

FINAL SUBMITTAL

**CRYSTAL RIVER 50-302/2000-301
SEPTEMBER 25 - 29, 2000**

FINAL AS ADMINISTERED

**RO WRITTEN EXAMINATION
WITH ANSWER KEY**

MASTER

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

Applicant Information

Name:	Region: I <input checked="" type="radio"/> III / IV
Date:	Facility/Unit: CRYSTAL RIVER 3
License Level <input checked="" type="radio"/> RO / SRO	Reactor Type: W / CE / <input checked="" type="radio"/> BW / GE
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected five hours after the examination starts.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

Applicant's Signature

Results

Examination Value	_____ Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

Name: _____

1. With the plant at 100% full power the SPO calls the control room and reports sparks and smoke around the CDP-1B coupling area. This call is immediately followed by an annunciator alarm informing the crew that CDP-1B has uncoupled. Total condensate flow is lowering on the Main Control Board indications.

Which of the following is the appropriate actions for the conditions stated above?

- A. Trip CDP-1B and ensure an automatic plant runback to approximately 80% full power occurs.
- B. Trip CDP-1B and ensure an automatic plant runback to approximately 60% full power occurs.
- C. Trip CDP-1B and manually reduce power to approximately 80% full power.
- D. Trip CDP-1B and manually reduce power to approximately 60% full power.

2. The following plant conditions exist:

- A secondary release from SDT-1, Secondary Drain Tank, is in progress
- RML 2/7 Bypass switch is selected to "Normal"
- RWP-2A, Nuclear Services Raw Water Pump, is running
- RWP-3A, Decay Heat Raw Water Pump is running.
- All other RWPs are shutdown

Which of the following statements describe a condition which should result in automatic termination of the secondary release and the method the RO should use to verify the release has terminated?

- A. RWP-3A trips; SDV-90 closure should be verified by monitoring the Green close indication located on the rear of the Main Control Board.
- B. RWP-3A trips; SDV-90 closure must be verified by contacting the proper building operator because no Main Control Board indication is available.
- C. RWP-2A trips; SDV-90 closure should be verified by monitoring the Green close indication located on the rear of the Main Control Board.
- D. RWP-2A trips; SDV-90 closure must be verified by contacting the proper building operator because no Main Control Board indication is available.

3. Which of the following conditions will result in an actuation of the Emergency Feedwater Initiation and Control (EFIC) system?

- A. 650 psig in the "A" OTSG, 625 psig in the "B" OTSG.
- B. Both trains of HPI have actuated due to RCS pressure <1625 psig..
- C. Total feedwater flow is 15% in both feedwater loops and reactor power is 40%
- D. EFIC instrumentation indicates 12" in "A" OTSG and 15" in "B" OTSG.

4. A step in EOP-06, Steam Generator Tube Rupture, states:

IF at any time PZR level is < 100 in,
THEN trip Rx and **GO TO** EOP-02, Vital System Status Verification, beginning with step 2.1.

Which of the following is the reason for tripping the reactor under these conditions?

- A. To prevent reduced RCS pressure control.
- B. To reduce RCS leakage.
- C. To prevent a loss of subcooling margin.
- D. To maximize the capacity of the RCS makeup system.

5. While placing a fuel assembly into the core the following is observed:

- Source range count rate increases from 30 cps to 36 cps (20% increase) and stabilizes.
- RM-G16, Radiation Monitor for the RB Fuel Handling Bridge, is in alarm.
- Bubbles are emerging from the core

Which of the following caused the above conditions?

- A. The reactor has gone critical.
- B. The fuel assembly has been damaged.
- C. The instrument air line to the grapple mechanism has broken.
- D. The standby decay heat removal train was placed in service.

6. On September first Nuclear Services Closed Cycle Cooling (SW) was lost to all Main RB Air Handling Fans (AHF-1A,B and C). Two Main RB Air Handling Fans are running with cooling water being supplied by Industrial Cooling (CI). The following containment average air temperatures have been recorded using the plant computer:

0800	SW flow is lost and fans are transferred to CI. - 119.6° F
0900	123.4° F
1000	130.1° F
1100	135.8° F
1200	140.6° F
1300	141.4° F
1400	143.9° F
1500	145.1° F
1600	145.2° F
1700	145.2° F

Assuming that RB conditions remain at approximately 145° F, which of the following statements describes the required operational mode and maximum allowable time to achieve that operational mode?

- A. Mode 3 at 1800 on September first
- B. Mode 3 at 2400 on September first.
- C. Mode 5 at 2400 on September second.
- D. Mode 5 at 0400 on September third

7. The following plant conditions exist:

- RCS Pressure 920 psig
- Cooldown to Mode 5 in progress
- All RPS channels in Shutdown Bypass
- Group 1 Control Rods fully withdrawn.

A transient occurs which results in an uncontrolled increase in RCS pressure. All RPS channels fail to trip at the high pressure setpoint associated with shutdown bypass operation. Which of the following statements describes the RCS high pressure trip protection which is required/available as pressure continues to rise?

- A. Shutdown Bypass automatically adjusts the RPS high pressure trip setpoint to a lower value, no overpressure trip protection remains and a manual trip will be required.
- B. The associated RPS channels will come out of bypass and other trip setpoints will actuate and trip the channel when RCS pressure exceeds the trip setpoint associated with Shutdown Bypass.
- C. A second high pressure trip contact with a setpoint higher than the Shutdown Bypass high pressure trip setpoint will actuate and trip the RPS channel.
- D. No automatic actions will occur until pressure reaches the Diverse Scram System actuation setpoint. At that point, Group 1 rods will be de-energized.

8. The following conditions exist:

- An RPS module failure during trouble shooting has caused a Rx trip from full power.
- Five minutes have elapsed following the trip.
- EOP-2, Vital System Status Verification, is in progress
- The crew has reached the step in EOP-02 to "Verify MFW flow is not excessive".

Which of the following conditions would be a cause or indication of excessive MFW flow?

- A. Both OTSGs are at 52 inches and levels are increasing..
- B. Both Main Feedwater Loop Masters are in hand and demand is at 40%.
- C. Both start-up feedwater flow meters read 0.1×10^6 lbm/hr
- D. Both Main Feedwater Block Valves are stuck fully open.

9. The following conditions exist:

- A fire in the radiation monitoring panel has made the control room uninhabitable.
- Procedural guidance directs the operating crew to man the Remote Shutdown Panel.
- Control is being transferred to the RSD Panel by selecting four control switches to the "RSP" and pulled out position.

In addition to transferring control to the RSD Panel, what is accomplished by these switch selections?

- A. Control circuits for components necessary for shutdown of the plant are isolated from the control room.
- B. Back-up fire suppression systems within the control room and cable spreading room are enabled.
- C. Engineered Safeguards automatic starts are enabled for HPI pumps, LPI pumps and both Emergency Diesel Generators.
- D. SASS will now monitor RSD Panel controls for blown fuses and transfer to redundant control circuits if fuse failures occur.

10. DPDP-1A is de-energized due to an internal fault on the bus coincident with a Loss of Offsite Power.

Based on these conditions which of the following describes the status of EDG-1A and the EFIC system?

- A. EDG-1A will start and load on the bus; the 'A' and 'C' EFIC cabinet will lose power.
- B. EDG-1A will start and come up to speed but its output breaker will remain open; the 'A' and 'C' EFIC cabinet will remain energized.
- C. EDG-1A will start and load on the bus; the 'A' train EFIC control valves will fail full open.
- D. EDG-1A will start and come up to speed but its output breaker will remain open; the 'B' train EFIC block valves will fail as is.

11. The following conditions exist:

- A small break LOCA has occurred and caused a loss of Adequate Subcooling Margin.
- The RO attempts to stop all RCPs but when the control handle for RCP-1B is taken to the Normal-after-stop position the red "run" light remains illuminated and RCP-1B shows normal motor amps.

Which of the following meets CR-3s expectations for contingency actions to be taken by the Reactor Operator?

- A. Dispatch the SPO to the Unit 6900V switchgear room to trip RCP-1B.
- B. Transfer the 6900V bus to its alternate power supply and repeat the attempt to stop RCP-1B from the Main Control Board.
- C. Open the feeder breaker to the 6900V switchgear from the Start-up Transformer.
- D. Call the system dispatcher and request that he separate CR-3 from the electrical grid.

12. A valve needs to be repositioned for the completion of a surveillance. The valve is located in the Make-up Demin Valve Alley. Lead shielding is draped over the valve handwheel. Which of the following is an accepted ALARA practice for repositioning the valve?

- A. Reposition the lead shielding along the valve piping enough to reposition the valve; replace the shielding to its original position; inform Health Physics when you have completed the task.
- B. Reposition the lead shielding so that it stays between you and the valve; reposition the valve by reaching around the shielding; replace the shielding to its original position.
- C. Remove the lead shielding; reposition the valve; leave the lead shielding for the Health Physics technician to replace.
- D. Remove the lead shielding with the permission of Health Physics; reposition the valve; replace the lead shielding.

13. The Primary Plant Operator (PPO) reports the following Spent Fuel (SF) component readings:

- SF-9-FIT, SF cooling water flow is 880 gpm.
- SF-2FI, SF purification flow is 100 gpm.
- SF purification temperature is 129°F.
- SF Demineralizer Delta-P is 15 psid.
- SFP-1B is out-of-service for maintenance.
- Nuclear Services Cooling Water (SW) flow to the in-service SF cooler is 1000 gpm.

