

Oyster Creek NRC Exam April 2008

- Simulator Scenarios

OC ILT 07-1 NRC Exam Scenario NRC SIM 2

Scenario Outline

Facility: Oyster Creek

Scenario No.: NRC SIM 2

Op Test No.: OC 2008

Examiners: _____

Operators: _____

Initial Conditions:

- The plant is at 100% power.
- RWCU Pump B is out of service for repair.
- Dilution Pump 2 is out of service for maintenance.
- The RWM is inoperable and is bypassed.

Turnover:

- Complete 610.4.002, Core Spray Pump Operability Test for normal surveillance.

| Event No. | Malf. No. | Event Type* | | Event Description |
|-----------|---------------------|-------------|------------|--|
| 1 | SWI-RPS034 | N TS | BOP SRO | Perform Automatic Scram Contactor Test, 619.4.025 |
| 2 | MAL-EDS003D | C | BOP | Respond to a loss 480 VAC USS 1B1 with failure of TBCCW to auto start. |
| 3 | PMP-GEA005B | R | ATC | Respond to loss of main generator isophase Fan #1. |
| 4 | MAL-NIS020D | C | ATC | Respond to an upscale failure of APRM 4. |
| 5 | MAL-RCP003A | C TS | BOP SRO | Respond to recirculation pump seal leak. |
| 6 | ANN-H5c | C | ATC | Responds to a high temperature control rod 46-15. |
| 7 | MAL-ICS02B | M | Crew | Respond to an Isolation Condenser B tube leak with rising fuel failures. |
| 8 | MAL-CFW003A, 3B, 3C | C | Crew | Respond to the loss of all Feedwater/Condensate. |

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor Transient, (TS) Tech Specs

NRC SIM 2 Simulator Scenario Summary

| <u>Event</u> | <u>Event Summary</u> |
|--------------|---|
| 1 | The BOP will complete procedure 619.4.025, Automatic Scram Contactor Test, starting at step 6.4. The last RPS scram channel will fail to function and the crew will enter ABN-39, RPS Failures. The RPS channel will be declared inoperable and Technical Specifications will be applied. (TS 3.1.1). (BOP: NORMAL EVOLUTION; SRO: TECHNICAL SPECIFICATIONS) |
| 2 | The BOP will respond to the loss of 480 VAC USS 1B1 and enter ABN-47, Loss of USS 1B1. The standby TBCCW Pump fails to auto start and is manually started. The BOP performs several switch manipulations (start TBCCW Pump 2, start SJAE Drain Pump 1-1, place Aux. Flash Tank Pump 1-1 in auto, start air compressor 1, and place the condensate prefilter bypass switch to open). (BOP: COMPONENT MALFUNCTION) |
| 3 | The in-service main generator isophase cooling fan will trip (RAP-R7d). The SRO will direct that reactor power be reduced with recirculation flow. (ATC: REACTIVITY MANIPULATION) |
| 4 | As reactor power is reduced, APRM 4 will slowly fail upscale. This will result in a ½ scram and control rod block. The ATC will bypass the APRM and reset the ½ scram. (ATC: COMPONENT MALFUNCTION) |
| 5 | The BOP will respond to Recirculation Pump A seal failure. This will result in an increased Drywell unidentified leakage. The SRO will direct the pump be secured and isolated to stop the leak. (BOP: COMPONENT MALFUNCTION; SRO: TECHNICAL SPECIFICATION) |
| 6 | The ATC will respond to a high temperature control rod 46-15 (at position 48). The ATC will perform stall flows IAW procedure 617.4.002, CRD Exercise and Flow Test/IST Cooling Water Header Check Valve. This requires placing the rod power switch on, selecting the high temperature control rod and instituting a withdraw signal several times. This will clear the alarm. (ATC: COMPONENT MALFUNCTION) |
| 7 | The crew will respond to rising fuel failures and an Isolation Condenser B tube leak, which cannot be isolated. The crew will enter the Radioactivity Release Control EOP. The Isolation Condenser tube leak will not be isolable. The crew will scram when fuel damage is evident. When the SM/ED declares a General |

| | |
|------------------|---|
| | Emergency, the Crew will Emergency Depressurize the RPV. (MAJOR) |
| 8 | The crew will respond to the loss all condensate pumps when the first EMRV is opened for the ED. This will remove feedwater/condensate as an injection source and RPV water level will be maintained with Core Spray when RPV pressure reduces to 305 psig. Core Spray will fail to automatically start and will be manually started and injected. (COMPONENT MALFUNCTION AFTER EOP) |
| Critical Task #1 | Manually scram the reactor when indications are present of core damage with an Isolation Condenser tube leak. This action places the reactor in the lowest energy state and allows a cooldown and depressurization to minimize the severity of an offsite radiological release. |
| Critical Task #2 | Emergency Depressurize the RPV when a General Emergency (for offsite release) is declared and a primary system is discharging outside primary and secondary containment. This reduces the driving head responsible for the offsite radiological release rate. (PRA) |

OC ILT 07-1 NRC Exam Scenario NRC SIM 2

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM2</u> Event No.: <u>1</u> Event Description: <u>Continue in Surveillance test 619.4.025 with a failure of RPS 2</u> | | |
|--|----------|---|
| Initiation: Following shift turnover | | |
| Cues: As directed by the SRO | | |
| Time | Position | Applicant's Actions or Behavior |
| | SRO | <ul style="list-style-type: none"> • Conducts pre-shift brief. • Directs BOP to continue in surveillance test 619.4.025, starting at step 6.5. • Directs entry into ABN-39, RPS Failures <ul style="list-style-type: none"> ○ Directs ATC to insert a ½ scram on RPS 2 • Reviews Technical Specifications Table 3.1.1.A, Note nn <ul style="list-style-type: none"> ○ Within 12 hours, restore to operable or place in the tripped condition • Notifies WWM/SM for investigation/repair of failed RPS System 2 • May direct ½ scram reset and scram contactor test resumed |
| | BOP | <ul style="list-style-type: none"> • Continues in surveillance test 619.4.025, Automatic Scram Contactor Test, at step 6.4 <ul style="list-style-type: none"> ○ Place SUBCHANNEL 2A TEST switch (Panel 7R) to TRIP ○ Verifies: <ul style="list-style-type: none"> ▪ 2K51 (Panel 7R) is de-energized (NOT MODELED) ▪ 2K51A (Panel 7R) is de-energized (NOT MODELED) ▪ SCRAM SOLENOIDS lights on Panel 7R and RPS-2 lights on Panel 4F are extinguished ▪ SCRAM CONTACTOR OPEN G1c alarm is received ▪ PCPID 2K51A (2K51A) is de-energized ○ Place SUBCHANNEL 2A TEST switch to NORMAL ○ Reset the half-scram by depressing the SCRAM SYSTEM RESET pushbutton ○ Verifies: <ul style="list-style-type: none"> ▪ 2K51 (Panel 7R) is energized (NOT MODELED) |

| | | |
|--|-----|--|
| | | <ul style="list-style-type: none"> ▪ 2K51A (Panel 7R) is energized (NOT MODELED) ▪ SCRAM SOLENOIDS lights on Panel 6R, 7R and RPS-2 lights on Panel 4F are illuminated ▪ SCRAM CONTACTOR OPEN G1c alarm is cleared ▪ PCPID 2K51A (2K51A) is energized ○ Place SUBCHANNEL 2B TEST switch (Panel 7R) to TRIP ○ Report that no ½ scram has occurred • Continues in surveillance test 619.4.025, Automatic Scram Contactor Test, at step 6.5 <ul style="list-style-type: none"> ○ Place SUBCHANNEL 2B TEST switch (Panel 7R) to TRIP ○ Verifies: <ul style="list-style-type: none"> ▪ 2K52 (Panel 7R) is de-energized (NOT MODELED) ▪ 2K52A (Panel 7R) is de-energized (NOT MODELED) ▪ SCRAM SOLENOIDS lights on Panel 7R and RPS-2 lights on Panel 4F are extinguished ▪ SCRAM CONTACTOR OPEN G1c alarm is received ▪ PCPID 2K52A (2K52A) is de-energized ○ Place SUBCHANNEL 2B TEST switch to NORMAL ○ Reset the half-scram by depressing the SCRAM SYSTEM RESET pushbutton ○ Verifies: <ul style="list-style-type: none"> ▪ 2K52 (Panel 7R) is energized (NOT MODELED) ▪ 2K52A (Panel 7R) is energized (NOT MODELED) ▪ SCRAM SOLENOIDS lights on Panel 6R, 7R and RPS-2 lights on Panel 4F are illuminated ▪ SCRAM CONTACTOR OPEN G1c alarm is cleared ▪ PCPID 2K52A (2K52A) is energized ○ Reports surveillance test completed successfully |
| | ATC | <ul style="list-style-type: none"> • Inserts ½ scram on RPS 2 by depressing MANUAL SCRAM BUS 2 pushbutton, when directed • Resets the ½ scram by depressing the SCRAM SYSTEM RESET pushbutton, when directed |
| | | |

OC ILT 07-1 NRC Exam Scenario NRC SIM 2

| | |
|--|--|
| ROLE PLAY as directed by the Lead Examiner | (If a ½ scram is placed on RPS 2 and) Tech. Specs. have been reviewed (and after a request to repair has been made), call the control room as the Shift Manager. Report that the SUBCHANNEL 2B TEST switch was faulty and was replaced. Reset the ½ scram (If inserted) and to perform the remaining section of the scram contactor test. Time compression may be used here. |
| BOOTH | Prior to performing the surveillance test the second time, the SWI-RPS034 malfunction must be deleted. ENSURE the SUBCHANNEL 2B TEST switch is in NORMAL prior to deleting the malfunction or a ½ scram will occur. |
| Lead Eval. | Provide a new copy of the surveillance test to the SRO. |
| | |
| Terminus: | Tech. Specs. have been addressed and the scram contactor test is completed. |

Notes/Comments

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

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM2</u> Event No.: <u>2</u> | | |
|--|----------|--|
| Event Description: <u>Responds to a loss of USS 1B1 and the failure of TBCCW Pump to auto start</u> | | |
| Initiation: Tech. Specs. have been addressed and the scram contactor test is completed, or as directed by the Lead Examiner. | | |
| Cues: Annunciators U1c, 1B1 MN BRKR TRIP; T6d, FDR TO 460V 1B1 TRIP | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <p>Responds to annunciators U1c, 1B1 MN BRKR TRIP; T6d, FDR TO 460V 1B1 TRIP</p> <ul style="list-style-type: none"> • Reports the loss of USS 1B1 and responding IAW ABN-47, Loss of USS 1B1 <ul style="list-style-type: none"> ○ Starts TBCCW Pump 2 by placing TBCCW PUMP 2 switch to start [PANEL 13R] ○ Monitors TBCCW temperatures ○ Confirms 1-1 Station Air Compressor is operating [PANEL 7F] ○ Monitors Instrument Air pressure [PANEL 5F/6F] ○ Directs EO to confirm Condensate Prefilter System Bypass Valve V-425-301 is open on LIR-425-1-8 [ROLE PLAY 1] ○ Opens V-425-301 by placing V-425-301\CS to OPEN [PANEL 5F/6F] ○ Confirms Trunion Room Ran 1-6 is operating [Panel 10R] ○ Monitors Trunion Room temperatures ○ Confirms SJAE Drain Pump 1-1 operating ○ Confirms AUX FLASH TANK DRAIN PUMP 1-1 switch is in AUTO and is controlling [PANEL 7F] ○ Monitors Feed Pump and Condensate Pump temperatures [PANEL 12XR] ○ Confirms Exhauster Blower #1 is operating [PANEL 7F] ○ Confirms with EO that Stator Cooling Pump 1A is operating [ROLE PLAY 2] ○ Directs EO to operate 1-2 and/or 1-3 sump pumps ○ Confirms with EO that Phase Bus Cooling Fan 1-1 is operating [ROLE PLAY 3] ○ Directs EO to confirm V-567-0005 is closed, HWC Isolation Valve [ROLE PLAY4] |

OC ILT 07-1 NRC Exam Scenario NRC SIM 2

| | | |
|--|-----|---|
| | | <ul style="list-style-type: none"> ○ Verifies Main Transformer M1A cooling power remains on its normal power feed as indicated by alarm R6e clear ○ Confirms with EO that Main Transformer M1A cooling fans and oil pumps are running [ROLE PLAY 5] ○ Verifies Main Transformer M1B cooling power remains on its normal power feed as indicated by alarm R6f clear ○ Confirms with EO that Main Transformer M1B cooling fans and oil pumps are running [ROLE PLAY 6] ○ Verifies Aux Transformer cooling power remains on its normal power feed as indicated by alarm S6a clear ○ Confirms with EO that Aux Transformer cooling fans and oil pumps are running [ROLE PLAY 7] ○ Monitors TB area temperatures and ΔP ○ Notifies Rad Pro and Chemistry of the bus loss |
| | SRO | <ul style="list-style-type: none"> ● Directs the BOP to enter and perform ABN-47, Loss of USS 1B1 ● Notifies WWM/SM about the loss of USS 1B1 |
| | ATC | <ul style="list-style-type: none"> ● Makes plant announcement for loss of USS 1B1 ● Directs EO to investigate tripped breaker 1B1 [ROLE PLAY8] |
| | | |

| | |
|----------------------|---|
| ROLE PLAY | <ol style="list-style-type: none"> 1. When asked as the EO to confirm Condensate Prefilter System Bypass Valve V-425-301 is open on LIR-425-1-8, wait 1 minute and then report: Valve V-425-301 is open. 2. When asked as the EO to confirm Stator Cooling Pump 1A is running, wait 1 minute and report: Stator Cooling Water Pump 1A is running. 3. When asked as the EO to confirm Phase Bus Cooling Fan 1-1 is running, wait 1 minute and report: Phase Bus Cooling Fan 1-1 is running. 4. When asked as the EO confirm V-567-0005 is closed, HWC Isolation Valve, report it is closed. 5. When asked as the EO to confirm that the Main Transformer M1A cooling fans and oil pumps are running, wait 1 minute and report: the Main Transformer M1A cooling fans and oil pumps are running. The emergency power breaker is tripped. 6. When asked as the EO to confirm that the Main Transformer M1B cooling fans and oil pumps are running, wait 1 minute and report: the Main Transformer M1B cooling fans and oil pumps are running. The emergency power breaker is tripped. 7. When asked as the EO to confirm that the Aux Transformer cooling fans and oil pumps are running, wait 1 minute and report: the Aux Transformer cooling fans and oil pumps are running. The emergency power breaker is tripped. 8. When asked as the EO to investigate USS 1B1 main breaker, report that it is open and is hot to the touch. |
| | |
| Terminus: | The Subsequent Operator Actions in ABN-47 have been completed. |

Notes/Comments

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

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM2</u> Event No.: <u>3</u> | | |
|--|---|---|
| Event Description: <u>Isophase Fan 1 Trip</u> | | |
| Initiation: The Subsequent Operator Actions in ABN-47 have been completed, or as directed by the Lead Examiner | | |
| Cues: Annunciator R7d, ISOL PH FAN 1 TRIP | | |
| Time | Position | Applicant's Actions or Behavior |
| | | |
| NOTE: | The intent of this event is to cause the SRO to direct a reactor power reduction. The RAP directs that the internal bus temperature shall not exceed 120 °C. Role Play temperatures may need to be adjusted to cause the reactor power reduction in a timely manner. Once power has been reduced, report lower temperatures than provided at rated reactor power. | |
| | | |
| | BOP | <ul style="list-style-type: none"> • Responds to annunciator R7d, ISOL PH FAN 1 TRIP <ul style="list-style-type: none"> ○ Reports Isophase Fan 1 tripped ○ Direct EO to monitor 3 internal bus contact temperatures and to investigate the tripped isophase fan [ROLE PLAY 1] ○ Directs EO to monitor external temperatures with a contact pyrometer at the top and middle of the duct also |
| | | |
| | SRO | <ul style="list-style-type: none"> • Notifies WWM/SM to replace the belts on the Isophase Cooling Fan 1 • Directs the ATC to reduce reactor power with recirculation flow |
| | | |
| | ATC | <ul style="list-style-type: none"> • Reduces reactor power as directed by rotating the knob CCW on the MASTER RECIRC SPEED CONTROLLER until the desired power is reached |
| | | |

| | |
|----------------------|---|
| ROLE PLAY | <ol style="list-style-type: none"> 1. When directed to monitor 3 internal bus contact temperatures and to investigate the tripped isophase fan, wait 2 minutes and then report: the 3 internal bus contact temperatures indicate 100 °C, 102 °C, and 101 °C, and rising slowly. Also report that the isophase fan 1 has tripped and the belts have disintegrated and little pieces are everywhere. 2. After about 5 minutes after the last report above OR before power is reduced: Call the Control Room and report: the 3 internal bus contact temperatures indicate 103 °C, 105 °C, and 104 °C, and still rising slowly (LIMIT is 120 °C). The maximum surface temperature is 177 °F and rising slowly (LIMIT is 200 °F). At this rate, we will rise to 120 °C in about 5 minutes. 3. After reactor power has been reduced to \leq 90% power, call the Control Room and report: 3 internal bus contact temperatures indicate 104 °C, 105 °C, and 105 °C, and steady. Duct surface temperatures have also stabilized with the highest reading at 183 °F. 4. If asked if there are any fan belts staged in the area, report that none are staged. |
| | |
| Terminus: | Reactor power has been reduced to \leq 90% with recirculation flow. |

Notes/Comments

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

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM2</u> Event No.: <u>4</u> | | |
|--|--|---|
| Event Description: <u>Respond to the upscale failure of APRM 4</u> | | |
| Initiation: Reactor power has been reduced to $\leq 90\%$ with recirculation flow. | | |
| Cues: Annunciators G1c, SCRAM CONTACTOR OPEN; G1d, CHANNEL I; G1f, APRM HI-HI INOP I; G3f, APRM HI; H7a, ROD BLOCK | | |
| Time | Position | Applicant's Actions or Behavior |
| | ATC | <ul style="list-style-type: none"> • Responds to annunciators G1c, SCRAM CONTACTOR OPEN; G1d, CHANNEL I; G1f, APRM HI-HI INOP I; G3f, APRM HI; H7a, ROD BLOCK • Reports $\frac{1}{2}$ scram on RPS 1 • Reports APRM 4 indicates upscale; all other APRMS indicate normally • Verifies APRM drawer readings • Bypasses APRM 4 IAW Procedure 403 [PANEL 4F] <ul style="list-style-type: none"> ○ Places the APRM BYPASS joystick to APRM 4 position ○ Updates Attachment 403-2 as directed by the SRO • Resets the $\frac{1}{2}$ scram by depressing the SCRAM SYSTEM RESET pushbutton • Reports APRM 4 is bypassed and the $\frac{1}{2}$ scram reset |
| | SRO | <ul style="list-style-type: none"> • Verifies able to bypass APRM 4 • Directs ATC to bypass APRM 4 IAW Procedure 403, and then to reset the $\frac{1}{2}$ scram • Notifies WWM/SM about the failed APRM 4 • May update Attachment 403-2 |
| | BOP | <ul style="list-style-type: none"> • Makes plant announcement to stop surveillance testing • Verifies APRM 4 indicates bypassed on Panel 3R |
| Terminus: | APRM 4 is bypassed and the $\frac{1}{2}$ scram is reset. | |

