

# Watts Barr 2009-302 Initial Written Exam

RO

11/2009 Watts Bar RO NRC License Exam  
12/17/2009

1. Given the following conditions:

- Unit 1 was operating at 100% power when Control Bank 'D' started inserting with Rod Control in manual.
- A manual Reactor Trip is initiated from handswitches on 1-M-4 and 1-M-6.
- Reactor Trip Breaker "A" indicates green.
- Reactor Trip Breaker "B" indicates red.
- Reactor power indicates 3% and decreasing.
- All CERPI indication is lost.
- Pressurizer pressure is 1990 psig and slowly trending down.
- All SG Narrow Range levels are off scale low.
- The Unit Supervisor has entered E-0, "Reactor Trip or Safety Injection."

Which ONE of the following identifies the condition of the reactor and the appropriate action?

- A. The Reactor has tripped.  
Continue in E-0; Actuate Safety Injection.
- B. The Reactor has tripped.  
Continue in E-0; Do **not** actuate Safety Injection.
- C. The Reactor has **not** tripped.  
Transition to FR-S.1, "Response to Nuclear Power Generation/ATWS."  
Actuate Safety Injection.
- D. The Reactor has **not** tripped.  
Transition to FR-S.1, "Response to Nuclear Power Generation/ATWS."  
Manually trip the turbine and start AFW pumps.

2. Given the following:

- Unit 1 is at 100% power.
- Containment Purge Train A is in service to lower containment.
- A small break LOCA occurs.
- A Containment Vent Isolation occurs.
- Four minutes later the crew initiates a manual Reactor Trip and Safety Injection.

Which ONE of the following identifies the position indicated for valves, 1-FCV-30-37 and 1-FCV-30-40, LWR CNTMT PURGE EXH PRESS RLF, on the supply line to the Containment Vent Air Cleanup Units during this period?

- A. Green lights will be lit on the control switches during the entire period.
- B. Green lights will be lit on the control switches only after the Safety Injection occurs.
- C. Red lights will be lit on the control switches until the Phase A Containment Isolation occurs.
- D. Red lights will be lit on the control switches unless a Phase B Containment Isolation occurs.

3. During which ONE of the following events does reflux cooling become important?
- A. Any Large break LOCA with the break on an RCS Cold Leg and RCS subcooling indicating 0°F.
  - B. Only a Large break LOCA with the break on an RCS Cold Leg and RVLIS indicating less than 100%.
  - C. Any Small Break LOCA with reactor vessel level below the top of the hot legs and RCS subcooling indicating 0°F.
  - D. Only a Small Break LOCA in the pressurizer vapor space and RVLIS indicating less than 100%.

4. Given the following:

- Unit 1 is at 41% power.
- Reactor Coolant Pump (RCP) #4 trips.

Which ONE of the following identifies how steam generator #4 level indications will be initially affected by the RCP trip and the effect of the RCP trip on reactor status?

<u>SG #4 Level</u>	<u>Reactor Status</u>
A. Decrease	RCP trip generates an automatic reactor trip.
B. Decrease	Manual reactor trip is required due to RCP tripping.
C. Increase	RCP trip generates an automatic reactor trip.
D. Increase	Manual reactor trip is required due to RCP tripping.

5. Given the following:

- Unit 1 is at 100% reactor power.
- Letdown flow is 75 gpm.
- The OAC closes 1-FCV-62-90A, "Charging Line Isolation."

Which ONE of the following identifies...

- (1) when Annunciator 108-A, "CHARGING FLOW HI/LO" would alarm as the charging flow drops,  
and
  - (2) how the charging flow indication would be affected when the valve reached the full closed position?
- A. (1) 47 gpm  
(2) indicating 0 gpm flow
- B. (1) 47 gpm  
(2) indicating ~ 32 gpm flow
- C. (1) 55 gpm  
(2) indicating 0 gpm flow
- D. (1) 55 gpm  
(2) indicating ~ 32 gpm flow

6. Given the following:

- Unit 1 is at 100% power when a Reactor trip and Safety injection are initiated due to a LOCA.
- RHR pump 1A-A is tagged with maintenance in progress.
- RHR pump 1B-B trips when it attempts to start.
- The crew makes a transition from E-I, "Loss of Reactor or Secondary Coolant," to ECA-1.1, "Loss of RHR Sump Recirculation."
- The conditions at the transition are:
  - RCS pressure is 480 psig.
  - RWST level is 73% and dropping.
  - Containment sump level is 17% and rising.
  - Containment pressure had peaked and is now stable at 3.2 psid.
  - STA reports an Orange path to FR-Z.1, "High Containment Pressure."

Assuming the plant conditions remain unchanged, which ONE of the following identifies...

- (1) the procedure controlling the operation of the containment spray pumps,  
and
- (2) if one of the spray pumps is later required for restoring the level in the RWST, how it will be aligned from the containment sump to the RWST?

(1) <u>Procedure</u>	(2) <u>Alignment</u>
A. FR-Z.1	Through the containment spray test line.
B. FR-Z.1	Through the containment spray pump mini flow line.
C. ECA-1.1	Through the containment spray test line.
D. ECA-1.1	Through the containment spray pump mini flow line.

7. Given the following:

- Unit 1 is at 100% power when a LOCA occurs.

Which ONE of the following identifies an automatic signal that will cause an isolation of the CCS to the RCP thermal barrier cooling during an accident and the reason for the isolation?

- |                      |  |
|----------------------|--|
| A. Phase A Isolation | To isolate a potential containment release path. |
| B. Phase A Isolation | To protect the CCS system from steam formation.  |
| C. Phase B Isolation | To isolate a potential containment release path. |
| D. Phase B Isolation | To protect the CCS system from steam formation.  |

8. Given the following plant conditions:

- Unit 1 is operating at 100% power.
- Pressurizer backup heater C is energized.
- The pressurizer pressure controller, 1-PIC-68-340, fails to 100%.

Which ONE of the following describes the immediate response of the pressurizer pressure control system to this failure?

- A. Spray valves go full closed, backup heater C remains energized.
- B. Spray valves go full open, backup heater C remains energized.
- C. Spray valves go full closed, backup heater C de-energizes.
- D. Spray valves go full open, backup heater C de-energizes.

9. With the plant at full power, the following occurs:

- A spurious turbine trip occurs which resulted in the crew performing FR-S.1, "Nuclear Power Generation / ATWS."
- The crew is at Step 20 for checking the reactor subcritical.
- Power range channels indicate 2%.
- Intermediate range startup rate indicates slightly positive.
- NO charging pumps are available.

Which ONE of the following describes:

- (1) an action which will address the step for reactor subcriticality  
and  
(2) the time in core life when the action would have the greatest effect on reactivity?

(1) <u>Required Action</u>	(2) <u>Time in Core Life</u>
A. Manually initiate SI to provide boration.	BOL
B. Manually initiate SI to provide boration.	EOL
C. Lower AFW flow to allow RCS to heatup.	BOL
D. Lower AFW flow to allow RCS to heatup.	EOL

10. With the plant initially at 80% power, a single tube completely ruptures on #3 SG. The crew has entered E-3, "Steam Generator Tube Rupture" and is at the step for identifying which SG is ruptured.

Which method will be used for determining which SG is ruptured and why?

- A. RADCON surveys of the main steam lines, since the Main Steam Line Post Accident Monitors will not be effective due to lack of N16 response.
- B. RADCON surveys of the main steam lines, since the ability to perform a Chemistry sample is no longer available.
- C. Main Steam Line Radiation Monitors high range indication, since the low range has been disabled.
- D. Main Steam Line Radiation Monitors high range indication, since they have a high level of sensitivity to N16.

11. With the plant initially at full power, a steam line break occurred. The crew is currently at Step 3 of E-2, "Faulted Steam Generator Isolation" and has determined that SGs 1 and 2 are intact. For SGs 3 and 4, the crew is evaluating the following parameters:

- 1-PI-1-20A (SG 3) indicates 470 psig and lowering.
- 1-PI-1-27A (SG 4) indicates 440 psig and lowering.
- #3 RCS Thot = 454°F.
- #4 RCS Thot = 456°F.
- All Core Exit Thermocouples are 460°F.
- #3 RCS Tcold = 453°F.
- #4 RCS Tcold = 410°F.
- All Reactor Coolant Pumps are in service.

Which ONE of the following describes the status of Steam Generators 3 and 4?

	<u>SG 3 Intact ?</u>	<u>SG 4 Intact ?</u>
A.	YES	NO
B.	YES	YES
C.	NO	NO
D.	NO	YES

12. Due to the loss of the running Main Feedwater Pump Turbine, Unit 1 is operating at 12% power with the Standby Main Feedwater Pump in service.

The following occurs:

- The Standby Main Feedwater Pump trips.
- The crew implements AOI-16, "Loss of Normal Feedwater," and initiates actions to stabilize the plant within AFW pump capability.
- Steam Generator Narrow Range levels are trending to setpoint and are currently:  
#1 - 27%, #2 - 25%, #3 - 28%, #4 - 31%.

