

Facility: VC_SUMMER Scenario No.: 1 Op-Test No.: 99-1Examiners: G. HOPPER
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Operators:

Objectives: _____

Initial Conditions: PLANT OPERATING AT 90% POWER. 'B' TRAIN EQUIPMENT IN SERVICE. PCV-445A HAS BEEN ISOLATED DUE EXTERNAL LEAKAGE. 'C' ACCUM PRESS HI/LO ANNUNCIATOR JUST ALARMED. HEAVY THUNDERSTORMS IN THE AREA.

Turnover: PCV-444B HAS MINOR SEAT LEAKAGE. 'A' TRAIN COMPONENT COOLING PUMP OOS SERVICE FOR MAINTENANCE (CLEARING TAGS). 30 GPD LEAKAGE ON 'A S/G.

| Event No. | Malf. No. | Event Type* | Event Description |
|-----------|----------------------|-------------|---|
| 1 | | N-RO | RAISE 'C' ACCUMULATOR PRESSURE |
| 2 | PRS-001A PRS-004B | I-RO | PZR PRESSURE CONTROL CHANNEL PT-444 FAILS HI (SEVERITY=2500, RAMP=15) PCV-444B STICKS OPEN (SEVERITY=50%, RAMP=5, DELAY=5, TRIGGER=JMLPRS1A) |
| 3 | MSS-009E | I-BOP | 'C' STEAMLINE FLOW XMITTER FT-494 FAILS LO (SEVERITY=0, RAMP=10) |
| 4 | CCW-007B | C-BOP | LOSS OF OPERATING COMPONENT COOLING WATER TRAIN <i>reestablish efflu & letdown</i> |
| 5a | | N-RO | REALIGN LETDOWN TO DEMINERALIZERS |
| 6 | CVC-004A | C-RO | RCP 'A' #1 SEAL FAILURE (SEVERITY=7.5, RAMP=120) |
| 7 | | R-ALL | SRO DIRECTS POWER REDUCTION TO <38% @ 3%/MINUTE |
| 8 | CVC-004A RCS-006A | M-ALL | RCP 'A' #1 SEAL FAILURE (SEVERITY=100, RAMP=30) RCP SEAL LOCA (SEVERITY=300, RAMP=180, DELAY=60) |
| | LOA-EPS-138 | | 'B' TRAIN EQUIPMENT FAILS TO AUTO SI. MANUALLY ACTUATE 'B' TRAIN ECCS EQUIPMENT (SELECT=OPEN, TRIGGER=JPPLSI(1)) |
| | PMP-CS004S | | 'A' CHARGING PUMP SHEARED SHAFT |
| | MSS-008B | | FAIL BANK 1 STEAM DUMP VALVE OPEN (SEVERITY=100, RAMP=10, DELAY=5, TRIGGER=JPPLSI(1)) |
| | | | |

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

A/1

Event Description: Raise 'C' Safety Injection Accumulator Pressure

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Event Description: Pressurizer Pressure Control Channel PT-444 Fails High
Pressurizer PORV, PCV-444B, Sticks Open

| Time | Position | Applicants Actions or Behavior |
|------|----------|--|
| 1439 | RO | Operator verifies failed Control Channel |
| | | • PI-444 indicates HI |
| | | • PZR CNTRL PRESS HI Annunciator |
| | | • PZR PRESS HI/LO Annunciator |
| | | • PZR PRESS HI Annunciator |
| | ✓ | Checks position of Pressurizer PORV's and places PCV-444B control switch to CLOSE. |
| | | ✓ Shuts Valve MVG-8000B, Block Valve for PCV-444B. |
| | | Compare Control Channel Indications to Protection Channel PI-455, 456, and 457. This may have been done in Step 1. |
| | ✓ | Close the Pressurizer Spray Valves PCV-444C and PCV-444D. |
| | ✓ | Control the PZR PRESS Master Control in Manual. |
| | ✓ | Operate Pressurizer Heaters and Spray Valves in Manual to control RCS pressure between 2220 PSIG and 2250 PSIG. |
| | | Verify PI-445, CNTRL CHAN PRESS PSIG, Indication is Normal. |
| | | Ensure Rod CNTRL BANK SEL Switch is in AUTO. |
| | | Maintain RCS Pressure between 2220 PSIG and 2250 PSIG. |
| | | |
| | | |
| | | |

