

Final Submittal  
(Blue Paper)

FINAL SRO  
WRITTEN EXAMINATION  
AND REFERENCES

*BROWNS FERRY 2007-301*

1.

Which ONE of the following describes the measures required by Tech Specs for control of access to areas where an individual may receive a dose of 500 rads or more in 1 hour at 1 meter from the radiation source?

- A. Provide continuous direct Radcon coverage or electronic surveillance of the area that is capable of preventing unauthorized entry.
- B. A control device that energizes a conspicuous visible or audible alarm so that the individual entering the area and the supervisor are made aware of the entry.
- C. Measures to ensure that an individual is not able to gain unauthorized or inadvertant access to the area.
- D. A control device that, upon entry into the area, reduces the radiation level such that an individual will **not** receive a deep-dose equivalent of 0.1 rem in 1 hour at 30 cm.

2.

Unit 1 was operating at full power when both seals for 1A Recirc pump failed. When the UO attempted to close 1-FCV-68-3 Recirc Pump A Discharge valve the handswitch could not be moved from the neutral position.

Which ONE of the following describes the required procedural and Tech Spec actions?

- A. Dispatch personnel to 480v RMOV board 1A to take local control and close 1-FCV-68-3 from the RMOV board.

APLHGR single loop limits in the COLR are applied

- B. Dispatch personnel to 480v RMOV board 1B to take local control and close 1-FCV-68-3 from the RMOV board.

MCPR single loop limits in the COLR are applied

- C. Dispatch personnel to 480v RMOV board 1D to take local control and close 1-FCV-68-3 from the RMOV board.

LHGR single loop limits in the COLR are applied

- D. Dispatch personnel to 480v RMOV board 1E to take local control and close 1-FCV-68-3 from the RMOV board.

APRM High flow biased allowable values are reset for single loop operation

3.

Unit 2 is performing a shutdown for refueling outage.

The Unit conditions are as follows:

- Reactor pressure - 925 psig
- Containment oxygen content (panel 9-53) - 20%
- Containment Airlock door interlocks are inoperable

You have been assigned to supervise and prepare for initial Drywell entry.

### REFERENCE PROVIDED

Which ONE of the following describes required action(s) for initial Drywell entry and the remedial action for the inoperable door interlocks?

- A. TIP nitrogen supply and TIP movement must be controlled by the clearance program .

Verify one door is closed within 1 hour and lock the door within 24 hours. Dedicate an AUO to verify one door is closed at all times during containment entry..

- B. Reactor Mode Switch must be in Refuel with no Control Rod movement in progress.

Initiate action to evaluate primary containment overall leakage rate per LCO 3.6.1.1, using current air lock test results.

- C. SCBAs are **not** required if oxygen content has been verified by Control Room Containment monitoring.

Verify one door is closed within 1 hour and lock the door within 24 hours. Dedicate an AUO to verify one door is closed at all times during containment entry..

- D. If Primary Containment is required, Mechanical Maintenance personnel must remain at the Personnel Airlock during Drywell entry.

Initiate action to evaluate primary containment overall leakage rate per LCO 3.6.1.1, using current air lock test results.

4.

Unit 2 was operating at full power when a Main Turbine trip was received. RPS failed to deenergize on the Turbine trip and Control Rod insertion was achieved by manual ARI initiation. Plant conditions have stabilized when the UO notes the following:

- All Control Rods inserted
- RPV water level 33 inches controlled by feedwater
- RPV pressure 700 psig controlled by bypass valves
- One Reactor Building Elevation 565 Rad Monitor above max safe
- One Reactor Building Elevation 565 Temperature above max safe
- Main Steam Line Radiation High-High alarm (3X Normal Full Power Background)

Which ONE of the following describes the action(s) the Unit Supervisor should direct?

- A. Emergency Depressurize per EOI-4.
- B. Close MSIVs and continue to cold shutdown per EOI-1.
- C. Close MSIVs and Emergency Depressurize per EOI-3.
- D. Rapidly Depressurize per EOI-3.

5.

The Unit 3 Reactor has scrammed. A small break LOCA has occurred with the following conditions present:

- Reactor Water level +8 inches
- Reactor Pressure 800 psig
- HPCI System Injecting
- Drywell Temperature 270°F steady
- Drywell Pressure 20 psig
- Suppression Pool level 14 feet

**REFERENCE PROVIDED**

Based upon the above conditions, which ONE of the following actions should the operators perform?

