 3.5.3. A and declares RCIC INOP – 14 day LCO<br><br>Verifies HPCI operable per STP 3.5.3-01<br><br>Notifies the Event Response Team<br><br>Assesses risk<br><br>**BOP**<br><br>Trips RCIC per Quick Response Card OI 150 QRC 2 and depresses RCIC Manual Turbine Trip PB.<br><br>Verifies that MO-2405, RCIC Turbine Stop Valve closes<br><br>**RO**<br><br>Monitors power, pressure and level. |

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #5**<br><br>"B" Well Water Pump trips | **Booth Instructor:**<br><br>Once the RCIC spurious start event has been addressed, then:<br><br>**Set Event Trigger 4 TRUE**<br>**IMF SW21B**<br><br>This will trip the "B" Well Water pump<br><br>**Booth Instructor** respond as plant personnel and respond as necessary. | **CREW**<br><br>Responds to Annunciators:<br><br>1C21 A11 – Panel 1C23<br><br>A1C07A C11- Drywell Cooling Panel trouble<br><br>**BOP**<br><br>Will check annunciator response for 1C23<br><br>Reports to SRO that a loss of the "B" well water pump occurred.<br><br>Starts additional Well Water pump and restores WW system parameters to normal<br><br>**EXAMINER NOTE**: <u>MAY use "C" OR "D" pump.</u><br><br><u>If "C" is used, starts pump at front panel and adjusts flow at back panel using FC 4414 C controller.</u><br><br><u>If "D" is used, adjusts flow at back panel using FC 4414 D controller.</u><br><br>**SRO**<br><br>Enters AOP 408 for loss of well water<br><br>Directs starting of additional Well Water pump and restores system parameters.<br><br>Directs monitoring drywell temperature and pressure.<br><br>Assess change in Risk<br><br>May direct venting of the DW<br><br>May start ESW pumps |
| **Event #6** | **Booth Instructor:** | **CREW** |

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| Loss of the 125 VDC panel 1D11 | When the Well Water event has been addressed, then:<br><br>**Set Event Trigger 5 TRUE**<br>**IMF ED13A**<br><br>This initiates a loss of 1D11 | Responds to Annunciator 1C08 D-9 A DG Control Power Failure<br><br>**SRO**<br>Enters AOP 302.1 – Loss of 125 VDC Power, Tab 1 – Loss of 125 VDC<br>Div 1.<br>Directs RO to transfer to "A" level control to control reactor level. Try to restore to normal band.<br>Enters TS LCO 3.8.7.B – 8 Hr LCO (1D11)<br>Directs transferring non-essential power to the startup transformer. |
| When called to investigate the loss of 1D11 feeder breaker: | **Role Play:** When called to investigate the 1D11 Feeder breaker, report that the breaker is tripped free (molded case breaker type). 1D11 feeder breaker is 1D10 breaker 06. | **RO**<br>Places "A" level controller in service with handswitch.<br>Takes manual control of FW and attempts to restore reactor water level to the normal band. |
| If called to investigate any other abnormal conditions for div 1 125vdc<br><br>**Event # 6 (CONT)** | **Role Play:** After a three minute delay, report that you can find no abnormal conditions for the Div 1 125 Vdc system. | **BOP**<br>Monitors BOP Equipment<br><u>Transfers non-essential power to the startup transformer per OI 304.1, section 4.2. as follows.</u><br>• Place the BUS 1A1[2] TRANSFER breaker mode selector switch in the MANUAL position.<br>• Select Phase 1 with the BUS 1A1[1A2] STARTUP XFMR AMPERES meter switch and observe the ammeter reading. Select Phase 1 with the BUS 1A1[1A2] AUX XFMR AMPERES meter switch.<br>**BOP Actions (CONT)**<br>• Place the control switch 4KV BREAKER 1A102[202] STARTUP XFMR TO BUS 1A1[1A2] momentarily in the CLOSE position. Observe that the red (breaker closed) and the white (closing spring charged) indicating lights are ON |

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| | | |
| **Event #7**<br>Station Blackout<br><br>When called as SOC:<br>When operator called to investigate SBDG:<br><br>**Event #7 (CONT)**<br><br>When called for assistance on the SBDG output breaker: | **Booth Instructor:**<br>When the evaluation team is ready to initiate the Station Blackout, then:<br>**Set ED03 <u>Initial</u> Severity to 40 and set <u>Final</u> Severity to 30, with a ramp time of 180 sec.**<br>• When the reactor scrams, verify that **Event Trigger 7** activates to initiate the Loss of Offsite Power.<br><br>**Booth Instructor:**<br>**Role Play:** as plant personnel and use simulator remote functions as necessary to carry out directed actions.<br><br>**Role Play:** Inform DAEC will be priority 1 for power restoration. Estimate is 3.5 hours for power restoration.<br><br>**Role Play:** When sent to investigate the SBDG output breaker, you see nothing abnormal.<br><br>**Role Play:** Wait five minutes, then inform the crew that electrical maintenance is in the switchgear room. | **RO:**<br>• Perform IPOI-5 immediate actions.<br>• Notifies the SRO that a loss of feed has occurred (RCIC/HPCI not available)<br><br>**SRO:**<br>• Enter EOP 1 due to RPV level <170".<br>  • Use HPCI/RCIC to maintain RPV water level 170-211".<br>  • Use SRVs to control RPV pressure (allow LLS to cycle).<br>• Enter, direct and perform AOP 301.1, Station Blackout, Immediate and Follow-up Actions<br>  • Notify the SOC and request Priority 1 power restoration.<br>  • Directs Defeat 11, Supply N2 to drywell<br>  • Bypass HPCI/RCIC temperature isolations.<br>  • Investigate the loss of the "A" SBDG and direct emergency maintenance support.<br>  • Use SRVs, HPCI and RCIC to start depressurizing the RPV at 80° to 100°/hr and then stop the cooldown when RPV pressure is in the 150 – 200 psig range.<br>  • Attempt to use HPCI/RCIC to maintain RPV level per the EOPs.<br><br>**BOP: (Evaluator CUE:** When BOP bypasses RCIC/HPCI Temp Isolations – inform him that backpanel doors are all simulated open)<br>• "A" SBDG will NOT start due to the loss of 1D11 (previous event)<br>• Verifies 'B" SBDG starts, but the output circuit breaker is mechanically bound up, and will not shut<br>  • Recognizes that the "B" SBDG is running without cooling water, and secures "B" SBDG.<br>• Bypass HPCI/RCIC temperature isolations. |