Which of the following is a valid reason for stopping SFP-1A?

- A. To protect the in-service SF cooler
- B. To protect the demineralizer resin
- C. To protect SFP-1A from being damaged
- D. To protect the demineralizer from inadequate flow

14. A LOCA cooldown is being accomplished in accordance with the guidance of EOP-08, LOCA Cooldown.

- The leak rate is approximately 300 gpm
- Normal cooldown rates are being used.
- All 4 RCPs are running.

The crew reaches a step in EOP-8 which states "IF 4 RCPs are running, THEN stop RCP-1D". Which of the following statements describes the reason RCP-1D is specified in this step?

- A. RCP-1D is specified to reduce RCS leakage if the leak is located on the Make-up and Purification system letdown line which taps off of "D" cold leg.
- B. RCP-1D was selected because it produces the greatest flow of the 4 RCPs. Stopping this pump provides the maximum margin for core lift concerns.
- C. RCP-1D is specified because it is in the opposite loop from RCP-1B, which provides pressurizer spray. Later guidance will reduce RCPs to a 2/0 combination.
- D. RCP-1D was selected because it provides the greatest heat input to the RCS. Stopping this pump will provide maximum heat reduction while maintaining 3 pumps in operation.

15. During a Station Blackout condition, EOP-12 has the RO direct the PPO to de-energize VBIT-1E by performing the following actions:

1. Open inverter "AC INPUT" Bkr.
2. Open inverter "AC OUTPUT" Bkr.
3. Open inverter "BATTERY INPUT" Bkr.

What is the basis of this action during a Station Blackout?

- A. This action prevents VBIT-1E overheating because of a loss of ventilation to the 108' of the control complex.
- B. This action prevents overheating of the plant computer hardware during a loss of control complex ventilation.
- C. This action is necessary to reduce loads on safety related station batteries and ensure they last the 4 hour design duration.
- D. This action removes heat input to the control complex, minimizing the likelihood of overheating relays and bistables.

16. While operating at 100% power the operating crew discovers that Group 6 Rod 1 is untriappable. Calculations show that shutdown margin is greater than 1%. What would be the affect on shutdown margin if Group 6 Rod 2 were to drop fully into the core?

- A. The negative reactivity from the dropped rod may be used to offset the reactivity of the untriappable rod. Shutdown margin will be the same value as if all rods are operable and aligned.
- B. Group 6 Rod 2 is operable for shutdown margin purposes. Shutdown margin is not affected.
- C. Group 6 Rod 2 must be declared inoperable. Shutdown margin must be reduced by the worth of that control rod.
- D. Group 6 Rod 2 must be declared inoperable. Shutdown margin is increased by the worth of this rod.

17. A cooldown is in progress with the "A" and "B" reactor coolant pumps (RCP-1A and RCP-1B) running. The following occurs:

- Instrument air has been lost to parts of the auxiliary building.
- MUV-16, seal injection control valve, has failed closed.
- A nuclear services closed cycle cooling (SW) piping failure has caused SWT-1 to empty.
- The reactor operator has shutdown all Nuclear Services Closed Cycle Cooling Pumps.

What effect will this have on RCP operation?

- A. RCPs may continue to operate as long as the control bleed off valve remains open.
- B. RCPs may run for 5 minutes without SW; there are no time restrictions on pump operation for the loss of seal injection.
- C. RCPs may be run for 5 minutes without seal injection; there are no time restrictions on pump operation for the loss of SW.
- D. RCPs must be shutdown within 2 minutes due to a loss of RCP cooling accompanied by a loss of seal injection.

18. You are in the process of starting the Containment Purge. The following conditions exist:

- AHF-7A and AHF-7B (Reactor Building Purge Exhaust Fans) are running.
- AHV-1A and AHV-1B (Reactor Building Purge Exhaust Valves) are open.
- AHF-6A and AHF-6B (Reactor Building Purge Supply Fans) are running.
- AHV-1C (Reactor Building Purge Supply Valve) is open.
- You are holding AHV-1D (Reactor Building Purge Supply Valve) control switch in the open position.

When you release the control switch for AHV-1D, the valve goes closed. Which of the following is the reason that AHV-1D closed?

- A. One of the Reactor Building Purge Supply Fans has tripped.
- B. AHV-1C has drifted off of its fully open seat.
- C. Reactor Building Purge Flow Control Pot is set too high.
- D. AHV-1D has been selected closed from its local ES MCC.

19. Which of the following would be a High Radiation Area?

- A. 0.5 meters from the side of a tank the dose rate is 480 R/hr.
- B. 1 meter on the other side of a 8" x 20" through wall opening the dose rate is 520 R/hr.
- C. 1 meter from the side of a tank the dose rate is 520 R/hr.
- D. 0.5 meters on the other side of 8" x 20" through wall opening the dose rate is 480 R/hr.

20. The following conditions existed:

- A failure of RCS pressure control (Pzr heater control and Spray) induced a plant transient.
- At one point in this transient RCS pressure decreased to 1990 psig with Tave at 594°F, reactor inlet temperature 572°F and reactor outlet temperature 616°F

Ten minutes following the onset of the transient the operating crew manually restored normal RCS conditions. Power remained at approximately 100% throughout this transient.

Which of the following is the limiting ITS required action and completion time for this transient?

- A. Normal conditions were re-established within the ITS 2 hour time limit. No additional actions are required.
- B. The plant should be in Mode 3 within 6 hours and have all CRD Breakers open within that same 6 hours.
- C. Actions should be initiated within 1 hour to place the plant in Mode 3 within 7 hours, Mode 4 within 13 hours and Mode 5 within 37 hours.
- D. ITS requires that actions be initiated to place the plant in Mode 3 within 1 hour.

21. CR-3 is conducting a plant shutdown with the following conditions established:

- Main Generator output 350 MWe.
- One condensate pump has been stopped
- The Main Feedwater Isolation Main Feedwater Pump Trip key switches have been selected to the "Both" position.
- Both MFWPs are still in operation
- FWV-28 (cross-tie) is closed.

With the conditions stated above present, a steam break occurs on the "A2" Main Steam Line resulting in the following:

- A Reactor and Main Turbine trip
- Depressurization of "A" OTSG to 580 psig.
- Depressurization of "B" OTSG to 870 psig
- Both OTSGs recover to normal post trip conditions.

Which of the following is the expected response of the Main Feedwater System for this transient?

- A. Both main feed pumps will continue to run.
- B. The "A" main feed pump will trip, "B" will continue to run.
- C. Both main feed pumps will trip.
- D. The "B" main feed pump will trip, "A" will continue to run.

22. The following plant conditions exist:

- The plant is at 100% power.
- The turbine is selected to the "A" steam header pressure transmitter for control.

Which statement below describes the expected ICS/SASS response to a low failure of the selected "A" turbine header pressure transmitter coincident with a reactor trip? (Assume no operator actions)

- A. SASS will transfer the "A" header pressure input for the turbine and bypass valves to the unaffected transmitter.
- B. SASS will transfer the "A" header input to the turbine to the unaffected transmitter. The bypass valves will be demanded closed.
- C. SASS will transfer the header input to the turbine and bypass valves to the "B" steam header pressure transmitter.
- D. SASS will transfer the header input for the turbine to the "B" steam header pressure transmitter. The bypass valves will be demanded closed.

23. A fuel handling accident in the "B" Spent Fuel Pool has resulted in high airborne activity. Which of the following statements describes the radiation monitor which will detect this elevated level of airborne radiation and the automatic action(s) associated with that monitor?

- A. RM-A4 will actuate on high radiation and cause AHF-11A and AHF-11B to stop.
- B. RM-A4 will actuate on high radiation and cause AHF-10 to stop.
- C. RM-A8 will actuate on high radiation and cause AHF-11A and AHF-11B to stop.
- D. RM-A8 will actuate on high radiation and cause AHF-10 to stop.

24. The following plant conditions exist:

- A reactor startup is in progress
- The reactor is critical at 4 E-10 amps on both intermediate range instruments.
- NI-3 fails low.

Based on these conditions determine if SR/IR overlap could have been verified and the applicable TS actions.

- A. Adequate SR/IR overlap could *not* be determined prior to this failure.
Immediately decrease power to ≤ 5 E-10 amps.
- B. Adequate SR/IR overlap could *not* be determined prior to this failure.
Restore channel to operable status prior to increasing thermal power.
- C. Adequate SR/IR overlap could be determined prior to this failure.
Restore channel to operable prior to entry into Mode 1.
- D. Adequate SR/IR overlap could be determined prior to this failure.
Restore channel to operable status prior to increasing thermal power.

25. An electrical fault has resulted in ES MCC 3AB being de-energized. Which of the following components will be unavailable as a result of this malfunction?

- A. Reactor Building Air Handling Fan 1C (AHF-1C)
- B. Nuclear Services Raw Water Pump 1C (RWP-1C)
- C. Inverter 1C (VBIT-1C)
- D. Make-up Pump 1C Main Lube Oil Pump (MUP-2C)

26. A step in SP-354A, Monthly Test of EDG-1A, requires the PPO to ensure that the Speed Droop is set to '60' and the Unit-Parallel switch to 'Parallel'. Where would you direct the PPO to go to perform these functions and why are they necessary?

