

<p><b>U.S. Nuclear Regulatory Commission</b></p> <p><b>Site-Specific RO Written Examination</b></p>	
<p><b>Applicant Information</b></p>	
<p>Name: _____</p>	
<p>Date: August 28, 2012</p>	<p>Facility/Unit: Surry Nuclear Power Plant</p>
<p>Region:        I / <u>II</u> / III / IV</p>	<p>Reactor Type: <u>W</u> / CE / BW / GE</p>
<p>Start Time: _____</p>	<p>Finish Time: _____</p>
<p><b>Instructions</b></p> <p>Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination, you must achieve a final grade of at least 80.00</p>	
<p><b>Applicant Certification</b></p> <p>All work done on this examination is my own. I have neither given nor received aid.</p> <p style="text-align: right;">_____</p> <p style="text-align: right;">Applicant's Signature</p>	
<p><b>Results</b></p>	
<p>Examination Value</p>	<p>_____ Points</p>
<p>Applicant's Score</p>	<p>_____ Points</p>
<p>Applicant's Grade</p>	<p>_____ Percent</p>

1. Initial conditions:

- Unit 1 is at 90% power.
- Reactor protection testing is in progress on Train A.
- Reactor Trip Breaker "B" is closed.
- Reactor Trip Breaker "A" is open.
- Reactor Trip Bypass Breaker "A" is closed.

Current Conditions:

- No other breaker manipulations have been performed.

Which ONE of the following describes the **immediate response** to the reactor trip breaker "B" and the reactor trip bypass breakers if the Reactor Trip Bypass Breaker "B" is closed?

- A. Reactor Trip Bypass Breakers "A" and "B" will trip open.  
Reactor Trip Breaker "B" will trip open.
- B. Reactor Trip Bypass Breakers "A" and "B" will trip open.  
Reactor Trip Breaker "B" will remain closed.
- C. Reactor Trip Bypass Breaker "B" will trip open. Reactor Trip Bypass Breaker "A" will remain closed.  
Reactor Trip Breaker "B" will remain closed.
- D. Reactor Trip Bypass Breakers "A" and "B" will remain closed.  
Reactor Trip Breaker "B" will remain closed.

## 2. Initial Conditions

- Unit 1 is at 100% and 2250 psig.
- The PRT is at 3 psig.

### Current Conditions

- Annunciator 1D-H4, "PRZR SFTY VV / PWR RELIEF VV OPEN" is alarming.
- The PRT is 10 psig and increasing.
- Reactor Pressure is 2210 psig and decreasing.
- There is a report that the local safety valve acoustic monitor indicates a valve partially open.

Which ONE of the following describes the appropriate actions IAW ARP 1D-H4?

The leaking valve is confirmed by the associated downstream temperature reading approximately \_\_\_\_ (1) \_\_\_\_, and the crew is required to \_\_\_\_ (2) \_\_\_\_.

- A. (1) the saturation pressure of the Pressurizer  
(2) initiate 1-E-0, "Reactor Trip or Safety Injection"
- B. (1) the saturation pressure of the Pressurizer  
(2) close the associated PORV block valve
- C. (1) the saturation pressure of the PRT  
(2) initiate 1-E-0, "Reactor Trip or Safety Injection"
- D. (1) the saturation pressure of the PRT  
(2) close the associated PORV block valve

3. The following conditions exist:

- Unit 1 has tripped from 100% power due to a Large Break Loss of Coolant Accident (LBLOCA).
- The operating crew has transitioned to 1-E-1, "LOSS OF REACTOR OR SECONDARY COOLANT", step 22, "Check if SI accumulators should be isolated".
- RCS hot leg temperatures are:
  - Loop "A" Th = 394 F.
  - Loop "B" Th = 393 F.
  - Loop "C" Th = 396 F.
- Power is available to all Accumulator discharge isolation valves.
- Both trains of SI have been reset.

Which ONE of the following completes the statement:

1-E-1 directs isolation of \_\_\_\_ (1) \_\_\_\_, and the MOVs for the accumulators to be isolated can be closed with the ACC Interlock in \_\_\_\_ (2) \_\_\_\_.

- A. (1) A, B and C Accumulators  
(2) NORMAL
- B. (1) A and B Accumulators, but not C Accumulator  
(2) NORMAL
- C. (1) A, B and C Accumulators  
(2) DEFEAT
- D. (1) A and B Accumulators, but not C Accumulator  
(2) DEFEAT

4. Initial conditions:

- Unit 1 is at 100% power.
- Pressurizer (PRZR) is at program level.
- Charging Pump "A" is running.
- Charging Pumps "B" and "C" normal breakers are racked in, and their switches in the Control Room are in AUTO.

Current conditions:

- Charging flow and discharge pressure are erratic.
- Charging pump amps are erratic on all three running pumps.
- Seal injection is oscillating between 4 and 5 gpm.
- PRZR level is at 19% and lowering. Charging flow has not been restored.
- 1-AP-8.00, "Loss of Normal Charging Flow" has been entered.
- Letdown flow and pressure indications are oscillating.

Which ONE of the following describes the correct sequence of actions IAW 1-AP-8.00 to secure charging and letdown, and restore pressurizer make-up?

- A. Trip Unit 1 ONLY. THEN isolate letdown and place all Unit One charging pumps in PTL. Dispatch personnel to vent and restart a charging pump.
- B. Trip BOTH Units. THEN isolate letdown and place all Unit One charging pumps in PTL. Dispatch personnel to establish charging cross-tie from Unit Two.
- C. Isolate letdown and place all Unit One charging pumps in PTL. THEN Trip Unit 1 ONLY. Dispatch personnel to vent and restart a charging pump.
- D. Isolate letdown and place all Unit One charging pumps in PTL. THEN Trip BOTH Units. Dispatch personnel to establish charging cross-tie from Unit Two.

5. Initial Conditions:

- Unit 1 has been shutdown for 35 days
- The RHR System aligned for normal operation.
- RCS level is at "mid-loop" 12.4 feet and stable as read on 1-RC-LI-100A.
- The "A" RHR pump is running.
- 1-RH-FC-1605C (RHR HXS BYP FLOW) controller fails to 100% full open demand in AUTO

Current Conditions:

- RHR flow is oscillating from 1500 to 3000 gpm.
- "A" RHR pump amps are oscillating
- RHR HX LO FLOW annunciator, 1B-G6 alarming

Based on the above conditions, which ONE of the following identifies the correct action to mitigate the event as directed by 1-AP-27.00 (LOSS OF DECAY HEAT REMOVAL CAPABILITY)?

- A. Raise RCS level by opening 1-SI-MOV-1869A (Th HHSI Isolation MOV).
- B. Reduce RHR flow by placing 1-RH-FC-1605C in MAN and lowering demand.
- C. Stop the "A" RHR pump.
- D. Start the "B" RHR pump.

6. Unit 1 Initial Conditions:

- 75% Power at Middle-of-Life (MOL) conditions.
- Excess Letdown is in service in preparation for removing Normal Letdown from service.

Current conditions:

- Component Cooling (CC) surge tank level is slowly DECREASING at 1% every 5 minutes.
- VCT level is slowly increasing.
- No operator actions have been taken.

Which ONE of the following completes the statement below?

The above conditions are consistent with a tube leak in the \_\_\_\_ (1) \_\_\_\_, which will cause reactor power to \_\_\_\_ (2) \_\_\_\_.

- A. (1) RCP Seal Return Heat Exchanger  
(2) increase
- B. (1) RCP Seal Return Heat Exchanger  
(2) decrease
- C. (1) Excess Letdown Heat Exchanger  
(2) increase
- D. (1) Excess Letdown Heat Exchanger  
(2) decrease

7. Unit 1 plant conditions:

- Rx heatup is in progress
- RCS pressure is 1900 psig

Which ONE of the following is the response of the pressurizer PORVs if pressurizer pressure transmitter 1-RC-PT-1444 fails high?

- A. Only 1-RC-PCV-1455C will open.
- B. Only 1-RC-PCV-1456 will open.
- C. Both 1-RC-PCV-1455C and 1-RC-PCV-1456 will open.
- D. Neither 1-RC-PCV-1455C nor 1-RC-PCV-1456 will open.



8. Unit 1 has experienced an Anticipated Transient Without Trip (ATWT).

- Operators have transitioned out of 1-E-0 to 1-FR-S.1
- SI has NOT been initiated.
- Charging Flow is 80 gpm.
- The BATP has been placed in FAST
- 1-CH-MOV-1350 (Emergency Borate Valve) will not open from the Control Room.

Based on the above conditions, which ONE of the following choices identifies the required procedure actions for getting boron into the reactor per 1-FR-S.1?

