

1.

Unit 1 Initial Conditions:

- 15% Power.
- An automatic Reactor Trip occurs.

Current conditions:

- Reactor is verified tripped.
- Main Turbine DID NOT automatically trip.
- Operators attempted to manually trip the Main Turbine from the control room.
- All Turbine Stop and Governor valves remain OPEN.
- Generator output breakers are CLOSED.
- Turbine speed is NOT DECREASING.
- Generator motoring is NOT initiated.
- It is now 45 seconds after the Reactor Trip.

Based on the current conditions, which one of the following is (1) the NEXT action required by 1-E-0, "REACTOR TRIP OR SAFETY INJECTION," and (2) the reason for this action?

- A. (1) Close MSTVs.  
(2) Prevent an uncontrolled cooldown of the Reactor Coolant System (RCS).
- B. (1) Close MSTVs.  
(2) Prevent a Loss of Heat Sink condition from occurring.
- C. (1) Open generator output breakers AND place Excitation control switch in OFF.  
(2) Prevent motoring the Main Generator.
- D. (1) Open generator output breakers AND place Excitation control switch in OFF.  
(2) Actuate an alternate Turbine trip signal.

2.

Initial conditions:

- Unit 1 is at 100% power.
- 1-RC-LT-461 (PRZR LEVEL PROTECT CH 3) selected for "Upper Control Channel."
- 1-RC-LT-460 (PRZR LEVEL PROTECT CH 2) selected for "Lower Control Channel."

Current conditions:

- 1C-B8 "PZR LO PRESS" is lit
- 1C-C8 "PRZR HI LVL HTRS ON" is lit
- PRZR Master pressure controller **output** is 0%.
- PRZR level controller **output** is 0%.
- Pressure trends are observed on the following indicators:
  - 1-RC-PI-455 (PRZR PRESS PROTECT CH 1) = 2245 psig and dropping.
  - 1-RC-PI-456 (PRZR PRESS PROTECT CH 2) = 2243 psig and dropping.
  - 1-RC-PI-457 (PRZR PRESS PROTECT CH 3) = 2135 psig and dropping.
- Level trends are observed on the following indicators:
  - 1-RC-LT-459 (PRZR LEVEL PROTECT CH 1) = 48% and dropping.
  - 1-RC-LT-460 (PRZR LEVEL PROTECT CH 2) = 47% and dropping.
  - 1-RC-LT-461 (PRZR LEVEL PROTECT CH 3) = 68% and rising.

Based on the current conditions, which one of the following explains the above event?

- A. PRZR Master pressure controller output has failed low.
- B. A leak has developed at the instrument tap to the reference leg for level transmitter 1-RC-LT-461.
- C. PRZR level controller output has failed low.
- D. A leak has developed at the instrument tap to the variable leg for level transmitter 1-RC-LT-461.

3.

Unit 1 plant conditions:

- SBLOCA has occurred
- All charging pumps are inoperable
- RCS hot legs are voided
- FR-C.1 RESPONSE TO INADEQUATE CORE COOLING in progress
- RCPs are off
- Total AFW flow = 100 gpm
- The SRO directs the intact SGs to be depressurized to 200 psig

Based on the above conditions, which one of the following: (1) states what limits (if any) are placed on SG depressurization and (2) the reason for this action?

- A. (1) Limited such that RCS cooldown rate does not exceed 100 °F/Hr  
(2) Maintain the SG as a heat sink via reflux boiling
- B. (1) Limited such that RCS cooldown rate does not exceed 100 °F/Hr  
(2) To establish RCP support conditions
- C. (1) There is no limit on how fast you can depressurize the SGs  
(2) Maintain the SG as a heat sink via reflux boiling
- D. (1) There is no limit on how fast you can depressurize the SGs  
(2) To establish RCP support conditions

4.

Unit 1 Initial Conditions:

- Unit 1 experienced a design-basis Large Break Loss of Coolant Accident (LBLOCA) coincident with a loss of offsite power.

Current Conditions:

- You are arriving at the plant to assume the Operator at the Controls (OATC) position.
- It is now ten (10) hours since the LOCA occurred.
- Containment Pressure has returned to sub-atmospheric conditions.

Based upon the current conditions, (1) what is the method of core cooling in use and (2) which spray system is in operation?

- A. (1) Recirculation flow from the Containment sump through the SI system with discharge into the cold legs.  
(2) The ISRS pumps are operated as required to maintain containment pressure.
- B. (1) Recirculation flow from the Containment sump through the SI system with discharge into the cold legs.  
(2) The OSRS pumps are operated as required to maintain containment pressure.
- C. (1) Recirculation flow from the Containment sump through the SI system with discharge into the hot legs.  
(2) The ISRS pumps are operated as required to maintain containment pressure.
- D. (1) Recirculation flow from the Containment sump through the SI system with discharge into the hot legs.  
(2) The OSRS pumps are operated as required to maintain containment pressure.

5.

Initial conditions:

- Unit 1 is at 100% power.
- Letdown was removed from service to repair a leak.
- Excess letdown is in service.
- Pressurizer (PRZR) is at program level.

Current conditions:

- 1-AP-8.00, Loss of Normal Charging Flow, has been initiated.
- VCT level indicates off-scale low.
- Charging flow and discharge pressure is erratic.
- All three charging pumps are running.
- Charging pump amps are erratic on all pumps.
- System valve positions are normal.

Based on the current conditions, which one of the following describes...

(1) how excess letdown flow will be affected  
and

(2) whether a reactor trip is required in accordance with 1-AP-8.00?

- A. (1) Excess letdown will continue until manually isolated.  
(2) Reactor trip is NOT required.
- B. (1) Excess letdown will be automatically isolated.  
(2) Reactor trip is NOT required.
- C. (1) Excess letdown will be automatically isolated.  
(2) Reactor trip is required.
- D. (1) Excess letdown will continue until manually isolated.  
(2) Reactor trip is required.

6.

Unit 1 Initial Sequence of events at 180 hours after shutdown:

- Mid loop operation was entered after a shutdown from 100%
- The running RHR pump suction was vortexing
- 1-AP-27.00, LOSS OF DECAY HEAT REMOVAL CAPABILITY, was entered
- The crew reduced RHR flow and raised RCS level, which stopped the vortexing

Current Conditions:

- RCS temperature is 145°F and increasing slowly
- The RHR controls are in their normal configuration

Which one of the following correctly describes: (1) actions that will stabilize temperature, and (2) the response of RHR cold leg return flow after the actions have been taken?

- A. (1) Adjust the potentiometer to manually open 1-RH-HCV-1758 (RHR HXS FLOW).  
(2) RHR cold leg return flow indication will rise.
- B. (1) Adjust the potentiometer to manually open 1-RH-HCV-1758 (RHR HXS FLOW).  
(2) RHR cold leg return flow indication will remain approximately stable.
- C. (1) Raise the setpoint on the controller to allow 1-RH-HCV-1758 (RHR HXS FLOW) to automatically open.  
(2) RHR cold leg return flow indication will rise.
- D. (1) Raise the setpoint on the controller to allow 1-RH-HCV-1758 (RHR HXS FLOW) to automatically open.  
(2) RHR cold leg return flow indication will remain approximately stable.

7.

Initial conditions:

- Both units are at 100% power

Current unit one conditions:

- Annunciator 1C-A1 - RCP 1A CC RETURN LO FLOW is LIT
  - Annunciator 1C-B1 - RCP 1B CC RETURN LO FLOW is LIT
  - Annunciator 1C-C1 - RCP 1C CC RETURN LO FLOW is LIT
  - Annunciator 1C-H2 - CTMT CC OUT HDR 1B LO FLOW is LIT
  - Annunciator VSP-D7 - CC SURGE TK Hi-Lo LVL is LIT
  - Annunciator 1K-E7 - CC PPs DISCH HDR LO PRESS is LIT
  - Annunciator RM-N6 - CC/SW HX C ALERT/FAILURE is LIT
- 
- The turbine building operator has aligned make-up to the CC surge tank
  - CC surge tank level is decreasing at 7%/minute with make-up aligned
  - The operating CC pump amps are oscillating erratically from 0 to 60 amps.
  - CC surge tank level is currently 2%

Based on the current conditions, which one of the following components would isolate the leakage?

Close the CC inlet and outlet valves to the ...

- A. RCP supply and return headers
- B. "C" component cooling water heat exchanger
- C. aligned RHR heat exchanger
- D. seal water heat exchanger

8.

Unit 1 Initial Conditions:

- Time = 1500.
- 100% Power.
- Pressurizer (PZR) Pressure = 2235 psig.
- All PZR Pressure control components are in their normal 100% power alignments.

Current Conditions:

- Time = 1502.
- 1-RC-PC-1444J (PZR Pressure Master Controller) **output** fails to a constant value of 70%.
- No operator actions have been taken.

Based upon the current conditions, what is the expected configuration of the PZR Pressure control system?

- A. Proportional Heaters OFF, Both Spray Valves FULL OPEN, PZR PORV 1-RC-PCV-1455C OPEN.
- B. Proportional Heaters OFF, Both Spray Valves FULL OPEN, PZR PORV 1-RC-PCV-1455C CLOSED.
- C. Proportional Heaters 50% OUTPUT, Both Spray Valves CLOSED, PZR PORV 1-RC-PCV-1455C CLOSED.
- D. Proportional Heaters 100% OUTPUT, Both Spray Valves CLOSED, PZR PORV 1-RC-PCV-1455C CLOSED.



9.

Unit 1 initial conditions:

- Reactor power = 12%
- Main Turbine surveillance testing is in progress
- CERPI:
  - Bank A = 228 Steps
  - Bank B = 228 Steps
  - Bank C = 228 Steps
  - Bank D = 140 Steps

Current plant conditions:

- Main Turbine trip occurs during testing
- Following the turbine trip CERPI indicates as follows:
  - Bank A = 228 Steps
  - Bank B = 228 Steps
  - Bank C = 228 Steps
  - Bank D = 140 Steps except control rod H-14 which = 0 Steps

Based on the above conditions, which one of the following states: (1) what the Control Rod Group Step Counter for Group D should read and (2) the correct procedure the crew is required to initiate to address the event?

