

**U.S. Nuclear Regulatory Commission
Site-Specific
RO Written Examination**

Applicant Information

Name:

Date:

Facility/Unit:

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 a 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require an 80.00 percent to pass. You have eight hours to complete the combined examination, and three 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

PART A - GENERAL GUIDELINES

1. **[Read Verbatim]** Cheating on any part of the examination will result in a denial of your application and/or action against your license.
2. If you have any questions concerning the administration of any part of the examination, do not hesitate asking them before starting that part of the test.
3. SRO applicants will be tested at the level of responsibility of the senior licensed shift position (i.e., shift supervisor, senior shift supervisor, or whatever the title of the position may be).
4. You must pass every part of the examination to receive a license or to continue performing license duties. Applicants for an SRO-upgrade license may require remedial training in order to continue their RO duties if the examination reveals deficiencies in the required knowledge and abilities.
5. The NRC examiner is not allowed to reveal the results of any part of the examination until they have been reviewed and approved by NRC management. Grades provided by the facility licensee are preliminary until approved by the NRC. You will be informed of the official examination results about 30 days after all the examinations are complete.

PART B - WRITTEN EXAMINATION GUIDELINES

1. **[Read Verbatim]** After you complete the examination, sign the statement on the cover sheet indicating that the work is your own and you have not received or given assistance in completing the examination.
2. To pass the examination, you must achieve an overall grade of 80.00 percent or greater, with a 70.00 percent or better on the SRO-only items, if applicable. If you only take the SRO portion of the exam (as a retake or with an upgrade waiver of the RO exam), you must achieve an 80.00 percent or better to pass. SRO-upgrade applicants who do take the RO portion of the exam and score below 80.00 percent on that part of the exam can still pass overall but may require remediation. Grades will not be rounded up to achieve a passing score. Every question is worth one point.
3. For an initial examination, the nominal time limit for completing the RO examination is six hours, the 25-question, SRO-only exam is three hours, the combined RO/SRO exam is eight hours, and SRO exam limited to fuel handling is four hours; extensions will be considered under extenuating circumstances.

For a requalification examination, the time limit for completing both sections of the examination is three hours. If both sections are administered in the simulator during a single three-hour period, you may return to a section of the examination that was already completed or retain both sections of the examination until the allotted time has expired.

4. You may bring pens, pencils, and calculators into the examination room; programable memories must be erased. Use black ink to ensure legible copies; dark pencil should be used only if necessary to facilitate machine grading.
5. Print your name in the blank provided on the examination cover sheet and the answer sheet. You may be asked to provide the examiner with some form of positive identification.
6. Mark your answers on the answer sheet provided and do not leave any question blank. Use only the paper provided and do not write on the back side of the pages. If you are using ink and decide to change your original answer, draw a single line through the error, enter the desired answer, and initial the change.
7. If you have any questions concerning the intent or the initial conditions of a question, do *not* hesitate asking them before answering the question. Ask questions of the NRC examiner or the designated facility instructor *only*. When answering a question, do *not* make assumptions regarding conditions that are not specified in the question unless they occur as a consequence of other conditions that are stated in the question. For example, you should not assume that any alarm has activated unless the question so states or the alarm is expected to activate as a result of the conditions that are stated in the question. Finally, answer all questions based on actual plant operation, procedures, and references. If you believe that the answer would be different based on simulator operation or training references, you should answer the question based on the *actual plant*.
8. Restroom trips are permitted, but only one applicant at a time will be allowed to leave. Avoid all contact with anyone outside the examination room to eliminate even the appearance or possibility of cheating.
9. When you complete the examination, assemble a package including the examination questions, examination aids, answer sheets, and scrap paper and give it to the NRC examiner or proctor. Remember to sign the statement on the examination cover sheet indicating that the work is your own and that you have neither given nor received assistance in completing the examination. The scrap paper will be disposed of immediately after the examination.
10. After you have turned in your examination, leave the examination area as defined by the proctor or NRC examiner. If you are found in this area while the examination is still in progress, your license may be denied or revoked.
11. Do you have any questions?

QUESTION: 001 (1.00)

- The plant was restarted following a forced outage.
- Loop flow measurement has determined the 'C' RCP impeller has degraded such that its RCS loop flow has DECREASED by 5% from its original value.
- The other three RCS loop flows remain UNCHANGED.

Which one of the following would be a result of the decreased flow rate in the 'C' loop?

- a. Demand on the Pressurizer variable heaters at 2235 psig will be lower.
- b. The reactor core will operate closer to DNB when at full power.
- c. Delta-T in the 'C' RCS loop at full power will be lower.
- d. Steam pressure in the 'C' S/G at full power will be higher.

QUESTION: 002 (1.00)

The following plant conditions exist:

- Core alterations are in progress on Unit 1.
- Conditions are such that Emergency Boration is required.
- All offsite power has been lost.
- Both ESF Buses are energized.

Which one of the following Emergency Boration methods should be used?

- a. Emergency Boration valve 1CV8104
- b. Normal Boration path through the blender
- c. Refueling Water Storage Tank (RWST)
- d. Manual Emergency Boration valve 1CV8439

QUESTION: 003 (1.00)

Given the following conditions:

- The RCS is water solid in MODE 5
- The 'A' RH pump is operating in shutdown cooling and RCS temperature is being maintained at 180°F via throttling of the 'A' train RH Hx valves.
- Instrument Air is lost to the 'A' RH Hx room.

Assuming NO operator action, which of the following describes the plant response over the next ten minutes?

'A' RHR suction pressure will ...

- a. NOT change because there is NO change in RHR flow.
- b. DECREASE because RH606 fails OPEN and RH618 fails CLOSED.
- c. DECREASE because RH606 fails CLOSED and RH618 fails OPEN
- d. INCREASE because RH606 fails OPEN and RH618 fails CLOSED

QUESTION: 004 (1.00)

Given the following plant conditions:

- Unit 2 has experienced a large break LOCA
- During the ECCS injection phase the 2B RH pump tripped due to a overheated bearing that seized
- The crew has now transitioned to 2BEP ES-1.3, 'TRANSFER TO COLD LEG RECIRCULATION'

In this situation the concern is _____(1)_____, therefore 2BEP ES-1.3 will direct valve alignments such that the 2A RH pump will be injecting into _____(2)_____ .

- | | | | |
|----|--------------------------|-----|--|
| a. | (1) inadequate core flow | (2) | all 4 cold legs, and supplying suction for only the 2 SI pumps. |
| b. | (1) inadequate core flow | (2) | all 4 cold legs, and supplying suction for only the 2 CV pumps. |
| c. | (1) 2A RH pump runout | (2) | only 2 cold legs, and supplying suction for both CV and both SI pumps. |
| d. | (1) 2A RH pump runout | (2) | only 2 cold legs, and supplying suction for only the 2 CV pumps. |

QUESTION: 005 (1.00)

The plant is operating at 40% power with all systems in a normal lineup. Annunciator 1-12-B7, "PRT PRESS HIGH" alarms. PRT pressure is currently 6 psig.

In order to clear this high pressure alarm, which of the following would be the appropriate action?

- a. Align and verify the start of a RCDT pump.
- b. Align the PRT to drain to the RCDT.
- c. Vent the PRT to the Waste Gas header.
- d. Vent the PRT to the RCDT.

QUESTION: 006 (1.00)

The unit has just experienced a spurious Containment Phase B actuation.

In regard to RCP components ...

- a. seal cooling is still being provided; motor bearing cooling is NOT.
- b. BOTH motor bearing cooling and seal cooling are still being provided.
- c. NEITHER motor bearing cooling NOR seal cooling is being provided.
- d. motor bearing cooling is still being provided; seal cooling is NOT.

QUESTION: 007 (1.00)

The following conditions exist on Unit 1:

- A load rejection has occurred from 100% power
- Reactor power is now 80%
- Pressurizer level is 56%
- Pressurizer pressure is 2275 psig
- RCS T_{ave} is 582°F

What Pressurizer Pressure Control System indications are expected on the Main Control Board?

- a. Backup and proportional heaters are fully on.
- b. Proportional heaters have modulated on.
- c. Pressurizer spray valves AND pressurizer PORVs are open.
- d. Pressurizer spray valves have modulated open.

QUESTION: 008 (1.00)

Given:

- Unit 1 P-7 Bypass Permissive light is LIT

Which of the following conditions will cause a Unit 1 reactor trip?

- a. PZR Level of 94%
- b. PZR Pressure of 2390 psig
- c. All 4 RCP breakers open
- d. PZR Pressure of 1880 psig

QUESTION: 009 (1.00)

Given the following plant status:

- Unit 1 is at full power
- Last shift Containment Pressure Channel II failed and the Tech Spec required actions were performed
- A few seconds ago Containment Pressure Channel III failed high

Which of the following automatic actions would be expected to be observed on 1PM06J?

- a. Closure of all MSIVs only.
- b. Closure of all MSIVs and start of ECCS pumps.
- c. Start of ECCS pumps only.
- d. Closure of all MSIVs, start of CS pumps, and start of ECCS pumps.