- A. Start a second Charging pump and fully open 1-CH-FCV-1122 (Charging Flow Control Valve).
- B. Locally open 1-CH-MOV-1350, after 21 minutes close 1-CH-MOV-1350.
- C. Open 1-CH-MOV-1115B and D (CHG pump suction from RWST) and Close 1-CH-MOV-1115C and E (CHG PUMP SUCTION FROM VCT).
- D. Manually open 1-CH-FCV-1113A (BORON TO BLENDER FLOW CONTROL), then dispatch an operator to establish Manual Emergency Boration by opening 1-CH-228 (MANUAL EMERGENCY BORATE STOP)

9. The following plant conditions exist:

- Tube Rupture on "A" SG.
- The operating team has cooled the RCS to 485 °F and completed the RCS depressurization.
- The ruptured SG pressure is 935 psig.
- Pressurizer level is 65%.
- Ruptured SG level is 45% NR and decreasing.

The operating team is currently performing step 35, *Control RCS Pressure and CHG Flow to Minimize RCS to Secondary Leakage*.

Which ONE of the following (1) describes the actions required by E-3, and (2) the basis for this action?

- A. (1) Turn ON pressurizer heaters to raise RCS pressure.  
(2) This will minimize RCS volume loss.
- B. (1) Turn ON pressurizer heaters to raise RCS pressure.  
(2) This will lead to a reduction in pressurizer level.
- C. (1) Use main or auxiliary spray to lower RCS pressure.  
(2) This will minimize RCS volume loss.
- D. (1) Use main or auxiliary spray to lower RCS pressure.  
(2) This will lead to a reduction in pressurizer level.

10. Reactor power was noted to be 101% and rapidly rising. The crew tripped the reactor and entered E-0, Reactor Trip or Safety Injection.

There is a report of a significant break on the supply to the TDAFW. All personnel have been evacuated from the area due to the unsafe conditions.

The crew has transitioned to ECA-2.1, Uncontrolled Depressurization of All Steam Generators.

Given the following:

- All Narrow Range Cold leg Temperature indications have lowered 18 °F in the last 5 minutes.
- Feedflow to each Steam Generator has been adjusted to 60 gpm.
- A Steam Generator level is 11% NR
- B Steam Generator level is 8% NR
- C Steam Generator level is 10% NR
- All Steam Dumps are closed.

Which ONE of the following describes the required actions IAW ECA-2.1?

- A. Lower feeding each steam generator to 25 gpm.
- B. Stop feeding all Steam Generators.
- C. Stop feeding only the A and C Steam Generators.
- D. Continue feeding all Steam generators at the current flow rates.

11. The AAC Diesel Generator is removed from service for scheduled maintenance. A sustained loss of offsite power has led to a reactor and turbine trip. The #1 and #3 EDG fail to start.

Five (5) minutes after the trip, the following conditions exist:

- RCS Pressure is 2107 psia and slowly lowering.
- Highest CETC is 575 °F and slowly rising.
- T<sub>C</sub> is 509 °F and slowly lowering.
- Delta T is 64 °F and slowly rising.
- SG pressure is 720 psig and stable.

Which ONE of the following describes the status of RCS heat removal?

- A. Reflux Cooling has developed.
- B. A pending loss of natural circulation is indicated.
- C. Single phase natural circulation is fully developed.
- D. Natural circulation is developing.

12. A loss of Vital Bus III has just occurred.

Which ONE of the following describes the reason that AP-10.03, Loss of Vital Bus III, requires the operators to trip the reactor?

Losing the vital bus causes a loss of \_\_\_\_\_.

- A. CC to the RCP thermal barriers.
- B. Pressurizer pressure control.
- C. CC to the A RCP lube oil cooler.
- D. Main and bypass Feed Regulating Valve Control.

13. With the unit initially at 100% power, a fault developed in the 1A battery bank (failed cell) that resulted in a loss of the 1A DC bus. Electricians have verified that the DC distribution system is unaffected.

Which ONE of the following states the recovery method for the 1A DC bus in accordance with 1-AP-10.06 (Loss of DC power)?

- A. Direct electricians to lift battery leads, open all breakers in the DC distribution panels, and align at least one battery charger to the DC bus.
- B. Direct electricians to lift battery leads and align at least one battery charger to the DC bus.
- C. Direct electricians to lift battery leads and close the "A" DC bus crosstie breaker.
- D. Direct electricians to lift battery leads, open all breakers in the DC distribution panels, and close the "A" DC bus crosstie breaker.

14. Unit 1 initial conditions:

- 100% power.
- 'A' Charging Pump is in service.
- The following alarms received in the Main Control Room:
  - 1D-G5, SW or CC Pps Disch to Chg Pps Lo Press
  - 0-VSP-M4, Flood Cont Pnl Trbl
- Flood Panel light LS-DA-115A-1, Unit #1 ESGR is illuminated.

Which ONE of the following completes the statement below?

The above conditions are consistent with a rupture of the supply piping from the Charging Pump \_\_\_(1)\_\_\_ system. If left uncorrected, 'A' Charging Pump \_\_\_(2)\_\_\_ could be damaged.

- A. (1) Component Cooling  
(2) seals
- B. (1) Component Cooling  
(2) bearings
- C. (1) Service Water  
(2) seals
- D. (1) Service Water  
(2) bearings

15. Unit 1 initial conditions:

- A SBLOCA has occurred.
- Containment pressure reached a maximum of 18.3 psia

Current conditions:

- Containment pressure has stabilized at 16.5 psia.

Which ONE of the following completes the description of control room indications on the Containment Instrument Air system?

1-IA-PT-106, Containment Instrument Air pressure, indicates \_\_\_(1)\_\_\_, and

1-IA-TV-101A/B, Normal Compressor Suction Valves, are \_\_\_(2)\_\_\_.

- A. (1) pressurized  
(2) OPEN
- B. (1) pressurized  
(2) CLOSED
- C. (1) depressurized  
(2) OPEN
- D. (1) depressurized  
(2) CLOSED



16. A transient is in progress and the following alarms have been received:

- 1B-F3, SFGDS AREA SUMP HI LEVEL is in ALARM.
- 1C-B8, PRZR LO PRESS.
- 1C-D8, PRZR LO LVL.
- 1F-A7 (B7), STM GEN A LO LVL – CHN 1 (CHN 2)
- 1F-A8 (B8), STM GEN B LO LVL – CHN 1 (CHN 2)
- 1F-A9, (B9), STM GEN C LO LVL – CHN 1 (CHN 2)
- 1H-B8, AFW Pump 3A LOCKOUT OR OL TRIP is in ALARM.
- 1-RM-D4, 1-RM-RI-154 (AUX BLDG CONT) HIGH is in ALARM.

Which ONE of the following casualties is in progress?

- A. Steam Generator Tube Rupture
- B. LOCA Outside Containment
- C. LOCA Inside Containment
- D. Loss of Secondary Heat Sink

17. Which one of the following correctly completes the statements listed below in accordance with the requirements of 1-ECA-1.1 (LOSS OF EMERGENCY COOLANT RECIRCULATION)?

The RMT MODE TRANSFER SWITCH will be placed in the (1) mode.

And

If containment sump blockage exists when 1-ECA-1.1 is entered, (2)

- A. 1) REFUEL  
2) FR procedures apply throughout the procedure
- B. 1) REFUEL  
2) FR procedures are suspended until directed
- C. 1) RMT  
2) FR procedures apply throughout the procedure
- D. 1) RMT  
2) FR procedures are suspended until directed

18. Unit 1 Initial Conditions:

- Unit 1 has experienced a LOCA from 100% power.

Unit 1 Current Conditions:

- PRZR pressure is 2200 psig.
- CETC temperatures are increasing.
- Containment Pressure is 21 psia.
- RCS Hot Leg temperatures are 552 degrees F and increasing.
- AFW flow has been lost to all Steam Generators.
- WIDE RANGE level in 1A Steam Generator is 21 %.
- WIDE RANGE level in 1B Steam Generator is 20 %.
- WIDE RANGE level in 1C Steam Generator is 20 %.
- The Unit Supervisor has directed entry into 1-FR-H.1 (RESPONSE TO LOSS OF SECONDARY HEAT SINK).

Based on Current Conditions, which ONE of the following correctly completes the statements listed below in accordance with 1-FR-H.1 (RESPONSE TO LOSS OF SECONDARY HEAT SINK)?

When the ability to supply feedwater is restored, feed flow should initially be \_\_\_\_\_.

- A. limited to 60 gpm per SG
- B. limited to 100 gpm per SG
- C. minimum of 350 gpm total
- D. established to ONE SG at the maximum available rate

19. Unit 1 Current Conditions:

- One Control Rod has dropped (Rod Bottom Light lit).
- The Rod Control System is in Manual.
- Tave is 532 degrees F and decreasing.