- A. Both switches are located in the EDG-1A control panel; Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.
- B. Speed droop switch is located on the engine governor and the Unit-Parallel switch is located in the EDG-1A control panel; Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.
- C. Both switches are located in the EDG-1A control panel; Speed droop setting is to allow sharing of reactive load; Parallel setting is to allow sharing of real load.
- D. Speed droop switch is located on the engine governor and the Unit-Parallel switch is located in the EDG-1A control panel; Speed droop setting is to allow sharing of reactive load; Parallel setting is to allow sharing of real load.

27. Which of the following control room indications is available to determine if any of the 52 Core Exit Thermocouples have failed low?

- A. Plant computer core map diagram.
- B. Flashing incore temperature on the SPDS screens
- C. Flashing indication on the extended range core exit thermocouple display.
- D. Eurothermal Chessel Temperature recorder displays 000 for any of the 52 CETs failing down scale.

28. The following conditions currently exist:

- CR-3 is recovering from a small break LOCA.
- RCS conditions entered Region 3 of ICC before returning to Region 1.
- RCS pressure is 220 psig
- Incore temperature is 250°F
- Both Saturation Monitors are displaying +90 in green.
- LPI is aligned
- All RCPs are stopped.

Procedural direction is given to "Control OTSG heat transfer" to maintain cooldown to < 5°F per 1/2 hr . Which of the following statements describes the reason for this procedural direction?

- A. Cooldown is slowed to stabilize the RCS while preparations for RCP restart can be completed.
- B. Cooldown is slowed to minimize the thermal transient on the RCS and prevent increasing the size of the LOCA.
- C. Cooldown is slowed to limit Pressurizer outsurge which could cause a subsequent loss of adequate subcooling margin.
- D. Cooldown is slowed to limit the rate at which non-condensable gasses come out of solution in the RCS.

29. With reactor power at 30%, the power range instrumentation agrees with the heat balance calculation. After increasing power to 85%, the power range indications do not agree with a new heat balance calculation. Which of the following explains why this is true?

- A. Downcomer temperature lowers as reactor power rises. Water in the reactor vessel downcomer acts as a better reflector thereby reducing neutron leakage. Therefore, indicated power will be lower than heat balance calculations.
- B. Downcomer temperature rises as reactor power rises. Water in the reactor vessel downcomer allows more neutron leakage. Therefore, indicated power will be higher than heat balance calculations.
- C. Downcomer temperature lowers as reactor power rises. Water in the reactor vessel downcomer will allow more neutron leakage. Therefore, indicated power will be higher than heat balance calculations.
- D. Downcomer temperature rises as reactor power rises. Water in the reactor vessel downcomer acts as a better reflector thereby reducing neutron leakage. Therefore, indicated power will be lower than heat balance calculations.

30. Which of the following conditions will cause an automatic trip of both Main Feedwater Pumps (FWP-2A & 2B) with the plant at 80% power?

- A. Deaerator level of two feet.
- B. Both suction valves are 75% open.
- C. Lube oil pressure of 7 psig on 2 of 3 pressure switches.
- D. "A" OTSG pressure < 600 psig.

31. Given the following conditions:

- The plant is at 100% power.
- SP-181, Containment Air Lock Test, is in progress on the personnel hatch.
- The ISI test engineer informs you the personnel hatch has failed its leak rate test by leaking at a rate greater than the acceptance criteria of 22,200 SCCM.
- There are indications of leakage around the shaft of the handwheel for operating the outer hatch.
- The inner hatch's seal is degraded to the point that the test engineer can feel air passing by.

What are the required actions and the condition of containment integrity?

- A. Verify both doors are closed and initiate repairs. Containment integrity may not exist.
- B. Verify either door is closed and initiate repairs. Containment integrity does not exist.
- C. Evaluate overall containment leakage rate and verify one door is closed. Containment integrity may not exist.
- D. Be in Mode 3 in 6 hours; and Mode 5 in 36 hours. Containment integrity does not exist.

32. The following conditions exist:

- A reactor startup power is in progress.
- All source range and intermediate range instruments are on scale and indicating.

During rod withdrawal the RO notes the following readings:

NI-1 Start-up Rate - 0.4 DPM
NI-2 Start-up Rate - 0.4 DPM
NI-3 Start-up Rate - 0.4 DPM
NI-4 Start-up Rate - 0.7 DPM

Which of the following explains the reason for these readings and describes how the readings will change as power increases?

- A. NI-4 has its compensating voltage set too high. As power increases the difference between NI-4 Start-up Rate and the Start-up Rate on the other NIs will increase.
- B. NI-4 has its compensating voltage set too low. As power increases the difference between NI-4 Start-up Rate and the Start-up Rate on the other NIs will increase.
- C. NI-4 has its compensating voltage set too high. As power increases the difference between NI-4 Start-up Rate and the Start-up Rate on the other NIs will decrease.
- D. NI-4 has its compensating voltage set too low. As power increases the difference between NI-4 Start-up Rate and the Start-up Rate on the other NIs will decrease.

33. Following an overcooling accident the following conditions exist:

- EFIC has actuated
- EFIC has been bypassed on all 4 channels
- EFW is the only FW source to the OTSGs
- "A" OTSG level is 14".
- "A" OTSG pressure is 400 psig.
- "B" OTSG level is 32".
- "B" OTSG pressure is 900 psig.
- RCS pressure is 1900 psig
- RCP-1A is shutdown.

Which of the following describes how EFIC will control the fill rate for "A" OTSG?

- A. EFIC will attempt to fill the "A" OTSG as quickly as possible (no rate limit) until Low Level Limit conditions are established.
- B. EFIC will attempt to fill the "A" OTSG as quickly as possible (no rate limit) until OTSG pressure is above 600 psig.
- C. EFIC will raise the level in "A" OTSG at a rate between 2" and 8" per minute based on OTSG pressure.
- D. EFIC will raise the level in "A" OTSG at a rate between 2" and 8" per minute based on RCS cooldown rate.

34. The plant is in Mode 5 with the following conditions:

- A Laundry Shower Sump Tank is being released.
- All SW RW pumps are secured.
- RM-L2/L7 Valve/Pump interlock bypass switch is selected to "Bypass".
- RM-L7 is reading below the warning setpoint.
- RM-L2 is in High Alarm.
- WDV-891 and WDV-892, liquid release isolation valves, are open.
- SDV-90, release isolation valve is closed.

Based on the conditions above, which of the following statements describes the associated plant response?

- A. A high radiation condition has been detected and the release has been terminated by closure of SDV-90, release isolation valve.
- B. Normal release radiation conditions are indicated and the release is continuing through WDV-891 and WDV-892, liquid release isolation valves.
- C. Normal release radiation conditions are indicated but the selection of the RM-L2/L7 valve/pump interlock bypass key switch to "bypass" has resulted in termination of the release by closure of SDV-90, release isolation valve.
- D. A high radiation condition has been detected, the release has failed to terminate and is continuing through WDV-891 and WDV-892, liquid release isolation valves.

35. The Make-up Tank (MUT) low pressure alarm has just actuated with the level at 80 inches. Which of the following is the required pressure to operate in the preferred region without receiving further MUT alarms?

- A. 15 psig
- B. 17 psig
- C. 19 psig
- D. 21 psig

36. High airborne activity in the Auxiliary Building will result in the actuation of automatic protective interlocks associated with atmospheric radiation monitors. Which of the following correctly describes an automatic interlock function and its basis?

- A. Secure Auxiliary Building Exhaust Fans to reduce the total release volume to outside areas and minimize public exposure.
- B. Automatically re-route any ongoing Waste Gas Decay Tank release to the Reactor Building to reduce the volume of radioactive gas available for release to the public.
- C. Automatically shutdown Auxiliary Building Supply Fans to create a negative pressure in the Auxiliary Building and ensure the gas is routed through filters.
- D. Secure the inlet flowpath to the Waste Gas Decay Tanks to prevent backflow of radioactive gas through relief valve piping.

37. Control complex ventilation was in the following alignment before the iodine channel of RM-A5 went into high alarm:

- Emergency duty supply fan AHF-18A is running.
- Control complex return fan AHF-19A is running.
- Controlled access area exhaust fan AHF-20A is running in fast.
- Controlled access area chemical laboratory supply fan AHF-30 is running.
- Sampling hood exhaust fan AHF-44A is running.

Which fans are still running after the RM-A5 actuation?

- A. AHF-18A, AHF-19A
- B. AHF-20A, AHF-30
- C. AHF-18A, AHF-30
- D. AHF-19A, AHF-20A

38. Failures within the Engineered Safeguards Actuation System can lead to the ECCS Acceptance Criteria of 10CFR50.46 being exceeded. Which of the following is this acceptance criteria designed to preclude?

- A. Increased centerline fuel melt
- B. Increased Iodine-131 gap activity
- C. Accelerated cladding oxidation
- D. Exceeding 10CFR20 dose guidelines

39. The following conditions exist:

- CR-3 is operating at 100% full power
- 80 gpm letdown flow
- Normal letdown flowpath alignment

Debris in the Nuclear Services Closed Cycle Cooling (SW) system causes a loss of flow to both on-line letdown coolers.

Which of the following describes the automatic protection interlock that will actuate in response to the conditions stated above and the basis of the interlock?