Notes/Comments

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

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM2</u> Event No.: <u>5</u> Event Description: <u>Responds to Recirculation Pump A seal failure</u> | | |
|---|----------|---|
| Initiation: APRM 4 is bypassed and the ½ scram is reset, or as directed by the Lead Examiner. | | |
| Cues: Rise in Recirculation Pump A number 2 seal cavity pressure; rise in Drywell unidentified leak rate; (delayed annunciator E7b, CCW TEMP HI; E2d, VIBRATION HI A) | | |
| Time | Position | Applicant's Actions or Behavior |
| | ATC | <ul style="list-style-type: none"> • Reports rise in Drywell unidentified leak rate and reports value/trend • Reports new value of Drywell unidentified leak rate and reports value/trend (after the seal failure has been increased) • If directed to maintain constant reactor power during the normal recirculation pump shutdown, rotates the MASTER RECIRC SPEED CONTROLLER CW as recirculation pump A speed is lowered • Reports Drywell unidentified leak rate is lowering (after recir. pump isolation) |
| | SRO | <ul style="list-style-type: none"> • Directs entry into ABN-2, Recirculation System Failures <ul style="list-style-type: none"> ○ Section 6: Potential 1st Stage Seal Failure OR ○ Section 8: Total Seal Failure • Review TS 3.3.F.2.a, 3.3.F.2.b <ul style="list-style-type: none"> ○ APLHGR limited to 98% ○ recirculation pump MG Set motor breaker is open and defeated from operation ○ with leakage rates above the limit, reduce the leak rates within 8 hours (> 2 gpm increase in unidentified leakage within a 24 hour period) |
| | BOP | <ul style="list-style-type: none"> • Responds to annunciator E7b, CCW TEMP HI <ul style="list-style-type: none"> ○ Verifies temperature on Recorder IA55 and reports alarm on |

| | | |
|--|--|--|
| | | <p>seal cooling for Recirculation Pump A</p> <ul style="list-style-type: none"> ○ Determines Drywell bulk temperature ○ Refers to ABN-19, RBCCW Failure Response ○ Checks RBCCW flow and pressure • Reports high pressure indicated on recirculation pump seal #2 • Performs ABN-2, Section 6: Secures recirculation pump B IAW 301.2 if directed <ul style="list-style-type: none"> ○ Notifies Chemistry ○ Places the Recirculation Pump A MG SPEED CONTROLLER in MAN by pressing the AUTO/MAN button ○ Reduce pump speed by rotating Recirculation Pump A MG SET SPEED CONTROLLER CCW ○ With speed at minimum: <ul style="list-style-type: none"> ▪ confirms suction/discharge of 1 other pump is open ▪ confirms the discharge bypass valve is open ▪ closes the discharge valve by placing its control switch to CLOSE ▪ closes the discharge valve by placing its control switch to CLOSE ▪ stops the recirculation pump by placing its DRIVE MOTOR switch to STOP ▪ confirms recirculation pump temperature indicators is selected to an operating pump ▪ Directs the EO to confirm the related dampers are closed: DM-56-93 and DM-56-94 [ROLE PLAY] ○ If directed to isolate the pump IAW Procedure 301.2, performs the following: <ul style="list-style-type: none"> ▪ confirms operation below MAPLHGR limits IAW procedure 202.1 ▪ confirms the discharge valve is closed ▪ closes the pump suction valve by placing its control switch to CLOSE ▪ closes the pump discharge bypass valve placing its control switch to CLOSE ▪ Directs the EO to rackout and tag the associated MG Set motor breaker [ROLE PLAY] • Performs ABN-2, Section 8: Total Seal Failure, if directed <ul style="list-style-type: none"> ○ stops the recirculation pump by placing its DRIVE MOTOR switch to STOP ○ closes the pump discharge valve, suction valve, and discharge bypass valves by taking their control switches to |
|--|--|--|

OC ILT 07-1 NRC Exam Scenario NRC SIM 2

| | | |
|-----------|--|--|
| | | <p>STOP</p> <ul style="list-style-type: none"> o confirms operation below MAPLHGR limits IAW procedure 202.1 o Directs the EO to rackout and tag the associated MG Set motor breaker [ROLE PLAY] o informs the SRO to review TS 3.3.F.2.a, 3.3.F.2.b |
| | | |
| ROLE PLAY | | <p>When requested to confirm the related dampers are closed (after shutdown of recirculation pump A): DM-56-93 and DM-56-94, report they are closed.</p> <p>When requested to rackout and tag the the associated MG Set motor breaker, insert the following: LOA-RFC021 to RACKED OUT. Wait a few minutes and report the recirculation pump A MG set is racked out and tagged.</p> |
| | | |
| Terminus: | | Recirculation Pump A is shutdown and isolated. |

Notes/Comments

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

OC ILT 07-1 NRC Exam Scenario NRC SIM 2

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM2</u> Event No.: <u>6</u> | | |
|--|----------|--|
| Event Description: <u>Responds to a high temperature control rod 46-15</u> [See NOTE 1 below] | | |
| Initiation: Recirculation Pump A is shutdown and isolated, or as directed by the Lead Examiner. | | |
| Cues: Annunciator H5c, CRD TEMP HI | | |
| Time | Position | Applicant's Actions or Behavior |
| | ATC | <ul style="list-style-type: none"> • Responds to annunciator H5c, CRD TEMP HI <ul style="list-style-type: none"> ○ Verifies CRD cooling water ΔP and flow are consistent with those listed in Procedure 302.1, Control Rod Drive System ○ Directs EO to check for a leaky scram discharge valve on HCU 46-15 [ROLE PLAY] ○ Applies stall flow IAW Procedure 617.4.002 [NOTE 2] <ul style="list-style-type: none"> ▪ Places the ROD POWER switch to ON ▪ Selects control rod 46-15 by depressing its P/B switch ▪ Holds the NOTCH OVERRIDE switch to NOTCH OVERRIDE ▪ Holds the ROD CONTROL switch to ROD OUT NOTCH position ▪ When the control rod returns to position 48, releases the switches ▪ Repeat 2 more times for control rod 46-15 [BOOTH] [NOTE 3] ○ Reports the high temperature alarm has cleared ○ Places the ROD POWER switch to OFF |
| | SRO | <ul style="list-style-type: none"> • Directs the RO to respond/investigate annunciator • Directs applying stall flow IAW Procedure 617.4.002 |
| | BOP | <ul style="list-style-type: none"> • Identifies control rod 46-15 as the high temperature control rod on Panel 8R recorders [NOTE 3] • Checks the control rod temperature panel on 8R and confirms the high temperature no longer exists after the cooling evolution |

| | | |
|------------------|--|--|
| | | |
| NOTE | <ol style="list-style-type: none"> 1. Because the CRD temperature recorders do not function, POST a stickey with "46-15 indicates 260 °F and steady" on the recorder BEFORE the annunciator is brought in. 2. Have SQR'd copy of 617.4.002 ready: initial step 6.1, and N/A step 6.2. The candidates will perform step 6.3. N/A all steps after this. 3. PRIOR to clearing the alarm, remove the previous stickey, and place a new stickey: " 46-15 indicates 235 °F and steady". | |
| | | |
| ROLE PLAY | <ol style="list-style-type: none"> 1. When directed as the EO to check for a leaky scram valve on HCU 46-15, wait 1 minute and then report: the scram discharge piping on HCU 46-15 and ones on either side of 46-15 all feel the same, and not too hot. | |
| | | |
| BOOTH | While the candidate is applying the stall flow the third time, then place ANN-H5c to OFF. | |
| | | |
| Terminus: | The high temperature control rod has been cleared. | |

Notes/Comments

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

| <p>Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM2</u> Event No.: <u>7</u></p> <p>Event Description: <u>Responds to Isolation Condenser B tube leak with indications of fuel failures</u></p> | | |
|---|----------|--|
| <p>Initiation: The high temperature control rod has been cleared, or as directed by the Lead Examiner.</p> | | |
| <p>Cues: Annunciator 10F1k, AREA MON HI; SJAE area radiation monitor tripped high; Later, annunciators C6b, SHELL B LVL HI/LO; C3b, COND B FLOW HI POSSIBLE RUPTURE</p> | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <ul style="list-style-type: none"> • Responds to Annunciator 10F1k, AREA MON HI <ul style="list-style-type: none"> ○ Reports SJAR radiation monitor in high alarm ○ Announces evacuation of the affected area • Reports offgas radiation monitors rising • Performs ABN-26 <ul style="list-style-type: none"> ○ Directs Chemistry to sample offgas and reactor coolant ○ Informs the SRO of Tech Specs 3.6.E and 4.6.E ○ Informs Reactor Engineering • Responds to annunciators C3b, COND B FLOW HI POSSIBLE RUPTURE and C6b, SHELL B LVL HI/LO <ul style="list-style-type: none"> ○ Checks area temperatures ○ checks shell level (high) ○ checks shell temperature (high) ○ Reports indications of a tube leak in IC-B ○ Reports that Isolation Condenser B failed to isolate and attempts to isolate without success • Reports Isolation Condenser area radiation monitor above its alarm point (EOP entry) • Places ROPS switch in BYPASS when directed for ED • Performs ED by placing all AUTO DEPRESS switches to MAN position (Critical Task) • Performs Support Procedure 4 (Core Spray injection) <ul style="list-style-type: none"> ○ Starts one Core Spray Main Pump in each System by placing their control switches to START ○ Starts one Core Spray Booster Pump in each System by |

| | | |
|--|-----|--|
| | | <p>placing their control switches to START</p> <ul style="list-style-type: none"> ○ When RPV pressure drops to < 310 psig, opens Core Spray Parallel Isolation Valves with their control switches to OPEN ○ Reports Core Spray is injecting and RPV water level rising ○ Control RPV water level 100 – 175" by cycling the Core Spray Parallel Isolation Valves |
| | | |
| | SRO | <ul style="list-style-type: none"> • Directs entry into ABN-26 • Directs entry into Radioactivity Release Control EOP <ul style="list-style-type: none"> ○ Directs BOP to isolate IC-B, if not already attempted ○ When fuel failures are recognized by high offgas/MSL radiation monitors high alarm, directs ATC to manually scram • Directs entry into Secondary Containment Control EOP <ul style="list-style-type: none"> ○ Directs isolating Isolation Condenser B, if not already attempted • Directs a manual scram and entry into RPV Control – No ATWS (Critical Task) <ul style="list-style-type: none"> ○ Directs BOP to perform Support Procedure 1 (Auto initiations/isolations verification) ○ Directs ATC to perform Support Procedure 2 (Feedwater Injection) ○ Directs RPV water level 138" – 175" ○ Directs RPV pressure 800 – 1000 psig with TBV • Directs entry into ED – No ATWS when a GE is declared (Critical Task) • (NOTE: When ED occurs, all feedwater and condensate pumps will automatically trip) <ul style="list-style-type: none"> ○ Directs ROPS bypassed ○ Directs all EMRVS opened • With RPV water level lowering after the Condensate Pumps tripped, directs Support Procedure 3 (CRD Injection) • Directs Support Procedure 4 to maintain an RPV water level 100 – 175" (Core Spray Injection) • If RPV water level < 61": <ul style="list-style-type: none"> ○ Directs ADS bypassed ○ Directs Support Procedure 9 (Core Spray Injection) |
| | | |
| | ATC | <ul style="list-style-type: none"> • Scrams the reactor when directed (Critical Task) <ul style="list-style-type: none"> ○ Depresses MANUAL SCRAM BUS 1 and BUS 2 |

OC ILT 07-1 NRC Exam Scenario NRC SIM 2

| | | |
|------------------|---|---|
| | | <ul style="list-style-type: none"> ○ Places the REACTOR MODE SELECTOR switch in SHUTDOWN ○ Inserts SRMs, IRMs ○ Reports all control rods in • Performs Support Procedure 2 (Feedwater Injection) <ul style="list-style-type: none"> ○ With RPV water level rising after the scram, trips 2 Feedwater Pumps by placing their control switches to STOP ○ Manually controls Feedwater flow with the MFRVs to maintain desired water level 138 – 175" • Reports Condensate Pumps tripped • Reports RPV water level lowering and when below 138" • Reports when RPV water level reaches LO-LO setpoint • Performs Support procedure 3 (CRD Injection) <ul style="list-style-type: none"> ○ Confirms CRD Pumps running ○ Directs EO to close CRD Charging Header Supply Valve V-15-52 ○ Directs EO to open CRD Bypass Isolation Valve, V-15-237 and to monitor flow ○ Directs EO to throttle open CRD Bypass Valve V-15-30 not to exceed 150 gpm • Bypasses ADS by placing key into ADS TIMER keylocks and rotates to BYPASS, if requested |
| | | |
| ROLE PLAY | After the scram and RPV water level and pressure are under control, call the control room as the ED and state that you are declaring a General Emergency due to Offsite Radiological Release. | |
| | | |
| Terminus: | The RPV has been emergency depressurized and Core Spray is injecting to raise RPV water level, or as directed by the Lead Examiner. | |

Notes/Comments

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

Emergency Plan Classification: Given as a General Emergency.

SIMULATOT SETUP

1. Setup to full power IC-65.
2. Place RWCU Pump B in PTL and hang tag.
3. Place RWM in bypass and hang tag.
4. Hang tag on Dilution Pump 2.
5. Have a copy of 619.4.025 (Automatic Scram Contactor Test) completed up to step 6.3.5 (up until step 6.4 completed). Have a second copy completed up to 6.4.5 (up until step 6.5 completed).
6. Setup a PPC screen to display RPS points from the RPS test.
7. Start SJAE Drain Pump 1-2. Verify TBCCW 1 and 3 running; and Aux. Flash Tank Drain Pump 1-2 running.
8. Have a clean signed/dated Attachment 403-2 in the 403 book.
9. Have SQR'd copy of 617.4.002 ready: initial step 6.1, and N/A step 6.2. The candidates will perform step 6.3 for the hot control rod.

Malfunctions:

| <u>Event</u> | <u>Trigger</u> | <u>Malfunction</u> |
|--------------|----------------------------------|--|
| 1 | PRESET | SWI-RPS034 to OFF <ul style="list-style-type: none"> • This keeps the RPS 2 subchannel 2B switch in the normal position |
| 2 | PRESET T1 → | PSW-TBC001A to FAIL TO TRIP <ul style="list-style-type: none"> • This will prevent the auto start of the standby TBCCW Pump on the loss of USS 1B1 (it also fails annunciator Q1f) MAL-EDS003D <ul style="list-style-type: none"> • This will trip USS 1B1 |
| 3 | T2→ | PMP-GEA005B <ul style="list-style-type: none"> • This provides a shaft seizure on Isophase Fan 1 and resultant trip |

OC ILT 07-1 NRC Exam Scenario NRC SIM 2

| | | |
|---|---|---|
| 4 | T3 → | <p>MAL-NIS020D</p> <ul style="list-style-type: none"> • This results in an upscale failure of APRM 4 and ½ scram |
| 5 | T4 → | <p>MAL-RCP003A to 100% MAL-RCP004A to 1%</p> <ul style="list-style-type: none"> • This causes a 100% failure of recirculation pump A inner seal and a 1% failure of the outer failure • After these malfunctions have been in for 3 minutes: insert MAL-RCP004A to 2% • If still not recognized by the candidates, insert ANN-E2d to ON (recirculation pump A vibration high). This alarm WILL come in by itself. |
| 6 | T5 → | <p>ANN-H5c to ON</p> <ul style="list-style-type: none"> • This makes annunciator H5c, CRD TEMP HI, turn on |
| 7 | <p>PRESET</p> <p>T6 →</p> <p>EVENT TRIGGER 7</p> | <p>VLV-ICS008 to MECH SIEZE (V-14-33) VLV-ICS007 to MECH SIEZE (V-14-32)</p> <ul style="list-style-type: none"> • This keeps IC-B steam IVs open <p>ICH-RMS032A to 2.1</p> <ul style="list-style-type: none"> • This raises SJAE area rad monitor to just above its alarm point (200 mr/hr) <p>ICH-RMS054A 200 to 300 over a 15 minute period ICH-RMS055A 200 to 300 over a 17 minute period</p> <ul style="list-style-type: none"> • This raises the offgas rad monitors to the values listed over the ramp time <p>Insert Event Trigger 7: hwx07d014r.gt.250</p> |

| | | |
|---|---|--|
| | T7 → | <p>MAL-ICS002B at 50% on trigger 7</p> <ul style="list-style-type: none"> This starts a tube leak in IC-B when offgas rad monitor reaches 250 mr/hr |
| 8 | <p>INSERT</p> <p>EVENT TRIGGER 8</p> <p>T8 →</p> <p>PRESETS</p> | <p>WHEN the SRO has entered RAD RELEASE CONTROL EOP: Insert</p> <p>ICH-RMS054A 700 to 825 over a 6 minute ramp</p> <p>ICH-RMS055A 700 to 800 over a 5 minute ramp</p> <ul style="list-style-type: none"> This raises the offgas rad monitors to above the OFFGAS HI alarm setpoint (700 mr/hr) <p>On TRIGGER 8: hwx01o076r.gt.0</p> <ul style="list-style-type: none"> This conditional trigger will activate Trigger 8 when EMRV NR108A red light comes on (during ED) <p>MAL-CFW003A</p> <p>MAL-CFW003B</p> <p>MAL-CFW003C</p> <ul style="list-style-type: none"> When triggered, all condensate pumps will trip <p>MAL-CSS007A</p> <p>MAL-CSS007B</p> <p>MAL-CSS007C</p> <p>MAL-CSS007D</p> <ul style="list-style-type: none"> This prevents Core Spray auto start and the parallel IVs will not auto open |

Procedures

| <u>Event</u> | <u>Number/revision</u> | <u>Title</u> |
|---------------------|-------------------------------|---|
| 1 | 619.4.025 | Auto Scram Contactor Test (2 copies) Note: This is handed out at scenario start. |
| 1 | ABN-39 | RPS Failures |
| 2 | RAP-U1c / 0 | 1B1 MN BRKR TRIP |
| 2 | RAP-T6d / 0 | FDR TO 460V 1B1 TRIP |
| 2 | ABN-47 / 4 | Loss of USS 1B1 |
| 3 | RAP-R7d / 0 | ISOL PH FAN 1 TRIP |
| 4 | RAP-G1c / 2 | SCRAM CONTACTOR OPEN |
| 4 | RAP-G1d / 0 | CHANNEL I |
| 4 | RAP-G1f / 2 | APRM HI-HI/INOP I |
| 4 | RAP-G3f / 2 | APRM HI |
| 4 | RAP-H7a / 3 | ROD BLOCK |
| 4 | 403 / 13 | LPRM-APRM System Operation |
| 5 | ABN-2 | Recirculation System Failures |
| 5 | 301.2 | Reactor Recirculation System |
| 5 | RAP-E7b | CCW TEMP HI |
| 5 | RAP-E2d | VIBRATION HI A |
| 6 | RAP-H5c / 0 | CRD TEMP HI |
| 6 | 302.1 / 97 | Control Rod Drive System |
| 6 | 617.4.002 / 48 | CRD Exercise and Flow Test/IST Cooling Water Header Check Valve |
| 7 | RAP-10F1k | AERA MON HI |
| 7 | ABN-26 / 2 | High Main Steam/Offgas/Stack Effluent Activity |
| 7 | RAP-10F2c | OFFGAS HI |
| 7 | RAP-C6b | SHELL B LVL HI |
| 7 | RAP-C4b | COND B VLVS OFF NORM |
| 7 | RAP-C3b | COND B FLOW HO POSSIBLE RUPTURE |
| 7 | | Rad Release Control EOP |

OC ILT 07-1 NRC Exam Scenario NRC SIM 2

| | | |
|---|------|-----------------------------------|
| 7 | | ED-No ATWS |
| | | Secondary Containment Control EOP |
| 7 | SP-2 | |
| 7 | SP-3 | |
| 7 | SP-4 | |
| 7 | sp-9 | |

Shift Turnover

1. The plant is at 100% power with Procedure 610.4.002, Core Spray Pump Operability Test in-progress.
2. Plant risk is yellow.
3. The following equipment is out of service:
 - a. RWCU Pump B is out of service for repair.
 - b. Dilution Pump 2 is out of service for maintenance.
 - c. The RWM is inoperable and is bypassed.
4. Following shift turnover:
 - a. Continue in Procedure 619.4.025, Automatic Scram Contactor Test, starting at Step 6.4.