Based on the Current Conditions, which one of the following correctly completes the statements listed below?

The earliest a Reactor trip will be required is if Tave decreases below \_\_\_\_ (1) \_\_\_\_ degrees F.

And

That Reactor trip will be required by \_\_\_\_ (2) \_\_\_\_.

- A. (1) 522  
(2) the Technical Specification Minimum Temperature for Criticality
- B. (1) 530  
(2) the Technical Specification Minimum Temperature for Criticality
- C. (1) 530  
(2) 0-AP-1.00 (ROD CONTROL SYSTEM MALFUNCTION)
- D. (1) 522  
(2) 0-AP-1.00 (ROD CONTROL SYSTEM MALFUNCTION)

20. Which ONE of the following correctly completes the statements listed below?

When performing an emergency boration per 1-AP-3.00 (EMERGENCY BORATION), the in-service BATP \_\_\_\_ (1) \_\_\_\_ automatically be shifted to FAST.

1-CH-MOV-1350 (emergency borate valve) can be electrically operated at the \_\_\_\_ (2) \_\_\_\_.

- A. (1) will NOT  
(2) Main Control room and Aux Shutdown Panel
- B. (1) will NOT  
(2) Main Control Room Only
- C. (1) will  
(2) Main Control Room and Aux Shutdown Panel
- D. (1) will  
(2) Main Control Room Only

21. Initial conditions:

- Unit 1 is at 100% steady state power
- All systems are in Automatic
- The Pressurizer Level Control Selector Switch is in position I/III.

Current conditions:

- The bellows inside the differential pressure cell for pressurizer level transmitter 1-RC-LT-1461 (Channel III Pressurizer Level) completely ruptures.
- No operator action occurs.

Which ONE of the following describes the immediate initial response of the pressurizer level control system?

- A. Charging flow decreases.  
Annunciator 1C-C8, "PRZR HI LVL HTRS ON" alarms.
- B. Charging flow increases.  
Annunciators 1C-E8, "PRZR LO LVL HTRS OFF & LETDOWN ISOL" and 1C-D8, "PRZR LO LVL" alarm.
- C. Charging flow remains constant.  
Annunciator 1C-E8, "PRZR LO LVL HTRS OFF & LETDOWN ISOL" alarms.
- D. Charging flow remains constant.  
Annunciator 1E-H3, RX TRIP CH 3 PRZR HI LVL" alarms.

22. Initial Conditions

- A Unit 1 Reactor Trip occurs from 60% power.

Conditions 25 minutes post-trip

- N-35 indicates  $4 \times 10^{-10}$  amps, SUR of 0 DPM.
- N-36 indicates  $1 \times 10^{-11}$  amps, SUR of 0 DPM.

Which ONE of the following describes the current conditions?

- A. N-35 is undercompensated.  
N-31 and N-32 must be manually energized.
- B. N-35 is undercompensated.  
N-31 and N-32 energized automatically.
- C. N-35 is overcompensated.  
N-31 and N-32 must be manually energized.
- D. N-35 is overcompensated.  
N-31 and N-32 energized automatically.

23. Unit 1 Initial Conditions:

- LOCA inside containment.
- 1-E-1 "Loss Of Reactor Or Secondary Coolant" in progress
- Both Train A and Train B of cold leg recirculation are NOT available.

Current Conditions:

- Unit Supervisor directs transition to 1-ECA-1.1, "Loss of Emergency Coolant Recirculation"
- A RED path exists for Containment
- RWST level is 5%

Which ONE of the following correctly states which procedure should be used for operation of the Containment Spray Pumps, AND whether or not CS Pumps are required to be placed in Pull to Lock (PTL) based on the Current Conditions?

CS Pumps operation is directed by \_\_\_\_ (1) \_\_\_\_, AND CS Pumps \_\_\_\_ (2) \_\_\_\_ required to be placed in PTL in accordance to the selected procedure.

- A. (1) ECA-1.1  
(2) are
- B. (1) ECA-1.1  
(2) are NOT
- C. (1) FR-Z.1  
(2) are
- D. (1) FR-Z.1  
(2) are NOT



24. Given the following plant conditions:

- "A" S/G Pressure is 1250 psig.
- "A" S/G Narrow range level is 82%
- RCS hot leg temperatures are 574 degrees F.
- 1-FR-H.2, "Response to Steam Generator Overpressure" has been entered.
- The condenser is not available.
- The "A" S/G PORV is stuck closed.
- Turbine Driven AFW pump is out of service for bearing replacement.

Which ONE of the following describes the preferred method to reduce "A" S/G pressure in accordance with 1-FR-H.2?

- A. Feed "A" S/G with AFW and commence an RCS cooldown to less than 540 degrees F.
- B. Feed "A" S/G with AFW and establish Blowdown from the "A" steam generator.
- C. Isolate AFW to the "A" S/G and commence RCS cooldown to less than 540 degrees F.
- D. Isolate AFW to the "A" S/G and establish Blowdown from the "A" Steam Generator.

25. The Unit is in Hot Shutdown with the following conditions:

- $T_{avg}$  is 547 °F.
- Pressurizer pressure is 2235 psig.
- RCS boron is at the CSD value of 1120 ppm.
- Initial Source Range counts are 45 cps.
- All Control Rods are inserted.
- Shutdown 7 days ago

The shutdown banks are withdrawn in accordance with procedure GOP-1.4 Unit Startup, HSD To 2% Reactor Power.

When the shutdown banks are fully withdrawn, the following Source Range data is recorded:

N-31 counts are 82 cps  
N-32 counts are 202 cps

Based on the above indications, which ONE of the following BEST describes the Source Range data that was collected and required actions (if any)?

- A. N31 is indicating an abnormally low count rate, initiate 1-AP-4.00 (NI Malfunction).
- B. N32 is indicating an abnormally high count rate, initiate 1-AP-4.00 (NI Malfunction).
- C. Source range response is as expected, no abnormalities exist.
- D. Current RCS boron is not as expected, initiate 1-AP-3.00 (Emergency Boration).

26. Initial Conditions:

- LOCA occurred on Unit 1.
- SI has been RESET.
- Operators are implementing 1-ES-1.2, "POST LOCA COOLDOWN AND DEPRESSURIZATION."
- 90 F/hr cooldown is in progress.
- RCP 'C' is the ONLY running RCP.

Current Conditions:

- Operators are at the step in 1-ES-1.2 to "CHECK SI FLOW NOT REQUIRED."
- RCS subcooling requirement is NOT met.
- One charging pump is in service.

Based on the current conditions, which ONE of the following is the NEXT action required by 1-ES-1.2 to regain subcooling?

- A. Energize all available pressurizer heaters and maintain current RCS pressure.
- B. Increase the cooldown rate to  $<100$  °F/hr and ensure PRZR level can be maintained  $>22\%$ .
- C. Reinitiate SI by operation of the SI pushbuttons and verify HHSI flow path to RCS cold legs.
- D. Manually start CHG pumps and align HHSI flow path to RCS cold legs.

27. Unit 1 Conditions

- A reactor trip has occurred on Unit 1.
- 1-E-0, Reactor Trip or Safety Injection, has been entered.
- Step 5, Initiate Attachment 1, System Alignment Verification, is in progress.

Which ONE of the following statements describes the basis for checking FW isolation in 1-E-0, Attachment 1, System Alignment Verification?

- A. To minimize feed flow to reduce the likelihood of thermal shock to SG components.
- B. To preclude any excessive FW addition to intact SG's that would cause negative MTC to add positive reactivity insertion and return to criticality.
- C. To ensure that excessive FW flow does not cause an overpressure condition of the SG's.
- D. To prevent excessive RCS cooldown that could aggravate the initiating transient, especially if it were a steam line break.

28. The seal leakoff valve is inadvertently isolated for 1-RC-P-1B (1-CH-HCV-1303B).

Which ONE of the following states the seal package response?

- A. The #1 seal assumes full RCS delta-P.
- B. The #2 seal assumes full RCS delta-P.
- C. The #3 seal assumes full RCS delta-P.
- D. The #2 and #3 seals share the RCS delta-P.

29. Which one of the following provides indications of #2 seal failure on 1B RCP (1-RC-P-1B)?

**REFERENCE PROVIDED**

- A. P1 (1-RC-PI-1402) = 1200 psig, P2 (1-CH-PI-1155) = 800 psig, Seal Leakoff = 1.75 gpm
- B. P1 (1-RC-PI-1402) = 2200 psig, P2 (1-CH-PI-1155) = 1100 psig, Seal Leakoff = 3.00 gpm
- C. P1 (1-RC-PI-1402) = 2200 psig, P2 (1-CH-PI-1155) = 1100 psig, Seal Leakoff = 0.00 gpm
- D. P1 (1-RC-PI-1402) = 1200 psig, P2 (1-CH-PI-1155) = 1200 psig, Seal Leakoff = 2.20 gpm

30. Unit 1 Initial Conditions at 0100:

- A Large Break LOCA has occurred from 100% power.
- 1-E-1 (LOSS OF REACTOR OR SECONDARY COOLANT) is in progress.