In accordance with AOI-16, which ONE of the following sets of conditions would direct the operators to manually control AFW flow and the reason why?

<u>Conditions</u>	<u>Reason</u>
A. Tavg at 554°F and rising with AFW flow at 100 gpm to each SG.	To meet minimum heat sink requirements.
B. Tavg at 554°F and rising with AFW flow at 120 gpm to each SG.	To terminate the RCS heatup.
C. Tavg at 555°F and lowering with AFW flow at 100 gpm to each SG.	To meet minimum heat sink requirements.
D. Tavg at 555°F and lowering with AFW flow at 120 gpm to each SG.	To minimize the RCS cooldown.

13. Given the following:

- A Station Blackout has occurred.
- The crew is implementing AOI-40, "Station Blackout."
- The decision has been made to backfeed from the 500kV switchyard.
- The overcurrent relays on 6.9kV Unit Board 1B actuated when the blackout occurred.

Which ONE of the following identifies which main bank transformers will be aligned to backfeed, and the action required to reset 6.9kV Unit Board 1B overcurrent lockout?

<u>Transformers</u>	<u>Lockout Relay</u>
A. Unit 1	Must be manually reset locally at the unit board.
B. Unit 1	Reset by placing the board's normal and alternate feeder control switches on 1-M-1 to TRIP.
C. Unit 2	Must be manually reset locally at the unit board.
D. Unit 2	Reset by placing the board's normal and alternate feeder control switches on 1-M-1 to TRIP.

14. Given the following plant conditions:

- Unit 1 is operating at 100% power.
- A loss of 120V AC Vital Instrument Power Board 1-I occurred.
- The crew implements AOI-25.01, "Loss of 120V AC Vital Instrument Power Boards 1-I and 2-I."

Which ONE of the following identifies the Main Feedwater Reg Valve controller(s) that will not function in automatic control and why AFW pump 1A-A is placed in PULL-TO-LOCK during performance of the procedure?

- |    | <u>Main Feed Reg. Valve controller(s)</u> | <u>AFW pump 1A-A is placed in PULL-TO-LOCK</u>         |
|----|---|--|
| A. | Only #1                                   | To prevent injection of cold water into SG #1 and # 2. |
| B. | Only #1                                   | Because the Pressure Control Valve is failed closed.   |
| C. | Both #1 & #2                              | To prevent injection of cold water into SG #1 and # 2. |
| D. | Both #1 & #2                              | Because Pressure Control Valve is failed closed.       |

15. Given the following plant conditions:

- Unit 1 was at 80% power.
- A loss of 125V DC Vital Battery Board III occurred.
- AOI-21.03, "Loss of 125V DC Vital Battery Bd III," Appendix A, "Transfer of 125V DC Buses," is in progress.

Depressing and holding the BO-RESET switch while 6.9kV Shutdown Board 2A-A 125V DC control bus is reenergized will prevent which ONE of the following?

- A. Inadvertent start of ALL four Emergency Diesel Generators.
- B. Inadvertent start of ONLY the Emergency Diesel Generator 2A-A.
- C. Unwanted trip of components supplied by 6.9kV Shutdown Board 2A-A.
- D. Unwanted start of components supplied by 6.9kV Shutdown Board 2A-A.

16. Which ONE of the following identifies...

- (1) the reason for the backup nitrogen supply for the Turbine Driven AFW Pump LCVs,  
and
  - (2) the action/condition required to align the backup supply?
- A. (1) Allows the LCVs to be OPENED during a Station Blackout event.  
(2) Is automatically supplied when air pressure drops below regulator setpoint.
- B. (1) Allows the LCVs to be OPENED during a Station Blackout event.  
(2) Requires local manual alignment.
- C. (1) To prevent overfeeding Steam Generators during a Station Blackout.  
(2) Is automatically supplied when air pressure drops below regulator setpoint.
- D. (1) To prevent overfeeding Steam Generators during a Station Blackout.  
(2) Requires local manual alignment.

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17. Given the following plant conditions:

- Unit 1 is at 100% power with all equipment aligned and functioning normally.
- Generator reactive load indicates 70 MVAR OUT as indicated on 1-EI-57-8, MEGAVARS.
- A grid disturbance occurs which results in a gradually lowering grid frequency.

As a result of the above conditions, how will the identified generator parameter indication be affected?

	<u>Generator Amps 1-EI-57-9, -10, -11</u>	<u>Exciter Amps 1-EI-57-7</u>
A.	Rising	Rising
B.	Lowering	Lowering
C.	Rising	Lowering
D.	Lowering	Rising

18. Given the following:

- The crew has entered ECA-1.2, "LOCA Outside Containment" from E-0, "Reactor Trip or Safety Injection" based upon high radiation levels in the Auxiliary Building.
- After closing 1-FCV-74-33, "RHR Crosstie Valve," and 1-FCV-63-93, "RHR Train A Cold Leg Injection Valve," the following conditions exist:
  - RWST level continues to drop.
  - RCS pressure is slowly increasing.

Which ONE of the following indicates the status of the LOCA and the subsequent action that would be taken?

- A. The LOCA is isolated;  
Stop RHR 1A-A pump and close 1-FCV-74-3, "RHR Pump 1A-A Suction Valve."
- B. The LOCA is isolated;  
Leave RHR 1A-A pump running and injecting through the RHR crosstie valves, 1-FCV-74-33 and 1-FCV-74-35.
- C. The LOCA is NOT isolated;  
Re-open 1-FCV-63-93, and close 1-FCV-63-94, "RHR Train B Cold Leg Injection Valve."
- D. The LOCA is NOT isolated;  
Leave 1-FCV-63-93 closed and close 1-FCV-63-94, "RHR Train B Cold Leg Injection Valve."

19. Given the following:

- Following a turbine runback, AOI-34, "Immediate Boration" is entered to restore control rods above the LO-LO insertion limit.
- Normal boration is unavailable due to 1-HS-62-140A, "VCT Makeup Control," being broken.
- 1-FCV-62-138, "Emergency Borate" could not be opened from the MCR or locally.

Which ONE of the following identifies the next boric acid flow path that AOI-34 directs to be established and additional valve alignment(s) required when using the flow path?

<u>Flow Path</u>	<u>Valve alignment</u>
A. Open 1-ISV-62-929, Manual Borate Valve.	Open 1-FCV-62-140, VCT Makeup Control.
B. Open 1-ISV-62-929, Manual Borate Valve.	Close 1-FCV-62-128, Makeup to the VCT Inlet.
C. Open 1-FCV-62-135 & 136 CCP suction from RWST.	Open 1-FCV-62-132 & 133 CCP suction from VCT.
D. Open 1-FCV-62-135 & 136, CCP suction from RWST.	Close 1-FCV-62-132 & 133 CCP suction from VCT.

20. Given the following plant conditions:

- Unit 1 is at 100% power.
- The Pressurizer Level Master Controller setpoint is failed at the current value.
- Pressurizer Level Control is selected to LI-68-339.
- A load reduction to 60% is initiated to remove a Main Feedwater Pump from service.

Which ONE of the following describes the action that will be taken in accordance with AOI-20, "Malfunction of Pressurizer Level Control System," and the reason for those actions?

- A. Change the pressurizer level channel input to the pressurizer level master controller and restore Letdown because the backup level channel response to actual level will cause a letdown isolation.
- B. Place the charging flow Control Valve in MANUAL and reduce charging flow because actual pressurizer level will be higher than program level for the actual power level as load is decreased.
- C. Place the charging flow Control Valve in MANUAL and raise Charging flow because actual pressurizer level will be lower than program level for the actual power level as load is decreased.
- D. Change the pressurizer level channel input to the pressurizer level master controller and restore Letdown because the controlling level channel failure will cause a letdown isolation.

21. Given the following:

- Unit 1 is in Mode 6.
- 1-HS-90-410-A [back of 1-R-73] and 1-HS-90-415-B [back of 1-R-78] are in the REFUEL position.

Compare the following two events:

- (1) An assembly is dropped in the Spent Fuel Pit resulting in radiation monitors 1-RM-90-102 and -103 High Radiation relay actuation.
- (2) An assembly is dropped inside containment resulting in radiation monitors 1-RM-90-130 and -131 High Radiation relay actuation.

Which ONE of the following identifies the automatic initiation of Containment Vent Isolation (CVI) and the isolation of the Auxiliary Building for the two events?

- A. Dropping either assembly results in initiation of CVI and isolation of the Auxiliary Building.
- B. Dropping the assembly inside containment results in an isolation of the Auxiliary Building but dropping the assembly in the Spent Fuel Pit does **NOT** result in a CVI.
- C. Dropping the assembly in the Spent Fuel Pit results in a CVI but dropping the assembly inside containment does **NOT** result in isolation of the Auxiliary Building.
- D. Dropping the assembly inside containment does **NOT** result in an isolation of the Auxiliary Building **NOR** does dropping the assembly in the Spent Fuel Pit result in a CVI.