OC ILT 07-1 NRC Exam Scenario NRC SIM 3

Scenario Outline

Facility: Oyster Creek

Scenario No.: NRC SIM 3

Op Test No.: OC 2008

Examiners: _____

Operators: _____

Initial Conditions:

- The plant is at about 65% power.
- EDG2 is OOS to replace a fuel pump.
- TBCCW Pump 2 and RWCU Pump B are OOS for maintenance.
- The RWM is inoperable and bypassed.
- Feedwater Pump B is off.

Turnover:

- Start Feedwater Pump B.
- Withdraw 4 control rods from position 40 to position 48.
- Restore reactor power to 75% with reactor recirculation flow.

| Event No. | Mal. No. | Event Type* | | Event Description |
|-----------|-------------------------------------|-------------|------------|--|
| 1 | N/A | N | BOP | The BOP will place Feedwater Pump B in service IAW Procedure 317. |
| 2 | MAL-CRD008_2 231 | C | ATC | Withdraw control rods and respond to uncoupled rod. |
| 3 | N/A | R | ATC | The ATC will raise reactor power by raising reactor recirculation flow. |
| 4 | MAL-TCS010 | C | BOP | The BOP will respond to an EPR failure. |
| 5 | ANN-T4b | TS | SRO | The SRO will respond to loss of oil to EDG 1. |
| 6 | LOA-RBC009 MAL-RCU014 | C | BOP | Responds to a RWCU isolation with failure to auto trip/isolate. |
| 7 | BKR-CRD002 & MAL-CRD006_2 231 | C TS | ATC SRO | The ATC will respond to the trip of CRD Pump A, and an inward drifting control rod on the manual CRD pump start. |
| 8 | MAL-NSS025E | M | Crew | The crew will respond to a leaking EMRV E and an electric ATWS. |
| 9 | PMP-SLC001A/ SLC002A | C | Crew | Respond to a SLC Pump shaft break. |

- (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor Transient, (TS) Tech Specs

NRC SIM 3 Simulator Scenario Summary

| <u>Event</u> | <u>Event Summary</u> |
|--------------|---|
| 1 | The BOP will startup Feedwater Pump B and place it on the Master FW Controller IAW Procedure 317, Feedwater System and 202, . The BOP will also initiate hydrogen injection to the pump and place the IP/HP feedwater heaters in service IAW Procedure 317.1. (BOP: NORMAL EVOLUTION) |
| 2 | The ATC will withdraw 4 control rods from position 40 to position 48 as part of a planned control rods for flow swap. The last control rod will be uncoupled and entry into ABN-6, Control Rod Malfunctions, will be made. The control rod will be inserted, where it will re-couple, and be withdrawn to position 48 (place rod power switch to on, select the control rod, rod control switch to rod out notch, rod control switch to rod in, rod control switch to rod out notch). (ATC: COMPONENT MALFUNCTION) |
| 3 | The ATC will raise reactor power to 75% with recirculation flow and notify Reactor Engineering as a hold point. (ATC: REACTIVITY MANIPULATION) |
| 4 | The BOP will respond to EPR setpoint changes resulting in lower RPV pressure (and will diagnose a faulted EPR) and will enter ABN-9, Electronic Pressure Regulator Malfunction. The BOP will place the MPR in control, secure the EPR, and raise RPV pressure back to normal. (BOP: COMPONENT MALFUNCTION) |
| 5 | The SRO will respond to the CNTRL DC LO/LOST annunciator and will declare EDG 1 inoperable. The SRO will apply Technical Specifications. (TS 3.7) (SRO: TECHNICAL SPECIFICATIONS) |
| 6 | The BOP will respond to RWCU non-regenerative heat exchanger outlet temperature alarm (D8b) with a failure of the RWCU System to trip and isolate. The BOP will manually perform these functions. This will require several switch manipulations (trips RWCU Pump, close isolation valves V-16-1 and V-16-14). (BOP: COMPONENT MALFUNCTION) |
| 7 | The ATC will respond to a trip of the in-service CRD Pump. IAW the RAP, the ATC will start the standby pump and then a control rod drift inward will occur. The ATC will insert the control rod IAW ABN-6, Control Rod Drive System. The SRO will apply Technical Specifications. (ATC: COMPONENT MALFUNCTION; SRO: TECHNICAL SPECIFICATIONS) |

- 8 EMRV E will begin to leak to the Torus. The BOP will enter ABN-40, Stuck Open EMRV. The BOP will not be successful in stopping the leak. The SRO will direct a manual scram. There will be an electric ATWS. The crew will enter RPV Control – With ATWS and lower RPV water level and inject SLC. (**MAJOR**) (**PRA**)
- 9 The first SLC Pump will not function and the alternate SLC Pump will be started. (**COMPONENT MALFUNCTION AFTER EOP**)
- Critical Task #1 Inject SBLC when Torus water temperature cannot be maintained below the boron injection initiation temperature (BIIT). This will ensure that the hot shutdown boron weight of boron will be injected before the torus temperature exceeds the heat capacity temperature limit (HCTL) of the primary containment. (**PRA**)
- Critical Task #2 Insert control rods IAW Support Procedure 21. Complete insertion of control rods is an absolute method in ensuring that power production has been ceased, and is preferable to boron injection alone.
- Critical Task #3 With reactor power > 2%, terminate and prevent injection into the RPV by all systems except CRD and Boron injection systems IAW Support procedure 17. These actions lower core subcooling to reduce the possibility of reduce/prevent power oscillations.

OC ILT 07-1 NRC Exam Scenario NRC SIM 3

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM3</u> Event No.: <u>1</u> Event Description: <u>Starts Feedwater Pump B</u> | | |
|--|----------|--|
| Initiation: Following shift turnover, or as directed by the Lead Examiner | | |
| Cues: As directed by the SRO | | |
| Time | Position | Applicant's Actions or Behavior |
| | SRO | <ul style="list-style-type: none"> • Directs the BOP to start the Feedwater Pump B IAW procedure 317 |
| | BOP | <p>Starts Feedwater Pump B IAW procedure 317 [Panel 5F/6F]</p> <ul style="list-style-type: none"> • Makes plant announcement prior to starting pump • Places the FEED PUMP 1B control switch to START and holds • When FEED PUMP AMPS 1B indicates breaker closed, releases the switch • Verifies proper operation of Feedwater Pump B [ROLE PLAY1] <ul style="list-style-type: none"> ○ Requests EO report on FW Pump operation • Requests EO to stop the FW Pump B auxiliary oil pump [ROLE PLAY2] • Places HEATER BANK OUTLET V-2-11 to the OPEN position • Operates the FW Pump for 10 minutes [LEAD FLOOR NOTE] • Initiates flow through the FW Pump B by slowly rotating the MFRV FLOW CONTROLLER V-ID11B manual know CW • Monitors flow in the other 2 FW strings to ensure they reduce flow as flow from the FW Pump B rises • When FEED PUMP DISCHARGE FLOW 1B reaches about 0.5 x 10⁶ lb/hr, verifies MIN FLOW VALVE V-2-19 closes • When the S display and the V display are about equal on MFRV FLOW CONTROLLER V-ID11B, presses the AUTO/MAN button <p>Reports that FW Pump B is in automatic on the Master Controller</p> <ul style="list-style-type: none"> • Directs EO to start hydrogen injection to FW Pump B IAW procedure 317.4 [ROLE PLAY3] <p>Places the FW Pump B feedwater heaters in service IAW procedure 317.1 at step 2.3.2.4 [PANEL 7F]</p> <ul style="list-style-type: none"> • Slowly opens the EXTRACTION STEAM ISOLATION valve 1B2 V-1-95 by alternating the control switch between OPEN and |

| | | |
|------------------------|--|--|
| | | spring return to NORMAL until fully open <ul style="list-style-type: none"> • Directs the EO to close IP HEATER VENT VALVE V-4-68 [ROLE PLAY4] • Directs the EO to reset the Reverse Check Valve, check valve V-1-90 with trip V-6-100 [ROLE PLAY5] • Directs the EO to place the normal and alternate drain valve control switches V-4-17 in AUTO and V-4-14 in CLOSED [ROLE PLAY6] • Slowly opens the EXTRACTION STEAM ISOLATION valve 1B3 V-1-96 by alternating the control switch between OPEN and spring return to NORMAL until fully open • Directs the EO to close HP HEATER VENT VALVE V-4-72 [ROLE PLAY7] • Directs EO to monitor shell water level at LIR 1-3 until level stabilizes Reports FW Pump B feed heaters in service |
| ROLE PLAY | | General Instructions: Wait 1-2 minutes after being requested to perform an action, then report. <ol style="list-style-type: none"> 1. When asked to report on the FW Pump B start, report that FW Pump B start is good. 2. When asked as the EO to stop the FW Pump B auxiliary oil pump, insert LOA-CFW059 to STOP, and report oil pump stopped. 3. When asked as the EO to start hydrogen injection to FW Pump B, insert VLV-HWC002 to OPEN, and then report hydrogen injection is in service. 4. When asked as the EO to close IP HEATER VENT VALVE V-4-68, report it is closed. 5. When asked as the EO to verify TRIP V-6-100 is reset in the up position, report that V-6-100 is reset in the up position. 6. When asked as the EO to place the normal and alternate drain valve control switches V-4-17 in AUTO and V-4-14 in CLOSED, report the positions as NORMAL and CLOSED 7. When asked as the EO to close HP HEATER VENT VALVE V-4-72, report it is closed. |
| LEAD FLOOR NOTE | | Time compression may be used here. Report that 10 minutes has elapsed. |
| | | |

| | |
|-----------|--|
| Terminus: | FW Pump B is in service and on the MASTER FEEDWATER LEVEL CONTROLLER. Hydrogen injection and extraction steam have been established. |
|-----------|--|

Notes/Comments

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

| | | | | | | | | |
|---|----------|--|-------------------------------|--|--|---------------------|--|--|
| Op-Test No.: <u>OC 2008</u> | | | Scenario No.: <u>NRC SIM3</u> | | | Event No.: <u>2</u> | | |
| Event Description: <u>Withdraws control rods 22-31, 22-23, 30-23, and 30-21 from position 40 to 48 and respond to control rod 22-31 uncoupled</u> | | | | | | | | |
| NOTE: The Reactor Engineer is present in the Control Room during control rod manipulations. | | | | | | | | |
| Initiation: FW Pump B is in service and on the MASTER FEEDWATER LEVEL CONTROLLER. Hydrogen injection and extraction steam have been established, or as directed by the Lead Examiner. | | | | | | | | |
| Cues: As directed by the SRO. | | | | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | | | | |
| | SRO | <ul style="list-style-type: none"> • Conducts a pre-job reactivity maneuver brief. • Directs the ATC to withdraw control rods IAW the reactivity maneuver sheet • Acts as the Reactivity Manager during the evolution. • Notifies the Reactor Engineer about the uncoupled control rod [ROLE PLAY] | | | | | | |
| | BOP | Provides a peer-check for withdrawing control rods and initials on the reactivity maneuver sheet after each control rod is withdrawn. | | | | | | |
| | ATC | Withdraws control rods IAW the reactivity maneuver sheet and Procedure 302.2, Control Rod Drive Manual Control System. [PANEL 4F] <ul style="list-style-type: none"> • Verifies the PERMIT light is illuminated. • Places the ROD POWER switch to ON. • Selects the control rod by depressing the corresponding pushbutton on the CONTROL ROD SELECT matrix. <ul style="list-style-type: none"> ○ Verifies the pushbutton light is lit and no others are lit. • Turns the ROD CONTROL switch to ROD OUT NOTCH position and simultaneously turns the NOTCH OVERRIDE switch to NOTCH OVERRIDE • Verifies: <ul style="list-style-type: none"> ○ Amber OVERRIDE light is ON ○ Green insert light is ON following switch movement and remains on for about 1 second | | | | | | |

| | | |
|------------------|---|---|
| | | <ul style="list-style-type: none"> ○ Rod position readout momentarily displays the next odd-numbered digit • Verifies the WITHDRAW light remains ON for the duration of the withdrawal and an increasing rod position is displayed and releases at position 48 • Performs a coupling check at position 48 <ul style="list-style-type: none"> ○ Turns the ROD CONTROL switch to ROD OUT NOTCH position and simultaneously turns the NOTCH OVERRIDE switch to NOTCH OVERRIDE ○ Verifies rod display indicates a continuous readout of 48 with red backlight [NOTE] • Reports control rod 22-31 is uncoupled and enters ABN-6, Control Rod Drive System <ul style="list-style-type: none"> ○ Applies a continuous insert signal by placing the ROD CONTROL switch to ROD IN until a response is observed on the nuclear instrumentation (APRMs, LPRMs) or fully inserted. [BOOTH] ○ Withdraws the control rod and verifies coupling at position 48 ○ Reports control rod 22-31 has re-coupled. ○ Returns CRD Drive Pressure to normal pressure ○ Notifies Reactor Engineering • Continues withdrawing control rods • Turns ROD POWER off when complete <p>Reports all control rods withdrawn IAW the reactivity maneuver form</p> |
| NOTE | Control rod 22-31 will be uncoupled. | |
| ROLE PLAY | As the Reactor Engineer for the uncoupled rod, acknowledge the report. IF the control rod is inserted to between 24-48 during re-coupling, direct that continuous withdrawal is allowed. Below this, single notch, until position 24. | |
| BOOTH | When the RO is inserting the uncoupled control rod, DELETE the uncouple malfunction. | |
| Terminus: | Control rods have been withdrawn. | |

Notes/Comments

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

OC ILT 07-1 NRC Exam Scenario NRC SIM 3

| | | | | | | | | |
|--|----------|---|-------------------------------|--|--|---------------------|--|--|
| Op-Test No.: <u>OC 2008</u> | | | Scenario No.: <u>NRC SIM3</u> | | | Event No.: <u>3</u> | | |
| Event Description: <u>Raise reactor power with reactor recirculation flow to 75% power</u> | | | | | | | | |
| Initiation: Control rods have been withdrawn, or as directed by the Lead Examiner. | | | | | | | | |
| Cues: As directed by the SRO | | | | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | | | | |
| | SRO | <ul style="list-style-type: none"> • Directs the ATC to increase recirculation flow to raise reactor power to 75% power • Acts as the Reactivity Manager during the evolution. | | | | | | |
| | BOP | Provides a peer-check for recirculation flow changes. | | | | | | |
| | ATC | <ul style="list-style-type: none"> • Raises recirculation flow in small increments by rotating the manual knob CW on the MASTER RECIRC SPEED CONTROLLER until 75% power is reached. • Notifies SRO when at 75% power. | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Terminus: | | Recirculation flow has been raised to reach 75% reactor power. | | | | | | |

Notes/Comments

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

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM3</u> Event No.: <u>4</u> Event Description: <u>Respond to Electronic Pressure Regulator (EPR) Failure</u> | | |
|---|----------|---|
| Initiation: Recirculation flow has been raised to reach 75% reactor power, or as directed by the Lead Examiner. | | |
| Cues: RPV pressure drops in 3-4 psig increments; EPR RELAY SETPOINT drops in 3-4 psig increments | | |
| Time | Position | Applicant's Actions or Behavior |
| | ATC | <ul style="list-style-type: none"> • Reports PRV pressure lowering • Monitors RPV pressure |
| | BOP | <ul style="list-style-type: none"> • Reports EPR RELAY SETPOINT is low/changed • Performs ABN-9, Electronic Pressure Regulator Malfunction [PANEL 7F] <ul style="list-style-type: none"> ○ Slowly lowers the MPR setpoint by placing the MPR RELAY POSITION switch in the ↑% position using 1 second bumps until the MPR position indicator moves in the direction of and reaches the EPR setting and the MPR takes control ○ Verifies MPR CONTROLLING light is ON ○ Verifies the EPR CONTROLLING light is OFF ○ Places the EPR POWER switch to OFF ○ Verifies alarm Q6a, EPR PWR LOST alarm is received ○ Slowly raises RPV pressure to the previous pressure by placing MPR RELAY POSITION switch in the ↓% position ○ Refers to Procedure 202.1 for limitations with one pressure regulator out of service (no actions required) • Reports MPR in control and RPV pressure back to its previous pressure |
| | SRO | <ul style="list-style-type: none"> • Directs entry into ABN-9, Electronic Pressure Regulator Malfunction • Notifies WWM/SM about the EPR failure |
| | | |
| | | |

| | |
|-----------|---|
| Terminus: | The EPR is off and the MPR is in control, and RPV pressure has been re-established. |
|-----------|---|

Notes/Comments

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

| | | | | | | | | |
|--|--|---|-------------------------------|--|--|---------------------|--|--|
| Op-Test No.: <u>OC 2008</u> | | | Scenario No.: <u>NRC SIM3</u> | | | Event No.: <u>5</u> | | |
| Event Description: <u>Respond to EDG1 DISABLED Annunciator</u> | | | | | | | | |
| Initiation: The EPR is off and the MPR is in control, and RPV pressure has been re-established, or as directed by the Lead Examiner. | | | | | | | | |
| Cues: Annunciator T4b, EDG1 DISABLED | | | | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | | | | |
| | BOP | <ul style="list-style-type: none"> • Responds to Annunciator T4b, EDG1 DISABLED <ul style="list-style-type: none"> ○ Directs EO to check the EDG1 local alarm panel [ROLE PLAY] ○ Refers SRO to TS 3.7 | | | | | | |
| | SRO | <ul style="list-style-type: none"> • Notifies WWM/SM to inspect EDG1 • Declares EDG1 inoperable and applies Tech Specs <ul style="list-style-type: none"> ○ TS 3.7.C.3: the plant shall be placed in cold shutdown in 30 hours. • Briefs the Crew. | | | | | | |
| ROLE PLAY | When asked as the EO to check EDG1 indications, report that there is oil on the EDG1 compartment floor and that the Engine Protection Light is ON. | | | | | | | |
| Terminus: | EDG1 has been declared inoperable and TS have been applied. | | | | | | | |