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| When called as plant personnel to perform SBO attachments: | **Role-play:** as plant personnel performing the SBO attachments and report after being directed:<br>**HPCI doors;** Wait 4 minutes and report HPCI doors 204 and 220 are blocked open.<br>**Attachment 1**; Report completed in 30 minutes.<br>**Attachment 6**; Wait 30 minutes and report complete with no unexpected findings. | • Use SRVs to start depressurizing the RPV at 80° to 100°/hr and then stop the cooldown when RPV pressure is in the 150 – 200 psig range.<br>• Monitor containment parameters |
| **Event #8**<br>DG running without cooling water | | **BOP:**<br>• "A" SBDG will NOT start due to the loss of 1D11 (previous event)<br>• Verifies "B" SBDG starts, but the output circuit breaker is mechanically bound up, and will not shut<br>• Recognizes that the "B" SBDG is running without cooling water, and secures "B" SBDG. |

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| | | |

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #9**<br><br>HPCI Inverter Failure | **Booth Instructor:**<br><br>When HPCI is started (manually or automatically),<br><br>Verify that **TRIGGER 9** goes **TRUE**<br><br>This inserts the HPCI Inverter Trouble condition (HPCI runs at minimum speed and does not inject) | **BOP**<br><br>• Notes that HPCI has an inverter failure (causes the HPCI turbine to run below the minimum acceptable RPM)<br>• Secures the HPCI system |
| **Event #10** | **Booth Instructor:** | **Crew:** |

SCENARIO TIMELINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| Leak in containment, Loss of feed, ED required | When the evaluation team is ready to initiate the LOCA, then (shortly after SBO):<br><br>**Set Event Trigger 8 TRUE**<br>**IMF RR15A to 20% over 600 sec**<br><br>This starts a LOCA in the DW<br><br>**Booth Instructor:**<br><br>ONLY IF the crew has requested help to restore SBDG, THEN Delete the malfunction and override:<br><br>**DMF DG02B** and **DOR DG152-411**<br><br>This will allow the "B" SBDG output breaker to work<br><br>**Role Play:**<br><br>When the crew opens the SRVs, call the control room as Electrical Maintenance and inform them that the "B" SBDG output breaker is fixed and can be closed in. | • Notices PC pressure increasing<br><br>**SRO:**<br><br>• Enters EOP-2 for containment control<br>• Enters the ALC portion of EOP-1:<br>  • Lock out ADS<br>  • When RPV level lowers to 15", and prior to -25", Emergency depressurization will be directed. **(Critical Task)**<br>  • For ED<br>  o Torus level verified >4.5'.<br>  o 4 ADS SRVs are opened and verified open.<br>  • Directs the "B" SBDG started and closed onto the bus<br>  • Directs ECCS pumps be used to restore RPV level to normal level band.<br><br>**BOP:**<br><br>• Monitors containment parameters, and keeps SRO advised of parameter trends and values.<br>• Opens 4 ADS SRVs<br>• When SBDG is carrying it's bus, uses ECCS pumps to restore RPV water level **(Critical Task)** |
| | **Scenario Termination Criteria** | **Emergency Depressurization has been completed and RPV water level is rising and above TAF.** |
| | **Event Classification** | **FS1 based upon loss of two barriers (containment not lost)** |

*** END OF SCENARIO ***

Facility: DAEC Scenario No.: 2 No.: 2007301

Examiners: _____ Operators: _____

**Initial Conditions:** The plant is operating at 100% power with "A" SBLC and "B" CS are out of service for maintenance and are tagged out. They won't be available for 24 hours.

