

|                     |   |               |       |              |          |
|---------------------|---|---------------|-------|--------------|----------|
| Facility:           | Davis-Besse   | Scenario No.: | 1     | Op Test No.: | NRC 2005 |
| Examiners:          | _____   | Operators:    | _____ |              |          |
|                     | _____   |               | _____ |              |          |
|                     | _____   |               | _____ |              |          |
| Initial Conditions: | <ul style="list-style-type: none"> <li>80% power, MOL</li> <li>AFPT #1 tagged OOS.</li> </ul>                             |               |       |              |          |
|                     | <ul style="list-style-type: none"> <li>Containment Air cooler (CAC) #1 tagged OOS</li> </ul>                              |               |       |              |          |
|                     | <ul style="list-style-type: none"> <li>CAC-3 is aligned for Train 1</li> </ul>  |               |       |              |          |
| Turnover:           | Hold at 80% power while the Reactor Engineer reviews the calorimetric calculation completed at the end of the last shift. |               |       |              |          |

| Event No. | Malf. No.  | Event Type*             | Event Description                                      |
|-----------|------------|-------------------------|--|
| 1         | N/A        | TS-SRO                  | AO reports oil leak on Train 1 Containment Spray Pump. |
| 2         | RCP-07     | C-RO, SRO               | RCP 1 <sup>st</sup> Stage Seal failure on RCP 1-1.     |
| 3         |            | R-RO<br>N-SRO<br>TS-SRO | Power reduction prior to stopping RCP 1-1.             |
| 4         | RCS-10     | I-RO, BOP, SRO          | RCS Hot Leg RTD slowly drifts HI.                      |
| 5         | RCP-01     | M-ALL                   | RCP 1-2 Breaker trips. Reactor Trip required.          |
| 6         | RPS-01     | C-RO                    | AUTO and MANUAL Reactor trip fails.                    |
| 7         | PZR-01     | M-ALL                   | PZR Safety Valve fails OPEN, initiating SFAS.          |
| 8         | HPI-02, 03 | C-RO                    | HPIP 1 trips.<br>HPIP 2 fails to automatically start.  |

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

### **DAVIS-BESSE 2005 NRC EXAM SIMULATOR SCENARIO 1 GENERAL DESCRIPTION**

The crew will take the watch with power holding at 80% power while the Reactor Engineer reviews the calorimetric calculation completed at the end of the last shift.

On cue from the Lead Evaluator, an AO will call the control room to report an oil leak on Containment Spray (CS) Pump #1. The SRO should request assistance from maintenance and/or enter the applicable TS. If necessary, a maintenance supervisor will report that the pump must be tagged OOS in order to make the repairs.

After the SRO has declared the TS for the CS Pump, the Lead Evaluator can cue the RCP 1-1 seal failure. The crew should respond to alarm 6-3-A in accordance with DB-OP-02006, REACTOR COOLANT PUMP ALARM PANEL 6 ANNUNCIATORS, and then enter DB-OP-02515, REACTOR COOLANT PUMP AND MOTOR ABNORMAL OPERATION. DB-OP-02515 will require the crew to reduce power to  $\leq 72\%$  in accordance with DB-OP-02504, RAPID SHUTDOWN, and stop the affected RCP. The SRO should enter the proper TS after the RCP is stopped.

On cue from the Lead Evaluator, the RCS Thot selected on HIS3A and for "Tave" or "UNIT" will begin to drift HI. The crew should respond to alarm 4-2-B or indications in accordance with DB-OP-02004, REACTOR COOLANT ALARM PANEL 4 ANNUNCIATORS. The affected controls should be shifted to an alternate channel and the channel should be removed from service. The channel does not have to be removed from service to proceed with the scenario.

The Lead Evaluator can cue RCP 1-2 breaker trip when evaluation on the Thot failure is complete. The crew should recognize that an AUTO reactor trip should have occurred and attempt to initiate a MANUAL reactor trip. This will fail and the RO should initiate a reactor trip by momentarily de-energizing Busses E2 and F2. Coincident with the reactor trip a PZR Safety Valve will fail sufficiently open to cause an SFAS actuation. HPIP #1 will trip and HPIP #2 will fail to automatically start. The crew should enter DB-OP-02000 - RPS, SFAS, SFRCS TRIP, OR S/G TUBE RUPTURE, and, among other actions, perform the following high level activities: verify the reactor is tripped, start HPIP #2, complete the actions for lack of adequate subcooling margin.

The Lead Evaluator can terminate the scenario when all high level activities have been completed and the evaluators agree the crew can be properly evaluated.

|  |          |                                 |          |         |          |      |          |    |           |
|--|----------|---------------------------------|----------|---------|----------|------|----------|----|-----------|
| Op Test No.:   | <u>1</u> | Scenario #                      | <u>1</u> | Event # | <u>1</u> | Page | <u>3</u> | of | <u>16</u> |
| Event Description: AO Reports Oil Leak On Train 1 Containment Spray Pump |          |                                 |          |         |          |      |          |    |           |
| Time   | Position | Applicant's Actions or Behavior |          |         |          |      |          |    |           |

**Booth Operator Instructions:**

**Call the control room to report an oil leak on Containment Spray Pump #1 due to a broken sight glass, and there is no oil level indicated for the pump.**

|  |        |   |
|--|--------|---|
|  |        |   |
|  | SRO    | Refers to Tech Spec LCO 3.6.2.1.        |
|  |        |   |
|  | RO/BOP | Manually energize CS pump 1 blue light. |
|  |        |   |
|  | SRO    | May Call Field Supervisor.              |
|  |        |   |
|  | SRO    | May Call Work Week Manager.             |
|  |        |   |
|  | SRO    | May refer to Risk Matrix (Yellow 5.2).  |
|  |        |   |

**At Lead Evaluator's discretion, proceed to Event 2**

Op Test No.: 1 Scenario # 1 Event # 2 & 3 Page 4 of 16  
 Event Description: RCP 1<sup>st</sup> Stage Seal Failure on RCP 1-1; Power Reduction Prior to Stopping RCP 1-1

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

**Booth Operator Instructions:****When directed, insert command for Event 2****Indications Available:****(6-3-A) 1-1 SEAL RET FLOW HI.****High controlled bleedoff flow of RCP 1-1 seal water.****Computer alarm, CAVITY SEAL PRESSURE HIGH**

|  |      |  |
|--|------|--|
|  |      |  |
|  | Crew | Respond to Annunciator Alarm (6-3-A) 1-1 SEAL RET FLOW HI.   |
|  |      |  |
|  | RO   | Observe High controlled bleedoff flow of RCP 1-1.  |
|  |      |  |
|  | SRO  | Enter DB-OP-02515, Reactor Coolant Pump and Motor Abnormal Operation.  |
|  |      |  |
|  | CREW | Determine IF any of the following RCP conditions exist:  |
|  |      |  |
|  |      | • Seal Return Temp $\geq 200^{\circ}\text{F}$  |
|  |      |  |
|  |      | • Total seal leakage for the affected RCP $\geq 2.0$ gpm.  |
|  |      |  |
|  |      | • Seal stage pressure drop greater than 1440 PSIG.   |
|  |      |  |
|  | CREW | Determines total seal leakage is $> 2.0$ gpm.  |
|  |      |  |
|  |      |  |
|  | CREW | IF a Reactor Shutdown to take the Unit off line is NOT desired, THEN, perform those steps necessary to reduce reactor power to the desired power level, AND REFER TO Attachment 1, Plant Stabilization at a Lower Power Level. |
|  |      |  |

Op Test No.: 1 Scenario # 1 Event # 2 & 3 Page 5 of 16  
 Event Description: RCP 1<sup>st</sup> Stage Seal Failure on RCP 1-1; Power Reduction Prior to Stopping RCP 1-1

| Time | Position | Applicant's Actions or Behavior   |
|------|----------|---|
|      |          | IF four RCPs are in operation, THEN perform the following:  |
|      |          |   |
|      | RO       | Reduce reactor power to 72 percent.   |
|      |          |   |
|      | SRO      | Notify the System Control Center (SCC) Load dispatcher of the unit load reduction.                            |
|      |          |   |
|      |          | As determined by the Unit Supervisor, reduce unit load by any of the following methods:                       |
|      |          |   |
|      |          | <ul style="list-style-type: none"> <li>At the LOAD CONTROL panel:</li> </ul>                                  |
|      |          |   |
|      | RO       | 1. Set the RATE OF CHANGE to a rate specified by the Unit Supervisor.   |
|      |          |   |
|      | RO       | 2. Set the MIN LIMIT – MW to 180 Mwe.   |
|      |          |   |
|      | RO       | 3. Depress the DEC pushbutton to lower the unit load to the target determined by the Unit Supervisor.         |
|      |          |   |
|      | RO       | IF the APSRs are available, THEN attempt to maintain Axial Power Imbalance between 0 and negative 10 percent. |
|      |          |   |
|      | RO       | When power is below 70%, reset minimum demand   |
|      |          |   |
|      | BOP      | Prior to tripping RCP, ensure load ratio in auto  |
|      |          |   |
|      | RO       | When power is at approximately 70%, stop the affected RCP.  |
|      |          |   |
|      | BOP      | Verify proper Feedwater flow ratios of 2.4 to 1.  |
|      |          |   |

Op Test No.: 1 Scenario # 1 Event # 2 & 3 Page 6 of 16  
 Event Description: RCP 1<sup>st</sup> Stage Seal Failure on RCP 1-1; Power Reduction Prior to Stopping RCP 1-1

