

Final Submittal
(Blue Paper)

FINAL SRO
WRITTEN EXAMINATION
AND REFERENCES

**H. B. ROBINSON STEAM ELECTRIC
GENERATING PLANT
05000261/2007301**

**FEBRUARY 5 - 9, 2007
JUNE 26, 2007
(WRITTEN RE-ADMINISTERED)**

U.S. Nuclear Regulatory Commission
Site-Specific SRO Written Examination**Applicant Information**

Name:

Date: 6/26/07

Facility/Unit: H.B. ROBINSON UNIT 2

Region: I ☐ II ☒ III ☐ IV ☐Reactor Type: W ☒ CE ☐ BW ☐ GE ☐

Start Time:

Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination you must achieve a final grade of at least 80.00 percent overall, with 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require a final grade of 80.00 percent to pass. You have 8 hours to complete the combined examination, and 3 hours if you are only taking the SRO portion.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

Applicant's Signature**Results**

RO/SRO-Only/Total Examination Values _____ / _____ / _____ Points

Applicant's Scores _____ / _____ / _____ Points

Applicant's Grade _____ / _____ / _____ Percent

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76.

Given the following:

- The plant is at 100% RTP.
- All parameters were normal.
- The following alarms are received:
 - APP-003-D6, PZR PORV / SAFETY VLV OPEN
 - APP-003-E6, PZR PORV LN HI TEMP
 - APP-003-F6, PZR SAFETY VLV LINE HI TEMP
- PZR PRV RC-551A OPEN Red light is ILLUMINATED.
- The RO reports RCS pressure has decreased rapidly to 2185 psig and is now recovering slowly.

Which ONE (1) of the following describes the event and the required actions IAW ITS?

- A. A PZR Safety valve has opened and reseated. Restore pressure to > 2205 psig within 2 hours.
- B. A PZR PORV has opened and reseated. Restore pressure to > 2205 psig within 2 hours.
- C. A PZR Safety valve has opened and reseated. Restore pressure to > 2205 psig within 6 hours.
- D. A PZR PORV has opened and reseated. Restore pressure to > 2205 psig within 6 hours.

77.

Given the following:

- Plant in Mode 1 at 35% RTP.
- APP-001-E8, RCP B OIL RESERV HI/LO LVL, alarms.
- THEN, a few minutes later, APP-001-B5, RCP HIGH VIB, alarms.
- BOP operator reports vibration data as follows for "B" RCP:

Frame = 5.2 mils and steady.

Shaft = 16 mils and steady.

What precautions and limitations would apply for a step change in power if "B" RCP is secured at power AND has the RCP trip criteria been met?

- A. (1) As stated in GP-005 Precautions and Limitations, challenging the PZR PORVs is prevented by limiting the unit to a step change of 5% power.
(2) "B" RCP is required to be tripped.
- B. (1) As stated in GP-005 Precautions and Limitations, challenging the PZR Safeties is prevented by limiting the unit to a step change of 5% power.
(2) "B" RCP is required to be tripped.
- C. (1) As stated in GP-005 Precautions and Limitations, challenging the PZR PORVs is prevented by limiting the unit to a step change of 10% power.
(2) "B" RCP trip criteria is NOT met.
- D. (1) As stated in GP-005 Precautions and Limitations, challenging the PZR Safeties is prevented by limiting the unit to a step change of 10% power.
(2) "B" RCP trip criteria is NOT met.

78.

Given the following:

- An ATWS has occurred.
- The crew is performing FRP-S.1, Response to Nuclear Power Generation/ATWS.
- RCS Emergency Boration is in progress.
- SI has actuated.
- All SG pressures are approximately 800 psig and trending down.
- RCS Temperature is approximately 490°F and trending down.
- Reactor Power indicates approximately 9% and trending down slowly.

Which ONE (1) of the following describes the mitigation strategy for the event in progress?