Event Description: 'C' Steamline Flow Transmitter FT-494 Fails Low

[illegible]

Op-Test No.: 99-1 Scenario No.: 1 Event No.: 4 Page 1 of 2
 Event Description: Loss of Operating Component Cooling Water Train

| Time | Position | Applicants Actions or Behavior |
|------|----------|--|
| 1256 | BOP | Operator recognizes indications for a trip of 'B' CCW Pump |
| | | • CCP B/C Trip Fail Annunciator |
| | | • 'B' CCW Pump Amps reading 0 |
| | | • CCW Loop B PP DISCH PRESS LO Annunciator |
| | | |
| | | Within one minute the operator should |
| | | • Start 'C' CCW Pump on 'A' Train |
| | | • Start 'A' Charging Pump |
| | | • Stop 'B' Charging Pump |
| | | <i>isolated below?</i> |
| | | Operator should establish 'A' CCW Train and the Active Train |
| | | • Start MVB-9503A, CC to RHR HX A, stroking in the Closed direction |
| | | • When flow on FI-7034 is between 5000 GPM and 4000 GPM rapidly |
| | | – Open MVB-9687A/9525A |
| | | – Open MVB-9524A/9526A |
| | | – Close MVB-9524B/9526B |
| | | – Close MVB-9687B/9525B |
| | | – Open MVB-9503B |
| | | • Have Auxiliary Building operator verify sample flow to RML2A is greater than one GPM |
| | | • Ensure the following Valves have not closed on High Flow |
| | | – MVG-9625 |
| | | – MVG-9626 |
| | | – MVG-9583 |
| | | – MVT-9593A/B/C |

Event Description: Loss of Operating Component Cooling Water Train

[illegible]

Event Description: Realign Letdown to Demineralizers

[illegible]

Op-Test No.: 99-1 Scenario No.: 1 Event No.: 6 Page 1 of 1
 Event Description: Reactor Coolant Pump 'A' Number One Seal Failure

| Time | Position | Applicants Actions or Behavior |
|------|----------|---|
| 1529 | RO | Operator recognizes indications of abnormal leakoff from 'A' RCP #1 Seal |
| | | • RCP A #1 SL LKOFF FLO HI/LO Annunciator |
| | | Operator breaks out ARP XCP-617 (2-1) and monitors Seal Leakoff Flow on FR-154B. |
| | | Operator ensures Seal Injection Flow to 'A' RCP is greater than 8 GPM on FI-130A. |
| | | Operator ensures CCW Flow to 'A' RCP Thermal Barrier is between 35 GPM and 60 GPM on FM-7138. |
| | | Operator monitors lower Seal Water Bearing temperature on T0417A. |
| | | Operator monitors #1 Seal Leakoff temperature on T0181A. |
| | | Operator determines that #1 Seal Leakoff Flow is greater than 6 GPM by monitoring FR-154A, RCP SL LKOFF HI RANGE. |
| | | Commence plant power reduction to allow securing 'A' RCP within 8 hours. |
| | | After the subsequent Safety Injection, the operator should secure 'A' RCP. |
| | | Within three to five minutes after 'A' RCP is secured, close RCP 'A' Seal Leakoff PVT-8141A. |

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 Event Description: Power Reduction to < 38% @ 3%/Min.