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

|  |        |   |
|--|--------|---|
|  | RO/BOP | Verify Tave control transferred to the RC loop with two RCPs.   |
|  |        |   |
|  | SRO    | Verify RCS flow is greater than the flow required by T.S. 3.2.5. Enter TS 3.2.5 if low is less than required                                  |
|  |        |   |
|  | RO     | During power reduction, may perform NI to heat balance check  |
|  |        |   |
|  | SRO    | Within four hours verify the $\emptyset/\Delta\emptyset$ /Flow AND High Flux Trips setpoints have been reduced in accordance with TS 3.4.1.1. |
|  |        |   |
|  | SRO    | Request Chemistry to perform the following:   |
|  |        |   |
|  |        | <ul style="list-style-type: none"> <li>• Monitor Condensate Polisher operation.</li> </ul>  |
|  |        |   |
|  |        | <ul style="list-style-type: none"> <li>• Sample the RCS for an isotopic analysis of Iodine.</li> </ul>  |
|  |        |   |
|  |        |   |

**At Lead Evaluator's discretion, proceed to Event 4**

Op Test No.: 1 Scenario # 1 Event # 4 Page 7 of 16

Event Description: RCS Hot Leg RTD Slowly Drifts HI

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

**Booth Operator Instructions:****When directed, insert command for Event 4****Indications Available:****4-2-B, HOT LEG TEMP HIGH****14-4-D, ICS FW LIMITED BY RX POWER****14-4-E, ICS INPUT MISMATCH****14-6-D, ICS IN TRACK****4-2-E, PZR LVL LO****Loop 2 Thot indication rising**

|  |      |   |
|--|------|---|
|  |      |   |
|  | RO   | Check the alarm by observing Loop 1 and Loop 2 Hot Leg Tis.   |
|  |      |   |
|  | RO   | Verify the ICS is reducing Rx power to lower Tave to 582°F  |
|  |      |   |
|  | RO   | Compare Hot Leg Temperature Indicators TI RC3A1 and T1 RC3B1 on RC Panel C5718.                                   |
|  |      |   |
|  | RO   | IF the selected Hot Leg Temperature Transmitter failed, THEN verify SASS has transferred to unfaulted instrument. |
|  |      |   |
|  | Crew | Respond to Annunciator Alarm (4-2-E) PZR LVL LO   |
|  |      |   |
|  | RO   | Observes Low Pressurizer level as indicated on LRS RC14 on Control Room Panel C5706.                              |
|  |      |   |
|  | RO   | Check Pressurizer level low on LRS RC14 on Control Room Panel C5705.  |
|  |      |   |
|  | RO   | IF Pressurizer Level is due to a Tave transient, THEN perform the following:                                      |
|  |      |   |

Op Test No.: 1 Scenario # 1 Event # 4 Page 8 of 16

Event Description: RCS Hot Leg RTD Slowly Drifts HI

| Time  | Position | Applicant's Actions or Behavior   |
|---|----------|---|
|   |          | a. Reduce MU-32 Setpoint to ~ 180".   |
|   |          |   |
|   |          | b. WHEN Tave is restored to ~ 582°F, AND Pressurizer Level is stable, THEN restore MU-32 to 220 inches as directed by the CTRM SRO. |
|   |          |   |
|   | CREW     | Determine which instrument pair has caused the alarm. (Thot)  |
|   |          |   |
|   | BOP      | Place SP6A, FEEDWATER MAIN VALVE, HVA Station in HAND.  |
|   |          |   |
|   | RO       | Place Diamond Control in MANUAL   |
|   |          |   |
|   | BOP      | Place BOTH FEEDWATER DEMAND HVA Stations in HAND.   |
|   |          |   |
|   | BOP      | Verify FW601, S/G 2 MAIN FEEDWATER STOP VALVE, is open.   |
|   |          |   |
|   | BOP      | Lower Feedwater flow to match Plant power using SP6A and SP7A AND LOOP 1 FEEDWATER DEMAND HVA Station.                              |
|   |          |   |
|   | BOP      | Verify Main Feedwater Pump(s) OR the Motor Driven Feed Pump is in service.  |
|   |          |   |
|   | RO/BOP   | Check for ICS module, component, or instrument failures.  |
|   |          |   |
| <b>At Lead Evaluator's discretion, proceed to Event 5</b> |          |   |



|                    |          |   |            |         |                         |      |          |    |           |
|--------------------|----------|---|------------|---------|-------------------------|------|----------|----|-----------|
| Op Test No.:       | <u>1</u> | Scenario #  | <u>All</u> | Event # | <u>5, 6, 7, &amp; 8</u> | Page | <u>9</u> | of | <u>16</u> |
| Event Description: |          | RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start |            |         |                         |      |          |    |           |
| Time               | Position | Applicant's Actions or Behavior   |            |         |                         |      |          |    |           |

**Booth Operator Instructions:****When directed, insert command for Event 5****Indications Available:****5-3-H, RPS POWER – PUMPS TRIPPED****5-1-G, H, I, J, RPS CH 1, 2, 3, 4 TRIPPED****ZL4265A and ZL 4265A red lights lit – Safety Valve Open indication****RCP 1-2 TRIPPED indication**

|                      |           |   |
|----------------------|-----------|---|
|                      |           |   |
|                      | CREW      | Determine that RCP 1-2 has tripped without a reactor trip   |
|                      |           |   |
|                      | RO        | Manually Trip the Reactor.  |
|                      |           |   |
|                      |           | Reactor Trip Pushbutton has been depressed;   |
|                      |           |   |
|                      |           | AND   |
|                      |           |   |
|                      |           | Power is decreasing on the Intermediate Range Nuclear Instrumentation (NO).                               |
|                      |           |   |
|                      |           | IF the reactor is NOT shutdown, THEN perform the following actions until the reactor is shutdown.         |
|                      |           |   |
|                      |           | <ul style="list-style-type: none"> <li>Manually deenergize the CRDs in the order listed below:</li> </ul> |
|                      |           |   |
| <b>CRITICAL TASK</b> | <b>RO</b> | <b>1. Momentarily deenergize 480-Volt Unit Substations E2 AND F2 simultaneously.</b>                      |
|                      |           |   |
|                      |           | <ul style="list-style-type: none"> <li>Maintain balanced primary to secondary heat transfer:</li> </ul>   |
|                      |           |   |
|                      |           | 1. IF MFW is less than Reactor power, THEN manually   |

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Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

| Time | Position | Applicant's Actions or Behavior  |
|------|----------|--|
|      |          | control MFW flow to match Reactor power.   |
|      |          |  |
|      | RO       | Manually trip the Turbine.   |
|      |          |  |
|      |          | Turbine Trip Pushbutton has been depressed.  |
|      |          |  |
|      |          | AND  |
|      |          |  |
|      |          | Turbine Stop Valves 1, 2, 3 AND 4 are closed.  |
|      |          |  |
|      |          | OR   |
|      |          |  |
|      |          | Turbine Control Valves 1, 2, 3, AND 4 are closed.                                      |
|      |          |  |
|      | SRO      | CHECK FOR SPECIFIC RULE OR SYMPTOM DIRECTION   |
|      |          |  |
|      |          | Implement any necessary Specific Rules.  |
|      |          |  |
|      |          | ACTIONS FOR LOSS OF SUBCOOLING MARGIN Applies<br>Specific Rule 2                       |
|      |          |  |
|      |          | MU\HPI\LP I FLOW INITIATION, THROTTLING, AND<br>TERMINATION Applies<br>Specific Rule 3 |
|      |          |  |
|      |          | OTSG LEVEL CONTROL<br>Specific Rule 4  |
|      |          |  |
|      | SRO      | Implement any necessary Symptom Mitigation Sections                                    |

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Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

| Time                 | Position  | Applicant's Actions or Behavior   |
|----------------------|-----------|---|
|                      |           |   |
|                      |           | LACK OF ADEQUATE SUBCOOLING MARGIN Applies  |
|                      |           |   |
|                      | SRO       | Directs tripping remaining RCP's IAW specific Rule 2 when subcooling is lost.   |
|                      |           |   |
| <b>CRITICAL TASK</b> | <b>RO</b> | <b>Trips all remaining RCPs</b>   |
|                      |           |   |
|                      | SRO       | Directs starting MDFW pump to feed OTSG #1  |
|                      |           |   |
|                      | BOP       | Unblock MDFW Valves and start MDFW Pump to feed OTSG 1  |
|                      |           |   |
|                      |           | MU\HPI Initiation   |
|                      |           |   |
|                      | RO        | Start the standby CCW Pump.   |
|                      |           |   |
|                      | RO        | Start BOTH HPI Pumps.   |
|                      |           |   |
|                      |           | <ul style="list-style-type: none"> <li>• HPI Pump 1 (Tripped)</li> <li>• HPI Pump 2</li> </ul>  |
|                      |           |   |
|                      | RO        | Open HPI Injection Valves. <ul style="list-style-type: none"> <li>• HP 2A</li> <li>• HP 2B</li> <li>• HP 2C</li> <li>• HP 2D</li> </ul> |
|                      |           |   |
|                      | RO/SRO    | IF only one HPI train is available, THEN REFER TO Attachment 11, HPI Flow Balancing.  |