- A. (1) 140 Steps  
(2) 1-E-0 REACTOR TRIP OR SAFETY INJECTION
- B. (1) 140 Steps  
(2) 0-AP-1.00 CONTROL ROD SYSTEM MALFUNCTION
- C. (1) 0 Steps  
(2) 1-E-0 REACTOR TRIP OR SAFETY INJECTION
- D. (1) 0 Steps  
(2) 0-AP-1.00 CONTROL ROD SYSTEM MALFUNCTION

10.

Unit 1 Initial Conditions:

- 100% Power.
- Reactor Coolant System (RCS) Pressure is 2235 psig and stable.
- Steam Generator (S/G) 'A' Pressure is 790 psig and stable.
- A seismic event causes a complete shear of one tube in S/G 'A' coincident with a loss of offsite power.
- Initial tube rupture flow rate from the RCS to S/G 'A' is 800 gpm.

Current conditions:

- Operators correctly perform the step to isolate ruptured S/G(s) in 1-E-3, STEAM GENERATOR TUBE RUPTURE, and have properly adjusted the 'A' S/G PORV controller setpoint.
- S/G 'A' pressure is 20 psig lower than the 'A' S/G PORV controller setpoint.
- S/G 'A' PORV is closed.
- RCS pressure is 1650 psig.

Based on the current conditions, which one of the following is: (1) the current tube rupture flow rate from the RCS to S/G 'A,' AND (2) if S/G 'A' PORV were to open at setpoint, the required action in accordance with 1-E-3 is to \_\_\_\_\_ ?

- A. (1) 350 gpm  
(2) place 'A' S/G PORV controller in MANUAL and close the PORV.
- B. (1) 350 gpm  
(2) verify 'A' S/G PORV closed when 'A' S/G pressure is less than setpoint.
- C. (1) 530 gpm  
(2) place 'A' S/G PORV controller in MANUAL and close the PORV.
- D. (1) 530 gpm  
(2) verify 'A' S/G PORV closed when 'A' S/G pressure is less than setpoint.

11.

Unit 1 Initial Conditions:

- A small break LOCA occurred following a reactor trip due to a loss of main feedwater.
- Subsequently, the AFW system degraded and 1-FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, was entered.

Unit 1 Current Conditions:

- RCS Bleed and Feed has been established
- Hot leg RCS temperatures are 475°F and stable
- CETC temperatures are 475°F and stable
- SG WR Levels are: A = 4%, B = 6%, C = 5%
- Containment pressure is 25 psia and lowering
- AFW flow capability has been restored

Based on the current conditions, which one of the following states the 1-FR-H.1 requirements for establishing AFW?

- A. Feed SGs at a minimum total flow of 350 gpm.
- B. Feed SGs at a minimum total flow of 450 gpm.
- C. Feed only one SG at no more than 60 gpm.
- D. Feed only one SG at no more than 100 gpm.

12.

Unit 1 Initial Conditions:

- Power = 100%.
- Time = 0255. A large electrical fire at the site caused the loss of Vital Buses 1-III, 1-IIIA, 1-IV and 1-IVA.

Current conditions:

- Time = 0300. Operators initiate a manual Reactor Trip.
- Time = 0301. One Reactor Coolant Pump (RCP) is secured.
- Time = 0303. Operators note the following:
  - Loop 'A' Tave = 541 °F
  - Loop 'B' Tave = 551 °F
  - Loop 'C' Tave = Failed Low
- Time = 0304. Safety Injection is NOT actuated.

Based upon the current conditions, which one of the following describes (1) whether an automatic safety injection should have occurred by Time = 0304, AND (2) how many RCPs have lost Component Cooling (CC) to the lube oil coolers?

- A. (1) An automatic Safety Injection should have actuated.  
(2) One RCP has lost CC to the lube oil coolers.
- B. (1) An automatic Safety Injection should NOT have actuated.  
(2) More than one RCP has lost CC to the lube oil coolers.
- C. (1) An automatic Safety Injection should have actuated.  
(2) More than one RCP has lost CC to the lube oil coolers.
- D. (1) An automatic Safety Injection should NOT have actuated.  
(2) One RCP has lost CC to the lube oil coolers.

13.

Initial Conditions:

- Unit One is at hot shutdown preparing for a reactor start-up.

Current conditions:

- While performing the monthly battery test on the 1A station battery, a tool is dropped on the battery lead terminals and the short results in the battery leads separating from the battery. Due to the fault current experienced, the battery chargers on both UPS trip off-line, resulting in a loss of the "A" DC bus.

Which one of the following describes (1) the impact of this failure on #1 EDG, and (2) the status of LCO 3.16, Emergency Power System?

- A. (1) #1 EDG starts and automatically assumes 1H bus.  
(2) Actions of LCO 3.16 are required.
- B. (1) #1 EDG starts and automatically assumes 1H bus.  
(2) Actions of LCO 3.16 are NOT required.
- C. (1) #1 EDG starts but cannot be loaded from the control room.  
(2) Actions of LCO 3.16 are NOT required.
- D. (1) #1 EDG starts but cannot be loaded from the control room.  
(2) Actions of LCO 3.16 are required.

14.

Which ONE of the following is correct regarding automatic alignments of the station service water (SW) system in response to a Hi-Hi CLS and the reason for that feature?

- A. If the Hi-Hi CLS occurred with a station blackout, SW to the CCHXs will automatically isolate to conserve canal inventory. These valves can then be re-opened immediately to allow heat sink restoration to the CCHXs.
- B. If the Hi-Hi CLS occurred with a loss of intake canal level, SW to two RSHXs will automatically throttle close to 25% to conserve intake canal level. These valves can then be re-opened immediately to allow for the additional heat removal capability of the system.
- C. If the Hi-Hi CLS occurred with a station blackout, SW to the CCHXs will automatically isolate to conserve canal inventory. These valves can then be re-opened after 5 minutes to allow heat sink restoration to the CCHXs.
- D. If the Hi-Hi CLS occurred with a loss of intake canal level, SW to two RSHXs will automatically throttle close to 25% to conserve intake canal level. These valves can then be re-opened after 5 minutes to allow for the additional heat removal capability of the system.

15.

Current conditions:

- The station has been notified that the real-time contingency analysis program is unavailable.
  - Unit 1 and Unit 2 crews have entered 0-AP-10.18, Response to Grid Instability.
  - While performing step #7 (Check system conditions), the system operator reports the following voltage readings:
    - 230 KV bus = 236 KV
    - 500 KV bus = 494 KV
- (1) Which one of the following describes the concern with these readings in accordance with 0-AP-10.18  
and
- (2) The maximum (minimum) MVAR limit allowed to compensate for this condition and the basis for this limit?
- A. (1) The maximum voltage limit has been exceeded on the 230 KV bus.  
(2) 400 MVARs in to limit stator winding temperature.
- B. (1) The maximum voltage limit has been exceeded on the 230 KV bus.  
(2) 500 MVARs in to limit stator winding temperature.
- C. (1) The minimum voltage limit has been reached on the 500 KV bus.  
(2) 500 MVARs out to limit rotor winding temperature.
- D. (1) The minimum voltage limit has been reached on the 500 KV bus.  
(2) 400 MVARs out to limit rotor winding temperature.

16.

Unit 1 Initial Conditions:

- An automatic Reactor Trip and Safety Injection occurred from 100% power.

Current Conditions:

- Operators have just transitioned to 1-ECA-1.2, "LOCA OUTSIDE CONTAINMENT."

Which ONE of the following parameters is used to determine if the break has been isolated, in accordance with 1-ECA-1.2?

- A. RVLIS level
- B. RCS subcooling
- C. RCS pressure
- D. PRZR level



17.

Unit 1 current conditions:

- Unit trip occurred due to a loss of main feedwater pumps.
- 1-FR-H.1, Response to Loss of Secondary Heat Sink, has been initiated.
- All Main Feedwater (MFW) and Auxiliary Feedwater (AFW) pumps are unavailable.
- Unit 2 AFW cross-tie valve will not open.
- Charging and letdown are in service.
- Pressurizer pressure is 2330 psig.
- Core Exit Thermocouple Temperature is 270 °F.
- SG Wide range level indications are as follows:
  - SG 1A = 10%      SG 1B = 9%      SG 1C = 10%
- The crew has reached step 5 of 1-FR-H.1 (Depressurize RCS to 1950 psig).

Based on the current conditions, which one of the following is consistent with the mitigation strategy :

- A. Initiate RCS Feed and Bleed immediately due to inadequate steam generator inventory.
- B. Initiate RCS Feed and Bleed immediately due to excessive RCS pressure.
- C. Continue with RCS depressurization to 1950 psig using one pressurizer PORV.
- D. Continue with RCS depressurization to 1950 psig using auxiliary spray.

18.

Unit 1 initial plant conditions:

- Reactor power = 100%
- Main Steam Line break occurs in unit one safeguards
- Main Steam Trip Valves failed to close
- Transition to 1-ECA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS has occurred

Current plant conditions:

- SG A, B and C NR Level = 6%
- RCS cooldown rate is 124°F/hr.

Based on the above conditions, which ONE of the following states: (1) The Minimum AFW flow requirements per steam generator and (2) The maximum cooldown rate allowed IAW 1-ECA-2.1?

- A. (1) 60 gpm  
(2) 100 °F/hr
- B. (1) 60 gpm  
(2) 50 °F/hr
- C. (1) 120 gpm  
(2) 100 °F/hr
- D. (1) 120 gpm  
(2) 50 °F/hr

19.

Unit 1 Initial Conditions:

- 70% Power.
- 0-AP-1.01, "CONTROL ROD MISALIGNMENT," is being implemented.
- A dropped Control Bank 'C' rod has just been re-aligned with its group, but the lift coil disconnect switches have NOT been returned to normal.

Current Conditions:

- While attempting to operate the INTERNAL ALARM RESET pushbutton, the operator inadvertently operates the STARTUP RESET pushbutton.

Based on the current conditions, which one of the following describes the effect of operating the incorrect reset?

- A. All of the Control Bank 'C' rods drop into the core. No other rods drop into the core.
- B. All rods, including all Control Bank and Shutdown Bank rods, drop into the core.
- C. All rods remain in their current position. There is no effect on the control rod group step counters.
- D. All rods remain in their current position. The control rod group step counters indicates all rods are fully inserted.

20.