Unit 1 Current Conditions at 0500:

- Annunciator 1A-A7 (RWST LO LVL) is in alarm.

Which ONE of the following correctly completes the statements listed below?

High Head Safety Injection Pump suction should automatically shift from the RWST to the discharge of the Low Head Safety Injection Pumps at an RWST level of \_\_\_(1)\_\_\_.

And

Transfer to \_\_\_(2)\_\_\_ leg recirculation is required at this time.

- A. (1) 20%  
(2) cold
- B. (1) 20%  
(2) hot
- C. (1) 13.5%  
(2) hot
- D. (1) 13.5%  
(2) cold

31. Initial Conditions (0910):

- Unit 1 is at 90%.
- Charging Pump "A" is RUNNING in AUTO on its NORMAL bus.
- Charging Pump "B" is OFF in AUTO on its NORMAL bus.
- Charging Pump "C" is OFF in AUTO on its NORMAL bus.
- 1-CC-FT-140A, Flow Transmitter for 1-CC-TV-140A (RCP Thermal Barrier CC Outlet Flow Outside Trip Valve) has failed high.
- Annunciator 1C-D2, "RCP Thermal Barrier Return Header HI Flow" is alarming.

Current Conditions (0912):

- Charging Pump "B" is locked out.
- 4160v bus 1H is deenergized.
- 4160v bus 1J is energized.
- Unit 1 remains at 90% power.
- No operator actions have occurred.

Which ONE of the following describes the operational implications of the current conditions and the correct action to take?

RCP Seal cooling \_\_\_\_ (1) \_\_\_\_ been lost.

An IMMEDIATE Reactor Trip \_\_\_\_ (2) \_\_\_\_ required.

- A. (1) has  
(2) is
- B. (1) has  
(2) is NOT
- C. (1) has NOT  
(2) is
- D. (1) has NOT  
(2) is NOT



32. The following Unit 1 conditions exist:

- A loss of decay heat removal has occurred and 1-AP-27.00, Loss of Decay Heat Removal Capability, has been entered.
- The RHR system has just been made available.
- Inadequate time to completely vent the RHR system exists prior to boiling in the core.

Which ONE of the following correctly states guidance in 1-AP-27.00 with respect to sweeping air from the RHR lines?

If adequate time to completely vent the RHR system is not available, air can be swept out of the RHR lines by filling the RCS to a MINIMUM of \_\_\_(1)\_\_\_ feet on 1-RC-LI-100A (RCS Standpipe), checking a minimum subcooling of 10F, and running an RHR pump at a flow rate of \_\_\_(2)\_\_\_ gpm.

**REFERENCE PROVIDED**

	(1)	(2)
A.	12.4	>2950 gpm
B.	12.4	<2600 gpm
C.	13.5	>2950 gpm
D.	13.5	<2600 gpm

33. Current Conditions

- Unit 1 is in REFUELING OPERATIONS.
- 1-RH-P-1A is in service to 1-RH-E-1A.
- Cavity level is 26 feet above the top of the reactor pressure vessel flange.
- Core alterations are in progress.

Which ONE of the following 1) requires entry into a LCO condition, and 2) whether fuel movement can continue?

- A. 1) 1-RH-E-1B is isolated and drained for tube leak testing  
2) Fuel movement MAY continue
- B. 1) 1-RH-E-1B is isolated and drained for tube leak testing  
2) Fuel movement may NOT continue
- C. 1) 1-RH-P-1A trips on ground overcurrent  
2) Fuel movement may NOT continue
- D. 1) 1-RH-P-1A trips on ground overcurrent  
2) Fuel movement MAY continue

34. Unit 1 Conditions:

- A Medium-Break LOCA has occurred.
- The crew is performing the actions of 1-E-1, "Loss of Reactor or Secondary Coolant".
- All RCPs are running.
- 5 minutes ago, Charging Pump A was placed in PTL IAW Step 19.b of 1-E-1 ("ESTABLISH CHG PUMP REDUNDANT FLOW PATHS"). No valve manipulations have occurred.
- The following information was displayed on the SPDS at the times indicated:

Parameter	10 minutes ago	5 minutes ago	Current	
<b>"CONTAINMENT CONDITIONS" PAGE</b>				
"CONTAINMENT PRESSURE – IR"	19.6	19.5	19.4	PSIA
<b>"RCS INTEGRITY" PAGE</b>				
"HIGH HEAD SAFETY INJECTION FLOW" "LOOP A"	176.2	119.2	120.7	GPM
"HIGH HEAD SAFETY INJECTION FLOW" "LOOP B"	176.5	119.2	121.1	GPM
"HIGH HEAD SAFETY INJECTION FLOW" "LOOP C"	176.3	119.1	120.9	GPM
"RCS PRESSURE"	1900	1887	1875	PSIG
"PRESSURIZER LEVEL"	22.9	21.5	19.1	PCT
<b>"CORE HEAT REMOVAL" PAGE</b>				
"PEAK CORE EXIT TEMPERATURE"	595.5	595.7	594.9	DEGF

Which ONE of the following describes appropriate actions IAW 1-E-1?

- SI is required to be reinitiated by starting A Charging Pump.
- SI is required to be reinitiated by placing A Charging Pump in AUTO and depressing the SI pushbuttons.
- SI is not required to be reinitiated. Establish charging pump redundant flow paths with B Charging Pump supplying the normal SI HDR and C Charging Pump supplying the alternate SI HDR.
- SI is not required to be reinitiated. Establish charging pump redundant flow paths with C Charging Pump supplying the normal SI HDR and B Charging Pump supplying the alternate SI HDR.

35. Current Conditions

- Unit 1 is at 100% power when annunciator C-E-7, "PRZR RELIEF TK HI TEMP", is received.
- The OATC confirms the alarm is valid, and notes that PRT level, pressure, and temperature have been slowly increasing since assuming the watch.
- The OATC is directed to lower tank temperature IAW 1-OP-RC-011.

Which ONE of the following describes how temperature will be lowered IAW 1-OP-RC-011, "Pressurizer Relief Tank Operations"?

The PRT is filled by opening 1-RC-TV-1519A and 1-RC-TV-1519B to discharge Primary Grade Water \_\_\_\_ (1) \_\_\_\_ the water level in the PRT, and the PRT is subsequently drained to maintain the PRT in the normal level band of \_\_\_\_ (2) \_\_\_\_.

- A. (1) above  
(2) 60 – 80 %
- B. (1) above  
(2) 59 – 83 %
- C. (1) below  
(2) 60 – 80 %
- D. (1) below  
(2) 59 – 83 %

36. Unit 1 is operating in Mode 1 at 100% power.

- A review of parameters shows the following:

Time	1300	1400
PRT Level	73%	84%
PRT Temperature	108 F	185 F
PRT Pressure	3 psig	4 psig

Which ONE of the following relief valves has failed (leaking by)?

- A. Regenerative Heat Exchanger Letdown Line Relief Valve, 1-CH-RV-1203
- B. RCP Seal Water Return Line Relief Valve, 1-CH-RV-1382A
- C. RHR Heat Exchanger Relief, 1-RH-RV-1721
- D. SI Accumulator Relief Valve, 1-SI-RV-1859

37. Unit 1 plant conditions:

- Reactor power = 100%
- Charging flow = 100 gpm increasing
- 1-CC-RI-105 (CC Heat Exchanger A/B Outlet Radiation Monitor) alarms HIGH
- CC surge tank level = 64% increasing
- 1-AP-16.00 (EXCESSIVE RCS LEAKAGE) is initiated

Based on the above conditions, which ONE of the following describes where the excess volume in the CC system will go and (2) what action is directed first by 1-AP-16.00 to attempt to isolate the leak?

- A. (1) The process vent system  
(2) Isolate letdown
- B. (1) The process vent system  
(2) Isolate thermal barrier on suspected RCP
- C. (1) The auxiliary building sump  
(2) Isolate letdown
- D. (1) The auxiliary building sump  
(2) Isolate thermal barrier on suspected RCP

38. Unit 1 plant conditions:

- 1C-B1, RCP 1B CC RETURN LO FLOW alarm annunciator lit
- Pressurizer Pressure Master Controller is in AUTO-HOLD
- Pressurizer Level Controller is in AUTO-HOLD
- Both Pressurizer Spray Valve Controllers are in AUTO-LOW

Based on the above conditions, which ONE of the following identifies the Vital Bus that has been lost?