22. Unit 1 is at full power with the following conditions:

- 162-F, "RIVER FLOW LO DISCHARGE TERMINATED" lit.
- 1-HS-15-44, "SG BLOWDOWN DISCH TO CTBD," is in the OPEN position.

Which ONE of the following identifies how the SGBD effluent is affected if a malfunction on the in-service SGBD radiation monitor causes output of the monitor to fail high and the reason why?

- A. SGBD flow will automatically divert from CTBD to the Condensate Demin to prevent an unmonitored release.
- B. SGBD flow must be manually diverted from CTBD to the Condensate Demin because of low CTBD flow.
- C. SGBD flow will be isolated automatically to prevent an unmonitored release.
- D. SGBD flow must be manually isolated because of low CTBD flow.

23. For a fire in the charcoal filter unit of the CREVS system, which ONE of the following describes the classification of the fire and what type of extinguishing agent is used to put out the fire?

	<u>Fire Classification</u>	<u>Extinguishing Agent</u>
A.	A	Water
B.	D	Foam
C.	A	Foam
D.	D	Water

24. Given the following:

- A Steam Line break occurs on Unit 1.
- Containment pressure is 3.7 psig.
- Control Air pressure is 97 psig.
- During the performance of E-0, "Reactor Trip or Safety Injection" the Unit Supervisor directs the CRO to perform E-0 Appendices A and B to evaluate the support systems.
- Containment Isolation Status Panel 1-XX-55-6E window 13 "FCV-32-110" indicates RED.

Which ONE of the following identifies the correct CRO response to the window indication?

- A. The valve is in the correct position for the current conditions; continue with the support system evaluation.
- B. Verify the penetration is isolated by verifying the Train B valve is closed in the flow path.
- C. If the FCV can NOT be closed, direct an AUO to close manual isolation valve in the penetration flow path.
- D. If the FCV can NOT be closed, direct an AUO to stop all Control & Station Air Compressors.

25. Given the following:

- Unit 1 experienced a Safety Injection.
- The operating crew entered E-0, "Reactor Trip or Safety Injection" and has reached the step for checking if SI termination criteria are met.
- The crew is contemplating use of ES-0.0, "Rediagnosis."

Current conditions are:

	<u>SG#1</u>	<u>SG#2</u>	<u>SG#3</u>	<u>SG#4</u>
Levels	34%NR	22% NR	29%NR	38%NR
AFW flow	40 gpm	260 gpm	130 gpm	0 gpm

RCS Subcooling	66°F
RCS Pressure	1630 psig and rising
Pressurizer Level	11% and rising

Which ONE of the following identifies...

- (1) if current conditions allow the termination of safety injection,  
and
  - (2) if use of ES-0.0 is allowed at this time for the current conditions?
- A. (1) SI Termination criteria are currently met.  
(2) Allowed.
- B. (1) SI Termination criteria are currently met.  
(2) NOT allowed.
- C. (1) SI Termination criteria are **NOT** currently met.  
(2) Allowed.
- D. (1) SI Termination criteria are **NOT** currently met.  
(2) NOT allowed.

26. Following an ATWS event that resulted in the MSIVs being closed, the following conditions exist:

- The crew has performed the applicable Emergency Instructions and has now implemented ES-0.1, "Reactor Trip Response."
- The crew determines the following conditions exist:
  - Reactor trip breakers are open.
  - Tavg has dropped from a high of 591°F to 566°F.
  - All SG levels are between 39% and 41% NR.
  - 1-HS-3-45, MFW Mode Switch, is in the 'LONG CYCLE RECIRC' position.
  - PORVs on S/G # 1, # 2 and # 4 maintaining SG pressure approximately 1025 psig.
  - SG #3 pressure is 1223 psig.
  - PORV on S/G #3 is closed and cannot be opened.
  - The crew transitions to FR-H.2 "Steam Generator Overpressure."

Which ONE of the following identifies the expected status of the Feedwater Isolation valves and a procedurally directed action to lower SG #3 pressure in accordance with FR-H.2?

	<u>FW Isolation Valves</u>	<u>Action to lower SG #3 pressure</u>
A.	Open	Cooldown RCS using INTACT S/Gs.
B.	Closed	Cooldown RCS using INTACT S/Gs.
C.	Open	Supply AFW to S/G #3.
D.	Closed	Supply AFW to S/G #3.

27. After a design basis accident on Unit 1, the following conditions exist:

- Containment Sump level increased to 83% and is rising.
- RWST level reached sump swapover setpoint.

Which ONE of the following identifies...

- (1) an unexpected source of water entering containment, in addition to the analyzed sources, that could result in the containment sump level and trend, and
  - (2) how many trains of RHR will be aligned to the containment sump and in service in accordance with ES-1.3, "Transfer to Containment Sump?"
- A. (1) High Pressure Fire Protection.  
(2) ONLY one RHR train.
- B. (1) High Pressure Fire Protection.  
(2) BOTH RHR trains.
- C. (1) Condensate Storage Tank.  
(2) ONLY one RHR train.
- D. (1) Condensate Storage Tank.  
(2) BOTH RHR trains.

28. Given the following plant conditions:

- Unit 1 is in Mode 5.
- A heatup is in progress.
- RCS pressure is 320 psig.
- RCS temperature is 190°F.

As the pressurizer pressure is raised to 400 psig , which ONE of the following correctly describes...

- (1) the response of #1 seal leakoff flow from the RCPs,  
and
- (2) how the pressure indicated on the #1 seal differential pressure indicators on 1-M-5 will respond to the change in pressurizer pressure?

(Assume seal injection flow, VCT temp., and VCT press. remain constant.)

	<u>#1 seal leakoff flow</u>	<u>Indicated #1 Seal Differential Pressure</u>
A.	rises	rises
B.	rises	remains the same
C.	drops	rises
D.	drops	remains the same

29. Given the following conditions:

- Unit 1 is at 100% power.
- 1-TE-62-78A, Letdown Heat Exchanger Temperature, fails HIGH.

Which ONE of the following describes...

- (1) the impact of the failure on the plant and
- (2) what effect placing 1-M-6 controller 1-HIC-62-78A, LETDOWN HX OUTLET TEMP TCV-70-192 CNTL, to manual and adjusting in the closed direction would have on letdown temperature?

(1) <u>Impact on the plant</u>	(2) <u>Letdown Temperature response</u>
A. Negative reactivity addition	Letdown temperature would rise.
B. Positive reactivity addition	Letdown temperature would rise.
C. Negative reactivity addition	Letdown temperature will <b>NOT</b> change.
D. Positive reactivity addition	Letdown temperature will <b>NOT</b> change.

30. Which ONE of the following procedure alignments, when performed, results in an RHR system alignment with both RHR Crosstie Valves, 1-FCV-74-33 and 1-FCV-74-35 aligned in the open position?
- A. RHR Spray alignment in accordance with FR-Z.1, "High Containment Pressure."
  - B. ECCS Cold Leg Injection alignment in accordance with SOI-74.01, "Residual Heat Removal System."
  - C. ECCS Cold Leg Recirculation alignment in accordance with ES-1.3, "Transfer to Containment Sump."
  - D. Hot Leg Recirculation alignment in accordance with E-1, "Loss of Reactor or Secondary Coolant."

31. Plant conditions are as follows:

- Unit 1 is in Mode 4.
- RHR Train 'A' is in service per SOI-74.01, "Residual Heat Removal System."
- RCS temperature is stable at the current RHR flow rate.

Which ONE of the following malfunctions will result in a reduction in flow through the RHR Heat Exchanger 1A?

A loss of ...

- A. 480V Shutdown Board 1A1-A.
- B. 120V AC Vital Instrument Power Board 1-II.
- C. air to 1-FCV-74-32, RHR HTX Bypass.
- D. air to 1-FCV-74-16, RHR HTX 'A' Outlet.

32. Given the following

- A small break LOCA has occurred and RCS pressure has stabilized at 985 psig.
- The crew is performing ES-1.2, "Post-LOCA Cooldown and Depressurization."
- The crew is ready to stop the first Centrifugal Charging Pump (CCP) as part of SI reduction.
- RCS temperature is 462°F.
- Subcooling is 82°F.

After stopping the CCP, the following conditions exist:

- RCS pressure is 947 psig.
- RCS temperature is 455°F.

Which ONE of the following identifies...

- (1) how the relationship between ECCS flow and break flow will be initially affected, and
- (2) based on the above conditions, how the RCS subcooling margin has changed?

<u>Relationship between ECCS Flow to Break Flow</u>	<u>Change in Subcooling Margin</u>
A. Break flow and ECCS flow remain equal.	Subcooling rises.
B. Break flow and ECCS flow remain equal.	Subcooling drops.
C. Break flow exceeds ECCS flow.	Subcooling rises.
D. Break flow exceeds ECCS flow.	Subcooling drops.

33. Given the following:

- Unit 1 is at 100% power.
- Annunciator 88-D "PRT TEMP HI" alarms.