QUESTION: 010 (1.00)

Assume the following conditions exist on Unit 2:

- A reactor trip has occurred from full power
- PZR pressure is 1820 psig and steadily decreasing
- Steps 1 through 3 of 2BEP-0, 'Reactor Trip or Safety Injection', have been properly verified

Per step 4 of 2BEP-0, an operator checks the Safety Injection annunciators and the Safety Injection Bypass Permissive annunciator, NONE OF WHICH ARE ILLUMINATED, and NO SI equipment has automatically actuated. For this reactor trip event, SI has...

- a. NOT occurred and is NOT required. The operator should transfer to 2 BEP ES-0.1, 'Reactor Trip Response'.
- b. occurred and is required.
- c. occurred but is NOT required. The operator should immediately terminate SI by depressing both train's reset pushbuttons on 2PM06J.
- d. NOT occurred but is required. The operator should manually initiate SI via the switch on 2PM05J or 2PM06J.

QUESTION: 011 (1.00)

A loss of Bus 131X will limit the availability of the Reactor Containment Fan Cooler (RCFC) Fans to ...

- a. 1A and 1C low speed only.
- b. 1A and 1B low speed only.
- c. 1B and 1D high or low speed only.
- d. 1B and 1C high or low speed only.

QUESTION: 012 (1.00)

- The 2A, 2B, and 2D RCFC's are operating in high speed.
- The 2C RCFC is in standby.

The following indications are observed on the Unit 2 RCFC Dry Bulb temperatures:

- 2A RCFC Inlet Temperature - 119°F
- 2B RCFC Inlet Temperature - 118°F
- 2C RCFC Inlet Temperature - 127°F
- 2D RCFC Inlet Temperature - 121°F

Per the Containment Air Temperature Technical Specification:

- a. The action requirement must be applied because the average of ALL the RCFC temperatures exceeds the LCO upper limit.
- b. NO action is necessary because ALL the RCFC temperatures are within their appropriate LCO limit(s).
- c. The action requirement must be applied because ONE of the OPERATING RCFC's temperatures is above the LCO upper limit.
- d. NO action is necessary because the average temperature of ALL OPERATING RCFC's is below the LCO upper limit.

QUESTION: 013 (1.00)

Consider each of the following situations separately; assume Mode 1 operations.

Over the next 20 minutes, which of the following situations would be expected to raise the humidity level in containment?

- a. A RCFC is swapped from low to high speed operation on PM06J.
- b. Containment Phase B Isolation is manually actuated via 2/2 switches on PM06J.
- c. CV8160, Letdown Orifices Outlet Header Isolation valve, inadvertently closes.
- d. A #1 seal failure is experienced on a RCP.

QUESTION: 014 (1.00)

The time is 0300.

The plant is in MODE 3 at 555°F, EOL, following a trip from 100% power moments ago.

The following events occur:

- The Unit NSO reports that T_{ave} has begun decreasing at a rate of approximately 1°F/min.
- The crew receives a report that one of the SG Safety Valves on the "C" SG is passing steam to the atmosphere.
- The Unit Supervisor confirms an RCS cooldown rate of 5°F in the last 5 minutes.

Assuming the RCS cooldown rate is constant, and NO actions are taken in response to the stuck open safety valve, which of the following conditions will exist by time 0400?

1. Main Steamline Isolation.
 2. Tech Spec limit for RCS Cooldown Rate will be exceeded.
 3. The actual amount by which the reactor is shutdown will decrease.
 4. A Pressurized Thermal Shock (PTS) challenge to reactor vessel integrity will occur.
- a. 1 and 3
 - b. 2 Only
 - c. 3 Only
 - d. 2 and 4

QUESTION: 015 (1.00)

Given the following plant conditions:

- Unit 2 is performing a reactor startup at End of Core Life (EOL) per 2BGP 100-2A1, 'REACTOR STARTUP'
- Reactor power is stable at 1E-3% while taking critical data
- Steam Header pressure transmitter 2PT-507 fails HIGH

Reactor power will _____ ; and the transient can be mitigated if the board operator places _____ .

- a. increase; one or more S/G PORV controllers in manual and increases demand
- b. decrease; a Steam Dump Bypass Interlock switch to 'OFF/RESET'.
- c. decrease; the Steam Dump Mode Selector switch to 'Tave' position.
- d. increase; the Steam Dump Main Steam Header Pressure Controller in manual and reduces demand.

QUESTION: 016 (1.00)

Which of the following describes component response to a Main Feed pump LOW NPSH signal:

- a. The CD152 valve (CD pump recirc) OPENS and CD157A and B (Gland Steam Condenser Bypass Valves) CLOSE.
- b. The standby CD/CB pump starts, then the standby CD/CB aux oil pumps start.
- c. The standby CD/CB aux oil pump starts, then the standby CD/CB pump starts.
- d. The HD46A and B (HD Pump Discharge Valves) OPEN and the CD210A and B (Condensate Polisher Bypass Valves) CLOSE.

QUESTION: 017 (1.00)

Given the following:

- Unit 1 experienced a reactor trip and Safety Injection from full power when DC Bus 112 deenergized.
- While performing step 5 to 'Verify FW Isolation' of 1BEP-0, 'Reactor Trip Or Safety Injection' the NSO noted the 1B FW Pump did NOT automatically trip, and its 'TURB LOSS OF DC TO TRIP' lite is illuminated.

Under these circumstances, what action must be performed to trip the 1B FW Pump?

- a. Manually trip 1B FW Pump via the MCB pushbutton.
- b. Manually initiate FW isolation via the MCB pushbutton.
- c. Select Speed Setter Control Mode then depress the DECREASE SPEED pushbutton for 1B FW Pump.
- d. Dispatch a NLO to locally trip 1B FW Pump via its overspeed trip plunger.

QUESTION: 018 (1.00)

Given the following plant conditions:

- Unit 2 just entered Mode 1 during plant startup.
- The Start Up FW Pump is maintaining S/G levels via the Feed Reg Bypass Valves in automatic.
- A grid disturbance has resulted in a Loss of Offsite Power (LOOP) for Unit 2.

One minute later, by what method is RCS heat being removed, and what is maintaining the heat sink?

- a. Natural Circulation; Aux Feedwater System
- b. Forced Circulation; Main Feedwater System
- c. Forced Circulation; Aux Feedwater System
- d. Natural Circulation; Main Feedwater System

QUESTION: 019 (1.00)

Following a reactor trip with NO SI, a transition is made to BEP ES-0.1, 'Reactor Trip Response'

Which of the following describes the basis for the RNO actions of step 2, 'MAINTAIN RCS TEMPERATURE' that directs:

- (1) Verifying total feed flow is greater than 500 GPM;
 - (2) then throttling it once a minimum S/G water level is obtained?
- a. (1) Ensure enough feedwater flow for decay heat removal;
(2) then limit overcooling of the RCS.
 - b. (1) Ensure enough flow for Aux Feed Pump protection;
(2) then limit runout of the Aux Feed pumps.
 - c. (1) Ensure enough feedwater flow for decay heat removal;
(2) then limit runout of the Aux Feed pumps.
 - d. (1) Ensure enough flow for Aux Feed Pump protection;
(2) then limit overcooling of the RCS.

QUESTION: 020 (1.00)

The following conditions exist on Unit 1:

- Bus 141 is powered from its normal source
- D/G 1A surveillance is being performed with the D/G paralleled to the bus

What would occur if a failure of the undervoltage relay results in a sensed undervoltage condition on Bus 141?

SAT feeder breaker ACB 1412 ...

- a. will open but D/G feeder breaker ACB 1413 will remain closed. The Safe Shutdown loads will NOT sequence and CANNOT be manually started from the control room.
- b. and D/G feeder breaker ACB 1413 remain closed. The Safe Shutdown loads will NOT sequence and CANNOT be manually started from the control room.
- c. and D/G feeder breaker ACB 1413 will open. After a short delay, ACB 1413 will close and the Safe Shutdown loads will sequence.
- d. will open but D/G feeder breaker ACB 1413 will remain closed. The Safe Shutdown loads will sequence normally.

QUESTION: 021 (1.00)

The purpose of the 125 VDC battery is to supply 125 VDC to:

- a. ESF and non-ESF DC buses during loss of all AC power.
- b. ESF and non-ESF DC buses during normal operation.
- c. Only ESF DC buses during normal operation.
- d. Only ESF DC buses during loss of off-site power.

QUESTION: 022 (1.00)

Given the following sequence of events:

- Following a reactor trip, Unit 1 in MODE 3 at 557°F, with the crew performing steps of 1BEP ES-0.1, 'REACTOR TRIP RESPONSE'.
- Annunciator 1-21-E10, '125V DC PNL 111/113 VOLT LOW' alarms.
- The MCB indication for DC Bus 111 indicates 0 volts
- Pressurizer Spray Valve 1RY455B is stuck open and RCS pressure is LOWERING.

To stop the RCS depressurization, the 1_____ RCP breaker must be opened. This can be done locally at the breaker _____.