- A. When letdown temperature is $\geq 145^{\circ}\text{F}$, letdown will isolate by automatic closure of all on-line letdown cooler individual outlet valves. This interlock protects the letdown cooler tubes from excessive thermal stresses.
- B. When letdown temperature is $\geq 135^{\circ}\text{F}$, letdown will isolate by automatic closure of MUV-49, Letdown Isolation Valve. This interlock protects the letdown cooler tubes from excessive thermal stresses.
- C. When letdown temperature is $\geq 145^{\circ}\text{F}$, letdown will isolate by automatic closure of all on-line letdown cooler individual outlet valves. This interlock protects the letdown demineralizers and filters from damage due to high temperatures.
- D. When letdown temperature is $\geq 135^{\circ}\text{F}$, letdown will isolate by automatic closure of MUV-49, Letdown Isolation Valve. This interlock protects the letdown demineralizers and filters from damage due to high temperatures.

40. Following an automatic Engineered Safeguards HPI actuation the RO notes that MUV-23 and MUV-24 (High Pressure Injection Valves) have lost power. Which of the following casualties is the reason for this loss of power?

- A. An electrical short has developed on VBDP-5
- B. An electrical short has developed on ES MCC 3B1
- C. A fire in the hallway between the PPO office and the entrance to the Control Complex / Chemistry Area.
- D. A fire in the hallway between the Make-up and Purification Pre-filter room and the Auxiliary Building Elevator.

41. The following plant conditions exist:

- A controlled plant shutdown is in progress due to a shaft failure of RWP-2A.
- The reactor is critical with RCS temperature at 545°F
- PZR level is 95"
- The SPO reports that CWTS-2 is completely clogged with debris and will not start and the flume water level is almost empty.

Based on these conditions, which of the following actions should be performed and what is the reason for performing the action?

- A. Continue the shutdown and inform maintenance of the problem.
Redundant equipment is available to compensate for CWTS-2 fouling,
- B. Trip the reactor and initiate EFIC due to the loss of Circulating Water cooling to the Condenser.
- C. The reactor should be tripped due to pressurizer level being under 100 inches.
- D. The reactor should be tripped due to a loss of Nuclear Services Raw Water flow.

42. The following plant conditions exist:

- Adequate Subcooling Margin has been lost and regained with full HPI.
- During HPI cooling, both OTSGs were raised to the ISCM setpoint of >90%.
- RCPs were tripped because of the loss of Adequate Subcooling Margin.

For these conditions EOP-14, Enclosure 16, RCP Recovery, requires stable, subcooled 2 loop Natural Circulation to exist for > 60 minutes before the crew can continue with RCP restart.

From which of the following concerns is this requirement providing protection?

- A. Reactor vessel thermal shock.
- B. Reactivity excursion.
- C. RCS piping rupture.
- D. OTSG tube rupture.

43. Which one of the following parameters is controlled to limit the amount of iodine in the RB atmosphere following a LOCA?

- A. The volume of galvanized metal inside containment.
- B. The volume of aluminum inside containment.
- C. The pH of the RB sump.
- D. The temperature of the RB atmosphere.

44. EOP-7, Inadequate Core Cooling, directs the operator to "Open all high point vents" when incore temperatures have reached region 3.

Which of the following is the reason this is done?

- A. This provides an additional flow path to assist HPI/PORV cooling in controlling/reducing core temperatures.
- B. This reduces reactor coolant system pressure allowing increased flowrates from a running injection system.
- C. This allows better control of reactor coolant pressure while maintaining it above OTSG pressure.
- D. This provides a vent path for non-condensable gasses that may be restricting natural circulation.

45. A step early in AP-404, Loss of Decay Heat Removal, states:

IF both DHR trains are NOT available
THEN isolate DHR from RCS.

The details of the step gives a list of equipment to secure and valves to close.
What is the reason for isolation of DHR?

- A. It is necessary for operators to place alternate cooling in service.
- B. It sets up the system for checkout and possible maintenance.
- C. It prevents system water hammer on DHR pump restart.
- D. It ensures adequate inventory to prevent boron precipitation.

46. During venting of the Makeup Tank an improper valve alignment causes the waste gas header to be vented to the auxiliary building and RM-A3 actuates. How do damper isolations associated with this actuation (D-29 and D-36) affect auxiliary building ventilation?
- A. The supply air is isolated to the waste gas surge and decay tank area. Exhaust air from the waste evaporator areas is isolated.
 - B. The supply air is isolated to all general floor areas of the Auxiliary Building. Exhaust air from the waste gas surge and decay tank area is isolated.
 - C. The supply air is isolated to the waste gas surge and decay tank area. Exhaust air from the waste gas surge and decay tank area is isolated.
 - D. The supply air is isolated to the general floor area of the 95' elevation of the Auxiliary Building. Exhaust air from the waste gas compressor area is isolated.

47. Which of the following is the order in which the Main Feedwater system is placed in service during a Plant Heatup (OP-202)?

- A.
 - 1. Long cycle clean-up is completed with the Feedwater Booster Pumps.
 - 2. Main Feedwater Pumps are placed on turning gear.
 - 3. The Start-up Feedwater Block Valves are opened.
 - 4. One Main Feedwater Pump is started.
- B.
 - 1. Main Feedwater Pumps are placed on turning gear.
 - 2. Long cycle clean-up is completed with the Feedwater Booster Pumps.
 - 3. One Main Feedwater Pump is started.
 - 4. The Start-up Feedwater Block Valves are opened.
- C.
 - 1. Main Feedwater Pumps are placed on turning gear.
 - 2. The Start-up Feedwater Block Valves are opened.
 - 3. Long cycle clean-up is completed with the Feedwater Booster Pumps.
 - 4. One Main Feedwater Pump is started.
- D.
 - 1. Main Feedwater Pumps are placed on turning gear.
 - 2. Long cycle clean-up is completed with the Feedwater Booster Pumps.
 - 3. The Start-up Feedwater Block Valves are opened.
 - 4. One Main Feedwater Pump is started.

48. RM-G30 has been inoperable for 32 days. With the plant at full power, what technical specification action is required?

- A. No technical specification action is required as long as RM-G29 remains operable.
- B. RM-G30 should be repaired immediately or a special report will be required in the next 14 days.
- C. RM-G30 should be repaired in 7 days or power must be reduced to less than 60% of Rated Thermal Power within the next 6 hours.
- D. A special report is required to be generated and submitted within the next 12 days.

49. EOP-09, Natural Circulation Cooldown, contains a table which provides limits on natural circulation cooldown rates.

If RCS pressure is maintained above the Natural Circulation curve of Figure 1 and 2 in EOP-9, the cooldown rate is limited to a maximum of 25°F per half hour.

Which of the following describes the basis for this cooldown rate limit?

- A. To limit thermal stress on the OTSG tubesheet.
- B. To limit voiding in the reactor vessel head region.
- C. To maintain a stable or lowering core ΔT .
- D. To conserve EFT-2 inventory.

50. Following a pressure transient, the plant has been stabilized at 90% power. The RO notices the ultrasonic indicator for the PORV spiking periodically and suspects that the PORV may be leaking. Which of the following sets of conditions would be expected if the ROs suspicions are correct?

- A. The PORV amber indicating light illuminated.
RCDT pressure constant
RCDT level constant.
PORV tailpipe temperature near RCDT saturation temperature
Pressurizer level constant
MUT level constant.
- B. The PORV green indicating light illuminated.
RCDT pressure slowly increasing
RCDT level slowly increasing
PORV tailpipe temperature near RCDT saturation temperature
Pressurizer level constant
MUT level slowly lowering
- C. The PORV amber indicating light illuminated.
RCDT pressure constant
RCDT level slowly increasing
PORV tailpipe temperature near Pressurizer steam space temperature
Pressurizer level constant
MUT level constant
- D. The PORV green indicating light illuminated.
RCDT pressure slowly increasing
RCDT level slowly increasing
PORV tailpipe temperature near Pressurizer steam space temperature
Pressurizer level slowly lowering
MUT level slowly lowering

51. Following a crud burst and high Reactor Coolant Activity, operations assistance has been requested to change Make-up system post-filters. A pre-planning meeting for the performance of OP-407S, Makeup and Spent Fuel Filter Changes, is in progress. The following post-filter dose rates are listed:

- Filter housing on contact - 2.5 R/hr.
- Filter housing general area - 1.0 R/hr.
- Room above the filter room (slots in floor) general area - .2 R/hr.

Which of the following combinations of workers would result in the *lowest* total radiation exposure?

- A. Two people in the upper room for 1.5 hours using long handled tools.
- B. Two people, one in the upper room for 0.5 hours using long handled tools and the other in the filter housing area for 0.5 hours.
- C. Three people, one in the upper room for 0.5 hours using long handled tools, one in the filter housing area for 0.2 hours and the last one in contact with the filter housing for 0.1 hours.
- D. Three people, two in the filter housing area for 0.25 hours each and the last one in contact with the filter housing for 0.1 hours.

52. The plant is in Mode 5 with "A" DH train aligned for core cooling

Which of the following describes the component or components affected if RC-132-PT, "B" loop low range RCS pressure transmitter, were to fail high and the setpoint at which the action should occur?

- A. DHV-4 only will close when RC-132-PT reaches approximately 265 psig.
- B. DHV-3 and DHV-4 will close when RC-132-PT reaches approximately 265 psig.
- C. DHV-4 only will close when RC-132-PT reaches approximately 385 psig.
- D. DHV-3 and DHV-4 will close when RC-132-PT reaches approximately 385 psig.

53. The following conditions exist:

- Reactor Power is 90%
- Group 7 Control Rods are 90% withdrawn
- All Control Rods in groups 1 through 6 are fully withdrawn
- The Diamond Control Station is in Manual
- The Reactor Demand Hand/Auto Station is in Mini-Track
- Both MFW Loop Demand Hand/Auto Stations are in Hand.

