

**Catawba Nuclear Station 2012 NRC Initial License Written Exam  
SENIOR REACTOR OPERATOR**

**Question 1**

With Unit 1 at 90% power the following conditions exist:

- RPS Testing is in progress.
- Reactor Trip Breaker A (RTA) is CLOSED.
- Reactor Trip Breaker B (RTB) is OPEN.
- Reactor Trip Bypass Breaker B (BYB) is Racked In to CONN and CLOSED.

During the testing the following occurs:

- The A NC Pump Shaft seizes.
- A MANUAL trip of the reactor was required and was SUCCESSFUL.

Which ONE of the following identifies the Reactor Trip/Bypass Breaker trip coil that operated AS DESIGNED throughout the event?

- A. RTA Undervoltage Coil
- B. RTA Shunt Trip Coil
- C. BYB Undervoltage Coil
- D. BYB Shunt Trip Coil

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**Question 2**

Given the following Unit 1 conditions:

**Initial:**

- The Unit was at 70% power when 1NC-32B (PZR PORV) began leaking.
- 1NC-31B (PZR Power Relief Isolation) was CLOSED to isolate the leak.

**Subsequent:**

- 1NC-34A (PZR PORV) comes off its valve seat and begins leaking by.
- Pressurizer Relief Tank pressure and level are increasing.
- The crew enters AP/1/A/5500/011, (Pressurizer Pressure Anomalies).

Which ONE of the following describes the required operation for closing 1NC-33A (PZR Power Relief Isolation)?

- A. Select control switch for **1NC-33A** to CLOSE only.
- B. Select control switch for **1NC-31B** to OVERRIDE and then select control switch for **1NC-33A** to CLOSE.
- C. Select control switch for **1NC-31B** to OVERRIDE and then select control switch for **1NC-33A** to OVERRIDE.
- D. Select control switch for **1NC-33A** to OVERRIDE only.

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**Question 3**

Given the following Unit 1 conditions:

**Initial:**

- The Unit is at 100% power.
- 1B NV Pump is tagged out for motor replacement.

**Subsequent:**

- A Small Break LOCA occurs.
- Containment pressure peaks at 2.3 psig.

**Current:**

- NC pressure is 1650 psig and stable.
- Core Exit Thermocouples are 750°F.
- RVLIS Level is 70% Upper Range and slowly decreasing.
- S/G levels are all ~30% and stable.
- Main Steam pressure is 1085 psig and stable.
- 1ETA is DEENERGIZED.
- Containment pressure is 1.8 psig and slowly decreasing.

- (1) What is the current mechanism/method for cooling?
- (2) In accordance with FR-C.2, (Response to Degraded Core Cooling), what is the next required action?
- A. (1) Safety injection flow  
(2) Dump steam to the condenser.
- B. (1) Reflux cooling  
(2) Depressurize the NC system by opening one PZR PORV.
- C. (1) Safety injection flow  
(2) Depressurize the NC system by opening one PZR PORV.
- D. (1) Reflux cooling  
(2) Dump steam to the condenser.

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**Question 4**

Given the following Unit 1 initial conditions:

- The Unit is cooling down for a refueling outage.
- NC Thots are at 365°F.
- NC pressure is 120 psig.
- All CLAs have been isolated.

**Subsequently:**

- Pressurizer pressure and level are steadily decreasing.
- Containment pressure is increasing.
- The crew enters AP/1/A/5500/027, (Shutdown LOCA) and maximizes charging and isolates letdown.
- Pressurizer level and pressure continue to decrease.

Which ONE of the following describes the requirements for cooldown?

- (1) In accordance with AP/27, the recommended cooldown rate is LESS THAN       (1)       in one hour.
- (2) In accordance with OP/1/A/6200/004, (Residual Heat Removal System), which ONE of the following NC temperatures is the EARLIEST at which the ND system can be operated in RHR mode?
- A. (1) 100°F  
(2) 340°F
- B. (1) 80°F  
(2) 340°F
- C. (1) 100°F  
(2) 300°F
- D. (1) 80°F  
(2) 300°F

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**Question 5**

Given the following Unit 1 conditions:

- The Unit is at 41% power.
- 1D NCP (Reactor Coolant Pump) trips.

Which ONE of the following describes:

(1) How 1D Steam Generator level indications are INITIALLY affected?

(2) The effect of the NCP trip on reactor status?

- A. (1) Decrease  
(2) Automatic reactor trip occurs.
- B. (1) Decrease  
(2) A manual reactor trip is required.
- C. (1) Increase  
(2) Automatic reactor trip occurs.
- D. (1) Increase  
(2) A manual reactor trip is required.

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**Question 6**

In accordance with AP/1/A/5500/008 (Malfunction of Reactor Coolant Pump), if the \_\_\_\_\_ (1) \_\_\_\_\_ seal leakoff flow is \_\_\_\_\_ (2) \_\_\_\_\_, then the pump must be tripped within 5 minutes.

(Assume Unit is in Mode 3.)

- A. (1) #1  
(2) > 1.1 gpm
- B. (1) #1  
(2) > 7.5 gpm
- C. (1) #2  
(2) > 1.1 gpm
- D. (1) #2  
(2) > 7.5 gpm

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**Question 7**

Assume Unit 1 ND is aligned in RHR Mode.

If relief valve \_\_\_\_\_ (1) \_\_\_\_\_ fails full OPEN, the A and B level indicators on 1MC-11 for the Containment Floor and Equipment Sump will begin to increase \_\_\_\_\_ (2) \_\_\_\_\_ after the valve failure .

Which ONE of the following completes the above statement?

- A. (1) 1ND-3, (1A ND Train Suction Relief)  
(2) within a few seconds
- B. (1) 1ND-3, (1A ND Train Suction Relief)  
(2) approximately 5 minutes
- C. (1) 1ND-31, (1A ND Pump Discharge Relief)  
(2) within a few seconds
- D. (1) 1ND-31, (1A ND Pump Discharge Relief)  
(2) approximately 5 minutes

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**Question 8**

In accordance with FR-S.1, (Response to Nuclear Power Generation/ATWS), Step 8 (Verify reactor is subcritical), which Nuclear Instrumentation is used in the steps for verifying that the reactor is subcritical, and why is it used?

- (1) The \_\_\_\_\_ (1) \_\_\_\_\_ Nuclear Instrumentation is used.
- (2) The purpose of using this instrumentation is to verify that \_\_\_\_\_ (2) \_\_\_\_\_ .
- A. (1) Wide Range  
(2) Reactor power is less than 5%.
- B. (1) Intermediate Range  
(2) Startup rate is more negative than (-) 0.2 dpm.
- C. (1) Intermediate Range  
(2) Reactor power is less than 1.00E-05%.
- D. (1) Source Range  
(2) Startup rate is more negative than (-) 0.2 dpm.



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**Question 9**

During the performance of FR-H.1 (Response to Loss of Secondary Heat Sink) all conditions have been met for establishing feed flow to the S/Gs using Enclosure 7 (S/G CM/CF Flow Restoration).

- S/G Wide Range (WR) levels are:
  - 1A S/G = 9%
  - 1B S/G = 1%
  - 1C S/G = 6%
  - 1D S/G = 10%

In accordance with FR-H.1, Enclosure 7, feeding the S/G with the \_\_\_\_\_ (1) level will reduce the risk of \_\_\_\_\_ (2) when reestablishing feed flow.

Which ONE of the following completes the above statement?

- A. (1) lowest  
(2) thermal shock to the S/G
- B. (1) lowest  
(2) excessive NC system cooldown
- C. (1) highest  
(2) thermal shock to the S/G
- D. (1) highest  
(2) excessive NC system cooldown

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**Question 10**

Following a Loss of Offsite Power, the crew is preparing to transfer 1FTA's power supply from the **ALTERNATE** source back to the **NORMAL** source, using the Hot Bus Transfer method.

Which ONE of the following describes how this operation is performed in accordance with OP/1/A/6350/005, (Alternate AC Power Sources)?

- A. With 1A D/G engine running, the operator selects "D/G 1A SYNC" switch on 1MC-11 to "ON". When the indicator is 1.5 minutes from vertical, close the D/G output breaker, and then close normal feeder breaker GTA.
- B. With 1A D/G engine running, the operator selects "D/G 1A SYNC" switch on 1MC-11 to "ON". When indicator is 1.5 minutes from vertical, close ONLY the normal feeder breaker GTA.
- C. With 1A D/G engine NOT running, "D/G 1A SYNC" switch on 1MC-11 is verified "OFF." Then close GTA and then manually open ETA-2 and FTA-1.
- D. With 1A D/G engine NOT running, "D/G 1A SYNC" switch on 1MC-11 is selected to "ON." Then close GTA and verify ETA-2 and FTA-1 have automatically opened.

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**Question 11**

Given the following Unit 1 conditions:

- The Unit is at 100% power.

**Subsequently:**

- The following alarms are received:
  - 1AD-11, I/4, (240/120VAC NORM AUX CONTROL PWR TROUBLE)
  - 1AD-2, F/10, (DCS TROUBLE)
- The crew has entered AP/1/A/5500/029, (Loss of Vital or Aux Control Power).
- It has been determined that more than one Distributed Control System (DCS) Controller Drop has lost power.

If DCS Controller Drop \_\_\_\_ (1) \_\_\_\_ AND DCS Controller Drop \_\_\_\_ (2) \_\_\_\_ have experienced the loss of power, immediate entry into T.S. 3.0.3 is required.

Which ONE of the following completes the above statement?

**Reference Provided**

- A. (1) 6/56  
(2) 7/57
- B. (1) 6/56  
(2) 8/58
- C. (1) 8/58  
(2) 12/62
- D. (1) 7/57  
(2) 8/58

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**Question 12**

Given the following Unit 1 initial conditions:

- The Unit is at 100% power.
- NV Pump 1B is tagged out for maintenance.

**Subsequent:**

- A loss of RN occurs and the crew is implementing AP/0/A/5500/020 (Loss of Nuclear Service Water).
  - The loss of RN has affected the KC System such that NV pump motor cooling has been lost.
  - The crew is implementing AP/020, Enclosure 12 (Alternate Cooling to NV Pump 1A).
- (1) In accordance with AP/020, if the alternate cooling water to NV Pump 1A is not established within (1) minutes, the thrust bearing will experience high temperature conditions.
- (2) Once the alternate cooling water flow is established, Enclosure 12 directs that it be throttled to a minimum to maintain bearing temperatures at just below the high temperature limit. This is done in order to (2).
- A. (1) 15  
(2) minimize the generation of liquid radwaste
- B. (1) 15  
(2) prevent thermal shocking of the thrust bearing
- C. (1) 5  
(2) minimize the generation of liquid radwaste
- D. (1) 5  
(2) prevent thermal shocking of the thrust bearing

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**Question 13**

For a Loss of Instrument Air event, which ONE of the following completes the statements below?

- (1) The reason for the CA accumulators is to provide a backup supply of operating air to the CA flow control valve actuators for a MINIMUM of \_\_\_\_\_ (1) \_\_\_\_\_.
- (2) The purpose for this feature is to protect from \_\_\_\_\_ (2) \_\_\_\_\_ with a Loss of VI.
- A. (1) 30 minutes  
(2) runout of the CA pumps during a Main Feedwater Line Rupture
- B. (1) 30 minutes  
(2) S/G overfill during a S/G Tube Rupture
- C. (1) 60 minutes  
(2) runout of the CA pumps during a Main Feedwater Line Rupture
- D. (1) 60 minutes  
(2) S/G overfill during a S/G Tube Rupture

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**Question 14**

Given the following Unit 1 conditions:

- The Unit is at 100% power.
- A grid disturbance occurs resulting in a **Zone B** lockout.

Which ONE of the following describes an expected alarm, and which automatic turbine runback will be in progress?