- A. Initiate Drywell Sprays per Appendix 17B only.
- B. Perform Emergency Depressurization per C-2 only.
- C. Perform Emergency Depressurization per C-2 and vent the Drywell irrespective of offsite release rates per Appendix 13.
- D. Initiate Drywell Sprays per Appendix 17B and place LPCI SYS OUTBD INJ VLV BYPASS SEL switches in **BYPASS**.

6.

Unit 1 has experienced a rupture of the CS&S system. Secondary Containment water levels are rising.

The RBAUO reports the following:

- Reactor Building Elevation 519 water level at 21 inches

**REFERENCE PROVIDED**

Which ONE of the following describes the required action per 1-EOI-3 and the basis for this action?

- A. Enter EOI-1, operation of RCIC Vacuum Tank Condensate Pump is jeopardized.
- B. Enter GOI-100-12A, operation of the PSC keep fill pumps is jeopardized.
- C. Enter EOI-1, operation of Core Spray Test Valve is jeopardized
- D. Enter GOI-100-12A, operation of HPCI Aux Oil pump is jeopardized.

7.

Unit 1 was operating at full power when the Unit received a loss of offsite power and loss of coolant accident.

The US notes the following conditions:

- 1B 250v RMOV board was lost due to a failure of 1-FCV-71-34.
- Suppression Chamber Pressure - 24 psig and rising
- RPV pressure - 800 psig
- Drywell Temperature - 275 F and rising

The Unit Supervisor has determined that Emergency Depressurization is required due to Drywell pressure and temperature.

### **REFERENCE PROVIDED**

Which ONE of the following describes the number of ADS SRVs that will open when the UO manually operates the ADS valves and any required actions?

- A. 3 valves open, rapidly depressurize with HPCI in test mode.
- B. 4 valves open, open additional SRVs to establish 6 open SRVs.
- C. 5 valves open, no additional actions required to depressurize.
- D. 6 valves open, place Shutdown Cooling in service when interlocks clear.

8.

Unit 2 is at 100 percent power with Loop 1 Core Spray Room Cooler inoperable for maintenance. 2B Core Spray pump is discovered without any oil in the reservoir.

Determine from the following the limitations and the reasons for the actions.

- A. An NRC report is required to allow for remedial actions to be specified.
- B. A programmed delay period is permitted to allow restoration of safety function.
- C. Plant shutdown is required due to loss of safety function required to limit offsite release below 10CFR50 limits.
- D. Plant shutdown is required to limit the possibility of an accident that could result in exceeding 10CFR20 limits.

9.

Unit 3 is performing a Reactor Startup. RPV pressure is at 750 psig. Control Rod withdrawal is in progress and Reactor power is at Range 6 on the IRMs. The Woodward Governor for 3A RFP fails upscale and the Reactor scrams on APRM High-High. The Operating Crew stabilizes the Unit. After the scram is reset the UO notes the following:

- Drywell Pressure 2.5 psig and rising
- Drywell Temperature 150 F and rising
- Drywell/Suppression Chamber Radiation High alarm
- Offgas Pretreatment Radiation High alarm

Which ONE of the following actions, per 3-ARP-9-7C, should the Unit Supervisor direct completion of within 2 hours?

- A. Inject SLC.
- B. Place SJAEs on Auxiliary Boiler Steam supply.
- C. Open 3-FCV-1-56 Main Steam Line Drain.
- D. Place Steam Seals on Auxiliary Boiler Steam supply.

10.

Unit 1 is operating at full power. RCIC suction aligned to Torus due to flange leak on the CS&S suction valve.

The Main Turbine trips due to an EHC logic failure. The Bypass Valves do **not** open to control RPV pressure after the trip. Some control rods fail to insert from the scram signal.

The UO notes the following conditions:

- Reactor Power 4%
- Torus Temperature 142 F
- Drywell Pressure 8 psig
- Reactor Water Level -140 inches slowly rising
- RCIC injecting
- HPCI LOGIC POWER FAILURE alarm
- SLC injecting with Tank level at 70%
- 1A RFP rolling at 600 rpm

**REFERENCE PROVIDED**

Which ONE of the following describes a required action?

- A. Perform Appendix 4, lower level for power control
- B. Restore RPV water level to between +2 inches and +51 inches with RCIC.
- C. Secure RCIC and maintain RPV water level between -180 inches and level to which it was lowered with RFPs.
- D. When SLC tank level reaches 43%, exit C5 and control RPV water level per RC/L.

11.