Which of the following conditions will prevent the RO from being able to select the Diamond Panel to the Automatic mode of control?

- A. One of the selected Power Range NI's fails high.
- B. Group 6 control rods are inserted to 90% withdrawn.
- C. "A" side +15V power and "B" side -15V power are lost.
- D. A group power supply blower failure occurs.

54. Given the following plant conditions:

No OTSG cooling is available.
EOP-4 was entered due to increasing incore temperatures.
1 RCP/loop is running.
Incore temperatures are 563°F.
RCS pressure is 2010 psig.

While attempts to recover OTSG cooling are in progress, incore temperature increases to 616°F and RCS pressure increases to 2286 psig. The SRO has just directed you to stop all RCPs. What is the basis of this action?

- A. RCPs must be secured to ensure continued core cooling capability.
- B. RCPs must be secured to prevent seal failure and loss of RCS inventory.
- C. RCPs must be secured to prevent achieving excessive OTSG tube to shell differential temperatures.
- D. RCPs must be secured to reduce overall RCS heat input.

55. The initial power escalation following a refueling outage is being performed. The reactor power level is stabilized to perform testing. The following indications are available to the operator at the control board:

NI-5	26.0%
NI-6	29.0%
NI-7	26.0%
NI-8	29.0%

T-hot Loop A	588.5° F
T-hot Loop B	588.0° F
T-cold Loop A	569.5° F
T-cold Loop B	570.0° F
Tave	579.0° F

Which of the following is an accurate estimate of the thermal power level of the reactor at this point?

- A. 363 MWt
- B. 661 MWt
- C. 738 MWt
- D. 1041 MWt

56. During a Small Break Loss of Coolant Accident the following conditions exist:

- RCS Pressure is 1200 psig and slowly lowering.
- HPI has actuated properly.
- HPI has been bypassed on all 3 channels.

Which of the following statements describes the expected response of the Low Pressure Injection System if the RO depresses the LPI Manual Actuation pushbuttons?

- A. No LPI components will actuate until RCS pressure lowers to 500 psig.
- B. The valves associated with LPI will align but the LPI pumps will not start until RCS pressure lowers to 500 psig.
- C. The LPI pumps will start but the valves associated with LPI will not align until RCS pressure lowers to 500 psig.
- D. The valves associated with LPI and the LPI pumps will align to their ES positions.

57. While performing an EOP the Procedure Director reaches a step which states that the PPO is to be notified to perform a portion of the step.

Which of the following describes the person who should give this direction and the form in which the direction should be given?

- A. The Procedure Director should state all step actions, including the details, to the PPO.
- B. The Procedure Director should state the task and read the applicable step and detail number to the PPO.
- C. The Reactor Operator should state all step actions, including the details, to the PPO.
- D. The Reactor Operator should state the task and read the applicable step and detail number to the PPO.

58. The SPO is performing a condenser air in-leakage test in accordance with OP-607. ARP-1A has been selected to the recirculation mode and ARV-42, AR-32-FI isolation, is open.

Which of the following would be the adverse effect of maintaining this configuration for an extended period of time (>5 minutes)?

- A. ARP-1A temperatures will begin to increase. Overheating of the pump motor could result.
- B. RMA-12 will read high due to low dilution flow through the monitor.
- C. Condensation could build up in the ARP-1A exhaust line and cause a loss of the seal.
- D. Having ARP-1A in recirculation for > 5 minutes will send an auto-start signal to ARP-1B.

59. The following plant conditions exist:

- The plant is at 55% reactor power.
- The ICS +24 volt DC bus has degraded to +18 volts.

What is the plant's response to this situation?

- A. ATWS removes power from the safety rods and initiates EFIC.
- B. AMSAC trips the main turbine and initiates EFIC.
- C. DSS removes power from the regulating control rods.
- D. RPS trips the reactor due to the loss of both MFW pumps.

60. The following conditions exist:

- A reactor startup is in progress.
- Control rod groups 1 through 3 are fully withdrawn.
- Group 4 rod withdrawal is stopped at 48%
- Source range NI counts are 540 cps and slowly increasing on NI-1 and NI-2
- Start-up rate is 0.2 DPM and constant on NI-1 and NI-2
- All rod motion has been stopped

Which of the following states the appropriate actions for the conditions stated above?

- A. Monitor the increasing count rate and verify power stabilizes below the point of adding heat before continuing rod withdrawal.
- B. Insert group 4 control rods, verify a Shutdown Margin of more than 1% exists and inform the Reactor Engineer of plant conditions.
- C. Insert groups 1 through 4 sequentially, request Chemistry to resample the RCS for boron concentration, and recalculate the ECP.
- D. Trip the reactor and enter EOP-2, Vital System Status Verification.

61. From a 100% power condition, a small break loss of coolant accident (LOCA) due to a letdown line break has resulted in a plant trip and loss of adequate subcooling margin. The following conditions exists:

- HPI has been initiated.
- Pressurizer level dropped to 17".
- Pressurizer level has been restored to 50".
- Adequate subcooling margin has been restored.

Which of the following is a reason that RCS pressure may begin to decrease during this event?

- A. The SCR controlled Pzr heaters are de-energized.
- B. A continuous pressurizer insurge is occurring.
- C. Pressurizer spray valve bypass flow has increased.
- D. OTSG heat removal is inadequate for current plant conditions.

62. The following plant conditions exist:

- Refueling operations are in progress inside the Reactor Building.
- The Main Fuel Handling Bridge operator is withdrawing a fuel assembly from the core into the mast.
- As the fuel assembly exits the core, the bowed end causes an adjacent fuel assembly to fall over in the core.
- No radiation alarms sound.

What actions should be taken by the refueling operators?

- A. Lower the fuel assembly into the core and evacuate the area.
- B. Immediately evacuate the area.
- C. Move the fuel assembly to the deep end of the pool and contact the Control Room.
- D. Move the fuel assembly to the deep end of the pool and evacuate the Reactor Building.

63. Which of the following statements describes the function of an Instrument Air supplied overpressure in a Pre-action sprinkler system?

- A. The air pressure provides the initial driving force for the fire service water after the fusible links are open.
- B. The air pressure minimizes leakage past the deluge valve to maintain the sprinkler header empty of water.
- C. The air pressure operates the pilot valve in the associated deluge valve to ensure rapid and complete opening.
- D. The air pressure provides a monitored parameter to detect broken sprinkler heads, broken piping or system actuations.

64. Which of the following describes how PZR level is controlled on a loss of NNI-X power?

- A. A backup power supply will allow manual operation of MUV-31 following a loss of all NNI-X DC power.
- B. A backup power supply will allow automatic operation of MUV-31 following a loss of all NNI-X AC power.
- C. A loss of NNI-X AC or DC power will cause MUV-31 to fail closed. MUV-24 will be used for PZR level control.
- D. A loss of NNI-X AC or DC power will cause the valve controller to swap to NNI-Y for control power.

65. Due to a switching error, both the 'B' and 'D' battery charger's output breakers have been opened. What is the expected status light indication on the 'B' vital bus inverter for this condition?

- | | | |
|----|------------------------------|-----|
| A. | Normal Source Available | ON |
| | Battery Source Available | ON |
| | Normal Source Supplying Load | ON |
| | Battery Supplying Load | OFF |
| | In Sync | ON |
| B. | Normal Source Available | ON |
| | Battery Source Available | OFF |
| | Normal Source Supplying Load | ON |
| | Battery Supplying Load | OFF |
| | In Sync | OFF |
| C. | Normal Source Available | OFF |
| | Battery Source Available | ON |
| | Normal Source Supplying Load | OFF |
| | Battery Supplying Load | ON |
| | In Sync | ON |
| D. | Normal Source Available | ON |
| | Battery Source Available | OFF |
| | Normal Source Supplying Load | ON |
| | Battery Supplying Load | OFF |
| | In Sync | ON |

66. A plant transient has resulted in an Inadequate Core Cooling condition and entry into EOP-07, Inadequate Core Cooling. As the transient progresses the "B" SPDS and associated indications are lost. The RCS has depressurized to 350 psig. The following are the Core Exit Thermocouple values being input to the "A" SPDS:

- | | |
|----------|----------|
| 1. 880°F | 5. 420°F |
| 2. 540°F | 6. 400°F |
| 3. 500°F | 7. 400°F |
| 4. 420°F | 8. 220°F |

Based on these input values, what region of the ICC curve will be indicated by the "A" train of SPDS?

- A. Region 1
- B. Region 2
- C. Region 3
- D. Severe Accident Region

67. The following plant conditions exist:

- Plant is operating \approx 20% power
- Both Main Feedwater Loop Master Hand/Auto stations are in HAND
- SUCV position \approx 95% open
- LLCV position \approx 5% open

I&C technicians have requested that the "B" train SUCV and LLCV hand/auto stations be taken to hand in order to record some data on the proportional/integral module supplying the input to these stations. Permission is received and these stations are placed in manual.

Which of the following describes the minimum required actions to return the FW control valve stations to automatic?

- A. Place the SUCV in auto first, then place the LLCV in auto.
- B. Place the LLCV in auto first, then place the SUCV in auto.
- C. Place the "B" Loop Master Hand/Auto station into auto first. Then place the SUCV to auto second and the LLCV to auto third.
- D. Place both Loop Master Hand/Auto stations to auto first. Then place the LLCV to auto second and the SUCV to auto third.