- a. C; only
- b. C; or remotely
- c. D; only
- d. D; or remotely

QUESTION: 023 (1.00)

Given the following:

- A Unit 2 Loss of Offsite Power event (LOOP) was caused by a fault on SAT 242-2.
- Both 2A and 2B Diesel Generators (D/Gs) started on their respective bus undervoltage condition.
- 2A D/G output breaker ACB 2413 closed in to energize bus 241.
- 2B D/G output breaker ACB 2423 did NOT close and bus 242 is still deenergized
- The MCB 'BUS ALIVE' indicator lite for the 2A D/G is lit.
- The MCB 'BUS ALIVE' indicator lite for the 2B D/G is NOT lit.

Which of the following is the reason the 2B D/G did NOT automatically energize bus 242; and what can be done to reenergize bus 242?

The status of the 2B BUS ALIVE lite indicates the D/G did not achieve proper _____ to auto close ACB 2423; and in order to reenergize bus 242 it will be necessary to _____ .

- a. VOLTAGE; go to RAISE on the Voltage Regulator control switch until proper VOLTAGE is obtained
- b. FREQUENCY; go to RAISE on the Governor Adjust switch until proper FREQUENCY is obtained
- c. VOLTAGE; use the unit crosstie breaker ACB 2424
- d. FREQUENCY; restore offsite power

QUESTION: 024 (1.00)

Given the following conditions:

- Containment Mini-Purge Supply and Exhaust Systems are in operation.
- Containment Fuel Handling Incident Rad Monitor, RE-AR012J spikes high.

In response to this Radiation Monitor spike ...

- a. ALL Containment Mini-Purge Supply and Exhaust valves close and the running fans remain running.
- b. ONE train of Containment Mini-Purge Supply and Exhaust valves close and the running fans remain running.
- c. ALL Containment Mini-Purge Supply and Exhaust valves close and the running fans trip.
- d. ONE train of Containment Mini-Purge Supply and Exhaust valves close and the running fans trip.

QUESTION: 025 (1.00)

Both Units are at 100% power, with the 1A and 2B SX pumps running. The 1A SX pump trips on over current.

In accordance with 1BOA Pri-7, 'SX Malfunction', the initial action by the Unit 1 NSO should be to...

- a. verify the 1B SX pump automatically starts.
- b. coordinate with Unit 2 NSO to start the 2A SX pump and open 1SX005 and 2SX005, the Unit 0 CC HX Inlet valves.
- c. verify open 1SX033 and 1SX034, the SX Pump Crosstie valves.
- d. manually start the 1B SX pump.

QUESTION: 026 (1.00)

Given:

- Both units are operating normally at 100% power
- Unit 2 station air compressor (SAC) is supplying all instrument and service air needs
- The remaining two SACs are in standby
- Maintenance is being performed in the Unit 2 turbine building
- A workman drops a toolbox from a raised platform
- The dropped toolbox severs the 4-inch turbine building Service Air header

Which of the following describes the plant response?

- a. Only unit 2 will trip due to an immediate loss of instrument air header pressure.
- b. BOTH units will trip due to an immediate loss of instrument air header pressure.
- c. BOTH units will trip, but only after instrument air header pressure bleeds down due to instrument air loads.
- d. Only unit 2 will trip, but only after instrument air header pressure bleeds down due to instrument air loads.

QUESTION: 027 (1.00)

On 5/23/1996, Byron Station Unit 1 experienced a Loss of Offsite Power (LOOP) when a fault occurred in a Bus Duct. Prior to the event:

- Unit 1 was in Mode 5
- Unit 2 was at 100% power
- The Unit 2 Station Air Compressor (SAC) was Out of Service
- The OC Non-Essential Service Water Pump (WS pp) was Out of Service

Two minutes after the LOOP occurred, operators manually tripped Unit 2 on decreasing steam generator levels as secondary system air operated valves began moving to their failure positions.

Prior to the Unit-2 manual trip, had the Unit-2 SAC been in standby instead of Out of Service, it would ...

- a. need to be manually started by placing the local control switch in COMP RUN.
- b. need to be shutdown until backup cooling water from FP was manually aligned.
- c. automatically start on low Instrument Air Receiver pressure, but soon trip on HIGH OIL or AIR TEMPERATURE.
- d. automatically start on low Service Air Receiver pressure, but trip immediately on SURGE.

QUESTION: 028 (1.00)

The BAR for Annunciator 2-1-B2, 'CNMT HATCH DOOR SEAL TROUBLE' lists the 3 alarm inputs as coming from:

- SUPPLY AIR PRESSURE HIGH
- SUPPLY AIR PRESSURE LOW
- SUPPLY AIR FLOW HIGH.

If the 'CNMT HATCH DOOR SEAL TROUBLE' annunciator came in due to high air FLOW and low air PRESSURE, then cleared 8 minutes later, which of the following should be considered valid?

- a. A Containment Hatch Air Lock is INOPERABLE.
- b. A Containment Hatch Air Lock Door interlock has failed.
- c. The Containment Overall Leakage Rate has increased.
- d. Personnel have just passed through the Air Lock Doors.

QUESTION: 029 (1.00)

Step 9 of BEP-1, 'LOSS OF REACTOR OR SECONDARY COOLANT', directs the operator to check all steam generator pressures STABLE OR INCREASING.

If any steam generator pressure is DECREASING, the operator is directed to return to step 1 of BEP-1.

Which of the following describes why the operator should NOT proceed past step 9 while a steam generator is still depressurizing?

- a. BEP-1 provides NO guidance for faulted steam generator isolation past step 9.
- b. The RCS cooldown rate must be under control in order for subsequent BEP-1 steps to be effectively implemented.
- c. SI Termination criteria could initially NOT be met. The crew then would be directed to BEP ES-1.2, 'POST LOCA COOLDOWN AND DEPRESSURIZATION' which contains more restrictive termination criteria.
- d. SI Termination criteria does NOT exist in BEP ES-1.2, 'POST LOCA COOLDOWN AND DEPRESSURIZATION'. A loop back to step 1 ensures that SI Termination criteria is met in BEP-1.

QUESTION: 030 (1.00)

Charging, letdown, and PZR level control system are in automatic. A&C letdown orifices are in service. The following conditions exist:

Letdown Hx Outlet Flow	FI-132	118 gpm
Charging Header Flow	FI-121	127 gpm
Total seal flow to RCPs	FI-142-145	30 gpm

The controlling PZR level channel fails high to an indicated 100% level. Which of the following describes the short term effect on total RCP seal injection flow, assuming NO operator action?

Total seal injection flow ...

- a. decreases to 0 gpm.
- b. decreases to about 12 gpm.
- c. remains about 30 gpm.
- d. increases to about 50 gpm.

QUESTION: 031 (1.00)

The emergency procedures require RCPs to be tripped during certain primary loss of coolant conditions. Prior to tripping RCPs, it must be verified that ECCS flow is occurring to the core.

As long as a controlled cooldown is NOT in progress, low ____ (1) ____ is used to indicate the LOCA conditions and ____ (2) ____ flow indication can be used to indicate adequate ECCS flow to the core.

- a. (1) PZR pressure (2) High Head SI
- b. (1) RCS pressure (2) Charging header
- c. (1) PZR pressure (2) Charging header
- d. (1) RCS pressure (2) SI pump discharge

QUESTION: 032 (1.00)

A step in BEP-1, 'LOSS OF REACTOR OR SECONDARY COOLANT' has the crew place the Hydrogen Monitors in service per BOP PS-9, 'POST LOCA CONTAINMENT HYDROGEN MONITORING SYSTEM OPERATION'.

Which of the following actions will be necessary to obtain valid indication of the containment hydrogen concentration:

1. Verify/Reset SI
 2. Verify/Reset Containment Phase A Isolation and open isolation valves
 3. Verify/Reset Containment Phase B Isolation and open isolation valves
 4. Switch the Hydrogen Monitors from 'OFF' to 'ON' on panel 1PM12J
 5. Place the HI/LO Range Switch to 'HI'
 6. Wait several minutes before taking readings
- a. 1, 2, 4
- b. 2, 5, 6
- c. 2, 4, 6
- d. 3, 4, 5

QUESTION: 033 (1.00)

A failure HIGH of 0RT-AR039J, the Fuel Handling Building Crane Radiation Monitor, will inhibit movement of the Fuel Handling Building Crane's ...

- a. upward motion only.
- b. downward and lateral motion.
- c. upward and lateral motion.
- d. downward motion only.

QUESTION: 034 (1.00)

- The crew is preparing for a Reactor Startup.
- PT-507, the Main Steam Header Pressure Channel, has a range of 0 to 1500 psig:

At what potentiometer value should PK-507, the Steam Dump Main Steam Header Pressure Controller be set in order to automatically maintain NO-LOAD Tave?

- a. 6.66 turns
- b. 7.28 turns
- c. 7.38 turns
- d. 7.43 turns

QUESTION: 035 (1.00)

Per 2BOA TG-8, 'TURBINE TRIP BELOW P8', following a Unit 2 Turbine Trip below 30% power ...

- a. BOTH Aux Feedwater pumps are started/verified running to ensure adequate SG levels are maintained.
- b. the control rods are required to be maintained in automatic to control primary system temperature.
- c. a manual reactor trip is required if the condenser is NOT available to maintain the heat sink.
- d. the reactor is stabilized at 25-30% power to minimize xenon transients.