Which ONE of the following identifies the actions required to establish and monitor Pressurizer Relief Tank (PRT) cooling?

- A. Open 1-FCV-68-303, PRI WATER TO PRT, from the Main Control Room but monitor the PRT temperature on 0-L-2, Rad Waste Panel.
- B. Open 1-FCV-68-303, PRI WATER TO PRT, from 0-L-2, Rad Waste Panel but monitor PRT temperature from the Main Control Room.
- C. Open 1-FCV-68-303, PRI WATER TO PRT, and monitor the PRT temperature from the Main Control Room.
- D. Open 1-FCV-68-303, PRI WATER TO PRT, and monitor the PRT temperature from 0-L-2, Rad Waste Panel.

34. Given the following:

- Unit 1 has been shutdown for refueling and is in Mode 5.
- The operating crew is performing the initial drain down of the pressurizer to 25% in accordance with GO-10, "Reactor Coolant System Drain and Fill Operations."

During the drain down, which ONE of the following identifies how the PRT level will be maintained and the tank level that would be rising?

PRT level will be maintained...

- A. at zero (0%) or less and Holdup Tank (HUT) level would be rising.
- B. at zero (0%) or less and Refueling Water Storage Tank (RWST) level would be rising.
- C. above the low level alarm and Holdup Tank (HUT) level would be rising.
- D. above the low level alarm and Refueling Water Storage Tank (RWST) level would be rising.

35. Given the following:

- Unit 1 Component Cooling Water System (CCS) Surge Tank level is decreasing due to a leak in the system.

Which ONE of the choices correctly completes the following statement?

The make-up from the Demineralized Water System would \_\_\_\_\_ (1) \_\_\_\_\_,  
and if the emergency make-up was needed, it would be supplied from the  
\_\_\_\_\_ (2) \_\_\_\_\_.

(1)

(2)

- |   |                                    |
|---|------------------------------------|
| A. require manual alignment             | Primary Water System               |
| B. require manual alignment             | Essential Raw Cooling Water System |
| C. auto open on low level in Surge Tank | Primary Water System               |
| D. auto open on low level in Surge Tank | Essential Raw Cooling Water System |

36. Given the following:

- Unit 1 is operating at 100% power when a pressurizer PORV fails and sticks open approximately 15%.
- The OAC closes the PORV block valve to isolate the PORV.

Which ONE of the following identifies the indicating light status on...

- (1) the failed PORV  
and
  - (2) the PORV Block valve while the Block valve is travelling from open to close?
- A. (1) Both the RED and GREEN lights LIT.  
(2) Only the RED light LIT.
- B. (1) Neither the RED nor GREEN light LIT.  
(2) Only the RED light LIT.
- C. (1) Both the RED and GREEN lights LIT.  
(2) Both the RED and GREEN lights LIT.
- D. (1) Neither the RED nor GREEN light LIT.  
(2) Both the RED and GREEN lights LIT.

37. Given the following conditions:

- Unit 1 was at 100% power.
- The 120V Vital Instrument Power Board 1-II feed to the Train B Solid State Protection System (SSPS) is de-energized.

Which ONE of the following identifies the status of the Solid State Protection System (SSPS) logic cabinet 48v DC and 15v DC power?

- A. Both the 48v and 15v power would be available.
- B. Only the 48v power would be available.
- C. Only the 15v power would be available.
- D. Neither the 48v nor 15v power would be available.

38. Given the following:

- Annunciator 114-A "SSPS-A GEN WARNING" alarms.

Which ONE of the following identifies...

- (1) a condition that would cause the alarm,  
and
  - (2) where the card with the board-edge LEDs identifying the probable cause of the alarm is located?
- A. (1) Permissive Switch placed in the OFF position.  
(2) in the SSPS Logic cabinet.
  - B. (1) Permissive Switch placed in the OFF position.  
(2) in the RONAN annunciator cabinets.
  - C. (1) Input Error Inhibit switch being placed in the INHIBIT position.  
(2) in the SSPS Logic cabinet.
  - D. (1) Input Error Inhibit switch being placed in the INHIBIT position.  
(2) in the RONAN annunciator cabinets.

39. Given the following:

- The plant is at 100% power.
- All control systems are in their normal alignments.
- Pressurizer Pressure Transmitter 1-PT-68-323 has failed LOW.
- All actions have been taken to remove the transmitter from service in accordance with the appropriate plant procedures.

Which ONE of the following describes the logic required from the remaining operable pressurizer pressure channels to initiate...

- (1) a Low Pressurizer Pressure Reactor Trip,  
and
- (2) a Low Pressurizer Pressure Safety Injection actuation?

- A. (1) 1 out of 2  
(2) 1 out of 3
- B. (1) 1 out of 3  
(2) 1 out of 2
- C. (1) 1 out of 2  
(2) 1 out of 2
- D. (1) 1 out of 3  
(2) 1 out of 3

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40. Which ONE of the following identifies the electrical board where the power supply breaker for the Incore Instrument Room Chiller 1A is located?
- A. 6.9kv Common Board A
  - B. 6.9kv Shutdown Board 1A-A
  - C. 480V Reactor MOV Board 1A1-A
  - D. 480V Aux Bldg Com MCC Board A

41. Given the following:

- A large break LOCA has occurred on Unit 1.

Which ONE of the following identifies a valve that is interlocked such that it could **NOT** be opened from the MCR control switch until after the automatic swapover to the containment sump occurred?

- A. 1-FCV-72-40, RHR Spray Header A.
- B. 1-FCV-63-172, RHR Hot Leg injection.
- C. 1-FCV-63-156, SIP Hot Leg Injection.
- D. 1-FCV-72-45, CSP B Suction from Containment Sump.

42. Given the following:

- A plant shutdown and cooldown is in progress on Unit 1.
- The cooldown is stopped with RCS pressure at 1850 psig and Tavg at 500°F.
- Steam Dumps are returned to automatic with 3 valves throttling open.
- S/G #1 PORV (atmospheric relief valve) fails open.

Which ONE of the following identifies the parameter that will cause the steam dump valves to start closing and the condition that will result in the automatic closure of the MSIVs?

<u>Steam Dumps</u>	<u>MSIVs</u>
A. RCS Tavg	Low Steam Line Pressure
B. RCS Tavg	Steam Line negative rate function
C. Steam pressure	Low Steam Line Pressure
D. Steam pressure	Steam Line negative rate function

43. Given the following:

- Unit 1 is at 100% power following a refueling outage.
- A significant feedwater heater level transient results in HI-HI levels in Feedwater Heaters A1 and B1.

Which ONE of the following identifies the initial effect on...

(1) indicated RCS  $T_{\text{cold}}$ ,  
and  
(2) reactor power?

- A. (1) RCS  $T_{\text{cold}}$  will decrease.  
(2) Reactor power decreases.
- B. (1) RCS  $T_{\text{cold}}$  will decrease.  
(2) Reactor power increases.
- C. (1) RCS  $T_{\text{cold}}$  will increase.  
(2) Reactor power decreases.
- D. (1) RCS  $T_{\text{cold}}$  will increase.  
(2) Reactor power increases.

44. Which ONE of the following describes:

- (1) when the main feed pump turbine trip runback circuit is enabled,  
and  
(2) how far will the load be automatically reduced to if a main feedwater pump trips?

(1)

(2)

- |                           |                                 |
|---------------------------|---------------------------------|
| A. Load greater than 67%. | Less than or equal to 800 MWe.  |
| B. Load greater than 85%. | Less than or equal to 800 MWe.  |
| C. Load greater than 67%. | Less than or equal to 1000 MWe. |
| D. Load greater than 85%. | Less than or equal to 1000 MWe. |

45. Given the following:

- Unit 1 was operating at 100% power when a reactor trip occurred.
- The operating crew entered the emergency procedures and have transitioned to ES-0.1, "Reactor Trip Response."
- CRO notes the following conditions:
  - Steam Generator levels:        #1        #2        #3        #4  
   36%NR   31%NR   33%NR   39%NR
  - AFW flows are:                    100 gpm   320 gpm   280 gpm   0 gpm
  - All AFW LCVs controllers are in automatic.

Considering Conditions A and B below,

- (1) which ONE would cause the larger change in the AFW flow rate to SG #2, and
- (2) which ONE would require that local action be taken to isolate feed flow to the affected SG in order to stabilize the SG level in accordance with ES-0.1?

Condition A    The control air line breaks off the SG #1 Motor Driven AFW supply valve, 1-LCV-3-164.

Condition B    The control air line breaks off the SG #4 Turbine Driven AFW supply valve, 1-LCV-3-175.

<u>Largest Change</u>	<u>Require Local Actions</u>
A.    Condition A	Condition A
B.    Condition A	Condition B
C.    Condition B	Condition A
D.    Condition B	Condition B

46. The plant is at 40% and raising power when the following occurs:

- An internal transformer problem resulted in a sudden pressure condition on CSST A.
- 503-A, "CSST A Failure" alarms.