- A. Vital Bus I
- B. Vital Bus II
- C. Vital Bus III
- D. Vital Bus IV

39. Initial Unit One Conditions:

- Cold Shutdown
- 1-RH-P-1A is in service to 1-RH-E-1B
- RCS temperature is 140°F and stable.
- PRZR is solid.
- RCP C is running.

Current Conditions:

- Testing on 1-CC-E-1A has resulted in CC system temperature increasing 15°F

Which ONE of the following describes the expected plant response to this increase in CC temperature? Assume no operator actions have occurred.

- A. Letdown flow will increase
- B. RHR flow will increase
- C. Pressurizer spray flow will increase
- D. Charging flow will increase



40. Unit 1 Initial Conditions:

- Time = 1400.
- Power = 100%.
- No equipment out of service.
- Steam Generator "A" (S/G "A") Level channel 1-FW-LT-474 (S/G "A" Level Transmitter CH 1) unexpectedly fails low.

Current conditions:

- Time = 1430 (same day). All required bistables for 1-FW-LT-474 failure have been placed in the TRIP condition.

Based on the current conditions, which ONE of the following identifies the Reactor Protection System actuation logic coincidence required from the **remaining** in-service "Low Low S/G" protection channels and "Steam Flow – Feed Flow Mismatch Coincidence With Low S/G Level" protection channels for S/G "A" only, to initiate an automatic Reactor Trip at time 1431?

	Low Low S/G Reactor Trip	Feed Flow – Steam Flow Mismatch With Low S/G Level Reactor Trip
A.	1/1	1/2 level with 1/2 flow mismatch
B.	1/2	1/2 level with 1/2 flow mismatch
C.	1/1	1/2 flow mismatch only
D.	1/2	1/2 flow mismatch only

41. Initial Conditions:

- Unit 2 is at 100% power.
- #2 EDG is out of service.
- Safety Injection actuated on Unit 1 five (5) minutes ago.
- Unit 1 emergency buses remain powered from off-site sources.

Current conditions:

- All power is lost to the **Unit 2** 'H' AND 'J' buses.
- Unit One Safety Injection has **NOT** been reset.

Based on the current conditions, which ONE of the following is correct concerning the #3 EDG, in accordance with 2-ECA-0.0?

- A. #3 EDG will automatically energize the Unit 2 'J' bus.
- B. operator action is required to manually close the #3 EDG output breaker for the Unit 2 'J' bus. No operator actions are required for the #3 EDG bypass switch on Unit 1.
- C. #3 EDG will automatically parallel on to the Unit 1 'J' bus. Operator actions are required to realign the #3 EDG to the Unit 2 'J' bus.
- D. operator action is required to place the #3 EDG bypass switch on Unit 1 in "Bypass" and then the #3 EDG output breaker for the Unit 2 'J' bus will automatically close.

42. Given the following plant conditions:

- A complete loss of vital bus 1-III occurred with the unit at 100% power.
- Repairs will require at least one hour before the bus can be re-energized.
- CC flow to the "A" RCP could not be restored and the team tripped the unit.
- Five minutes after the trip, RCS average temperature decreased to 538°F in the idle RCS loop.

Based on the given conditions, which ONE of the following **automatic** actuations will occur (if any)?

	<u>High Steam Flow Safety Injection</u>	<u>Steam Line Isolation</u>
A.	NOT Actuated	Actuated
B.	Actuated	Actuated
C.	Actuated	NOT Actuated
D.	NOT Actuated	NOT Actuated

43. Unit 2 was operating at 100% power when a LOCA occurred. Containment pressure has risen to 8.4 psig.

Which ONE of the following accurately describes the current containment air recirculation fan configuration?

- A. A, B, and C recirculation fans are in service.
- B. A and B recirculation fans are in service. C recirculation fan is secured.
- C. C recirculation fan is in service. A and B recirculation fans are secured.
- D. A, B, and C recirculation fans are all secured.

44. A large break LOCA has occurred on Unit 1. Containment pressure has reached the HI-HI CLS setpoint. The 1A Containment Spray Pump failed to start and cannot be started manually. RWST level is 40% and lowering.

Which ONE of the following describes the direction provided by 1-FR-Z.1, "Response to Containment High Pressure"?

- A. Monitor the 2A Outside Recirc Pump for cavitation. Throttle pump discharge valve if cavitation observed.
- B. Monitor the 2A Outside Recirc Pump for cavitation. Place in PTL if cavitation observed.
- C. Monitor the 1A Inside Recirc Pump for cavitation. Throttle pump discharge valve if cavitation observed.
- D. Monitor the 1A Inside Recirc Pump for cavitation. Place in PTL if cavitation observed.

45. AFW was automatically actuated from a valid AMSAC signal. SG levels are now all greater than 50% NR.

Which ONE of the following describes the minimum actions that the Operator must take to secure the TDAFW Pump?

- A. 1) RESET AMSAC.  
2) Close 1-MS-PCV-102A and B by taking their switches to CLOSED.
- B. 1) RESET AMSAC.  
2) Close 1-MS-PCV-102A and B by taking their switches to OPEN then CLOSED.
- C. 1) RESET AMSAC AND place AMSAC BYPASS switch in BYPASS.  
2) Close 1-MS-PCV-102A and B by taking their switches to CLOSED.
- D. 1) RESET AMSAC AND place AMSAC BYPASS switch in BYPASS.  
2) Close 1-MS-PCV-102A and B by taking their switches to OPEN then CLOSED.

46. Unit 1 conditions at 0800:

- Reactor power = 50%
- The operating Main Feedwater Pump discharge valve inadvertently closes
- The operating Main Feedwater Pump Recirc valve fails to open

Unit 1 conditions at 0805:

- A S/G NR level = 23% decreasing
- B S/G NR level = 19% decreasing
- C S/G NR level = 15% decreasing

Based on the above plant conditions, at 0800 \_\_\_(1)\_\_\_ will start and at 0805 \_\_\_(2)\_\_\_ will be operating.

- A. (1) 1-FW-P-2 ONLY  
(2) 1-FW-P-2 ONLY
- B. (1) 1-FW-P-2 ONLY  
(2) 1-FW-P-2, 1-FW-P-3A AND 1-FW-P-3B
- C. (1) 1-FW-P-3A AND 1-FW-P-3B ONLY  
(2) 1-FW-P-3A AND 1-FW-P-3B ONLY
- D. (1) 1-FW-P-3A AND 1-FW-P-3B ONLY  
(2) 1-FW-P-2, 1-FW-P-3A AND 1-FW-P-3B

47. Given the following plant conditions:

- Unit 1 tripped from 100% power with all systems functioning in automatic.
- 480 Volt Bus 1H1 source breaker tripped open.

Based on the above conditions, which ONE of the following AFW pumps will be able to feed the steam generators (if any)?

- A. 1-FW-P-2 ONLY
- B. 1-FW-P-3A ONLY
- C. 1-FW-P-3B ONLY
- D. All



48. Unit 1 Conditions:

- Unit 1 has been shutdown for 30 days.
- The crew is performing 1-AP-27.00, "Loss of Decay Heat Removal Capability".
- Attachment 5, "Reflux Boiling Heat Removal", of 1-AP-27.00 has been initiated.

Which ONE of the following describes the appropriate control of SG narrow range level IAW Step 5 of Attachment 5 of 1-AP-27.00?

Control SG narrow range level in a minimum of \_\_\_(1)\_\_\_ SG(s) by utilizing \_\_\_(2)\_\_\_ .

- A. (1) 2  
(2) 1-FW-FCV-1478, 1488, 1498.
- B. (1) 2  
(2) 1-FW-MOV-151A through F.
- C. (1) 1  
(2) 1-FW-FCV-1478, 1488, 1498.
- D. (1) 1  
(2) 1-FW-MOV-151A through F.

49. The Unit is in Refueling Shutdown. Refueling operations are in progress. Annunciator 1B-E6, IA LO HDR PRESS/IA COMPR 1 TRBL, alarms. 1-IA-PS-100, Instrument Air Header Pressure, indicates 0 psig.

Which ONE of the following is an expected plant change without operator actions?

- A. Charging flow has isolated.
- B. RHR cooling is no longer occurring.
- C. Fuel Transfer Canal Door seal will be deflating.
- D. The standby Containment Instrument Air Compressor has started.

50. Unit 1 is at full power. The UPS 1A1 Battery Charger fails.

Which ONE of the following sources will AUTOMATICALLY supply power to the loads on the 1A DC bus?

- A. 1A1 regulating line conditioner.
- B. 1A2 battery charger.
- C. 1B1 battery charger.
- D. 1B DC bus.