QUESTION: 036 (1.00)

- An Assist NSO initiated a liquid release in accordance with BCP 400-TWX01, 'LIQUID RADWASTE RELEASE FORM FOR RELEASE TANK 0WX01T'.
- A few minutes later the same NSO noted CW Blowdown flowrate is indicating 8000 gpm.
- The NSO contacted the Radwaste Panel to check the release status and was informed the liquid release from 0WX01T was still in progress.
- NO alarms are currently lit on the Center Desk annunciator panels.

Under these circumstances ...

- a. the release failed to automatically isolate; the NSO should initiate the manual interlock function for OPR001J, the Liquid Radwaste Effluent Radiation Monitor from OPM01J.
- b. a low flow alarm failed to come in on the MCB; the NSO should open 0CW018A/B, the CW Blowdown Spray valves to increase blowdown flow.
- c. the release failed to automatically isolate; the NSO should direct the Radwaste Operator to close 0WX353, the Liquid Release Isolation valve.
- d. a low flow alarm failed to come in on the MCB; the NSO should direct the Radwaste Operator to reduce release tank flow rate to 80% of the original value.

QUESTION: 037 (1.00)

The following plant conditions exist:

- Instrument Air Header pressure is at 50 psig and decreasing.

OBOA SEC-4, 'Loss of Instrument Air', Attachment A, 'SAC Startup During Abnormal Conditions', directs connecting a nitrogen bottle for backup control air to the Station Air Compressor to be started.

This is done because on a loss of Instrument Air, the Station Air Compressor's ...

- a. Unloader Valve fails open and the Compressor Discharge Valve fails open.
- b. Unloader Valve fails closed and the Compressor Discharge Valve fails closed.
- c. Unloader Valve fails closed and the Compressor Discharge Valve fails open.
- d. Unloader Valve fails open and the Compressor Discharge Valve fails closed.

QUESTION: 038 (1.00)

An NLO is performing Outside Rounds and reports to the Control Room that the door hinges for the 0B Fire Pump room are broken.

In this situation, this is an impairment of...

- a. a fire door.
- b. the ventilation when the Fire Pump is running.
- c. a flood seal.
- d. a security barrier.

QUESTION: 039 (1.00)

The crew has diagnosed a Pressurizer (PZR) Vapor Space Accident.

The following is the procedural flowpath followed:

- BEP-0, 'REACTOR TRIP OR SAFETY INJECTION'
- BEP-1, 'LOSS OF REACTOR OR SECONDARY COOLANT'
- BEP ES-1.2, 'POST LOCA COOLDOWN AND DEPRESSURIZATION'

90 minutes after the reactor trip, performing the COOLDOWN and DEPRESSURIZATION of the plant per BEP ES-1.2 will result in ...

- a. a stable flowrate out the vapor space leak, and decreasing PZR level.
- b. a reduction in flowrate out the vapor space leak, and increasing PZR level.
- c. a reduction in flowrate out the vapor space leak, and PZR level offscale high.
- d. a stable flowrate out the vapor space leak, and stable PZR level.

QUESTION: 040 (1.00)

Consider plant parameter response to each of the following accidents separately:

- Small Break LOCA
- Faulted Steam Generator inside Containment
- Steam Generator Tube Rupture

Which of the following plant parameters is used to differentiate the small break LOCA from either the Faulted Steam Generator inside Containment or the Steam Generator Tube Rupture events?

Only the small break LOCA would exhibit a change in:

- a. Containment airborne activity.
- b. Pressurizer pressure.
- c. Containment pressure.
- d. Steam Generator level.

QUESTION: 041 (1.00)

Given the following:

- A loss of RCP seal cooling resulted in hot seal package conditions
- The reactor was tripped, then all RCPs were tripped
- The plant has been cooled down to <250°F on natural circulation.

Select from the following options to complete the statement describing how the RCP seal packages will be further cooled in accordance with BOA RCP-2, Attachment A, 'RCP HOT SEAL PACKAGE COOLDOWN'.

Establishing ____ (1) ____, maintaining <1°F/min cooldown rate until ____ (2) ____ temperature is less than 235°F and ____ (3) ____ temperature is less than 225°F.

- | | (1) | (2) | (3) |
|----|--------------------------|----------------|---------------|
| a. | seal injection; | lower bearing; | seal outlet |
| b. | thermal barrier cooling; | lower bearing; | seal outlet |
| c. | thermal barrier cooling; | seal outlet; | lower bearing |
| d. | seal injection; | seal outlet; | lower bearing |

QUESTION: 042 (1.00)

The plant is operating at 100% power. An NLO reports to the control room that the charging line containment isolation valve (CV8105) has a significant bonnet leak, approx. 20 to 30 gpm.

The SM directs the control room operators to isolate letdown, secure normal charging, and then place excess letdown in service. NO changes are to be made in the Seal Return flowpath.

Under these conditions, excess letdown is required to:

- a. Restore VCT hydrogen-control capability.
- b. Permit maintenance of a constant RCS inventory/PZR level.
- c. Provide a means of purifying reactor coolant by aligning flow through the mixed-bed demineralizers.
- d. Ensure an adequate cooling water flow rate through the RCP seals while charging flow is isolated.

QUESTION: 043 (1.00)

While performing actions of BOA S/D-2, 'SHUTDOWN LOCA', the operator is directed to check RCS hot leg temperatures less than 260°F prior to aligning any RH pump suction to the RWST.

For example, aligning a RH pump to the RWST with suction piping temperature of 340°F ...

- a. exceeds the RH pump's design temperature.
- b. may cause damage to the HUT if the RH suction relief valve were to lift.
- c. may cause steam binding at the RH pump suction when aligned to the RWST.
- d. exceeds the RH heat exchanger's heat removal capacity.

QUESTION: 044 (1.00)

Given the following:

- The LEVEL HIGH alarm for annunciator 1-2-A5, 'CC SURGE TANK LEVEL HIGH LOW' came in a few minutes ago when Unit 2 started a second CC pump for a test.
- A Safety Injection has subsequently occurred on Unit 1.
- While checking the Component Cooling pumps 1A and 1B running, the operator notices annunciator 1-2-A5 'CC SURGE TANK LEVEL HIGH LOW' is slow flashing.
- The Unit 1 Component Cooling Surge Tank level is now DROPPING.

Assuming the level decrease continues, the operator should verify the following CC system response:

- a. Demineralized water auto makeup starts at 50%. Primary water auto makeup starts at 42%.
- b. Demineralized water auto makeup starts at 55%. Primary water auto makeup starts at 50%.
- c. Primary water auto makeup starts at 50%. Demineralized water auto makeup starts at 42%.
- d. Primary water auto makeup starts at 55%. Demineralized water auto makeup starts at 50%.

QUESTION: 045 (1.00)

The unit is at 100% power, steady state conditions.

A malfunction on the Master Pressurizer Pressure Controller has caused Reactor Coolant System pressure to deviate 80 psig from its normal setpoint.

This malfunction will result in a change in ...

- a. PRT parameters.
- b. the Overpower Delta T trip setpoints.
- c. VCT level.
- d. Pressurizer Vapor Space temperature.

QUESTION: 046 (1.00)

Given the following:

- The plant experienced a Steam Generator Tube Rupture with Loss of Reactor Coolant.
- A degraded ECCS has resulted in the LOSS of core heat transfer from BOTH forced circulation and natural circulation.

If vessel level continues to decrease below the hot leg penetrations and boiling occurs in the core, which of the following describes the prevalent core heat transfer mechanism?

- a. Condensation of vapor in the head, which is cooled by fans in containment, and draining back to the core.
- b. Slug flow via the cold legs through the loop seal and flashing across the RUPTURED and FAULTED SG U-tube break.
- c. Condensation of vapor from the bubble at the hot leg side of the INTACT SGs U-tubes which then drains back to the core via the hot legs.
- d. Partial natural circulation flow characterized by liquid pulses flowing from the cold leg over the INTACT SGs U-tubes and into the hot legs.

QUESTION: 047 (1.00)

The WOG Background Document for CA-2.1, 'UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS' lists a "High Level Action Summary" of several actions that are to be taken to combat this event.

The action to "Control Feed Flow" is intended to ___(1)___ . The action to "Terminate SI Flow" is intended to ___(2)___ . Overall the main goal during this event is maintaining ___(3)___ .

- a. (1) prevent overfilling the steam generators
(2) conserve RWST inventory for Containment Spray usage
(3) Containment Integrity
- b. (1) minimize further RCS cooldown
(2) prevent repressurization of the RCS
(3) RCS integrity
- c. (1) maintain steam generator levels
(2) allow primary and secondary pressures to equalize
(3) an adequate heat sink for decay heat removal
- d. (1) maintain a thermal stratification layer in the steam generators
(2) minimize boron plate out on heat transfer surfaces
(3) integrity of the steam generator U-tubes

QUESTION: 048 (1.00)

Should a loss of Main Feedwater occur, proper Steam Generator levels can be maintained by starting the Aux Feedwater Pump(s) and controlling flow via the AF005's, the AF Pump Discharge Flow Control Valves.