Notes/Comments

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

| <p>Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM3</u> Event No.: <u>6</u></p> <p>Event Description: <u>Loss of cooling to Reactor Water Cleanup System heat exchanger and failure to auto isolate</u></p> | | |
|--|----------|---|
| <p>Initiation: EDG1 has been declared inoperable and TS have been applied, or as directed by the Lead Examiner.</p> | | |
| <p>Cues: Annunciator D8b, NRHX OUTLET TEMP HI (May also get C3f, DW PRESS HI/LO); C4f, C5f, TORUS/DW VAC BRKR OPEN</p> | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <ul style="list-style-type: none"> • Responds to annunciators C4f, C5f, TORUS/DW VAC BRKR OPEN • Reports Drywell pressure lowering • Responds to annunciator D8b, NRHX OUTLET TEMP HI <ul style="list-style-type: none"> ○ Directs EO to verify high system temperatures [ROLE PLAY1] ○ Reports the RWCU failed to isolate and manually isolates ○ Isolates RWCU and trips running RWCU Pump <ul style="list-style-type: none"> ○ Places SYSTEM INLET V-16-14 control switch to CLOSE ○ Places CLEANUP SYSTEM V-16-1 to CLOSE ○ Places RECIRC PUMP ND02A control switch to STOP ○ Directs EO to check RBCCW flow/temperatures to the NRHX [ROLE PLAY2] ○ Reports RWCU is isolated and RWCU Pump is tripped |
| | SRO | <ul style="list-style-type: none"> • Notifies WWM/SM for the event and the failure to auto isolate/trip • May direct that RBCCW temperatures changed in the plant |
| ROLE PLAY | | <ol style="list-style-type: none"> 1. As the EO directed to check high system temperatures, report that RWCU out of the NRHX is 160 °F and rising. 2. As the EO directed to check RBCCW flow/temperatures to the NRHX, RBCCW report that flow has been secured. |
| Terminus: | | RWCU has been isolated and RWCU Pump tripped. |

Notes/Comments

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

| <p>Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM3</u> Event No.: <u>7</u></p> <p>Event Description: <u>CRD Pump A trips and a single control rod drifts inward when the standby CRD Pump is started</u></p> | | |
|--|----------|---|
| <p>Initiation: Annunciator H1c, PUMP A TRIP; RAP-H5c, CRD TEMP HI; H6a, ROD DRIFT</p> | | |
| <p>Cues: RWCU has been isolated and RWCU Pump tripped.</p> | | |
| Time | Position | Applicant's Actions or Behavior |
| | ATC | <ul style="list-style-type: none"> • Responds to Annunciator H1c, PUMP A TRIP; RAP-H5c, CRD TEMP HI • Reports CRD Pump A tripped <ul style="list-style-type: none"> ○ Directs EO to check CRD Pump A breaker locally at USS 1A2 and at the pump ○ Starts CRD PUMP NC08B by placing its control switch to START or re-starts CRD PUMP NC08A by placing its control switch to START if no overload ○ Checks the following: <ul style="list-style-type: none"> ▪ CRD System flow ▪ Directs EO to check CRD Pump min. flow valve, motor/pump bearings for loss of lubrication and excessive temperatures, system leaks, pump suction valve [ROLE PLAY1] • Responds to control rod drift <ul style="list-style-type: none"> ○ Reports control rod 22-31 is drifting in ○ Performs ABN-6 <ul style="list-style-type: none"> ▪ Places the ROD POWER switch to ON ▪ Selects control rod 22-31 by pressing the appropriate button on the control rod matrix inserts by placing the ROD CONTROL switch to ROD IN until fully inserted ▪ Directs the EO to isolate HCU 22-31 [ROLE PLAY2] ▪ Notifies Chemistry |
| | SRO | <ul style="list-style-type: none"> • Declares CRD Pump A inoperable • Notifies WWM/SM about the pump • Reviews/applies Tech Specs 3.2.B.4 and 3.4.D.2 <ul style="list-style-type: none"> ○ In no case shall the number of inoperable control rods valved |

| | | |
|------------------|--|--|
| | | <p>out of service b greater than 6 during power operation.</p> <ul style="list-style-type: none"> o With both CRD pumps considered inoperable, the reactor water temperature shall be reduced to < 212 °F in 30 hours. |
| ROLE PLAY | | <ol style="list-style-type: none"> 1. As the EO directed to check CRD Pump A, report that there is oil all over the floor around the pump, but none has gotten to any floor drains and that you are containing it. 2. As the EO directed to isolate HCU 22-31, DELETE the drift and report HCU isolated. |
| Terminus: | | CRD Pump B is running and the SRO has applied Tech Specs. |

Notes/Comments

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

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM3</u> Event No.: <u>8/9</u> Event Description: <u>EMRV E leaks-by and an electric ATWS</u> | | |
|---|----------|--|
| Initiation: Annunciator B4g, SV/EMRV NOT CLOSED; EMRV E indicating in the VALVE OPEN REGION; Acoustic monitor audible alarm | | |
| Cues: CRD Pump B is running and the SRO has applied Tech Specs. | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <ul style="list-style-type: none"> • Responds to annunciator B4g, SV/EMRV NOT CLOSED • Reports EMRV E indicates open • Checks RPV pressure and ADS • Performs ABN-40 <ul style="list-style-type: none"> ○ Waits for RPV water level transient to clear ○ Places Feedwater control in manual by selecting MAN on the MASTER FEEDWATER LEVEL CONTROLLER [PANEL 4F] ○ Places the AUTO DEPRESS VALVE NR108E switch in OFF [PANEL 1F/2F] ○ Recognizes/reports the valve still open ○ Cycles the AUTO DEPRESS VALVE NR108E switch from OFF to MAN to OFF ○ Recognizes/reports the valve still open ○ Cycles the AUTO DEPRESS VALVE NR108E switch from OFF to MAN to OFF 3-5 times ○ Recognizes/reports the valve still open ○ Places the EMRV NORMAL/DISABLE NR108E keylock switch to DISABLE [INSIDE PANEL 1F/2F] ○ Reports EMRV NR108E is still open ○ Places Feedwater control in manual by selecting AUTO on the MASTER FEEDWATER LEVEL CONTROLLER [PANEL 4F] • Bypasses ADS by placing both ADS TIMER keylock switches to BYPASS • Performs Support Procedure 16 to bypass MSIV isolation (MSIV/RBCCW Isolation Bypass) <ul style="list-style-type: none"> ○ Obtains 4 bypass plugs ○ Inserts plug in position BP1 and BP2 in the EOP BYPASS |

| | | |
|--|--|---|
| | | <p>PLUGS Panel in the rear of Panel 6R</p> <ul style="list-style-type: none"> ○ Inserts plug in position BP1 and BP2 in the EOP BYPASS PLUGS Panel in the rear of Panel 6R ○ Places the ISOL SIGNAL BYPASS V-6-395 switch to BYPASS ○ Reports MSIV LO-LO isolation bypassed ● Performs Terminate and Prevent Support Procedure 17 (Terminate and Prevent Injection) <ul style="list-style-type: none"> ○ Presses OVERRIDE switches that are lit ○ Presses all ACTUATED switches ○ Confirm Core Spray Parallel Isolation valves closed ○ Confirms Core Spray Booster pumps tripped ○ Places Core Spray MAIN PUMP control switches in PULL-TO-LOCK position ○ Trips all FW Pumps by placing their control switches to STOP ○ Confirms 1 Condensate Pump running and trips the other 2 by placing their control switches to STOP ○ Places MFRVs in MAN by pressing the AUTO/MAN button on the MFRV FLOW CONTROLLERS ○ Closes all MFRVs by rotating the manual knob CCW ○ Closes all LFRVs by rotating the manual knob CCW ○ Reports injection terminated and prevented ● Maintains RPV water level –20” to 30” with Support Procedure 19 (Critical Task) (Feedwater Injection) <ul style="list-style-type: none"> ○ Starts 1 FW Pump by placing its control switch to START ○ Manually controls flow with the MFRV manual knob ● Performs Support Procedure 25 (Torus Cooling) <ul style="list-style-type: none"> ○ Confirms the SYSTEM MODE SELECT switch is in the TORUS COOLING position ○ Starts the selected ESW Pump by placing its control switch to START ○ Places and hold the keylock SYSTEM PUMPS START PERMISSIVE to the selected pump ○ Starts the selected Containment Spray by placing its control switch to START ○ Reports Torus Cooling in service |
| | | |

| | | |
|------------------|-----|---|
| | ATC | <ul style="list-style-type: none"> • Manually scrams the reactor <ul style="list-style-type: none"> ○ Places the REACTOR MODE SELECTOR switch in SHUTDOWN ○ Presses MANUAL SCRAM BUS 1 and BUS 2 ○ Reports failure to scram ○ Presses ALT ROD INJECTION INSERTION • Places ROPS in BYPASS • Reduces recirculation flow to minimum by rotating MASTER RECIRC SPEED CONTROLLER manual knob CCW to minimum • Trips all Recirculation Pumps by DRIVE MOTOR switches to STOP • Performs Support Procedure 22 (Critical Task) (Liquid Poison Injection) <ul style="list-style-type: none"> ○ Starts SLC Pump by placing STANDBY LIQUID CONTROL keylock to FIRE SYS 1 or FIRE SYS 2 ○ Reports SLP Pump is not indicating proper discharge pressure ○ Starts the alternate SLP Pump • Performs Support Procedure 21 for an electrical ATWS (Critical Task) (Insertion of Control Rods during ATWS) <ul style="list-style-type: none"> ○ Directs EO to vent the Scram Air Header [ROLE PLAY] ○ Places REACTOR SELECTOR MODE switch in REFUEL ○ Closes CRD DRIVE WATER PRESSURE CONTROL NC18 ○ Inserts Cram Array control rods <ul style="list-style-type: none"> ▪ Places ROD POWER to ON ▪ Selects cram array control rod ▪ Places ROD CONTROL switch to ROD IN • Reports all control rods inserted (after air header de-pressurized) • Maintains RPV water level 138 – 175" with Feedwater/Condensate Support Procedure 2 (Feedwater Injection) |
| ROLE PLAY | | To vent the Scram Air Header, see ROLE PLAY on the Page 22. |
| | | |

| | | |
|--|-----|---|
| | SRO | <ul style="list-style-type: none"> • Directs entry into ABN-40, Stuck Open EMRV • Directs ATC to manually scram • Directs entry into RPV Control - With ATWS <ul style="list-style-type: none"> ○ Confirms reactor scram and Mode switch in SHUTDOWN ○ Confirms ARI initiated ○ Directs ROPS bypassed ○ Directs recirculation flow reduced to minimum ○ Directs all Recirculation Pumps tripped ○ When Torus water temperature cannot be maintained below BIIT, directs Liquid Poison initiated IAW Support Procedure 22 (Critical Task) (Liquid Poison Injection) ○ Directs bypassing ADS ○ Directs Support Procedure 21 to insert control rods (Critical Task) (Insert Control Rods during ATWS) ○ Directs Support Procedure 16 to bypass MSIV LO-LO isolation (Bypass MSIV/RBCCW Isolations) ○ Directs Terminate and Prevent Support Procedure 17 (Terminate and Prevent) ○ Directs RPV water level lowered to 30" ○ Directs RPV water level –20" to 30" with Support Procedure 19 (Critical Task) (Feedwater/CRD Injection) • Directs entry into Primary Containment Control EOP when Torus water temperature exceeds 95 °F <ul style="list-style-type: none"> ○ Directs Torus cooling IAW Support Procedure 25 (Torus Cooling) • Exits the ATWS EOP and enters RPV Control – No ATWS when control rods are inserted <ul style="list-style-type: none"> ○ Directs RPV water level 138 – 175" with Feedwater/Condensate Support Procedure 2 (Feedwater Injection) ○ Directs boron injection terminated |
| | | |

OC ILT 07-1 NRC Exam Scenario NRC SIM 3

| | |
|---|--|
| ROLE PLAY at the direction of the Lead Examiner | To vent the scram air header: When: <ul style="list-style-type: none"> • RPV water level has been terminated and prevented • RPV water level is being controlled –20" to 30" • Control rods are being manually inserted Then: <ul style="list-style-type: none"> • Close the scram air header isolation valve V-6-157: LOA-CAS 012 to 0 • Open the scram air header drain valve V-6-409: LOA-CAS022 to 1 • Report you have vented the scram air header after control rods start inserting |
| | |
| Terminus: | All control rods have been inserted and RPV water level is being re-established to 138-175" in RPV Control – No ATWS EOP, or as directed by the Lead Examiner. |

Notes/Comments

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

Emergency Plan Classification: MS3, Site Area Emergency (Failure of RPS and either reactor power > 2% or torus temperature > 110 °F and boron injection required for reactivity control).

SIMULATOR SETUP

1. Reset to full power IC-65
2. Open EMRV NR108E to raise Torus temperature to 89 °F, then close and let plant stabilize.
3. Insert the following control rods from position 48 to position 40:
 - i. 22-31, 22-23, 30-23, 30-31
4. Reduce reactor power to about 70% with recirculation flow (to about 27 hz)
5. Place FW Pump B in manual and reduce flow to 0, and trip the pump
6. Close the FW Pump B heater bank outlet valve
7. Close the H2 injection valve to FWP B (V-567-34): Insert VLV-HWC002 to CLOSE
8. Close FWP B IP/HP heater valves (7F): 1B2 V-1-95 and 1B3 V-1-96
9. Start the FW Pump B aux oil pump (LOA-CFW059 to START)
10. Place RWCU Pump B in PTL and hang tag.
11. Place RWM in bypass and hang tag.
12. Hang tag on TBCCW Pump 2.
13. Place EDG 2 in Local Stop: Insert LOA-DGN009 to STOP. This will activate annunciator RAP-T5f (EDG2 NOT IN AUTO).
14. Raise RPV pressure to 1000 psig with the EPR.
15. Have a completed reactivity Maneuver Form for the rod withdrawal (ensure rod 22-31 is moved last).
16. Have 2 copies of procedure 317 to start a feedwater pump, section 9.
17. Have 2 copies of procedure 317.4, section 8.
18. Have 2 copies of procedure 317.1, section 2.

| <u>Event</u> | <u>Trigger</u> | <u>Malfunction</u> |
|--------------|----------------|--|
| 1 | T1 → | Insert VLV-HWC002 to OPEN • This will open FWP B hydrogen injection |

OC ILT 07-1 NRC Exam Scenario NRC SIM 3

| | | |
|---|----------------|--|
| | | valve V-567-32 to FWP B |
| 2 | PRESET | <p>MAL-CRD008_22-31</p> <ul style="list-style-type: none"> • This will uncouple control rod 22-31 • Delete this malfunction when the Operator is inserting the control rod |
| 3 | None | None |
| 4 | T2 → | <p>MAL-TCS010 to 3 psig BELOW the CURRENT setpoint</p> <p>MAL-TCS010 to 3 psig BELOW the PREVIOUS setpoint after about 1 minute</p> <p>MAL-TCS010 to 3 psig BELOW the PREVIOUS setpoint after about 1 minute</p> <p>MAL-TCS010 to 3 psig BELOW the PREVIOUS setpoint after about 1 minute</p> <ul style="list-style-type: none"> • This lowers the EPR setpoint by 3 psig each time. This lowers RPV pressure about the same amount. Continue until the event is diagnosed. |
| 5 | T3 → | <p>ANN-T4b to ON</p> <ul style="list-style-type: none"> • This activates annunciator T4b (EDG1 DISABLED) |
| 6 | PRESETS | <p>MAL-RCU014</p> <ul style="list-style-type: none"> • This inserts a failure of the RWCU System to auto isolate <p>BKR-RCU001 to FAIL AUTO TRIP</p> <ul style="list-style-type: none"> • This prevent the auto trip of RWCU Pump A |
| | T4 → | <p>MAL-RBC005</p> <ul style="list-style-type: none"> • This inserts a loss of RBCCW to the RWCU non-regenerative heat exchanger |
| 7 | T5 → | <p>BKR-CRD002 to TRIP</p> <ul style="list-style-type: none"> • This trips CRD Pump A breaker and |

| | | |
|---|--|--|
| | T6 → | <p>prevents re-start</p> <p>Insert on Conditional TRIGGER 6: hwx03o277r.gt.0 on Event Triggers MAL-CRD006_2231</p> <ul style="list-style-type: none"> Control rod 22-31 will drift-in when the CRD Pump B red light comes on |
| 8 | T7 → INSERT → | <p>MAL-NSS025E to 100% over a 3 minute ramp</p> <ul style="list-style-type: none"> This inserts leakage through EMRV NR108E that cannot be stopped <p>Insert CAE File: ATWS at this time</p> <ul style="list-style-type: none"> This inserts an electric ATWS |
| 9 | PRESETS | <p>PMP-SLC001A (for SLC Pump A) PMP-SLC002A (for SLC Pump B)</p> <ul style="list-style-type: none"> This places a broken shaft on each SLC Pump NOTE: IF SLC Pump A is started first, then DELETE 002A BEFORE SLC Pump B is started NOTE: IF SLC Pump B is started first, then DELETE 001A BEFORE SLC Pump A is started |

Procedures

| <u>Event</u> | <u>Number/revision</u> | <u>Title</u> |
|---------------------|-------------------------------|---|
| 1 | 317 | Feedwater |
| 1 | 317.4 | Hydrogen Injection |
| 1 | 317.1 | Feedwater heaters |
| 2 | 302.2 | Control Rod Drive Manual Control System |
| 2 | ABN-6 | Control Rod Drive System |
| 2 | RAP-H5a | ROD OVERTRAVEL |
| 4 | ABN-9 | Electronic Pressure Regulator Malfunction |
| 4 | 202.1 | Power Operation |
| 5 | RAP-T4b | EDG1 DISABLED |
| 6 | RAP-D8b | NRHX OUTLET TEMP HI |
| 7 | RAP-H1c | PUMP A TRIP |
| 7 | RAP-H5c | CRD TEMP HI |
| 7 | ABN-6 | Control Rod Drive System |
| 7 | RAP-H61 | ROD DRIFT |
| 8 | RAP-B4g | SV/EMRV NOT CLOSED |
| 8 | ABN-40 | Stock Open EMRV |
| 8 | | RPV Control – With ATWS |
| 8 | | Support procedure 21 |
| 8 | | Support Procedure 16 |
| 8 | | Support Procedure 17 |
| 8 | | Support procedure 25 |
| 8 | | Support Procedure 2 |
| 8 | | Primary Containment Control EOP |
| 8 | | RPV Control – No ATWS |
| | | |

Shift Turnover

Initial Conditions:

1. The plant is about 68% power.
2. Feedwater Pump B tripped a short while ago. Investigation revealed that an electrician accidentally bumped a relay at the breaker and there was no damage to the breaker or feedwater pump/motor. The pump is being prepared to be placed back in service.
3. EDG 2 is out of service to replace a fuel pump (Out of service time began this morning at 600). Technical Specifications have been reviewed and applied as required.
4. TBCCW Pump 2 is out of service for maintenance.
5. The RWM is inoperable and bypassed.
6. RWCU Pump B is out of service.