51. Unit 1 Initial Conditions:

- 1A and 1B 125 VDC Station Batteries are carrying equal loads at the same state of discharge and all related parameters are identical
- There are no battery chargers supplying power to either Station Battery

Unit 1 Current Conditions:

- Discharge rate is increased on 1A 125 VDC Station Battery

Which ONE of the following correctly completes the statements listed below?

The total amount of ampere-hours that the 1A 125 VDC Station Battery will be able to supply will be (1) the 1B 125 VDC Station Battery.

And

The voltage indicated on vertical board 2 for the 1A 125 VDC Station Battery will be (2) that for the 1B 125 VDC Station Battery.

- A. (1) less than  
(2) equal to
- B. (1) less than  
(2) less than
- C. (1) equal to  
(2) equal to
- D. (1) equal to  
(2) less than

52. Unit 1 Current Conditions:

- Annunciator 1C-F6 (EDG 1 TRBL) is in alarm
- EDG 1 Left Air Bank Pressure is 100 psig.
- EDG 1 Right Air Bank Pressure is 98 psig.
- There is no electrical power available to EDG 1 Air Compressor #1 (South compressor)
- There is no electrical power available to EDG 1 Air Compressor #2 (North compressor)

Based on the current conditions, which ONE of the following correctly completes the statements listed below?

The EDG 1 Air Start System   (1)   capable of providing three start attempts.

And

If necessary, EDG 1 Right and Left Air Bank pressures may be increased using the EDG 1   (2)   Air Compressor.

- A. (1) is  
   (2) #2
- B. (1) is NOT  
   (2) #2
- C. (1) is  
   (2) #1
- D. (1) is NOT  
   (2) #1

53. Current Conditions:

- PROCESS VENT RAD MON TRBL (0-RMA-C5) alarms.
- The Green Operate light on the Remote Display Unit (RDU) for 1-GW-RM-130A (Rad Monitor Process Vent Particulate Detector) is off.

Which ONE of the following correctly completes the statements listed below?

Per the 0-RMA-C5 Annunciator Response Procedure, manual operator action is required to \_\_\_\_\_ (1) \_\_\_\_\_.

And

Following a loss and restoration of power, 1-GW-RM-130A will restart in the \_\_\_\_\_ (2) \_\_\_\_\_ mode.

- A. (1) place the CTMT Vacuum Pumps in OFF  
(2) accident
- B. (1) place the CTMT Vacuum Pumps in OFF  
(2) normal
- C. (1) close the CTMT Vacuum Pump Discharge Isolation Valves (1-GW-FCV-160/260)  
(2) accident
- D. (1) close the CTMT Vacuum Pump Discharge Isolation Valves (1-GW-FCV-160/260)  
(2) normal

54. Unit 1 Initial Conditions:

A Stop Log is installed in the 1A Screenwell.

Unit 1 Current Conditions:

A Stop Log is inadvertently installed in the 1C Screenwell.

Based on current conditions, which ONE of the following will indicate an increase in temperature?

- A. Main Control Room Chillers
- B. Charging Pump Lubricating Oil
- C. Bearing Cooling Water cooled components
- D. Component Cooling Water cooled components

55. Unit 1 Initial Conditions:

- 100% Power

Current Conditions:

- Unit 1 has experienced a LOCA.
- 1-LM-PT-100A (Containment Pressure) = 22 psia.
- 1-LM-PT-100B (Containment Pressure) = 24 psia.
- 1-LM-PT-100C (Containment Pressure) = 24 psia.
- 1-LM-PT-100D (Containment Pressure) = 22 psia.

Based on the current conditions, which ONE of the following correctly completes the statements listed below?

1-CC-TV-140A (CCW from RCP Thermal Barrier) should be \_\_ (1) \_\_.

And

1-CS-MOV-101A ('A' CS Pump Discharge to Spray Ring) should be \_\_ (2) \_\_.

- A. (1) open  
(2) open
- B. (1) open  
(2) closed
- C. (1) closed  
(2) open
- D. (1) closed  
(2) closed



56. Which ONE of the following states the normal and alternate sources of **CONTROL POWER** to the Unit 1 Rod Control logic cabinets?

- A. Normal – Directly from the output of the rod drive MG sets  
Alternate – MCC 1C1-2 via a step-down transformer
- B. Normal – From the output of the rod drive MG sets via a step-down transformer  
Alternate – MCC 1C1-2 via a step-down transformer
- C. Normal – MCC 1C1-2 via a step-down transformer  
Alternate – Directly from the output of the rod drive MG sets
- D. Normal – MCC 1C1-2 via a step-down transformer  
Alternate – From the output of the rod drive MG sets via a step-down transformer

57. Initial conditions:

- Unit 1 is at 100% power.
- All systems are in automatic.

Current conditions:

- The lower control channel for Pressurizer Level Control has failed off-scale low.

Which ONE of the following describes the **immediate** effect of this malfunction on the CVCS?

- A. 1-CH-LCV-1460A closes. There is no change in charging flow.
- B. 1-CH-LCV-1460B closes. There is no change in charging flow.
- C. 1-CH-LCV-1460A closes. 1-CH-FCV-1122 throttles open to establish approximately 115 gpm charging flow.
- D. 1-CH-LCV-1460B closes. 1-CH-FCV-1122 throttles open to establish approximately 115 gpm charging flow.

58. A LOCA has occurred on Unit 1.

The operators are performing actions of E-1, "Loss of Reactor or Secondary Coolant."

The following plant conditions exist:

- Core Exit Thermocouples (CET) are all reading between 750 and 950°F, except for three that are reading 1207°F, 1223°F, and 1205°F.
- No RCPs are running.
- RVLIS is reading 55% full range.

The STA declares a RED PATH on the CORE COOLING and states that FR-C.1, "Response to Inadequate Core Cooling," must be implemented.

Based on the above conditions, which ONE of the following describes your response to the STA's declaration and why?

- A. Agree with the STA; three CETs indicating above 1200°F warrants the RED PATH.
- B. Disagree with the STA; at least five CETs must average greater than 1200°F to warrant a RED PATH.
- C. Agree with the STA; with no RCPs running and CETs indicating greater than 700°F warrants the RED PATH.
- D. Disagree with the STA; RVLIS level indicates that sufficient subcooling exists for the core conditions.

59. Which ONE of the following describes (1) how NaOH solution is added to the Reactor Building during a design based accident, and (2) why?

- A. (1) Gravity-fed to the suction of the Outside Recirculation Spray pumps.  
(2) To aid in the prevention of hydrogen formation.
- B. (1) Gravity-fed to the suction of the Outside Recirculation Spray pumps.  
(2) To aid in the removal of radioactive iodine.
- C. (1) Gravity-fed to the suction of the Containment Spray pumps.  
(2) To aid in the prevention of hydrogen formation.
- D. (1) Gravity-fed to the suction of the Containment Spray pumps.  
(2) To aid in the removal of radioactive iodine.

60. Which ONE of the following describes

- (1) How the containment hydrogen recombiner reduces containment H<sub>2</sub> concentration

AND

- (2) The band given in 1-E-1 (Loss of Reactor or Secondary Coolant) of hydrogen concentration that the recombiner is placed in service?

- A. (1) Flow is heated to 1150-1400°F causing recombination of H<sub>2</sub> and O<sub>2</sub> to occur.  
(2) 0.4% to 5.0%
- B. (1) Hydrogen is directed over electronic device that dissipates hydrogen via small combustions  
(2) 0.4% to 5.0%
- C. (1) Flow is heated to 1150-1400°F causing recombination of H<sub>2</sub> and O<sub>2</sub> to occur.  
(2) 0.5% to 4.0%
- D. (1) Hydrogen is directed over electronic device that dissipates hydrogen via small combustions  
(2) 0.5% to 4.0%

61. With the unit initially at 100%, the steam dumps are placed in **STEAM PRESSURE** mode to allow for I&C testing.

Which ONE of the following describes how the **STEAM PRESSURE** arming signal is cleared following completion of the test?

The operator must \_\_\_\_\_.

- A. shift the Steam Header Pressure Controller to manual and decreasing signal demand to zero.
- B. take the Steam Dump Mode Selector Switch to the Tavg Mode.
- C. take the Steam Dump Control Switch to Off/Reset and return the switch to the ON position.
- D. take the Steam Dump Control Switch to the By-pass Interlock position.

62. Unit 1 Conditions

- The plant is at 50% rated thermal power.
- 1-MS-PT-447, the selected  $P_{imp}$  channel, fails low.

Assuming no operator action, which ONE of the following represents the correct response of SG water level?

- A. SG water level control will be maintained at program level for 50% power.
- B. SG water level will increase to 44%.
- C. SG water level will increase to 75%, resulting in FW isolation at SG Hi-Hi level.
- D. SG water level will decrease to 33%.