With reactor power initially stable at 50%, the following alarms were received:

- 1C-B8 - PRZR LO PRESS
- 1G-B5 - COMPUTER PRINTOUT ROD CONT SYS
- 1G-E2 - RPI SYS TROUBLE
- 1G-H1 - NIS DROPPED ROD FLUX DECREASE >5% PER 2 SEC
- 1G-H2 - RPI ROD BOTTOM <20 STEPS

Which ONE of following states 1) whether the problem is a dropped rod or CERPI issue, and 2) an alarm that supports this conclusion (and eliminates the other)?

- A. 1) The problem is a CERPI indication issue  
2) 1G-E2 - RPI SYS TROUBLE
- B. 1) The problem is a CERPI indication issue  
2) 1G-H2 - RPI ROD BOTTOM <20 STEPS
- C. 1) The problem is an actual dropped rod  
2) 1G-H1 - NIS DROPPED ROD FLUX DECREASE >5% PER 2 SEC
- D. 1) The problem is an actual dropped rod  
2) 1G-H2 - RPI ROD BOTTOM <20 STEPS

21.

A large break LOCA has occurred

Plant conditions 10 minutes into the event:

- Containment pressure is 32 psia
- Pressurizer pressure - 3 psig
- Pressurizer level - 0%
- RVLIS full range - 46%
- Containment High Range radiation -  $3.45 \times 10^6$

Current plant conditions:

- Containment pressure is 16 psia
- Pressurizer pressure - 2 psig
- Pressurizer level - 0%
- RVLIS full range - 52%
- Containment High Range radiation -  $9.45 \times 10^4$

Which ONE of the following states the instrument to be used to monitor core reactivity and the basis for this decision?

- A. Source range NIs, because containment conditions are no longer adverse.
- B. Source range NIs, because RVLIS level has increased such that voiding is no longer occurring and SRNIs will indicate properly.
- C. Gamma-Metrics because adverse containment conditions have been exceeded during the event.
- D. Gamma-Metrics because RVLIS level was low enough during the event to indicate vessel voiding and cause the SRNIs to indicate erratically.

22.

Unit 1 Initial Conditions:

- 100% Power.
- The operations crew notes degrading condenser vacuum and enters 1-AP-14.00, "LOSS OF MAIN CONDENSER VACUUM."
- The crew is performing steps in Attachment 3, Low Air Ejector Flow Rate.

Current Conditions:

- The Turbine Building operator checks both condenser air ejector loop seal drain lines to condenser, and reports that one loop seal drain line is **very hot** to the touch, and the other is normal.

Based on the current conditions, which one of the following are the required actions, in accordance with 1-AP-14.00?

- A. Isolate **ONLY** the **hot** loop seal drain line, verify the condenser hoppers are in service, and secure **ONLY** the set of air ejectors associated with the **hot** loop seal drain line.
- B. Isolate **ONLY** the **hot** loop seal drain line, if Air Ejector flows are NOT normal leave the drain valve closed for approximately 5 minutes, then reopen the **hot** loop seal drain isolation valve.
- C. Isolate **BOTH** loop seal drain lines, verify the condenser hoppers are in service, and secure **ONLY** the set of air ejectors associated with the **hot** loop seal drain line.
- D. Isolate **BOTH** loop seal drain lines, if Air Ejector flows are NOT normal leave both drain valves closed for approximately 5 minutes, then reopen **both** loop seal drain isolation valves.

23.

Current conditions on Unit 1:

- 1000 - A Large Break Loss of Coolant Accident has occurred.
- 1030 - 1B train of Recirc Spray is the only available train and started automatically.
- 1038 - Increasing trend is identified on 1-SW-RM-115 (RS/SW HX B RM)
- 1042 - Alarm 1-RM-A8, RS/SW HX B ALERT / FAILURE is received.
- 1048 - Alarm 1-RM-B8, 1-SW-RI-115 HIGH, alarm is received.
- 1050 - An increasing trend has been identified on 1-SW-RI-120 (DISCH TUNNEL)
- 1052 1-SW-RI-115 indicates all EEEEEEs and the following lights are lit on the radiation monitor:
  - Warning
  - High
  - Range

Based on the current conditions, which one of the following describes the response of the radiation monitors and an acceptable action in accordance with alarm response procedures?

- A. 1-SW-RM-115 has failed high. Request HP sampling per the Offsite Dose Calculation Manual.
- B. Current radiation levels are above the range of 1-SW-RM-115. Request HP sampling per the Offsite Dose Calculation Manual.
- C. 1-SW-RM-115 has failed high. Secure 1B Recirc Spray train.
- D. Current radiation levels are above the range of 1-SW-RM-115. Secure 1B Recirc Spray train.

24.

Unit 1 initial conditions:

Fire is reported in the "B" 4160v station service bus  
The SRO directs the bus to be de-energized

Based on the above conditions, which one of the following states (1) the load lost when de-energizing the "B" 4160v station service bus and (2) the type of fire suppression system in the 4160V Station Service Switchgear room?

- A. (1) 1-BC-P-1A "A" BC Pump  
(2) Low Pressure CO2
- B. (1) 1-SD-P-1B "B" HP HTR Drain Pump  
(2) Low Pressure CO2
- C. (1) 1-BC-P-1A "A" BC Pump  
(2) High Pressure CO2
- D. (1) 1-SD-P-1B "B" HP HTR Drain Pump  
(2) High Pressure CO2



25.

Unit 1 Initial Conditions:

- A large electrical fire occurred in the Main Control Room.
- Operators implemented 0-FCA-1.00, "LIMITING MCR FIRE."
- Both units' Reactor and Turbine are tripped.
- All Reactor Coolant Pumps (RCPs) are placed in Pull-to-Lock (PTL).
- During the confusion, the Unit 1 operator inadvertently placed ALL Unit 1 Charging Pumps in PTL.

Current Conditions:

- You were dispatched to the #1 EDG with 0-FCA-12.00, "EMERGENCY DIESEL GENERATOR OPERATION."
- Upon arrival at #1 EDG, you report that the #1 EDG is NOT running.
- The Senior Reactor Operator (SRO) informs you that the station has NOT lost normal offsite power.

Based on the current conditions, which one of the following is (1) the required action for loss of RCP seal injection, in accordance with 0-FCA-1.00, AND (2) the required action(s) for operation of the #1 EDG, in accordance with 0-FCA-12.00?

- A. (1) Wait at least 30 minutes and then isolate RCP seals.  
(2) Verify switch lineup at #1 EDG for normal automatic operation, but do NOT transfer #1 EDG control to the local panel.
- B. (1) Wait at least 30 minutes and then isolate RCP seals.  
(2) Transfer #1 EDG control to the local panel.
- C. (1) RCP seals must be isolated and remain isolated until the RCS is cooled down to less than 200 °F.  
(2) Transfer #1 EDG control to the local panel.
- D. (1) RCP seals must be isolated and remain isolated until the RCS is cooled down to less than 200 °F.  
(2) Verify switch lineup at #1 EDG for normal automatic operation, but do NOT transfer #1 EDG control to the local panel.

26.

Which one of the following correctly states the SI reduction criteria for 1-FR-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION (1) for subcooling margin and (2) the RCS inventory with all RCPs running?

- A. (1) > 30 F [85 F]  
(2) > 82% Dynamic Range RVLIS
- B. (1) > 30 F [85 F]  
(2) > 22% [50%] PZRZ level
- C. (1) > 80 F [135 F]  
(2) > 82% Dynamic Range RVLIS
- D. (1) > 80 F [135 F]  
(2) > 22% [50%] PZRZ level

27.

Current conditions:

- Unit 1 experienced a reactor trip and a loss of offsite power.
- 1-ES-0.4, Natural Circulation Cooldown with Steam Void in Rx Vessel (W/O RVLIS), is in progress.

During RCS depressurization with Pressurizer level above 90% per 1-ES-0.4, which ONE of the following states 1) the action required in response to this pressurizer level and 2) the basis for this action?

- A. 1) Energize pressurizer heaters  
2) To prevent water relief out of the safety valves
- B. 1) Commence RCS Drain  
2) To prevent water relief out of the safety valves
- C. 1) Energize pressurizer heaters  
2) To promote reactor head cooling and collapse any void that may exist
- D. 1) Commence RCS Drain  
2) To promote reactor head cooling and collapse any void that may exist

28.

Unit 1 Initial Conditions:

- 100% Power.

Current Conditions:

- No. 1 Seal Leakoff on 1-RC-P-1B, the 'B' Reactor Coolant Pump (RCP), unexpectedly rises to a value of 6.5 gpm and stabilizes.
- Operators enter 1-AP-9.00, "RCP ABNORMAL CONDITIONS."
- All temperatures, and all other monitored parameters for 1-RC-P-1B are within normal operating limits and are stable.

Based on the current conditions, which one of the following:

- (1) is the required action, in accordance with 1-AP-9.00, AND
- (2) describes the No. 2 seal design for 1-RC-P-1B during normal operation?

- (1) Manually trip the Reactor, and secure the 'B' RCP within 5 minutes.  
(2) The No. 2 seal is a film-riding seal consisting of a runner which rotates with the shaft and a non-rotating seal ring attached to the lower seal housing.
- (1) Manually trip the Reactor, and secure the 'B' RCP within 5 minutes.  
(2) The No. 2 seal is a rubbing-face seal comprised of a chrome carbide seal ring and a chrome-carbide runner that is fixed on the pump shaft.
- (1) Shut down the plant, and secure the 'B' RCP within 8 hours.  
(2) The No. 2 seal is a rubbing-face seal comprised of a chrome carbide seal ring and a chrome-carbide runner that is fixed on the pump shaft.
- (1) Shut down the plant, and secure the 'B' RCP within 8 hours.  
(2) The No. 2 seal is a film-riding seal consisting of a runner which rotates with the shaft and a non-rotating seal ring attached to the lower seal housing.

29.

Current conditions:

- The latest shutdown margin calculation indicates the shutdown margin has decreased to 1.5% delta-K/K.
- RCP 'A' is in operation and preparations are underway to shutdown the pump.
- RHR system is in operation.
- RCS pressure has been reduced to 300 psig.
- RCS temperature is 210°F.

Based on the current conditions, which one of the following completes the statements below?

A tube leak exists on the \_\_\_\_\_ (1) \_\_\_\_\_. Shutdown Margin as defined by Technical Specifications is \_\_\_\_\_ (2) \_\_\_\_\_.