Shift Activities:

1. Place Feedwater Pump B in service IAW Procedure 317, starting at step 9.3.7. After hydrogen injection to the Feedwater Pump has been established, place the associated Feedwater Heater string in service, IAW Procedure 317.1, starting at step 2.3.2.4. The trip handle for the Reverse Flow Check Valve for the 1B2 Feedwater heater is reset. An EO has been briefed, has a copy of the procedures and is standing by.
2. Withdraw control rods IAW the Reactivity Maneuver Approval Form.
3. Raise reactor power to 75% with recirculation flow and notify Reactor Engineering when 75% has been reached.

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

Scenario Outline

Facility: Oyster Creek

Scenario No.: NRC SIM 4

Op Test No.: OC 2008

Examiners: _____

Operators: _____

Initial Conditions:

- The plant is at 95% power
- EDG1 is OOS to replace a starting motor.
- TBCCW Pump 2 and Air Compressor 3 are OOS for maintenance.
- The RWM is inoperable and bypassed.

Turnover:

- Withdraw control rod 22-11
- Perform 609.4.001, Isolation Condenser Valve Operability and In Service Test

| Event No. | Mal. No. | Event Type* | | Event Description |
|-----------|------------------------------------|-------------|------------|---|
| 1 | MAL- CRD007_2 211 | C | ATC | Responds to control rod 22-11 stuck at 00 on withdrawal. |
| 2 | VLV-ICS06 | N TS | BOP SRO | Performs 609.4.001, Isolation Condenser Valve Operability and In Service Test and responds to failure of V-14-36 (IC A) to re-open. |
| 3 | MAL- EDS003B | C TS | BOP SRO | Responds to a failure of 480 VAC Bus USS 1A2. |
| 4 | MAL- RFC003A | C | BOP | The BOP will respond to an oscillating reactor recirculation pump. |
| 5 | MAL- TSI017A MAL- TSI018A | R | ATC | Responds to high turbine vibrations. |
| 6 | MAN- NIS021E | C | ATC | Responds to a leak in RPV water level instruments common variable leg to ID13A and ID13C. |
| 7 | MAL- NSS017A | M | Crew | Responds to a primary leak in the Primary Containment. |
| 8 | MAL- RPS007A | C | Crew | Respond to a loss of offsite power and failure of all Core Spray Pumps. |

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor Transient, (TS) Tech Specs

NRC SIM 4 Simulator Scenario Summary

| <u>Event</u> | <u>Event Summary</u> |
|--------------|--|
| 1 | The ATC will insert control rod 22-15 from position 12 to position 00. The ATC will then withdraw control rod 22-11 from position 00 to position 48. It will be initially stuck and ABN-6, Control Rod Malfunctions. After adjusting drive pressure, the control rod will move. The ATC will then withdraw control to its original position (12). This evolution requires several switch manipulations (rod power switch to on, select the control rod, CRD drive pressure control switch, rod control switch to rod out notch). (ATC: COMPONENT MALFUNCTION) |
| 2 | The BOP will perform 609.4.001, Isolation Condenser Valve Operability and In Service Test. Manipulations include closing V-14-36, opening V-14-34, closing V-14-34, opening V-14-5/V-14-20, re-opening V-14-36. When valve V-14-36 is closed, it will not re-open. The SRO will declare the Isolation Condenser A inoperable and will apply Technical Specifications (TS 3.8). (BOP: NORMAL EVOLUTION; SRO: TECHNICAL SPECIFICATION) |
| 3. | The BOP will respond to a loss of USS 1A2 and will perform ABN-45, Loss of USS 1A2. Actions include starting RBCCW Pump 2, CRD Pump B, securing normal RB ventilation and starting Standby Gas Treatment, restoring RPS 1, resetting ½ scram and isolations. The SRO will apply Technical Specifications (TS 3.7). (BOP: COMPONENT MALFUNCTION; SRO: TECHNICAL SPECIFICATION) |
| 4. | The BOP will diagnose reactor power oscillations due to reactor recirculation pump A, and will enter ABN-2, Recirculation System Failures. The power oscillations will be of such a magnitude that the pump will require manually tripping. This evolution will require several switch manipulations (Placing pump speed controller in manual, manually controlling speed, trip the pump, close the pump discharge valve). (BOP: COMPONENT MALFUNCTION) |
| 5. | The ATC will be directed to lower reactor power in response to high turbine vibrations by lowering recirculation flow. The vibrations will lower after reactor power is reduced. (ATC: REACTIVITY MANIPULATION) |
| 6. | The ATC will respond to lowering indicated RPV water level on ID13A and ID13C (which also input into FWLC System). This will raise FW |

| | |
|------------------|---|
| | flow into the RPV and a resultant real rise in RPV water level on all other level instruments. The ATC will perform ABN-17: places FWLC in manual, and transfers the RPV water level input to ID13B, and places FWLC back in auto. (ATC: COMPONENT MALFUNCTION) |
| 7. | The Crew will respond to a primary coolant leak in the Primary Containment. The reactor scram will be successful. (MAJOR EVOLUTION) |
| 8. | When the reactor is manually scrammed, the leak will worsen. Also, 30 seconds after the manual scram, there will be a loss of offsite power and a complete failure of all Core Spray main Pumps to start (both auto and manual fail). The Crew will be successful in spraying the Drywell. RPV water level will fall to TAF, which will require an ED. The Crew will be successful with injecting the Fire Protection System via the Core Spray System, SLC Pump B and CRD Pump B. (COMPONENT FAILURE AFTER EOP ENTRY) |
| Critical Task #1 | The SRO will direct Emergency Depressurization when RPV water level reaches 0" provided at least one injection source is lined-up and running. ED will rapidly reduce RPV pressure to allow maximum injection of low pressure injection systems. (PRA) Or, With low pressure systems running that have the capacity to restore and maintain RPV water level, the SRO will direct to lower RPV pressure as necessary to allow low pressure systems to inject. |
| Critical Task #2 | With the loss of Core Spray during a LOOP-LOCA, inject into the RPV with Alternate Sub-systems. |

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM4</u> Event No.: <u>1</u> Event Description: <u>Manipulates control rods and responds to a stuck control rod at position 00</u> | | |
|--|----------|--|
| Initiation: Following Shift Turnover. | | |
| Cues: As directed by the SRO, or as directed by the Lead Examiner. | | |
| Time | Position | Applicant's Actions or Behavior |
| | SRO | <ul style="list-style-type: none"> • Conducts a pre-job reactivity maneuver brief. • Directs the ATC to withdraw control rods IAW the reactivity maneuver sheet • Acts as the Reactivity Manager during the evolution. • May direct entry into ABN-6, Control Rod Drive System |
| | BOP | <ul style="list-style-type: none"> • Provides a peer-check for withdrawing control rods and initials on the reactivity maneuver sheet after each control rod is withdrawn. |
| | ATC | <p>Withdraws control rods IAW the reactivity maneuver sheet and Procedure 302.2, Control Rod Drive Manual Control System. [PANEL 4F]</p> <ul style="list-style-type: none"> • Verifies the PERMIT light is illuminated. • Places the ROD POWER switch to ON. • Inserts control rod 22-15 <ul style="list-style-type: none"> ○ Selects the control rod by depressing the corresponding pushbutton on the CONTROL ROD SELECT matrix. ○ Verifies the pushbutton light is lit and no others are lit. ○ Places and holds the ROD CONTROL switch to ROD IN ○ Releases the switch when the control rod indicates 00 • Withdraws control rod 22-11 from 00 – 12 continuous <ul style="list-style-type: none"> ○ Selects the control rod by depressing the corresponding pushbutton on the CONTROL ROD SELECT matrix. ○ Verifies the pushbutton light is lit and no others are lit. ○ Places the ROD CONTROL switch to ROD OUT NOTCH and simultaneously places the NOTCH OVERRIDE switch in |

| | | |
|--|--|---|
| | | <p>NOTCH OVERRIDE and verifies:</p> <ul style="list-style-type: none"> ▪ Amber OVERRIDE light ON ▪ Green INSERT light is ON following switch movement for about 1 second ▪ Rod position readout momentarily displays the next odd-numbered digit <ul style="list-style-type: none"> ○ Verifies the WITHDRAW light ON for the duration of the withdrawal and increasing rod position ○ Releases the switches one notch before the desired position and verifies the control rod latches in an even-numbered position ○ Reports the control rod will not move <ul style="list-style-type: none"> ● Enters ABN-6 OR Procedure 302.2 Precautions & Limitations ● ABN-6 <ul style="list-style-type: none"> ○ Verifies no rod blocks ○ Verifies CRD DR WTR PRESS at 250 psig ○ Applies an insert signal for about 2 minutes by placing the ROD CONTROL switch to ROD in then to ROD OUT NOTCH ○ Applies alternately withdraw and insert signals ○ Raises CRD DR WTR PRESS to 390 psig by closing the CRD DRIVE WATER PRESS CONTROL switch to close [BOOTH] ○ Attempts to withdraw the control rod ○ Reports the control rod moves ○ Lowers CRD DR WTR PRESS to 250 psig and withdraws the rod continuously to position 12 ● Procedure 302.2 Precautions & Limitations <ul style="list-style-type: none"> ○ Raises CRD drive by throttling closed CRD DRIVE WATER PRESS CONTROL switch to obtain 50 psi increase in drive pressure and attempts to drive the control rod. If no motion, can continue to increase pressure in 50 psi increments not to exceed 390 psid. [BOOTH] ○ Reports the control has moved ○ Lowers CRD DR WTR PRESS to 250 psig and withdraws the rod continuously to position 12 ● Withdraws control rod 22-11 from 12-30 single notch <ul style="list-style-type: none"> ○ Places the ROD CONTROL switch to ROD OUT NOTCH and verifies: <ul style="list-style-type: none"> ▪ Green INSERT light ON and remains for 1 second ▪ Immediately releases the switch and verifies the red WITHDRAW light is ON 2 seconds after switch movement for about 1.5 seconds and the rod latches in the next |
|--|--|---|

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| | | |
|------------------|--|---|
| | | <p>even-numbered position</p> <ul style="list-style-type: none"> ▪ Continues withdrawing to position 36 • Withdraws control rod 22-11 from 30-48 continuous <ul style="list-style-type: none"> ▪ Performed as before ▪ Performs coupling check at position 48 • Withdraws control rod 22-15 from 00-12 continuous • Reports rod movements complete • Turns ROD POWER switch OFF |
| | | |
| Booth | DELETE the stuck rod when drive pressure is raised. | |
| | | |
| | | |
| Terminus: | Control rods are moved IAW the reactivity maneuver form. | |

Notes/Comments

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

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM4</u> Event No.: <u>2</u> | | |
|--|----------|--|
| Event Description: <u>Isolation Condenser surveillance results in inoperability of Isolation Condenser A</u> | | |
| Initiation: Control rods are moved IAW the reactivity maneuver form as directed by the SRO | | |
| Cues: As directed by Radiation Protection, or as directed by the Lead Examiner. | | |
| Time | Position | Applicant's Actions or Behavior |
| ROLE PLAY | | <ul style="list-style-type: none"> As Radiation Protection, call the SRO and report that all personnel are clear from RB 75' and that the isolation condenser surveillance test may continue. |
| | SRO | <ul style="list-style-type: none"> Continue performance of surveillance 609.4.001, starting at step 6.1.9.1 Declares Isolation Condenser A inoperable when valve V-14-31 fails to re-open Reviews/applies Tech Specs 3.8.C <ul style="list-style-type: none"> 7-day LCO with verifying motor operated isolation and condensate makeup valves in the operable IC are verified operable daily Notifies WWM/SM for investigation/repair Updates the Crew |
| | BOP | <ul style="list-style-type: none"> Continue performance of surveillance 609.4.001, starting at step 6.1.9.1 <ul style="list-style-type: none"> Closes V-14-30 by placing its control switch to CLOSE <ul style="list-style-type: none"> Verifies alarms C4a and C5a are received Records closing time Opens V-14-30 by placing its control switch to AUTO <ul style="list-style-type: none"> Verifies alarms C4a and C5a are cleared Records opening time Closes V-14-31 by placing its control switch to CLOSE <ul style="list-style-type: none"> Verifies alarms C4a and C5a are received |

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| | | |
|------------------|---|---|
| | | <ul style="list-style-type: none"> ▪ Records closing time ○ Opens V-14-31 by placing its control switch to AUTO ▪ Reports that V-14-36 will not open ▪ Directs the EO to check the breaker for the valve [ROLE PLAY] |
| | | |
| | ATC | <ul style="list-style-type: none"> • Acts as peer checker during the surveillance |
| | | |
| ROLE PLAY | When directed as the EO to check the breaker for Isolation Condenser A Steam Valve V-14-31, reports that everything looks normal. | |
| | | |
| Terminus: | Isolation condenser A is declared inoperable and TS have been applied. | |

Notes/Comments

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

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM4</u> Event No.: <u>3</u> Event Description: <u>Loss of 480V Bus USS 1A2</u> | | |
|---|----------|--|
| Initiation Isolation condenser A is declared inoperable and TS have been applied, or as directed by the Lead Examiner. | | |
| Cues: Annunciators U3a, 1A2 MN BRKR TRIP; S7f, FDR TO 460V 1A2 TRIP; ½ Scram | | |
| Time | Position | Applicant's Actions or Behavior |
| | SRO | <ul style="list-style-type: none"> ● Directs entry into ABN-45, Loss of USS 1A2 ● Reviews Tech Specs <ul style="list-style-type: none"> ○ 3.7.B (AC Electrical Power) <ul style="list-style-type: none"> ■ The reactor shall be placed in cold shutdown in 30 hours ○ 3.7.D.3 (Batteries) <ul style="list-style-type: none"> ■ Restore the inoperable battery to operable within 2 hours, The reactor shall be placed in cold shutdown in 30 hours ○ 3.8.D (Isolation Condensers) <ul style="list-style-type: none"> ■ The reactor shall be placed in cold shutdown in 30 hours ○ 3.5.A.3 (Containment) <ul style="list-style-type: none"> ■ For RBCCW valve V-5-167 ■ Restore or isolate within 4 hours or shutdown in the next 24 hours ● Notifies WWM/SM for repair/investigation of USS 1A2 ● Makes notifications for TS required shutdown |
| | BOP | <ul style="list-style-type: none"> ● Responds to Annunciators U3a, 1A2 MN BRKR TRIP; S7f, FDR TO 460V 1A2 TRIP ● Reports loss of USS 1A2 ● Performs ABN-45 <ul style="list-style-type: none"> ○ Starts RBCCW Pump 1-2 running by placing its control switch to START ○ Starts CRD Pump B running by placing its control switch to START ○ Confirms DW Cooling Recirculation Fans 1-4, and 1-5 running ○ Secures Reactor Building Ventilation <ul style="list-style-type: none"> ■ Confirms V-28-42 and V-28-42 CLOSED, RB Ventilation |

| | | |
|--|--|---|
| | | <p>Isolation Inlet to Drywell</p> <ul style="list-style-type: none"> ▪ Confirms RB Ventilation Supply Fan SF-1-14 tripped ▪ Confirm RB Exhaust Fan EF-1-6 tripped ▪ Position EXH VALVES TO MAIN EXHAUST switch to CLOSE ▪ Verify Reactor Building Exhaust Main Isolation Damper, V-28-21 closed ▪ Verify Reactor Building Exhaust Main Isolation Damper, V-28-22 closed ▪ Verify RB Ventilation Supply isolation Valves <ul style="list-style-type: none"> ○ V-28-1 and V-28-2 ○ V-28-3 and V-28-4 ○ V-28-5 and V-28-6 ○ V-28-7 and V-28-8 ○ V-28-9 and V-28-10 ○ V-28-11 and V-28-12 ○ V-28-13 and V-28-14 ○ V-28-15 and V-28-16 ○ V-28-38 and V-28-39 ○ Starts Standby Gas Treatment System 2 <ul style="list-style-type: none"> ▪ Places STANDBY GAS SELECT switch in SYS 2 position ▪ Starts EF 1-9 by placing SGTS System Exhaust Fan control switch to HAND position ▪ Verifies: <ul style="list-style-type: none"> ○ EFR 1-9 starts ○ V-28-27 opens ○ V-28-28 opens ○ V-28-30 opens ▪ After flow is established, verifies: <ul style="list-style-type: none"> ○ V-28-28 closes ○ V-28-24 closes ▪ Places SGTS Cross-Tie Valve, V-28-48 switch to CLOSE ○ Re-energizes Protection System Panel 1 [ROLE PLAY] <ul style="list-style-type: none"> ▪ Directs the EO to perform the following: <ul style="list-style-type: none"> ○ Confirm disconnect switch SW-733-169 is off and Kirk Key removed ○ Confirm Kirk Key inserted and disconnect switch SW-733-170 is on ○ Confirm EPA breaker 5 and 6 closed |
|--|--|---|

| | | |
|------------------|--|--|
| | | <ul style="list-style-type: none"> ▪ Verifies TRANSFORMER OUTPUT green OFF light is lit above RPS1 POWER SELECT switch (Panel 6R) ▪ Places RPS1 POWER SELECT switch to TRANS position ▪ Verifies TRANSFORMER OUTPUT red ON light is lit above RPS1 POWER SELECT switch ▪ Resets ½ scram by pressing SCRAM SYSTEM RESET pushbutton ▪ Resets main steam isolation by pressing MAIN STEAM ISOLATION RESET pushbutton ▪ APRM lights ▪ APRM flow converters ▪ Main Steam Line Radiation Monitors ▪ Verifies FCTR card status is green and curve selected to 0 ▪ Verifies annunciator 9XF3a is clear ▪ Verifies auto restart of DCC-Y computer (NOT modeled) ▪ Confirms VLDP-1 transferred to VMCC 1B2 by verifying annunciator 9XF1c is received ▪ Informs the SRO of Tech Specs 3.7 for inoperable valves V-14-33 and V-14-35 (Isolation Cooling B steam inlet and condensate return) ▪ Informs SRO to declare C Battery inoperable ▪ Monitors DC Bus C voltage |
| | | |
| | ATC | <ul style="list-style-type: none"> • May start CRD Pump B running by placing its control switch to START • Directs EO to investigate USS 1A2 and its feeder breaker • Makes announcement of loss of bus, ½ scram |
| | | |
| ROLE PLAY | <p>To re-energizes Protection System Panel 1 from USS 1B2:</p> <ul style="list-style-type: none"> • to open disconnect switch SW-733-169, insert LOA-EDS133 to OPEN • to close disconnect switch SW-733-170, insert LOA-EDS133 to 1B2 • to close EPA 5 and 6 breakers, insert LOA-RPS007 to CLOSE <p>When performed, notify the control room: Transformer PS-1 is lined-up to the Bus USS 1B2.</p> <ul style="list-style-type: none"> • If the SRO orders a reactor shutdown started with the loss of USS 1A2, call him as the SM and tell him to leave the plant at its present power to give electrical maintenance a chance to correct the problem. | |
| | | |