- A. (1) 1AD-11, C/1, (GEN BKR A OVERCURRENT)  
(2) Runback to 48%
- B. (1) 1AD-11, F/1, (GEN BKR **B** OVERCURRENT)  
(2) Runback to 48%
- C. (1) 1AD-11, C/1, (GEN BKR **A** OVERCURRENT)  
(2) Runback to 65%
- D. (1) 1AD-11, F/1, (GEN BKR **B** OVERCURRENT)  
(2) Runback to 65%

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**Question 15**

When performing ECA-1.2, (LOCA Outside Containment), why is the ND system alignment addressed EARLIER in the procedure than other ECCS equipment?

- A. To maintain suction to the charging pumps if containment sump swapover has already occurred.
- B. This allows the charging pumps to maintain NC Pump seal injection.
- C. Isolation of ND components requires manipulations outside the control room.
- D. The leak is most likely to occur in the ND system.

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**Question 16**

(Assume containment pressure in each Unit is 1.2 psig.)

- (1) When determining entry conditions for FR-H.1 (Response to Loss of Secondary Heat Sink), the \_\_\_\_\_ (1) \_\_\_\_\_ range indication for S/G levels is used.
- (2) In accordance with FR-H.1, the level requirement for S/G levels for **Unit 1** is \_\_\_\_\_ (2) \_\_\_\_\_ than for **Unit 2**.
- A. (1) narrow  
(2) higher
- B. (1) narrow  
(2) lower
- C. (1) wide  
(2) higher
- D. (1) wide  
(2) lower



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**Question 17**

Which ONE of the following describes the method of depressurizing the S/Gs to support CLA injection, in accordance with ECA-1.1 (Loss of Emergency Coolant Recirculation)?

- A. Slowly until S/G pressures are < 690 psig, then at the maximum rate until S/G pressures are < 125 psig.
- B. Slowly until at least two NC Thots are < 356°F, then at the maximum rate until S/G pressures are < 125 psig.
- C. At the maximum rate while attempting to avoid Main Steam Isolation until at least two NC Thots are < 356°F, then slowly until S/G pressures are < 125 psig.
- D. At the maximum rate while attempting to avoid Main Steam Isolation until S/G pressures are < 690 psig, then slowly until S/G pressures are < 125 psig.

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**Question 18**

During the performance of ECA-2.1, (Uncontrolled Depressurization of All Steam Generators) the following conditions exist:

- The operators have requested NC boron samples from Primary Chemistry.
- The actions of Step 6 (minimizing NC system cooldown) have just been initiated.

- (1) The operators \_\_\_\_\_ (1) \_\_\_\_\_ required to obtain boron sample results PRIOR to initiating a controlled cooldown.
- (2) In accordance with ECA-2.1, Enclosure 1 (Foldout Page), IF the pressure in any S/G increases, AND S/I termination \_\_\_\_\_ (2) \_\_\_\_\_, then the crew will GO TO E-2, (Faulted Steam Generator Isolation).

In accordance with ECA-2.1, which ONE of the following completes the above statements?

- A. (1) are  
(2) is in progress
- B. (1) are NOT  
(2) is in progress
- C. (1) are  
(2) has been completed
- D. (1) are NOT  
(2) has been completed

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**Question 19**

Given the following conditions:

- With Unit 1 initially at 100% power, Bank A rod H-6 dropped fully into the core.
- AP/14, (Control Rod Misalignment) Case II, "Dropped Control Rod" was entered.
- Dropped rod recovery is in progress, in accordance with OP/1/A/6150/008, (Rod Control), Enclosure 4.6, "Rod Retrieval".
- The operators have ensured that the lift coils are in the required configuration for all rods in the affected bank (rods H-6, K-8, F-8, and H-10).

- (1) When the OATC operates the "ROD MOTION" lever, a "ROD CONTROL URGENT FAILURE" alarm \_\_\_\_\_ (1) \_\_\_\_\_ be received.
- (2) Whenever a "ROD CONTROL URGENT FAILURE" alarm is received, a manual RESET is performed by depressing the "ROD CTRL ALARM RESET" pushbutton for \_\_\_\_\_ (2) \_\_\_\_\_ before releasing it, in accordance with OP/1/A/6150/008.

Which ONE of the following completes the above statements?

- A. (1) WILL  
(2) no more than ONE second
- B. (1) WILL  
(2) at least TWO seconds
- C. (1) will NOT  
(2) no more than ONE second
- D. (1) will NOT  
(2) at least TWO seconds

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**Question 20**

Given the following Unit 1 conditions:

- The Unit is at 100% power.
- While performing the RCCA movement test, Bank D control rod H-8 remains at 198 steps withdrawn.
- All other Bank D control rods (D4, M12, D12, M4) are at 212 steps withdrawn as indicated on DRPI and step demand counters.

- (1) What is the maximum time allowed to restore rod H-8 to within limits per Technical Specification 3.1.4 (Rod Group Alignment Limits)?
- (2) In accordance with OP/1/A/6150/008 (Rod Control), in the Control Rod Disconnect Switch Box on 1MC5, which switch, or switches, will be operated when initially attempting to restore the required rod alignment?
- A. (1) 30 minutes  
(2) Switch labeled "H8" ONLY
- B. (1) 30 minutes  
(2) Switches labeled "D4" and "M12" and "D12" and "M4"
- C. (1) 1 hour  
(2) Switch labeled "H8" ONLY
- D. (1) 1 hour  
(2) Switches labeled "D4" and "M12" and "D12" and "M4"

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**Question 21**

Unit 1 was operating at 100% power when a turbine trip occurred.

Given the following conditions and sequence of events:

- The reactor did not trip and could NOT be tripped from the control room.
- Pressurizer pressure is 2340 psig.
- The crew entered EP/1/A/5000/E-0, (Reactor Trip or Safety Injection) and immediately transitioned to EP/1/A/5000/FR-S.1, (Response to Nuclear Power Generation/ATWS).
- The crew is initiating emergency boration.
- 1NV-236B (Boric Acid to NV Pump Suct) is opened.
- Boric acid transfer pump switches are in "ON".
- 1NV-312A and 1NV-314B (Chrg Line Cont Isol) are OPEN.

- (1) In accordance with FR-S.1, what is the required action?
- (2) The reason for that action is to ensure that EMERGENCY BORATION is provided to the core at a MINIMUM of \_\_\_\_\_ ?
- A. (1) Manually actuate safety injection.  
(2) 30 gpm
- B. (1) Depressurize the NC system to less than 2135 psig using Pressurizer PORVs.  
(2) 60 gpm
- C. (1) Manually actuate safety injection.  
(2) 60 gpm
- D. (1) Depressurize the NC system to less than 2135 psig using Pressurizer PORVs.  
(2) 30 gpm

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**Question 22**

Given the following Unit 1 conditions:

- The Unit is in Mode 2 conducting a reactor startup following a refueling outage.
- N-31 (Source Range) indicates  $4.0 \times 10^2$  cps.
- N-32 (Source Range) indicates  $5.0 \times 10^1$  cps.
- N-35 (Intermediate Range) indicates  $10^{-6}\%$  power.
- N-36 (Intermediate Range) indicates  $10^{-6}\%$  power.
- Both reactor trip breakers are closed.
- The rod control system is capable of rod withdrawal.

Which ONE of the following describes:

- (1) Which Source Range instruments are indicating properly?
  - (2) What immediate action is required in accordance with Technical Specifications?
- A. (1) NEITHER  
(2) Open both reactor trip breakers.
- B. (1) ONLY N-31  
(2) Open both reactor trip breakers.
- C. (1) NEITHER  
(2) Suspend positive reactivity additions.
- D. (1) ONLY N-31  
(2) Suspend positive reactivity additions.

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**Question 23**

Given the following Unit 2 conditions:

**Initial:**

- The Unit is at 6% power during a startup.
- A problem required that N-36 be declared INOPERABLE.

**Subsequent:**

- Due to erratic operation, N-35 "LEVEL TRIP" switch is placed in "BYPASS".

What is/are the MINIMUM required action(s), per Technical Specification 3.3.1, (Reactor Trip System Instrumentation)?

- A. Reduce thermal power to < P-6.
- B. Increase thermal power to > P-10.
- C. Open both Reactor Trip Breakers IMMEDIATELY.
- D. Suspend positive reactivity additions IMMEDIATELY, AND then reduce thermal power to < P-6.

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**Question 24**

In the event BOTH EMF-53A and EMF-53B become inoperable during an accident, which ONE of the following describes an alternate method used to estimate containment radiation levels?

- A. Use the indication on EMF-60 Annulus Radiation Monitor.
- B. Use the indication on EMF-71, 72, 73, 74 N16 Steam Line Monitors.
- C. Have RP monitor the contact dose rate at center of outside airlock door.
- D. Have an individual begin monitoring EMF-33, Condenser Air Ejector Monitor.



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**Question 25**

During an event involving a fire in the plant, 1SLXG has become de-energized. A Reactor Operator is dispatched to start the Standby Shutdown Facility (SSF) Diesel Generator in accordance with AP/017 (Loss of Control Room) Case II (Loss of Plant Control Due to Fire or Security Event), Enclosure 10 (SSF D/G Startup).

At the SSF control panel the operator places the "SSF D/G MODE" switch to "EMERG" and then cranks the engine for 30 seconds. The engine does NOT start.

- (1) In accordance with AP/017, Enclosure 10 what alternate method is prescribed for starting the engine?
  - (2) If the alternate method is successful (diesel engine starts), what are the effects on the SSF D/G?
- A.
    - (1) Engage the fuel oil solenoid manual override, wait one to two minutes, then make another start attempt.
    - (2) ALL automatic trips and manual trips are disabled.
  - B.
    - (1) Engage the fuel oil solenoid manual override, wait one to two minutes, then make another start attempt.
    - (2) ONLY the high jacket water temperature and low lube oil pressure trips are disabled.
  - C.
    - (1) Wait two minutes ONLY, and attempt another start by cranking the engine for up to 45 seconds.
    - (2) ONLY the engine overspeed and generator differential trips are disabled.
  - D.
    - (1) Wait two minutes ONLY, and attempt another start by cranking engine for up to 45 seconds.
    - (2) ONLY the high jacket water temperature and low lube oil pressure trips are disabled.

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**Question 26**

Unit 1 has tripped from 100% power. The operators transitioned from E-0, (Reactor Trip or Safety Injection) to ES-0.1, (Reactor Trip Response). There are indications of failed fuel based on the results of post-trip activity samples. AP/18, (High Activity in Reactor Coolant) is being implemented.

Which ONE of the following describes the correct actions to take with the NV system, including the reason for the action?

- A. Letdown is diverted to the Recycle Holdup Tank to limit radiation levels in the charging pump area.
- B. Charging and Letdown flows are reduced to limit radiation levels in the Auxiliary Building.
- C. The cation bed is placed in service at greater than 80 gpm flow in order to reduce the amount of fission products in the reactor coolant system.
- D. Ensure 1NV-153A is placed in "DEMIN" position and ensure one mixed bed demineralizer is aligned for purification of the reactor coolant.

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**Question 27**

Given the following Unit conditions:

- A transfer of control to the Standby Shutdown Facility (SSF) has been completed.
- Natural circulation is being verified in accordance with OP/0/B/6100/013 (Standby Shutdown Facility Operations).
- In-core thermocouple readings are:
  - 582°F
  - 610°F
  - 588°F
  - 600°F
  - 585°F

- (1) In accordance with OP/0/B/6100/013, what NC system pressure indication is used for determining the status of natural circulation?
- (2) IF that pressure indication is 1700 psig, and for the given conditions, does natural circulation currently exist?

**Reference Provided**

- A. (1) Pressurizer pressure  
(2) Yes
- B. (1) Pressurizer pressure  
(2) No
- C. (1) NC Loop B WR pressure  
(2) Yes
- D. (1) NC Loop B WR pressure  
(2) No

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**Question 28**

Regarding the cooling of the NC Pump motor and seals:

- (1) For normal conditions, \_\_\_\_ (1) \_\_\_\_ cools the air flow through the motor.
- (2) For Phase B actuation, seal cooling will be provided by the \_\_\_\_\_ (2) \_\_\_\_\_ .

Which ONE of the following completes the statements above?