Unit 1 is at 85% power and 60% Core Flow performing a control rod shuffle for establishing a new Load Line. The Recirc Loop A Flow transmitter to APRM 1 1-FT-68-5A fails to zero.

Which ONE of the following describes the Trips/Alarms received from this failure and the required Operator actions per 1-OI-92B?

- |   |                         |
|---|-------------------------|
| A. APRM HIGH-HIGH alarm<br>CONTROL ROD BLOCK alarm<br>OPRM TRIP ENABLED alarm         | Bypass APRM 1 only      |
| B. APRM HIGH-HIGH alarm<br>CONTROL ROD BLOCK alarm<br>APRM FLOW BIAS OFF NORMAL alarm | Bypass APRM 1 only      |
| C. APRM UPSCALE alarm<br>CONTROL ROD BLOCK alarm<br>OPRM TRIP ENABLED alarm           | Bypass APRM 1 and RBM A |
| D. APRM UPSCALE alarm<br>CONTROL ROD BLOCK alarm<br>APRM FLOW BIAS OFF NORMAL alarm   | Bypass APRM 1 and RBM A |

12.

Unit 3 was operating at full power when a seismic event was experienced. The US notes the following:

- 19 Control Rods at 02, all others at 00
- RPV water level at -160 inches, slowly rising
- Only Core Spray Loop I injecting at 6500 gpm
- Primary Containment level at 90 feet
- RPV pressure at 190 psig

**REFERENCE PROVIDED**

Which ONE of the following describes a required action per Unit 3 EOIs?

- A. Stop venting the RPV.
- B. Continue venting the RPV.
- C. Maintain Primary Containment water level between 90 - 105 feet using only sources external to Primary Containment.
- D. Maintain RPV water level between -180 inches and the level to which it was lowered.

13.

Unit 1 is operating at 100% power. 1-LIS-3-208B RPV Water Level switch is inoperable. The switch has been inoperable for 4 hours and maintenance is in progress to repair.

The Maintenance Manager reports that 1-LT-3-208C has a ruptured diaphragm and will require 8 hours to replace and calibrate the level transmitter.

None of the LIS have been placed in the tripped condition.

**REFERENCE PROVIDED**

Which ONE of the following is correct?

- A. No action required if 1-LT-3-208C is repaired within 24 hours.
- B. Reduce Reactor power to less than 25% within 6 hours.
- C. Be in Mode 3 in 12 hours and reduce Reactor pressure to less than 150 psig in 36 hours.
- D. Be in Mode 2 within 10 hours, Mode 3 within 13 hours and Mode 4 within 37 hours.

14.

Unit 1 was operating at full power when the following indications were received:

- Reactor Building Area High Rad alarm
- RWCU Area High Temperature element 69-835A is in alarm
- Reactor Building Ventilation Abnormal alarm

Radcon reports that radiation levels in Unit 1 Reactor building elevation 565 east are 950 mr/hr and rising. Radiation levels at elevation 565 west are 800 mr/hr and stable.

**REFERENCE PROVIDED**

Which ONE of the following describes the required actions for the given conditions and a possible isolation source for the radiation release?

- A. Enter EOI-1, FCV 74-47, 48
- B. Enter EOI Contingency C2, FCV 69-1, 2, 12
- C. Enter EOI-1, SDV vents and drains
- D. Enter EOI Contingency C2, SDV vents and drains

15.

You are the oncoming Unit 3 Unit Supervisor, during turnover the onshift Unit Supervisor informs you that 2 Drywell Coolers had been secured on his shift while performing ground isolation on 3C 480v RMOV board. Drywell Average Temperature is 152 F and stable.

Which ONE of the following is correct?

- A. Exceeded 3-EOI-1 entry condition, enter 3-EOI-1 and take required actions
- B. Exceeded 3-EOI-2 entry condition, enter 3-EOI-2 and take required actions
- C. Exceeded normal operating Drywell temperature limit, calculate Drywell Sump Leakage at a frequency of once every hour.
- D. Exceeded 3-SR-2 Drywell temperature limit, enter Tech Spec section 3.6 and take required actions.

16.

A steam line break inside containment has occurred on Unit 3.

The US notes the following:

- All Control Rods inserted
- RPV water level -10 inches
- RPV pressure 900 psig
- Drywell Pressure 11 psig
- Torus water level 16 feet
- Torus water temperature 185 F
- No RHR pumps available

**REFERENCE PROVIDED**

Which ONE of the following describes the effect of the given conditions on Torus water temperature and required action(s) per EOIs?