68. A reactor start-up is in progress with power indicating 10^{-10} amps on NI-3 and NI-4. Which of the following describes the changes in indication and power level restrictions if the auxiliary power supply for NI-3 fails?

- A. NI-3 will indicate greater than 10^{-10} amps and power is restricted to less than 5%.
- B. NI-3 will indicate less than 10^{-10} amps and power is restricted to less than 5%.
- C. NI-3 will indicate greater than 10^{-10} amps and power is restricted to less than 1×10^{-9} amps
- D. NI-3 will indicate less than 10^{-10} amps and power is restricted to less than 1×10^{-9} amps

69. With the plant operating at 100% full power, surveillance data for the Core Flood Tanks (CFT) is as follows:

- CFT-1A level is 13.0 ft.
- CFT-1A boron concentration is 2280 ppm.
- CFT-1B level is 12.0 ft.
- CFT-1B boron concentration is 2300 ppm.

Which of the following actions must be taken?

- A. Restore only CFT-1A boron within 72 hours.
- B. Restore CFT-1A or CFT-1B boron within 1 hour.
- C. Restore CFT-1A and CFT-1B level within 1 hour.
- D. Restore only CFT-1B level within 1 hour.

70. The following plant conditions exist:

- The nuclear services surge tank level is slowly decreasing.
- SWV-277 (SW Surge Tank fill valve) is full open.
- The RO has estimated the SW leak rate to be in excess of 80 gpm.
- The reactor building and auxiliary building sump levels are not increasing.
- All nuclear services heat exchangers have been rotated into operation with no change in conditions.
- RCS makeup, letdown and MUT level are steady.
- There are no reactor building system leak annunciators in alarm.

Where is the location of the SW leak?

- A. The reactor coolant drain tank.
- B. The industrial cooling system.
- C. The primary sample cooler.
- D. The in-service reactor coolant pump seal return cooler.

71. A broken air line has caused the Instrument and Station Air Systems to depressurize to 18 psig. The leak has been isolated and the Instrument and Station Air headers have repressurized to 110 psig. Other than leak isolation, no operator actions have been taken.

For the conditions stated above which of the following statements describe the expected status of Letdown flow and Pressurizer level control?

- A. Letdown flow control via MUV-51 will be available via the normal control station while Pressurizer level control via MUV-31 will be in manual.
- B. Pressurizer level control via MUV-31 will be in automatic while Letdown flow control via MUV-51 will be unavailable until the "Air Fail Reset" pushbutton is depressed.
- C. Both of these flow controls will be unavailable until their respective "Air Fail Reset" pushbuttons are depressed.
- D. Both of these flow control stations will be in their normal mode of flow control.

72. CR-3 is operating at 100% power when the following indications are received:

- An Asymmetric Rod Fault alarm is illuminated.
- The Out-Inhibit Lamp is illuminated.
- Group 7 rod 3 rod in-limit light is illuminated.

Which of the following describes the plant response to these conditions?

- A. A manual runback is required because a sequence fault will exist for these conditions. Power must be reduced below 60%
- B. A manual runback is required. The in-limit bypass pushbutton must be depressed to permit inward motion of group 7.
- C. An automatic runback will occur. No operator action is required unless power stabilizes above 60%.
- D. An automatic runback will occur but the operator must hold the in-limit bypass pushbutton depressed until group 7 in motion is not required.

73. Four (4) minutes after a reactor trip from 98% power which was due to an "A" OTSG tube leak of 320 gpm, the following plant conditions exist:

- Incore temperature is 604°F and rising.
- Reactor coolant pressure is 1574 psig.
- Reactor Building pressure is 5.8 psig.
- The "A" OTSG has a level of 100 inches and the level is rising.
- The "B" OTSG has a level of 20 inches and the level is lowering.
- All Main and Emergency Feedwater has been lost.

Based on these symptoms, what Emergency Operating Procedure (EOP) should you be using?

- A. EOP-03, Inadequate Subcooling Margin.
- B. EOP-04, Inadequate Heat Transfer.
- C. EOP-06, Steam Generator Tube Rupture.
- D. EOP-07, Inadequate Core Cooling.

74. While operating at 100% full power, a failure of automatic pressurizer level control causes a plant transient. The operating crew stabilizes the plant with pressurizer level control in manual. The RO notes the following indications:

Time 0800 Pzr Lvl - 220" MUT Lvl - 80" Letdown Flowrate - 80 gpm
Seal Injection flowrate - 40 gpm Make-up flowrate - 100 gpm

Time 0801 Pzr Lvl - 224" MUT Lvl - 78" Letdown Flowrate - 80 gpm
Seal Injection flowrate - 40 gpm Make-up flowrate - 100 gpm

The following data is provided:

Pressurizer level = 12.2 gal/inch MUT level = 30.8 gal/inch

Based on these indications, which of the following statements describes current RCS leakage? (Disregard Control Bleedoff Flowrate)

- A. Conditions indicate RCS leakage is less than 5 gpm.
- B. Conditions indicate RCS leakage is greater than 5 gpm but less than 10 gpm.
- C. Conditions indicate RCS leakage is greater than 10 gpm but less than 15 gpm.
- D. Conditions indicate RCS leakage is greater than 15 gpm.

75. The following plant conditions exist:

- The plant is at 55% power.
- "A" Circulating Water Pump (CWP-1A) is out of service for bearing replacement.

Which of the following describes the expected plant response and/or operator actions required if the CWP-1B were to trip?

- A. With the plant at 55% power the remaining two CWPs are sufficient. No additional operator actions are required.
- B. The operator should immediately trip the turbine and enter EOP-2, Vital System Status Verification.
- C. The operator should enter AP-510, Rapid Power Reduction, reduce power to < 45% then enter AP-660, Turbine Trip, and trip the turbine.
- D. The operator should immediately trip the turbine, enter EOP-2 and ensure the ADVs for the 'A' OTSG are controlling due to the loss of CWP interlock closing the 'A' OTSG turbine bypass valves.

76. The following plant conditions exist:

- The plant is at 90% power.
- Seal injection flow has been lost.
- RCP-1B vibrations are in the "action" range on one monitor and in the "alert" range on another monitor for the same parameter.
- Cooling water leaving RCP-1B is 184° F.
- Thrust bearing temperatures for RCP-1B are 184° F.

Which of the following actions are required to be taken for the above conditions?

- A. Trip RCP-1B immediately.
- B. Secure RCP-1B after reducing power to 75%.
- C. Start available lift oil pumps for RCP-1B and notify engineering.
- D. Trip the reactor, enter EOP-02, complete all of the immediate actions of EOP-02, then trip RCP-1B.

77. Which of the following describes the direct signal that decreases condensate flow demand on a loss of one MFW pump at 80% power?

- A. A signal from the deaerator high level interlock.
- B. A runback signal from the ULD sub-section of the ICS.
- C. A signal that compares existing CD flow with FW flow and hotwell level.
- D. A signal that compares existing CD flow with FW flow and deaerator level.

78. Following a loss of off site power, what are the indications, if any, that Control Rod groups 1 through 7 are fully inserted?

- A. The CRD panel is de-energized, there are no indications that CRD groups 1 through 7 are fully inserted.
- B. All in-limit lights on the position indication panel and the diamond control panel are on.
- C. Only the in-limit lights on the position indication panel are on.
- D. Only the in-limit lights on the diamond control panel are on.

79. The following plant conditions exist:

- A SBLOCA with ISCM has been in progress for 2 hours.
- RCP-1B and RCP-1C are running.
- RCS pressure and temperature indicate cladding temperatures now exceed 1800°F

Based on these conditions, which of the following is the proper action and basis for that action?

- A. RCP-1D and RCP-1A should be started to collapse RCS voids and limit off site dose consequences.
- B. RCP-1D and RCP-1A should be started to assist in forcing any remaining RCS liquid to the core.
- C. RCP-1B and RCP-1C should be stopped to allow non-condensable gases to reach high points in the RCS where they can be vented.
- D. RCP-1B and RCP-1C should be stopped to prevent thermally induced failures of OTSG tubes.

80. The following plant conditions exist:

- "A" OTSG has a 280 gpm OTSG tube leak
- The Reactor has tripped due to a loss of off-site power.
- Both OTSGs are being maintained at 75% level with EFW.
- Both OTSGs have a safe steaming path available.
- Initial dose equivalent I-131 was 1.23 $\mu\text{Ci/g}$
- RCS Tave is 512°F
- RCS pressure is 1320 psig.

Which of the following would be the proper actions to take for these plant conditions?

- A. Immediately isolate the "A" OTSG and continue cooldown to DHR at the normal cooldown rates.
- B. Use both OTSGs to rapidly cooldown to < 500°F, then isolate the "A" OTSG due to TRACC considerations.
- C. Immediately isolate the "A" OTSG and raise level in the "B" OTSG to >90% to accelerate RCS cooldown and depressurization.
- D. Use both OTSGs to maintain normal cooldown limits, then isolate the "A" OTSG once DHR is established.

81. Following a Large Break Loss of Coolant Accident the BWST has been depleted (<15 feet). Which of the following statements describes the source of water, if any, for containment spray operation?