- A. (1) RN  
(2) normal seal injection
- B. (1) RN  
(2) thermal barrier heat exchanger
- C. (1) YV  
(2) normal seal injection
- D. (1) YV  
(2) thermal barrier heat exchanger

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**Question 29**

The effect of a failure of the #2 seal on 1A NCP is that the Standpipe \_\_\_\_\_(1)\_\_\_\_\_ level alarm 1AD-7, A/1, (NCP A **#2** Seal S-Pipe Hi/Lo Lvl), is received, and the NCP **#1** Seal Leakoff \_\_\_\_\_(2)\_\_\_\_\_ alarm is also received.

- A. (1) HIGH  
    (2) HIGH
- B. (1) HIGH  
    (2) LOW
- C. (1) LOW  
    (2) HIGH
- D. (1) LOW  
    (2) LOW

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**Question 30**

Given the following Unit 1 conditions:

- A unit shutdown for refueling is in progress, in accordance with OP/1/A/6100/002, Enclosure 4.2, Unit Shutdown From Mode 3 To Mode 5.
- 1NV-148 (Letdown Pressure Control) controller is in AUTO.

(1) As the cooldown continues and NC pressure decreases, the operator will need to \_\_\_\_\_ (1) \_\_\_\_\_ the control setpoint of 1NV-148 (Letdown Pressure Control).

(2) One reason for the above operation is to \_\_\_\_\_ (2) \_\_\_\_\_.

Which ONE of the following completes the above statement?

- A. (1) RAISE  
(2) maintain adequate NCP seal injection by maximizing charging flow
- B. (1) RAISE  
(2) reduce the degasification time by maximizing letdown flow
- C. (1) LOWER  
(2) maintain adequate NCP seal injection by maximizing charging flow
- D. (1) LOWER  
(2) reduce the degasification time by maximizing letdown flow

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**Question 31**

Given the following conditions:

- Pressurizer Pressure Master Controller is initially in MANUAL.
- A failure of the Pressurizer Pressure Master Controller occurs.
- All Pressurizer heaters were energized.
- NC Pressure reached 2310 psig prior to termination of the event.

Which ONE of the following describes the effect on the PZR Surge Line temperature and charging flow due to this failure?

	<u>PZR Surge Line Temperature</u>	<u>Charging Flow</u>
A.	INCREASED	DECREASED
B.	DECREASED	DECREASED
C.	INCREASED	INCREASED
D.	DECREASED	INCREASED

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**Question 32**

Given the following Unit 1 conditions:

- Both ND pumps are operating in RHR mode.
- Cold Leg temperatures are:
  - Loop 1A: 215.4°F
  - Loop 1B: 214.1°F
  - Loop 1C: 211.8°F
  - Loop 1D: 209.4°F
- 1ND-3 (1A ND Pump Suction From NC Loop B Header Relief) lift setpoint is WITHIN the required range.
- 1ND-38 (1B ND Pump Suction From NC Loop C Header Relief) lift setpoint is OUTSIDE of the required range.
- One PORV (1NC-32B) is INOPERABLE.

Considering only the above conditions, is entry into LCO 3.4.12, (Low Temperature Overpressure) required, and why or why not?

- A. YES, because only ONE PORV is operable.
- B. NO, because the LCO does not apply for the given Unit conditions.
- C. NO, because Unit conditions satisfy the requirements of the specification.
- D. YES, because only ONE ND suction relief valve lift setpoint is within the required range.



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**Question 33**

Given the following Unit 1 conditions:

The Unit is performing a cool down and depressurization for a refueling outage.

- Both trains of “PZR LO PRESS S/I” and “MAIN STEAM ISOL” have been BLOCKED in accordance with OP/1/A/6100/002 (Controlling Procedure For Unit Shutdown).
- A minor plant transient has caused NC pressure to INCREASE from 1830 psig to 1895 psig.
- The crew has stabilized pressure and are preparing to re-initiate the cool down.

Which ONE of the following describes the status of the PZR LOW PRESS S/I and MAIN STEAM ISOL signals?

- A. Both signals are now ACTIVE.
- B. PZR LO PRESS S/I is still BLOCKED; MAIN STEAM ISOL is now ACTIVE.
- C. PZR LO PRESS S/I is now ACTIVE; MAIN STEAM ISOL is still BLOCKED.
- D. Both signals are still BLOCKED.

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**Question 34**

In describing automatic operation of valves associated with the Pressurizer Relief Tank (PRT):

\_\_\_\_\_ (1) \_\_\_\_\_ receives a CLOSE signal on a \_\_\_\_\_ (2) \_\_\_\_\_ actuation.

Which ONE of the following completes the above statement?

- A. (1) 1NC-53B (N2 to PRT Cont Isol)  
(2) Phase A
- B. (1) 1NC-54A (N2 to PRT Cont Isol)  
(2) Phase B
- C. (1) 1NC-56B (RMW Pump Disch to PRT Cont Isol)  
(2) Phase B
- D. (1) 1NC-58A (PRT Spray Supply Isol)  
(2) Phase A

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**Question 35**

Given the following plant conditions:

- Unit 1 at 100% power.
- PT/1/A/4200/023B, (NC PORV and Air Supply Stroke Test) is in progress.
- 1NC-36B (PZR PORV) stroke is performed and 1NC-35B (PZR Power Relief Isolation) is reopened.
- 1NC-36B (PZR PORV) OPENS and CANNOT be closed.
- 1NC-35B CANNOT be closed.

The Pressurizer Relief Tank (PRT) rupture disc will blow when PRT pressure FIRST reaches \_\_\_\_\_ (1) \_\_\_\_\_ , at which point the Pressurizer PORV tailpipe temperature will \_\_\_\_\_ (2) \_\_\_\_\_ .

Which ONE of the following completes the above statement?

- A. (1) 85 psig  
(2) remain the same
- B. (1) 85 psig  
(2) decrease
- C. (1) 100 psig  
(2) remain the same
- D. (1) 100 psig  
(2) decrease

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**Question 36**

Given the following Unit 1 conditions:

- The Standby Shutdown Facility (SSF) has been manned due to a fire in the cable spreading room.
- During the course of SSF operations a reactor head vent was stuck in the open position for a short period of time and then reclosed.
- You have been directed to increase NC pressure using Pressurizer heaters.

(1) Why is pressure recovery slower from the SSF than from the Control Room?

(2) What is the power supply for those heaters?

- A. (1) Only a portion of the D heaters are available from the SSF.  
(2) SMXG
- B. (1) Only a portion of the D heaters are available from the SSF.  
(2) 1EMXS
- C. (1) Only A and B heaters are available from the SSF.  
(2) 1EMXS
- D. (1) Only A and B heaters are available from the SSF.  
(2) SMXG

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**Question 37**

Given the following Unit 1 conditions:

- Reactor startup is in progress.
- The permissive P-6 light on 1SI-18 has just LIT.
- Reactor power is increasing.

In accordance with PT/0/A/4150/019, (1/M Approach to Criticality), the operator will:

- (1) manually block the \_\_\_\_\_ (1) \_\_\_\_\_ high flux reactor trip.
- (2) At this point, the reactor trip setpoint for high flux is \_\_\_\_\_ (2) \_\_\_\_\_ .
- A. (1) Intermediate Range  
(2) 10%
- B. (1) Intermediate Range  
(2) 25%
- C. (1) Source Range  
(2) 10%
- D. (1) Source Range  
(2) 25%

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**Question 38**

Given the following Unit 1 conditions:

**Initial:**

- Unit 1 was performing a heatup following a refueling outage.
- NC System temperature was 400°F.
- NC System pressure was 1600 psig.
- “A” and “B” shutdown banks were withdrawn.
- Containment Pressure Channel II failed high.

**Current:**

- 1ERPD has lost power.
- Containment pressure channels read:
  - Channel I: 0 psig
  - Channel II: +5 psig
  - Channel III: 0 psig
  - Channel IV: -5 psig

Which ONE of the following describes the effect on the Engineered Safeguards Features (ESF) system and the FIRST appropriate procedure entry?

- A. ONLY Train “A” ESF equipment starts.  
AP/1/A/5500/005, Reactor Trip or Inadvertent S/I Below P-11.
- B. ONLY Train “A” ESF equipment starts.  
EP/1/A/5000/E-0, Reactor Trip or Safety Injection.
- C. BOTH Train “A” AND “B” ESF equipment starts.  
AP/1/A/5500/005, Reactor Trip or Inadvertent S/I Below P-11.
- D. BOTH Train “A” AND “B” ESF equipment starts.  
EP/1/A/5000/E-0, Reactor Trip or Safety Injection.

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**Question 39**

Given the following Unit 1 conditions:

**Initial:**

- The Unit is at 100% power.
- Lower Containment Ventilation Units (LCVUs) 1A, 1B, 1D are operating in LOW speed with MAX cooling.
- Upper Containment Ventilation Unit (UCVU) 1A is operating in NORM.

**Subsequent:**

- Containment humidity begins increasing.
- Containment temperature and pressure are slowly increasing.
- Containment radiation levels are normal.

In accordance with AP/1/A/5500/028, (Secondary Steam Leak), the required operation for LCVU 1C is to start it in \_\_\_\_\_ (1) \_\_\_\_\_ speed, and place it in \_\_\_\_\_ (2) \_\_\_\_\_ cooling.

- A. LOW  
MAX
- B. LOW  
NORM
- C. HIGH  
MAX
- D. HIGH  
NORM

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**Question 40**

Given the following Unit 1 conditions:

**Initial:**

- The Unit is at 100% power.
- The following Lower Containment Ventilation Units are in service at low speed:
  - 1A LCVU
  - 1B LCVU
  - 1C LCVU

**Subsequent:**

- 1C LCVU TRIPS for an unknown reason.
- In response, the operator manually starts 1D LCVU.
- 1D LCVU starts and immediately TRIPS on overcurrent.
- Lower Containment Average Temperature is 118°F and is steadily increasing.

In accordance with OP/1/A/6450/001 (Containment Ventilation Systems), Enclosure 4.11 (LCVU Additional Cooling):

- (1) How many LCVUs are required to be placed in HIGH speed?
  - (2) What is the reason for the associated maximum time restriction on operating with this configuration?
- A. (1) ONE  
(2) Potential fan bearing problems.
- B. (1) TWO  
(2) Potential fan bearing problems.
- C. (1) ONE  
(2) Elevated Containment Air Temperature requirements.
- D. (1) TWO  
(2) Elevated Containment Air Temperature requirements.



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**Question 41**

Given the following Unit 1 conditions:

- The Unit was initially at 100% power.
- Subsequently, a Loss of Coolant Accident occurred.

**Currently:**

- EP/1/A/5000/ES-1.3, Transfer to Cold Leg Recirculation is being implemented.
- Containment pressure is 4.6 psig and slowly increasing.
- Containment sump annunciators are as follows:
  - 1AD-20, B/2 (CONT. SUMP LEVEL > 2.5 FT) - LIT
  - 1AD-21, B/2 (CONT. SUMP LEVEL > 2.5 FT) - DARK
  - 1AD-20, B/3 (CONT. SUMP LEVEL > 3.3 FT) - DARK
  - 1AD-21, B/3 (CONT. SUMP LEVEL > 3.3 FT) - DARK

At this point, which ONE of the following describes whether the crew can align Containment Spray (NS) for recirculation, including the reason?

- A. NO, because containment sump level is too LOW.
- B. NO, because only ONE channel of containment sump level > 2.5 ft has alarmed.
- C. YES, because at least ONE channel of containment sump level > 2.5 ft. has alarmed.
- D. YES, because containment pressure is greater than 3.0 psig.

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**Question 42**

Which ONE of the following describes an interlock that is designed to prevent cross contamination of the FWST from the Containment Sump?

A. In order to OPEN:

NI-115A (NI Pump A Miniflow) or  
NI-144A (NI Pump B Miniflow)

These valves must be CLOSED:

NI-136B (ND Supply to NI Pump B)  
ND-28A (ND Supply to NV and NI Pump A)

B. In order to OPEN:

NS-18A (NS Pump A Sump Suction)

These valves must be as follows:

NS-20A (NS Pump A FWST Suction Block) must be CLOSED.  
NI-185A (Containment Sump Isolation) must be OPEN.