Depending on plant status, the flow control valves may need to be positioned from various locations such as the Main Control Board (MCB) potentiometer, the Remote Shutdown Panel (RSP) potentiometer, or locally.

The methodology to control flow is different for each because:

When controlled from the MCB potentiometer, AF005 positioning is based on _____(1)_____; when controlled from the RSP potentiometer, AF005 positioning is based on _____(2)_____; and when controlled locally, a handwheel allows the operator to force the valve ____ (3) ____ upon failing the Instrument Air supply.

- a. (1) 0 to 100% loop flow
(2) 0 to 100% valve position
(3) closed
- b. (1) 0 to 100% loop flow
(2) 0 to 100% valve position
(3) open
- c. (1) 0 to 100% valve position
(2) 0 to 100% loop flow
(3) open
- d. (1) 0 to 100% valve position
(2) 0 to 100% loop flow
(3) closed

QUESTION: 049 (1.00)

- 1 BCA-0.0, 'LOSS OF ALL AC POWER' is in progress.
- The crew is performing the step to crosstie Bus 141 to Bus 241.
- The following breakers have been placed in PULL OUT:
 - ACB 1411, the Non-ESF bus tie
 - ACB 1412, the SAT feed
 - ACB 1414, the Reserve feed

Which ONE of the following annunciators COULD be LIT and still allow Bus 141 to be crosstied:

- a. 1-21-A7, 'BUS 141 FD BRKR 1412 TRIP'
- b. 1-21-C7, 'BUS 141 OVERLOAD OR VOLT LOW'
- c. 1-21-B8, 'BRKR 1414 CROSS-TIE OVERCURRENT'
- d. 1-21-B9, 'DG 1A OVERLOAD'

QUESTION: 050 (1.00)

Given the following:

- Unit 1 has experienced a SAT fault that resulted in a Loss of Offsite Power (LOOP).
- Unit 1 is in Mode 3 at 557°F and 2235 psig.
- 1BOA ELEC-4, 'LOSS OF OFFSITE POWER' is being performed.
- Attachment C, 'RESTORATION OF RCS PRESSURE CONTROL' is being performed to restore PZR Heaters.

Assuming NO jumpers were used to defeat interlocks, which of the following describes an alignment that would energize a PZR Backup Heater Group:

- Bus 143 crosstied to bus 141 that is energized by ___(1)___ .
 - Closed associated 4KV heater transformer high and low side breakers.
 - Heater group contactor control switch position of ___(2)___ .
- a. (1) 1A D/G
(2) 'ON'
- b. (1) Bus 241
(2) 'ON'
- c. (1) 1A D/G
(2) 'AUTO'
- d. (1) Bus 241
(2) 'AUTO'

QUESTION: 051 (1.00)

Given:

- Unit 1 is in Mode 3 at 557°F.
- Annunciator 1-21-E10 "125V DC PNL 111/113 VOLT LOW" alarms.
- Annunciator 1-4-A5 "BUS 111 INVERTER TROUBLE" alarms.
- Annunciator 1-4-C5 "BUS 113 INVERTER TROUBLE" alarms.
- Power Range Channel N-43 Drawer is dark (Deenergized).

Which of the following is indicated by the above?

- a. DC bus 113 is deenergized; only instrument bus 113 is deenergized.
- b. DC bus 113 is deenergized; instrument bus 111 and 113 are deenergized.
- c. DC bus 111 is deenergized; instrument bus 111 and 113 are deenergized.
- d. DC bus 111 is deenergized; only instrument bus 111 is deenergized.

QUESTION: 052 (1.00)

The AF-2 breaker (125 VDC Feed from Battery) to DC Bus 211 has tripped and will not reclose. From the below selections, choose which correctly describes the alternate flowpath used to reenergize DC bus 211.

- a. Bus 141 to 131X, thru battery charger 111 to battery and DC bus 113, thru bus 113 crosstie breaker, thru bus 211 crosstie breaker.
- b. Bus 242 to 232X, thru battery charger 212 to battery and DC bus 212, thru bus 212 crosstie breaker, thru bus 211 crosstie breaker.
- c. Bus 241 to 231X to 231X2, thru bus 211 inverter to DC bus 211.
- d. Bus 141 to 131X, thru battery charger 111 to battery and DC bus 111, thru bus 111 crosstie breaker, thru bus 211 crosstie breaker.

QUESTION: 053 (1.00)

Given the following:

- 1BOA PRI-7, 'ESSENTIAL SERVICE WATER MALFUNCTION' is in progress.
- Attachment A is being used to perform a SX system crosstie between the units.

The procedural direction is to verify/open the respective RCFC SX Supply and Return valves, 1SX016_ and 1SX027_, prior to starting the standby SX pump.

The reason for having these valves open is ...

- a. to ensure a flowpath is available for containment chiller cooling.
- b. that they provide the crosstie flowpath.
- c. that they are part of the starting interlocks for the pump.
- d. to ensure a flowpath is available for Diesel Generator cooling.

QUESTION: 054 (1.00)

Given the following Unit 2 plant conditions:

- Unit 2 was in Mode 3 at 2235 psig and 557°F with primary system and secondary system parameters being controlled automatically.
- The Instrument Air (IA) Header became depressurized and the crew entered 0/1/2BOA SEC-4, 'LOSS OF INSTRUMENT AIR'.
- During the loss of IA, the Unit 2 operators performed actions directed by 2BOA SEC-4.
- The IA problem has been corrected and IA Header pressure is now 50 psig and INCREASING.

Which of the following MCB controllers should be placed in MANUAL with 0% demand to prevent an undesired transient?

- a. 2AF005A thru H, Aux Feedwater Flow Controllers
- b. 2RY455B and C, PZR Spray Valve Controllers
- c. 2CC130A/B, Letdown Heat Exchanger Temperature Control Valve Controller
- d. 2CV121, Centrifugal Charging Pump Flow Controller

QUESTION: 055 (1.00)

The following conditions exist on Unit 1:

- A loss of coolant accident has occurred.
- RWST Level is 35% and DECREASING.
- 1BCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION is in progress.
- 1B RH pump has TRIPPED on overcurrent.
- Attempts are being made to establish Cold Leg Recirculation capability.
- SI has been RESET.
- The NSO is questioning the ECCS valve alignment.

Which of the following is PREVENTING 1SI8811A, Train A SI Recirc Sump Isolation valve from being MANUALLY OPENED?

- a. 1SI8812A, Train A RWST to RH Suction valve is CLOSED.
- b. 1SI8812A, Train A RWST to RH Suction valve is OPEN.
- c. 1CS001A, Train A RWST to CS Suction valve is CLOSED.
- d. 1CS009A, Train A Containment Recirc Sump to CS Suction valve is OPEN.

QUESTION: 056 (1.00)

Given the following:

- 1BFR-H.1, 'RESPONSE TO LOSS OF SECONDARY HEAT SINK' is in progress.
- The Operators are performing step 4, trying to establish Aux Feedwater to at least one S/G.

Per the Operator Action Summary (OAS) page, which one of the following conditions would result in the need to jump ahead in the procedure to initiate 'Bleed and Feed'?

- a. Low PZR pressure
- b. Low S/G Narrow Range level
- c. NO Centrifugal Charging pumps available
- d. Increasing loop Delta-T

QUESTION: 057 (1.00)

Per 2BOA REFUEL-2, 'REFUELING CAVITY OR SPENT FUEL POOL LOSS', in order to initiate evacuation of non-essential personnel from affected areas:

_____ (1) _____ if the affected area is the containment (CNMT).

_____ (2) _____ if the affected area is the Fuel Handling Building (FHB).

- a. (1) Actuate the CNMT evacuation alarm from the MCB and make an announcement over the plant page
(2) Make an announcement over the plant page
- b. (1) Make an announcement over the plant page
(2) Actuate the FHB evacuation alarm from the MCB and make an announcement over the plant page
- c. (1) Insure the CNMT evacuation alarm has automatically sounded and contact the CNMT Coordinator to initiate the evacuation.
(2) Insure the FHB evacuation alarm has automatically sounded and make an announcement over the plant page
- d. (1) Insure the CNMT evacuation alarm has automatically sounded and make an announcement over the plant page
(2) Insure the FHB evacuation alarm has automatically sounded and contact the Fuel Handling Supervisor to initiate the evacuation.

QUESTION: 058 (1.00)

Given the following plant conditions:

- Unit 1 is at full power.
- Based on primary and secondary plant indication, 1BOA SEC-8, 'STEAM GENERATOR TUBE LEAK', has been entered.
- 1CV121, the CV Pumps Discharge Header Flow Control Valve, and 1CV182, the Seal Injection Flow Control Valve, have been throttled full open.
- Pressurizer level is still DROPPING.

Prior to manually initiating a reactor trip and SI, which of the following actions is acceptable in an attempt to maintain Pressurizer level?

- a. Start a Second Charging Pump.
- b. Establish 75 GPM Letdown.
- c. Begin a Unit Load Reduction.
- d. Open 1SI8801A and B, the Cold Leg Injection Valves.