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Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

| Time | Position | Applicant's Actions or Behavior   |
|------|----------|---|
|      |          |   |
|      | RO       | Stop Makeup flow through HPI Train 2 by closing MU 6422, MU CTMT ISOLATION.   |
|      |          |   |
|      | RO       | Verify HPI Train 2 Injection Valves are fully open.   |
|      |          |   |
|      |          | <ul style="list-style-type: none"> <li>HP2A, HIGH PRESSURE INJECTION LINE 2-1 ISOLATION</li> </ul>                    |
|      |          |   |
|      |          | <ul style="list-style-type: none"> <li>HP2B, HIGH PRESSURE INJECTION LINE 2-2 ISOLATION</li> </ul>                    |
|      |          |   |
|      | RO       | Determine which injection line has the lower flow and REFER TO Figure 3, HPI Balancing.                               |
|      |          |   |
|      |          | <ul style="list-style-type: none"> <li>FYI HP3A</li> <li>FYI HP3B</li> </ul>  |
|      |          |   |
|      | RO       | IF only the lower flow is NOT in the acceptable region, THEN throttle the higher flow line until:                     |
|      |          |   |
|      |          | <ul style="list-style-type: none"> <li>The lower flow line is in the acceptable region</li> </ul>                     |
|      |          |   |
|      |          | OR  |
|      |          |   |
|      |          | <ul style="list-style-type: none"> <li>The high flow line reaches the lower limit of the acceptable region</li> </ul> |
|      |          |   |
|      |          | REFER TO Figure 3, HPI Balancing.   |
|      |          |   |

Op Test No.: 1 Scenario # All Event # 5, 6, 7, & 8 Page 13 of 16

Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

| Time | Position | Applicant's Actions or Behavior  |
|------|----------|--|
|      | RO       | IF MU 6422 was closed in Step 2.a above, THEN open MU 6422, MU CTMT ISOLATION.   |
|      |          |  |
|      | RO       | Monitor RCS Pressure.  |
|      |          |  |
|      | SRO      | Routes to DB-OP-02000, section for LACK OF ADEQUATE SUBCOOLING MARGIN  |
|      |          |  |
|      | RO       | Trip all RCPs. (Already performed.)  |
|      |          |  |
|      | RO       | Verify BOTH HPI Trains are in service as follows:  |
|      |          |  |
|      | RO       | Verify BOTH CCW Trains are in service to supply essential cooling:   |
|      |          |  |
|      |          | <ul style="list-style-type: none"> <li>• CCW Train 1</li> <li>• CCW Train 2</li> </ul>   |
|      |          |  |
|      | RO       | Verify BOTH HPI Pumps are running.   |
|      |          |  |
|      |          | <ul style="list-style-type: none"> <li>• HPI Pump 1 – tripped</li> <li>• HPI Pump 2</li> </ul>   |
|      |          |  |
|      | RO       | Verify HPI Injection Valves fully open. <ul style="list-style-type: none"> <li>• HP 2A</li> <li>• HP 2B</li> <li>• HP 2C</li> <li>• HP 2D</li> </ul> |
|      |          |  |
|      | RO       | Lineup Makeup System as follows:   |

Op Test No.: 1 Scenario # All Event # 5, 6, 7, & 8 Page 14 of 16

Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

| Time | Position | Applicant's Actions or Behavior  |
|------|----------|--|
|      |          |  |
|      |          | Lock MU Pump Suctions in the BWST position.  |
|      |          |  |
|      |          | <ul style="list-style-type: none"> <li>• MU 3971</li> <li>• MU 6405</li> </ul>                                   |
|      |          |  |
|      | RO       | Start the second MU Pump.  |
|      |          |  |
|      | RO       | Start BOTH LPI Pumps   |
|      |          |  |
|      |          | <ul style="list-style-type: none"> <li>• LPI Pump 1</li> <li>• LPI Pump 2</li> </ul>                             |
|      |          |  |
|      | RO       | Open MU 6420, MU 32 BYPASS.  |
|      |          |  |
|      | RO       | Verify MU 6422, MU CTMT ISOLATION is open.   |
|      |          |  |
|      |          | IF LPI Flow into the RCS does not exist, THEN perform the following:   |
|      |          |  |
|      | RO       | a. Open BOTH piggyback valves <ul style="list-style-type: none"> <li>• DH 63</li> <li>• DH 64</li> </ul>         |
|      |          |  |
|      | RO       | b. IF two MU Pumps are running, THEN perform the following:  |
|      |          |  |
|      |          | <ul style="list-style-type: none"> <li>• Open MU 6421, CTMT ISOLATION FOR ALTERNATE MU INJECTION LINE</li> </ul> |
|      |          |  |

Op Test No.: 1 Scenario # All Event # 5, 6, 7, & 8 Page 15 of 16

Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

| Time | Position | Applicant's Actions or Behavior   |
|------|----------|---|
|      |          | <ul style="list-style-type: none"> <li>Open MU 6419, ALTERNATE MU INJECTION LINE.</li> </ul>  |
|      | CREW     | Verify proper SFAS response. (HPIP #1 Tripped)  |
|      | BOP      | Verify proper SFRCS actuation for the trip parameters present using Table 1.  |
|      | BOP      | Verify proper SG level control by AFW using Specific Rule 4.  |
|      |          | Isolate Possible RCS Leaks as follows: <i>(May not be a priority if crew realizes that a Pressurizer Safety Valve failure is the cause)</i> |
|      | RO       | IF MU/HPI PORV Cooling is NOT in progress, THEN perform the following:  |
|      |          | a. Verify RC 2A, PORV, control switch in AUTO.  |
|      |          | b. Close RC 11, PORV BLOCK Valve.   |
|      | RO       | Verify MU 2B, LETDOWN ISO is closed.  |
|      | RO       | Verify RC 2, PZR SPRAY Valve is closed.   |
|      | RO       | Close RC 10, PZR SPRAY BLOCK Valve.   |
|      | RO       | Close Pressurizer Sample Isolations   |
|      |          | <ul style="list-style-type: none"> <li>RC 239A</li> <li>RC 239B</li> </ul>  |

Op Test No.: 1 Scenario # All Event # 5, 6, 7, & 8 Page 16 of 16

Event Description: RCP 1-2 Breaker Trips; Reactor Trip Required; AUTO and MANUAL Reactor Trip Fails; PZR Safety Valve Fails OPEN, Initiating SFAS; HPIP 1 Trips; HPIP 2 Fails to Automatically Start

| Time   | Position | Applicant's Actions or Behavior  |
|--|----------|--|
|  |          |  |
|  | RO       | Verify Loop 1 High Point Vents are closed.   |
|  |          |  |
|  |          | <ul style="list-style-type: none"> <li>• RC 4608A</li> <li>• RC 4608B</li> </ul>                                     |
|  |          |  |
|  | RO       | Verify Loop 2 High Point Vents are closed.   |
|  |          |  |
|  |          | <ul style="list-style-type: none"> <li>• RC 4610A</li> <li>• RC 4610B</li> </ul>                                     |
|  |          |  |
|  | RO       | Verify CFT Isolation Valves are open.  |
|  |          |  |
|  |          | <ul style="list-style-type: none"> <li>• CF 1A</li> <li>• CF 1B</li> </ul>   |
|  |          |  |
|  | SRO      | If adequate subcooling margin exists, THEN GO TO Step 5.18.  |
|  |          |  |
|  |          | ADEQUATE SUBCOOLING MARGIN (20 degrees F) HAS BEEN ESTABLISHED   |
|  |          |  |
|  | CREW     | Throttle MU and HPI as necessary to maintain adequate subcooling margin. REFER TO Specific Rule 5, PTS Requirements. |
|  |          |  |
| <b>Scenario may be terminated when crew reaches Step 5.18.</b> |          |  |



| Facility:   | DAVIS-BESSE  | Scenario No.:       | 2  | Op Test No.: | NRC 2005 |
|---|--|---------------------|--|--------------|----------|
| Examiners:  | _____  | Operators:          | _____  |              |          |
|   | _____  |                     | _____  |              |          |
|   | _____  |                     | _____  |              |          |
| Initial Conditions:   | <ul style="list-style-type: none"> <li>100% power, EOL</li> </ul>                      |                     |  |              |          |
|   | <ul style="list-style-type: none"> <li>AFPT #1 tagged OOS</li> </ul>                   |                     |  |              |          |
|   | <ul style="list-style-type: none"> <li>Containment Air Cooler #1 tagged OOS</li> </ul> |                     |  |              |          |
|   | <ul style="list-style-type: none"> <li>CAC #3 is aligned for Train 1</li> </ul>        |                     |  |              |          |
| Turnover:   | Maintain 100% power.   |                     |  |              |          |
| Event No.   | Malf. No.  | Event Type*         | Event Description                                    |              |          |
| 1   | F3B2B  | TS-SRO              | SFRCS Power Supply Failure Channel 2.                |              |          |
| 2   | FAK4I  | R-RO, SRO           | Condensate Pump Trip.                                |              |          |
| 3   | L1T2N  | I-ALL               | Steam Pressure Transmitter Failure.                  |              |          |
| 4   | CCW-01<br>CCW-02   | C-RO, SRO<br>TS-SRO | CCW Pump trip/failure of AUTO start on standby pump. |              |          |
| 5   | AC-05  | M-ALL               | Loss of one 13.8KV Bus.                              |              |          |
| 6   | MS-06  | C-ALL               | One Atmospheric Vent Valve fails OPEN.               |              |          |
| 7   | SFRCS-02   | C-BOP               | Failure of AUTO SFRCS actuation.                     |              |          |
| <p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p> |  |                     |  |              |          |

### **DAVIS-BESSE 2005 NRC EXAM SIMULATOR SCENARIO 2 GENERAL DESCRIPTION**

The crew will take the watch with directions to maintain 100% power.

On cue from the Lead Evaluator, an SFRCS power supply failure will occur. The crew will respond to multiple annunciators, check the SFRCS cabinets, and determine that channel 2 28 VDC power supply has failed. The SRO will refer to DB-OP-06406 and Technical Specifications to determine required action.