- A. The Building Spray pumps must be aligned to draw directly from the RB sump.
- B. The Building Spray pumps will receive suction from the discharge of an operating Low Pressure Injection pump.
- C. The RB Spray system has completed its design function and must be shutdown due to lack of alternate suction sources.
- D. The suction for the RB spray pumps must be aligned to the RCS drop line. If this path is unavailable the pumps must be shutdown due to lack of alternate suction sources.

82. A plant transient accompanied by equipment failures has left EFP-3 as the only available Main, Auxiliary or Emergency Feedwater pump. As a plant cooldown to Decay Heat Removal operation is conducted, which of the following sources of EFW suction is /will become unavailable?

- A. Fire Service Tanks 1A and 1B
- B. The Condensate Storage Tank
- C. The Main Condenser Hotwell
- D. Emergency Feedwater Storage Tank

83. SCP-1A has been in operation for two hours when the open limit switch on its discharge valve malfunctions, indicating the valve is not full open. Which of the following describes the plant response to this failure?

- A. SCP-1A will trip, its discharge *and* suction valves will close and SCP-1B will auto start 10 seconds later.
- B. SCP-1A will remain in operation. No auto start signal will be generated for SCP-1B.
- C. SCP-1A will trip, its discharge valve will close and SCP-1B will auto start 10 seconds later.
- D. SCP-1A will remain in operation because its discharge valve full open indication is only required for pump start.

84. Following a Reactor/Turbine trip caused by a loss of Main Condenser Vacuum, which of the following actions will/must occur to protect the Main Condenser from overpressurization?

- A. The Turbine Bypass Valves selected to automatic control on the MCB will fail closed. The Turbine Bypass Valves in manual must be controlled at 1025 psig from the MCB.
- B. All Turbine Bypass Valves will fail closed regardless of the status of the MCB control stations.
- C. The Turbine Bypass Valves selected to automatic control on the MCB will have a new control setpoint of 1025 psig. The Turbine Bypass Valves in manual must be controlled at 1025 psig from the MCB.
- D. All Turbine Bypass Valves will control at 1025 psig regardless of the status of the MCB control stations.

85. While in Mode 5 with containment purge in operation the following conditions exist:

- Outside ambient air temperature is 64°F
- Both CFTs are being depressurized for maintenance and are currently at 100 psig.
- Rosemont pressure transmitters associated with RCS Pressure are being calibrated by a team of I&C technicians in the RB.

A failure of all purge heaters has resulted in the following RB conditions:

- 95' RB Temperature is 65°F
- 119' RB Temperature is 66°F

Which of the following statements describe action required for these conditions and the basis of those actions?

- A. Depressurize both Core Flood Tanks to less than or equal to 40 psig to prevent possible brittle fracture.
- B. Fully depressurize and drain both Core Flood Tanks to prevent boron stratification and rocking up of core flood system piping.
- C. Suspend Rosemont transmitter calibration until RB Air Temperature is at or above 70°F to ensure design input data is within analyzed conditions.
- D. Ensure I&C calibration is corrected to include base line data that meets the new RB temperature conditions

86. During a startup the plant has been stabilized at 75% power for NI calibration when the RO notes the following indications;

- CRD out motion light illuminated
- CRD Group API and RPI indicate group out motion
- The "FW Limited by Reactor" annunciator alarm has just come in.
- Reactor Power is increasing.

To prevent further out motion, the RO depresses the "Sequence / Sequence override" pushbutton on the diamond control panel.

Which of the following describes the results of this action and the reason for those results?

- A. Rod motion will continue because the "Sequence / Sequence override pushbutton does not function with the CRD system in automatic.
- B. Rod motion will continue because even though the diamond control will be in Sequence override, only a single rod group is commanded to move.
- C. Rod motion will stop because having the diamond control station in Sequence override will force the diamond station to manual and remove insert and withdrawal signals to all rods.
- D. Rod motion will stop because having the diamond control station in Sequence override forces the Rx Demand station into "mini-track" which removes all rod withdrawal signals.

87. The plant is operating at 90% full power when the following events occur:

- Reactor power increases to approximately 97.5% full power.
- Turbine-Generator electrical load remains unchanged.
- All Turbine Bypass Valve and Atmospheric Dump valve hand auto stations indicate minimum demand.
- Plant conditions have stabilized at this higher power level.
- Once "ICS Track" and Cross-limit alarms clear, no annunciator windows are in alarm on the main control board.

Which of the following is the cause of this transient?

- A. An Atmospheric Dump Valve has failed full open.
- B. Two Main Steam Safeties have failed full open.
- C. Two Turbine Bypass Valves have failed full open.
- D. A steam leak has developed in the Reactor Building.

88. The following sequence of events have occurred:

- Instrument Air (IA) pressure dropped to 70 psig.
- The air leak is then isolated.
- Air pressure recovers to 110 psig.

Which of the following describes the response of IAV-30 and required operator actions(s), if any, to this sequence of events?

- A. IAV-30 will close and automatically open when IA pressure increases above 80 psig.
- B. IAV-30 will open and automatically close when IA pressure increases above 80 psig.
- C. IAV-30 will close and must be manually reset and opened when IA pressure increases above 80 psig.
- D. IAV-30 will open and must be manually reset and closed when IA pressure increases above 80 psig.

89. The following conditions exist:

- The plant is in Mode 3.
- An unacceptable increase in neutron flux has been observed.
- Boration has been initiated from the BAST via ~~MUV-60~~.
CAV cme 9-22-00

Which of the following describes the required action if ~~MUV-60~~ were to fail closed and could not be reopened?
CAV cme 9-22-00

- CAV cme 9-22-00*
A. Dispatch the PPO to manually bypass ~~MUV-60~~ and regulate the boration flow rate.
- B. Realign the boration flow path to establish flow from the BAST to the RCS via the Batch Controller.
- C. Establish the BWST as the suction source to a running MUP and open MUV-31 to maintain maximum flow rate.
- D. Establish maximum available HPI flow to the RCS with two MUPs and suction from the BWST.

90. The "A" 4160V ES bus is aligned to the Offsite Power transformer and the "B" 4160V ES bus is aligned to the BEST transformer. The "B" EDG is started for the monthly operability test, SP-354B, Monthly Functional Test of the Emergency Diesel Generator EGDG-1B. What impact, if any, will this have on the AC electrical distribution system?

- A. Diesel Cross-tie blocking prevents closure of the "A" EDG output breaker.
- B. Diesel Cross-tie blocking prevents closure of the Off-site Power Transformer feeder breaker to the "B" 4160V ES bus.
- C. Diesel Cross-tie blocking prevents closure of the BEST feeder breaker to the "A" 4160V ES bus.
- D. Diesel Cross-tie blocking will not be in effect; no interlocks will be actuated.

91. During a plant transient the RO observes the following Subcooling Margin indications on both of the Subcooling Margin monitor screens on SPDS.

The number 10 is displayed in yellow as a negative value.

Which of the following describes the status of RCS Subcooling indicated by this display?

- A. The RCS is approximately 10 degrees above the adequate subcooling margin line.
- B. The RCS is approximately 10 degrees below the adequate subcooling margin line.
- C. The RCS is approximately 10 degrees above the saturation line.
- D. The RCS is approximately 10 degrees below the saturation line.

92. An uncontrolled depressurization of both OTSGs has occurred. "A" OTSG pressure is 530 psig and "B" OTSG pressure is 490 psig. Main Steam Line Isolation and Main Feedwater Line Isolation have correctly actuated for both OTSGs. The Procedure Director has given direction for the RO to isolate steam to EFP-2 from both OTSGs.

Which of the following statements describes the required operator actions to accomplish this isolation?

- A. The EFIC actuation must be reset, after which MSV-55 and MSV-56 can be closed by selecting their main control board switches to the "CLOSE" position.
- B. The EFIC actuation must be bypassed, after which MSV-55 and MSV-56 can be closed by selecting their main control board switches to the "CLOSE" position.
- C. The EFIC actuation must be selected to "Manual Permissive", after which MSV-55 and MSV-56 can be closed by selecting their main control board switches to the "CLOSE" position.
- D. The EFIC actuation status does not impact valve closure, MSV-55 and MSV-56 may be closed by selecting their main control board switches to the "CLOSE" position.

93. Reactor power has been reduced to 80% to investigate indicated Main Feedwater flow oscillations in the "A" loop. With the plant stable at this power, the "A" Main Feedwater flow transmitter fails low. Assuming no SASS transfer, which of the following describes the expected ICS response to this failure? Consider the results if the transient is allowed to continue for at least one minute.

- A. ICS will increase FW to both OTSGs. Reactor Power will decrease.
- B. ICS will increase FW to the "A" OTSG and decrease FW to the "B" OTSG. Reactor Power will decrease.
- C. ICS will increase FW to both OTSGs. Reactor Power will increase.
- D. ICS will increase FW to the "A" OTSG and decrease FW to the "B" OTSG. Reactor Power will increase.

94. During a loss of Main Feedwater the PPO hears a loud squealing sound coming from EFP-2. EFP-2 and the surrounding area are coated in oil. No oil is visible in any bubbler or sightglass on EFP-2.

Which of the following is correct concerning the course of action the PPO is expected to take?

- A. Immediately trip EFP-2 without delay.
- B. Notify the chief nuclear operator or another licensed operator of your intent and then trip EFP-2.
- C. Inform the Nuclear Shift supervisor prior to taking any action.
- D. Obtain approval from any senior reactor operator prior to taking action.

95. The following plant conditions exist:

- RCS pressure is 180 psig.
- RCS temperature is 175° F
- Instrument air pressure is 85 psig and decreasing.