(1)

(2)

- |                                      |          |
|--------------------------------------|----------|
| A. Seal water return heat exchanger. | met.     |
| B. Seal water return heat exchanger. | NOT met. |
| C. In-service RHR heat exchanger.    | met.     |
| D. In-service RHR heat exchanger.    | NOT met. |

30.

Initial conditions:

- Unit 1 at 100% and stable with all systems in normal configuration

Current Conditions:

- 1D-E5 - (CHG PP TO REGEN HX Hi-Lo FLOW) is LIT
- VCT level is 49% and increasing
- Pressurizer level is 52% and decreasing
- Letdown flow is oscillating
- Letdown pressure is oscillating

Which ONE of the following identifies the failure that has resulted in the above indications?

- A. 1-CH-FT-1122 (CHG FLOW) transmitter has failed high
- B. 1-CH-PCV-1145 has failed closed
- C. 1-CH-LCV-1460A (Letdown Isol Vlv) has failed closed
- D. 1-CH-FCV-1122 (Chg Flow Cntrl Vlv) instrument air has been lost

31.

Unit 1 Initial Conditions:

- The plant is solid.
- RCS temperature is being controlled with the 'A' RHR pump running on the "A" RHR heat exchanger. The 'B' RHR pump is not running.
- RCS pressure is being controlled with the 1-CH-PCV-1145 (Letdown Pressure Control Valve) controller in AUTO and the 1-CH-FCV-1122 (Charging flow control valve) controller in MANUAL.

Current conditions:

- The 'A' RHR pump just tripped.

Based on the current conditions, which one of the following (1) describes the response of RCS pressure if NO operator actions are taken, AND (2) the action the operator is required to take to restore RCS pressure to its value before the 'A' RHR pump tripped?

- A. (1) RCS pressure will increase  
(2) Lower the setpoint on 1-CH-PCV-1145 controller to lower RCS pressure
- B. (1) RCS pressure will decrease  
(2) Raise the setpoint on 1-CH-PCV-1145 controller to raise RCS pressure
- C. (1) RCS pressure will decrease  
(2) Lower the setpoint on 1-CH-PCV-1145 controller to raise RCS pressure
- D. (1) RCS pressure will increase  
(2) Raise the setpoint on 1-CH-PCV-1145 controller to lower RCS pressure

32.

Which one of the following correctly states a condition that would result in automatic isolation (closure) of all the main feedwater regulating valves **AND** all the main feedwater bypass flow control valves?

Evaluate each condition listed below as a separate and individual event with the unit initially at 100% power with all systems in normal configuration.

- A. Narrow range level in one steam generator 80% on 2/3 channels.
- B. Reactor trip breakers open and median Tave 547° F.
- C. Pressurizer pressure is 1760 psig.
- D. Non-recoverable loss of vital bus 1-II.



33.

The following Unit 1 conditions exist:

Pressurizer PORV leakage exists

PRT pressure is 12 psig

PRT gas samples indicate Xe-133 activity at  $8 \times 10^{-2}$  micro-curies/ml

Operators have been directed to vent the PRT

Which one of the following describes where the PRT is required to be vented in accordance with 1-OP-RC-011, Pressurizer Relief Tank Operations?

- A. Vent Vent System
- B. Overhead Gas System
- C. Through the Sample System to the Process Vent System
- D. Process Vent System directly (I.E., not through the Sample System)

34.

Unit 1 Initial Conditions:

- Power = 100%.

Current Conditions:

- Reactor Coolant System (RCS) Pressure is 900 psig and slowly lowering.
- Pressurizer level is offscale low.
- Containment pressure reached a maximum at 19 psia and is now 18 psia and slowly lowering.
- Steam Generator pressures and levels are equal and stable.

Based on the current conditions, which one of the following is the Component Cooling (CC) valve lineup? (consider that ONLY automatic actuations occurred, no manual re-positioning of valves)

1-CC-TV-105A, B, C      Reactor Coolant Pump (RCP) Cooler Return Valves  
1-CC-TV-110A, B, C      Containment Air Recirc CC Return Valves

	<u>1-CC-TV-105A, B, C</u>	<u>1-CC-TV-110A, B, C</u>
A.	CLOSED	CLOSED
B.	OPEN	CLOSED
C.	CLOSED	OPEN
D.	OPEN	OPEN

35.

Unit 1 Initial Conditions:

- Power = 100%.
- Component Cooling (CC) Pump 1-CC-P-1B is RUNNING.
- An electrical fault caused a loss of normal offsite power to the '1H' Emergency Bus.
- Operators took action in accordance with 1-AP-10.07, "LOSS OF UNIT 1 POWER," and have re-energized the 'stub bus' from the #1 EDG.
- Operators have completed 1-AP-10.07 and are at the 'when/then' step to initiate 0-AP-10.08, STATION POWER RESTORATION, once the cause of power loss is corrected.

Current Conditions:

- Time = 0800. A Large Break LOCA occurs.
- Time = 0802. Containment pressure peaks at 28 psia.
- Time = 0810. 1-CC-P-1B trips.

Which one of the following completes the below statements?

(1) The standby CC pump low discharge header pressure auto start setpoint is

\_\_\_\_\_ .

(2) Based on the current conditions, when CC discharge pressure reaches the low discharge header pressure auto start setpoint, CC Pump 1-CC-P-1A will

\_\_\_\_\_ .

- A. (1) 55 psig  
(2) automatically start on low discharge header pressure
- B. (1) 55 psig  
(2) NOT automatically start on low discharge header pressure
- C. (1) 75 psig  
(2) automatically start on low discharge header pressure
- D. (1) 75 psig  
(2) NOT automatically start on low discharge header pressure

36.

Unit 1 Initial Conditions:

- 100% Power.
- Pressurizer Relief Tank (PRT) pressure is 2.2 psig.
- A transient causes a Pressurizer (PZR) PORV to open.
- The PZR PORV will not reseal, and operators are unable to close the associated PORV block valve.
- Maximum PZR pressure was 2340 psig and has continually DECREASED from that value.

Current conditions:

- Containment pressure is 10.6 psia.
- PZR Pressure is 1550 psig and DECREASING at 5 psig/min.
- PRT Pressure is 90 psig and INCREASING at 10 psig/min.

Based on the current conditions, and assuming a completely ideal thermodynamic process, which one of the following is

(1) the expected temperature trend observed on PZR PORV downstream temperature instrument (1-RC-TE-1463) from the maximum observed PZR pressure to the current conditions

AND

(2) the expected temperature value read on 1-RC-TE-1463 two minutes after the current conditions, considering no operator actions and no significant change in the Pressurizer PORV leakrate for the two minute interval?

	<b>Expected PORV discharge temp trend (1-RC-TE-1463)</b>	<b>Expected PORV discharge temp trend (1-RC-TE-1463) two minutes later</b>
A.	INCREASING	GREATER THAN current temperature on 1-RC-TE-1463
B.	INCREASING	LESS THAN current temperature on 1-RC-TE-1463
C.	DECREASING	GREATER THAN current temperature on 1-RC-TE-1463
D.	DECREASING	LESS THAN current temperature on 1-RC-TE-1463

37.

Unit 1 Initial Conditions:

- 5% Power.
- The 'A' reactor trip breaker and the 'B' reactor trip bypass breaker are CLOSED.

Current conditions:

- The 'A' DC bus loses power/de-energizes.

Based on the current conditions, which one of the following is the automatic response of the Reactor Protection System?

	<u>'A' Reactor Trip Breaker</u>	<u>'B' Reactor Trip Bypass Breaker</u>
A.	OPEN	CLOSED
B.	CLOSED	OPEN
C.	CLOSED	CLOSED
D.	OPEN	OPEN

38.

Unit 1 Initial Conditions:

- Time = 0300.
- Power = 100%
- No equipment out of service.
- Pressurizer (PZR) Pressure channel 1-RC-PT-1455 (PRZR PRESS PROTECT CH1) unexpectedly fails high.

Current conditions:

- Time = 0850 (same day). All required bistables for 1-RC-PT-1455 have been placed in the TRIP condition.

Based on the current conditions, which one of the following identifies the Reactor Protection System (RPS) and Engineered Safety Function (ESF) actuation logic coincidence required, from the remaining in-service PZR Pressure protection channels, to initiate an automatic low PZR Pressure Reactor Trip and automatic Low PZR Pressure Safety Injection at time 0851?

	<u>Low PZR Pressure Rx Trip Actuation Logic Coincidence</u>	<u>Low PZR Pressure Safety Injection Actuation Logic Coincidence</u>
A.	1/3	1/3
B.	1/2	1/2
C.	2/3	2/3
D.	1/3	1/2

39.

On Unit 1, 1-MS-PT-1474 (SG 'A' PRESS PROTECT CH 2) is out of service and Technical Specifications actions have been taken for that channel to place it in trip.

Which one of the following is now the minimum logic necessary for a valid, reliable Safety Injection (SI) signal to occur?

- A. High steam flow on **1** of 2 channels on **one** of the three steam lines in coincidence with low pressure on **either** 'B' or 'C' steam line.
- B. High steam flow on **1** of 2 channels on **two** of the three steam lines in coincidence with low pressure on **either** 'B' or 'C' steam line.
- C. High steam flow on **2** of 2 channels on **one** of the three steam lines in coincidence with low pressure on **both** 'B' and 'C' steam lines.
- D. High steam flow on **2** of 2 channels on **two** of the three steam lines in coincidence with low pressure on **both** 'B' and 'C' steam lines.

40.

Current conditions:

- Unit 1 is operating at 100% power in mid August
- 1-CD-REF-1A ('A' Chilled Water Refrigeration Unit) is operating.
- The following alarms on annunciator panel 1B are lit:
  - A6 – CTMT PART PRESS -0.1 CH 1
  - B6 – CTMT PART PRESS -0.1 CH 2
- Bulk Containment temperature on the Plant Computer shows a slowly rising trend.
- Three control rod drive mechanism (CRDM) fans are running.
- Three Containment Air Recirculation Fans (CARF) are running.

Based on the above conditions, which ONE of the following actions will clear the containment partial pressure alarms?

- A. Place the in-service Containment Vacuum Pump control switch to OFF.
- B. Increase Component Cooling (CC) water flow in Header 'A'.
- C. Increase cooling through the operating Chilled CC heat exchanger.
- D. Start an additional CRDM cooling fan.