The Lead Evaluator can cue the Condensate Pump failure any time after the declaration of the SFRCS TS. The crew will respond to annunciators and the BOP will manually throttle CD-420 and 421 to maintain Deaerator level in accordance with DB-OP-02013.

When the plant is stable following the Condensate Pump trip, a Steam header Pressure transmitter will fail, requiring the crew to place the turbine in MANUAL and raise SG pressure, and to place the SG/RX Demand in HAND to stabilize the plant. The crew will refer to DB-OP-06407 for the NNI failure, and DB-OP-06401 to restore ICS to full automatic operation.

Anytime after the plant is stabilized, the Lead Evaluator can cue the trip of a running Component Cooling Water (CCW) Pump. The crew should respond to alarm 11-4-B in accordance with DB-OP-02011, HEAT SINK ALARM PANEL 11 ANNUNCIATORS, and then implement DB-OP-02523, COMPONENT COOLING WATER SYSTEM MALFUNCTIONS. The RO should manually start the standby pump before RCP/reactor trip criteria is met.

After the standby CCW Pump has been started and the non-essential CCW Header isolation valves are closed on the failed pump, the Lead Evaluator can cue the loss of one 13.8KV Bus. This results in a reactor trip and entry into DB-OP-02000. One Atmospheric Vent Valve will fail partially open and SFRCS will fail to actuate in AUTO. Among other actions, the crew will perform the following high level activities: actuate SFRCS and perform overcooling actions.

The Lead Evaluator can terminate the scenario when all high level activities have been completed and the evaluators agree the crew can be properly evaluated.

|   |          |                                 |          |         |          |      |          |    |           |
|---|----------|---------------------------------|----------|---------|----------|------|----------|----|-----------|
| Op Test No.:  | <u>1</u> | Scenario #                      | <u>2</u> | Event # | <u>1</u> | Page | <u>3</u> | of | <u>14</u> |
| Event Description: SFRCS Channel 2 Power Supply Failure |          |                                 |          |         |          |      |          |    |           |
| Time  | Position | Applicant's Actions or Behavior |          |         |          |      |          |    |           |

**Booth Operator Instructions:****When directed, insert command for Event 1****Indications Available:****Multiple SFRCS alarms.**

|  |      |  |
|--|------|--|
|  |      |  |
|  | CREW | Responds to alarms.  |
|  |      |  |
|  | CREW | Determines cause is loss of 28 VDC channel 2 power supply. |
|  |      |  |
|  | SRO  | Refers to DB-OP-06406.                                     |
|  |      |  |
|  | SRO  | Determines T.S. 3.3.2.2 applies.                           |
|  |      |  |

**When Tech Specs have been addressed or at Lead Evaluator's discretion, proceed to Event 2**

Op Test No.: 1 Scenario # 2 Event # 2 Page 4 of 14

Event Description: Condensate Pump Trip

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

**Booth Operator Instructions:****When directed, insert command for Event 2****Indications Available:****13-2-B CNDS PMP DISCH HDR PRESS****Low Condensate Pump discharge header pressure as indicated at PI 569, CONDENSATE PUMP DISCHARGE.****13-4-C DEAR STRG TK 1 LVL****13-4-D DEAR STRG TK 2 LVL****Lowering Deaerator Storage Tank 1 and 2 water levels**

|  |      |  |
|--|------|--|
|  |      |  |
|  | Crew | Refer to Annunciator Response DB-OP-02013  |
|  |      |  |
|  | BOP  | Verify the proper number of condensate pumps are on for the unit load. REFER TO DB-OP-06221, Condensate System. Determines one (1) pump tripped. |
|  |      |  |
|  | BOP  | Observes condensate header flow rate as indicated at FI 578, CONDENSATE PUMPS DISCHARGE.   |
|  |      |  |
|  | SRO  | Direct power reduction to within capacity of 2 Condensate Pumps  |
|  |      |  |
|  | SRO  | Notify the System Control Center (SCC) Load dispatcher of the unit load reduction.   |
|  |      |  |
|  |      | As determined by the Unit Supervisor, reduce unit load by any of the following methods:  |
|  |      |  |
|  |      | <ul style="list-style-type: none"> <li>At the LOAD CONTROL panel:</li> </ul>   |
|  |      |  |
|  | RO   | 1. Set the RATE OF CHANGE to a rate specified by the Unit Supervisor.  |

Op Test No.: 1 Scenario # 2 Event # 2 Page 5 of 14

Event Description: Condensate Pump Trip

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

|  |     |  |
|--|-----|--|
|  |     |  |
|  | RO  | 2. Set the MIN LIMIT – MW to 180 Mwe.  |
|  |     |  |
|  | RO  | 3. Depress the DEC pushbutton to lower the unit load to the target determined by the Unit Supervisor.          |
|  |     |  |
|  | RO  | May perform NI and Heat Balance checks   |
|  |     |  |
|  | BOP | IF NECESSARY, control CD 421 and 420, DEAER STORAGE TANK 1 and 2 CONTROL VALVES, to maintain Deaerator levels. |
|  |     |  |

**At Lead Evaluator's discretion, proceed to Event 3**

Op Test No.: 1 Scenario # 2 Event # 3 Page 6 of 14

Event Description: Steam Pressure Transmitter Failure

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

**Booth Operator Instructions:****When directed, insert command to initiate Event 3****Indications Available:****14-4-E, ICS INPUT MISMATCH**

|  |     |   |
|--|-----|---|
|  |     |   |
|  | BOP | Transfer turbine to MANUAL.   |
|  |     |   |
|  | RO  | Depress and release HAND on HIC ICS13, SG/RX DEMAND.  |
|  |     |   |
|  | BOP | Lower on Turbine Control to maintain Main Steam Header Pressure   |
|  |     |   |
|  |     | Check Main Steam Header Pressure:   |
|  |     |   |
|  |     | <ul style="list-style-type: none"> <li>PI SP16A, Turbine Header Pressure 2 – Dropping (Inst. Failure).</li> </ul> |
|  |     |   |
|  |     | <ul style="list-style-type: none"> <li>PI SP16B, Turbine Header Pressure 1.</li> </ul>                            |
|  |     |   |
|  | BOP | Determine the cause of the abnormal Main Steam Line header pressure. (Instrument Fail)                            |
|  |     |   |
|  |     | When plant is stable;   |
|  |     |   |
|  | BOP | Reset ICS Mismatch annunciator  |
|  |     |   |
|  | BOP | Select PI SP16B, Turbine Header Pressure 1  |
|  |     |   |
|  | BPO | Verify FIC ICS32B(A), FEEDWATER DEMAND is in AUTO.  |
|  |     |   |

Op Test No.: 1 Scenario # 2 Event # 3 Page 7 of 14

Event Description: Steam Pressure Transmitter Failure

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

|  |      |  |
|--|------|--|
|  | RO   | Verify HC ICS20, REACTOR DEMAND is in AUTO.  |
|  |      |  |
|  | RO   | Verify the error between the POS and MV positions on HIC ICS13, SG/RX DEMAND is as small as possible for the current plant conditions.       |
|  |      |  |
|  | RO   | Depress and release AUTO on HIC ICS13, SG/RX DEMAND.   |
|  |      |  |
|  | BOP  | Verify the Turbine is synchronized to the grid.  |
|  |      |  |
|  | BOP  | Verify PIC ICS 10, HDR PRESSURE CONTROL Setpoint is 45%.   |
|  |      |  |
|  | BOP  | Adjust Turbine load using increase/decrease pushbuttons on HIC 2540, EHC PANEL 1, until PRS SP16, TURBINE THROTTLE PRESS indicates 870 psig. |
|  |      |  |
|  | BOP  | Depress and release LOAD CONTROL SELECTOR ICS IN.  |
|  |      |  |
|  | BOP  | Check the ICS IN AND ICS READY lights are lit.   |
|  |      |  |
|  | CREW | IF ICS is returned to its normal alignment, THEN verify annunciator (14-6-D) ICS IN TRACK is EXTINGUISHED.                                   |
|  | CREW | May be operating in Rod Insertion Limit Zone. (2 Hours before power reduction is required)   |
|  |      |  |

**When the plant is stable with ICS stations returned to AUTO and at Lead Evaluator's discretion, proceed to Event 4**

Op Test No.: 1 Scenario # 2 Event # 4 Page 8 of 14

Event Description: CCW Pump Trip/Failure of AUTO Start on Standby Pump

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

**Booth Operator Instructions:****When directed, insert command to initiate Event 4****Indications Available:****6-5-B, SEAL CCW FLOW LOW****2-3-A, LETDOWN TEMP HIGH****Letdown Isolation**

|                      |           |   |
|----------------------|-----------|---|
|                      |           |   |
|                      | RO        | Verify the standby CCW Pump starts. (FAILS)   |
|                      |           |   |
|                      | RO        | IF the standby CCW Pump fails to start, THEN perform the following:   |
|                      |           |   |
|                      | RO        | IF high temperature computer alarms are received on the RCPs, THEN GO TO Step 4.6.11, OTHERWISE monitor RCP Temperatures. |
|                      |           |   |
|                      | RO        | Monitor RCS Letdown Temperatures.   |
|                      |           |   |
|                      | RO        | Reduce Seal Injection flow IAW DB-OP-02523 (ARP)  |
|                      |           |   |
| <b>CRITICAL TASK</b> | <b>RO</b> | <b>Start the standby CCW pump.<br/>(Prior to reaching RCP Trip Criteria)</b>  |
|                      |           |   |
|                      | CREW      | Send an Operator to investigate relay targets on any tripped CCW Pump breakers.   |
|                      |           |   |
|                      | RO        | Verify the Non-Essential CCW Isolation valves open for the running CCW Pump, AND close for the non-running CCW Pump.      |
|                      |           |   |
|                      |           | LOOP 1 (CLOSED)   |
|                      |           | <ul style="list-style-type: none"> <li>CC 5095</li> </ul>   |