| Time | Position | Applicants Actions or Behavior |
|------|----------|--|
| | SRO | CRS directs power reduction at 3%/min. |
| | BOP | Reduces Turbine Load |
| | | <ul style="list-style-type: none"> • Deenergizes LOAD LMT circuit • Energizes DEC LOAD RATE circuit • Selects 3%/min. on LOAD RATE LMT - % • Depress DECREASE pushbutton to reduce LOAD SET to value directed by CRS |
| | RO | Monitors control rods to ensure T_{AVE} is decreasing with automatic inward rod motion. |
| | RO | Opens MVG-8104 as necessary to minimize $T_{AVE} - T_{REF}$ mismatch. |
| | BOP | Secure one MFP per SOP-210 when directed by CRS |
| | | <ul style="list-style-type: none"> • Open MFP Turbine Drain Valve MOV-1-5 • Place MFP recirculation in Manual • Decrease MFP speed controller output to 0 • Trip the MFP using the FWP PP TRIP/RESET switch at the MCB • Dispatches operator to verify HP & LP Stop Valves have closed • Ensures MFP turbine is on turning gear when speed is 0. |
| | BOP | Secures one MFBP when directed by CRS. |

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Event Description: RCP Seal LOCA

'B' Train ESFLS Failure, 'A' Charging Pump Broken Gear Box Bank 1

Steam Dump Fails Open

| Time | Position | Applicants Actions or Behavior |
|------|----------|--|
| 1539 | RO | Recognizes increase in 'A' RCP #1 Seal Failure/Seal LOCA <ul style="list-style-type: none"> RCP Seal Bearing temperature increasing PZR level decreasing Charging flow increasing |
| | RO/BOP | Trips the reactor when directed by CRS or when SOP-101 RCP trip criteria are met. |
| 1540 | RO/BOP | Auto Manually SI's when directed by CRS or after automatic SI. |
| | RO | Secures 'A' RCP after the reactor trip. |
| | RO | Performs Immediate Actions of EOP-1.0 <ul style="list-style-type: none"> Verifies reactor trip |
| | BOP | Performs Immediate Actions of EOP-1.0 <ul style="list-style-type: none"> Verifies turbine trip Verifies ESF buses energized |
| | BOP | Recognizes failure of 'B' Train ESFLS to sequence and informs RO/CRS |
| 1541 | RO | Recognizes 'A' Charging Pump low amps and informs CRS. Calls AB operator to investigate. |
| | RO | Closes PVT-8141A, 3-5 minutes after securing 'A' RCP. <i>done</i> |
| | RO | <i>Report on loss of RB 2058 MTR</i> |
| | RO | Directs TB operator to rack up 'C' Charging Pump on 'A' Train and rack down 'A' Charging Pump. |

Op-Test No.: 99-1 Scenario No.: 1 Event No.: 8 Page 2 of 3

Event Description: RCP Seal LOCA

'B' Train ESFLS Failure, 'A' Charging Pump Broken Gear Box Bank 1
Steam Dump Fails Open

| Time | Position | Applicants Actions or Behavior |
|--|----------|--|
| <i>RO Recommend not really</i> | RO/BOP | Crew should NOT secure 'B' & 'C' RCPs when RCS pressure decreases < 1400 psig until SI flow is established from 'C' Charging Pump. |
| | RO | During initial check after Immediate Actions: |
| | | <ul style="list-style-type: none"> Recognizes 'B' RHR failed to start and manually starts it Recognizes one 'B' Train RBCU failed to start and manually starts it Recognizes 'B' SWBP did not start and manually starts it. |
| | BOP | Performs Attachment 3 of EOP-1.0 to verify proper operation of all ESF equipment (If not already performed by the NROATC). |
| | | <ul style="list-style-type: none"> Recognizes 'B' RHR failed to start and manually starts it. Recognizes one 'B' Train RBCU did not start and manually starts it Recognizes 'B' SWBP did not start and manually starts it. |
| | BOP/RO | Recognizes failure of one Bank 1 Steam Dump and attempts to manually close with the steam dump controller |
| | BOP/RO | Dispatches an operator to locally close or isolate the failed open steam dump. |
| | SRO | Transitions to EOP-2.0, <i>Loss of Reactor on Secondary Coolant.</i> |
| | RO | Resets SI, Phase A Isolation, Phase B Isolation. |
| | BOP | Resets ESF Loading Sequencers. |

Event Description: RCP Seal LOCA

**'B' Train ESFLS Failure, 'A' Charging Pump Broken Gear Box Bank 1
Steam Dump Fails Open**

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