**Turnover:** Maintain power at 100%. Perform STP 3.3.1.1-21 "A" Manual Scram Surveillance as scheduled.

| Event No. | Malf. No. | Event Type* | Event Description |
|---|---|---|---|
| 1. | N/A | N-SRO<br>N-BOP | Perform STP 3.3.1.1-21 - "A" Manual Scram Surveillance. |
| 2. | RM02R<br>E4448C | I-SRO<br>(TS) | Leak in SBLC tank requiring the SRO to declare it INOP in accordance with Tech Specs. |
| 3. | RH01C<br>1C03A(17) | C-SRO<br>C-BOP<br>(TS) | Small Earthquake; the "C" RHR pump will inadvertently start. The A Core Spray keepfill system will break, which requires declaration of the "A" CS pump INOP. With both pumps INOP, a Tech Spec 3.0.3 shutdown is required. |
| 4. | N/A | R-SRO<br>R-RO | Power reduction to comply with Tech Specs.; The RO will commence the lowering of reactor recirc flow to lower reactor power. Peer Check performed by BOP. |
| 5. | FW12B | C-SRO<br>C-RO | One Feed Regulating Valve fails as is. |
| 6. | FW02A<br>FW02B<br>RP05A<br>RP05B | C-SRO<br>C-RO | Both Condensate Pumps will trip, requiring a manual Scram; Auto and Manual Scrams do not work; the Mode Switch will scram the unit. |
| 7. | MS02 | M<br>(ALL) | Steam Leak in Primary Containment with a failure of all ECCS to automatically start on the high DW pressure signal. |
| 8. | HP03 | C-BOP | HPCI flow controller is failed at 0 gpm in automatic, but will work in manual. |

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

| | EVALUATION SCENARIO GUIDE (ESG) |
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**SITE:** **DAEC**

| | |
|---|---|
| **SCRAM SURVEILLANCE, SBLC LEAK, EARTHQUAKE, TS3.0.3, FRV FAILURE, VENT THE PRIMARY CONTAINMENT, DUAL CONDENSATE PUMP TRIP, STEAM LEAK IN PC, GROUP 3 FAILURE, HPCI CONTROLLER FAILURE** | **2007 ILT 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* |

## TURNOVER INFORMATION

⇒ Day of week and shift

- ♦ Thursday
- ♦ Dayshift

⇒ Weather conditions

- ♦ Fair and breezy
- ♦

⇒ (Plant power levels) 97% Pwr

- ♦ MWT 1844
- ♦ MWE 632
- ♦ CORE FLOW 46.5

⇒ Thermal Limit Problems/Power Evolutions

- ♦ None

⇒ Plant Risk Status

- ♦ CDF 2.2E-5
- ♦ Color YELLOW

⇒ Existing LCOs, date of next surveillance

- ♦ "A" SBLC pump tagged out for maintenance
- ♦ "B" Core Spray pump tagged out for maintenance

⇒ STPs in progress or major maintenance

- ♦ STP 3.3.1.1-21 was started last shift, but not completed. You will have to finish the STP when you take the shift.

⇒ 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.

- ♦ Scaffold being built in SBLC area to rig out the "A" SBLC pump.