What is another expected alarm, and what action is directed by procedures as a result of the condition?

<u>Alarm</u>	<u>Action</u>
A. 505-A, "Sprinkler Initiated"	Verify shutdown of South TB bldg air intake fans.
B. 505-A, "Sprinkler Initiated"	Notify Appendix R AUOs to report to U-2 side control room.
C. 75-C, "Electrical Trouble"	Verify shutdown of South TB bldg air intake fans.
D. 75-C, "Electrical Trouble"	Notify Appendix R AUOs to report to U-2 side control room.

47. Given the following:

- Unit 1 at 100% power.
- Control and Station Air Compressors A, B, & C running and loaded.
- Control and Station Air Compressor D out of service.
- All electrical boards in a normal alignment.
- ERCW system in a normal alignment with 1 pump running on each shutdown board.
- 2B-B Shutdown Board automatically transferred to the Diesel Generator.

Which ONE of the following is an action required while restoring the plant back to normal in accordance with SOI-211.04, "6.9KV Shutdown Board 2B-B?"

- A. Manually start Control and Station Air Compressor B.
- B. Manually stop an Essential Raw Cooling Water pump.
- C. Transfer 480v Auxiliary Building Common Board back to normal.
- D. Restore CCS Heat Exchanger 'C' Outlet, 0-FCV-67-152, to close.

48. The unit is operating at 100%.

Which ONE of the following correctly describes the effect of a loss of 125 V DC Vital Battery Board I on the DG(s), assuming no operator action?

- A. ONLY DG 1A-A starts. Power is available to the DG 1A-A local control panel relays.
- B. ONLY DG 1A-A starts. Power is NOT available to DG 1A-A local control panel relays.
- C. ALL four DGs start. Power is available to DG 1A-A local control panel relays.
- D. ALL four DGs start. Power is NOT available to DG 1A-A local control panel relays.

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49. Which ONE of the following identifies a condition that would result in the 250 V DC Turbine Building Distribution Board 1 automatically transferring to its alternate supply, and, if the condition was cleared, how the transfer back to normal would occur?

<u>Condition</u>	<u>Transfer Back</u>
A. Normal feeder current exceeds 800 amps.	Automatically
B. Normal feeder current exceeds 800 amps.	Manually
C. Board voltage drops to 188v for 4 seconds.	Automatically
D. Board voltage drops to 188v for 4 seconds.	Manually

50. The operating crew has performed a manual start of Diesel Generator (DG)1A-A using 1-HS-82-14, START-STOP, on 0-M-26, when the following alarm is received:

- 196-D, "CRANKCASE PRESS HI"

Which ONE of the following:

- (1) Is the LOWEST crankcase pressure which would result in the above alarm,  
and
- (2) how the crankcase pressure will affect DG operation?

(1)

(2)

- |                       |                                 |
|-----------------------|---------------------------------|
| A. 1"H <sub>2</sub> O | DG will NOT automatically trip. |
| B. 1"H <sub>2</sub> O | DG will automatically trip.     |
| C. 7"H <sub>2</sub> O | DG will NOT automatically trip. |
| D. 7"H <sub>2</sub> O | DG will automatically trip.     |

51. Given the following:

- D/G 1A-A is running for a surveillance test.
- The Fuel Oil Transfer Pump on Engine 1A1 is automatically started due to low level in the Day Tank.
- As the tank level rises the Day Tank "Hi Level" switch fails to stop the pump.

Which ONE of the following identifies...

- (1) the result of the "Hi Level" switch failure,  
and
  - (2) how Engine 1A2 Day Tank is affected by the fuel oil transfer pump running on Engine 1A1?
- A. (1) The Day Tank will overflow back to the 7-day Tank.  
(2) 1A2 Day Tank will receive fuel oil while the pump is running.
- B. (1) The Day Tank will overflow back to the 7-day Tank.  
(2) 1A2 Day Tank level will lower until the Fuel Oil Transfer Pump on its engine is started.
- C. (1) The pump will be stopped by a "HI-HI Level" switch actuation.  
(2) 1A2 Day Tank will receive fuel oil while the pump is running.
- D. (1) The pump will be stopped by a "HI-HI Level" switch actuation.  
(2) 1A2 Day Tank level will lower until the Fuel Oil Transfer Pump on its engine is started.

52. Given the following plant conditions:

- Waste Gas Decay Tank 'D' planned release is in progress.
- 184-C, "WGDT REL LINE 0-RM-118 INSTR MALF," actuates due to a momentary power failure.
- The instrument malfunction has been reset by the crew.

Which ONE of the following identifies the effect of the above conditions on the Plant Vent Flow Control Valve, 0-FCV-77-119?

- A. 0-FCV-77-119 will close and cannot be opened until after local action is taken to reduce the controller output to ZERO.
- B. 0-FCV-77-119 will remain open unless the radiation monitor spikes to the HI RAD setpoint when the power is restored.
- C. 0-FCV-77-119 will close but reopen when the power is restored.
- D. 0-FCV-77-119 will close but reopen when the instrument malfunction is reset.

53. Given the following:

- ERCW pump F-B is running and is the pump selected to start by the load sequencing relays if off-site power was lost.

With the above alignment, which ONE of the following identifies...

- (1) the 6.9kV Shutdown Board that supplies power to ERCW pump F-B and
- (2) an additional ERCW pump that can be selected to start on the opposite Unit Shutdown Board?

	<u>Pump F-B Power Supply</u>	<u>Additional Pump Selected</u>
A.	1B-B	ERCW pump E-B
B.	1B-B	ERCW pump H-B
C.	2B-B	ERCW pump E-B
D.	2B-B	ERCW pump H-B

54. Given the following:

- A leak in the Control Air System has caused the air pressure to decrease to 82 psig.

Which ONE of the following identifies the status of the Auxiliary Air Compressors and 0-PCV-33-4, Service Air Isolation Valve?

<u>Auxiliary Air Compressors</u>	<u>0-PCV-33-4</u>
A. Not running but will start if pressure drops lower.	OPEN
B. Not running but will start if pressure drops lower.	CLOSED
C. Would have automatically started.	OPEN
D. Would have automatically started.	CLOSED

55. Given the following:

- Unit 1 is in Mode 3 following a forced shutdown.
- The operating crew is performing the procedure to place Train A Containment Purge in service to lower containment.
- Both Containment Purge Radiation Monitors 1-RM-90-130 and 1-RM-90-131 are operable.

Which ONE of the choices below completes the following statement?

When placing only Containment Purge Train A in service (1) of the Containment Purge Radiation Monitors will be aligned for service and maintenance would be notified to (2)

- |    | (1)      | (2)   |
|----|----------|---|
| A. | both     | Block lower ice doors to prevent inadvertent opening.                   |
| B. | both     | Recalibrate 1-RM-90-106, Containment Radiation Monitor, alarm setpoint. |
| C. | only one | Block lower ice doors to prevent inadvertent opening.                   |
| D. | only one | Recalibrate 1-RM-90-106, Containment Radiation Monitor, alarm setpoint. |

56. Given the following:

- Unit 1 reactor startup is in progress.
- Control Bank C is withdrawn 48 steps.
- ECP predicts criticality at 97 steps on Control Bank C.
- OAC is withdrawing Control Rods when an AFW flow perturbation occurs.
- Control Rod withdrawal is stopped with Control Bank C at 72 steps.
- Tavg drops to 554°F and the reactor is determined to be critical.
- Power is stabilized below P-6.

Which ONE of the following choices completes the following statement?

The Control Rod Insertion Limit was (1) and Tavg (2) the Surveillance Requirement for the minimum temperature for criticality.

**REFERENCE PROVIDED**

- | <u>(1)</u>             | <u>(2)</u>     |
|------------------------|----------------|
| A. Violated            | lowered below  |
| B. Violated            | remained above |
| C. <b>NOT</b> Violated | lowered below  |
| D. <b>NOT</b> Violated | remained above |

57. Given the following plant conditions:

- A Reactor Cavity seal failure occurred during refueling operations.
- Reactor Cavity water level lowered to EI 746'.
- The crew enters AOI-29, "Dropped or Damaged Fuel or Refueling Cavity Seal Failure."
- The decision has been made to makeup to the cavity using the CVCS system.

When the alignment of the CVCS is complete in accordance with AOI-29, the CCP will be taking suction from the (1) and discharging to the RCS through the (2) flow path.

- |    | <u>(1)</u> | <u>(2)</u>      |
|----|------------|-----------------|
| A. | VCT        | normal charging |
| B. | VCT        | BIT             |
| C. | RWST       | normal charging |
| D. | RWST       | BIT             |

58. Consider Unit 1 operating in the following 2 conditions with the Main Control Room Radiation Monitor, 0-RM-90-125, out of service.

Condition 1 - Mode 5 with no fuel movement in progress in the Spent Fuel Pit.

Condition 2 - NO Mode with spent fuel shuffles being conducted in the Spent Fuel Pit.

Which ONE of the following correctly identifies the status of Technical Specification 3.3.7, "CREVS Actuation Instrumentation" for each of the conditions?