C. In order to OPEN:

FW-27A (ND Pump A Suction from FWST)

These valves must be CLOSED:

NS-18A (NS Pump A Suction from Containment Sump)  
ND-28A (ND Supply to NV and NI Pump A)  
NI-185A (Containment Sump Isolation)  
ND-43A (ND Pump A to Containment Spray Header)

D. In order to OPEN:

NS-43A (ND Pump A to Containment Spray Header)

At least ONE of these valves must be CLOSED:

ND-1B (ND Pump Suction from NC)  
ND-2A (ND Pump Suction from NC)

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**Question 43**

Unit 1 tripped from 100% power with the following subsequent conditions:

- “B” Reactor trip breaker remains CLOSED.
- EP/1/A/5000/ES-0.1 (Reactor Trip Response) in progress.
- Enclosure 2 (NC Temperature Control) is in effect.

- (1) Which steam dump controller is in control initially?
- (2) In accordance with ES-0.1, Enclosure 2, how will temperature control be accomplished to stabilize Tavg at 557°F?
- A. (1) load rejection controller  
(2) Use S/G PORVs to stabilize Tavg.
- B. (1) load rejection controller  
(2) Use steam dumps to stabilize Tavg.
- C. (1) The plant trip controller  
(2) Use steam dumps to stabilize Tavg.
- D. (1) The plant trip controller  
(2) Use S/G PORVs to stabilize Tavg.

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**Question 44**

In accordance with OP/1/A/6250/001, Condensate and Feedwater System, the crew is starting a Feedwater Pump. The operator is at Enclosure 4.3, (Feedwater Pump Startup), Step 2.2 which contains direction on oil warming.

- (1) Prior to exceeding 1500 rpm on the Feedwater Pump, the operator must ensure that CFPT lube oil temperature is at least \_\_\_\_\_.
  - (2) Based on the Limits and Precautions of OP/1/A/6250/001, the reason for this requirement is to \_\_\_\_\_.
- A. (1) 110°F  
(2) prevent bearing damage AND ensure proper hydraulic control operation
  - B. (1) 110°F  
(2) prevent bearing damage ONLY
  - C. (1) 60°F  
(2) prevent bearing damage AND ensure proper hydraulic control operation
  - D. (1) 60°F  
(2) prevent bearing damage ONLY

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**Question 45**

- (1) Which component, if INOPERABLE, requires entry into Tech. Spec. 3.7.3 (Main Feedwater Isolation Valves (MFIVs), Main Feedwater Control Valves (MFCVs), Associated Bypass Valves and Tempering Valves)?
- (2) Assuming this valve is OPEN, what are the modes of applicability for this LCO?
  - A. (1) S/G CA Nozzle Tempering Control Valve (1CF-100)  
(2) Mode 1, Mode 2, and Mode 3 ONLY
  - B. (1) S/G CA Nozzle Tempering Isolation Valve (1CA-185)  
(2) Mode 1, Mode 2, Mode 3, and Mode 4
  - C. (1) S/G CF Bypass to CA Nozzle Valves (1CA-149)  
(2) Mode 1, Mode 2, and Mode 3 ONLY
  - D. (1) S/G CF Bypass to CA Nozzle Valves (1CA-149)  
(2) Mode 1, Mode 2, Mode 3, and Mode 4

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**Question 46**

Given the following Unit 1 conditions:

- A reactor trip from 100% power has occurred.
- Bus 1ETA has locked out.
- The CAPT Pump started and immediately tripped on overspeed.

Which S/Gs are currently being fed?

- A. A and B S/Gs ONLY
- B. C and D S/Gs ONLY
- C. A and C S/Gs ONLY
- D. B and D S/Gs ONLY

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**Question 47**

Assume Unit conditions at 100% power.

How is the concern for potential feed line voiding and water hammer in the discharge piping of the CA pumps addressed?

If a \_\_\_\_\_ (1) \_\_\_\_\_ condition exists, an OAC alarm annunciates.

To mitigate this condition, the operators will \_\_\_\_\_ (2) \_\_\_\_\_ .

- A. (1) high pressure  
(2) run the CA pump to flush and reseal the CA pump discharge check valve
- B. (1) high temperature  
(2) run the CA pump to flush and reseal the CA pump discharge check valve
- C. (1) high temperature  
(2) operate 1CF-105 (S/G Tempering Flow Supply Throttle) to increase tempering flow
- D. (1) high pressure  
(2) operate 1CF-105 (S/G Tempering Flow Supply Throttle) to increase tempering flow

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**Question 48**

Given the following Unit 1 conditions:

- The Unit is at 100% power.
- Annunciator 1AD-11 C/2 Transformer 1A Forced Cooling Reduction is received.
- The annunciator has been lit for 5 minutes.
- Generator PCB 1A is currently closed.
- The NLO dispatched to respond to this alarm has not yet reported back.

Based on the above conditions:

- (1) How many cooling fan banks have been lost?
- (2) What is the NEXT automatic action to occur?

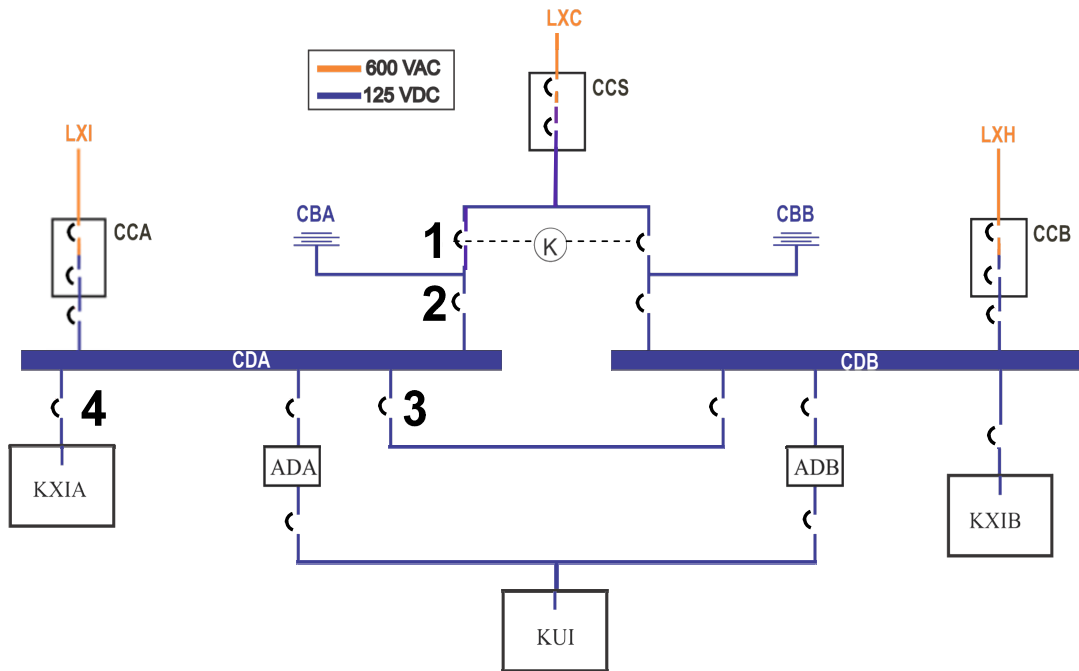
(Assume NO operator action.)

- A. (1) ONE  
(2) 1A Generator PCB trip
- B. (1) ONE  
(2) Unit runback
- C. (1) TWO  
(2) Unit runback
- D. (1) TWO  
(2) Zone A Lockout



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**Question 49**



Which ONE of the following describes which of the DC breakers (labeled 1, 2, 3, 4 in the drawing above) will cause an alarm to be received in the Control Room when the breakers OPEN?

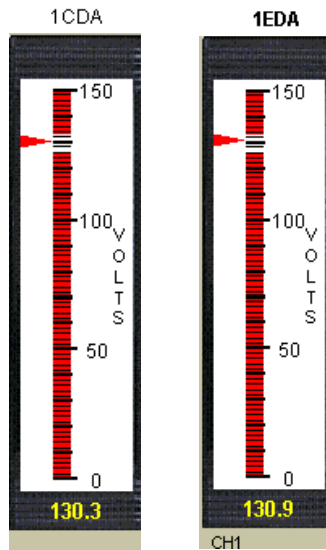
- A. Any one of the four breakers.
- B. Breakers 1 and 3 ONLY.
- C. Breakers 2 and 3 ONLY.
- D. Breakers 2 and 4 ONLY.

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**Question 50**

Given the following Unit 1 conditions:

- The Unit is initially at 100% power.
- A complete loss of offsite power occurs.
- Neither of the DGs will start.



- (1) Battery discharge rates will cause the above indicators (1CDA, 1EDA) to decrease at a steady rate over a period of approximately (1).
- (2) At the end of that time period, the above indicators will decrease (2) rapidly.

In accordance with the appropriate abnormal procedure, which ONE of the following completes the statements above? (Assume no operator action.)

- A. (1) Two hours  
(2) more
- B. (1) Two hours  
(2) less
- C. (1) Eight hours  
(2) more
- D. (1) Eight hours  
(2) less

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**Question 51**

Given the following Unit 1 conditions:

- A malfunction of the feeder breaker from 1ATC to 1ETA occurs and causes 1ETA to de-energize.
- Jacket Water temperature immediately begins increasing.
- 5 minutes after the D/G started, the High Jacket Water Temperature outlet trip setpoint is exceeded.

Which ONE of the following describes the status of the protective trip for the D/G on High Jacket Water Temperature?

- A. The D/G can ONLY be tripped manually throughout the event.
- B. The D/G automatically trips as soon as the trip setpoint is reached.
- C. The D/G automatically trips when the ENABLE NON-EMERG TRIP pushbutton ONLY is depressed.
- D. The D/G automatically trips when BOTH the Sequencer is reset AND the ENABLE NON-EMERG TRIP pushbutton is depressed.

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**Question 52**

Concerning the operation of 1EMF-46A (Component Cooling Water):

- (1) When a Trip 2 alarm is received, 1KC-122 (KC Surge Tank Vent) \_\_\_\_\_ automatically close.
- (2) When the associated KC train pumps are NOT running, the EMF loss of flow alarm \_\_\_\_\_ blocked from being received in the control room.
- A. (1) does  
(2) is
- B. (1) does  
(2) is NOT
- C. (1) does NOT  
(2) is
- D. (1) does NOT  
(2) is NOT

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**Question 53**

Given the following plant conditions:

**Initially:**

- Both Units are at 100% power.
- A flooding event begins to occur.
- The source of flooding is from a rupture on the main RL supply header to the KR heat exchangers in Unit 1 Service Building.

**Currently:**

- The operators have isolated RL to the KR heat exchangers to attempt to stop the flooding.

In accordance with AP/0/A/5500/030, (Plant Flooding):

To mitigate these conditions, the operators are required to \_\_\_\_\_ (1) \_\_\_\_\_ due to the effect of the RL to KR isolation on cooling for \_\_\_\_\_ (2) \_\_\_\_\_.

- A. (1) Trip BOTH reactors.  
(2) CM/CF pumps
- B. (1) Trip BOTH reactors.  
(2) C-Heater Drain Tank pumps
- C. (1) Perform a Rapid Downpower to less than 69%.  
(2) CM/CF pumps
- D. (1) Perform a Rapid Downpower to less than 69%.  
(2) C-Heater Drain Tank pumps

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**Question 54**

Given the following Unit 1 conditions:

- The Unit is shutdown for a refueling outage.
- WR Loop 1A NC Level is 83.4%.
- WR Loop 1C NC Level is 83.4%.
- 1A Train of ND is in service.
- ND suction temperature on the OAC is 103.2°F.
- 1A ND Hx outlet temperature is 90.1°F.
- 1A KC Hx outlet temperature is 87.0°F.

**Subsequently:**

- A short in the motor operator for 1RN-287A (KC 1A Hx Inlet Isol) results in the valve going full CLOSED.
- 1RN-287A cannot be reopened.