SCENARIO TIME-LINE

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

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| Event #1<br>"A" Manual Scram Surveillance | | **SRO**<br>Gives Pre-job brief to coordinate and discuss evolution<br><br>**RO**<br>Completes "A" Manual Scram Surveillance (section 7.2 needs to be completed)<br><br>**BOP**<br>Acts as peer checker for RO |
| | **Booth Instructor:**<br>*AFTER* the surveillance is complete, and the ½ scram is RESET, then insert the ATWS malfunctions by:<br>**Insert Trigger 1 TRUE**<br>This overrides the Manual Scram PBs in OFF, and inserts Failure to Auto Scram (this sets up the mode switch to scram). | |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| Event #2<br>SBLC Tank Leak | **Booth Instructor:**<br>When the Manual Scram event has been completed, then initiate the SBLC tank leak:<br>**Set TRIGGER 2 TRUE**<br>This ramps the SBLC Tank Level Indicator from 85% to 65% in 120 sec and after a 15 sec TD alarms the SBLC Tank Lo Level<br>**ROLE PLAY** as the person sent to investigate:<br>Riggers were rigging the SBLC pump and lost control of the load. A small hole has been created in the suction piping to the SBLC pumps, and is isolable by shutting the SBLC pump isolation valve, V-26-01. Ask if the crew wants you to unlock and shut V-26-01 to isolate the leak. | **RO**<br>• Notices the SBLC tank low level condition<br>• Refers to ARP 1C05A (E-3)<br>**BOP**<br>• Sends an in-plant operator to check out the SBLC area<br>• Might call Radwaste and inform them of the borated water leak.<br>• Might dispatch Chemistry to investigate/respond to the borated water leak.<br>**SRO**<br>• Refers to Technical Specifications 3.1.7.B (8 Hour Action statement to restore one subsystem to operable status)<br>• Notifies Duty Manager / OM / OSM of issue, Activates the Event Response Team |
| Setup for the Earthquake | **Booth Instructor**<br>Utilize both instructor station screens and using the expert command function do the following:<br>• On one screen expert command window type in **ror earthquake**. DO NOT hit enter.<br>• On the other screen expert command window type **ror earthquake1**. DO NOT hit enter. | |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| Event #3<br>Small Earthquake | **Booth Instructor:**<br>When ready to start the earthquake event:<br>Hit **ENTER** on the monitor that has **ROR EARTHQUAKE** typed in the expert command window.<br>**Set Event Trigger 3 TRUE**<br>(This starts the earthquake alarm)<br>When the seismic alarm sounds, hit **ENTER** on the monitor that has **ROR EARTHQUAKE1** typed in the expert command window.<br>**Select the LAST 14 OVERRIDES and DELETE THEM (these are the overrides that place level recorders HIGH for the "sloshing" in the TORUS, ESW pits, etc.**<br>**DELETE the OVERRIDE FOR the "C" RHR Handswitch in START**<br>**WHEN** the RO acknowledges the Seismic Alarm at 1C35, **OBSERVE** that **ET10** activates and the Seismic alarm silences; if not, **DELETE PCPB3**.<br>**Booth Instructor**<br>Inform the crew that they felt the building shake.<br><br>**SEE EVENT #5 (FRV Failure)**<br><br>**[CONTINUED ON NEXT PAGE]** | **SRO**<br>• Direct operators to perform immediate actions of AOP 901.<br>• Determine no hazardous condition exists on the refuel floor.<br>• Direct operators to perform the follow-up actions of AOP 901.<br>• Commence shutting down the reactor to be in cold shutdown within 24 hours.<br>• Direct the inspection and radiological surveying/sampling all plant areas and required systems.<br>• Direct surveying and sampling of high priority areas, structures, systems and components.<br>• Verify any heavy loads being handled (within the turbine building or LLRWSF) are landed in safe location.<br>• Direct Health Physics to perform radiation surveys of the normally accessible areas inside main DAEC Buildings and the site grounds.<br>• Direct chemist to review KAMAN data and perform sensor checks.<br>• Direct the inspection and radiological surveying/ sampling of all plant areas and required systems in accordance with AOP 901, Earthquake.<br>• Have Radwaste monitor for abnormal pump ups or rising leak rates.<br>• Declares Alert HA 1.1. – Seismic Event<br><br>**RO**<br>• Respond to Earthquake condition.<br>• Monitor Reactor power, pressure and level on 1C05.<br>• Monitor for any Control Rod out of position.<br>**[CONTINUED ON NEXT PAGE]** |
| Small Earthquake | **Booth Instructor**<br>**Role Play:** As the crew sends various people in the plant instructions, respond that you will do the requested actions. As NSPEOs, perform desired | **BOP**<br>• Acknowledge seismic alarm and reset. |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **(CONTINUED)** | investigations.<br><br>**Booth Instructor:**<br>**ROLE PLAY:** When an appropriate time has passed, call the control room and inform them that there is a water leak coming off of the discharge pipe of the "C" RHR pump. The leak is downstream of the discharge isolation valve for the pump.<br>**ROLE PLAY:** When sent to investigate the Core Spray system, report a pipe leak on the discharge pipe of the "A" CS pump in the SECR. The leak is downstream of the discharge isolation valve for the pump.