The LCO is ...

- A. required to be entered with the Unit in Condition 1 only.
- B. required to be entered with the Unit in Condition 2 only.
- C. required to be entered with the Unit in either Condition.
- D. **NOT** required to be entered with the Unit in either Condition.

59. Given the following:

- A LOCA has occurred on Unit 1.
- One train of EGTS has been removed from service in accordance with E-1, "Loss of Reactor or Secondary Coolant."

Which ONE of the following identifies ...

- (1) the purpose of the charcoal filter on the suction side of the EGTS cleanup fan,  
and
  - (2) why flow is maintained through the EGTS Filter removed from service?
- A. (1) To remove iodine and other halogen gases.  
(2) To remove the heat generated in the charcoal bed.
- B. (1) To remove iodine and other halogen gases.  
(2) To prevent corrosive carbolic acid build-up in the charcoal bed.
- C. (1) To remove Cesium and other particulates.  
(2) To remove the heat generated in the charcoal bed.
- D. (1) To remove Cesium and other particulates.  
(2) To prevent corrosive carbolic acid build-up in the charcoal bed.

60. Given the following plant conditions:

- The plant is in Mode 6.
- The Reactor Cavity has been filled from the RWST.
- Reactor Cavity and Spent Fuel Pool (SFP) levels are equalized.
- A purification of the Transfer Canal has just been commenced.
- A rupture of the Transfer Canal drain line then occurs.
- Reactor Cavity and SFP levels are at 747' and lowering.

Which ONE of the following identifies ...

- (1) if no operator action is taken, at what level above the fuel assemblies would the Spent Fuel Pool level stabilize,  
and
- (2) if the operators respond by isolating the leak and immediately establishing makeup to the SFP makeup per SOI-78.01, "Spent Fuel Pool Cooling and Cleaning System," the source of makeup to the SFP that will be used?

- A. (1) 13 feet  
(2) Demineralized water
- B. (1) 13 feet  
(2) RWST
- C. (1) 25 feet, 10 inches  
(2) Demineralized water
- D. (1) 25 feet, 10 inches  
(2) RWST

61. Given the following conditions:

- Unit 1 is at 21% power with all systems in normal alignment.
- The Main Generator is synchronized to the grid.
- SG #1 Main Steam Isolation Valve closes due to a spurious signal.

Assuming the reactor does **NOT** trip, which ONE of the following describes how RCS  $\Delta T$  and Steam Generator pressure will INITIALLY respond in the affected loop?

In the affected Loop, RCS  $\Delta T$ ...

- A. rises and SG steam pressure rises.
- B. rises and SG steam pressure lowers.
- C. lowers and SG steam pressure rises.
- D. lowers and SG steam pressure lowers.

62. Given the following conditions:

The plant is at 40% power and 1-TRI-47-1, "Main Turbine Oil Trip Devices Quarterly Test" is in progress for the mechanical overspeed trip device.

Operator #1 places the TO TEST - NORMAL lever to the TO TEST position.  
Operator #2 fully opens the 1-TV-47-27, Overspeed Trip Test valve.

If the TO TEST - NORMAL lever were to slip from Operator #1's grasp, which ONE of the following will occur?

- A. Neither the turbine nor the reactor will trip, but indicated auto stop oil pressure will drop to approximately 70 psig and stabilize.
- B. Neither the turbine nor the reactor will trip, but indicated auto stop oil pressure will drop to 0 psig.
- C. ONLY the turbine will trip. The reactor will remain operating.
- D. BOTH the reactor and the turbine will trip.

63. Given the following conditions:

- Reactor power is steady-state at 80%.
- Condenser Vacuum Pumps (CVP) 1A and 1B are running.
- Condenser Vacuum Pump 1C pump is out of service for maintenance.

Which ONE of the following conditions would result if NO operator action is taken in response to a leak which completely drains the seal water tank?

- A. CVP 1B would trip when seal water pressure drops to 12 psig, and condensate temperature leaving the hotwell would rise.
- B. CVP 1B would trip when seal water pressure drops to 20 psig, and condensate temperature leaving the hotwell would drop.
- C. Both the Generator electrical output and condensate temperature leaving the hotwell would drop.
- D. The Generator electrical output would drop and condensate temperature leaving the hotwell would rise.

64. Given the following:

- A release of the Waste Gas Tank "C" is being performed.

Which ONE of the following identifies...

- (1) the ABGTS alignment required during the release,  
and
- (2) how the running ABGTS fan will be affected if the release is automatically terminated due to an instrument malfunction of 0-RM-90-118, Waste Gas Release Radiation Monitor?

ABGTS alignment

Running ABGTS fan will...

- |  |   |
|--|---|
| A. Either ABGTS Train can be in service.       | automatically shutdown.                     |
| B. Either ABGTS Train can be in service.       | have to be manually shutdown using the SOI. |
| C. ABGTS Train A is required to be in service. | automatically shutdown.                     |
| D. ABGTS Train A is required to be in service. | have to be manually shutdown using the SOI. |

65. Which ONE of the following describes a personnel hazard associated with the fire extinguishing agent used in the Lube Oil Dispensing Room, and the method used to warn personnel that the extinguishing agent has been discharged?

<u>Hazard</u>	<u>Method of Protecting Personnel</u>
A. asphyxiation from CO <sub>2</sub>	wintergreen odor AND audible alarm
B. asphyxiation from CO <sub>2</sub>	audible alarm ONLY
C. toxic fumes from aqueous foam	wintergreen odor AND audible alarm
D. toxic fumes from aqueous foam	audible alarm ONLY

66. Which ONE of the following describes an acceptable method for verifying the position of a LOCKED and THROTTLED valve in a safety related flowpath?
- A. Independent verification is conducted by two individuals at different times, where the first positions and locks the valve. The second then verifies the locking mechanism installed.
  - B. Independent verification is conducted by two individuals, one who physically positions and locks the valve and the second who verifies valve closure using alternate indications.
  - C. Concurrent verification is conducted by two individuals at the same time where one initially positions and locks the valve while the second party observes.
  - D. Concurrent verification is conducted by two individuals at the same time where the valve is positioned and locked, then a third person is required to verify the locking mechanism is in place.

67. Which ONE of the following identifies two (2) components that can be directly controlled from the Auxiliary Control Room 1-L-10 Panel?
- A. TD AFW pump.  
SG #3 PORV 1-PCV-1-23.
  - B. TD AFW pump.  
Main Steam Isolation Valve 1-FCV-1-4.
  - C. SG #3 PORV 1-PCV-1-23.  
M-D AFW Pump 1B-B Pressure Control Valve.
  - D. Main Steam Isolation Valve 1-FCV-1-4.  
M-D AFW Pump 1B-B Pressure Control Valve.

68. Given the following:

- Unit 1 is at 100% power.
- The Shift Manager and the Shift Technical Advisor (who has an active SRO license) are in the Control Room discussing an upcoming evolution.
- The Unit 1 Unit Supervisor is on a plant walkdown when the following events occur:
  - Unit 1 experienced a spurious turbine trip.
  - The Unit 1 reactor did NOT trip automatically and could not be tripped manually from the Control Room.

In accordance with TI-12.04, "User's Guide for Abnormal and Emergency Operating Instructions," which ONE of the following identifies who can be the initial EOP 'Procedure Reader,' and also identifies the required frequency of 'Status Tree' monitoring while performing FR-S.1, "Nuclear Power Generation/ATWS?"

<u>Procedure Reader</u>	<u>Status Tree Monitoring</u>
A. Shift Manager	Continuously
B. Shift Technical Advisor	Continuously
C. Shift Manager	Every 10-20 minutes
D. Shift Technical Advisor	Every 10-20 minutes

69. Given the following:

- An operator is retrieving an electrical system schematic drawing from the Business Support Library (BSL) to verify system status.
- The computer screen displays 2 active versions of the print.
- The "Drawing Type" column identifies one as "AC" and the other as "CC."

Which ONE of the following identifies...

- (1) which of the prints is the correct print to retrieve from BSL,  
and  
(2) how markings on a MCR primary drawing would reflect a recent change that  
added something to the print?

- |    | <u>(1)</u> | <u>(2)</u>       |
|----|------------|------------------|
| A. | AC         | with Green lines |
| B. | AC         | with Red lines   |
| C. | CC         | with Green lines |
| D. | CC         | with Red lines   |

70. Given the following conditions;

- Unit 1 is in Mode 3 with a reactor startup in progress.
- During Control Rod withdrawal, the OAC notes the following:
  - Control Bank A Group 1 demand position indication is 107 steps.
  - All of the Group 1 control rod RPIs indicate from a low of 94 steps to a high of 111 steps.
  - Control Bank A Group 2 demand position indication is 104 steps.
  - All of the Group 2 Control rod RPIs indicate from a low of 97 steps to a high of 108 steps.
  - Control Bank B step counters and all RPIs indicate zero (0).

Which ONE of the following actions is required?