In response to the above failure,

(1) 1ND-26 (ND Hx 1A Outlet Ctrl) will require manual operation in the \_\_\_\_ (1) \_\_\_\_ direction.

(2) As a result of the above operation of 1ND-26, 1ND-27 (ND Hx 1A Bypass Ctrl) will \_\_\_\_\_ (2) \_\_\_\_\_ .

- A. (1) CLOSED  
(2) require manual operation in the CLOSED direction.
- B. (1) CLOSED  
(2) automatically modulate in the OPEN direction.
- C. (1) OPEN  
(2) require manual operation in the CLOSED direction.
- D. (1) OPEN  
(2) automatically modulate in the CLOSED direction

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**Question 55**

With Unit 1 at 100% power, which ONE of the following states the MAXIMUM possible number of Personnel Airlock seals per airlock that can FAIL, and still maintain containment integrity?

- A. ONE inner AND ONE outer door seal.
- B. ONE of the inner OR ONE of the outer door seals.
- C. BOTH of the outer AND ONE inner door seal.
- D. BOTH of the inner OR BOTH of the outer door seals.

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**Question 56**

Given the following Unit 2 conditions:

- The Unit is in Mode 6 with fuel loading in progress.
- A spike occurs on "A" Train BDMS (Boron Dilution Mitigation System).
- 2AD-2, E/2 "Train A Shutdown Margin Alarm" is LIT.
- The VCT OUTLET VALVE INTERLOCK switch is in "NORMAL."

(1) What is the FINAL alignment of the following components?

- 2NV-252A (NV Pumps Suct From FWST)
- 2NV-253B (NV Pumps Suct From FWST)

(2) Which of the following pumps receive a trip signal?

- 2A Reactor Makeup Water Pump
- 2B Reactor Makeup Water Pump

- A. 1) Only 2NV-252A OPENS  
2) Only 2A
- B. 1) Both 2NV-252A and 2NV-253B OPEN  
2) Only 2A
- C. 1) Only 2NV-252A OPENS  
2) Both 2A and 2B
- D. 1) Both 2NV-252A and 2NV-253B OPEN  
2) Both 2A and 2B



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**Question 57**

Given the following Unit 1 conditions:

- The Unit is at 100% power.
- The final feedwater temperature input to the thermal power best estimate (TPBE) was incorrectly calibrated to 7°F less than actual feedwater temperature.

- (1) **Indicated** TPBE power will be \_\_\_\_\_ than **actual** thermal power.
- (2) By using the calculated value of TPBE as described above, calibration of the NIs will result in setpoints that are \_\_\_\_\_ conservative.

Which ONE of the following completes the above statements?

- A. (1) LOWER  
(2) LESS
- B. (1) HIGHER  
(2) LESS
- C. (1) HIGHER  
(2) MORE
- D. (1) LOWER  
(2) MORE

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**Question 58**

Which ONE of the following identifies why an Isolation Amplifier is used in the Loop Tavg circuits?

- A. To prevent a failed RTD from resulting in a loss of Reactor Control.
- B. To prevent a failed RTD from producing a Reactor Trip signal.
- C. To ensure that a fault in the control circuit of the instrument does not affect its associated protection circuits.
- D. To ensure that a fault in the protection circuit of the instrument does not affect its associated control circuits.

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**Question 59**

Given the following Unit 1 conditions:

- A LOCA occurred 24 hours ago.
- The 1A H2 Recombiner was placed in service per OP/1/A/6450/010 (Containment Hydrogen Control Systems).
- When the Recombiner was first placed in service containment parameters were:
  - Pressure: 4.8 psig
  - H2 concentration: 3.2%

**Current containment conditions (24 hours later):**

Pressure: 2.7 psig  
H2 concentration: 3.6%

- (1) Based on the conditions above when the recombiner was INITIALLY placed in service, the Power Setting was     (1)     .
- (2) Based on the current containment conditions, the Power Setting will NOW be adjusted to     (2)     .

**Reference Provided**

- A. (1) 60.0 KW  
    (2) 57.6 KW
- B. (1) 60.0 KW  
    (2) 61.6 KW
- C. (1) 54.6 KW  
    (2) 57.6 KW
- D. (1) 54.6 KW  
    (2) 61.6 KW

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**Question 60**

Given the following Unit 1 conditions:

**Initial:**

- For a refueling outage, the Unit was shutdown on September 2.

**Current:**

- The Unit is at 100% power.
- 1A KF Pump is in service.
- Due to an emergent issue, 1B KF Pump has been tagged out and is currently disassembled.
- The date is September 29.
- Spent Fuel Pool level is 39.9 ft.
- Spent Fuel Pool temperature is 113.6°F.

**Subsequent:**

- 1A KF Pump trips for an unknown reason.
  - The crew enters AP/1/A/5500/041, (Loss of Spent Fuel Pool Cooling or Level).
- (1) In approximately \_\_\_\_\_(1)\_\_\_\_\_ hours, the indication on 1EMF-15 (Spent Fuel Bldg Refuel Bldg) will FIRST begin to rise significantly.
- (2) To restore Spent Fuel Pool cooling and exit the AP, one KF pump must be restored and the Spent Fuel Pool temperature must be reduced to NO GREATER THAN \_\_\_\_\_(2)\_\_\_\_\_ .

In accordance with AP/041, which ONE of the following completes the above statements?

**Reference Provided**

- A. (1) 17  
(2) 125°F
- B. (1) 37  
(2) 125°F
- C. (1) 17  
(2) 140°F
- D. (1) 37  
(2) 140°F

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**Question 61**

With Unit 1 in Mode 6, a fuel handling accident involving fuel damage occurs and results in an alarm condition on 1EMF-17, Reactor Building Refueling Bridge.

- (1) Which EMF is used to provide additional radiation monitoring for the above conditions, in accordance with AP/025, (Damaged Spent Fuel)?
  - (2) If the radiation monitor reaches its Trip 2 setpoint, the Containment Evacuation Alarm \_\_\_\_\_ .
- A. (1) 1EMF-53A/B, Containment Train A/B  
(2) will automatically actuate
  - B. (1) 1EMF-53A/B, Containment Train A/B  
(2) must be manually actuated
  - C. (1) 1EMF-38, Containment Particulate Monitor  
(2) will automatically actuate
  - D. (1) 1EMF-38, Containment Particulate Monitor  
(2) must be manually actuated

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**Question 62**

Given the following conditions:

- A planned release of the contents of Waste Monitor Tank (WMT) B was initiated per OP/0/B/6500/113, (Operations Liquid Waste Release).
- (1) **IF** 1RAD-1, F/4, EMF-49 LIQUID WASTE DISCH LOSS OF FLOW, alarms and can NOT be cleared, the release is terminated \_\_\_\_\_ .
- (2) **IF** 1AD-12, F/3, RL DISCHARGE LOW FLOW alarms, the release is terminated \_\_\_\_\_ .

Considering each of the above valid alarms separately, which ONE of the following completes the above statements?

- A. (1) automatically  
(2) automatically
- B. (1) automatically  
(2) manually
- C. (1) manually  
(2) automatically
- D. (1) manually  
(2) manually

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**Question 63**

Given the following plant conditions:

- A failure of an isolation valve in the WG system has resulted in an unintentional release of radioactive gas into the Auxiliary Building.
- The VA system has automatically aligned to the following configuration:

VA System Component	Status
Unit 1 <u>and</u> 2 Filtered Exhaust Fans	ON
Unit 1 Supply Fans	OFF
Unit 2 Supply Fans	ON
Unit 1 Unfiltered Exhaust Fans	OFF
Unit 2 Unfiltered Exhaust Fans	ON

- The following Area Radiation Monitor annunciator is in alarm:
  - 1RAD-3, B/6, (1EMF6 543 MM, 61-62 WG/Resin Area)

Which ONE of the following describes the **MINIMUM** number of radiation monitors that, if in the Trip 2 condition, will account for the above conditions?

- A. 1EMF-6 (Waste Gas and Spent Resin Area)  
1EMF-35 (Unit Vent Particulate Monitor)
- B. 1EMF-6 (Waste Gas and Spent Resin Area)  
0EMF-41 (Auxiliary Building Ventilation Monitor)
- C. 1EMF-6 (Waste Gas and Spent Resin Area)  
1EMF-35 (Unit Vent Particulate Monitor)  
0EMF-41 (Auxiliary Building Ventilation Monitor)
- D. 0EMF-41 (Auxiliary Building Ventilation Monitor)  
1EMF-35 (Unit Vent Particulate Monitor)  
0EMF-50L (Waste Gas Discharge - Low Range)

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**Question 64**

If 1B and 2B Nuclear Service Water System (RN) pumps are running (with normal suction and discharge alignment) and a blackout occurs on 2ETA, which ONE of the following will occur?

- A. BOTH Train A RN pumps start.
- B. ONLY the Unit 2 RN Pump A starts.
- C. ONLY the Unit 1 RN Pump A starts.
- D. NEITHER Train A RN Pumps start.



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**Question 65**

Given the following Unit 1 conditions:

**Initial:**

- The Unit is at 100% power.
- VI Compressors D and E are running and loaded.
- VS Compressor A is in BASE mode and running.
- VS Compressor B is in STANDBY mode.
- VS is being supplied from VI.

**Subsequent:**

- 1VI-500 (VI Supply to VS) is closed.
- VI pressure is no longer decreasing.
- VS Compressor A TRIPS on high discharge air temperature.
- 0VIP5260 on 1MC13 indicates that VS (Station Air) header pressure is 72 psig and continuing to DECREASE.
- VS Compressor B is NOT running.

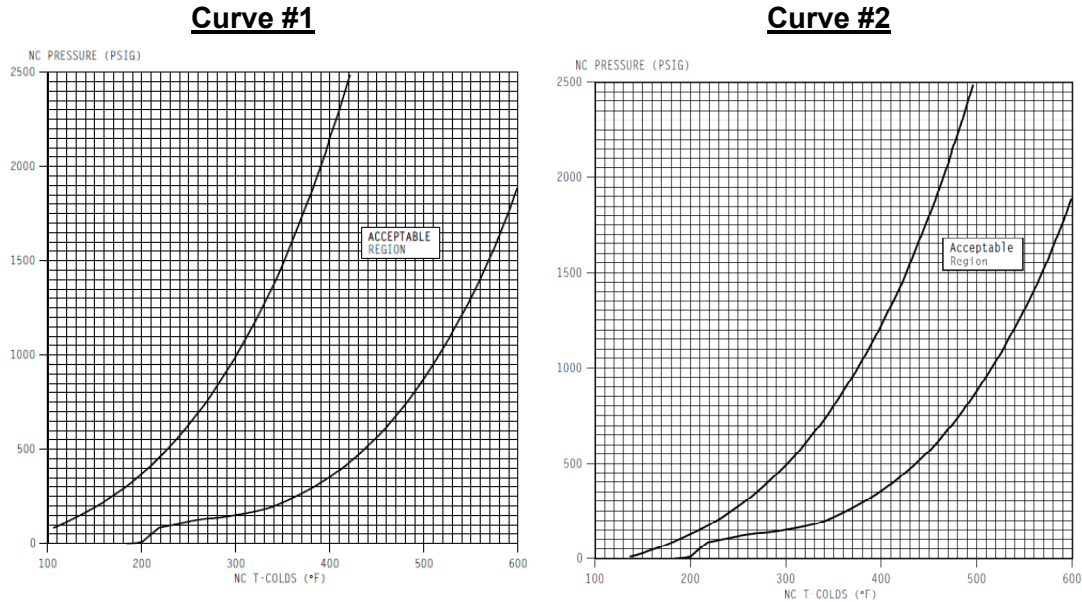
(1) What provides guidance for the required action?

(2) What is the required action?

- A. (1) OAC Alarm Response  
(2) Dispatch an operator to manually start VS Compressor B.
- B. (1) OAC Alarm Response  
(2) Manually start VI Compressor F.
- C. (1) AP/022, Loss of Instrument Air  
(2) Manually start VI Compressor F.
- D. (1) AP/022, Loss of Instrument Air  
(2) Dispatch an operator to manually start VS Compressor B.