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| | |
|-----------|---|
| Terminus: | ABN-45 has been performed and the SRO has addresses Technical Specifications. |
|-----------|---|

Notes/Comments

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

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM4</u> Event No.: <u>4</u> | | |
|--|----------|--|
| Event Description: <u>Responds to oscillating Reactor Recirculation Pump B</u> | | |
| Initiation: ABN-45 has been performed and the SRO has addresses Technical Specifications, or as directed by the Lead Examiner. | | |
| Cues: Oscillations in reactor power and reactor pressure; Possibly annunciator H7a, ROD BLOCK; Indications of oscillations at recirculation Pump A | | |
| Time | Position | Applicant's Actions or Behavior |
| | | |
| | ATC | <ul style="list-style-type: none"> • Reports changes in reactor power and reactor pressure |
| | | |
| | BOP | <ul style="list-style-type: none"> • Reports oscillations in reactor Recirculation Pump B • Performs ABN-2 <ul style="list-style-type: none"> ○ Places Recirculation Pump B in manual by pressing the AUTO/MAN button on the Recirculation Pump A MG-SET SPEED CONTROLLER ○ Attempts to manually control by rotating the manual knob on the MG-SET SPEED CONTROLLER ○ Reports that control has not been regained ○ Verifies power fluctuations > 5% peak to peak or > 30 MWe and trips the pump by placing the Recirculation Pump B DRIVE MOTOR switch to STOP ○ Verifies the Recirculation Pump B DISCH BYPASS valve open ○ Closes the discharge valve for Recirculation Pump B by placing DISCHARGE V-37-21 switch to CLOSE ○ Verifies operating point on Power Operation Curve ○ Informs SRO of Tech Specs 3.3.F, and 3.10.A |
| | | |
| | SRO | <ul style="list-style-type: none"> • Directs entry into ABN-2, Recirculation System Failures • Reviews Tech Specs 3.3.F, and 3.10.A (no actions) • Notifies WWM/SM for repair/investigation of Recirculation Pump B event |
| | | |

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| | | |
|-----------|--|--|
| | | |
| Terminus: | Recirculation Pump B has been secured and the SRO has reviewed Tech Specs. | |

Notes/Comments

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

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| | | | | | | | | |
|---|---|--|-------------------------------|--|--|---------------------|--|--|
| Op-Test No.: <u>OC 2008</u> | | | Scenario No.: <u>NRC SIM4</u> | | | Event No.: <u>5</u> | | |
| Event Description: <u>Respond to Main Turbine vibrations</u> | | | | | | | | |
| Initiation: Recirculation Pump B has been secured and the SRO has reviewed Tech Specs, or as directed by the Lead Examiner. | | | | | | | | |
| Cues: Annunciator Q3b, VIBRATION HI | | | | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | | | | |
| | BOP | <ul style="list-style-type: none"> • Responds to annunciator Q3b, VIBRATION HI <ul style="list-style-type: none"> ○ Reports bearings 9 and 10 are at 10.3 and 10.5 mils ○ Reports RAP direction to reduce reactor power to minimize vibrations ○ Reports 15 minute time limitation on vibrations ○ Monitors main turbine vibrations ○ After power reduction, reports vibrations lowered | | | | | | |
| | SRO | <ul style="list-style-type: none"> • Directs ATC to reduce reactor power with recirculation flow • Notifies WWM/SM to investigate turbine vibrations | | | | | | |
| | ATC | <ul style="list-style-type: none"> • Reduces reactor power by rotating MASTER RECIRC SPEED CONTROLLER manual knob CCW and reports power when attained [BOOTH] | | | | | | |
| BOOTH | When reactor power has been reduced by > 5% below original power, reduce vibrations to below the limit of 10 mils (5.5 and 5.9 mils over a 2 minute ramp) | | | | | | | |
| Terminus: | Reactor power has been reduced with recirculation flow. | | | | | | | |

Notes/Comments

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

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM4</u> Event No.: <u>6</u> | | |
|--|----------|--|
| Event Description: <u>Responds to Lowering RPV water level indications on ID13A/ID13C and rising water level on all other water level instruments (due to a common variable leg leak in the Drywell)</u> | | |
| Initiation: Reactor power has been reduced with recirculation flow, or as directed by the Lead Examiner. | | |
| Cues: Indicated RPV water level lowering on NR GEMACs ID13A and ID13C, with actual RPV water level rising on all other available RPV water level instruments; Slow rise in Drywell pressure. | | |
| Time | Position | Applicant's Actions or Behavior |
| | ATC | <ul style="list-style-type: none"> • Reports Indicated RPV water level lowering on NR GEMACs ID13A and ID13C, with RPV water level rising on all other available RPV water level instruments • Reports small rise in Drywell pressure • Performs ABN-17, Feedwater System Abnormal Conditions <ul style="list-style-type: none"> ○ Places the MASTER FEEDWATER LEVEL CONTROLLER in manual by pressing the AUTO/MAN pushbutton ○ Lowers feedwater flow by turning the manual knob on the MASTER FEEDWATER LEVEL CONTROLLER CCW to match TOTAL STEAM FLOW and TOTAL FEEDWATER FLOW ○ Places the LEVEL TRANSMITTER SELECTOR to the B position ○ Selects the S display on the MASTER FEEDWATER LEVEL CONTROLLER by pressing CHNG DISP button ○ Matches the S display to the P display by turning the manual knob on the MASTER FEEDWATER LEVEL CONTROLLER ○ When the deviation = 0 (S = P; Y = 0), then places the turning the manual knob on the MASTER FEEDWATER LEVEL CONTROLLER in auto by pressing the AUTO/MAN pushbutton ○ Monitors RPV water level and Feedwater flow ○ Maintains RPV water level at 160" or as directed by the US ○ Reports RPV water level transmitters swapped, Feedwater in auto and controlling. |
| | | |

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| | | |
|-----------|--|---|
| | BOP | <ul style="list-style-type: none"> Starts Drywell RECICR FAN 1-3 by placing its control switch to ON |
| | SRO | <ul style="list-style-type: none"> Directs entry into ABN-17, Feedwater System Abnormal Conditions Notifies WWM/SM for repair/investigation RPV water level instruments ID13A and ID13C Directs entry into Primary Containment Control EOP if Drywell temperature exceeds 150 °F <ul style="list-style-type: none"> Directs starting all available Drywell coolers |
| | | |
| | | |
| Terminus: | RPV water level transmitters have been swapped, Feedwater is in auto and is controlling. | |

Notes/Comments

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

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| <p>Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM4</u> Event No.: <u>7</u></p> <p>Event Description: <u>Loss of Coolant in the Primary Containment with Loss of Offsite Power (after the scram)</u></p> | | |
|---|----------|--|
| <p>Initiation: RPV water level transmitters have been swapped, Feedwater is in auto and is controlling, or as directed by the Lead Examiner.</p> | | |
| <p>Cues: Rising Drywell pressure; annunciator C3f, DRYWELL PRESS HI/LO; C3h, DW SUMP HI LEAK/PWR FAIL</p> | | |
| Time | Position | Applicant's Actions or Behavior |
| | ATC | <ul style="list-style-type: none"> • Reports Drywell pressure rising • Scrams reactor when directed <ul style="list-style-type: none"> ○ Depresses MANUAL SCRAM BUS 1 and BUS 2 ○ Places the REACTOR MODE SELECTOR switch in SHUTDOWN ○ Inserts SRMs, IRMs ○ Reports all control rods in • Reports loss of offsite power • Performs Support Procedure 3 (CRD System Operation) <ul style="list-style-type: none"> ○ Directs the EO to close the CRD Charging Header Supply valve V-15-52, to open CRD Bypass Isolation Valve V-15-237, and to throttle with CRD Bypass Valve V-15-30 [ROLE PLAY] • Bypasses ADS by placing ADS TIMER switches in BYPASS • Performs Support Procedure 9 (Lineup for Core Spray Injection) <ul style="list-style-type: none"> ○ Verifies Core Spray suction valves open ○ Confirms Core Spray Test Flow Return Valves V-20-27, V-20-26 closed ○ Attempts to start Core Spray Pumps in each system and reports no Core Spray pumps will start • Performs Support Procedure 5 (Firewater Injection) <ul style="list-style-type: none"> ○ Overrides Core Spray logic by pressing OVERRIDE switches for those lit ○ Presses all ACTUATED switches ○ Confirms Core Spray System 1 (but could be System 2) |

| | | |
|--|-----|--|
| | | <p>is not available</p> <ul style="list-style-type: none"> ○ Confirms Condensate Transfer is not being injected via Core Spray ○ Confirms Core Spray System 1 Booster Pumps and Main Pumps stopped ○ Places Core Spray System 1 Main Pumps in pull to lock ○ Directs EO to close Tell-Tale Drain, V-20-91 [ROLE PLAY1] ○ Confirms all available Diesel Fire Pumps (if not running) by placing their control switches to MAN position ○ Directs EO open Fire Water Supply Valve V-20-83 [ROLE PLAY3] ○ Confirms open Core Spray System 1 Discharge Valve V-20-12 ○ Confirms closed open Core Spray System 1 Test Flow Return Valve V-20-27 ○ Closes Core Spray System 1 suction valves V-20-32 and V-20-3 with their common control switch to CLOSE (only 1 valve has electrical power) ○ May request EO to close V-20-3 [ROLE PLAY4] ○ When RPV pressure is less than 310 psig and directed by the SRO, opens either Core Spray System 1 Parallel Isolation Valves by taking the control switch to OPEN ○ Reports Fire Water injecting into the RPV |
| | SRO | <ul style="list-style-type: none"> ● Directs manual scram prior to automatic scram setpoint (2.9 psig) <ul style="list-style-type: none"> ○ Mat direct a power reduction with recirculation flow prior to the manual scram ● Enters RPV Control EOP and Primary Containment Control EOP on high Drywell pressure and RPV water level ● RPV Control <ul style="list-style-type: none"> ○ Directs RPV water level band 138-175" with Support Procedure 2 and 3 (Feedwater and CRD Injection) ○ Directs RPV pressure band 8000-1000 with TBV (or may direct a lower band) ○ Following LOOP and lowering RPV water level lowering <ul style="list-style-type: none"> ▪ Directs Support Procedure 3 (CRD Injection) ▪ Directs ADS bypassed ▪ Confirms initiation of Isolation Condensers |

| | | |
|--|-----|--|
| | | <ul style="list-style-type: none"> ▪ Confirms Core Spray running IAW Support Procedure 9 (Lineup for Core Spray Injection) ▪ Directs lining up alternate subsystems: Fire Water IAW Support Procedure 5 (Firewater Injection) ▪ Directs Liquid Poison injected IAW Support Procedure 7 (Liquid Poison Injection) ○ Directs RPV pressure lowered as necessary to allow low pressure systems to inject (if fire water is lined up and running) (Critical Task) ○ If RPV water level reaches 0", directs Emergency Depressurization and enters Emergency Depressurization – No ATWS EOP (Critical Task) <ul style="list-style-type: none"> ▪ Directs ROPS bypassed ▪ Verifies Torus water level > 90" ▪ Directs all EMRVs open ● Primary Containment Control EOP <ul style="list-style-type: none"> ○ When Drywell pressure exceeds 12 psig, directs Drywell Sprays IAW Support Procedure 29 (Drywell Sprays) |
| | BOP | <ul style="list-style-type: none"> ● Performs Support Procedure 2 (FW Injection) <ul style="list-style-type: none"> ○ When RPV water level is rising after the scram, selects 1 FW Pump and trips the other 2 by placing their control switches in STOP ○ Controls RPV water level with MFRVs in manual ● Performs Support Procedure 7 (Liquid Poison Injection) <ul style="list-style-type: none"> ○ Places key into STANDBY LIQUID CONTROL keylock and turns to FIRE SYS 2 ● Places ROPS in BYPASS when directed ● Lowers RPV pressure as necessary to allow low pressure systems to inject, as directed (Critical Task) ● Places all AUTO DEPRESS VALVE switches to MAN to ED, if directed (Critical Task) ● Performs Support Procedure 29 (Drywell Sprays) <ul style="list-style-type: none"> ○ Confirms Recirculation Pumps and Drywell Recirculation fans ○ Places the System 2 SYSTEM MODE SELECT switch in DW SPRAY position ○ Verifies Torus CLG Discharge valve closes ○ Verifies DW Spray Discharge valve opens ○ Verifies adequate load on EDG2 |

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| | | |
|------------------|--|--|
| | | <ul style="list-style-type: none"> ○ Starts ESW Pump with the control switch to START ○ Inserts key into the SYSTEM 2 START PERMISSIVE and holds to C or D ○ Starts the Containment Spray Pump C or D with its control switch to START ○ Confirms the following RBCCW valves closed on Panel 1F/2F: <ul style="list-style-type: none"> ▪ V-5-147, V-5-148, V-5-166, V-5-167 |
| ROLE PLAY | | <ol style="list-style-type: none"> 1. As the EO, when asked to close Tell-Tale Drain, V-20-91, report it is closed. (to Core Spray System 1) 2. As the EO, when asked open Fire Water Supply Valve V-20-83, insert LOA-CSS029 to 1. (to Core Spray System 1) 3. As the EO, when asked to close Core Spray System 1 suction valve V-20-3, insert LOA-CSS003 to 0. 4. As the EO, when asked to close Tell-Tale Drain, V-20-90, report it is closed. (to Core Spray System 2) 5. As the EO, when asked open Fire Water Supply Valve V-20-82, insert LOA-CSS028 to 1. (to Core Spray System 2) 6. To perform Support Procedure 2, as the EO directed to close the CRD Charging Header Supply valve V-15-52 and to open CRD Bypass Isolation Valve V-15-237, insert LOA-CRD024 to 0 (close V-15-52) and LOA-CRD052 to 1 (open V-15-237) and open V-15-30 LOA-CRD51 to 1 (open). |
| Terminus: | | The RPV has been Emergency Depressurized or RPV pressure has been lowered to allow low pressure systems to inject into the RV and Fire Water is injecting (or other alternate sub-system), or as directed by the Lead Examiner |

Notes/Comments

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

Emergency Plan Classification: If RPV water level < -20": FS1, Site Area Emergency; IF PRV water level lowers to < 0": FS1, Site Area Emergency

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

(Potential loss of fuel clad barrier and Loss of reactor coolant system barrier). If RPV water level remains > 0": FA1, Alert (loss or potential loss of reactor coolant system).

SIMULATOR SETUP

1. Reset to full power IC-65
2. Insert control rod 22-11 from position 48 to position 00.
3. Reduce reactor power to about 95% with recirculation flow.
4. Place TBCCW Pump 2 in PTL and hang tag.
5. Place RWM in bypass and hang tag.
6. Place Air Compressor 3 in PTL and hang tag.
7. Place EDG 1 in Local Stop: Insert LOA-DGN003 to STOP. This will activate annunciator RAP-T5b (EDG1 NOT IN AUTO).
8. Place 2 tags on EDG 1 switches.
9. Verify RBCCW Pump 1-1 and TBCCW Pump 1 in service.
10. Have a completed 609.4.001 (isolation condenser surveillance) complete up to step 6.1.9.1.
11. Verify SGTs Selected to System 1.
12. Have stopwatch available.

| <u>Event</u> | <u>Trigger</u> | <u>Malfunction</u> |
|--------------|------------------------|--|
| 1 | PRESET → | MAL-CRD007_2211 <ul style="list-style-type: none"> • This will stick control rod 22-11 at position 00. • DELETE this malfunction when CRD drive pressure is raised to 390 psid |
| 2 | EVENT TRIGGER → | On Event Trigger: Trigger 1 hwx01o134R.eq.0 VLV-ICS006 to MECH SIEZE on Trigger 1 <ul style="list-style-type: none"> • When the red light for V-14-31 turns off, this will stick V-14-31 in its current position (closed) |

OC ILT 07-1 NRC Exam Scenario NRC SIM 4

| | | |
|---|--|---|
| 3 | T2 → | <p>MAL-NSS012E to 3% over a 15-minute ramp</p> <ul style="list-style-type: none"> This places a leak in the common variable leg to NR GEMACs level instruments ID13A and ID13C (also inputs into FWLC) |
| 4 | T3 → | <p>MAL-EDS003B</p> <ul style="list-style-type: none"> This results in the loss of USS 1A2 Bus |
| 5 | <p>PRESET →</p> <p>T4 →</p> <p>INSERT →</p> | <p>STL-RFC002 to OFF</p> <ul style="list-style-type: none"> This keeps the Recirculation Pump B AIR FAIL light off <p>LOA-RFC002 to TRUE</p> <ul style="list-style-type: none"> This places the Recirculation Pump B MG scoop tube in local manual control <p>LOA-RFC007 to 0.50 LOA-RFC007 to 0.40 LOA-RFC007 to 0.50 LOA-RFC007 to 0.40 LOA-RFC007 to 0.50</p> <p>Oscillate between 0.4 and 0.5 about every 3-5 seconds until the pump is manually tripped</p> <ul style="list-style-type: none"> This will cause oscillations on Recirculation Pump B greater than 5% peak-peak APRMs |
| 6 | <p>T5 →</p> <p>INSERT →</p> | <p>ICH-TSI017A to 10.3 ICH-TSI018A to 10.5</p> <ul style="list-style-type: none"> This causes high vibrations on turbine bearings #9 and #10 WHEN power has been reduced by > 5%, then ramp the two bearings to 5.5 and 5.9 mils over 2 minutes |

| | | |
|---|------------------------|---|
| 7 | T6 → | <p>MAL-NSS005B to 0.1% over 10 minutes</p> <ul style="list-style-type: none"> • This inserts a small recirculation line break to initiate the event |
| | EVENT TRIGGER → | <p>Insert EVENT TRIGGER 7: hwx03i254b.gt.0 to trigger 7</p> <p>MAL-NSS005A to 3% over 20 minutes</p> <p>MAL-OED003 with a 3 minute time delay</p> <ul style="list-style-type: none"> • This starts a larger recirculation line break inside the PC and a loss of offsite power with a 3 minute delay from the manual scram button (RPS2) |
| | PRESETS → | <p>BKR-CSS003 to MECH SIEZE (NZ01A)</p> <p>BKR-CSS004 to MECH SIEZE (NZ01B)</p> <p>BKR-CSS005 to MECH SIEZE (NZ01C)</p> <p>BKR-CSS006 to MECH SIEZE (NZ01D)</p> <ul style="list-style-type: none"> • This prevents all Core Spray Main Pump breakers from closing |
| 8 | T8 → | <p>LOA-CSS029 to 1</p> <ul style="list-style-type: none"> • This opens fire protection valve V-20-83 to Core Spray System 1 |
| | T9 → | <p>LOA-CSS028 to 1</p> <ul style="list-style-type: none"> • This opens fire protection valve V-20-82 to Core Spray System 2 |
| | INSERT → | <p>LOA-CSS003 to 0</p> <ul style="list-style-type: none"> • This closes Core Spray System 1 suction valve V-20-3 (to Pump A) <p>LOA-CSS021 to 0</p> <ul style="list-style-type: none"> • This closes Core Spray System 2 suction valve V-20-33 (to Pump D) |

Procedures

| <u>Event</u> | <u>Number/revision</u> | <u>Title</u> |
|---------------------|-------------------------------|--|
| 1 | ABN-6 | Control Rod Malfunctions |
| 1 | 302.2 | Control Rod Drive Manual Control System |
| 2 | Handout 609.4.001 | Isolation Condenser Valve Operability and Inservice test |
| 3 | ABN-17 | FW System Abnormal |
| 4 | RAP-u3a | 12 MN BRKR TRIP |
| 4 | RAP-S7f | FDR TO 460V 1A2 TRIP |
| 4 | ABN-45 | Loss of USS 1A2 |
| 5 | ABN-2 | Recirculation System Failures |
| 6 | RAP-Q3b | VIBRATION HI |
| 7 | RAP-C3f | DW PRESS HI/LO |
| 7 | RAP-C3h | DW SUMP HI LEAK/PWR FAIL |
| 7 | | RPV Control – No ATWS EOP |
| 5 | | Primary Containment Control EOP |
| 6 | | Support procedure 2 |
| 6 | | Support procedure 3 |
| 6 | | Support Procedure 5 |
| 7 | | Support procedure 9 |
| 7 | | Support procedure 29 |
| 7 | | Support procedure 7 |
| | | |
| | | |
| | | |

Shift Turnover

Initial Conditions:

1. The plant is at 95% power. Reactor power is limited to <98% due to turbine control fluctuations at $\geq 98\%$.
2. The following equipment is out of service:
 - a. EDG 1 is out of service to replace a fuel pump.
 - b. TBCCW Pump 2 is out of service for repair.
 - c. Air Compressor 3 is out of service for maintenance.
 - d. The RWM is out of service due to a fault, and is bypassed.
3. Procedure 609.4.001, Isolation Condenser Valve Operability and In Service Test, is in progress and is completed up to and including step 6.1.8.2. When resumed, start at step 6.1.9.1. Remote position verification is not required for this test. The test was halted by RP to allow emergent work on RB 75'. This work will be completed soon and RP will notify the US.
4. Control rod 22-11 had the scram valve diaphragm replaced and has been declared operable. It is currently at position 00 and needs to be withdrawn back to its normal position, 48. This activity may take place while RP has a hold on the surveillance test.