- A. Immediately open the Reactor Trip breakers.
- B. Restore rod to within alignment limits within 1 hour.
- C. Stop rod withdrawal until RPI indications are verified.
- D. Manually insert all Bank A Control Rods to zero steps.

71. Given the following:

- The operating crew is performing AOI-31, "Abnormal Release of Radioactive Material," due to radiation being detected in the Turbine Building.
- Turbine Building Station Sump is determined to have high radiation.
- Station Sump pumps are realigned to the unlined pond.
- Efforts to determine the point of release and terminate are underway.

In accordance with AOI-31, which ONE of the following describes...

- (1) why the station sumps will be operated locally,  
and  
(2) the position of the station sump pump handswitches if Radiological Protection determines the area must be evacuated?
- A. (1) To prevent overflowing sump into the condenser waterbox area.  
(2) Placed in off.
- B. (1) To prevent overflowing sump into the condenser waterbox area.  
(2) Placed in automatic.
- C. (1) To prevent overflowing the Unlined Pond.  
(2) Placed in off.
- D. (1) To prevent overflowing the Unlined Pond.  
(2) Placed in automatic.

72. During accident conditions, which ONE of the following identifies the maximum dose an individual is allowed to receive to prevent damage to equipment needed for protection of the public?
- A. 5 Rem
  - B. 10 Rem
  - C. 25 Rad
  - D. 75 Rad

73. Given the following:

- The operating crew is performing E-1, "Loss of Primary or Secondary Coolant."
- The "Procedure Reader" directs the OAC to perform an action contained in a step of the procedure.

Which ONE of the following correctly describes the crew's "Peer Checking" and "Place Keeping" responsibilities related to performance of the step in accordance with OPDP-1, "Conduct of Operations?"

<u>Peer Checking</u>	<u>Place Keeping</u>
A. Required	Initial the step when completed.
B. Required	Use the "circle/slash" method.
C. Desired but not required	Initial the step when completed.
D. Desired but not required	Use the "circle/slash" method.

74. Given the following:

- Unit 1 is responding to a LOCA.
- The operators are performing E-1, "Loss of Reactor or Secondary Coolant," when the STA reports the following Critical Safety Functions (CSFs) status indications:

<u>CSF</u>	<u>Status</u>
1. INVENTORY	Yellow
2. CORE COOLING	Red
3. CONTAINMENT	Green
4. PRESSURIZED THERMAL SHOCK	Green
5. HEAT SINK	Red
6. SUBCRITICALITY	Yellow

Which ONE of the following is the correct order in which these CSFs shall be prioritized in regard to the challenge presented?

- A. 5, 2, 6, 4, 3, 1
- B. 2, 5, 6, 1, 4, 3
- C. 5, 2, 6, 1, 4, 3
- D. 2, 5, 6, 4, 3, 1

75. Given the following:

- A LOCA has occurred on Unit 1.
- The operating crew is responding in accordance with the Emergency Procedures.
- All Emergency Centers are staffed and operational.
- The SED has just initiated Assembly and Accountability.

Which ONE of the following correctly identifies both...

- (1) the Operator at the Controls' (OAC) responsibility when Assembly and Accountability is sounded,  
and
  - (2) if someone calls x3911 to report a medical emergency after the OSC is staffed and operational, who will answer the phone?
- A. (1) The OAC's badge must be swiped for Assembly and Accountability.  
(2) x3911 calls will continue to be answered by the MCR staff.
- B. (1) The OAC's badge must be swiped for Assembly and Accountability.  
(2) x3911 calls will be directed to and answered by the OSC staff.
- C. (1) The OAC will already be carded in for Assembly and Accountability due to being in the MCR.  
(2) x3911 calls will continue to be answered by the MCR staff.
- D. (1) The OAC will already be carded in for Assembly and Accountability due to being in the MCR.  
(2) x3911 calls will be directed to and answered by the OSC staff.

## 11/2009 RO NRC Exam Reference Package

1. Steam Tables
2. Control Bank Insertion Limits Versus Thermal Power Four Loop Operation,  
COLR page 6

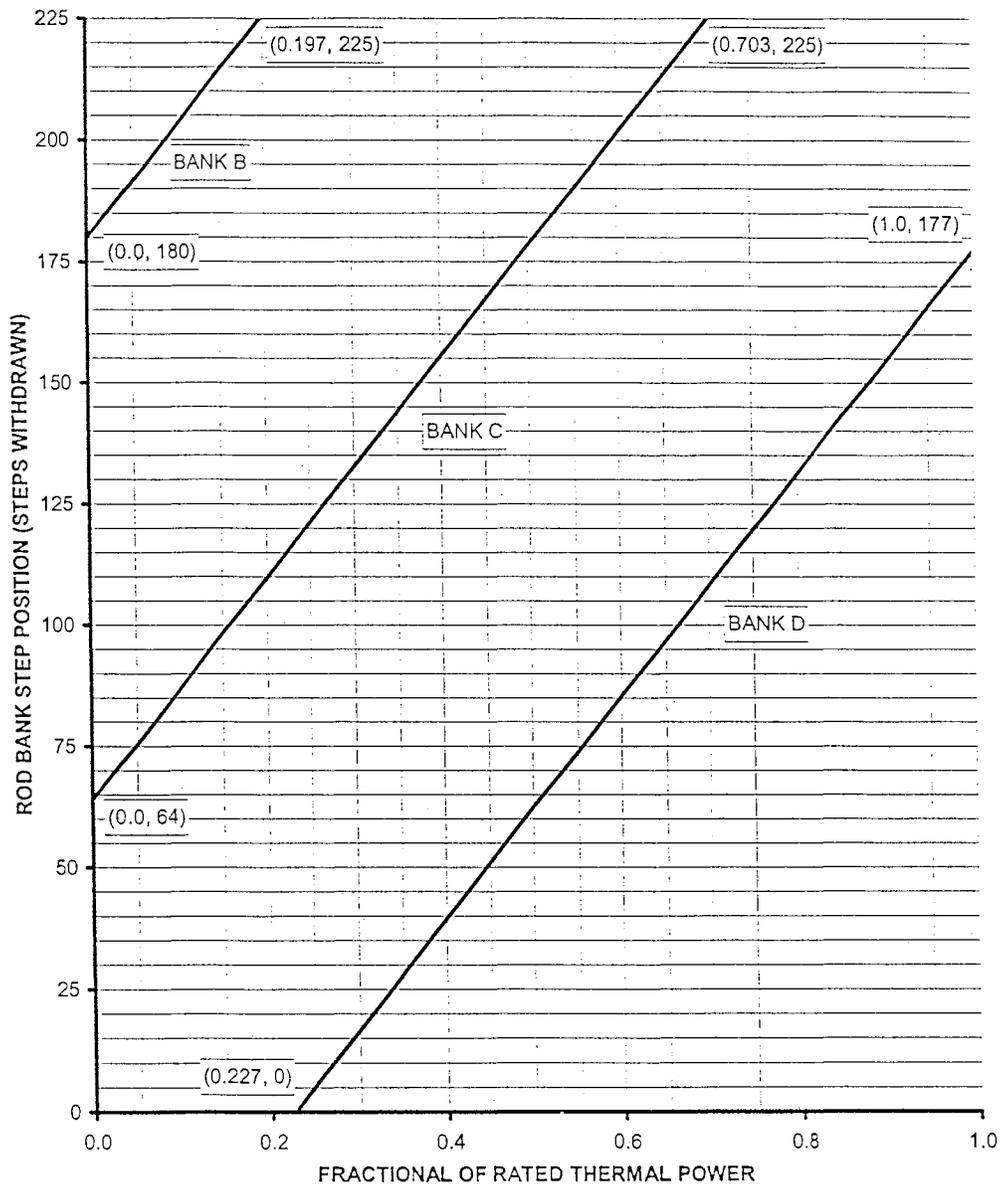


Figure 1  
Control Bank Insertion Limits Versus Thermal Power  
Four Loop Operation

\* Fully withdrawn region shall be the condition where shutdown and control banks are at a position within the interval of  $\geq 225$  and  $\leq 231$  steps withdrawn.