QUESTION: 059 (1.00)

Which of the following Process Radiation Monitors has an INTERLOCK FUNCTION designed to prevent an accidental offsite liquid radwaste release?

- a. 0RE-PR010, the Station Blowdown Rad Monitor
- b. 1RE-PR002, the RCFC 1A and 1C SX Outlet Rad Monitor
- c. 1RE-PR011, the Containment Atmosphere Rad Monitor
- d. 0RE-PR041, the Condensate Polisher Sump Discharge Rad Monitor

QUESTION: 060 (1.00)

Given the following:

- Both units were manually tripped from mode 1.
- The Control Room has been evacuated, 0/1/2 BOA PRI-5, 'CONTROL ROOM INACCESSIBILITY' procedures have been entered and local control has been established from the respective Unit's Remote Shutdown Panel (RSP).

It has been decided to place both units in Mode 4.

To prevent an automatic SI, it will be necessary to block the ...

- a. Steamline Low Pressure SI by depressing the block pushbuttons at the RSP prior to Main Steamline pressure reaching 640 psig.
- b. Pressurizer Low Pressure SI by depressing the block pushbutton at the RSP prior to Pressurizer pressure reaching 1930 psig.
- c. Steamline Low Pressure SI by placing jumpers in the SSPS cabinets prior to Main Steamline pressure reaching 640 psig.
- d. Pressurizer Low Pressure SI by placing jumpers in the SSPS cabinets prior to Pressurizer pressure reaching 1930 psig.

QUESTION: 061 (1.00)

Meeting LCO 3.5.2, 'ECCS-OPERATING', helps to ensure the ECCS Acceptance Criteria (10 CFR 50.46) of 2200°F peak cladding temperature will NOT be exceeded during a LOCA.

The limit of 2200°F is selected as this is ...

- a. 500°F below the clad melt point of 2700°F.
- b. 1000°F below the fuel melt temperature of 3200°F.
- c. the temperature above which thermal conductivity of the clad decreases significantly.
- d. the temperature above which the zircaloy-water reaction is greatly accelerated.

QUESTION: 062 (1.00)

Given the following plant conditions for Unit 1:

- A LOCA has occurred.
- The crew manually tripped the Reactor, manually actuated Safety Injection, entered and performed 1BEP-0, 'REACTOR TRIP AND SAFETY INJECTION'.
- A transition was made to 1BEP-1, 'LOSS OF REACTOR OR SECONDARY COOLANT'.
- The crew is now in 1BEP ES-1.1, 'SI TERMINATION', preparing to perform the step to 'REALIGN CENT CHG PUMPS(s)' when the following was observed:
 - RCS pressure: 1250 psig
 - SI Pump 1A flow: 0 gpm
 - SI Pump 1B flow: 150 gpm

What is the status of the ECCS?

- a. SI Pump 1A flow is LOWER than expected and SI Pump 1B flow is HIGHER than expected.
- b. SI Pump 1A flow is LOWER than expected and SI Pump 1B flow is AS expected.
- c. SI Pump 1A is indicating the expected flow rate with its miniflow valve OPEN. SI Pump 1B is indicating the expected flow rate with its miniflow valve CLOSED.
- d. BOTH SI Pumps are reading LESS THAN the expected flow.

QUESTION: 063 (1.00)

1BFR-H.2, 'RESPONSE TO STEAM GENERATOR OVERPRESSURE', contains a CAUTION: "If AFFECTED SG narrow range level increases to greater than 93% (81% ADVERSE CNMT), steam should NOT be released from the AFFECTED SG(s)".

WHICH of the following is the reason for this caution?

- a. To prevent moisture separator damage due to two phase flow from an overfilled steam generator.
- b. To prevent damage to valves and piping from water hammer if steam is released from the steam generator.
- c. Steam flow indication would be inaccurate due to moisture collection in steam flow transmitters.
- d. Steam flow would have a high moisture content and could cause inaccurate main steam line radiation readings.

QUESTION: 064 (1.00)

During various Design Basis Accidents (DBAs), water is collected in the containment sump so it is available for long term core and/or containment cooling via the emergency core cooling or containment spray recirculation system.

During a major accident, indications of water addition to the containment water volume from which of the following sources is UNEXPECTED per BFR-Z.2, 'RESPOND TO CONTAINMENT FLOODING'?

- a. Condensate Storage Tank
- b. Safety Injection Accumulators
- c. Primary Water Storage Tank
- d. Refueling Water Storage Tank

QUESTION: 065 (1.00)

Assume the following plant conditions exist on Unit 1:

- The unit tripped from 100% power when a switchyard failure caused a loss of offsite power.
- 1BEP ES-0.2, 'NATURAL CIRCULATION COOLDOWN' is in progress to perform a natural circulation cooldown and depressurization of the RCS.

For which of the following situations should 1BEP ES-0.3, NATURAL CIRCULATION COOLDOWN WITH STEAM VOID IN VESSEL (WITH RVLIS) be used instead of 1BEP ES-0.2?

- a. NO RCPs will be able to be restarted prior to cooling down the plant to less than 200°F.
- b. Normal Pressurizer Spray is unavailable for use in depressurizing the RCS.
- c. The required high rate of plant cooldown and depressurization results in less than 100% level in the vessel head.
- d. The SI Accumulators are unable to be isolated.

QUESTION: 066 (1.00)

Consider each of the following situations individually. Assume Mode 1 operation.

Which of the following has a Completion Time of "Immediately" for the Tech Spec Required Action of "Initiate action to restore one train to OPERABLE status"?

- a. 2 ECCS Trains are inoperable.
- b. 2 AF Trains are inoperable.
- c. 2 CS Trains are inoperable.
- d. 2 VC Filtration Trains are inoperable.

QUESTION: 067 (1.00)

An NSO has been tasked to perform an activity that involves directing NLOs in the field to manipulate equipment.

Which of the following is the expected method of ensuring the most recent revision of the procedure is being used to perform the activity?

Use the ...

- a. NLO's field copy.
- b. Electronic Central Files (ECF) copy.
- c. Electronic Document Management System (EDMS) copy.
- d. spare copy that was printed out the last time the task was performed.

QUESTION: 068 (1.00)

BGP 100-3, 'POWER ASCENSION' has a Turbine Generator 'Limitation and Action' to ensure that, when within 5% of a power limit, MW OUT is to be selected at the DEHC panel.

What is the basis for the direction of operating with MW OUT?

Operating in MW OUT mode REDUCES ...

- a. turbine Governor Valve oscillations that would occur from changing main steam pressure.
- b. turbine load changes from grid frequency perturbations.
- c. reactor power changes since generator output is held constant.
- d. the chances of exceeding power limits due to degrading secondary efficiency.

QUESTION: 069 (1.00)

BOP RC-1, 'STARTUP OF A REACTOR COOLANT PUMP', has a Limitation and Action for starting an RCP with RCS cold leg temperatures less than 350°F in that the temperature in the Steam Generators must be less than 50°F above RCS temperature.

This Limitation and Action is designed to ...

- a. prevent an overpressure event of the RCS.
- b. prevent excessive cooldown rate of the Steam Generators.
- c. maintain RCP seal parameters within normal operating range.
- d. ensure sufficient net positive suction head at suction of the RCP.

QUESTION: 070 (1.00)

An Estimated Critical Condition (ECC) has been calculated for a Beginning of Life (BOL), Negative Moderator Temperature Coefficient (- MTC) reactor startup that is to be performed 5 hours after a trip from a 60 day full power run.

Which of the following events or conditions will result in the ACTUAL critical control rod height being LOWER than the PREDICTED control rod height in the ECC? (Consider each item separately)

- a. The startup is delayed 2 hours due to a passing thunderstorm.
- b. The Nuclear Engineer used the EOL Integrated Rod Worth Curve instead of the BOL Curve for the ECC calculation.
- c. A new boron sample shows a current boron concentration 20 ppm higher than that used in the ECC calculation.
- d. Main Steam Header pressure is decreased by 100 psi just prior to criticality.

QUESTION: 071 (1.00)

2BGP 100-3, 'POWER ASCENSION' for Unit 2 has a step to open 2FW039A, B, C, and D (Feedwater Preheater Bypass Valves) at 80% power.

Why does 1BGP 100-3 'POWER ASCENSION' for Unit 1 NOT direct a similar action?

1FW039A, B, C, and D are ...

- a. opened earlier in the power ascension when feedwater control is switched to the Feed Reg Valves.
- b. only open at low power when it is necessary to close the respective 1FW009 valve.
- c. NOT allowed to be opened while in Mode 1.
- d. normally open when tempering flow is required.

QUESTION: 072 (1.00)

During repair of a Reactor Coolant Filter connection, radiation levels suddenly increased from 15 mRem/hr to 400 mRem/hr.

The worker ...

- a. recognizes the increased radiation levels, but continues the repair since levels are less than 1 Rem/hr and is NOT an ALARA concern.
- b. identifies the increasing general area dose rates and immediately leaves the area to inform the Radiation Protection Department based on ALARA concerns.
- c. continues the work since the repair is covered under a general RWP, and the estimated time of exposure for the job is 4 hours.
- d. continues the work because the Radiation Protection Department is scheduled to perform a survey of the job site in 4 hours AND the ALARA review was performed prior to commencing the repair work.