Op Test No.: 1 Scenario # 2 Event # 4 Page 9 of 14

Event Description: CCW Pump Trip/Failure of AUTO Start on Standby Pump

| Time | Position | Applicant's Actions or Behavior  |
|------|----------|--|
|      |          | <ul style="list-style-type: none"> <li>• CC 5097</li> <li>• CC 2645</li> </ul>   |
|      |          |  |
|      |          | LOOP 2   |
|      |          |  |
|      |          | <ul style="list-style-type: none"> <li>• CC 5096</li> <li>• CC 5098</li> <li>• CC 2649</li> </ul>                          |
|      |          |  |
|      | RO       | Return the Letdown System to service, REFER TO DB-OP-06006, Makeup and Purification.<br>(Letdown is isolated.)             |
|      |          |  |
|      | RO       | Open MU104, PURIFICATION DEMINERALIZER BYPASS.   |
|      |          |  |
|      | RO       | Isolate Purification Demineralizers 1, 2, and 3 by closing the following valves:   |
|      |          |  |
|      |          | <ul style="list-style-type: none"> <li>• MU10A, MIXED BED 1 LETDOWN INLET, using HISMU10A.</li> </ul>                      |
|      |          |  |
|      |          | <ul style="list-style-type: none"> <li>• MU10B, mixed bed 2 LETDOWN INLET, using HISMU10B</li> </ul>                       |
|      |          |  |
|      |          | <ul style="list-style-type: none"> <li>• MU1903, PURIFICATION DEMIN 3 LETDOWN FLOW INLET, using HISMU1903.</li> </ul>      |
|      |          |  |
|      | RO       | Manually override the high temperature signal by holding the following valves in the OPEN position, until the trip clears: |
|      |          |  |
|      | RO       | <ul style="list-style-type: none"> <li>• MU2B, LETDOWN COOLERS INLET ISOLATION, using HISMU2B</li> </ul>                   |

Op Test No.: 1 Scenario # 2 Event # 4 Page 10 of 14

Event Description: CCW Pump Trip/Failure of AUTO Start on Standby Pump

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

|  |     |   |
|--|-----|---|
|  |     |   |
|  | RO  | <ul style="list-style-type: none"> <li>MU1A, RC LETDOWN COOLER 1 INLET ISOLATION, using HISMU1B.</li> </ul>   |
|  |     |   |
|  | RO  | <ul style="list-style-type: none"> <li>MU1B, RC LETDOWN COOLER 2 INLET ISOLATION, using HISMU1B</li> </ul>  |
|  |     |   |
|  | RO  | Restore the Makeup system to the normal valve lineup by opening the following valves as directed by the Shift Manager:  |
|  |     |   |
|  | RO  | <ul style="list-style-type: none"> <li>MU10A, MIXED BED 1 LETDOWN INLET, using HISMU10A.</li> </ul>   |
|  |     | <ul style="list-style-type: none"> <li></li> </ul>  |
|  | RO  | <ul style="list-style-type: none"> <li>MU10B, MIXED BED 2 LETDOWN INLET, using HISMU10B.</li> </ul>   |
|  |     |   |
|  | RO  | <ul style="list-style-type: none"> <li>MU1903, PURIFICATIONS DEMIN 3 LETDOWN FLOW INLET, using HISMU1903.</li> </ul>  |
|  |     |   |
|  | RO  | Close MU104, PURIFICATION DEMINERALIZER BYPASS.   |
|  |     |   |
|  | SRO | <p>Refer to Technical Specifications</p> <ul style="list-style-type: none"> <li>TS 3.7.3.1, CCW Train inoperable</li> <li>TS 3.4.4, PZR level high inoperable (&gt;228 inches)</li> </ul> |
|  |     |   |

**When the standby CCW Pump is running and Letdown has been restored, proceed to Event 5**

Op Test No.: 1 Scenario # 2 Event # 5, 6, & 7 Page 11 of 14

Event Description: Loss of One 13.8KV Bus; One Atmospheric Vent Valve Fails OPEN; Failure of AUTO SFRCS Actuation

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

**Booth Operator Instructions:****When directed, insert command to initiate Event 5****Indications Available:****Reactor Trip****Alarms related to Loss of 13.8 KV Bus A**

|  |     |  |
|--|-----|--|
|  |     |  |
|  | RO  | Manually trip the Reactor.   |
|  |     |  |
|  |     | Reactor Trip Pushbutton has been depressed.                                |
|  |     |  |
|  | RO  | Manually trip the Turbine.   |
|  |     |  |
|  |     | Turbine Trip Pushbutton has been depressed                                 |
|  |     |  |
|  |     | AND  |
|  |     |  |
|  |     | Turbine Stop Valves 1, 2, 3 AND 4 are closed.                              |
|  |     |  |
|  |     | OR   |
|  |     |  |
|  |     | Turbine Control Valves 1, 2, 3 AND 4 are closed.                           |
|  |     |  |
|  |     | Check for Specific Rule or Symptom Direction                               |
|  |     |  |
|  | SRO | Implement any necessary Specific Rules<br>(NONE Apply At This Time)        |
|  |     |  |
|  | RO  | Perform Emergency Shutdown of EDG 1 due to loss of cooling<br>(IF Running) |
|  |     |  |

Op Test No.: 1 Scenario # 2 Event # 5, 6, & 7 Page 12 of 14

Event Description: Loss of One 13.8KV Bus; One Atmospheric Vent Valve Fails OPEN; Failure of AUTO SFRCS Actuation

| Time                 | Position | Applicant's Actions or Behavior  |
|----------------------|----------|--|
|                      | SRO      | Implement any necessary Symptom Mitigation Sections  |
|                      |          |  |
|                      | SRO      | Determines Section 7 applies (Overcooling).  |
|                      |          |  |
|                      | CREW     | Maintain RCS Inventory as follows:   |
|                      |          |  |
|                      | RO       | Set the PZR level controller to 100 inches.  |
|                      |          |  |
|                      | RO       | Transfer MU Pump suctions to the BWST position AND press OFF for each switch.                                    |
|                      |          |  |
|                      |          | <ul style="list-style-type: none"> <li>• MU 3971</li> <li>• MU 6405</li> </ul>                                   |
|                      |          |  |
|                      | RO       | Start MU Pumps (#1 may only run for 1 hour due to loss of CCW)   |
|                      |          |  |
|                      | RO       | Isolate Letdown  |
|                      |          |  |
|                      | RO       | Ensure pressurizer heaters off   |
|                      |          |  |
| <b>CRITICAL TASK</b> | BOP      | Check for SFRCS Actuation.<br><b>MUST Manually actuate SFRCS due to failure of auto actuation</b>                |
|                      |          |  |
|                      | SRO      | Determines a failed AVV causing overcooling.   |
|                      |          |  |
|                      | BOP      | Initiate AFW flow AND isolation of BOTH SGs by depressing SFRCS MANUAL ACTUATION switches HIS 6403 AND HIS 6404. |
|                      |          |  |

Op Test No.: 1 Scenario # 2 Event # 5, 6, & 7 Page 13 of 14

Event Description: Loss of One 13.8KV Bus; One Atmospheric Vent Valve Fails OPEN; Failure of AUTO SFRCS Actuation

| Time | Position | Applicant's Actions or Behavior   |
|------|----------|---|
|      | BOP      | Verify proper SFRCS actuation for the trip parameters present.  |
|      |          |   |
|      | CREW     | IF an SFRCS Low MS Line Pressure Trip is present OR occurs while performing Steps 7.24 through 7.28, THEN verify proper SFRCS actuation AND GO TO Step 7.29.                  |
|      |          |   |
|      | SRO      | IF it is apparent which SG is causing the overcooling, THEN GO TO Step 7.28.  |
|      |          |   |
|      | CREW     | Determines OTSG-1 is causing the overcooling condition  |
|      |          |   |
|      | BOP      | Take manual control of BOTH AFW level control valves and close BOTH valves.   |
|      |          |   |
|      | BOP      | Manually isolate AFW to the steam leak SG by performing one of the following:   |
|      |          |   |
|      | BOP      | <ul style="list-style-type: none"> <li>IF SG 1 has the steam leak, THEN close AF 608.</li> </ul>  |
|      |          |   |
|      | BOP      | Verify proper operation of AFW trains feeding the non-isolated SG.  |
|      |          |   |
|      | BOP      | Maintain proper SG level in the non-isolated SG with AFW using Specific Rule 4.   |
|      |          |   |
|      | CREW     | Check for continued Overcooling with one SG isolated.   |
|      |          |   |
|      | BOP      | WHEN the steam leak side SG boils dry (terminating the overcooling), THEN control the AVV on the non-isolated SG to maintain RCS temperature constant or slightly decreasing. |
|      |          |   |
|      | BOP      | AVV H/A Station Operation for the Non-Isolated SG   |