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**Question 66**



The above curves are from:

- EP/1/A/5000/FR-P.1, Response to Imminent Pressurized Thermal Shock Condition
- EP/1/A/5000/FR-P.2, Response to Anticipated Pressurized Thermal Shock Condition

- (1) The curve for **FR-P.1** is \_\_\_\_\_ (1) \_\_\_\_\_.
- (2) When the crew begins a controlled cooldown the maximum allowed cooldown rate will be \_\_\_\_\_ (2) \_\_\_\_\_ restrictive for **FR-P.1** than for **FR-P.2**.
- A. (1) Curve #1  
(2) more
- B. (1) Curve #1  
(2) less
- C. (1) Curve #2  
(2) more
- D. (1) Curve #2  
(2) less

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**Question 67**

Note the table below from SLC 16.5-3, Chemistry (excerpt).

PARAMETER	STEADY STATE LIMIT	TRANSIENT LIMIT
Dissolved Oxygen	$\leq 0.10$ ppm	$\leq 1.00$ ppm
Chloride	$\leq 0.15$ ppm	$\leq 1.50$ ppm
Fluoride	$\leq 0.15$ ppm	$\leq 1.50$ ppm

- (1) In accordance with SLC 16.5-3, Chemistry, Fluoride is a \_\_\_\_\_ (1) \_\_\_\_\_ chemistry parameter.
- (2) In accordance with the applicable abnormal operating procedure, if dissolved oxygen were at a value in Action Level 3, a shutdown to Mode 3 would be required in \_\_\_\_\_ (2) \_\_\_\_\_ hours.

Which ONE of the following completes the statements above?

- A. (1) Primary  
(2) 3
- B. (1) Primary  
(2) 24
- C. (1) Secondary  
(2) 3
- D. (1) Secondary  
(2) 24

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**Question 68**

During a Unit 1 startup, the OATC is preparing to perform a dilution.

The following individuals are present in the Unit 1 control room:

- An individual enrolled in Hot License Prep class on shift for OJT.
- An SRO dedicated to the start-up.
- Shift Technical Advisor (SRO licensed)
- Control Room Supervisor

In accordance with SOMP 01-02, (Reactivity Management):

Of the individuals currently in the control room, who is authorized to perform the Peer Check for the reactivity manipulation?

- A. ONLY the HLP student or the Control Room Supervisor.
- B. ONLY the HLP student or the SRO dedicated to the start-up.
- C. ONLY the SRO dedicated to the start-up or Shift Technical Advisor.
- D. ONLY the Control Room Supervisor (CRS) or Shift Technical Advisor.

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**Question 69**

During an outage, a planned maintenance activity will result in a YELLOW Defense in Depth (DID) sheet configuration.

In accordance with NSD 403 (Shutdown Risk Management),

- 1) Defense in Depth (DID) sheets are first initiated once \_\_\_\_\_ (1) \_\_\_\_\_ is reached on a shutdown.
  - 2) A RISK MANAGEMENT PLAN is \_\_\_\_\_ (2) \_\_\_\_\_ for a YELLOW risk condition.
- A. (1) Mode 3  
(2) optional
- B. (1) Mode 3  
(2) required
- C. (1) Mode 4  
(2) optional
- D. (1) Mode 4  
(2) required

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**Question 70**

Given the following Unit 1 conditions:

- Plant conditions have been stable for the past 15 minutes.
- Loop 1A Tavg is 572.0 °F.
- Loop 1B Tavg is 570.0 °F.
- Loop 1C Tavg is 570.0 °F.
- Loop 1D Tavg is 568.0 °F.
- Tref is 568.0°F.
- The CRD Bank Select Switch is in MANUAL.

If the CRD Bank Select Switch is placed in AUTO, the control rods will initially ...

- A. NOT step.
- B. Step IN at 8 steps/minute.
- C. Step IN at 40 steps/minute.
- D. Step IN at 54 steps/minute.

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**Question 71**

Following a planned waste gas release, in accordance with

- OP/0/A/6500/080, (EMF RP86A Output Modules)
- OP/0/A/6500/019, (Operations Waste Gas Release)

What guidance is used to calculate and enter the new setpoints for EMF 50 (Waste Gas Disch Hi Rad)?

(1) **Trip 2** is set to     (1)     the EMF reading after the purge.

(2) **Trip 1** is set for     (2)     of the Trip 2 setpoint.

- A. (1) 2 times  
    (2) 70%
- B. (1) 2 times  
    (2) 80%
- C. (1) 3 times  
    (2) 70%
- D. (1) 3 times  
    (2) 80%

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**Question 72**

Given the following Unit 1 conditions:

- The unit has experienced several fuel pin failures.
- You have been directed to tag out the 1B NI pump.
- The 1B NI pump room general area is 400 mREM/hr.
- To reach the 1B NI pump room you must transit through a 6 REM/hr high radiation area for 2 minutes and return via the same route.
- Your current accumulated annual dose is 990 mREM.
- An RWP has been written for this job which has your Electronic Dosimeter (ED) alarm set for your EXCLUDE exposure limit.

Based on the conditions above, what is your MAXIMUM allowable stay-time in the 1B NI pump room for hanging the tag out to prevent your ED from alarming before you exit the RCA?

- A. 30 minutes
- B. 1 hour
- C. 1.5 hours
- D. 2 hours



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**Question 73**

During conditions involving the implementation of Emergency Procedures, and in accordance with OMP 1-7, (Emergency/Abnormal Procedure Implementation Guidelines), control board manipulations may be performed by an SRO other than the \_\_\_\_\_ (1) \_\_\_\_\_, ONLY if authorized by the \_\_\_\_\_ (2) \_\_\_\_\_.

Which ONE of the following completes the above statement?

- A. (1) Unit Supervisor  
(2) Control Room Supervisor
- B. (1) Unit Supervisor  
(2) Operations Shift Manager
- C. (1) Control Room Supervisor  
(2) Operations Shift Manager
- D. (1) Operations Shift Manager  
(2) Control Room Supervisor

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**Question 74**

With the reactor initially at 100% power, which ONE of the following would result in implementation of E-0, (Reactor Trip or Safety Injection)?

- A. One (1) NR level for SG 1A indicates 84%.
- B. Main turbine bearing #11 vibration increases to 8 mils.
- C. Main turbine lube oil cooler outlet temperature is at 140°F and slowly increasing.
- D. Main condenser vacuum decreases to 21.0" Hg.

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**Question 75**

During a Unit 1 event, the following conditions for the listed times exist:

	1000	1030	1050	1110
Level in S/G (%)				
1A	12	15	30	32
1B	13	16	31	33
1C	15	18	32	32
1D	6	10	30	30
Pressure in S/G (psig)				
1A	1205	1150	1100	1085
1B	1210	1145	1105	1090
1C	1215	1100	1105	1090
1D	1170	1110	1108	1105
Containment Pressure (psig)	3.1	3.3	3.1	2.8

Considering only the given conditions, which ONE of the following is the earliest TIME at which the Critical Safety Function for "Heat Sink" is SAT?

- A. 1000
- B. 1030
- C. 1050
- D. 1110

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**Question 76**

Given the following Unit 1 conditions:

**Initial:**

- The Unit is in Mode 3.
- NC System operational leakage is:
  - - 0.1 gpm unidentified
    - 1.83 gpm identified
- NC Pump #1 Seal Leakoff flows are:
  - 1A NCP is 4.0 gpm and slowly increasing.
  - 1B NCP is 2.9 gpm and stable.
  - 1C NCP is 3.0 gpm and stable.
  - 1D NCP is 3.1 gpm and stable.

**Subsequently:**

- The following valid alarm then annunciates:
  - 1AD-7, C/1, NCP #1 Seal Leakoff Hi Flow

If 1A NCP #1 Seal Leakoff flow is AT the alarm setpoint, which ONE of the following describes:

- (1) What equipment is declared non-functional?
  - (2) Who is the SRO required to notify within 15 minutes?
- A. (1) SSF  
(2) Security
  - B. (1) Standby Makeup Pump  
(2) Engineering
  - C. (1) Standby Makeup Pump  
(2) Security
  - D. (1) SSF  
(2) Engineering

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**Question 77**

Given the following Unit 1 conditions:

The Unit 1 is initially at 100% power when the 1D S/G steam line breaks inside the doghouse.

- The required Immediate Actions of E-0, (Reactor Trip or Safety Injection) have just been completed.
- Total CA flow = 890 gpm.
- 1EMF-33 (Condenser Air Ejector Exhaust) Trip 2 actuated.
- 1EMF-71 (S/G A Leakage) Trip 2 actuated.
- 1EMF-74 (S/G D Leakage) Trip 2 actuated.
- S/G indications are:

<b>S/G</b>	<b>N/R Level</b>	<b>Pressure</b>
1A	23% and increasing	750 psig and increasing
1B	15% and decreasing	720 psig and decreasing
1C	18% and decreasing	700 psig and decreasing
1D	0%	200 psig and decreasing

Which ONE of the following procedures or enclosures contains the steps for throttling CA flow to the S/G that **FIRST** requires CA flow throttling?

- A. E-0, (Reactor Trip or Safety Injection), Enclosure 1 (Foldout Page)
- B. E-0 (Reactor Trip or Safety Injection), Enclosure 4 (NC Temperature Control)
- C. E-3 (Steam Generator Tube Rupture)
- D. E-2 (Faulted Steam Generator Isolation)

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**Question 78**

Which ONE of the following describes the **EARLIEST** NRC Notification Requirements for the loss of ONE CF Pump, as compared to the loss of BOTH CF Pumps? (Assume initial conditions at 80% power.)

- A. For the loss of BOTH CF Pumps, the notification requirement is within 8 hours.
- B. For the loss of EITHER ONE or BOTH CF Pumps, the notification requirement is within 8 hours.
- C. For the loss of ONLY ONE CF Pump, the notification requirement is within 24 hours.
- D. For the loss of BOTH CF Pumps, the notification requirement is within 4 hours.

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**Question 79**

Given the following Unit 1 conditions:

**Initial:**

- With the Unit initially at 100% power, a complete loss of switchyard occurred.
- Both D/Gs FAILED to start, and will not start manually.
- ECA-0.0, (Loss of All AC Power) has been implemented.
- NO NC Pumps are available.

**Current:**

- NC subcooling is 5°F.
- PZR level is 19%.
- 1NI-9A (NV Pmp C/L Inj Isol) is CLOSED.
- 1NI-10B (NV Pmp C/L Inj Isol) is CLOSED.
- In accordance with ECA-0.0 the SRO is evaluating the availability of the following power sources:
  - Offsite Power from Unit 1
  - Offsite Power from Unit 2
  - D/G 1A
  - D/G 1B

(1) To establish plant conditions and restore equipment needed for natural circulation the SRO will remain in ECA-0.0 until power is available from at least       (1)       of the above power sources.

(2) Once the required power sources are available the SRO will then GO TO       (2)       .

- A. (1) TWO  
(2) ECA-0.1, (Loss of All AC Power Recovery Without S/I Required).
- B. (1) TWO  
(2) ES-0.2, (Natural Circulation Cooldown).
- C. (1) ONE  
(2) ECA-0.1, (Loss of All AC Power Recovery Without S/I Required).
- D. (1) ONE  
(2) ES-0.2, (Natural Circulation Cooldown).

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**Question 80**

Given the following conditions on Unit 1:

- The unit was at 100% power when a total loss of onsite and offsite power occurred.
- (1) Which procedure contains the instructions for the voltage value on essential DC busses (EDA, EDB, EDC, and EDD) for when the essential batteries (EBA, EBB, EBC, EBD) are required to be removed from service?
- (2) After power is restored and the battery chargers are placed in service, in accordance with Tech Spec 3.8.4 (DC Sources – Operating), what is the MINIMUM voltage required for the essential batteries to be OPERABLE?
- A. (1) AP/007, (Loss of Normal Power)  
(2) 125 volts
- B. (1) AP/29, (Loss of Vital or Aux Control Power)  
(2) 125 volts
- C. (1) AP/007, (Loss of Normal Power)  
(2) 110 volts
- D. (1) AP/29, (Loss of Vital or Aux Control Power)  
(2) 110 volts



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**Question 81**

Given the following Unit 1 conditions:

**Initial:**

- The Unit is at 100% power.
- 1B Diesel Generator (D/G) is running at 5750 KW for a periodic test.
- 1A ND pump is tagged out.
- Then, a LOCA initiates concurrent with a Loss of Offsite Power.