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

Scenario Outline

Facility: Oyster Creek

Scenario No.: NRC SIM 1

Op Test No.: OC 2008

Examiners: _____

Operators: _____

Initial Conditions:

- The plant is at about 92% power.
- EDG2 is OOS to replace a fuel pump.
- RWCU Pump A and Dilution Pump 1 are OOS for maintenance.

Turnover:

- Perform Backwash condenser half C South.
- Return the plant to rated power with Recirculation Flow and control rods.

| Event No. | Mal. No. | Event Type* | | Event Description |
|-----------|---------------------------------|-------------|------------|---|
| 1 | N/A | N | BOP | Perform backwash of condenser C South IAW procedure 323. |
| 2 | N/A | R | ATC | Withdraw control rods. |
| 3 | N/A | C | BOP | Responds to the trip of the Steam Packing Exhauster Blower |
| 4 | PMP-CRD002C | C TS | ATC SRO | Respond to reduced head on CRD Pump A. |
| 5 | MAL-CRD005_3 015 | C TS | ATC SRO | Respond to an outward drifting control rod. |
| 6 | ICH-CFW065A | C | BOP | Responds to high temperature on Feedwater Pump Bearing. |
| 7 | MAL-CFW012B | M | Crew | Respond to a feedwater line break with failure of feedwater check valves. |
| 8 | VLV-CSS004, 006, 011, 012 | C | Crew | Respond to a failure of Core Spray Isolation Valves to auto open. |

- (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor Transient, (TS) Tech Specs

NRC SIM 1 Simulator Scenario Summary

| <u>Event</u> | <u>Event Summary</u> |
|--------------|--|
| 1 | The BOP will backwash condenser C South section IAW procedure 323, Main Condenser Circulating Water System, section 8.3.12. This will require several switch manipulations (2 switches to place into backwash; same 2 switches to recover from backwash). (BOP: NORMAL EVOLUTION) |
| 2 | After the backwash is complete, the ATC will withdraw 6 control rods from position 10 to position 12. Then, the ATC will recover reactor power by raising reactor recirculation flow. (ATC: REACTIVITY MANIPULATION) |
| 3 | The BOP will respond to a loss of the in-service Steam Packing Exhauster Blower. The BOP will place the standby exhauster blower in service IAW PAR-Q8c, RXHAUSTER TRIP. |
| 4 | The ATC will respond to indications of inadequate CRD Pump A performance. The ATC will swap CRD Pumps IAW procedure 302.1, Control Rod Drive System, section 6.3. This will require several switch manipulations (takes manual control of CRD FCV, starts second CRD pump, places CRD flow in auto, stops first CRD pump). The SRO will declare CRD Pump A inoperable and apply Technical Specifications (TS 3.4.D.2 and TS 3.0.B which will require a plant shutdown with EDG 2 inoperable). (ATC: COMPONENT MALFUNCTION; SRO: TECHNICAL SPECIFICATION) [PMP-CRD002C to 75 for reduced head on CRD Pump A.] |
| 5 | The ATC will respond to an outward drifting control rod IAW ABN-6, Control Rod Malfunctions. This malfunction will require several switch manipulations (places rod power switch on, selects the control rod, and manually inserts). The SRO will declare the control rod inoperable and apply Technical Specifications for an inoperable control rod and for shutdown margin (TS 3.2.B.4). (ATC: COMPONENT MALFUNCTION; SRO: TECHNICAL SPECIFICATION) [MAL-CRD005_3015 for outward drift of control rod 30-15.] |
| 6 | The BOP will respond to annunciator J8f for high FW/Condensate pump/motor bearing temperatures. The BOP will see that the FW Pump B outboard bearing temperature (ICH-CFW065A to 190 [alarm at 185]) is high. The RAP says, if the alarm persists, to remove the FW Pump from service and perform a rapid power reduction. The |

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

BOP will shutdown the FW Pump B IAW procedure 317. Power will be first reduced to about 70%, the B String of Feedwater heaters removed (IAW procedure 317), Hydrogen injection to the B FW Pump secured (IAW procedure 317.4) then the FW Pump's MFRV is taken to manual and reduced, and the pump tripped.

- 7 The crew will respond to a large feedwater line break compounded with the failure of the feedwater isolation check valves. The crew will enter the RPV Control – No ATWS EOP. During the event, if the Feedwater Pumps are not secured, all Feedwater Pumps will trip. The crew will Emergency Depressurize (ED) when RPV water level reaches 0". (**MAJOR**)

[MAL-CFW012B to 100% for feedwater line break. SRV-CFW002B to 100% and SRV-CFW003B to 100% for backseat leakage.]

- 8 The crew will respond to the failure of all Core Spray System Parallel Isolation Valves to open. The valves will open by actions of the RB EO when requested to open the valves. The crew will be successful in recovering RPV water level after ED. (**FAILURE AFTER EOP ENTRY**)

Critical Task #1 The SRO will direct Emergency Depressurization when RPV water level reaches 0" provided at least one injection source is lined-up and running. ED will rapidly reduce RPV pressure to allow maximum injection of low pressure injection systems. (**PRA**) Or,

With low pressure systems running that have the capacity to restore and maintain RPV water level, the SRO will direct to lower RPV pressure as necessary to allow low pressure systems to inject.

Critical Task #2 The EO opens the Core Spray System Parallel Isolation Valves to allow Core Spray injection to recover RPV water level above the top of active fuel (TAF). Recovering RPV water level will re-assure adequate core cooling to minimize fuel damage. (**PRA**)

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

| <p>Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM1</u> Event No.: <u>1</u> Event Description: <u>Backwash Condenser half C South section IAW Procedure 323.</u></p> | | |
|--|----------|--|
| Initiation: Following shift turnover, or as directed by the Lead Examiner. | | |
| Cues: As directed by the SRO. | | |
| Time | Position | Applicant's Actions or Behavior |
| | SRO | <ul style="list-style-type: none"> Provides Pre-shift brief. Directs BOP to backwash the Condenser half C South IAW Procedure 323, starting at step 8.3.13.1. Notifies the Work Week Manager/OS when backwash is complete to evaluate condenser performance IAW Procedure 323.1. |
| | BOP | <p>Performs backwash of the Condenser half C South IAW Procedure 323. [PANEL 5F/6F]</p> <ul style="list-style-type: none"> Initiates the backwash <ul style="list-style-type: none"> Notifies EO of backwash status Places COND C SOUTH BACKWASH CONTROL switch to BACKWASH (spring return to normal) (V-3-23) After approximately 10 seconds, places COND C SOUTH CIRC WATER INLET & OUTLET switch to CLOSE (spring return to normal) (V-3-17) Verifies the following valve positions: <ul style="list-style-type: none"> V-3-17, COND C SOUTH INLET VALVE closed V-3-32, COND C SOUTH OUTLET VALVE closed V-3-23, COND C SOUTH BACKWASH VALVE open V-3-26, COND C SOUTH CROSS-CONNECT VALVE open V-3-31, COND C SOUTH NORTH OUTLET VALVE closed V-3-16, COND C NORTH INLET VALVE open V-3-22, COND C NORTH BACKWASH VALVE closed Allows the backwash to continue for approximately 3-5 minutes, and monitors the following: <ul style="list-style-type: none"> Condenser Hotwell Level Turbine Exhaust Hood Temperature |

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

| | | |
|-----------|---|---|
| | | <ul style="list-style-type: none"> ▪ Condenser vacuum • Secures from backwash • places COND C SOUTH CIRC WATER INLET & OUTLET switch to OPEN (V-3-17) • After approximately 10 seconds, places COND C SOUTH BACKWASH CONTROL switch to CLOSE (V-3-23) • Verifies the following valve positions: <ul style="list-style-type: none"> ▪ V-3-17, COND C SOUTH INLET VALVE open ▪ V-3-32, COND C SOUTH OUTLET VALVE open ▪ V-3-23, COND C SOUTH BACKWASH VALVE closed ▪ V-3-16, COND C NORTH INLET VALVE open ▪ V-3-31, COND C SOUTH NORTH OUTLET VALVE open ▪ V-3-22, COND C NORTH BACKWASH VALVE closed ▪ V-3-26, COND C SOUTH CROSS-CONNECT VALVE closed • Notifies the SRO that the backwash of Condenser half C South is complete and that to evaluate the condenser performance IAW Procedure 323.1. |
| | | |
| | ATC | <ul style="list-style-type: none"> • Provides peer check for valve manipulations. |
| | | |
| Terminus: | The backwash of Condenser half C South is complete. | |

Notes/Comments

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

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

| | | | | | | | | |
|---|----------|---|-------------------------------|--|--|---------------------|--|--|
| Op-Test No.: <u>OC 2008</u> | | | Scenario No.: <u>NRC SIM1</u> | | | Event No.: <u>2</u> | | |
| Event Description: <u>Withdraws Control Rods.</u> | | | | | | | | |
| Initiation: The backwash of Condenser half C South is complete, or as directed by the Lead Examiner. (NOTE: The Reactor Engineer remains in the CR for this evolution.) | | | | | | | | |
| Cues: As directed by the SRO. | | | | | | | | |
| Time | Position | Applicant's Actions or Behavior | | | | | | |
| | SRO | <ul style="list-style-type: none"> • Conducts a pre-job reactivity maneuver brief. • Directs the ATC to withdraw control rods IAW the reactivity maneuver sheet. • Acts as the Reactivity Manager during the evolution. | | | | | | |
| | BOP | <ul style="list-style-type: none"> • Provides a peer-check for withdrawing control rods and initials on the reactivity maneuver sheet after each control rod is withdrawn. | | | | | | |
| | ATC | <p>Withdraws control rods IAW the reactivity maneuver sheet and Procedure 302.2, Control Rod Drive Manual Control System. [PANEL 4F]</p> <ul style="list-style-type: none"> • Verifies the PERMIT light is illuminated. • Places the ROD POWER switch to ON. • Selects the control rod by depressing the corresponding pushbutton on the CONTROL ROD SELECT matrix. <ul style="list-style-type: none"> ○ Verifies the pushbutton light is lit and no others are lit. • Places the ROD CONTROL switch to ROD OUT NOTCH for about 1 second and verifies: <ul style="list-style-type: none"> ○ Green INSERT light is illuminated for about 1 second. • Releases the switch and verifies: <ul style="list-style-type: none"> ○ The red WITHDRAW light is illuminated about 2 seconds after the switch movement and remains on for about 1.5 seconds. ○ The control rod latches in the next even-numbered position before the SETTLE light is extinguished. ○ Initials on the reactivity maneuver form. • The ATC may request suspension of place keeping during the | | | | | | |

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

| | | |
|-----------|-----------------------------------|---|
| | | <p>evolution.</p> <ul style="list-style-type: none"> • Repeats this process for all control rods to be withdrawn. • Reports the control rods have been withdrawn. • Notifies Reactor Engineering of completion of the control rod withdrawals. |
| | | |
| | | |
| Terminus: | Control rods have been withdrawn. | |

Notes/Comments

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

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM1</u> Event No.: <u>3</u> Event Description: <u>Swaps Steam Packing Exhauster Blowers.</u> | | |
|---|---|---|
| Initiation: Control rods have been withdrawn, or as directed by the Lead Examiner. | | |
| Cues: Annunciator Q8c, EXHAUSTER TRIP | | |
| Time | Position | Applicant's Actions or Behavior |
| | | |
| | SRO | <ul style="list-style-type: none"> • Notifies WWM/SM about the tripped exhauster blower 1. |
| | | |
| | BOP | <ul style="list-style-type: none"> • Responds to annunciator Q8c, EXHAUSTER TRIP <ul style="list-style-type: none"> ○ Verifies gland steam pressure on Panel 7F ○ Confirms closed both V-7-38 and V-7-39 <ul style="list-style-type: none"> ▪ Closes V-7-38, EXHAUSTER VALVE 1, by holding its control switch to CLOSE if not already closed, until fully closed ○ Starts EXHAUSTER BLOWER 2 by placing its control switch to START ○ Verifies EXHAUSTER BLOWER 2 ON light is on ○ Throttles open EXHAUSTER VALVE 2 V-7-39 with its control switch to OPEN and release ○ Adjusts EXHAUSTER VALVE 2 V-7-39 as necessary to maintain GLAND STM HEADER VACUUM at 15 – 17.5 inches of water. • Reports Steam Packing Exhauster Blowers 2 is in service. • Directs the EO to investigate the tripped exhauster blower 1. [ROLE PLAY] |
| | | |
| ROLE PLAY | As the EO, when requested to investigate the tripped exhauster blower 1, wait 1-2 minutes and then report the motor is hot to the touch and you can smell a burnt odor. | |
| | | |
| Terminus: | Steam Packing Exhauster Blowers 2 has been placed in service. | |

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

Notes/Comments

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

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM1</u> Event No.: <u>4</u> Event Description: <u>Responds to CRD Pump A low pump head conditions</u> | | |
|--|----------|--|
| Initiation: Steam Packing Exhauster Blowers 2 has been placed in service, or as directed by the Lead Examiner. | | |
| Cues: Annunciator H7c, CHARG WTR PRESS LO; CRD Hydraulic System indications are lower; CRD Flow Control Valve indicates full open | | |
| Time | Position | Applicant's Actions or Behavior |
| | ATC | <p>Responds to annunciator H7c, CHARG WTR PRESS LO</p> <ul style="list-style-type: none"> • Monitors CRD system indications • Reports low readings on the CRD system and the CRD FCV is full open [PANEL 4F] • Directs an EO to check the CRD Pump A locally and the pump breaker [ROLE PLAY1] • May refer to Procedure 235 <p>Swaps CRD Pumps IAW Procedure 302.1, section 6.3.1</p> <ul style="list-style-type: none"> • Directs the RB EO to the CRD Pump Room with a radio • Places the CRD FLOW CONTROLLER in MAN • Starts CRD Pump B by placing the CRD PUMP NC08B control switch to START [ROLE PLAY2] • Confirms normal CRD System flow 55-65 gpm and confirms a good pump start with the local EO [ROLE PLAY3] • Stops CRD Pump A placing the CRD PUMP NC08A control switch to STOP • Places the CRD FLOW CONTROLLER in AUTO • Verifies normal CRD System indications <p>Reports CRD Pump B running and CRD Pump A is secured.</p> |
| | SRO | <ul style="list-style-type: none"> • Directs the ATC to swap CRD Pumps IAW Procedure 302.1, section 6.3.1 • Declares CRD PUMP A inoperable • Applies TS 3.4.D.2 and TS 3.0.B <ul style="list-style-type: none"> ○ The Unit shall be placed in COLD SHUTDOWN within the following 30 hours |

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

| | | |
|------------------|--|--|
| | | <ul style="list-style-type: none"> • Notifies the WWM/SM about CRD Pump A • Briefs the Crew about the loss of CRD Pump A |
| | | |
| | BOP | <ul style="list-style-type: none"> • Makes plant announcement for the start of CRD Pump B |
| | | |
| ROLE PLAY | <p>General Instructions: Wait 1-2 minutes after being requested to perform an action, then report.</p> <ol style="list-style-type: none"> 1. As the RB EO sent to check CRD Pump A, report CRD Pump A is running but it is making a loud metallic noise and vibrating much more than usual. Oil levels are normal. No abnormal indications at the breaker 2. As the RB EO, when asked to check CRD Pump B prior to start, report that it is ready to start. 3. As the RB EO, when asked to check CRD Pump B after the start, report a good start on CRD Pump B. | |
| | | |
| Terminus: | CRD Pump B is running and CRD Pump A is secured; The SRO has briefed the Crew. | |

Notes/Comments

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

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM1</u> Event No.: <u>5</u> Event Description: <u>Responds to a drifting-out control rod</u> | | |
|---|----------|---|
| Initiation: CRD Pump B is running and CRD Pump A is secured; The SRO has briefed the Crew, or as directed by the Lead Examiner. | | |
| Cues: Annunciator H6a, ROD DRIFT | | |
| Time | Position | Applicant's Actions or Behavior |
| | ATC | <p>Responds to annunciator H6a, ROD DRIFT</p> <ul style="list-style-type: none"> • Reports control rod 30-15 is drifting out • Enters ABN-6, Control Rod Malfunctions [PANEL 4F] <ul style="list-style-type: none"> ○ Places ROD POWER switch to ON ○ Selects control rod 30-15 ○ Inserts control rod 30-15 to its original position by placing the ROD CONTROL switch to ROD IN and releases ○ Reports control rod 30-15 is drifting outward again ○ Inserts control rod 30-15 to the full in position by placing the ROD CONTROL switch to ROD IN ○ Reports control rod 30-15 is at position 00 while still holding the ROD CONTROL switch ○ After the single rod scram, releases the ROD CONTROL switch ○ Reports the control rod remains at position 00 ○ Directs the EO to isolate HCU 30-15 [ROLE PLAY4] ○ Turns ROD POWER switch OFF. |
| | BOP | <ul style="list-style-type: none"> • Scrams control rod IAW procedure 302.2 <ul style="list-style-type: none"> ○ Asks for SM/QNE permission to scram control rod 30-15 [ROLE PLAY1] ○ Directs EO to verify open HCU 30-15 valves 101, 102, and 108 [ROLE PLAY2] ○ Obtains key from SM Office ○ Unlocks Panel 6XR ○ Points to switch 30-15 ○ Peer checker verifies correct switch ○ Places the correct toggle switch in the up position (scram) |