63. Both units are being fed by the Reserve Station Service Transformers

Which ONE of the following pairs of condensate pumps will be automatically tripped by the actuation of a load shed?

- A. 2A and 1C
- B. 1B and 2C
- C. 1A and 2C
- D. 2B and 1C



64. Unit 1 Current Conditions:

- WGDT 1B release is in progress.

When 1-GW-FCV-101 (PROCESS VENT WGDT EFFLUENT FLOW CONTROL) is throttled closed to terminate the release, **steady state** Process Vent flow will \_\_\_\_\_.

- A. Decrease to zero
- B. Increase slightly
- C. Decrease slightly
- D. Remain the same

65. Which ONE of the following correctly completes the statements listed below?

A (1) scintillation detector is used in the Containment Gas Monitor (1-RM-RI-160).

And

The units indicated on the Containment Gas Monitor (1-RM-RI-160) meter are (2).

- A. (1) beta  
(2) cpm
- B. (1) beta  
(2) mR/hr
- C. (1) gamma  
(2) cpm
- D. (1) gamma  
(2) mR/hr

66. Current Conditions:

- Unit 1 is in INTERMEDIATE SHUTDOWN.
- 1-CH-MOV-1381 (RCP Seal Return) is required to be locally shut in preparation for a clearance.
- The local shutting of 1-CH-MOV-1381 is NOT directed by a procedure.
- An emergency does NOT exist.

Which ONE of the following describes the necessary approval for local operation and the impact of manual MOV operation on operability, IAW OP-AA-100, "Conduct of Operations"?

Local operation of 1-CH-MOV-1381 must be authorized by \_\_\_(1)\_\_\_ and following manual operation, the valve will be considered \_\_\_(2)\_\_\_.

- A. (1) Shift Manager  
(2) inoperable
- B. (1) Shift Manager  
(2) operable
- C. (1) Manager Nuclear Operations  
(2) inoperable
- D. (1) Manager Nuclear Operations  
(2) operable

67. Current Conditions:

- 1-FW-P-2, TURB DRVN AFW PUMP is being run for the monthly PT.
- 1-MS-SOV-102A, TURB DRVN AFW PUMP is OPEN.
- 1-MS-SOV-102B, TURB DRVN AFW PUMP is CLOSED.
- The service building operator identifies turbine speed is 4630 rpm.

Based on the above conditions, which ONE of the following describes the action to take IAW 1-OPT-FW-003, "Turbine Driven Auxiliary Feedwater Pump 1-FW-P-2"?

- A. In the MCR, take 1-MS-SOV-102A to CLOSE.
- B. In the MCR, verify 1-MS-SOV-102A in OPEN/RESET and take 1-MS-SOV-102B to OPEN/RESET. THEN take 1-MS-SOV-102A and 1-MS-SOV-102B to CLOSE.
- C. Locally at the pump, trip the pump by cycling 1-MS-TV-120, AFW Pump 2 Turb Trip Valve, at least one time and leave it in the LATCH position.
- D. Locally at the pump, trip the pump by pushing the Manual Push Trip Lever.

68. You are in work control on a rainy day when an operator comes to you and states he has been assigned to 34.5 KV switching and tagging tasks. The operator was checking his PPE and noticed that the test date for a pair of electrical rubber insulating gloves was 9 months old.

In accordance with SA-AA-125 Electrical Safety, which ONE of the following describes (1) if electrical rubber insulating gloves are required to be used when performing 34.5 KV switching and tagging tasks in the rain, and (2) If this pair of gloves needs to be retested before use?

- A. (1) yes  
(2) yes
- B. (1) yes  
(2) no
- C. (1) no  
(2) yes
- D. (1) no  
(2) no

69. Unit 1 Current Conditions:

- Tavg is 160F.
- The reactor is subcritical by 3% delta-k/k.
- Reactor defueling is scheduled to begin in 48 hours.

Based on the current conditions, which one of the following correctly completes the statements listed below in accordance with the Surry Power Station Technical Specifications?

Unit 1 is currently in (1)?

And

Following completion of refueling, the reactor must be subcritical by at least (2) % delta-k/k in order to be in INTERMEDIATE SHUTDOWN.

- A. (1) COLD SHUTDOWN  
(2) 1
- B. (1) COLD SHUTDOWN  
(2) 1.77
- C. (1) REFUELING SHUTDOWN  
(2) 1
- D. (1) REFUELING SHUTDOWN  
(2) 1.77

70. Unit 1 Conditions:

- Unit 1 was at 100% power.
- A SGTR occurred, resulting in an automatic SI.
- All systems responded as designed.
- The ruptured steam generator has been isolated.
- RCS cooldown has been completed.
- The operating crew has commenced RCS depressurization.
- The ruptured steam generator level is 100% WR.
- The other two steam generators are at 40% NR and rising.
- Pressurizer level is 20% and rising.
- Subcooling is 100 °F and rising.

Based on the above conditions, which ONE of the following describes the required actions of the operating crew?

The operating crew shall \_\_\_\_\_.

- A. immediately stop all high head safety injection pumps.
- B. go to 1-ES-0.0, "REDIAGNOSIS".
- C. continue with the procedure in effect.
- D. immediately go to 1-FR-H.3, "Response to Steam Generator High Level."

71. • The unit was shutdown and placed on RHR Cooling for a refueling outage. All fuel has been offloaded and the A train of RHR secured for maintenance.
- In the "A" Loop room, the area around the letdown isolation valves has been surveyed and is reading 175 mr/hr. This is the maximum dose observed in the loop room. The dose rate is 35 mr/hr at the loop room entrance.
  - The entrance gate to the loop room is being maintained UNLOCKED.
  - An Operator has been assigned the task to hang a tagout in the room. It is expected that this task will take 10 to 15 minutes to complete.

Which ONE of the following describes:

(1) In accordance with 10 CFR 20 requirements, how should HP post the room?

AND

(2) In accordance with VPAP-2101, Radiation Protection Program, can the Operator perform the task on the general Operator Clearance RWP, or must a specific RWP be obtained?

- A. (1) Radiation Area  
(2) General RWP is sufficient
- B. (1) Radiation Area  
(2) Specific RWP is required
- C. (1) High Radiation Area  
(2) General RWP is sufficient
- D. (1) High Radiation Area  
(2) Specific RWP is required



72. Initial Conditions:

- Unit Two is currently commencing the spring 2011 refueling outage..

Current Conditions:

- The refueling team is preparing to load the first Fuel Assembly into the reactor vessel.

Based on the current conditions, which ONE of the following completes both of the below statements in accordance with 2-OP-FH-001, "CONTROLLING PROCEDURE FOR REFUELING?"

The MINIMUM allowable reactor cavity boron concentration for Refueling Shutdown is \_\_\_\_\_ (1) \_\_\_\_\_.

AND

The LATEST point in time when base neutron count rates for SRNI N-31 and SRNI N-32 is allowed to be obtained is \_\_\_\_\_ (2) \_\_\_\_\_.

- A. (1) 2250 ppm  
(2) after the fourth (4<sup>th</sup>) Fuel Assembly is loaded into the core and before the fifth (5<sup>th</sup>) Fuel Assembly is loaded into the core.
- B. (1) 2350 ppm  
(2) after the fourth (4<sup>th</sup>) Fuel Assembly is loaded into the core and before the fifth (5<sup>th</sup>) Fuel Assembly is loaded into the core.
- C. (1) 2250 ppm  
(2) after the eighth (8<sup>th</sup>) Fuel Assembly is loaded into the core and before the ninth (9<sup>th</sup>) Fuel Assembly is loaded into the core.
- D. (1) 2350 ppm  
(2) after the eighth (8<sup>th</sup>) Fuel Assembly is loaded into the core and before the ninth (9<sup>th</sup>) Fuel Assembly is loaded into the core.

73. Initial Conditions:

- Unit 1 experienced an automatic SI coincident with a total loss of offsite power

Current Conditions:

- All Power Range NI=4% and increasing
- All Intermediate Range SUR=+0.1 DPM and stable
- All CETs=715 °F and lowering slowly
- RVLIS Full Range=26% and increasing slowly
- RCS Subcooling based on CETs=superheated
- Total AFW Flow=200 GPM and stable
- All S/G NR levels=0% (downscale low)
- RWST Level=10% and lowering
- Recirculation has been established in accordance with 1-ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION"
- Containment sump levels are oscillating erratically
- Amps, flows, and discharge pressures on the running ECCS pumps aligned for recirculation are all oscillating erratically
- A transition to Attachment 1, "CONTAINMENT SUMP SCREEN BLOCKAGE—CONTINGENCY ACTIONS," of 1-ES-1.3 has just been announced by the SRO

Based on the current conditions, which ONE of the following is a correct evaluation of critical safety function procedural implementation?