Op Test No.: 1 Scenario # 2 Event # 5, 6, & 7 Page 14 of 14

Event Description: Loss of One 13.8KV Bus; One Atmospheric Vent Valve Fails OPEN; Failure of AUTO SFRCS Actuation

| Time   | Position | Applicant's Actions or Behavior   |
|--|----------|---|
|  |          |   |
|  | BOP      | Place the AVV H/A Station in HAND.  |
|  |          |   |
|  | BOP      | Reduce the demand to zero.  |
|  |          |   |
|  | BOP      | Press the AVV BLOCK pushbutton (HIS-ICS-11C).   |
|  |          |   |
|  | BOP      | Press AUTO on HIS-ICS-11B or HIS-ICS-11A.   |
|  |          |   |
|  | BOP      | Control SG pressure as necessary from the H/A Station.  |
|  |          |   |
|  | SRO      | Route to Specific Rule 3 when criteria is met.  |
|  |          |   |
|  | BOP      | Place Main Steam RIM 600/609 in GROSS   |
|  |          |   |
|  | RO       | When SCM is adequate, throttle MU flow as necessary to observe the following limits:  |
|  |          |   |
|  |          | <ul style="list-style-type: none"> <li>IF MU is piggybacked from LPI, limit MU flow to 275 gpm (motor limitation).</li> </ul> |
|  |          |   |
|  | RO       | MU/HPI shall be throttled to prevent exceeding the maximum P/T for cooldown limit line on Figure 1, curve 1.                  |
|  |          |   |
| <b>Terminate scenario when RCS temperature is stable using AFW and OTSG #2 AVV</b> |          |   |

|                     |  |               |       |              |          |
|---------------------|--|---------------|-------|--------------|----------|
| Facility:           | Davis-Besse  | Scenario No.: | 3     | Op Test No.: | NRC 2005 |
| Examiners:          | _____  | Operators:    | _____ |              |          |
|                     | _____  |               | _____ |              |          |
|                     | _____  |               | _____ |              |          |
| Initial Conditions: | <ul style="list-style-type: none"> <li>70% power, BOL</li> </ul>   |               |       |              |          |
|                     | <ul style="list-style-type: none"> <li>AFPT #1 tagged OOS</li> </ul>   |               |       |              |          |
|                     | <ul style="list-style-type: none"> <li>Containment Air Cooler (CAC) #1 tagged OOS</li> </ul>   |               |       |              |          |
|                     | <ul style="list-style-type: none"> <li>CAC #3 is aligned for Train 1</li> </ul>  |               |       |              |          |
| Turnover:           | MFPT #1 has a leak on the inboard bearing supply line. The previous shift initiated a power reduction to take MFPT #1 out of service for repairs. Continue the power reduction at 5 MW/minute and remove MFPT #1 from service. |               |       |              |          |

| Event No. | Malf. No. | Event Type*         | Event Description  |
|-----------|-----------|---------------------|--|
| 1         |           | N-SRO<br>R-RO       | Controlled power reduction                                 |
| 2         | MFW-11    | C-BOP, SRO          | Increasing vibration on MFPT #1 requiring manual trip      |
| 3         | ICS-02    | C-RO, SRO           | ICS AUTO Runback fails                                     |
| 4         | RCS-13    | I-RO, SRO<br>TS-SRO | RCS Pressure instrument selected for NNI input fails LO    |
| 5         |           | TS-SRO              | 120VAC Inverter alarm actuates in the control room         |
| 6         | SG-01     | C-BOP, SRO;<br>R-RO | OTSG Tube Leak   |
| 7         | MFW-01    | M-ALL               | MFPT #2 trips  |
| 8         | SG-01     | C-ALL               | OTSG tube leak rises to rupture following the reactor trip |
| 9         | PZR-02    | C-RO                | PZR Spray Valve fails CLOSED during depressurization       |

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

### **DAVIS-BESSE 2005 NRC EXAM SIMULATOR SCENARIO 3 GENERAL DESCRIPTION**

The crew will take the watch with power holding between 70%. The previous shift initiated a power reduction to take MFPT #1 out of service for repairs. Directions will be to continue the power reduction and remove MFPT #1 from service for repair of an oil leak.

Any time after the power reduction is initiated the Lead Evaluator can cue initiation of rising vibration levels on MFPT #1. The crew should respond to alarm 10-3-A in accordance with DB-OP-02010, FEEDWATER ALARM PANEL 10 ANNUNCIATORS. The Auxiliary Operator (AO) will report a vibration level exceeding the threshold for tripping the pump. The crew should trip MFPT #1, recognize that an AUTO runback did not initiate and then manually runback power to within the capacity of one MFWP.

The Lead Evaluator can cue initiation of failure of the RCS pressure channel selected for NNI input after the plant is stabilized. The crew should respond to alarm 4-4-C in accordance with DB-OP-02004, REACTOR COOLANT ALARM PANEL 4 ANNUNCIATORS. The operator should return the heaters to the correct alignment for the conditions, the channel should be removed from service and the SRO should enter the correct TS. The channel does not have to be removed from service to proceed with the scenario.

Any time after the RCS pressure channel actions are complete, the Lead Evaluator can cue actuation of alarm 1-6-A, INV YV1-YV-3 TRBL. The crew should respond in accordance with DB-OP-02001, ELECTRICAL DISTRIBUTION ALARM PANEL 1 ANNUNCIATORS, and dispatch an AO to investigate. The AO will report that one of the inverters has shifted to the alternate source. The SRO should request maintenance assistance and/or enter the correct TS. If necessary, the maintenance supervisor will report an electrical problem that indicates the normal supply cannot be restored until corrective actions are completed.

Any time after the SRO has entered the TS for the 120VAC problem, the Lead Evaluator can cue initiation of the OTSG tube leak. The crew should respond to alarm 9-4-A in accordance with DB-OP-02009, PLANT SERVICES ALARM PANEL 9 ANNUNCIATORS, which will direct them to DB-OP-02531, STEAM GENERATOR TUBE LEAK, for actions. The simulator operator will maintain leak rate greater than the TS limit but less than DB-OP-02000 entry. After the crew has recognized the tube leak and/or the SRO is evaluating the tube leak TS, the Lead Evaluator can cue the MFPT #2 trip. This results in a reactor trip and entry into DB-OP-02000. After the crew has entered DB-OP-02000, the OTSG tube leak will ramp to a size below SFAS actuation. Among other actions, the crew will perform the following high level activities: establish HPI piggyback operation, depressurize the RCS using pressurizer PORV when the spray valve fails closed.

The Lead Evaluator can terminate the scenario when all high level activities have been completed and the evaluators agree the crew can be properly evaluated.



Op Test No.: 1 Scenario # 3 Event # 1 Page 3 of 18

Event Description: Controlled Power Reduction

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

|  |      |                                       |
|--|------|---------------------------------------|
|  | SRO  | Direct Load Reduction at 5 MWE/minute |
|  |      |                                       |
|  | RO   | Set ULD for 5 MWe/min                 |
|  |      |                                       |
|  | RO   | Press DEC pushbutton                  |
|  |      |                                       |
|  | CREW | Monitor plant parameters              |
|  |      |                                       |

**On Lead Evaluator's discretion, proceed to Event 2**

Op Test No.: 1 Scenario # 3 Event # 2 Page 4 of 18

Event Description: Increasing Vibration on MFPT #1 Requiring Manual Trip

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

**Booth Operator Instructions:****When directed, insert command for Event 2****Indications Available:****10-3-A, MFP 1 or BFP 1 BEARING VIB HI****Excessive vibration of MFP 1 Bearings****Excessive vibration of MFPT 1 Bearings****Excessive vibration of MFPT 1 Gear Reducer Bearings**

|  |         |   |
|--|---------|---|
|  |         |   |
|  | CREW    | Refer to Annunciator Response DB-OP-02010   |
|  |         |   |
|  | BOP     | Send EO to locally monitor the MAIN FD PUMPS 1 AND 2 VIBRATION PANEL for Gear Reducer, Booster Pump, and Feed Pump vibration.   |
|  |         |   |
|  | BOP     | Obtain vibration reading from ZJR 2538, MAIN TURBINE & MFP TURBINES – BEARING VIBRATION & ECCENTRICITY, points 11 and 12 for MFPT 1.  |
|  |         |   |
|  | SRO/BOP | IF vibration amplitude increases and remains above the second setpoint AND Maintenance personnel are NOT immediately available to take vibration readings, THEN trip MFPT 1 using HS 797, TURBINE TRIP. |
|  |         |   |

**BOOTH INSTRUCTOR: Report that Maintenance personnel are NOT available.**

|  |     |              |
|--|-----|--------------|
|  |     |              |
|  | BOP | TRIP MFPT #1 |

**Indications Available:****8-4-A, MFPT 1 TRIP****4-3-E, PZR LEVEL HI****14-3-D, ICS MFP LOSS OR LOW DEAR RUNBACK****14-4-C, ICS RX PWR LIMITED BY FEEDWATER**

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Op Test No.: 1 Scenario # 3 Event # 2 Page 5 of 18

Event Description: Increasing Vibration on MFPT #1 Requiring Manual Trip

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

|  |    |  |
|--|----|--|
|  |    | IF an ICS Runback occurs THEN REFER to DB-OP-06401, Integrated Control System Operating Procedure. <b>Runback should occur but does NOT.</b> |
|  | RO | Places SG/RX DEMAND H/A Station in HAND and initiates runback at 20% power per minute (See Event next page)                                  |