<br><br>**PEER CHECKER required for upcoming reactivity change. The Peer checker is expected to correct errors** | • Notice and inform crew of RHR pump spurious start<br>• Notice and inform crew of RHR min flow valve SHUT<br>• Secure "C" RHR pump<br>• Dispatch an operator to check the event indicators on accelographs.<br>• Verify RWS availability.<br>• Monitor Process and Area Radiation Monitoring System channels on Panels 1C10 and 1C11.<br>• Monitor Torus Water Level on Panels 1C03, 1C29, 1C09, and SPDS.<br>• Monitor Area Water Levels on Panel 1C21.<br>• Monitor water levels of Drywell Equipment and Floor Drain sumps.<br>• Take a complete set of NSPEO and control room logs and compare them with prior logs specifically to look for indications of hidden damage, system leakage, or unusual indications. |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #4**<br>Power Reduction to Comply with Tech Spec 3.0.3 | **Booth Instructor:**<br>Once the CRS determines that TS 3.0.3 applies to situation, IF the crew is taking too long to downpower, call the crew as the Ops Manager and inform the crew that you want them to start lowering power promptly. | **SRO:**<br>Perform brief for downpower<br>May direct the circuit breakers for the “A” CS and “C” RHR pump to be racked down.<br><br>**RO:**<br>Perform downpower maneuver as follows per IPOI-3, Section 5.0<br>• In two loop operation, reduce RECIRC MG SET A and B SPEED CONTROL at 1C04 in small equal increments, maintaining balanced recirc loop flow, while closely monitoring the Power to Flow Map, as directed by the CRS/OSM.<br><br>**BOP:**<br>Peer check downpower maneuver |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #5**<br>FRV Controller Fails As Is. | **Booth Instructor:**<br>When seismic occurs:<br><br>Double Click on FW12B, match inputs, insert .<br>**Set TRIGGER 4 TRUE**<br><br>**Select AI FW HIC-1621(2)**<br>**Insert variable to TRUE**<br><br>This will Fail the B FWRV controller As Is | **RO**<br>Recognizes and reports Feedwater Level control is not responding as expected.<br><br>**CRS**<br>• Enters AOP 644 Feedwater/Condensate Malfunctions<br>• Directs the ROs on feedwater and recirc to coordinate power reduction.<br>• Monitors and supervises the ROs. |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| Condensate Pumps Trip<br>**Event #6**<br>**(C-RO, C-SRO)** | **Booth Instructor:**<br><br>**Set TRIGGER 7 TRUE**<br>This will trip both condensate pumps | **SRO:**<br>• Identifies the loss of FW<br>• Orders manual reactor scram<br>• Enters EOP 1 due to <170" RPV water level<br>• Orders RPV level and pressure be controlled IAW EOP 1<br>• Directs Defeat 11 and Defeat 4<br><br>**RO:**<br>• Identifies the loss of FW<br>• SCRAMS the reactor IAW ARP 1C06A A-12/13<br>• Controls RPV water level using RCIC/HPCI<br>• Carries out IPOI 5 Scram actions<br>• If Directed, Implements Defeat 11 and/or Defeat 4<br><br>**BOP:**<br>• Sends in-plant operator to investigate condensate pump trips<br>• If Directed, Implements Defeat 11 and/or Defeat 4 |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| Steam Leak in Primary Containment (bigger)<br><br>**Event #7**<br>**(M-ALL)** | **Booth Instructor:**<br>After the scram, increase the DW steam leak by:<br>**Modify MS02 Malfunction to:**<br>**Ramp to 2 over 120 secs**<br>This ramps up the DW steam leak<br>**AND**<br>**Set TRIGGER 8 TRUE**<br>This ramps in DW Coolers flow blockage to help drive DW temp up | **SRO:**<br>• Enters EOP 2 on Primary Containment parameters<br>• Orders Torus Sprays prior to DW pressure exceeding 11 psig<br>• Orders DW Sprays prior to DW temperature exceeding 280F.<br>**BOP:**<br>• Identifies rising DW pressure<br>• Communicates trends and values to the SRO<br>• Places RHR in torus spray lineup<br>• Places DW sprays in service |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| | | **SRO:**<br>• Identifies ECCS pumps do NOT automatically start on 2 psig signal<br>• Orders BOP to start all available Core Spray pumps and RHR pumps with their control handswitches<br>• Directs Defeat 17<br><br>**BOP:**<br>• Notices ECCS pumps do NOT automatically start on 2 psig signal<br>• Enables Sprays with handswitch “Enable Containment Spray Valves”<br>• Starts all available Core Spray pumps<br>• Opens MO-2005, MO-1932, MO-2006 and MO-1933<br>• Initiates DW Spray by opening MO-2001 and MO-1903<br>• Installs Defeat 17 as directed |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| HPCI Flow Controller Failure<br><br>**Event 8**<br>**(C-BOP)** | **Booth Instructor:**<br>Verify that trigger 9 goes active at 2 psig DW pressure. This will fail the HPCI AUTOMATIC flow controller to 0 over 120 secs. | **BOP**<br>• Identifies the failed HPCI Automatic controller and transfers the controller to manual<br>• Identifies that HPCI responds in MANUAL control<br>• Communicates status of HPCI to SRO<br>• Coordinates control of RPV water level with RO<br>• Controls HPCI system with MANUAL control<br>  o Ensures HPIC remains above 2000 rpm |
| | **Scenario Completion Criteria:** | • Primary Containment has been manually isolated<br>• DW Sprays are in service maintaining temperature below 280F<br>• RPV water level is being maintained in the normal band |
| | **EAL Declaration** | • HA 1.1 – Alert – Seismic Event |