**One minute later:**

- 1B NV Pump has the following indications:
    - NO running amps are indicated.
    - Both the "ON" and "OFF" light on the E30 pushbutton are DARK.
  - 1A NI Pump has the following indications:
    - No running amps are indicated.
    - Both the "ON" and "OFF" light on the E30 pushbutton are DARK.
- (1) There \_\_\_\_\_ (1) \_\_\_\_\_ enough ECCS pumps operating to meet the LOCA analysis assumptions described in Technical Specification 3.5.2 (ECCS - Operating) BASES.
- (2) In accordance with E-0, (Reactor Trip or Safety Injection) what train(s) of ECCS and D/G load sequencers must be RESET?
- A. (1) ARE  
(2) Both "A" and "B" trains must be RESET.
- B. (1) ARE  
(2) Only "B" train must be RESET.
- C. (1) ARE NOT  
(2) Both "A" and "B" trains must be RESET.
- D. (1) ARE NOT  
(2) Only "B" train must be RESET.

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**Question 82**

Given the following Unit 1 conditions:

- Power level was initially at 15%.
- Intermediate Range NIs are NOT blocked.
- Rod M-4 in Control Bank D begins to continuously withdraw.
- Reactor power reached 31% just prior to a successful manual trip from the Control Room.

**Reference Provided**

What is the Emergency Classification of this event?

- A. Unusual Event
- B. Alert
- C. Site Area Emergency
- D. General Emergency

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**Question 83**

Given the following Unit 1 conditions:

- With the Unit in Mode 2, a Unit startup is in progress in accordance with OP/1/A/6100/001, (Controlling Procedure for Unit Startup).
- A Pressurizer Level malfunction has occurred during the startup.
- During the restoration of Pressurizer level, the operators are attempting to maintain an outflow on the Pressurizer in accordance with the Limits and Precautions of OP/1/A/6100/001.

- (1) What is the basis for the above Limit and Precaution to maintain an outflow on the Pressurizer?
- (2) If the operators are unable to maintain an outflow on the Pressurizer, and SLC 16.5-4, (Pressurizer), action and completion time cannot be met for the resulting condition, within 6 hours the Unit must be placed in \_\_\_\_\_.
- A. (1) boron equalization  
(2) MODE 3
- B. (1) boron equalization  
(2) MODE 4
- C. (1) thermal stratification  
(2) MODE 3
- D. (1) thermal stratification  
(2) MODE 4

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**Question 84**

Given the following plant conditions:

- Due to a fire event, AP/17 (Loss of Control Room) is in progress for both Units.

Which ONE of the following describes the required operation, PRIOR to Control Room evacuation, of the listed components, AND the BASIS for the requirement?

- A. All CRD vent fans RUNNING.  
No control of these fans is available from the ASP.
- B. All CRD vent fans RUNNING.  
Cooling of the reactor vessel head during natural circulation.
- C. NV-10A (Letdn Orif B Oflit Cont Isol) CLOSED.  
To ensure NC inventory is conserved in case the event also involves a LOCA.
- D. NV-10A (Letdn Orif B Oflit Cont Isol) OPEN.  
To ensure inventory control is available when transferring controls to the SSF.

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**Question 85**

Given the following Unit 1 conditions:

- The Unit is heating up following a short forced outage following a reactor trip 3 days ago.
- NC pressure is 1500 psig.
- NC temperature is 385°F.
- Due to High NC Activity, Radiation Protection discovered that dose rates are too high to allow work in an area near the letdown line.
- To reduce dose rates, smaller micron NC filters were installed and letdown flow was increased from 75 gpm to 95 gpm to aid in cleanup.

- (1) Which ONE of the parameters evaluated per Technical Specification 3.4.16 has a lower limit based on increases in letdown flow to greater than 80 gpm?
- (2) Based on current plant status, is Technical Specification 3.4.16 (RCS Specific Activity) applicable?
- A. (1) Dose Equivalent I-131  
(2) Yes
- B. (1) Gross specific activity  
(2) Yes
- C. (1) Dose Equivalent I-131  
(2) No
- D. (1) Gross specific activity  
(2) No

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**Question 86**

Given the following Unit 1 conditions:

- A large break LOCA occurred.
- The ECCS suction has been swapped to the Cold Leg Recirculation alignment.
- NS suction has been swapped to the containment sump.

**Current Conditions:**

- 1AD-9, E/8 (FWST Lo-Lo Level) is LIT.
- 1AD-20 B/3 (Cont. Sump Level > 3.3 ft.) is LIT.
- 1AD-21 B/3 (Cont. Sump Level > 3.3 ft.) is LIT.
- Containment sump level is at 19.1 ft.
- 1AD-13 B/4 (Containment Hi-Hi Press) is LIT.
- CETs are 560°F.
- RVLIS level is 57% and slowly decreasing.
- PZR Level indicates 0%.

Which ONE of the following describes:

- (1) The procedure for implementation which contains the required actions?
  - (2) What is contained in this procedure that will aid the crew in the operation of certain valves inside containment?
- A. (1) FR-C.2 (Response to Degraded Core Cooling)  
(2) Instructions on ensuring power is available to valves needed for mitigation.
- B. (1) FR-C.2 (Response to Degraded Core Cooling)  
(2) Use the OAC "Valves Subject to Submergence Report" to determine last known valve positions.
- C. (1) FR-Z.2 (Response to Containment Flooding)  
(2) Instructions on ensuring power is available to valves needed for mitigation.
- D. (1) FR-Z.2 (Response to Containment Flooding)  
(2) Use the OAC "Valves Subject to Submergence Report" to determine last known valve positions.

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**Question 87**

In accordance with Tech. Spec. 3.3.2 BASES (ESFAS Instrumentation):

- (1) What is the BASIS for the following interlock: Reactor Trip P-4?
- (2) In accordance with Tech Spec 3.3.2 BASES, the functions of the P-4 interlock (2) required in order to meet the unit licensing basis safety analysis acceptance criteria.
- A. (1) To avert a continued cooldown upon a reactor trip.  
(2) are not
- B. (1) To avert a continued cooldown upon a reactor trip.  
(2) are
- C. (1) To permit a normal Unit cooldown and depressurization without actuation of Safety Injection or Main Steam Isolation.  
(2) are
- D. (1) To permit a normal Unit cooldown and depressurization without actuation of Safety Injection or Main Steam Isolation.  
(2) are not

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**Question 88**

Given the following Unit 1 conditions:

- The Unit is initially at 100% power.
- The 1A CFPT trips for an unknown reason.
- NO other component malfunctions have occurred.

- (1) The appropriate procedure for mitigation of the above condition is \_\_\_\_\_.
- (2) A step in the procedure requires the operators to ensure that the C-heater drain pumps are \_\_\_\_\_ (2) \_\_\_\_\_, in order to protect the hotwell pumps and condensate booster pumps.
- A. (1) AP/1/A/5500/006, (Loss of S/G Feedwater), Case I - Loss of CF Supply to S/Gs  
(2) ON
- B. (1) AP/1/A/5500/003, (Load Rejection), Case I - Switchyard Available  
(2) ON
- C. (1) AP/1/A/5500/006, (Loss of S/G Feedwater), Case I - Loss of CF Supply to S/Gs  
(2) OFF
- D. (1) AP/1/A/5500/003, (Load Rejection), Case I - Switchyard Available  
(2) OFF



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**Question 89**

Given the following Unit 1 conditions:

- The Unit is at 12% power and preparing to roll the main turbine.
- An OAC alarm for the parameter associated with 1CA-37 (CA Pmp #1 Disch to S/G 1D Check) is received.
- In accordance with the OAC alarm response, the CRS refers to OP/1/A/6250/002 (Auxiliary Feedwater System).

ONE of the required actions of OP/1/A/6250/002 for this condition is to position the following controller to 0%:

1CA-36 (CA Pump #1 Flow to S/G 1D)

- (1) Does the above action affect the operability of the CA Pump?
  - (2) The concern that is addressed by the required actions of the above OAC alarm response is to prevent gas formation \_\_\_\_\_ (2) \_\_\_\_\_ of the CA pump discharge check valve.
- A. (1) NO  
(2) downstream
- B. (1) YES  
(2) upstream
- C. (1) NO  
(2) upstream
- D. (1) YES  
(2) downstream

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**Question 90**

Given the following Unit 1 conditions:

- ES-1.2, (Post LOCA Cooldown and Depressurization) is being implemented.
- VI system pressure is 70 psig and decreasing.
- The crew is at step 6 of ES-1.2 for establishing VI to containment.
- The SRO then refers to AP/0/A/5500/022, (Loss of Instrument Air).

(1) In accordance with AP/0/A/5500/022, the crew is directed to attempt restoration of VI system pressure by **FIRST** \_\_\_\_\_ (1) \_\_\_\_\_.

(2) A subsequent step in ES-1.2 (step 22) will determine if the actions of AP/022 were successful by verifying that VI pressure is adequate for operation of \_\_\_\_\_ (2) \_\_\_\_\_.

- A. (1) starting the Backup VI Compressor  
(2) the PZR PORVs
- B. (1) starting the Backup VI Compressor  
(2) 1NV-294 (NV Pmps A&B Disch Flow Ctrl)
- C. (1) operating the VS Compressors and open 1VS-78 to supply VI  
(2) the PZR PORVs
- D. (1) operating the VS Compressors and open 1VS-78 to supply VI  
(2) 1NV-294 (NV Pmps A&B Disch Flow Ctrl)

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**Question 91**

Given the following Unit 1 conditions:

- The Unit is at 65% power.
- During annunciator testing, Annunciator 1AD-2, B/9 (Control Rod Bank Lo-Lo Limit) FAILED to illuminate.
- IAE has reported that a failed annunciator card must be replaced.
- The part will not be available until next week.

In accordance with Operations Management Procedure 2-31 (Control Room Instrumentation Status), which ONE of the following is required?

- A. The shift work manager directs Reactor Engineering to initiate a temporary modification to change the Control Rod Bank Lo Limit (1AD-2, A/9) annunciator setpoint to the Control Rod Bank Lo-Lo rod insertion limit.
- B. The unit supervisor initiates a control panel information tag for 1AD-2, B/9.
- C. The operations shift manager ensures that alternate indications are monitored to duplicate the function of the failed annunciator.
- D. The reactor operator enters the requirement to verify Rod Insertion Limits manually during transients in the shift turnover log.

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**Question 92**

Given the following Unit 1 conditions:

- A small break LOCA is in progress.
- FR-C.1, (Response to Inadequate Core Cooling) is in progress.
- BOTH NC Pumps in the TWO available loops are running.
- The SRO is at Step 26 in FR-C.1 for assessing CET indications.

- (1) The MINIMUM temperature at which core damage will occur is     (1)     .
- (2) If the RNO column of Step 26 for CET temperatures INCREASING applies, what is required?
- A. (1) 700°F  
(2) Continue attempts in FR-C.1 to restore core cooling.
- B. (1) 700°F  
(2) GO TO SACRG1, (Severe Accident Control Room Guideline Initial Response).
- C. (1) 1200°F  
(2) Notify Engineering to assess core damage in accordance with RP/015, (Core Damage Assessment).
- D. (1) 1200°F  
(2) GO TO SACRG1, (Severe Accident Control Room Guideline Initial Response).