Op Test No.: 1 Scenario # 3 Event # 3 Page 6 of 18

Event Description: ICS AUTO Runback Fails

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

|   |        |   |
|---|--------|---|
|   |        |   |
|   |        | Crew may refer to OP-06401 for runback.   |
|   |        |   |
|   | RO/BOP | IF the runback was caused by a feed pump trip, THEN perform the following:  |
|   |        |   |
|   | RO     | IF ICS was NOT in TRACK, THEN verify ICS is or has runback at 20%/minute to 55% power. OTHERWISE place HIC ICS13, SG/RX DEMAND station in HAND AND perform the runback at 20%/minute to 55% power. (ULD DEMAND as read on DAAS=514 Mwe) |
|   |        |   |
|   | RO     | IF the pressurizer spray valve was operated, THEN verify RC2, PRESSURIZER SPRAY VALVE is in AUTO AND closed.  |
|   |        |   |
|   | RO/BOP | Perform a NIP/HBP comparison for the current power level.   |
|   |        |   |
|   | SRO    | REFER to DB-OP-06902, Power Operations, for guidance to operate plant equipment for the current power level.  |
|   |        |   |
| <b>On Lead Evaluator's discretion, proceed to Event 4</b> |        |   |

Op Test No.: 1 Scenario # 3 Event # 4 Page 7 of 18

Event Description: RCS Pressure Instrument Selected for NNI Input Fails LO

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

**Booth Operator Instructions:****When directed, insert command for Event 4****Indications Available:****5-1-G, RPS CH 1 TRIP****5-3-G, RPS RC LO PRESS TRIP**

|  |      |  |
|--|------|--|
|  |      |  |
|  | SRO  | Refer to Technical Specifications 3.3.1.1, and take action as required.  |
|  |      |  |
|  | CREW | Refer to DB-OP-02513, Section 4.6.   |
|  |      |  |
|  | RO   | Manually control Pressurizer Heaters as required to maintain normal RCS Pressure.  |
|  |      |  |
|  | RO   | Manually control Pressurizer Spray RC 2 to maintain normal RCS pressure.   |
|  |      |  |
|  | BOP  | Exchange RCS pressure input to NNI from RPS, REFER to DB-OP-06403, Reactor Protection System (RPS) and Nuclear Instrumentation (NI) Operating Procedure, Section 4.3.                              |
|  |      |  |
|  | BOP  | IF exchanging the RCS PRESSURE NNI input, THEN perform the following:  |
|  |      |  |
|  |      | 1. Place the following Pressurizer Heaters in OFF OR as directed by the Control Room SRO.  |
|  |      |  |
|  |      | <ul style="list-style-type: none"> <li>• HIS RC2-2, Bank 2</li> <li>• HIS RC2-3, Bank 3</li> <li>• HIS RC2-4, Bank 4</li> <li>• IS RC2A, Essen Bank 1</li> <li>• HIS RC2B, Essen Bank 2</li> </ul> |

Op Test No.: 1 Scenario # 3 Event # 4 Page 8 of 18

Event Description: RCS Pressure Instrument Selected for NNI Input Fails LO

| Time | Position | Applicant's Actions or Behavior  |
|------|----------|--|
|      |          |  |
|      | RO       | 2. IF available, THEN place PIC RC2 Bank 1 in MANUAL and maintain RCS pressure by adjusting the output.  |
|      |          |  |
|      | RO       | IF RC 11 PORV BLOCK, is closed, THEN open RC 11, PORV BLOCK.   |
|      |          |  |
|      | RO       | Return to normal operation.  |
|      |          |  |
|      | BOP      | Remove the cap on the selection panel for the alternate RC PRESSURE NNI receptacle in RPS Channel 2.   |
|      |          |  |
|      | BOP      | Disconnect the amphenol connector from the RC PRESSURE NNI subassembly and reconnect the amphenol connector to the alternate RC PRESSURE NNI Receptacle.   |
|      |          |  |
|      | BOP      | Cap the open RC PRESSURE NNI receptacle.   |
|      |          |  |
|      | RO       | IF desired, THEN place the following Pressurizer Heaters in the designated position:   |
|      |          |  |
|      | RO       | <ul style="list-style-type: none"> <li>• HIS RC2-2 Bank 2, in AUTO + BASE</li> <li>• HIS RC2-3, Bank 3, in AUTO</li> <li>• HIS RC2-4, Bank 4, in AUTO</li> <li>• HIS RC2A, Essen Bank 1, in AUTO</li> <li>• HIS RC2B, Essen Bank 2, in AUTO</li> </ul> |
|      |          |  |
|      | RO       | If desired, THEN place PIC RC2 Bank 1 in AUTO.   |
|      |          |  |
|      | CREW     | Circle the RPS Channel now supplying the input signal to the NNI and record the exchange of the RCS Pressure signal in the Unit Log.   |

|   |          |                                 |
|---|----------|---------------------------------|
| Op Test No.: <u>1</u> Scenario # <u>3</u> Event # <u>4</u> Page <u>9</u> of <u>18</u> |          |                                 |
| Event Description: RCS Pressure Instrument Selected for NNI Input Fails LO            |          |                                 |
| Time  | Position | Applicant's Actions or Behavior |

|   |  |  |
|---|--|--|
|   |  |  |
| <b>On Lead Evaluator's discretion, proceed to Event 5</b> |  |  |

Op Test No.: 1 Scenario # 3 Event # 5 Page 10 of 18

Event Description: 120VAC Inverter Alarm Actuates in the Control Room

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

**Booth Operator Instructions:****When directed, insert command for Event 5****Indications Available:****Annunciator Alarm (1-6-A) INV YVI-YV3 TRBL**

|  |      |  |
|--|------|--|
|  |      |  |
|  | CREW | Refer to Annunciator Response DB-OP-02001  |
|  |      |  |
|  | SRO  | Dispatch EO to inspect Essential Inverters YV1 or YV3 to determine which channel(s) caused the alarm.        |
|  |      |  |
|  | SRO  | REFER to DB-OP-06319, Instrument AC System Procedure, Emergency Operations Section.                          |
|  |      |  |
|  | SRO  | REFER to Technical Specification:  |
|  |      |  |
|  |      | <ul style="list-style-type: none"> <li>• 3.8.2.1 Applies</li> <li>• 24 Hour Clock for operability</li> </ul> |
|  |      |  |

**On Lead Evaluator's discretion, proceed to Event 6**



Op Test No.: 1 Scenario # 3 Event # 6 Page 11 of 18

Event Description: OTSG Tube Leak

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

**Booth Operator Instructions:****When directed, insert command for Event 6****Indications Available:****9-4-A, VAC SYS DISCH RAD HI****4-4-C, HOT LEG PRESS LO****Makeup flow rising****PZR level lowering**

|  |      |  |
|--|------|--|
|  |      |  |
|  | CREW | Refer to Annunciator Response DB-OP-02009  |
|  |      |  |
|  | SRO  | Dispatch an operator to the affected RE to check if a high flow or low flow condition exists by observing flow at FI 1003A and FI 1003B. |
|  |      |  |
|  | SRO  | GO to DB-OP-02531, Steam Generator Tube Leak, for guidance.  |
|  |      |  |
|  | RO   | Isolate Letdown by closing MU-2B.  |
|  |      |  |
|  | RO   | IF second Makeup Pump is available, THEN start the second Makeup Pump AND verify Makeup flow is rising.                                  |
|  |      |  |
|  |      | FI MU 31, MAKEUP FLOW TRAIN 2  |
|  |      | FI 6425, MAKEUP FLOW TRAIN 1   |
|  |      |  |
|  | CREW | Determine which SG is leaking (OTSG-1)   |
|  |      |  |
|  | CREW | Calculate a leak rate using Attachment 1, Steam Generator Tube Leak Rate Calculation. (CALC $\approx$ 115 gpm)                           |
|  |      |  |
|  | SRO  | Determine Emergency Classification. REFER to RA-EP-01500, emergency Classification.  |

Op Test No.: 1 Scenario # 3 Event # 6 Page 12 of 18

Event Description: OTSG Tube Leak

| Time  | Position | Applicant's Actions or Behavior   |
|---|----------|---|
|   | SRO      | Notify Chemistry personnel to perform Attachment 2, Chemistry Personnel Responsibilities.                       |
|   |          |   |
|   | SRO      | Notify Radiation Protection personnel to perform Attachment 3, Radiation Protection Personnel Responsibilities. |
|   |          |   |
|   | SRO      | Perform Attachment 4, Control of Secondary Contamination and Offsite Releases.                                  |
|   |          |   |
|   | SRO      | Determine the appropriate actions based on the following criteria:  |
|   |          |   |
|   | SRO      | IF the leak rate calculation exceeds T.S. 3.4.6.2 limits with 4 RCPs running, THEN GO TO Subsection 4.2.        |
|   |          |   |
|   | SRO      | Notify the System Control Center (SCC) of the unit load reduction.  |
|   |          |   |
|   |          | As determined by the Unit Supervisor, reduce unit load by any of the following methods:                         |
|   |          |   |
|   | RO       | <ul style="list-style-type: none"> <li>At the LOAD CONTROL panel:</li> </ul>                                    |
|   |          |   |
|   |          | 1. Set the RATE OF CHANGE to a rate specified by the Unit Supervisor.   |
|   |          |   |
|   |          | 2. Set the MIN LIMIT – MW to 180 Mwe.   |
|   |          |   |
|   | RO       | 3. Depress the DEC pushbutton to lower the unit load to the target determined by the Unit Supervisor.           |
|   |          |   |
| <b>On Lead Evaluator's discretion, proceed to Event 7</b> |          |   |

Op Test No.: 1 Scenario # 3 Event # 7, 8 & 9 Page 13 of 18Event Description: MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip;  
PZR Spray Valve Fails CLOSED During Depressurization

| Time | Position | Applicant's Actions or Behavior |
|------|----------|---------------------------------|
|------|----------|---------------------------------|