- A. Implementation of 1-FR-S.1, "RESPONSE TO NUCLEAR POWER GENERATION/ATWS," takes precedence over implementation of 1-FR-H.1, "RESPONSE TO LOSS OF SECONDARY HEAT SINK"
- B. Implementation of 1-FR-H.1, "RESPONSE TO LOSS OF SECONDARY HEAT SINK," takes precedence over implementation of Attachment 1 of 1-ES-1.3
- C. Implementation of Attachment 1 of 1-ES-1.3 takes precedence over implementation of 1-FR-C.1, "RESPONSE TO INADEQUATE CORE COOLING"
- D. Implementation of 1-FR-H.1, "RESPONSE TO LOSS OF SECONDARY HEAT SINK," takes precedence over implementation of 1-FR-C.2, "RESPONSE TO DEGRADED CORE COOLING"

74. Unit 1 Conditions:

- The unit has experienced a Steam Generator Tube Rupture.
- 1-E-3 (STEAM GENERATOR TUBE RUPTURE) is in effect.
- An RCS Cooldown using the Steam Dumps has been initiated.
- One Charging Pump is running and flowing to the RCS.
- RCS subcooling is 29°F.

Based on the conditions listed above, which one of the following correctly completes the statements listed below?

Flow on each Main Steamline should be kept less than  $1.0 \times 10^6$  PPH to prevent (1).

And

RCP trip criteria (2) apply.

- A. (1) Main Steamline isolation  
(2) do
- B. (1) Main Steamline isolation  
(2) do NOT
- C. (1) exceeding the Technical Specification cooldown rate limit  
(2) do
- D. (1) exceeding the Technical Specification cooldown rate limit  
(2) do NOT

75. Which ONE of the following describes the lowest position on the Station Emergency Organization chart that may authorize the use of Emergency Exposure Limits?

- A. Unit Supervisor
- B. Station Emergency Manager
- C. Radiation Protection Supervisor
- D. Radiological Assessment Director

**ANSWER KEY REPORT**  
for Surry RO-SRO Combined 2012 Test Form: 0

#	ID	Points	Type	0	Answers
1	007 EK2.02 1	1.00	MCS	B	
2	008 AK1.01 1	1.00	MCS	C	
3	011 EA1.09 1	1.00	MCS	C	
4	022 AA2.02 1	1.00	MCS	D	
5	025 G2.4.31 1	1.00	MCS	B	
6	026 AA2.01 1	1.00	MCS	A	
7	027 AK2.03 1	1.00	MCS	D	
8	029 EA1.03 1	1.00	MCS	C	
9	038 EK3.01 1	1.00	MCS	B	
10	040 WE12 EK2.1 1	1.00	MCS	D	
11	055 EK1.02 1	1.00	MCS	B	
12	057 AK3.01 1	1.00	MCS	C	
13	058 AA1.01 1	1.00	MCS	A	
14	062 AA2.01 1	1.00	MCS	D	
15	065 G2.1.31 1	1.00	MCS	B	
16	W/E04 G2.4.45 1	1.00	MCS	B	
17	W/E11 EK1.2 1	1.00	MCS	B	
18	W/E05 EK3.2 1	1.00	MCS	D	
19	003 AK3.07 1	1.00	MCS	C	
20	024 AK2.03 1	1.00	MCS	A	
21	028 AK2.02 1	1.00	MCS	D	
22	033 AK1.01 1	1.00	MCS	A	
23	069 WE14 EK3.4 1	1.00	MCS	B	
24	W/E13 EA1.1 1	1.00	MCS	C	
25	032 AA2.02 1	1.00	MCS	B	
26	W/E03 G2.1.20 1	1.00	MCS	D	
27	W/E08 EA2.2 1	1.00	MCS	D	
28	003 K6.02 1	1.00	MCS	C	
29	003 A3.03 1	1.00	MCS	B	
30	004 A2.13 1	1.00	MCS	D	
31	004 G2.4.2 1	1.00	MCS	A	
32	005 K5.02 1	1.00	MCS	C	
33	005 G2.2.42 1	1.00	MCS	C	
34	006 A4.10 1	1.00	MCS	D	
35	007 K4.01 1	1.00	MCS	A	
36	007 A3.01 1	1.00	MCS	A	
37	008 A2.04 1	1.00	MCS	C	
38	010 K2.02 1	1.00	MCS	B	
39	010 A1.04 1	1.00	MCS	A	
40	012 K6.03 1	1.00	MCS	D	
41	013 K1.12 1	1.00	MCS	D	
42	013 K5.02 1	1.00	MCS	B	
43	022 K4.05 1	1.00	MCS	C	
44	026 K3.02 1	1.00	MCS	B	
45	039 A4.04 1	1.00	MCS	B	
46	059 K1.02 1	1.00	MCS	C	

**ANSWER KEY REPORT**  
for Surry RO-SRO Combined 2012 Test Form: 0

#	ID	Points	Type	0	Answers
47	061 K2.01 1	1.00	MCS	D	
48	061 K5.02 1	1.00	MCS	D	
49	078 K3.02 1	1.00	MCS	B	
50	063 K4.02 1	1.00	MCS	B	
51	063 A1.01 1	1.00	MCS	B	
52	064 K6.07 1	1.00	MCS	B	
53	073 A2.01 1	1.00	MCS	A	
54	076 A1.02 1	1.00	MCS	C	
55	103 A3.01 1	1.00	MCS	B	
56	001 K2.03 1	1.00	MCS	B	
57	011 K3.01 1	1.00	MCS	B	
58	017 K6.01 1	1.00	MCS	B	
59	027 K1.01 1	1.00	MCS	D	
60	028 G2.1.28 1	1.00	MCS	C	
61	041 A4.02 1	1.00	MCS	B	
62	035 A3.01 1	1.00	MCS	D	
63	056 A2.04 1	1.00	MCS	C	
64	071 A1.06 1	1.00	MCS	D	
65	072 K5.01 1	1.00	MCS	A	
66	G2.1.1 1	1.00	MCS	C	<i>1/2 A RSB 9/24/2012</i>
67	G2.1.8 1	1.00	MCS	D	
68	G2.1.26 1	1.00	MCS	A	
69	G2.2.35 1	1.00	MCS	B	
70	G2.2.44 1	1.00	MCS	C	
71	G2.3.7 1	1.00	MCS	D	<i>1/2 D RSB 9/24/2012</i>
72	G2.3.12 1	1.00	MCS	D	
73	G2.4.5 1	1.00	MCS	C	
74	G2.4.20 1	1.00	MCS	B	
75	G2.4.37 1	1.00	MCS	B	
76	009 G2.1.19 1	1.00	MCS	D	
77	015 AA2.08 1	1.00	MCS	A	
78	027 G2.1.23 1	1.00	MCS	B	
79	040 WE12 EA2.2 2	1.00	MCS	D	
80	055 G2.4.9 1	1.00	MCS	C	
81	077 AA2.05 2	1.00	MCS	C	
82	005.AA2.03 1	1.00	MCS	B	
83	067 G2.4.11 1	1.00	MCS	D	
84	W/E15 G2.4.18 1	1.00	MCS	D	
85	W/E10 EA2.1 1	1.00	MCS	C	
86	004 A2.01 1	1.00	MCS	A	
87	006 A2.05 1	1.00	MCS	D	
88	012 G2.2.38 1	1.00	MCS	B	
89	073 A2.03 1	1.00	MCS	B	
90	078 G2.1.7 2	1.00	MCS	B	
91	034 K4.03 1	1.00	MCS	C	
92	045 G2.1.23 1	1.00	MCS	D	

**ANSWER KEY REPORT**  
for Surry RO-SRO Combined 2012 Test Form: 0

#	ID	Points	Type	Answers
93	015 A2.04 1	1.00	MCS	A
94	G2.1.34 1	1.00	MCS	A
95	G2.1.13 1	1.00	MCS	D
96	G2.2.11 1	1.00	MCS	A
97	G2.2.12 1	1.00	MCS	B
98	G2.3.13 1	1.00	MCS	B
99	G2.4.16 1	1.00	MCS	A
100	G2.4.30 1	1.00	MCS	A
<b>SECTION 1 ( 100 items)</b>		<b>100.00</b>		

# NRC Exam Reference Materials

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5	1-AP-27.00 – Attachment 2 (Minimum RCS Level Versus RHR Flow (1-RC-LI-100A))
6	PCS Drawing – Unit 1 Low Head Safety Injection
7	Surry Power Station EAL Matrix – Revision 2
8,9	Technical Specifications 3.1.D (Pages 3.1-15a & 3.1-15b)
10	VPAP- 2802 – Notifications and Reports