- A. Remain in FRP-S.1 and perform Faulted SG Isolation. Transition to PATH-1 immediately upon faulted SG isolation prior to completion of actions in FRP-S.1.
- B. Remain in FRP-S.1 and perform Faulted SG Isolation. Transition to PATH-1 when actions in FRP-S.1 are complete.
- C. Exit FRP-S.1 prior to completion of all actions. Transition to PATH-1 and initiate Supplement L to ensure actuated components are in their correct alignments.
- D. Exit FRP-S.1 prior to completion of all actions. Transition to PATH-1 and subsequently isolate the faulted SG per EPP-11, Faulted SG Isolation.

79.

Given the following:

- Unit in Mode 3 at 547°F.
- MSIVs are open and secondary plant is ready to support turbine roll.
- ONE (1) safety valve on "A" Steam Line drifts open and will not reseal.

Which ONE (1) of the following states the ESFAS signal that will provide protection for the plant conditions and the basis?

- A. High Steam Line Delta P; Provides protection for a steam line break downstream of the MSIVs.
- B. High Steam Line Flow with Low Tave; Provides protection for a steam line break upstream of the MSIVs.
- C. High Steam Line Flow with Low Tave; Provides protection for a steam line break downstream of the MSIVs.
- D. High Steam Line Delta P; Provides protection for a steam line break upstream of the MSIVs.

80.

Given the following:

- The plant is at 100% RTP.
- An Instrument Bus has been lost resulting in a loss of power to TR-408, Tave/Tref Recorder.
- AOP-024, Loss of Instrument Bus, has been entered and the BOP operator has reported that all 3 Feed Reg Valves have failed AS IS and cannot be controlled.

Which ONE (1) of the following Instrument Busses has been lost and what impact does this failure have on the Feedwater Regulating valve operability?

- A. IB #3
FRVs are inoperable. Valves are locked up in their present position and will require closure using manual handwheel operation.
- B. IB #3
FRVs are inoperable. Valves are locked up in their present position and will not close on a Feedwater Isolation signal.
- C. IB #4
FRVs are operable. All Feedwater Isolation signals will function to close the valves.
- D. IB #4
FRVs are operable. Power is available to the Feedwater Block valves which will provide the Feedwater Isolation function.

81.

Given the following:

- Plant in Mode 3 at 547°F.
- Control Room notified of Instrument Air header pipe break.
- APP-002-F7, INST AIR HDR LO PRESS, illuminates with pressure decreasing.
- All available Instrument Air compressors are running.

Which ONE (1) of the following states when Instrument Air will be cross-connected with Station Air IAW AOP-017 and what is the basis for the restriction for use of Breathing Air?

- A. 60 psig; Station Air Compressor is powered from non-vital power and cannot be assured to support breathing air supply.
- B. 60 psig; The Station Air Compressor is oil lubricated and is now cross-connected with Instrument Air, thus unsafe for breathing purposes.
- C. 80 psig; Station Air Compressor is powered from non-vital power and cannot be assured to support breathing air supply.
- D. 80 psig; The Station Air Compressor is oil lubricated and is now cross-connected with Instrument Air, thus unsafe for breathing purposes.

82.

Given the following:

- A manual reactor trip has been initiated.
- Reactor Trip breakers indicate the following:

"A" RTB RED light on, GREEN light off.

"B" RTB RED light off, GREEN light on.

- Power Range indication is 3%.
- Intermediate Range indication is 1×10^{-4} amps.
- Intermediate Range Start Up Rate (SUR) is -0.1 DPM.
- Eight (8) control rods indicate 225 steps.

Which ONE (1) of the following describes the procedure that will be used to initiate RCS boration, and the basis for the steps provided?