**Booth Operator Instructions:****When directed, insert command for Event 7****Indications Available:****MFPT #2 Trips****Reactor Trip**

|  |     |   |
|--|-----|---|
|  |     |   |
|  | RO  | Manually Trip the Reactor   |
|  |     |   |
|  | RO  | Reactor Trip Pushbutton has been depressed:                           |
|  |     |   |
|  |     | AND   |
|  |     |   |
|  |     | Power is decreasing on the Intermediate Range Nuclear Instrumentation |
|  |     |   |
|  | RO  | Manually trip the Turbine.  |
|  |     |   |
|  |     | Turbine Trip Pushbutton has been depressed                            |
|  |     |   |
|  |     | AND   |
|  |     |   |
|  |     | Turbine Stop Valves 1, 2, 3 AND 4 are closed.                         |
|  |     |   |
|  | SRO | Implement any necessary Specific Rules                                |
|  |     |   |
|  |     | SG LEVEL SETPOINTS – May apply. MDFP must be started to feed OTSG 1.  |
|  |     |   |
|  | SRO | Implement any necessary Symptom Mitigation Sections                   |
|  |     |   |

Op Test No.: 1 Scenario # 3 Event # 7, 8 & 9 Page 14 of 18

Event Description: MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip; PZR Spray Valve Fails CLOSED During Depressurization

| Time                 | Position  | Applicant's Actions or Behavior   |
|----------------------|-----------|---|
|                      |           | Section 8.0 STEAM GENERATOR TUBE RUPTURE – does apply. SRO will route to Section 8.0, Step 8.7                  |
|                      |           |   |
| <b>CRITICAL TASK</b> | <b>RO</b> | <b>IF HPI piggyback operation is NOT in service, THEN line up and start HPI piggyback operation as follows:</b> |
|                      |           |   |
|                      |           | <b>Start the standby CCW Pump.</b>  |
|                      |           |   |
|                      |           | <b>Start BOTH HPI Pumps</b>   |
|                      |           |   |
|                      |           | <ul style="list-style-type: none"> <li>• HPI Pump 1</li> <li>• HPI Pump 2</li> </ul>                            |
|                      |           |   |
|                      |           | <b>Open HPI Injection Valves</b>  |
|                      |           |   |
|                      |           | <ul style="list-style-type: none"> <li>• HP 2A</li> <li>• HP 2B</li> <li>• HP 2C</li> <li>• HP 2D</li> </ul>    |
|                      |           |   |
|                      |           | <b>Start BOTH LPI Pumps</b>   |
|                      |           |   |
|                      |           | <ul style="list-style-type: none"> <li>• LPI Pump 1</li> <li>• LPI Pump 2</li> </ul>                            |
|                      |           |   |
|                      |           | <b>Open piggyback valves</b>  |
|                      |           |   |
|                      |           | <ul style="list-style-type: none"> <li>• DH 63</li> <li>• DH 64</li> </ul>                                      |
|                      |           |   |

Op Test No.: 1 Scenario # 3 Event # 7, 8 & 9 Page 15 of 18

Event Description: MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip; PZR Spray Valve Fails CLOSED During Depressurization

| Time  | Position | Applicant's Actions or Behavior   |
|---|----------|---|
|   | RO       | Align the Makeup and Letdown System as follows:   |
|   |          |   |
|   | RO       | Verify letdown is isolated.   |
|   |          |   |
|   | RO       | Lock MU Pump suctions in the BWST position.   |
|   |          |   |
|   |          | <ul style="list-style-type: none"> <li>• MU 3971</li> <li>• MU 6405</li> </ul>                |
|   |          |   |
|   | RO       | Verify the Standby MU Pump is running.  |
|   |          |   |
|   | RO       | IF BOTH MU Pumps are running, THEN open MU 6421, CTMT ISOLATION FOR ALTERNATE INJECTION LINE. |
|   |          |   |
|   | RO       | Control MU flow using MU 6419 and MU 32.  |
|   |          |   |
|   | BOP      | Verify SG levels are controlled at OR increasing the proper level using Specific Rule 4.      |
|   |          |   |
|   |          | <ul style="list-style-type: none"> <li>• SG 1</li> <li>• SG 2</li> </ul>                      |
|   |          |   |
|   | RO       | Depressurize the RCS as follows:  |
|   |          |   |
|   |          | Turn off all PZR heaters.   |
|   |          |   |
| <b>CAUTION: With the SFAS Low RCS Pressure Trip blocked, the operator is responsible for initiating SFAS should the leak rate increase such that Pressurizer level OR RCS pressure can NOT be controlled.</b> |          |   |
|   |          |   |

Op Test No.: 1 Scenario # 3 Event # 7, 8 & 9 Page 16 of 18

Event Description: MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip; PZR Spray Valve Fails CLOSED During Depressurization

| Time | Position | Applicant's Actions or Behavior   |
|------|----------|---|
|      | CREW     | IF SFAS has NOT actuated on Low RCS Pressure, AND RCS pressure decrease is being manually controlled, THEN block the SFAS Low RCS Pressure trip when the BLOCK PERMIT comes on. |
|      |          |   |
|      | RO       | Use Pressurizer Spray to reduce RCS pressure to maintain minimum adequate subcooling margin.  |
|      |          |   |
|      |          | Open RC 10, PZR SPRAY BLOCK Valve.  |
|      |          |   |
|      | RO       | Open RC 2, PZR SPRAY Valve ( <b>valve does NOT open</b> ).  |
|      |          |   |
|      | SRO      | IF Pressurizer Spray is NOT available OR is NOT sufficient to reduce RCS pressure THEN REFER to Step 8.14 for guidance on Depressurizing the RCS without PZR Spray.             |
|      |          |   |
|      | RO       | Depressurize the RCS as follows:  |
|      |          |   |
|      | RO       | Turn off all PZR Heaters.   |
|      |          |   |
|      | RO       | Start the QT Circ Pump if available.  |
|      |          |   |
|      | RO       | Reduce RCS pressure to close to the minimum adequate SCM curve (Fig. 1) using one of the following methods:   |
|      |          |   |
|      |          | <ul style="list-style-type: none"> <li>PZR Vent Line Method</li> </ul>  |
|      |          |   |
|      |          | 1. Open RC239A, PZR STEAM SPACE SAMPLE VALVE  |
|      |          |   |
|      |          | 2. Open RC 200, PZR VENT TO QT ISOLATION.   |
|      |          |   |

|                    |          |   |          |         |                     |      |           |    |           |
|--------------------|----------|---|----------|---------|---------------------|------|-----------|----|-----------|
| Op Test No.:       | <u>1</u> | Scenario #  | <u>3</u> | Event # | <u>7, 8 &amp; 9</u> | Page | <u>17</u> | of | <u>18</u> |
| Event Description: |          | MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip; PZR Spray Valve Fails CLOSED During Depressurization |          |         |                     |      |           |    |           |
| Time               | Position | Applicant's Actions or Behavior   |          |         |                     |      |           |    |           |

|   |      |  |
|---|------|--|
|   |      | 3. Manually cycle RC 200 AND control PZR heaters to maintain RCS pressure.   |
|   |      |  |
|   |      | OR   |
|   |      |  |
|   |      | • PORV method  |
|   |      |  |
|   |      | 1. Open RC 11, PORV Block Valve  |
|   |      |  |
|   |      | 2. Open RC 2A, PORV  |
|   |      |  |
|   |      | 3. Manually cycle the PORV AND control PZR heaters to maintain RCS pressure close to the minimum adequate SCM curve of Figure 1.   |
|   |      |  |
| <b>CAUTION: With the SFAS Low RCS Pressure trips blocked, the operator is responsible for initiating SFAS if the leak rate rises such that PZR level OR RCS pressure can NOT be controlled.</b> |      |  |
|   |      |  |
|   | CREW | IF SFAS has NOT actuated on Low RCS Pressure, AND if the RCS pressure decrease is being manually controlled with adequate SCM THEN block the SFAS Low RCS Pressure trips when the BLOCK PERMITs come in. |
|   |      |  |
|   | RO   | Allow HPI and MU to recover PZR level AND maintain PZR level from 80 to 120 inches by controlling HPI and MU.  |
|   |      |  |
|   | SRO  | Check for entry into PTS criteria. REFER to Specific Rule 5.   |
|   |      |  |
|   | CREW | Establish a 50°F/hr cooldown rate.   |
|   |      |  |
|   | BOP  | IF SFRCS has tripped the AVVs, THEN block the trip and take control as follows:  |

Op Test No.: 1 Scenario # 3 Event # 7, 8 & 9 Page 18 of 18

Event Description: MFPT #2 Trips; OTSG Tube Leak Rises to Rupture Following the Reactor Trip; PZR Spray Valve Fails CLOSED During Depressurization

| Time   | Position    | Applicant's Actions or Behavior   |
|--|-------------|---|
|  |             |   |
|  |             | 1. Place BOTH AVV H/A Stations in HAND  |
|  |             |   |
|  |             | 2. Reduce BOTH demands to zero.   |
|  |             |   |
|  |             | 3. Press the AVV BLOCK pushbuttons (HIS-ICS-11D or HIS-ICS-11C).  |
|  |             |   |
|  |             | 4. Press AUTO on HIS-ICS-11B or HIS-ICS-11A.  |
|  |             |   |
|  |             | 5. Control SG pressure using the H/A Station.   |
|  |             |   |
| <b>CRITICAL TASK</b>   | <b>CREW</b> | <b>Depressurize the RCS down to AND maintain close to the minimum adequate subcooling margin limit during RCS cooldown.</b> |
|  |             |   |
| <b>Scenario may be terminated when RCS depressurization is in progress</b> |             |   |