41.

Unit 1 conditions:

- Time = 0930: Large Break LOCA
- Time = 1002: Loss of Offsite Power

Based on the above conditions, as the Emergency Buses energize, which one of the following states (1) which recirc spray pumps start first and (2) the reason for this action?

- A. (1) Inside Recirc Pumps  
(2) Their spray header is full of water which results in spraying the containment sooner
- B. (1) Inside Recirc Pumps  
(2) Their starting current is larger so starting them earlier in the sequence will minimize the chance of overloading the DGs
- C. (1) Outside Recirc Pumps  
(2) Their spray header is full of water which results in spraying the containment sooner
- D. (1) Outside Recirc Pumps  
(2) Their starting current is larger so starting them earlier in the sequence will minimize the chance of overloading the DGs

42.

Unit 1 Initial Conditions (1000 hrs):

- Reactor power is at 2%
- RCS temperature is 550 °F
- Main steam lines are being heated using the Main Steam Trip Valve bypass valves

Current Conditions (1015 hours):

- RCS temperature is stable at 524 °F

Based on the current conditions, which one of the following states (1) if the technical specification minimum temperature for criticality has been violated, and (2) if Technical Specification cooldown rate limits have been exceeded?

- A. (1) Minimum temperature for criticality has been violated.  
(2) Cooldown rate limits exceeded.
- B. (1) Minimum temperature for criticality has NOT been violated.  
(2) Cooldown rate limits NOT exceeded.
- C. (1) Minimum temperature for criticality has NOT been violated.  
(2) Cooldown rate limits exceeded.
- D. (1) Minimum temperature for criticality has been violated.  
(2) Cooldown rate limits NOT exceeded.

43.

Unit 1 Initial Conditions:

- Power = 15% and stable for a chemistry hold.
- 1-MS-PT-1446 (TURB 1st STAGE PRESS CH 3) is the selected channel.
- All Feed Regulating Valves (FRV) are controlling steam generator (S/G) levels in AUTO.

Current conditions:

- Time = 1440. 1-MS-PT-1446 fails high over a two minute period.
- Time = 1442. The operator realizes that 1-MS-PT-1446 has failed and begins to take the appropriate actions.

Based on the current conditions, which one of the following (1) is the response of the steam generator level control system to the 1-MS-PT-1446 failure **IF** no operator actions are taken, AND (2) the required operator actions to restore the steam generator level control system, in accordance with 0-AP-53.00, "LOSS OF VITAL INSTRUMENTATION/CONTROLS?"

- A. (1) S/G levels will stabilize at 44%.  
(2) VERIFY 1-MS-PT-1447 (TURB 1st STAGE PRESS CH 4) indications are NORMAL and then select 1-MS-PT-1447. Once S/G levels are stable then place all FRVs to MANUAL and then back to AUTO to remove windup from the controllers.
- B. (1) S/G levels will stabilize at 44%.  
(2) Place all FRVs to MANUAL, select 1-MS-PT-1447(TURB 1st STAGE PRESS CH 4), reduce SG levels to program, and then place the FRVs back to AUTO.
- C. (1) S/G levels will increase until the High S/G level trip setpoint is reached.  
(2) Place all FRVs to MANUAL, then Select 1-MS-PT-1447(TURB 1st STAGE PRESS CH 4), then place the FRVs back to AUTO.
- D. (1) S/G levels will increase until the High S/G level trip setpoint is reached.  
(2) VERIFY 1-MS-PT-1447 (TURB 1st STAGE PRESS CH 4) indications are NORMAL, then Select 1-MS-PT-1447. Once S/G levels are stable, place all FRVs to MANUAL and then back to AUTO to remove windup from the controllers.

44.

Unit 1 Initial Conditions:

- Power = 96%.
- The unit has operated at full power for 356 days of continuous operation, and has been in a “power coastdown” for the past four days.
- RCS Boron concentration is 20 ppm.

Current conditions:

- Time = 0004. The operations team has just commenced a power reduction in accordance with 1-GOP-2.1, “UNIT SHUTDOWN, POWER DECREASE FROM ALLOWABLE POWER TO LESS THAN 30% REACTOR POWER,” in order to begin a refueling outage.
- An operator inadvertently opens 1-FW-FCV-150A, 1A Main Feed Pump Recirc Valve.

Based on the current conditions, which one of the following completes the below statement, in accordance with 1-GOP-2.1?

When the Main Feed Pump Recirc Valve opens, Feedwater temperature will \_\_\_\_\_ (1) \_\_\_\_\_ which will add \_\_\_\_\_ (2) \_\_\_\_\_ to the core as compared to the exact same situation at beginning of life (BOL).

- A. (1) decrease  
(2) a larger amount of positive reactivity
- B. (1) decrease  
(2) a smaller amount of positive reactivity
- C. (1) increase  
(2) a larger amount of negative reactivity
- D. (1) increase  
(2) a smaller amount of negative reactivity

45.

With the unit initially at 100% power, the control room team closes the AFW MOVs to the "A" steam generator for a special test. No other switches are manipulated for this test.

Subsequently, an inadvertent safety injection occurs.

Which ONE of the following correctly states the expected response of the AFW system 35 seconds after the safety injection?

- A. All AFW water pumps are running with AFW aligned to all steam generators.
- B. Only the steam driven AFW pump in service to only "B" and "C" steam generators.
- C. All AFW pumps are running with AFW aligned to only "B" and "C" steam generators.
- D. Only the steam driven AFW pump in service with AFW aligned to all steam generators.

46.

Current conditions on Unit 1:

- 100% power
- Locally, in Unit One Safeguards, the 'J' AFW header temperature indicates 168°F and increasing.

Which ONE of the following describes:

- (1) the actions that should be taken in accordance with 1-AP-21.01, Response to AFW Check Valve Backleakage  
AND
- (2) the reason the action is taken?

- A. (1) Close MOV-FW-151A, -151C, and -151E.  
(2) To prevent S/G blowdown in the event of a piping rupture upstream of the valve.
- B. (1) Close MOV-FW-151B, -151D, and -151F.  
(2) To prevent S/G blowdown in the event of a piping rupture upstream of the valve.
- C. (1) Close MOV-FW-151A, -151C, and -151E  
(2) To prevent vapor binding of the AFW headers and pump casings.
- D. (1) Close MOV-FW-151B, -151D, and -151F  
(2) To prevent vapor binding of the AFW headers and pump casings.

47.

Unit 1 conditions:

- Rx Trip with loss of offsite power occurred
- EDG 1 is powering Bus 1H
- EDG 3 is powering Bus 1J
- 1-CH-P-1A is in pull-to-lock
- 1-CH-P-1B is secured in auto
- 1-CH-P-1C is in service
- 1-AP-10.07, Loss of Unit 1 Power, Attachment 4, Emergency Bus Load Alignment, is in progress

Based on the above conditions, which one of the following states (1) the action required to be taken with charging pump 1-CH-P-1B in accordance with 1-AP-10.07, Attachment 4, and (2) the consequence if this action is not taken?

- A. (1) Start 1-CH-P-1B  
(2) Subsequent HI HI CLS actuation could overload EDG 3
- B. (1) Start 1-CH-P-1B  
(2) Subsequent HI HI CLS actuation could overload EDG 1
- C. (1) Place 1-CH-P-1B in PTL  
(2) Subsequent HI HI CLS actuation could overload EDG 3
- D. (1) Place 1-CH-P-1B in PTL  
(2) Subsequent HI HI CLS actuation could overload EDG 1

48.

Initial conditions:

0130 - Unit 1 a non-recoverable loss of the semi-vital bus occurs.

Current plant conditions:

0230 - Unit 1 tripped during the down power required due to the de-energized semi-vital bus

Based on current plant conditions, which one of the following actions are required to maintain Tave at 547°F?

- A. Dump steam using the steam dumps.
- B. Dump steam using local operation of the SG PORVs.
- C. Dump steam using auto controller operation of the SG PORVs.
- D. Dump steam using manual controller operation of the SG PORVs.



49.

Unit 1 Initial Conditions:

- Power = 100%.

Current conditions:

- Reactor trips with no operator action.
- Turbine trips.
- Generator output breakers open, but the generator exciter field breaker does NOT open automatically when the turbine initially trips.
- In the absence of operator action, the exciter field eventually automatically secures on Volts/Hertz protection.
- #1 EDG automatically starts but the #1 EDG output breaker does NOT operate either automatically or remotely from the control panels.

Based upon the current conditions, which one of the following describes (1) what event caused the above indications, AND (2) the impact on breaker overcurrent protection?

- A. (1) Loss of 'A' DC Bus.  
(2) 'A' DC Bus 480V breakers AND 'A' DC Bus 4160V breakers will trip on overcurrent.
- B. (1) Loss of 'A' DC Bus.  
(2) 'A' DC Bus 480V breakers will trip on overcurrent. 'A' DC Bus 4160V breakers will NOT trip on overcurrent.
- C. (1) Loss of 'B' DC Bus.  
(2) 'B' DC Bus 480V breakers AND 'B' DC Bus 4160V breakers will trip on overcurrent.
- D. (1) Loss of 'B' DC Bus.  
(2) 'B' DC Bus 480V breakers will trip on overcurrent. 'B' DC Bus 4160V breakers will NOT trip on overcurrent.

50.

Unit 1 Initial Conditions:

- Refueling outage is in progress.
- Reactor is completely de-fueled.
- Electrical systems from the 480V Emergency Buses to the Vital Buses are in a normal at-power line-up.

Current conditions:

- Time = 0215. Battery '1B' is disconnected from DC Bus '1B' for maintenance.
- Time = 0220. An electrical fault causes all sections of UPS '1B1' to de-energize.

Based on the current conditions, with no operator actions taken, which one of the following is the status of Vital Buses as of Time = 0221 ?

<u>Vital Buses 1-II and 1-IIA</u>	<u>Vital Buses 1-IV and 1-IVA</u>
A. De-energized	De-energized
B. Energized	De-energized
C. Energized	Energized
D. De-energized	Energized

51.

Current conditions:

- Unit 1 has experienced a loss of offsite power.
- #1 EDG has started but failed to load.
- A field operator reports the exciter field circuit breaker on #1 EDG is tripped.