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

Facility: DAEC Scenario No.: 3 Op-Test No.: 2007-01

Examiners: _____ Operators: _____

**Initial Conditions:** The plant is operating at 100% power. The plant is in a normal configuration with "A" Core Spray pump out of service.

**Turnover:** After taking the watch the RO swaps the CRD Pumps for routine maintenance.

| Event No. | Malf. No. | Event Type * | Event Description |
|---|---|---|---|
| 1. | N/A | N (RO)<br>N (SRO) | Swap CRD Pumps for routine maintenance. |
| 2. | MS27a/b | I (BOP)<br>TS (SRO) | A spurious ½ Group 5 PCIS isolation occurs. This will isolate the RWCU system. The SRO will address TS. |
| 3. | RD11 | C (RO)<br>TS (SRO) | Running CRD Pump trips; While header pressure is < 940 many control rod scram accumulators experience a low pressure of less than 940 psig. SRO determines Tech Spec applicability. |
| 4. | SW01<br>SW04 | C (BOP)<br>C (SRO) | One of the running GSW Pumps trips; flow perturbation causes Turbine LO cooler to start plugging. |
| 5. | TU01A<br>TU02A | C | Main turbine high vibration. |
| 6. | N/A | R (RO)<br>N (SRO) | RO performs a rapid power reduction to lower turbine vibration. |
| 7. | RP05A<br>RP05B<br>RP05C<br>RP05D | M<br>(ALL) | ATWS. Scram-reset-scram, then that method will stop working. |
| 8. | FW16A,B | C (RO) | Feedwater FRVs lock up. Requires additional operator action to terminate and prevent injection. |
| 9. | RD09 | C (RO) | CRD Flow controller Failure. This failure requires the RO to swap flow controllers, since the scram-reset-scram will stop working. |

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

| | EVALUATION SCENARIO GUIDE (ESG) |
|---|---|

**SITE:** **DAEC**

| | | |
|---|---|---|
| **SWAP CRD, SPURIOUS GROUP 5, CRD PUMP TRIP, GSW PUMP TRIP W/ NO AUTO START, TURBINE HI HI VIBES, HIGH POWER ATWS W/ GROUP 1, BOTH FRVS LOCKUP, SCRAM-RESET-SCRAM STOPS WORKING** | **ESG ILT 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* |

## TURNOVER INFORMATION

⇒ Day of week and shift

- ♦ Wednesday
- ♦ Dayshift

⇒ Weather conditions

- ♦ Fair
- ♦ Sunny

⇒ (Plant power levels) 97% Pwr

- ♦ MWT 1850
- ♦ MWE 635
- ♦ CORE FLOW 46.5

⇒ Thermal Limit Problems/Power Evolutions

- ♦ None

⇒ Plant Risk Status

- ♦ CDF 7.95E-6
- ♦ Color GREEN

⇒ Existing LCOs, date of next surveillance

- ♦ "A" Core Spray pump OOS. Day 2 of 7. Expected return to service - 2 days.