- A. EPP-4, Reactor Trip Response. Boration to achieve adequate Shutdown Margin at **HOT** Shutdown conditions by multiple means is provided to ensure the reactor can be shutdown.
- B. EPP-4, Reactor Trip Response. Boration to achieve adequate Shutdown Margin at **COLD** Shutdown conditions by multiple means is provided to ensure the reactor can be shutdown.
- C. FRP-S.1, Response to Nuclear Power Generation/ATWS. Boration to achieve adequate Shutdown Margin at **HOT** Shutdown conditions by multiple means is provided to ensure the reactor can be shutdown.
- D. FRP-S.1, Response to Nuclear Power Generation/ATWS. Boration to achieve adequate Shutdown Margin at **COLD** Shutdown conditions by multiple means is provided to ensure the reactor can be shutdown.

83.

Given the following:

- The reactor has tripped.
- Safety Injection has actuated.
- The crew is performing PATH-1.
- SPDS is reset.
- Foldout "B" is in effect.

- The current plant conditions exist:
 - RCS pressure is 1700 psig and slowly rising.
 - RCS temperature is 480°F and slowly rising.
 - SG pressures are all approximately 610 psig and slowly rising.
 - CV Pressure peaked at 3.4 psig and slowly lowering.
 - Total AFW flow is 340 GPM.
 - SG NR levels are approximately 5%.
 - PZR level is 15% and slowly rising.

Which ONE (1) of the following is the appropriate procedure selection for these conditions?

- A. Continue in PATH-1.
- B. Go to EPP-7, SI Termination.
- C. Go to EPP-8, Post LOCA Cooldown and Depressurization.
- D. Go to EPP-11, Faulted SG Isolation.

84.

Given the following:

- A LOCA has occurred.
- Safety systems have **NOT** functioned as designed.
- RCPs are tripped.
- CETC temperature is 626°F.
- RVLIS Full Range is 40%.
- CV Pressure peaked at 9 psig.

Which ONE (1) of the following procedures will be entered, and what is the FIRST set of actions that will be taken?

- A. FRP-C.1, "Response To Inadequate Core Cooling". Attempt to start an RCP.
- B. FRP-C.2, "Response To Degraded Core Cooling". Attempt to start an RCP.
- C. FRP-C.1, "Response To Inadequate Core Cooling". Verify or establish SI equipment alignments.
- D. FRP-C.2, "Response To Degraded Core Cooling". Verify or establish SI equipment alignments.

85.

Given the following:

- A LOCA has occurred.
- The crew has completed PATH-1, to the point of transition to another procedure.
- All ESF equipment is operating as designed.
- The following conditions exist in Containment:
 - Containment Pressure is 11.5 psig and rising slowly.
 - Containment Sump Level is 380 inches and rising slowly.

Which ONE (1) of the following describes the condition that exists, the procedure transition that will be made, and the strategy for recovery?

- A. ORANGE condition on Containment Pressure ONLY.
Enter FRP-J.1, Response to High Containment Pressure and ensure Containment Isolation and Heat Removal functions are satisfied.
- B. ORANGE condition on Containment Sump Level ONLY.
Enter FRP-J.2, Response to Containment Flooding and attempt to locate and isolate the source of the leak; notify plant staff to obtain recommended action for disposition of the waste.
- C. ORANGE conditions on Containment Pressure and Containment Sump Level.
Enter FRP-J.1, Response to High Containment Pressure and ensure Containment Isolation and Heat Removal functions are satisfied.
- D. ORANGE conditions on Containment Pressure and Containment Sump Level.
Enter FRP-J.2, Response to Containment Flooding and attempt to locate and isolate the source of the leak; notify plant staff to obtain recommended action for disposition of the waste.

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86.

Given the following:

- Mode 3 at 547°F.
- All seal injection and thermal barrier cooling has been lost to all RCPs.
- Seal leakoff for "A" RCP is trending up.

How much time is allowed to restore RCP seal cooling and what constitutes seal cooling restoration IAW AOP-018?

- A. 15 minutes to restore EITHER thermal barrier cooling OR seal injection.
- B. 15 minutes to restore BOTH thermal barrier cooling AND seal injection.
- C. 30 minutes to restore EITHER thermal barrier cooling OR seal injection.
- D. 30 minutes to restore BOTH thermal barrier cooling AND seal injection.