QUESTION: 073 (1.00)

The NRC Legal Radiation Exposure limit for an Adult Occupational Worker at Byron Station is ___(1)___ TEDE.

The Exelon Exposure limit for an Emergency Worker to PROTECT VALUABLE PROPERTY should the Byron site enter the Emergency Plan due to an accident event, and with proper authorization, is ___(2)___ TEDE.

- a. (1) 5 Rem/year
(2) 10 Rem
- b. (1) 5 Rem/year
(2) 25 Rem
- c. (1) 2 Rem/year
(2) 10 Rem
- d. (1) 2 Rem/year
(2) 25 Rem

QUESTION: 074 (1.00)

While operating at 50% power, a scan of the Main Control Board reveals the following:

- Reactor Power = 50%
- RCS Tavg = 575°F
- PZR Press. = 1860 psig
- PZR Level = 40%
- Rod Control = MANUAL

Which ONE of the following is the correct procedure to enter based on the above information?

- a. BOA PRI-1, 'EXCESSIVE PRIMARY PLANT LEAKAGE'.
- b. BOA PRI-12, 'UNCONTROLLED DILUTION'.
- c. BEP-1, 'LOSS OF REACTOR OR SECONDARY COOLANT'.
- d. BEP-0, 'REACTOR TRIP OR SAFETY INJECTION'.

QUESTION: 075 (1.00)

Which ONE of the following statements completes the following sentence?

Concerning usage rules of LOW-LEVEL STEPS in Emergency Procedures, _____ are used to signify those steps that must all be completed, but can be in any order.

- a. closed bullets
- b. lower case letters
- c. open bullets
- d. diamonds

(***** END OF EXAMINATION *****)

ANSWER: 001 (1.00)
 B
 REFERENCE:
 ILT Fundamentals Lesson
 Plan Power Distribution
 Chapter 3, Thermal Limits;
 page 15-16.
 I1-PD-XL-03
 modified
 High
 003000K501 ..(KA's)

ANSWER: 005 (1.00)
 A
 REFERENCE:
 P & ID M-60, sheet 6 & M-70
 sheet 1
 BOP RY-3, page 3 note: BOP
 RY-4 page 2
 BAR 1-12-B7
 Bank
 High
 007000A102 ..(KA's)

ANSWER: 009 (1.00)
 B
 REFERENCE:
 ILT Systems LP Ch 61,
 pages 15-16, 21
 ILT Systems Ch 40, pages
 31-32
 New
 High
 013000A302 ..(KA's)

ANSWER: 002 (1.00)
 C
 REFERENCE:
 BOP AB-E1 page 3
 1BOA PRI-2, EMERGENCY
 BORATION
 bank
 High
 004000K201 ..(KA's)

ANSWER: 006 (1.00)
 A
 REFERENCE:
 ILT Systems LP Ch 19, page
 32
 ILT Systems LP Ch 13, page
 20 & 21
 New
 High
 008000K303 ..(KA's)

ANSWER: 010 (1.00)
 D
 REFERENCE:
 2BEP-0, page 5
 Bank
 High
 013000 2.4.49 ..(KA's)

ANSWER: 003 (1.00)
 B
 REFERENCE:
 ILT Systems LP Ch 18 page
 12; ILT Systems Ch 53 page
 52
 Bank
 High
 005000K603 ..(KA's)

ANSWER: 007 (1.00)
 D
 REFERENCE:
 ILT Systems LP Ch 14,
 pages 8 - 10
 Bank
 High
 010000A401 ..(KA's)

ANSWER: 011 (1.00)
 C
 REFERENCE:
 BOP VP-E1A page 3, BOP
 VP-E1B page 3
 New
 Low
 022000K201 ..(KA's)

ANSWER: 004 (1.00)
 C
 REFERENCE:
 2BEP ES-1.3 steps 5 and 8;
 Horsenote ECCS-2
 WOG ERG background for
 ES-1.3, page 4
 New
 High
 006000A201 ..(KA's)

ANSWER: 008 (1.00)
 B
 REFERENCE:
 ILT Systems LP Ch 60b,
 pages 13 thru 16
 Bank
 High
 012000K406 ..(KA's)

ANSWER: 012 (1.00)
 D
 REFERENCE:
 LCO 3.6.5, SR 3.6.5.1
 2BOSR 0.1-1,2,3 page D12
 Bank
 High
 022000 2.1.33 ..(KA's)

ANSWER: 013 (1.00)
 B
 REFERENCE:
 ILT Systems Ch 59, page 11
 New
 High
 026000A104 ..(KA's)

ANSWER: 014 (1.00)
 A
 REFERENCE:
 steam tables
 ILT Systems LP Ch 23 page
 9-10
 bank
 High
 039000A105 ..(KA's)

ANSWER: 015 (1.00)
 D
 REFERENCE:
 ILT Systems Ch 24, page
 18-19
 ILT Fundamentals Ch RT3
 BAP 300-1, 'OP-AA-100,
 Conduct of Operations
 Manual, Byron
 Addendum' C.1.h on page 4.
 New
 High
 039000A205 ..(KA's)

ANSWER: 016 (1.00)
 C
 REFERENCE:
 ILT Systems LP Ch 25, page
 48-49, 55
 bank
 Low
 056000K103 ..(KA's)

ANSWER: 017 (1.00)
 D
 REFERENCE:
 ILT Systems LP Ch 37b,
 page 34
 New
 High
 059000A401 ..(KA's)

ANSWER: 018 (1.00)
 A
 REFERENCE:
 ILT Systems LP Ch 13, page
 18-19
 ILT Systems LP Ch 4, pages
 34-37
 New
 High
 061000K412 ..(KA's)

ANSWER: 019 (1.00)
 A
 REFERENCE:
 ILT Procedure LP page 57 for
 BEP ES-0.1 step 2
 WOG Background Document
 for ES-0.1 step 1
 Modified
 Low
 061000A302 ..(KA's)

ANSWER: 020 (1.00)
 A
 REFERENCE:
 ILT Systems LP Ch 9, page
 45
 Horse Note DG-2
 bank
 High
 062000K102 ..(KA's)

ANSWER: 021 (1.00)
 A
 REFERENCE:
 ILT Systems Ch 8a, pages
 5-6, 13
 Bank
 Low
 063000K103 ..(KA's)

ANSWER: 022 (1.00)
 C
 REFERENCE:
 BEP ES-0.1 step 6b RNO
 (page 8) for direction to trip
 1D RCP for this situation.
 ILT Systems LP Ch 13, page
 18 for RCP control power
 BOA ELEC-5, Symptoms or
 Entry Conditions (page 1),
 and Attachment A (page 6).
 Bank
 High
 2.4.31 063000 ..(KA's)

ANSWER: 023 (1.00)
 C
 REFERENCE:
 ILT Systems LP Ch 9, pages
 28-29, 33-34
 BOA ELEC-3, pages 2, 27-28
 6E-2-4004B, 6E-2-4021A
 New
 High
 064000A202 ..(KA's)

ANSWER: 024 (1.00)
 D
 REFERENCE:
 ILT Systems LP Ch 42, page
 52-53
 ILT Systems LP Ch 49, page
 30
 Bank
 Low
 073000K301 ..(KA's)

ANSWER: 025 (1.00)
 D
 REFERENCE:
 1BOA Pri-7, page 2, step 1
 RNO
 Bank
 Low
 076000A401 ..(KA's)

ANSWER: 026 (1.00)
 C
 REFERENCE:
 ILT Systems LP Ch 53,
 pages 55, 57, TPs 4 & 5
 Based on actual Braidwood
 event
 Bank
 High
 078000K102 ..(KA's)

ANSWER: 027 (1.00)
 B
 REFERENCE:
 OBOA SEC-5, step 3 RNO
 (page 3 of 13)
 ILT Systems LP Ch 53,
 pages 67, 69
 New
 High
 078000K403 ..(KA's)

ANSWER: 028 (1.00)
 D
 REFERENCE:
 BAR 2-1-B2
 SR 3.6.2.1 Note 1
 New
 High
 103000K105 ..(KA's)

ANSWER: 029 (1.00)
 C
 REFERENCE:
 Westinghouse Background
 Document for EP-1, step 9
 (page 86)
 Bank
 High
 002000 2.4.6 ..(KA's)

ANSWER: 030 (1.00)
 B
 REFERENCE:
 ILT Systems Ch 14 pages
 50-51, Ch 15a pages 29-30
 Bank
 High
 011000K302 ..(KA's)

ANSWER: 031 (1.00)
 D
 REFERENCE:
 BEP-0 step 26/page 23 or
 OAS
 New
 Low
 016000K107 ..(KA's)

ANSWER: 032 (1.00)
 C
 REFERENCE:
 BEP-1 steps 11c/d on page
 17
 BOP PS-9 pages 2-3
 New
 Low
 028000A403 ..(KA's)

ANSWER: 033 (1.00)
 A
 REFERENCE:
 ILT Systems LP Ch 49, page
 27
 Bank
 Low
 034000K602 ..(KA's)