A. The Torus water temperature will initially heat up evenly throughout the Torus.

Rapidly depressurize the RPV with the bypass valves per EOI-1

B. The Torus water average temperature is unreliable until Torus cooling is established to provide even mixing of the water.

Initiate Drywell Sprays using Standby Coolant

C. The Torus water temperature will heat up more quickly below the area of the leak in the drywell due to more energy being distributed to the Torus in that area.

Initiate Suppression Chamber sprays using Standby Coolant

D. The saturation temperature of the Torus water will be lower than at normal operating parameters due to the non-condensable gases discharged to the Torus.

Emergency Depressurize with the SRVs

17.

Unit 1 is operating at 100% power.

Unit 2 is operating at 100% power.

Unit 3 is refueling (MODE 5), fuel movement is in progress. Recirc pump 3A suction line work in progress has potential to drain the RPV. The 3ED D/G is out of service for an inspection.

During performance of the monthly SBT SR, B SBT fails to start.

**REFERENCE PROVIDED**

Which ONE of the following describes the required actions?

- A. Enter LCO 3.0.3 on Unit 1 and 2 immediately. Suspend Unit 3 fuel movement immediately.
- B. Enter LCO 3.0.3 on Unit 1 and 2 in 4 hours. Initiate actions to suspend OPDRVs immediately.
- C. Be in Mode 3 on Unit 1 and 2 in 12 hours and Mode 4 in 36 hours. Start A and C SBT trains in 4 hours.
- D. Be in Mode 3 on Unit 1 and 2 in 12 hours and Mode 4 in 36 hours. Initiate actions to suspend OPDRVs immediately.

18.

Unit 2 was operating at 100% power when a transient results in an inadvertent MSIV closure. Eight (8) SRVs open in response to the pressure transient and RPV pressure peaks at 1330 psig.

Which ONE of the following describes the Technical Specification implications and the significance for this condition?

- A. RCS Pressure SL was exceeded  
Five of the required SRVs are inoperable  
There is a potential for immediate RCS failure and radioactive release in excess of the limits
- B. RCS Pressure SL was **not** exceeded  
Only four of the required SRVs are inoperable  
RCS total accumulated pressure in a transient may exceed 110% of the design pressure
- C. RCS Pressure SL was **not** exceeded  
Five of the required SRVs are inoperable  
RCS total accumulated pressure in a transient may exceed 110% of the design pressure
- D. RCS Pressure SL was exceeded  
Only four of the required SRVs are inoperable  
There is a potential for immediate RCS failure and radioactive release in excess of the limits

19.

Unit 1 is performing a Reactor startup. Power level is at Range 8 on the IRMs when the A Feedwater Flow Transmitter 1-FT-3-78A fails upscale.

Which ONE of the following describes the response of the RWM to this failure and any allowable actions per Tech Specs to continue Reactor startup?

- A. RWM enters Transition Zone with no Blocks enforced; startup may continue.
- B. RWM Program Failure with Select Block; RWM may be bypassed to continue startup.
- C. RWM Insert and Withdrawal blocks; startup may not continue until RWM is repaired.
- D. RWM Withdrawal Block; RWM may be bypassed if no startup with RWM bypassed was performed in the last calendar year.

20.

All Units are operating at full power.

An active clearance on Unit 1 Loop II RHR must have the clearance boundary modified to include the 1-FCV-23-57 (Standby Coolant Supply Valve). Several Mechanical Maintenance personnel are signed on to the clearance.

Which ONE of the following actions is correct concerning the clearance boundary modification and additional impacts from TRM requirements?

- A. The Tagging UO (RE) and WCC SRO (RE) will determine if notification of clearance holders is required.

Unit 2 must enter an informational LCO due to loss of a Standby Coolant supply.

- B. The Unit Operator (RE) can revise the clearance boundary with concurrence from the responsible Maintenance Shift Supervisor.

Unit 2 must enter an active LCO action statement due to loss of Standby Coolant supply.

- C. All work under the clearance should be stopped while the clearance is revised and reissued.

Unit 1 must enter an informational LCO due to loss of a Standby Coolant supply.

- D. All current clearance holders (PAEs) shall give concurrence before this clearance can be revised.

Unit 1 must enter an active LCO action statement due to loss of Standby Coolant supply.

21.

Units 1, 2 and 3 are operating at 100% power when the plant experiences a fire in Fire Zone 19. The Shift Manager enters the SSI's.