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87.

Initial Plant Conditions:

- Plant in Mode 5 with RCS drained to -10 inches for refueling preparations.
- Equipment hatch is open for material transfer.
- RCS temperature is 135°F with "A" RHR Train in service.

Current Plant Conditions:

- RHR Pump A trips on overcurrent.
- The crew enters AOP-020 Section E, Loss of RHR Flow or Temperature Control.
- RCS temperature is increasing rapidly.
- An operator has been dispatched to the E-1/E-2 Switchgear Room.

Which ONE (1) of the following describes the task that will be performed by the dispatched operator and the basis for the action?

When notified by the control room.....

- A. that RCS temperature is > 175°F, verify breakers racked in and control power fuses installed for BOTH SI Pumps. All SI Pumps have been rendered incapable of injection and BOTH are now required for core cooling.
- B. that RCS temperature is > 140°F, verify breakers racked in and control power fuses installed for BOTH SI Pumps. All SI Pumps have been rendered incapable of injection and BOTH are now required for core cooling.
- C. that RCS temperature is > 175°F, verify breaker racked in and control power fuses installed for ONE (1) SI Pump. All SI Pumps have been rendered incapable of injection and ONE (1) is now required for core cooling.
- D. that RCS temperature is > 140°F, verify breaker racked in and control power fuses installed for ONE (1) SI Pump. All SI Pumps have been rendered incapable of injection and ONE (1) is now required for core cooling.

88.

Given the following conditions:

- The plant is at 100% RTP.
- Maintenance reports that "A" Battery electrolyte level is overflowing in several cells.
- "A" Station Battery is declared Inoperable.

Which ONE (1) of the following is the maximum time allowed before a Plant Shutdown to Mode 3 must begin, and the reason why?

- A. 1 Hour; a subsequent worst case single active failure would result in loss of all DC subsystems with attendant loss of ESF functions.
- B. 2 Hours; a subsequent worst case single active failure would result in loss of all DC subsystems with attendant loss of ESF functions.
- C. 1 Hour; sufficient control and instrumentation capability is no longer available to monitor and maintain the unit status.
- D. 2 Hours; sufficient control and instrumentation capability is no longer available to monitor and maintain the unit status.

89.

Given the following:

- The Unit is in Mode 4.
- A plant heatup is in progress.
- Normal Off-site power is available and supplying all AC Busses.
- The Inside AO reports that there is a large pool of oil under EDG "B".
- Further investigation reveals that an oil pump discharge coupling has gross leakage and that EDG "B" should not be operated until the leak is fixed.

Which ONE (1) of the following specifies the correct action with regards to Technical Specifications?

- A. Mode 3 entry is allowed. Verify operability of offsite circuit immediately including power to the Startup Transformer, 4 KV Busses 2 and 3, SSTs 2F and 2G and normal power supplies to 480V Busses E-1 and E-2.
- B. Mode 3 entry is allowed. Verify operability of offsite circuit within 1 hour including power to the Startup Transformer, 4 KV Bus 3, SST 2G and normal power supply to 480V Bus E-2.
- C. Mode 3 entry is NOT allowed. Verify operability of offsite circuit within 1 hour including power to the Startup Transformer, 4 KV Busses 2 and 3, SSTs 2F and 2G and normal power supplies to 480V Busses E-1 and E-2.
- D. Mode 3 entry is NOT allowed. Verify operability of offsite circuit immediately including power to the Startup Transformer, 4 KV Bus 3, SST 2G and normal power supply to 480V Bus E-2.

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90.

Which ONE (1) of the following describes the Technical Specification basis for Containment operability?

Containment is capable of limiting radioactive release to less than 10CFR100 limits by limiting leakage to 0.1% air weight percent per day at a pressure of.....

- A. 40.5 psig.
- B. 10 psig.
- C. 4 psig.
- D. 1 psig.

91.

Which ONE (1) of the following describes the applicability and Technical Specification Basis for the High Pressurizer Water Level reactor trip?