⇒ STPs in progress or major maintenance

- ♦

⇒ Equipment to be taken out of or returned to service this shift/maintenance on major plant equipment

- ♦ Need to switch running CRD pumps after turnover for oil sample. WCC waiting to hang clearance on the "B" CRD pump for the oil sample, so call them as soon as you get the pumps swapped.
- ♦ Two NSPEOs are dedicated for the CRD task

⇒ Comments, evolutions, problems, core damage frequency, etc.

- ♦

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| | COMPLETE TURNOVER:<br>Provide turnover information to the **SRO** and the **ROs:**<br>a. Review applicable current Plant Status<br>b. Review relevant At-Power Risk status<br>c. Review current LCOs not met and Action Requirements<br>d. Verify crew performs walk down of control boards and reviews turnover checklists. | Crew:<br>• Walkdown the panels to familiarize themselves with the status of the simulator |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **EVENT #1**<br><br>**Booth Note:**<br>**Section 5.3 removes the Ref Backfill**<br>**Section 3.4 Restores it after CRD pump start** | **Booth Instructor:**<br>**Role Play:** Remove & Restore A & B reference leg backfill as requested. (NOT SIMULATED) Use OI 880, section J-1 to do this... **there is MCR interface** in this procedure (the RPV water level selector switch has to be moved, as well as relays verified)…<br><br>**Role Play:** Perform local CRD "A" pump checks – oil level, discharge valve open – as requested.<br><br>**Examiner CUE:**<br>**When BOP is requested to check the relays energized on back panel 1C18 and proceeds to the panel location, provide a cue that the relays that need to be verified are energized.**<br><br>**Booth Instructor:**<br>When the crew has swapped the CRD pump, wait until the crew has called the WCC to inform them they can hang the clearance before proceeding to the next event. **If** the crew does not do this, **then**: | **SRO**<br>Gives Pre-job brief to coordinate and discuss evolution<br>Directs swapping CRD pumps from "B" to "A"<br><br>**RO**<br>Performs OI 255 - CRD Hydraulic system , Section 6.1 to swap pumps as follows:<br>(a) Isolate both sides of the GEMAC Reference Leg Backfill System as directed by OI 880, Section J 1.<br>(b) Verify adequate oil level in standby CRD Pump 1P-209A.<br>(c) Verify standby CRD Pump 1P 209A Discharge Isolation V-17-8 full open.<br>(d) Start Standby CRD PUMP 1P 209A[B] by momentarily placing handswitch HS 1807A[B] on 1C05 in the START position.<br>(e) Stop Running CRD PUMP 1P 209B[A] by momentarily placing handswitch HS 1807B[A] on 1C05 in the STOP position.<br>(f) Restore both GEMAC Reference Leg Backfill Systems as directed by OI 880, Section J 1.<br>Makes page announcement to stand clear while starting pump<br>Starts the "A" CRD pump<br>Restores reference leg backfill by using OI 880 – Non Nuclear Instrumentation Section J.1. – Isolates and restores reference leg backfill<br>**BOP** |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **EVENT #1 (CONT)** | **Role Play:** Call the control room as the WCC, and ask if they have the B CRD pump off and ready to be tagged out.<br><br>**Role Play:** When the control room informs the WCC they can hang the clearance on the "B" CRD pump, inform them you will send out the NSPEO, and he will be opening the "B" CRD pump breaker. Instruct them to hang a "Maintenance in Progress" Tag on B CRD pump.<br><br>**Booth Instructor:**<br><br>Simulate Racking Down the "B" CRD pump breaker by:<br><br>**Set TRIGGER 1 TRUE**<br><br>This will override the Green and White lights for the B CRD pump, as well as override the B CRD pump handswitch to OFF. | Performs peer check of RO actions.<br><br>Per OI 880 when requested – verifies relays C31A-K003 and C31A-K-004 energized on panel 1C18. |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #2**<br><br>Spurious incomplete Group 5 PCIS isolation | **Booth Instructor:**<br><br>When the CRD pump has been de-energized, then initiate the next event by:<br><br>**Set TRIGGER 2 TRUE**<br><br>This will result in a spurious FULL Group 5 (RWCU) isolation, with a failure of MO-2740 to shut.<br><br>**Role Play:** When called about the status of the RWCU C/D beds, wait 5 minutes, and call back to inform the crew that the RWCU beds are in hold, and the lineup is the normal lineup for the isolated condition. | **CREW**<br><br>Recognizes Group 5 isolation<br><br>**SRO**<br><br>Directs response to annunciator 1C05B – E-8 PCIS Group 5 Isolation initiated.<br><br>Directs closure of RWCU valve MO-2740<br><br>Enters TS 3.6.1.3. – Condition A for an inoperable valve – 4 hours<br><br>TRM 3.3.4 Instrumentation, Condition A – 4 hours<br><br>May call chemistry to verify conductivity monitoring is on recirc<br><br>**RO**<br><br>Monitors Reactor power, Pressure and Level<br><br>**BOP**<br><br>Recognizes an incomplete Group 5 isolation has occurred.<br><br>Recognizes a Full RWCU isolation should have occurred but did not and Closes RWCU valve MO-2740<br><br>Directs the 2nd Assistant to verify the status of RWCU C/D beds (ensure they went into hold properly.)<br><br>Per ARP 1C05B E8, must crack open MO 2723, Demin Bypass. |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #3**<br>Running CRD Pump trips<br><br>**Booth Note:**<br>**Long time OK. Flag a CRD pump Bkr**<br>**CRD pump motor hot.** | **Booth Instructor:**<br>When the Group 5 event has been addressed, initiate the next event by:<br>**Set TRIGGER 3 TRUE**<br>This will insert an overcurrent trip of the "A" CRD pump<br>**Role Play:** When requested to check pump locally report that the breaker is tripped on overcurrent and the pump appears to have no damage<br>**Role Play:** When requested to check accumulator pressure, report that local pressure is between 900 and 935 psig for all alarming HCUs.<br>**Role Play:** When the WCC is called to restore the "B" CRD pump, inform them that you will get right on getting the pump back. Estimate 15 minutes to restore.<br>**Role Play:** *Wait until after* TS are addressed by the SRO, before reporting back as maintenance that the "B" CRD pump is ready to have the B CRD circuit breaker racked up. (Takes ≅ 11 mins for HCU alarms to come in.)<br>**Booth Instructor:**<br>When the crew orders you to rack up the breaker for the B CRD pump, select the FOUR OVERRIDES and delete them to simulate racking up the "B" CRD breaker. | **SRO**<br>Directs response to the following annunciator:<br>1C05 A-6 A CRD PUMP TRIP OR MOTOR OVERLOAD<br>1C05 E-6 CRD DRIVE MECH HI TEMP<br>Directs a call to work control center to return the "B" CRD for service<br>When Accumulator Alarms are received and after the accumulators are checked locally enters TS 3.1.5.B. – within 1 hr it must be recharged or declared inoperable.<br>Directs start of the "B" CRD pump<br>**RO**<br>Recognizes trip of "A" CRD pump<br>Reviews 1C05 A-6 annunciator response<br>Reports Accumulator Alarms as they come in<br>Coordinates with field operator and Starts "B" CRD pump as follows:<br>• Takes CRD Flow Controller to MAN, dials to "O"<br>• Starts Pump<br>• After pump discharge valve is opened locally, manually opens CRD FCV to obtain 40 gpm flow rate.<br>• Takes controller to AUTO.<br>**BOP**<br>Monitors Reactor Power Pressure and Level<br>Directs field operator to check local indications (breaker and pump)<br>Checks CRD Mech temperatures on back panel<br>Peer checks Reactor CRD pump start |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #3 (cont)** | **Booth Instructor:** | |