**REFERENCE PROVIDED**

Which ONE of the following water level control systems and level indicators would the SM provide to each Unit Supervisor as available for use with a fire in this area?

	Unit 1	Unit 2	Unit 3
A.	RCIC/3-58B	HPCI/3-58B	RCIC/3-58A
B.	Feedwater/3-58B	RCIC/3-58A	HPCI/3-58A
C.	RCIC/3-58B	HPCI/3-58B	RCIC/3-58B
D.	Feedwater/3-58B	HPCI/3-58B	Feedwater/3-58A

22.

Unit 2 was operating at 80% RTP when the Unit experienced a seismic event with a loss of offsite power. The following alarm is received by the Unit 2 Operator:

- DRYWELL CONTROL AIR PRESSURE LOW 2-PA-32-70

The Reactor Building AUO reports that Drywell control air pressure is 55 psig on both A and B air receivers and slowly lowering.

**REFERENCE PROVIDED**

Which ONE of the following describes an adverse condition that would result from this failure and the required Tech Spec action(s)?

A. Primary Containment pressure and temperature will rise after the Drywell cooler cooling water valves fail closed.

Be in Mode 4 within 37 hours.

B. Primary Containment pressure and temperature will rise after the Drywell cooler cooling water valves fail closed..

Reduce Reactor steam dome pressure to 150 psig within 36 hours.

C. RPV pressure control via SRVs will be at risk when the Drywell control air pressure and accumulator pressure falls below 45 psig.

Reduce Reactor steam dome pressure to 150 psig within 36 hours.

D. RPV pressure control via SRVs will be at risk when the Drywell control air pressure and accumulator pressure falls below 45 psig.

Be in Mode 4 within 37 hours.

23.

Unit 3 was operating at full power when a pipe rupture in the Generator Seal Oil system results in a fire on elevation 617 of the Turbine Building. All Electric Fire Pumps auto start in response to the fire.

Water from the Fire Suppression system causes further electrical failures and result in a loss of offsite power. All systems respond as designed to the transient.

5 minutes after the loss of offsite power, the Incident Commander reports that the fire is not extinguished and additional fire pumps are needed for firefighting efforts.

Which ONE of the following describes the status of the High Pressure Fire pumps and any actions required per 0-AOI-57-1A to restore the pumps to service?

- A. No Electrical Fire pumps are running, Unit 1 operator must start Diesel Fire pump.
- B. No Electrical Fire pumps are running, all Electric Fire Pumps may be manually started after 60 seconds.
- C. Only the Diesel Fire pump is running; all Electric Fire Pumps may be manually started after 60 seconds.
- D. Only the Diesel Fire pump is running; all Electric Fire Pumps NORMAL/EMERGENCY switches must be cycled to restore these pumps to service.

24.

Browns Ferry has experienced a loss of offsite power. 0-AOI-57-1A LOSEP/STATION BLACKOUT performance is in progress. Drywell pressure on Unit 2 is 3 psig.

The Shift Manager determines that the following are the only AC sources available:

- 1/2 C 4kv Shutdown board
- 3EA 4kv Shutdown board

Which ONE of the following describes the Unit(s) that are in Station Blackout and a required action, per 0-AOI-57-1A, to facilitate correcting this condition?

- A. Only Unit 1 is in Station Blackout, energize A 4kv Shutdown Board from 3EA D/G.
- B. Only Unit 2 is in Station Blackout, energize B 4kv Shutdown Board from C D/G.
- C. Only Unit 3 is in Station Blackout, energize 3C 4kv Shutdown board from C D/G.
- D. All Units are in Station Blackout, energize 3C 4kv Shutdown board from 3EA D/G.

25.

The IMs are performing an SR as PMT for an inoperable Division I RCIC RPV low level switch (LIS 3-58A). Additionally, the IMs discover that the setpoint for the second Division I switch (LIS 3-58B) has drifted such that it will trip at -60 inches. The IMs stop the SR before completion and report the setpoint drift to the Unit Supervisor.

**REFERENCE PROVIDED**

Which ONE of the following describes the action(s) required by Tech Specs?

- A. The LIS 3-58B channel must be placed in the trip condition within 24 hours of the time that LIS 3-58A was declared inoperable.
- B. RCIC initiation capability is lost, declare RCIC inoperable immediately.
- C. The LIS 3-58B channel must be placed in the trip condition within 24 hours of the time that LIS 3-58B was declared inoperable.
- D. RCIC initiation capability is lost, verify by administrative means HPCI system is operable.