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

| | | |
|------------------|---|--|
| | | <ul style="list-style-type: none"> o Verifies scram display on Panel 4F [BOOTH] o Places correct toggle switch in the down position o Verifies scram signal removed o Locks Panel 6XR and returns the key |
| | SRO | <ul style="list-style-type: none"> • Directs entry into ABN-6, Control Rod Malfunctions • Notifies Reactor Engineering about the control rod [ROLE PLAY3] • Declares control rod 30-15 inoperable and applies TS 3.2.B.4 <ul style="list-style-type: none"> o 3.2.B.4: Verifies ≤ 6 inoperable control rods • Briefs the Crew on the Tech Specs • Notifies WWM/SM of the control rod problem |
| | | |
| BOOTH | When control rod 30-15 is indicated scrammed, DELETE the CRD malfunction. | |
| | | |
| ROLE PLAY | <ol style="list-style-type: none"> 1. If asked for permission from the Shift Manager and QNE, to scram control rod 30-15, role play as both and provide permission. 2. When asked to as the EO to verify open HCU 30-15 valves 101, 102, and 108, report the valves are open. 3. As System Manager and Reactor Engineering, when contacted about the drifting control rod, acknowledge the report. 4. When asked as the EO to isolate HCU 30-15, acknowledge the report. No action is required. Report when isolated. | |
| | | |
| Terminus: | Control rod 30-15 has been inserted/scrammed and the SRO has addressed TS 3.2.B.4. | |

Notes/Comments

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

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM1</u> Event No.: <u>6</u> Event Description: <u>Respond to high temperature on Feedwater Pump B bearing</u> | | |
|--|----------|---|
| Initiation: Control rod 30-15 has been inserted/scrammed and the SRO has addressed TS, or as directed by the Lead Examiner. | | |
| Cues: Annunciators J8f, COND/FD PMP BRG TEMP HI | | |
| Time | Position | Applicant's Actions or Behavior |
| NOTE: Perform at the Lead Examiner direction ONLY The intent of this event is to cause the Crew to shutdown Feedwater Pump B IAW procedure. If it appears they will wait too long, then call the SRO as the SM and ask about what is happening with the FW Pump. Ask him what the RAP says to do and the trend of the bearing temperature. Then direct him to shutdown the FW Pump normally, IAW procedure. The same applies if it appears that they intend to trip the FW Pump. | | |
| | BOP | Responds to annunciator J8f, COND/FD PMP BRG TEMP HI <ul style="list-style-type: none"> • Verifies/identified high bearing temperature on FW Pump B outboard bearing • Directs EO to verify TBCCW to FW Pump B and supply to the bearing [ROLE PLAY1] Removes FW Pump B from service IAW procedure 317 <ul style="list-style-type: none"> • Removes the FW Pump B heater string from service IAW procedure 317.1 [PANEL 7F] (Steps may be performed concurrently) <ul style="list-style-type: none"> ○ Slowly throttles closed the HP EXTRACTION STEAM ISOLATION valve 1B3 V-1-96 (NOTE: Valves V-1-96 and V-1-95 may be performed concurrently) ○ Verifies MOISTURE REMOVAL VALVE OPEN annunciator N2e is received ○ Directs the EO to place the alternate drain valve control switch for heater 1B3 to AUTO, V-4-14 [ROLE PLAY2] ○ Remove the IP Heater by slowly throttling closed the IP EXTRACTION STEAM ISOLATION valve 1B2 V-1-95 ○ Verifies MOISTURE REMOVAL VALVE OPEN annunciator N5e is received ○ Directs the EO to place the alternate drain valve control switch for heater 1B2 to AUTO, V-4-15 [ROLE PLAY3] |

| | | |
|--|-----|--|
| | | <ul style="list-style-type: none"> • Directs the EO to secure hydrogen injection to FW Pump B IAW procedure 317.4 [ROLE PLAY4] • Shuts down FW Pump B IAW procedure 317 <ul style="list-style-type: none"> ○ Places the FW Pump B MFRV FLOW CONTROLLER V-ID11B in MAN ○ Monitors flows through the other FW Pumps ○ Directs the EO to start the auxiliary oil pump for FW Pump B by pressing the start pushbutton and latching [ROLE PLAY5] ○ Slowly closes FW Pump B MFRV by rotating the manual knob CCW and observes other controllers ○ Verifies MIN FLOW VALVE opens at about 0.25×10^6 lb/hr ○ When MFRV controller indicates 0% (closed), closes the HEATER BANK OUTLET Valve V-2-11 ○ Stops the FW Pump B by placing FEED PUMP 1B control switch to STOP [BOOTH] ○ Directs EO to secure B Feed Water Pump supplemental cooling [ROLE PLAY6] • Reports the FW Pump B is secured. • If directed to trip Feedwater Pump B, places the control switch to TRIP. <ul style="list-style-type: none"> ○ Performs those actions to isolate steam the affected Feedwater heaters and stop hydrogen injection to Feedwater Pump B as provided above. |
| | ATC | <ul style="list-style-type: none"> • Reduces recirculation flow as directed by rotating the MASTER RECIRC SPEED CONTROLLER manual knob CCW, as directed • For a rapid power reduction, rotate the MASTER RECIRC SPEED CONTROLLER manual knob CCW to no less than 8.5×10^4 gpm or as directed • Notifies System Dispatch of the power reduction. • Notifies Chemistry to sample reactor coolant. |
| | | |

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

| | |
|------------------|--|
| ROLE PLAY | <p>General: Wait 1-2 minutes after being requested to perform an action, then report.</p> <ol style="list-style-type: none"> 1. As the EO requested to verify TBCCW and supply to FW Pump outboard bearing, report TBCCW lineup is correct and that the supply to the bearing has been verified. 2. As the EO requested to place the alternate drain valve control switch for heater 1B3 to AUTO, V-4-14, report that it is in AUTO. 3. As the EO requested to place the alternate drain valve control switch for heater 1B2 to AUTO, V-4-5, report that it is in AUTO. 4. As the EO requested to secure hydrogen injection to Feedwater Pump B, then Insert VLV-HWC002 to CLOSE; then report you have the closed indication for the valve. 5. As the EO requested to start and latch the FW Pump B auxiliary oil pump, insert LOA-CFW059 to START and then notify that the auxiliary oil pump is started 6. As the EO requested to secure B Feed Water Pump supplemental cooling, acknowledge the report. |
| | <p>SRO</p> <ul style="list-style-type: none"> • Provides brief prior to down power • Directs ATC to reduce reactor power with recirculation flow to reduce load on FW Pump B to clear the FW Pump alarm • With the alarm persisting, directs the ATC to perform a rapid power reduction OR the SRO may direct the BOP to trip Feedwater Pump B and the ATC to perform a rapid power reduction • Directs the BOP to remove the FW Pump B from service IAW procedure • Notifies Ops. Management/SM for the power reduction and to make required notifications • Notifies WWM/SM for the FW Pump B repair |
| | |
| BOOTH | <p>When FW Pump B is tripped, DELETE the bearing temperature malfunction.</p> |
| | |
| Terminus: | <p>Reactor power has been reduced and FW Pump B has been removed from service.</p> |

Notes/Comments

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

| Op-Test No.: <u>OC 2008</u> Scenario No.: <u>NRC SIM1</u> Event No.: <u>7/8</u> | | |
|---|----------|--|
| Event Description: <u>Feedwater line break in the Turbine Building followed by the failure of FW check valves leading to a LOCA outside the Primary Containment</u> | | |
| Initiation: Reactor power has been reduced and FW Pump B has been removed from service, or as determined by the Lead Examiner. | | |
| Cues: Annunciator P2f, CONDENSATE BAY 1-2 LEVEL HI; RPV water level lowers; FW flow becomes > steam flow; Annunciator J8c FCS/RFCS TROUBLE; Feed Pumps flow becomes limited (MFRV LIMIT light ON) | | |
| Time | Position | Applicant's Actions or Behavior |
| | BOP | <ul style="list-style-type: none"> • Responds to Annunciator P2f, CONDENSATE BAY 1-2 LEVEL HI and directs to verify locally [ROLE PLAY1] • Reports RPV water level • Performs Support Procedure 2 (Feedwater Injection) <ul style="list-style-type: none"> ○ When RPV water level begins to rise, trips 1 FW Pump by placing its control switch to STOP ○ May re-start the FW Pump to control RPV water level • Performs SP-11 and cycles IC condensate return valves as required to maintain given RPV pressure band (RPV Pressure Control – Isolation Condensers) • Bypasses ADS by placing key into ADS TIMER keylocks and rotates to BYPASS • Performs Support Procedure 8 (Condensate Injection) <ul style="list-style-type: none"> ○ Confirms MFRVs in MAN and opens • Places ROPS switch in BYPASS when directed |
| | ATC | <ul style="list-style-type: none"> • Reports FW Flow > steam flow • Reports the FW Pumps are at runout conditions • Lowers recirculation flow as directed by rotating the MASTER RECIRC SPEED CONTROLLER manual knob CCW to no less than 8.5×10^4 gpm if directed to reduce FW demands • Scrams reactor when directed <ul style="list-style-type: none"> ○ Depresses MANUAL SCRAM BUS 1 and BUS 2 ○ Places the REACTOR MODE SELECTOR switch in SHUTDOWN |

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

| | | |
|--|-----|---|
| | | <ul style="list-style-type: none"> ○ Inserts SRMs, IRMs ○ Reports all control rods in ● Performs Support Procedure 3 (CRD Injection) <ul style="list-style-type: none"> ○ (Will not start the standby CRD Pump as directed by procedure since it was declared inoperable earlier in the scenario) ○ Directs the EO to close the CRD Charging Header Supply valve V-15-52, to open CRD Bypass Isolation Valve V-15-237, and to throttle with CRD Bypass Valve V-15-30 [ROLE PLAY2] ● Reports all FW Pumps tripped and reports RPV water level ● Performs Support Procedure 9 (Core Spray Injection) <ul style="list-style-type: none"> ○ When RPV pressure drops to < 305 psig, confirms open Core Spray Parallel Isolation Valves (Failed to auto open) ○ Manually opens all PARALLEL ISOL valves when RPV pressure drops < 305 psig ● Places AUTO DEPRESS VALVE to MAN to open EMRVs to lower RPV pressure (Critical Task) ● Places all AUTO DEPRESS VALVE to MAN for ED (Critical Task) ● When RPV pressure lowers, opens Core Spray valves and injects into the RPV and reports RPV water level rising (Critical Task) |
| | | |
| | SRO | <ul style="list-style-type: none"> ● May directs the ATC to reduce power with recirculation flow to reduce FW flow demands ● Directs manual scram prior to the auto RPV water level setpoint ● Directs entry into RPV Control – No ATWS EOP ● Directs Support Procedure 1 (Auto isolations/initiations Verification) ● Directs BOP to maintain RPV water level 138-175" with Support Procedure 2 and 3 (CRD and Feedwater Injection) ● Directs RPV pressure 800-1000 psig with TBV and may lower this band later ● When RPV water level lowers to near 86", directs RPV pressure control to the Isolation Condensers IAW Support Procedure 11 ● With RPV water level < 61", directs ADS bypassed ● Directs confirmation of Isolation Condensers ● Directs Support Procedure 8 and 9 Condensate and Core Spray |

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

| | | |
|------------------|---|--|
| | | <p>Injection)</p> <ul style="list-style-type: none"> • Directs RPV pressure be reduced with ICs and EMRVs to lower RPV pressure to allow low pressure systems to inject (Critical Task) • IF RPV water level lowers to 0", directs ED (Critical Task) <ul style="list-style-type: none"> ○ Directs ROPS bypassed ○ Directs all EMRVS opened |
| | | |
| ROLE PLAY | <p>General: Wait 1-2 minutes after being requested to perform an action, then report.</p> <ol style="list-style-type: none"> 1. As the EO directed to check TB Sump 1-2, and report that the sump is full. Also report that water is raining down from the ceiling in the FW Pump Room. 2. As the EO directed to close the CRD Charging Header Supply valve V-15-52 and to open CRD Bypass Isolation Valve V-15-237, insert LOA-CRD024 to 0 (close V-15-52) and LOA-CRD052 to 1 (open V-15-237) and open V-15-30 LOA-CRD51 to 1 (open). | |
| | | |
| Terminus: | <p>RPV pressure has been reduced and Core Spray is injecting into the RPV, or as directed by the Lead Examiner.</p> | |

Notes/Comments

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

Emergency Plan Classification: IF RPV water level lowers to < 0" (but NOT < -20"): FS1, Site Area Emergency (Potential loss of fuel clad barrier and Loss of reactor coolant system barrier).

SIMULATOT SETUP

1. Setup to full power IC-65.
2. Reduce power with recirculation flow to 95% (about 43 hz.).
3. Insert control rods 14-31, 38-31, 38-23, 14-23, 30-15, 22-15, 22-39, and 30-39 from position 12 to position 10. (Goal: 92% power after rod insertions; lower recirculation flow as necessary)
4. Place RWCU Pump B is-service and secure RWCU Pump A.
5. Place RWCU Pump B in PTL and hang tag.
6. Place RWM in bypass and hang tag.
7. Place Dilution Pumps 2 and 3 in-service and secure Dilution Pump 1.
8. Place Dilution Pump 1 in PTL and hang tag.
9. Place EDG 2 in Local Stop: Insert LOA-DGN009 to STOP. This will activate annunciator RAP-T5f (EDG2 NOT IN AUTO) and hang 2 tags.
10. Have a completed reactivity maneuver sheet (include control rods 14-31, 38-31, 38-23, 14-23, 30-15, 22-15, 22-39, and 30-39 from position 10 to position 12).
11. Have a copy of procedure 302.2, Control Rod Drive manual Control System, for the Crew
12. Have Procedure 323 completed for backwash up to step 8.3.13.

Malfunctions:

| <u>Event</u> | <u>Trigger</u> | <u>Malfunction</u> |
|--------------|----------------|--|
| 1 | NA | None |
| 2 | NA | None |
| 3 | T1 → | MAL-MSS005A <ul style="list-style-type: none"> • This causes Exhauster Blower 1 to trip and alarms Q8c |
| 4 | T2 → | PMP-CRD002C to 75% <ul style="list-style-type: none"> • This causes a reduction in head of the running CRD Pump A |

• • •

| | | |
|---|---------------------------------|--|
| 5 | T3 → | <p>ICH-CFW065A from 185-190 over 10 minutes</p> <ul style="list-style-type: none"> • This will increase the Feedwater Pump B outboard bearing from 185 °F to 190 °F over the period • WHEN the FW Pump B is tripped, DELETE the malfunction. |
| | INSERT when required | <p>Insert VLV-HWC002 to CLOSE</p> <ul style="list-style-type: none"> • This will close hydrogen injection valve V-567-34 to FW Pump B <p>Insert LOA-CFW059 to START</p> <ul style="list-style-type: none"> • This will manually start FW Pump B auxiliary oil pump |
| 6 | T4 → | <p>MAL-CRD005_3015</p> <ul style="list-style-type: none"> • This will cause control rod 30-15 to drift outward • DELETE this malfunction when the single rod is scrambled. |
| 7 | T5 → | <p>MAL-CFW012B to 20% over 20 minutes</p> <ul style="list-style-type: none"> • This will cause a FW leak in the FW Heater Bay |
| | T5 → | <p>SRV-CFW002B to 100% with a 8 minute delay</p> <p>SRV-CFW003B to 100% with a 8 minute delay</p> <ul style="list-style-type: none"> • This causes a leak through the FW line check valves to reduce RPV water level |
| | T5 → | <p>MAL-CFW006A with a 10 minute delay</p> <p>MAL-CFW006B with a 10 minute delay</p> <p>MAL-CFW006C with a 10 minute delay</p> <ul style="list-style-type: none"> • This will cause a trip of all Feedwater Pumps |

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

| | | |
|---|---------------|--|
| 8 | PRESET | <p>VLV-CSS011 (for V-20-40) to FAIL AUTO OPEN</p> <p>VLV-CSS004 (for V-20-15) to FAIL AUTO OPEN</p> <p>VLV-CSS012 (for V-20-41) to FAIL AUTO OPEN</p> <p>VLV-CSS006 (for V-20-421) to FAIL AUTO OPEN</p> <ul style="list-style-type: none">• This prevents auto opening of the Core Spray System Parallel Isolation Valves |
|---|---------------|--|

OC ILT 07-1 NRC Exam Scenario NRC SIM 1

Procedures

| <u>Event</u> | <u>Number</u> | <u>Title</u> |
|--------------|--------------------------------|--|
| 1 | 323 / 84 | Main Condenser Circulating Water System |
| 2 | 302.2 / 35 Handout provided | Control Rod Drive Manual Control System |
| 2 | Handout provided | OP-AB-300-1003/3, Reactivity Maneuver Approval Cover Page and Reactivity Maneuver Guidance Sheet |
| 3 | RAP-Q8c | EXHAUSTER TRIP |
| 4 | RAP-H7c / 1 | CHARG WTR PRESS LO |
| 4 | 235 / 34 | Determination and Correction of Control Rod Drive System Problems |
| 4 | 302.1 / 97 | Control Rod Drive System |
| 5 | RAP-J8f / 4 | COND/FD PMP BRG TEMP HI |
| 5 | 317 / 81 | Feedwater |
| 5 | 317.1 / 40 | FW Heaters |
| 5 | 317.4 / 40 | FW Hydrogen Injection |
| 5 | 202.1 / 110 | Power Operation |
| 6 | RAP-H6a / 1 | ROD DRIFT |
| 6 | ABN-6 / 5 | Control Rod Malfunctions |
| 6 | 302.2 | Control Rod Drive Manual Control System |
| 7 | RAP-p2F / 0 | CONDENSATE BAY 1-2 LEVEL HI |
| 7 | RAP-J8c / 1 | FCS/RFCS TROUBLE |
| 7 | SP-2 | |
| 7 | SP-3 | |
| 7 | SP-8 | |
| 7 | SP-9 | |
| 7 | EOP | RPV Control - No ATWSW EOP |
| 7 | EOP | ED – No ATWS EOP |

Shift Turnover

1. The plant is at 92% power with condenser backwash in-progress.
2. The following equipment is out of service:
 - a. EDG 2 is out of service to replace a fuel pump. All Technical Specifications have been reviewed and applied. EDG 2 is expected back by the end of shift today.
 - b. RWCU Pump A is out of service for repair.
 - c. Dilution Pump 1 is out of service for maintenance.
 - d. The RWM is out of service due to a fault, and is bypassed.
 - e. Plant risk is yellow
3. Following shift turnover:
 - a. Complete the condenser backwash IAW Procedure 323
 - i. Complete the backwash on condenser half C South, starting at step 8.3.13.1.
 - ii. An EO is in the field and is aware of which valves will be moved.
 - b. Following the backwash, withdraw control rods IAW the Reactivity Maneuver Form.