Based on the current conditions, which one of the following describes:

- (1) the impact this will have on the ability to transfer fuel oil to the #1 EDG  
and
- (2) the minimum volume necessary to meet the Technical Specification Day Tank requirements?

The fuel oil system will no longer be able to transfer fuel to the \_\_\_\_\_ (1) \_\_\_\_\_. The Day Tank volume must be greater than or equal to \_\_\_\_\_ (2) \_\_\_\_\_.

- (1) Base Tank, but will continue to transfer fuel to the Wall Tank.  
(2) 290 gallons.
- (1) Base Tank, but will continue to transfer fuel to the Wall Tank.  
(2) 375 gallons.
- (1) Base Tank and it will be unable to transfer fuel to the Wall Tank.  
(2) 375 gallons.
- (1) Base Tank and it will be unable to transfer fuel to the Wall Tank.  
(2) 290 gallons.

52.

Unit 1 plant conditions:

Refueling is in progress

The containment gas radiation monitor (1-RI-RM-160) loses power

Based on the above conditions, which one of the following states the actions required by Technical Specifications / Technical Requirements Manual?

- A. Fuel movement must be suspended until the automatic actions of the radiation monitor are verified, then fuel movement may resume.
- B. Fuel movement may continue provided that the containment particulate and manipulator crane radiation monitors (1-RI-RM-159/162) are operable.
- C. Fuel movement is allowed to continue for up to one hour while repair attempts are made on the detector.
- D. Fuel movement must be suspended immediately and no operations which increase the reactivity of the core shall be made.

53.

Current conditions:

- Unit 1 has experienced a large break LOCA.
- Containment pressure peaked at 24.5 psia.

Based on the above current conditions, which one of the following components will have their supporting Service Water equipment repositioned from the equipment's original position before the LOCA?

- A. Recirculation Spray heat exchangers.
- B. Component Cooling Water heat exchangers.
- C. Bearing Cooling Water heat exchangers.
- D. Charging Pump oil coolers.

54.

Unit 1 initial plant conditions:

- Reactor is at Hot Shutdown conditions
- The Containment Instrument Air Compressors are non-functional.

Based on the above conditions, which one of the following states (1)operator action that will be required to allow air to be aligned to containment (2) if the operator stationed at the containment isolation valve(s) is required to assume administrative control per TS 3.8 Containment?

- A. (1) Open 1-CP-FIC-101  
(2) No
- B. (1) Open 1-CP-FIC-101  
(2) Yes
- C. (1) Open 1-IA-446 and 1-IA-447  
(2) No
- D. (1) Open 1-IA-446 and 1-IA-447  
(2) Yes

55.

Unit one is at hot shutdown in preparation for a refueling shutdown.

A team is heading to containment to perform the hot shutdown walkdown.

After opening the outer door the team leader identifies air flow noise coming from the inner door. The team leader verified that the inner door was closed fully. The entry was cancelled and the outer door was closed.

Which ONE of the following states the required actions in response to this event in accordance with Technical Specification section 3.8 (Containment)?

- A. The personnel hatch outer door may be opened for a period not to exceed 15 minutes for repair and retest of the inner door seal.
- B. The personnel hatch outer door must remain closed. Any repair attempts must be made using the equipment hatch escape hatch.
- C. The personnel hatch outer door may be opened and a 1 hour clock initiated due to loss of containment integrity.
- D. The unit is in a condition that containment integrity is no longer required. Repairs may commence immediately.

56.

Unit 1 Current Conditions:

- Reactor Vessel Disassembly is in progress, and the Refueling team is ready to 'flood up' the Reactor Cavity.
- Testing of Safety Injection check valves is NOT required.

Based on the current conditions, which one of the following completes the below statements in accordance with 1-OP-FH-001, "CONTROLLING PROCEDURE FOR REFUELING?"

(1) The preferred method for cavity fill is from the Refueling Water Storage Tank (RWST) through the Reactor Coolant System \_\_\_\_\_ .

(2) When the cavity is filled to between 26 and 27 feet, the final **minimum** required RWST level is \_\_\_\_\_ .

- A. (1) cold legs  
(2) 22%
- B. (1) cold legs  
(2) 12%
- C. (1) hot legs  
(2) 22%
- D. (1) hot legs  
(2) 12%



57.

Initial conditions:

- Unit 1 is at 100% power.
- The PRZR LVL – CH SEL Switch is in the “CH 3 & 2” position.
- Pressurizer backup heater bank ‘B’ and bank ‘C’ proportional heaters are energized.

Current conditions:

- Pressurizer level transmitter 1-RC-LT-1461 (PRZR LEVEL PROTECT CH 3) fails high.

Based on current conditions, which one of the following statements describes the effect on pressurizer level control and on the pressurizer heaters?

The pressurizer level control system ...

- A. will continue to maintain pressurizer level at program level and the remaining backup heater banks will energize.
- B. is required in accordance with 0-AP-53.00, Loss of Vital Instrumentation/Controls, to be placed in manual to adjust pressurizer level back to the program level setting and the remaining backup heater banks will energize.
- C. will continue to maintain pressurizer level at program level, however pressurizer backup heater bank ‘B’ will de-energize.
- D. is required in accordance with 0-AP-53.00, Loss of Vital Instrumentation/Controls, to be placed in manual to adjust pressurizer level back to the program level setting, however pressurizer backup heater bank ‘B’ will de-energize.

58.

Unit 2 Initial Conditions (0800 hours):

- Startup and power escalation are in progress.
- Reactor power is 25%.
- All control rods bank demand positions have remained aligned within 6 steps of their CERPI indication.

Unit 2 Current Conditions (0830 hours):

- Reactor power is 35% when the CERPI indication for control rod F8 drifts 14 steps lower than its bank demand position

Based on current conditions, which one of the following describes (1) whether the conditions of Tech Spec LCO 3.12.E, ROD POSITION INDICATION SYSTEM AND BANK DEMAND POSITION INDICATION SYSTEM, are currently met, and (2) required actions, if any, in accordance with 0-AP-1.01, CONTROL ROD MISALIGNMENT?

- A. (1) CERPI F8 is currently operable.  
(2) Shutdown margin requirements ARE required to be verified within one hour.
- B. (1) CERPI F8 is currently operable.  
(2) Shutdown margin requirements ARE NOT required to be verified within one hour.
- C. (1) CERPI F8 is currently inoperable.  
(2) Shutdown margin requirements ARE required to be verified within one hour.
- D. (1) CERPI F8 is currently inoperable.  
(2) Shutdown margin requirements ARE NOT required to be verified within one hour.

59.

Which one of the following completes the below statements?

(1) The normal power supply to NFI-NM-190A/B, the remote (local) Unit 1 Excore Neutron Flux Monitor (Excore Fission Chamber), is \_\_\_\_\_ .

(2) In the event of a loss of power on Unit 1, the power supply for NFI-NM-190A/B may be aligned to Unit 2 using a transfer switch located in \_\_\_\_\_ .

- A. (1) Vital Bus 1-I  
(2) the Unit 1 Cable Tray Room
- B. (1) Vital Bus 1-I  
(2) the Unit 2 Emergency Switchgear Room (ESGR)
- C. (1) Vital Bus 1-II  
(2) the Unit 1 Cable Tray Room
- D. (1) Vital Bus 1-II  
(2) the Unit 2 Emergency Switchgear Room (ESGR)

60.

Unit 1 is shutdown for refueling with conditions as follows:

- Core off load to the fuel building is in progress
- 1-FH-1 (transfer canal gate valve) is open
- Containment Purge is in service
- One containment air recirc fan is in service
- All other containment ventilation fans are secured
- The equipment hatch is closed
- Operators are maintaining one door of the personnel hatch closed.
- Outside air is aligned to containment and the containment instrument air compressors are secured.

The containment purge **supply** MOVs inadvertently CLOSE while the containment purge exhaust MOVs remain OPEN. No other changes to the purge alignment have occurred.

Which ONE of the following states 1) the expected response to containment parameters to this event, and 2) the impact of this event on Spent Fuel Pit Level?

- A. 1) Unit 1 containment pressure increases.  
2) Spent Fuel Pit Level increases
- B. 1) Unit 1 containment pressure decreases.  
2) Spent Fuel Pit Level decreases
- C. 1) Unit 1 containment pressure decreases.  
2) Spent Fuel Pit Level increases
- D. 1) Unit 1 containment pressure increases.  
2) Spent Fuel Pit Level decreases

61.

Initial conditions:

- Unit 1 is in REFUELING
- Fuel off-loading is in progress.

Current conditions:

- A report is received that a spent fuel assembly being removed from the core has slipped from the manipulator crane and is lying on the lower core plate.
- Bubbles were seen escaping the dropped fuel assembly.
- No radiation alarms have been received from the radiation monitors associated with the manipulator crane or the refueling area.
- HP is monitoring the area, but report normal readings around the reactor cavity area.

Based on current conditions, which one of the following describes the actions required by 0-AP-22.00, Fuel Handling Abnormal Conditions?

- A. Stop fuel handling operations and evacuate Containment. Fuel Building evacuation is not required.
- B. Stop fuel handling operations, Notify Shift Supervision, OMOC and the Shift Technical Advisor. Area evacuations are not required at this time.
- C. Stop fuel handling operations and evacuate Containment and the Fuel Building.
- D. Stop fuel handling operations, Notify Shift Supervision, Fuel Performance Analysis and Health Physics. Area evacuations are not required at this time.

62.

Unit 1 Initial Conditions:

- Power = 100%.
- 1G-A6 ROD CONTROL SYSTEM URGENT FAILURE is in alarm.
- I&C has determined that the fault is in the logic cabinets
- Rod control is in MANUAL.

Current Conditions:

- Main Turbine control valves unexpectedly throttle closed, resulting in a 12% load rejection over a 90 second period.

Based on the current conditions, which one of the following describes the effect on Reactor Coolant System (RCS) temperature with **no** operator action?

- A. RCS temperature will change based on the higher Xenon concentration, with no manual rod motion possible and no steam dump operation.
- B. RCS temperature will be controlled entirely by manual use of control rods. No steam dumps will operate.
- C. RCS temperature will be controlled entirely by steam dump operation. No manual control rod motion is possible.
- D. RCS temperature will be controlled with a combination of manual control rod motion and steam dump operation.