11/2009 Watts Bar RO NRC License Exam  
12/17/2009

#	ID	Points	Type	Answers
1	007 EG2.4.21 1	1.00	MCS	B
2	009 EA 2.20 2	1.00	MCS	A
3	011 EK1.01 3	1.00	MCS	C
4	015 AK1.02 4	1.00	MCS	B
5	022 AA1.02 5	1.00	MCS	D
6	025 AK2.05 6	1.00	MCS	C
7	026 AK3.02 7	1.00	MCS	C
8	027 AK2.03 8	1.00	MCS	B
9	029 EK1.05 9	1.00	MCS	D
10	038EA2.11 10	1.00	MCS	A
11	040 AA1.23 11	1.00	MCS	A
12	054 AK3.03 12	1.00	MCS	D
13	055 EA2.06 13	1.00	MCS	C
14	057 AG2.1.23 14	1.00	MCS	B
15	058 AG2.3.34 15	1.00	MCS	D
16	065 AK3.04 16	1.00	MCS	B
17	077 AK2.03 17	1.00	MCS	A
18	W/E04 EA1.3 18	1.00	MCS	A
19	024 AA2.02 19	1.00	MCS	A
20	028 AK3.05 20	1.00	MCS	B
21	036 AG2.4.2 21	1.00	MCS	A
22	059AK3.01 22	1.00	MCS	A
23	067 AK1.01 23	1.00	MCS	A
24	069 AA1.01 24	1.00	MCS	C
25	W/E01 EA1.3 25	1.00	MCS	D
26	W/E13 EG2.1.31 26	1.00	MCS	B
27	W/E15 EK2.2 27	1.00	MCS	B
28	003 A1.09 28	1.00	MCS	A
29	004 K5.36 29	1.00	MCS	B
30	005 G2.1.23 30	1.00	MCS	B
31	005 K6.03 31	1.00	MCS	C
32	006 K5.09 32	1.00	MCS	C
33	007 A4.01 33	1.00	MCS	C
34	007 A4.09 34	1.00	MCS	A
35	008 K1.05 35	1.00	MCS	D
36	010 A4.03 36	1.00	MCS	D
37	012 A3.03 37	1.00	MCS	A
38	012 G 2.1.30 38	1.00	MCS	C
39	013 K6.01 39	1.00	MCS	B
40	022 K2.02 40	1.00	MCS	C
41	026 K4.08 41	1.00	MCS	A
42	039 K1.02 42	1.00	MCS	D
43	059 K3.04 43	1.00	MCS	B
44	059 K4.02 44	1.00	MCS	D
45	061 A2.08 45	1.00	MCS	A

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12/17/2009

#	ID	Points	Type	Answers
46	062 A2.09 46	1.00	MCS	A
47	062 A2.10 47	1.00	MCS	D
48	063 K3.01 48	1.00	MCS	C
49	063 K4.01 49	1.00	MCS	D
50	064 A1.04 50	1.00	MCS	B
51	064 K1.03 51	1.00	MCS	A
52	073 K3.01 52	1.00	MCS	A
53	076 K2.01 53	1.00	MCS	B
54	078 A3.01 54	1.00	MCS	C
55	103 G2.4.30 55	1.00	MCS	B
56	001 A1.13 56	1.00	MCS	C
57	002 A4.05 57	1.00	MCS	C
58	016 G 2.2.38 58	1.00	MCS	C
59	027 K5.01 59	1.00	MCS	A
60	033 A2.03 60	1.00	MCS	B
61	035 K6.01 61	1.00	MCS	C
62	045 K4.46 62	1.00	MCS	C
63	055 K3.01 63	1.00	MCS	D
64	071 A2.02 64	1.00	MCS	D
65	086 K5.04 65	1.00	MCS	A
66	G 2.1.29 66	1.00	MCS	C
67	G 2.1.30 67	1.00	MCS	C
68	G 2.1 6 68	1.00	MCS	B
69	G 2.2.41 69	1.00	MCS	D
70	G 2.2.42 70	1.00	MCS	A
71	G 2.3.13 71	1.00	MCS	B
72	G 2.3.4 72	1.00	MCS	B
73	G 2.4.12 73	1.00	MCS	D
74	G 2.4.21 74	1.00	MCS	B
75	G 2.4.39 75	1.00	MCS	A
<b>SECTION 1 ( 75 items)</b>		<b>75.00</b>		

**ENCLOSURE 4**

**Questions Asked by and Answers Given to the Applicants**

Questions Asked During Administration of WBN  
NRC Written Examination 12-17-2009

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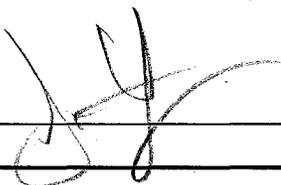
Question # 12

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Question Asked:

Could the word direct be substituted  
with the word cause

Applicant Signature: \_\_\_\_\_



Time: \_\_\_\_\_

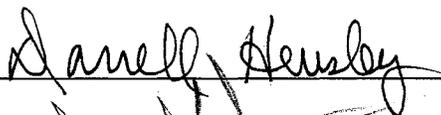
0808  
12/17/09

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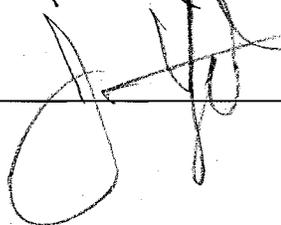
Response Provided:

It would be acceptable to interpret "direct" as also  
meaning "cause." However, master copy of exam  
remains as is.

Proctor Signature: \_\_\_\_\_



Applicant Signature: \_\_\_\_\_



Time: \_\_\_\_\_

0821

Questions Asked During Administration of WBN  
NRC Written Examination 12-17-2009

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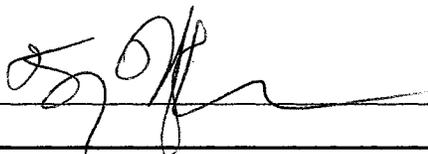
Question # 20

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Question Asked:

DOES THE PER LVL MASTER CONTROLLER SETPOINT  
MEAN THE SAME AS 1-2A-68-339 GREEN BEN

Applicant Signature: \_\_\_\_\_



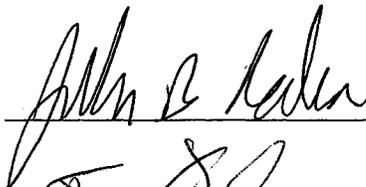
Time: 1154

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Response Provided:

YES. MEANS THE SAME

Proctor Signature: \_\_\_\_\_



Applicant Signature: \_\_\_\_\_



Time: 1205

Questions Asked During Administration of WBN  
NRC Written Examination 12-17-2009

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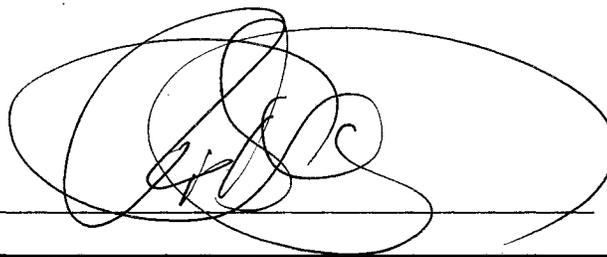
Question # 32

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Question Asked:

DOES INITIALLY MEAN AT THE TIME OF CCP  
STOPPED?

Applicant Signature: \_\_\_\_\_



Time: 11:17

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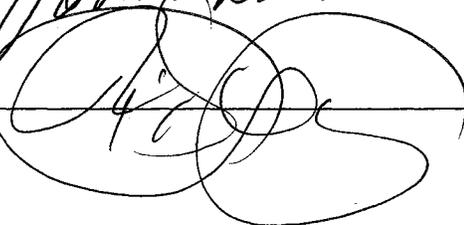
Response Provided:

MEANS when the CCP is STOPPED, the  
initial effect.

Proctor Signature: \_\_\_\_\_



Applicant Signature: \_\_\_\_\_



Time: 12:18

Questions Asked During Administration of WBN  
NRC Written Examination 12-17-2009

Question # 43

Question Asked: In HI HI, heaters A1 + B1 will  
ISOLATE. → AT 100% power C1 heater  
~~will~~ should provide ENOUGH RESTRICTION ~~where~~ S/G  
Level will Drop ⇒ RCS Temp may Rise.

If I ASSUME ~~the~~ ~~the~~ S/G levels will be  
MAINTAINED AND I feed with JUST ONE HEATER  
⇒ VERY COLD FEEDWATER + Temp will Drop

Applicant Signature: [Signature]

Time: 0945

Response Provided:

~~Received as a~~ ~~comment~~ ~~only~~, therefore

Upon discussion and clarification with NRC, we are  
pointing out that the stem asks for the initial effect...

Proctor Signature: [Signature]

Applicant Signature: [Signature] Time: 1012

Questions Asked During Administration of WBN  
NRC Written Examination 12-17-2009

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Question # 61

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Question Asked:

LCS  $\Delta T$  Are you asking  
for  $\Delta T$  for LOOP #1?

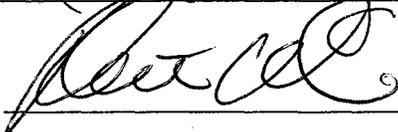
Applicant Signature:  Time: 1025

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Response Provided:

There is enough information as written to answer  
the question.

Proctor Signature: 

Applicant Signature:  Time: 1025

Questions Asked During Administration of WBN  
NRC Written Examination 12-17-2009

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Question # 73

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Question Asked:

Is "Peer Checking" the same as "Switch Checking" per OPDR 1 d  
T1-12.04?

Applicant Signature: Thomas Husky

Time: 12:20 pm

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Response Provided:

No further clarification is required. Sufficient  
information is provided as written,

Proctor Signature: Daniel Husky

Applicant Signature: Thomas Husky

Time: 12:35 pm