- A. Mode 1 above P-7; Provides a backup trip to PZR High Pressure reactor trip and ensures that water relief through the PZR safety valves will not occur.
- B. Modes 1 and 2; Provides primary protection for loss of load events and ensures that on a PZR level channel failure, the PZR safety valves will not lift prior to the PZR High Pressure reactor trip.
- C. Modes 1 and 2; Provides a backup trip to PZR High Pressure reactor trip and ensures that water relief through the PZR safety valves will not occur.
- D. Mode 1 above P-7; Provides primary protection for loss of load events and ensures that on a PZR level channel failure, the PZR safety valves will not lift prior to the PZR High Pressure reactor trip.

92.

Given the following:

- A Plant Shutdown is in progress in accordance with GP-006, Normal Plant Shutdown From Power Operation to Hot Shutdown.
- Reactor power is 15%.
- While transferring Steam Dump system to Steam Pressure Mode, all steam dump valves drift open when the Steam Dump Mode Selector is placed in STEAM PRESSURE.
- Tave reaches a minimum of 532°F in all loops before stabilizing.

Which ONE (1) of the following describes the effect on the unit and the action required?

- A. Tave is below Technical Specification limits. Restore Tave to ITS limits within the next 15 minutes.
- B. Tave is below Technical Specification limits. Restore Tave to ITS limits within the next 30 minutes.
- C. Tave is above Technical Specification limits. Ensure the Steam Dumps are operated IAW GP-006, Normal Plant Shutdown from Power Operation to Hot Shutdown.
- D. Tave is above Technical Specification limits. Ensure the Steam Dumps are operated IAW AOP-025, RTGB Instrument Failure.

93.

Given the following:

- Mode 1 at 45% RTP.
- "A" Condensate Pump is under clearance.
- APP-007-A2, COND PMP B MOTOR OVLD/TRIP alarms.
- "B" Condensate Pump is still running.
- Operator has been dispatched to the 4160V Switchgear Room to investigate the breaker.
- The operating crew is briefing on possible outcomes.

Which ONE (1) of the following describes the cause, possible plant effects, and subsequent procedural usage to mitigate this event?

- A. There is an overcurrent condition sensed by Phases "A" and "C" relays for the breaker. If the breaker trips, the crew will restore feed to the S/Gs using AFW pumps that auto started.
- B. There is an overcurrent condition sensed by Phase "B" relay for the breaker. If the breaker trips, the crew will restore feed to the S/Gs using AFW pumps that auto started.
- C. There is an overcurrent condition sensed by Phases "A" and "C" relays for the breaker. If the breaker trips, the crew will restore feed to the S/Gs by overriding Feedwater Isolation signals and restarting the Condensate Pump.
- D. There is an overcurrent condition sensed by Phase "B" relay for the breaker. If the breaker trips, the crew will restore feed to the S/Gs by overriding Feedwater Isolation signals and restarting the Condensate Pump.

94.

Given the following:

- Plant in Mode 1 at 100% RTP.
- "C" Service Water Pump inoperable for planned maintenance.
- "A" Service Water Booster Pump trips on overcurrent.
- Inside AO reports an acrid odor at the pump motor.

Which ONE (1) of the following describes the correct application of Technical Specifications for this condition?

- A. EDG operability is affected. ONE (1) train of Service Water is inoperable while the other Service Water train remains operable AND ONE (1) EDG is inoperable.
- B. EDG operability is affected. TWO (2) trains of Service Water are inoperable AND ONE (1) EDG is inoperable.
- C. EDG operability is NOT affected. ONE (1) train of Service Water is inoperable while the other Service Water train remains operable.
- D. EDG operability is NOT affected. TWO (2) trains of Service Water are inoperable.

95.

Given the following:

- Mode 1 at 100% RTP.
- A notification of a plant threat has been received.
- The threat is determined to be credible.
- Security personnel informs you that a land based vehicle impact inside the protected area is **imminent (< 5 minutes)**.