63.

Unit 1 initial conditions:

- Reactor shutdown in progress
- Reactor power = 8%
- Turbine Trip occurs
- Main Steam Dump Valves fail closed

Based on the above conditions, which one of the following states (1) if the Pressurizer PORV(s) will open during the initial transient (1st minute) and (2) the Tcold at which the RCS will stabilize?

- A. (1) Yes  
(2) 550 °F
- B. (1) Yes  
(2) 556 °F
- C. (1) No  
(2) 550 °F
- D. (1) No  
(2) 556 °F

64.

Which one of the following corresponds to the pressure setting of the relief valve on the inner tank of the Waste Gas Decay Tanks?

A. 75 psig.

B. 100 psig.

C. 115 psig.

D. 150 psig.



65.

Unit 2 is about to begin refueling operations (movement of irradiated fuel and water level is >23 feet). Per T.S. 3.10, Refueling, which ONE of the following will prevent refueling operations from commencing?

- A. The 1A RHR pump was declared inoperable 10 hours ago, both RHR HXs are available.
- B. The Manipulator Crane Area Rad. Monitors have failed and containment purge is isolated.
- C. The inner door of the personnel airlock cannot be closed.
- D. RCS boron concentration is 2360 ppm as verified by a sample taken 24 hours ago.

66.

Unit 1 Current conditions:

- Reactor has been shutdown for 5 days.
- RCS water level is being maintained at 7.0 inches as indicated 1-RC-LR-105 (Cold Shutdown RCS Level Narrow Range).
- The 'B' and 'C' loops are isolated.
- Steam generator (SG) primary manways have been removed in preparation for SG tube plugging efforts.
- The reactor vessel head is tensioned.
- 'A' RHR pump is in operation with oscillating amperage indications
- Flow indication on 1-RH-FI-1605 is oscillating between 3,300 and 3,700 gpm.

Based on the current conditions, which one of the following describes the proper adjustments of RCS level and RHR flow in accordance with 1-AP-27.00, Loss of Decay Heat Removal Capability?

(REFERENCE PROVIDED)

- A. Raise RCS level to 9.0 inches as indicated on 1-RC-LR-105 and reduce flow to 3,100 gpm.
- B. Maintain current RCS level as indicated on 1-RC-LR-105 and reduce flow to 1,500 gpm.
- C. Maintain current RCS level as indicated on 1-RC-LR-105 and reduce flow to 3,100 gpm.
- D. Raise RCS level to 9.0 inches as indicated on 1-RC-LR-105 and stabilize flow at 3,500 gpm.

67.

Which one of the following statements lists the required items to be in a Reactivity Plan for a ramp up in power in accordance with GOP-1.5, UNIT STARTUP, 2% REACTOR POWER TO MAX ALLOWABLE POWER?

- A. Delta flux control, expected xenon transient, and recommendations for rod height and/or RCS boron adjustments.
- B. Limitations on startup rate, expected xenon transient, and recommendations for rod height and/or RCS boron adjustments.
- C. Delta flux control, expected xenon transient, and RCS temperature control.
- D. Delta flux control, expected source range counts at the doubling points, and recommendations for rod height and/or RCS boron adjustments.

68.

Which one of the following completes the statement listed below, in accordance with OP-AA-200, "Equipment Clearance?"

**IF** maintenance activities are to be performed on a (1) \_\_\_\_\_ that would normally be tagged OPEN, **THEN ENTER** the component on the Tagging Record to show the initial and final positions to maintain status control as a (2) \_\_\_\_\_ .

- A. (1) breaker  
(2) Operating Permit (blue lock), and only one Tagout Holder for each tag-out is allowed.
- B. (1) breaker  
(2) No Tag item, and only one Tagout Holder for each tag-out is allowed.
- C. (1) vent or drain valve  
(2) Operating Permit (blue lock), and more than one Tagout Holder for each tag-out is allowed.
- D. (1) vent or drain valve  
(2) No Tag item, and more than one Tagout Holder for each tag-out is allowed.

69.

Which one of the following describes the Technical Specification definitions of

- (1) COLD SHUTDOWN, and
- (2) REFUELING SHUTDOWN?

- A. (1) At least 1 % delta-k/k & Tave less than or equal to 200°F  
(2) At least 5 % delta-k/k, Tave less than or equal to 140 °F with fuel scheduled to be moved.
- B. (1) At least 1 % delta-k/k & Tave less than or equal to 200°F  
(2) Reactor vessel head unbolted.
- C. (1) At least 1.77 % delta-k/k & Tave less than or equal to 200°F  
(2) At least 5 % delta-k/k, Tave less than or equal to 140 °F with fuel scheduled to be moved.
- D. (1) At least 1.77 % delta-k/k & Tave less than or equal to 200°F  
(2) Reactor vessel head unbolted.

70.

Unit One is at Cold Shutdown and it is desired to perform a manual make-up to increase VCT level.

The following actions occur:

0930 - 1-CH-223 (PG isolation to blender) is opened for VCT make-up

0945 - VCT make-up is complete and the blender is secured

Which one of the following (1) describes the time at which 1-CH-223 is required to be closed in accordance with Tech Specs, and (2) whether sealing the valve after closure will comply with the conditions of the Tech Spec LCO 3.2, "Chemical and Volume Control System"?

- A. (1) 1000  
(2) Sealing the valve after closure will comply with the Tech Spec LCO.
- B. (1) 1000  
(2) Sealing the valve after closure will NOT comply with the Tech Spec LCO.
- C. (1) 1045  
(2) Sealing the valve after closure will comply with the Tech Spec LCO.
- D. (1) 1045  
(2) Sealing the valve after closure will NOT comply with the Tech Spec LCO.

71.

Current conditions on Unit 1:

- Core loading is in progress.
- Both loops of RHR are operable with 'B' RHR loop providing shutdown cooling.
- Reactor cavity level is 24 feet and slowly decreasing.

Based on the current conditions, which one of the following describes :

- (1) the minimum level above the reactor vessel flange that must be maintained in the reactor cavity during REFUELING OPERATIONS in accordance with Technical Specifications  
and
  - (2) what indications are available in the main control room to monitor this parameter?
- A. (1) 26 feet  
(2) RCS standpipe trend recorder
- B. (1) 26 feet  
(2) Cold calibrated pressurizer level
- C. (1) 23 feet  
(2) RCS standpipe trend recorder
- D. (1) 23 feet  
(2) Cold calibrated pressurizer level

72.

Corrective maintenance is scheduled to be performed on a blowdown radiation monitor sample cooler. The work will involve removing the relief valve on the Component Cooling (CC) side of the heat exchanger. HP has already posted the area as a 'Contaminated Area' although NO work has been done at this time.

You are assigned to tag out the cooler to support the maintenance and will have to enter the posted 'Contaminated Area'.

Which ONE of the following states the requirements to enter the area to execute the tagout?

- A. Report to the Health Physics check-in desk and inform them of the actions to be taken. Obtain a DAD on the respective RWP. Anti-contamination clothing is NOT required for this work.
- B. Report to the Health Physics check-in desk and inform them of the actions to be taken. Obtain a DAD on the respective RWP. Anti-contamination clothing is required for this work.
- C. Report to the Health Physics check-in desk and inform them of the actions to be taken. A DAD is not required for this work but anti-contamination clothing is required for this work.
- D. Since no work has been done and the area is clean, entry into the area is allowed with no further limitations or controls.



73.

Consider the following step from 1-E-0 (Reactor Trip or Safety Injection), and answer the question below:

\*8. \_\_\_ CHECK RCP TRIP AND MINIFLOW  
RECIRC CRITERIA:

- |   |  |
|---|--|
| <input type="checkbox"/> a) Charging Pumps - AT LEAST ONE<br>RUNNING AND FLOWING TO RCS | <input type="checkbox"/> a) GO TO Step 9.        |
| <input type="checkbox"/> b) RCS subcooling - LESS THAN 30°F [85°F]                      | <input type="checkbox"/> b) GO TO Step 9.        |
| <input type="checkbox"/> c) Stop all RCPs   |  |
| <input type="checkbox"/> d) RCS pressure - LESS THAN 1275 psig<br>[1475 PSIG]           | <input type="checkbox"/> d) GO TO Step 9.        |
| e) Close CHG pump miniflow recirc valves:   | <input type="checkbox"/> e) Close 1-CH-MOV-1373. |
| <input type="checkbox"/> • 1-CH-MOV-1275A   |  |
| <input type="checkbox"/> • 1-CH-MOV-1275B   |  |
| <input type="checkbox"/> • 1-CH-MOV-1275C   |  |

Which ONE of the following 1) states the purpose of the " \* " preceding the step number, and 2) the significance of the bullets on substep "e" above?

- A. (1) That the step is an Immediate Operator Action step.  
(2) The bullets signify that the components must be operated in the order listed.
- B. (1) That the step is a Continuous Action step  
(2) The bullets signify that the components can be operated in any order.
- C. (1) That the step is an Immediate Operator Action step  
(2) The bullets signify that the components can be operated in any order.
- D. (1) That the step is a Continuous Action step  
(2) The bullets signify that the components must be operated in the order listed.

74.

Initial Conditions:

- A large group of armed hostile intruders has gained access to multiple vital areas of the Surry Power Station.

Current Conditions:

- The Shift Manager has declared an emergency, and determined that the Local Emergency Operations Facility (LEOF) is unavailable due to the ongoing gun battle occurring on the station.

Based on the current conditions, which one of the following is (1) the backup facility for the LEOF; AND (2) personnel Accountability must be complete within \_\_\_\_\_ following a declaration of ALERT, SITE AREA EMERGENCY, or GENERAL EMERGENCY, in accordance with the Surry Emergency Plan (SEP)?

- A. (1) Technical Support Center (TSC)  
(2) 60 minutes
- B. (1) Central Emergency Operations Facility (CEOF)  
(2) 30 minutes
- C. (1) Technical Support Center (TSC)  
(2) 30 minutes
- D. (1) Central Emergency Operations Facility (CEOF)  
(2) 60 minutes

75.

Unit One has experienced a Loss of Coolant Accident from 100% power and the control room team is performing 1-E-1 (Loss of Reactor or Secondary Coolant).