| Running CRD Pump trips | **Role Play:** When directed to throttle the CRD pump discharge valve ½ turn open, then close the CRD discharge valve (using simvue) to 10% open. (V-17-10) | |
| | **Role Play:** When directed to slowly open the CRD pump discharge valve (V-17-10), open the valve using a 120 second ramp. | |
| | **Role Play:** When directed to vent both CRD pump discharge filters, wait 2 minutes, and call the crew to inform them that the CRD pump discharge filters are vented. | |
| | **Role Play:** If asked to verify HCU pressures AFTER the pump is running, then wait approximately 4 minutes, and inform the crew that all HCU pressures have returned to normal. | |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #4**<br>One of the running GSW Pumps trip.<br>Standby pump fails to auto start. | **Booth Instructor:**<br>When the CRD pump trip event has been addressed, initiate the GSW pump trip by:<br>**Set TRIGGER 4 TRUE**<br>This trips the "B" GSW pump and starts a ramp to plug the Main Turbine LO Cooler "B" to 70%<br><br>When crew starts the "C" GSW pump insert malfunction AN 1C06 A(17).<br>1C06A B-4 annunciator box will indicate a Hi GSW Strainer DP.<br><br>**ROLE PLAY as NSPEO when called to investigate the GSW pump trip.**<br>**Wait 3 minutes and inform them that the bkr for the "B" GSW pump has a long time overcurrent trip.**<br><br>**Wait 5 minutes and inform crew that the motor is very hot at the motor bearing.** | **SRO**<br>Directs response to annunciator:<br>1C06A C-4 – "B" GSW Pump trip.<br>Enters and directs actions of AOP 411 – Loss of GSW<br>Direct the ROs to contact field operator to check GSW "B" pump<br><br>**RO**<br>Recognizes trip of "B" GSW pump and failure of standby pump to start.<br>Starts "C" GSW pump.<br><br>**BOP**<br>Contacts field operator to check GSW "B" pump and breaker. |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #5**<br>Main Turbine Vibration<br>**Event #6**<br>Rapid power reduction required. | **Booth Instructor:**<br>NOTE: The Turbine LO cooler clogging will result in Turbine High Vibes as the LO heats up, but Trigger 5 is used to ensure the crew gets the indications to force them to Fast Power Reduction/Scram.<br>Shortly after the Standby GSW pump is started:<br>**Set TRIGGER 5 TRUE**<br>This increases turbine bearing 1 and 5 temperatures and vibrations | **CREW**<br>Recognizes increasing Main Turbine Vibration<br><br>**SRO**<br>AOP 693 – Main Turbine/EHC Failure<br>Directs Fast Power reduction<br>With vibrations> 12 mils and another bearing rising directs taking unit offline<br><br>**RO**<br>Takes core flow to 27 Mlbm per IPOI 4 for Power Reduction<br>• In two loop operation, reduce RECIRC MG SET A and B SPEED CONTROL at 1C04 in small equal increments, maintaining balanced recirc loop flow, while closely monitoring the Power to Flow Map, as directed by the CRS/OSM.<br><br>**BOP**<br>Monitors reactor level |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #7**<br>Hydraulic ATWS<br>Group 1 isolation | **Booth Instructor:**<br>When either of the ADS Override Switches are positioned to OVERRIDE, verify:<br>**TRIGGER 15 goes TRUE**<br>This trigger ensure the Spurious Group I isolation goes active<br>When the MODE SWITCH is taken to SHUTDOWN, verify:<br>**TRIGGER 9 goes TRUE**<br>This inserts all rods stuck malfunction until P/L leg entered<br>When CRS announces that Power/Level leg of ATWS is being entered, then:<br>**Set TRIGGER 11 to TRUE**<br>This deletes the all rods stuck malfunction.<br><br>**Booth Instructor:**<br>**Role Play:** When directed to install Defeat 12, then wait 2 minutes, and insert REMOTEs RP02 and RP03 to TEST, inform crew that Defeat 12 is installed. | **SRO**<br>Directs Reactor Scram due to Hi turbine vibration<br>Enters EOP-1 on the Failure to Scram condition<br>Enters EOP-ATWS<br>Directs Lock out of ADS<br>Directs installation of Defeat 11<br>Directs installation of Defeat 12 and 3<br>Directs performance of ATWS QRC<br>Directs Lockout of HPCI<br>Directs initiation of SLC<br><br>**RO**<br>Scrams the reactor and takes Immediate actions of IPOI 5<br>Initiates ARI<br>Inserts IRMs<br>Bypasses RWM<br>Trips Recirc Pumps<br>Recognizes a Hydraulic ATWS condition exists<br>Notifies SRO of ATWS<br>Performs ATWS QRC as directed<br>Monitors and Controls reactor level |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #7 (cont)**<br>Hydraulic ATWS<br>Group 1 isolation | | **BOP**<br>Locks out ADS as directed<br>Locks out HPCI<br>Recognizes MSIV closure (Group 1 isolation)<br>Installs Defeat 11<br>Installs Defeat 12 and 3.<br><br>**SRO**<br>Directs Terminate and Prevent Injection when power is > 5% (**CT**)<br>• Terminate all injection except RCIC, CRD.<br>Directs Performing Hydraulic RIPs<br>Directs initiation of SBLC prior to Torus Temp reaching 110 Degrees F. (**CT**)<br>Directs placing RHR in Torus Cooling<br>May direct trip of RCIC.<br><br>**RO**<br>Initiates SBLC<br>Performs scram-reset-scram to insert rods<br>Terminates and Prevents injection<br>• Trips condensate/feedwater pumps or closes block valves due to FRV failure to close |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #7 (CONT)** | | **BOP**<br>Terminates and Prevents injection to allow level to lower (**CT**)<br>Places RHR in Torus Cooling as follows:<br>• Starts RHR pumps ‘A” and “C”<br>• Starts RHRSW pumps A &C, opens MO2046<br>• Starts RHRSW pumps B & D, opens MO1947<br>• Places LIC 4231 (4232) in MAN, adjust flow.<br>• Open MO 2005, MO 1932, MO 2007, MO 1934<br>• Closes HX Bypas Valves MO 2030, MO 1940 |
| **Event #8**<br>Failure of FRVs to close during Terminate and Prevent actions | **Booth Instructor:**<br>Watch the “A” FRV position indication meter on 1C06, ensure the FRVs lockup (trigger 6 goes true). It is important to have the FRVs lockup prior to the valves going completely shut. | **SRO**<br>Directs operators to terminate and prevent injection to lower level<br><br>**RO**<br>When directed to terminate and prevent injection recognizes the failure of the FRV controllers to function and stops feedwater pumps and/or closes block valves to prevent injection from feed and condensate. (**CT**)<br>Informs SRO of FRV failure to close. |

SCENARIO TIME-LINE

| TIME/NOTES | INSTRUCTOR ACTIVITY | EXPECTED STUDENT RESPONSE |
|---|---|---|
| **Event #9**<br><br>**Alternate method required to insert control rods.** | **Booth Instructor:**<br><br>When the crew has completed **TWO** successful SCRAM-RESET-SCRAM cycles (have scrammed twice), then:<br><br>**Set TRIGGER 7 TRUE**<br><br>This sets a spurious scram signal, which does NOT allow the scram to be reset. | **RO**<br><br>Recognizes scram-reset-scram is no longer working and takes action to individually insert control rods<br><br>Informs SRO that manual rod insertion is being performed. (**CT**) |
| | **Scenario Completion Criteria:** | When the control rods are being inserted, RPV water level is being restored and maintained between -25 and the level set at step in EOP-ATWS the scenario can be terminated. |
| | **Event Classification** | SAE- SS2.1 – auto scram failure |

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