Which ONE (1) of the following correctly states the notification requirements IAW AOP-034, Security Events?

- A. Immediate notification of the NRC is required. Make a plant announcement for all personnel to take shelter and not to move about the plant site.
- B. Make a plant announcement for all personnel to take shelter and not to move about the plant site. Notify the NRC within 60 minutes from determination of security threat.
- C. Sound the site evacuation alarm and notify all non-essential personnel to evacuate the site. Notify the NRC within 60 minutes from determination of security threat.
- D. Immediate notification of the NRC is required. Sound the site evacuation alarm and notify all non-essential personnel to evacuate the site.

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96.

Given the following:

<u>Date</u>	<u>Time</u>	<u>Activity</u>
5/31/2007	0000	Plant Shutdown to Mode 3 commenced.
5/31/2007	0630	Reactor Trip Breakers opened.
5/31/2007	1320	Mode 4 Entry.
5/31/2007	2210	Mode 5 Entry.
6/3/2007	2200	Mode 6 Entry.

Which ONE (1) of the following is the EARLIEST time that core alterations may commence in accordance with GP-010, Refueling?

- A. 6/4/2007 at 1030.
- B. 6/4/2007 at 1720.
- C. 6/5/2007 at 0210.
- D. 6/8/2007 at 0200.

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97.

Who, by title, has approval authority for bypassing interlocks on Refueling equipment in accordance with OMM-001-18, Outages?

- A. Operations Outage Coordinator (OOC)
- B. Operations Shift Manager (OSM)
- C. Superintendent - Shift Operations (SSO)
- D. Refueling SRO

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98.

In accordance with OP-921, Containment Air Handling, who is responsible for the final approval of the EMP-022 Gaseous Waste Release Permit for a CV Purge and what is the **minimum** ODCM monitoring requirements for the release?

- A. E&C Superintendent; (R-11 OR R-12 operable) AND 2 independent CV air samples.
- B. Superintendent - Shift Operations; (R-11 OR R-12 operable) AND 2 independent CV air samples.
- C. E&C Superintendent; R-11 AND 12 operable.
- D. Superintendent - Shift Operations; R-11 AND 12 operable.

99.

Given the following:

- The plant is in Mode 1 at 100% RTP.
- A valve mis-positioning event has occurred that did not adversely affect the plant.
- SSO has directed a partial valve lineup of the CVCS Charging system IAW OP-301, CVCS.
- Dose rate in the Auxiliary Building Pipe Alley is 100 mR/hr due to a crud burst.

Which ONE (1) of the following states the radiation dose considered "Excessive" IAW OPS-NGGC-1303, and what type of independent verification would be performed for valve CVC-282, Charging Line Isolation (Located in Pipe Alley)?

- A. > 5 mRem; Functional verification via charging flow indication on RTGB.
- B. > 5 mRem; Functional verification via valve position lights on RTGB.
- C. > 10 mRem; Functional verification via charging flow indication on RTGB.
- D. > 10 mRem; Functional verification via valve position lights on RTGB.

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100.

Given the following:

- During a tour of the plant, it is determined that several AFW valves are out of their required positions.
- The mispositioning appears to be deliberate, as several valve padlocks were cut.
- Plant Management and Security have been notified.

Which ONE (1) of the following actions will be required in accordance with OMM-001-8, Control of Equipment and System Status?

- A. Refer to AP-030, NRC Reporting Requirements, for Two Working Day notifications. Implementation of the Two Man Rule IAW SEC-NGGC-2170 is required.
- B. Refer to AP-030, NRC Reporting Requirements, for Two Working Day notifications. Stationing security guards outside the Control Room is required.
- C. Refer to AP-030, NRC Reporting Requirements, for Immediate (One Hour) notifications. Implementation of the Two Man Rule IAW SEC-NGGC-2170 is required.
- D. Refer to AP-030, NRC Reporting Requirements, for Immediate (One Hour) notifications. Stationing security guards outside the Control Room is required.