0200 - Plant conditions are as follows:

- All S/G narrow range levels are 33%
- RWST level is 25% and decreasing
- RCS Pressure is 4 psig
- Core Exit Thermocouple temperature is 229°F
- Containment Pressure peaked at 39 psia and is currently 17 psia (decreasing)

0215 - Plant conditions are as follows:

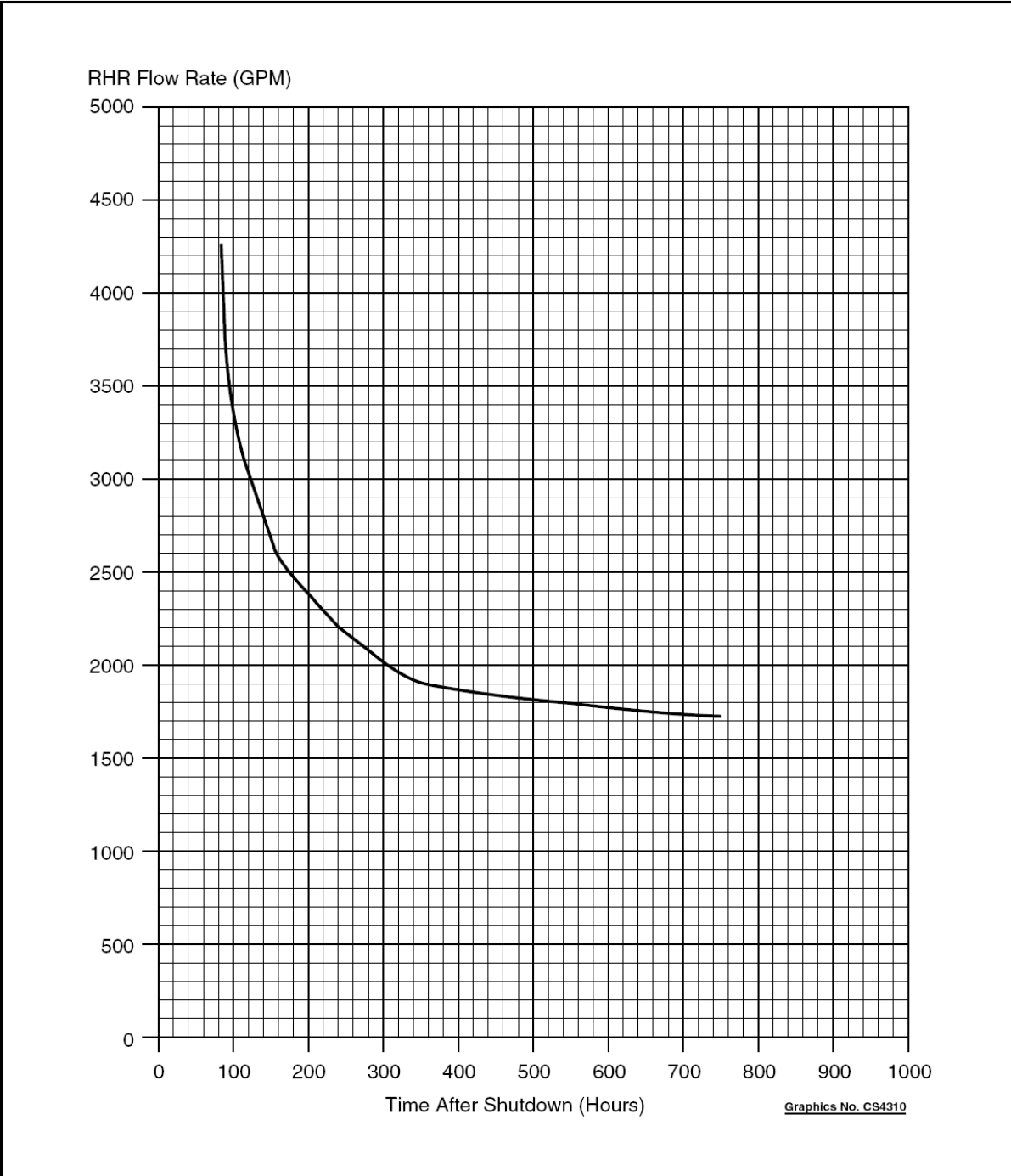
- A red path condition is identified for 1-FR-P.1 (Response to Imminent Pressurized Thermal Shock Condition).
- Annunciator 1A-G4 (LHSI PP 1A LOCKOUT OR OL TRIP) is received
- Annunciator 1D-E6 (CHG PP 1A 15H5 LOCKOUT) is received
- Annunciator 1A-A7 (RWST LO LVL) is received

Which ONE of the following states the required action to be taken by the team for these conditions?

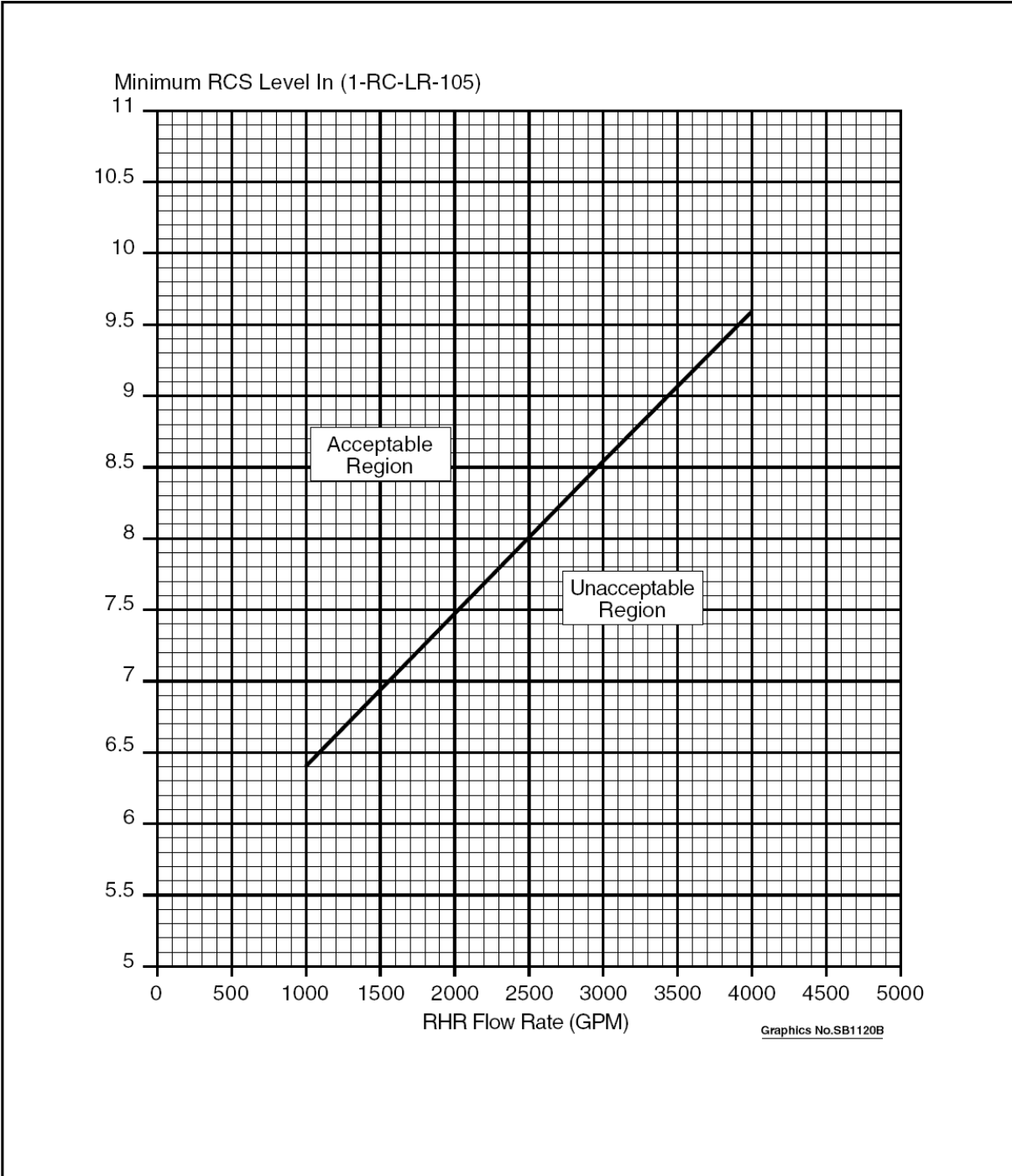
- A. Go to 1-FR-P.1 (Response to Imminent Pressurized Thermal Shock Condition)
- B. Go to 1-ES-1.3 (Transfer to Cold Leg Recirculation)
- C. Go to ECA-1.1 (Loss of Emergency Coolant Recirculation)
- D. Continue in 1-E-1 until transition made to subsequent procedure

# SRO/RO REFERENCE MATERIAL

NUMBER 1-AP-27.00	ATTACHMENT TITLE RHR FLOW REQUIREMENT VERSUS TIME AFTER SHUTDOWN	ATTACHMENT 1
REVISION 20		PAGE 1 of 1



NUMBER 1-AP-27.00	ATTACHMENT TITLE  MINIMUM RCS LEVEL VERSUS RHR FLOW (1-RC-LR-105)	ATTACHMENT 3
REVISION 20		PAGE 1 of 1



# Pearson NCS Test Sheet 100/W

1

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ANSWER KEY INFO.				PERFORMANCE ASSESSMENT			
# OF KEYS				% OF TOTAL SCORE		POINTS EARNED	
ITEM COUNT				<small>(out of 100%)</small>			
0	0	0	2	0	0	0	0
1	1	1	3	1	1	1	1
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Bar Code

**KEY ID**  
(A) (B) (C) (D)

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 2 A  C D E  
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 99 A  C D E  
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↑ FEED IN THIS DIRECTION ↓

NUMBER CORRECT	
PERCENT CORRECT	
ROSTER NUMBER	
SCORE	
RESCORE	

RO



COMBINED POINTS EARNED

COMBINED PERCENT CORRECT

LETTER GRADE

SCORE

RESCORE

SRO



NAME SURRY 2010-301  
 SUBJECT ANSWER KEY  
 PERIOD                      DATE

**MARKING INSTRUCTIONS**

Use a No. 2 Pencil

- A  C D E  
 Fill oval completely
- A B C D E  
 Erase cleanly

**STUDENT ID NUMBER**

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