ANSWER: 034 (1.00)
 B
 REFERENCE:
 ILT Systems Ch 24, pages
 6-7
 New
 High
 041000A305 ..(KA's)

ANSWER: 035 (1.00)
 C
 REFERENCE:
 2BOA TG-8 LP for steps 2, 3,
 4
 Bank
 High
 045000K518 ..(KA's)

ANSWER: 036 (1.00)
 C
 REFERENCE:
 BAR OPL01J-7-B6 (Radwaste
 Panel)
 BCP 400-TWX01, page 23
 Modified
 High
 068000A204 ..(KA's)

ANSWER: 037 (1.00)
 D
 REFERENCE:
 ILT Systems LP Ch 53, page
 48
 Bank
 Low
 079000K401 ..(KA's)

ANSWER: 038 (1.00)
 A
 REFERENCE:
 BAP 1100-3A3 page 20
 New
 Low
 086000A103 ..(KA's)

ANSWER: 039 (1.00)
 C
 REFERENCE:
 WOG ERG ES-1.2, pages
 47, 54, 73, 74, 76
 New
 High
 000008K102 ..(KA's)

ANSWER: 040 (1.00)
A
REFERENCE:
BEP-0, steps 27, 28, 29
New
High
000009A210 ..(KA's)

ANSWER: 041 (1.00)
C
REFERENCE:
BOA RCP-2, Attachment A,
pages 2 thru 5 of 5
Bank
Low
000017A207 ..(KA's)

ANSWER: 042 (1.00)
B
REFERENCE:
ILT Systems LP Ch 15a,
page 34
Bank
High
000022K303 ..(KA's)

ANSWER: 043 (1.00)
C
REFERENCE:
BOA S/D-2, Attachment D,
Note prior to Step 1
Bank
Low
000025K101 ..(KA's)

ANSWER: 044 (1.00)
A
REFERENCE:
BAR 1-2-A5
Bank
Low
000026 2.4.50 ..(KA's)

ANSWER: 045 (1.00)
D
REFERENCE:
ILT Systems LP CH 14, page
2
New
High
000027K101 ..(KA's)

ANSWER: 046 (1.00)
C
REFERENCE:
Critical Safety Function
Analysis Text, Module 2,
Lesson 2, page 2-18
Modified
High
000038K104 ..(KA's)

ANSWER: 047 (1.00)
B
REFERENCE:
WOG Background Document
for ECA-2.1, pages 3, 17-20
New
High
00WE12K3.1 ..(KA's)

ANSWER: 048 (1.00)
A
REFERENCE:
ILT Systems LP Ch 26,
pages 32-33
Bank
Low
000054K303 ..(KA's)

ANSWER: 049 (1.00)
B
REFERENCE:
BCA-0.0, step 9
New
High
000055 2.4.50 ..(KA's)

ANSWER: 050 (1.00)
A
REFERENCE:
ILT Systems Ch 14 pages 8-9
ILT Systems Ch 4 page 89
BOA ELEC-4, pages 8 & 24
New
High
000056A1.3 ..(KA's)

ANSWER: 051 (1.00)
A
REFERENCE:
BAR 1-21-E10
BAR 1-4-A5 and C5
1BOA ELEC-2, page 1
'Symptoms or Entry
Conditions' for loss of an
instrument bus.
Horse Note I&C-5
Bank
High
000057A204 ..(KA's)

ANSWER: 052 (1.00)
D
REFERENCE:
Horsenote AC-7
Bank
Low
000058A101 ..(KA's)

ANSWER: 053 (1.00)
C
REFERENCE:
ILT Systems LP Ch 20 page
33
New
Low
000062K303 ..(KA's)

ANSWER: 054 (1.00)
 B
 REFERENCE:
 1/2 BOA SEC-4 pages 2 thru
 6
 Modified
 High
 000065 2.1.23 ..(KA's)

ANSWER: 055 (1.00)
 B
 REFERENCE:
 ILT Systems LP Ch 18, page
 11
 Bank
 Low
 00WE11K2.1 ..(KA's)

ANSWER: 056 (1.00)
 C
 REFERENCE:
 1BFR-H.1 OAS page
 New
 Low
 00WE05 2.4.49 ..(KA's)

ANSWER: 057 (1.00)
 A
 REFERENCE:
 BOA REFUEL-2 step 1a
 New
 Low
 000036A103 ..(KA's)

ANSWER: 058 (1.00)
 B
 REFERENCE:
 BOA SEC-8 step 1b RNO
 (page 2)
 Modified
 Low
 000037 2.1.32 ..(KA's)

ANSWER: 059 (1.00)
 D
 REFERENCE:
 TRM Table 3.11.a, pages
 3.11.a-9 thru 11 or
 ILT Systems Chapter 49 LP,
 page 36
 New
 Low
 000059K201 ..(KA's)

ANSWER: 060 (1.00)
 C
 REFERENCE:
 BOA PRI-5 pages 28-30,
 61-62
 ILT Systems LP Ch 61 pages
 15-16
 New
 Low
 000068K314 ..(KA's)

ANSWER: 061 (1.00)
 D
 REFERENCE:
 ILT Systems LP Ch 58,
 pages 3-4
 ILT Fundamentals LP Ch
 PD1
 TS Bases B 3.5.2 page 4
 Bank
 Low
 000074 2.2.25 ..(KA's)

ANSWER: 062 (1.00)
 D
 REFERENCE:
 ILT Systems LP Ch 58, page
 9-10
 Bank
 High
 00WE02K1.1 ..(KA's)

ANSWER: 063 (1.00)
 B
 REFERENCE:
 WOG Background Document
 for Caution prior to step 4 of
 FR-H.2 (page 16 of
 Document)
 Bank
 Low
 00WE13K3.3 ..(KA's)

ANSWER: 064 (1.00)
 C
 REFERENCE:
 WOG Background Document
 for FR-Z.2, page 2 & 8
 New
 Low
 00WE15A1.3 ..(KA's)

ANSWER: 065 (1.00)
 C
 REFERENCE:
 1BEP ES-0.2 Note at top of
 page 8, step 14
 New
 Low
 00WE09A2.1 ..(KA's)

ANSWER: 066 (1.00)
 B
 REFERENCE:
 LCO 3.7.5 Condition C on
 page 3.7.5-1
 New
 Low
 194001 2.1.11 ..(KA's)

ANSWER: 067 (1.00)
 C
 REFERENCE:
 HU-AA-104-101, 'Procedure
 Use and Adherence", page 2.
 New
 Low
 194001 2.1.21 ..(KA's)

ANSWER: 068 (1.00)
 D
 REFERENCE:
 ILT Systems LP Ch 37a,
 page 22
 New
 High
 194001 2.1.32 ..(KA's)

ANSWER: 069 (1.00)
 A
 REFERENCE:
 ILT Systems LP Ch 13, page
 31for discussion of LCO 3.4.6
 Note.
 Bank
 Low
 194001 2.2.25 ..(KA's)

ANSWER: 070 (1.00)
 D
 REFERENCE:
 BCB Fig 8c for distractor A
 BCB Fig 2 for BOL & EOL for
 distractor B
 BCB Table 1-5 for distractor
 C
 BCB Fig 5A for answer D
 Bank
 High
 194001 2.2.34 ..(KA's)

ANSWER: 071 (1.00)
 B
 REFERENCE:
 1BGP 100-3, step F.40
 (pages 51-53)
 New
 Low
 194001 2.2.3 ..(KA's)

ANSWER: 072 (1.00)
 B
 REFERENCE:
 RP-AA-1002 Reference:
 Bank
 Low
 194001 2.3.2 ..(KA's)

ANSWER: 073 (1.00)
 A
 REFERENCE:
 RP-AA-203, page 2 and page
 7
 New
 Low
 194001 2.3.4 ..(KA's)

ANSWER: 074 (1.00)
 D
 REFERENCE:
 BEP-0, page 1, 'SYMPTOMS
 OR ENTRY CONDITIONS
 BAR 1-11-C3
 Bank
 High
 194001 2.4.2 ..(KA's)

ANSWER: 075 (1.00)
 A
 REFERENCE:
 BAP 1310-10,
 'HU-AA-104-101, Procedure
 Use and Adherence, Byron
 Addendum" page 13
 New
 Low
 194001 2.4.19 ..(KA's)

ANSWER KEY
MULTIPLE CHOICE

001 B	016 C	031 D	046 C	061 D
002 C	017 D	032 C	047 B	062 D
003 B	018 A	033 A	048 A	063 B
004 C	019 A	034 B	049 B	064 C
005 A	020 A	035 C	050 A	065 C
006 A	021 A	036 C	051 A	066 B
B 2				
007 D	022 C	037 D	052 D	067 C
S 3				
008 B	023 C	038 A	053 C	068 D
009 B	024 D	039 C	054 B	069 A
010 D	025 D	040 A	055 B	070 D
011 C	026 C	041 C	056 C	071 B
012 D	027 B	042 B	057 A	072 B
013 B	028	043 C	058 B	073 A
014 A	029 C	044 A	059 D	074 D
015 D	030 B	045 D	060 C	075 A

(***** END OF EXAMINATION *****)