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**Question 93**

In accordance with the BASIS for Selected Licensee Commitment (SLC) 16.9-20 (Refueling Operations - Crane Travel - Spent Fuel Storage Pool Building):

- (1) The MAXIMUM load limit for loads over the Spent Fuel Pool is based on the weight of \_\_\_\_\_ (1) \_\_\_\_\_ .
- (2) ONE of the BASES for this limitation is to ensure that if a heavy load is dropped, that \_\_\_\_\_ .
- A. (1) One fuel and control rod assembly ONLY.  
(2) any distortion of fuel in the storage racks will not result in a critical array.
- B. (1) One fuel and control rod assembly ONLY.  
(2) the activity release will be limited to that contained in a MAXIMUM of 3 fuel assemblies.
- C. (1) One fuel and control rod assembly AND associated fuel handling tool.  
(2) any distortion of fuel in the storage racks will not result in a critical array.
- D. (1) One fuel and control rod assembly AND associated fuel handling tool.  
(2) the activity release will be limited to that contained in a MAXIMUM of 3 fuel assemblies.

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**Question 94**

Given the following Unit 1 conditions:

- The Unit is at 100% power.
- 1EMF-33 (Condenser Air Ejector Exhaust) is in Trip 2 alarm.
- 1EMF-71 (N-16 Leakage) is in Trip 2 alarm.
- Pressurizer level has been stabilized in accordance with AP/1/A/5500/010, (Reactor Coolant Leak), Case I (Steam Generator Tube Leak).
- Letdown flow is 45 gpm.
- Charging flow is 78 gpm.

The **MAXIMUM** time that AP/10 allows for the unit to reach MODE 3 for these conditions is \_\_\_\_\_ (1) \_\_\_\_\_.

Which ONE of the following completes the statement above?

- A. 2 hours
- B. 3 hours
- C. 4 hours
- D. 6 hours

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**Question 95**

Unit 1 is shutdown in Mode 6. Given the following events and conditions:

- Containment airlock doors are all open.
- A full shift of qualified maintenance personnel are inside containment.
- The Refueling SRO is in the Control Room.
- The Fuel Handling Maintenance Supervisor is inside containment.
- Refueling has been completed and the Maintenance Supervisor requests permission to begin control rod latching.

What additional MINIMUM requirement(s) must be met to proceed with latching control rods under the direction of the Fuel Handling Maintenance Supervisor?

- A. The Refueling SRO must be present in the Reactor Building.
- B. The Refueling SRO must be present in containment AND containment closure capability must be maintained.
- C. The Fuel Handling Maintenance Supervisor must establish communications with the Refueling SRO in the Control Room ONLY.
- D. The Fuel Handling Maintenance Supervisor must establish communications with the Refueling SRO in the Control Room AND containment closure capability must be maintained.

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**Question 96**

During the approach to criticality in accordance with PT/0/A/4150/019, (1/M Approach to Criticality), rod status is as follows:

- All shutdown banks are fully withdrawn.
- Control Bank A are fully withdrawn.
- Control Bank B is approaching fully withdrawn.
- SR count rate has doubled once.

**Subsequent:**

- During a subsequent rod withdrawal a single rod in Control Bank B drops fully into the core.
- (1) Which procedure will be used that contains the specific guidance for how the rods are to be operated?
- (2) The required action is to insert \_\_\_\_\_ (2) \_\_\_\_\_ .
- A. (1) AP/1/A/5500/014, (Control Rod Misalignment), Case II, (Dropped Control Rod)  
(2) all control banks ONLY
- B. (1) AP/1/A/5500/014, (Control Rod Misalignment), Case II, (Dropped Control Rod)  
(2) all control banks AND all shutdown banks
- C. (1) PT/0/A/4150/019, (1/M Approach to Criticality)  
(2) all control banks ONLY
- D. (1) PT/0/A/4150/019, (1/M Approach to Criticality)  
(2) all control banks AND all shutdown banks



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**Question 97**

Which ONE of the following changes requires a 10CFR50.59 review?

- A. A change to the Site Physical Security Plan that reduces the shift staffing requirements for security guards.
- B. A revision to the Site Emergency Plan that changes the designated assembly areas for accountability.
- C. A system modification that adds a backup Nitrogen accumulator to an air operated containment isolation valve.
- D. A change to the Nuclear Quality Assurance Plan.

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**Question 98**

A seismic event has occurred that was felt in the plant.

In accordance with RP/0/A/5000/007, (Natural Disaster and Earthquake), the SRO makes the required initial assumption regarding operability of EMF38(L) (Containment Particulate).

What course of action is specifically required by the procedure (RP/07)?

- A. Enter Tech Spec 3.0.3.
- B. Enter Tech Spec 3.4.13, RCS Operational Leakage.
- C. Align EMF38(L) to Upper Containment ONLY.
- D. Implement manual sampling of containment particulate activity.

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**Question 99**

Given the following conditions:

- An Auxiliary Building waste monitor tank liquid waste release (LWR) package has been delivered to the Control Room.
- All RN pumps are on.
- 1AD-12 B/1 RN Pump Intake Pit A Lo Level is LIT.
- 1AD-12 E/2 RN Pit-A Swap to SNSWP is LIT.
- A and B RL pumps are on and RL flow is greater than the flow required for the WL release.
- EMF-57 (Monitor Tank Building Liquid Discharge Monitor) is NOT operable.
- EMF-49 (Liquid Waste Discharge Lo Range) is operable.

Should the CRS allow the release and why or why not?

- A. The CRS should NOT allow this release because RN is aligned to the Standby Nuclear Service Water Pond.
- B. The CRS should allow this release since RL flow is greater than required for the WL release ONLY.
- C. The CRS should allow this release since EMF 49 is operable AND RL flow is greater than required for the WL release.
- D. The CRS should NOT allow this release since EMF 57 is NOT operable.

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**Question 100**

During a Unit 1 emergency event, the Primary SPDS Display indicates:

**Initial:**

- CORE COOL            ORANGE
- RADIATION            RED
- The remaining Critical Safety Functions indicate GREEN.
- The SRO selects the appropriate CSF procedure and begins implementation.

**Current:**

- The Primary SPDS Display NOW indicates:

CORE COOL    ORANGE  
HEAT SINK     RED  
RADIATION     RED  
The remaining CSFs indicate GREEN.

- (1) How does the SRO prioritize implementation of the CSF procedures for the CURRENT conditions?
  - (2) What is the basis for that prioritization?
- A. (1) Continue implementation of the originally selected CSF procedure until it is completed.  
(2) RP/01, Classification of Emergency, Fission Product Barrier Matrix
- B. (1) Continue implementation of the originally selected CSF procedure until it is completed.  
(2) Westinghouse Owner's Group Background Documents
- C. (1) Discontinue implementation of the originally selected CSF procedure and GO TO FR-H.1.  
(2) RP/01, Classification of Emergency, Fission Product Barrier Matrix
- D. (1) Discontinue implementation of the originally selected CSF procedure and GO TO FR-H.1.  
(2) Westinghouse Owner's Group Background Documents

**SENIOR REACTOR OPERATOR  
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**REFERENCE PACKAGE CONTENTS**

EXAM ID: HLP12 NRC Exam SRO Exam	
1	OP/1/A/6750/010, (Distributed Control System (DCS) Operations: Encl. 4.6.2 Encl. 4.6.3 Encl. 4.6.4 Encl. 4.6.7
2	OP/1/A/6450/010, (Containment Hydrogen Control Systems), Encl. 4.10
3	AP/1/A/5500/041, (Loss of Spent Fuel Cooling or Level), Enclosure 1
4	Unit ONE Revised Data Book, Figure 10, (Unit 1 Hydrogen Recombiners Post-LOCA Power Consumption)
5	Unit ONE Revised Data Book, Figure 57, (Reactor Coolant Saturation Curve, Wide Range)
6	RP/0/A/5000/001, (Classification of Emergency), Enclosure 4.4

HLP 2012 - NRC Written Exam - Answer Key (1-75 is RO Exam; 76-100 is SRO only portion)

	Status				Status				Status				Status		
1	D			26	D			51	D			76	A		
2	D			27	D			52	C			77	A		
3	D			28	C			53	A			78	D		
4	A			29	B			54	D			79	C		
5	B			30	D			55	C			80	B		
6	B			31	A			56	D			81	A		
7	B			32	C			57	C			82	B		
8	A			33	D			58	C			83	C		
9	C			34	A			59	B			84	B		
10	B			35	D			60	B			85	C		
11	B			36	A			61	C			86	D		
12	A			37	D			62	C			87	A		
13	D			38	A			63	A			88	D		
14	A			39	A			64	A			89	B		
15	D			40	B			65	A			90	B		
16	B			41	A			66	C			91	C		
17	D			42	A			67	A			92	D		
18	D			43	B			68	B			93	C		
19	A			44	A			69	C			94	B		
20	D			45	C			70	B			95	<del>B</del> Question deleted (post exam comment)		
21	D			46	B			71	C			96	C		
22	D			47	B			72	B			97	C		
23	D			48	B			73	C			98	A		
24	C			49	D			74	D			99	A		
25	A			50	A			75	C			100	D		

**Catawba Nuclear Station**  
**Oct. 2012 Initial License Written Exam**

**Post Exam Comments Resulting from the Examination Analysis**

**Question #95**

In accordance with NUREG-1021, Operator Licensing Examination Standards for Power Reactors, ES-403, Section D.1.b and c, the facility recommends that the question be deleted from the exam.

**Basis:**

This SRO level question tests knowledge of the fuel handling responsibilities of SROs. Conditions are given in the stem involving completion of refueling and subsequent latching of control rods. The stem then asks:

*What additional MINIMUM requirement(s) must be met to proceed with latching control rods under the direction of the Fuel Handling Maintenance Supervisor?*

"Additional" and "minimum" are the key concepts in the stem. The word "minimum" implies the absolute requirement in the sense of "this is what you must have." Applicants are trained that this usually means Tech. Specs. or SLCs (Selected Licensee Commitments).

In accordance with Selected Licensee Commitment 16.13-4, (**Minimum** Station Staffing Requirements), Table 16.13-4-1, note (2), the minimum requirement for core alterations is that the Refueling SRO must be present to directly supervise the activity.

In accordance with Operations Management Procedure (OMP) 1-10, (Shift Manning and Overtime Requirements), Attachment 7.1, Administrative Shift Manning Requirements, Note ##, the same requirement is listed for the Refueling SRO.

NUREG 1021, ES-403, Section D.1.b provides guidance that :

- "a question with an unclear stem that confused the applicants or did not provide all the necessary information"

may be accepted for a change. The wording of the stem "additional MINIMUM" is confusing, as follows: Containment closure would already be established for the given bulleted stem conditions. Asking what additional and MINIMUM requirements beyond what is already given in the stem, is confusing. Some applicants chose "A" and some chose "B".

Therefore, rather than request two correct answers, we are requesting that this question be deleted from the exam.

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**Post Exam Comments Resulting from the Examination Analysis**

**Question #96**

In accordance with NUREG-1021, Operator Licensing Examination Standards for Power Reactors, ES-403, Section D.1.b and c, the facility recommends that choices "A" and "C" be accepted as correct.

**Basis:**

This SRO level question involves a single rod in a control bank dropping fully into the core during an approach to criticality.

The applicants are tested on procedure content and selection, and on a required action. Part (1) of the stem says:

- (1) *Which procedure will be used that contains the specific guidance for how the rods are to be operated?*

Choice "C" - PT/0/A/4150/019, (1/M Approach to Criticality) was intended to be the only correct answer, and it DOES contain information on inserting all Control Banks for the given stem conditions. It would be allowable for the operators to insert control banks based on the information contained in the Limits and Precautions.

However, 4/7 applicants selected choice "A" (AP/1/A/5500/014, Control Rod Misalignment, Case II, Dropped Control Rod) as the correct answer.

Per Standard Operations Management Procedure (SOMP) 01-07, Section 12, the AP would be entered due to a Rod Bottom light, which would be lit for the conditions provided in the stem of the question. The AP will accomplish the same end point as the Limit and Precaution listed in PT/0/A/4150/019, (1/M Approach to Criticality).

We acknowledge that choice "A" is the most correct answer under the conditions provided in the stem of the question. However, based on the fact that both AP14 and the PT provide specific guidance on how control rods are to be operated, we request that both choices "A" and "C" be accepted as correct answers.