Which of the following describes the expected plant response and required operator actions for these conditions?

- A. DHHE DC control valves will fail to the NO cooling position on loss of air. Manual control is necessary to limit the RCS heatup rate to $\leq 15^{\circ}\text{F}$ in any 1 hour period.
- B. DHHE DC control valves will fail to the full cooling position on loss of air. Manual control is necessary to limit the RCS cooldown rate to $\leq 15^{\circ}\text{F}$ in any 1 hour period.
- C. DHHE DC control valves will fail to the NO cooling position on loss of air. Manual control is necessary to limit the RCS heatup rate to $\leq 25^{\circ}\text{F}$ in any 1/2 hour period.
- D. DHHE DC control valves will fail to the full cooling position on loss of air. Manual control is necessary to limit the RCS cooldown rate to $\leq 25^{\circ}\text{F}$ in any 1/2 hour period.

96. While operating at 100% full power four Core Exit Thermocouples (IM-5G-TE, IM-6C-TE, IM-7F-TE, and IM-2G-TE) are found to be failed. What effect, if any, do these failures have on operability of the Core Exit Temperature thermocouples and the Core Exit Temperature recorders?

- A. Both thermocouple channels of Core Exit Temperature and both recorder channels of Core Exit Temperature are inoperable.
- B. Both thermocouple channels of Core Exit Temperature are inoperable but both recorder channels of Core Exit Temperature remain operable.
- C. Both thermocouple channels of Core Exit Temperature remain operable but both recorder channels of Core Exit Temperature are inoperable.
- D. Both thermocouple channels of Core Exit Temperature and both recorder channels of Core Exit Temperature remain operable.

97. The following plant conditions exist:

- The plant is in Mode 5.
- The operating decay heat pump, DHP-1A, trips on overload.
- The standby decay heat pump, DHP-1B, is started, cavitates and trips.
- Reactor coolant level is 131'.
- Reactor coolant temperature is 93°F.
- Upper hand holds on the steam generators are removed.

Based on these conditions, which of the following methods should be used to restore core heat removal?

- A. Establish decay heat removal with DHP-1A.
- B. Establish high pressure injection.
- C. Establish fuel transfer canal fill.
- D. Establish decay heat removal using spent fuel cooling.

98. With the plant in Mode 1, the following sequence of events has occurred:

- A failure in the 'A' inverter (VBIT-1A) has caused its transfer switches (VBXS-1A and VBXS-3A) to automatically swap to the alternate power supplies.
- Operations manually bypasses the inverter and transfer switches to assist troubleshooting activities.
- Electricians replace a circuit board and report that the inverter is functioning properly and ready to supply the vital buses.

Prior to re-alignment of the inverter and transfer switches which of the following describes the operability condition for this equipment?

- A. The vital buses and inverter are *operable*.
- B. The vital buses and inverter are *inoperable*.
- C. The vital buses are *operable* but the inverter is *inoperable* until the transfer switches are placed back in service.
- D. The inverter is *operable* but the vital buses are *inoperable* until the transfer switches are placed back in service.

99. Which of the following actions must be completed prior to hanging an in-plant tagout on one of the Main Generator output breakers?

- A. A switching order from the Energy Control Center to the on-duty Nuclear Shift Manager must be in place.
- B. A grounding device must be installed on the Main Generator side of the Main Generator output breakers.
- C. The Emergency Diesel Generators must be tested and one left loaded on a 4160V bus.
- D. The Main Generator must be purged of hydrogen and filled with nitrogen prior to work on the output breakers.

100. The following plant conditions exist:

- A loss of Coolant Accident is in progress.
- The RCS leak is in the Reactor Building.
- Reactor Coolant Pressure is 1825 psig.
- RB pressure is 4.3 psig.
- The level in the Nuclear Services Closed Cycle Cooling Surge Tank is lowering and has reached the low level alarm setpoint.

Which of the following statements describes the automatic actuations and actions that should have occurred?

- A. RB Isolation and Cooling actuation has occurred; all reactor building penetrations, other than SW to the RCPs and those required for Engineered Safeguards, have been isolated.
- B. RB Isolation and Cooling actuation has occurred; all reactor building penetrations, other than those required for Engineered Safeguards, have been isolated.
- C. A High Pressure Injection actuation has occurred; all reactor building penetrations, other than SW to the RCPs and those required for Engineered Safeguards, have been isolated by Diverse Containment Isolation.
- D. A High Pressure Injection actuation has occurred; all reactor building penetrations, other than those required for Engineered Safeguards, have been isolated by Diverse Containment Isolation.

	(T)	(F)	KEY
	(%)	(2)	(3) (4) (5)
51	(A)	(B)	(C) (D) (E)
52	(A)	(B)	(C) (D) (E)
53	(A)	(B)	(C) (D) (E)
54	(A)	(B)	(C) (D) (E)
55	(A)	(B)	(C) (D) (E)
56	(A)	(B)	(C) (D) (E)
57	(A)	(B)	(C) (D) (E)
58	(A)	(B)	(C) (D) (E)
59	(A)	(B)	(C) (D) (E)
60	(A)	(B)	(C) (D) (E)
61	(A)	(B)	(C) (D) (E)
62	(A)	(B)	(C) (D) (E)
63	(A)	(B)	(C) (D) (E)
64	(A)	(B)	(C) (D) (E)
65	(A)	(B)	(C) (D) (E)
66	(A)	(B)	(C) (D) (E)
67	(A)	(B)	(C) (D) (E)
68	(A)	(B)	(C) (D) (E)
69	(A)	(B)	(C) (D) (E)
70	(A)	(B)	(C) (D) (E)
71	(A)	(B)	(C) (D) (E)
72	(A)	(B)	(C) (D) (E)
73	(A)	(B)	(C) (D) (E)
74	(A)	(B)	(C) (D) (E)
75	(A)	(B)	(C) (D) (E)
76	(A)	(B)	(C) (D) (E)
77	(A)	(B)	(C) (D) (E)
78	(A)	(B)	(C) (D) (E)
79	(A)	(B)	(C) (D) (E)
80	(A)	(B)	(C) (D) (E)
81	(A)	(B)	(C) (D) (E)
82	(A)	(B)	(C) (D) (E)
83	(A)	(B)	(C) (D) (E)
84	(A)	(B)	(C) (D) (E)
85	(A)	(B)	(C) (D) (E)
86	(A)	(B)	(C) (D) (E)
87	(A)	(B)	(C) (D) (E)
88	(A)	(B)	(C) (D) (E)
89	(A)	(B)	(C) (D) (E)
90	(A)	(B)	(C) (D) (E)
91	(A)	(B)	(C) (D) (E)
92	(A)	(B)	(C) (D) (E)
93	(A)	(B)	(C) (D) (E)
94	(A)	(B)	(C) (D) (E)
95	(A)	(B)	(C) (D) (E)
96	(A)	(B)	(C) (D) (E)
97	(A)	(B)	(C) (D) (E)
98	(A)	(B)	(C) (D) (E)
99	(A)	(B)	(C) (D) (E)
100	(A)	(B)	(C) (D) (E)

FINAL SUBMITTAL

**CRYSTAL RIVER 50-302/2000-301
SEPTEMBER 25 - 29, 2000**

FINAL AS ADMINISTERED

**SRO WRITTEN EXAMINATION
WITH ANSWER KEY**

MASTER

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

Applicant Information

Name:	Region: I <input checked="" type="radio"/> II / III / IV
Date:	Facility/Unit: CRYSTAL RIVER 3
License Level: RO <input checked="" type="radio"/> SRO	Reactor Type: W / CE <input checked="" type="radio"/> BW / GE
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected five hours after the examination starts.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

Applicant's Signature

Results

Examination Value	_____	Points
Applicant's Score	_____	Points
Applicant's Grade	_____	Percent

Name: _____

1. The plant is operating at 90% full power when the following events occur:
- Reactor power increases to approximately 97.5% full power.
 - Turbine-Generator electrical load remains unchanged.
 - All Turbine Bypass Valve and Atmospheric Dump valve hand auto stations indicate minimum demand.
 - Plant conditions have stabilized at this higher power level.
 - Once "ICS Track" and Cross-limit alarms clear, no annunciator windows are in alarm on the main control board.

Which of the following is the cause of this transient?

- A. An Atmospheric Dump Valve has failed full open.
- B. Two Main Steam Safeties have failed full open.
- C. Two Turbine Bypass Valves have failed full open.
- D. A steam leak has developed in the Reactor Building.

2. Which of the following are Entry Conditions for AP-1050, Flooding?

- A. The COND PUMP SUMP LEVEL HIGH annunciator has alarmed and two CW pumps tripped. All CDP pumps are running normally.
- B. A running CDP pump decouples, another CDP pump trips. A non-licensed operator reports significant quantities of water on the floor around the CDP sump. The COND PUMP SUMP LEVEL HIGH annunciator has *not* alarmed but the sump is filling.
- C. Both CDP pumps trip and a non-licensed operator reports significant quantities of water on the floor around the CDP sump. The COND PUMP SUMP LEVEL HIGH annunciator has *not* alarmed but the sump is filling.
- D. The COND PUMP SUMP LEVEL HIGH annunciator has alarmed and one CDP has tripped. The other CDP is running normally.

3. While operating at 100% power the operating crew discovers that Group 6 Rod 1 is untrippable. Calculations show that shutdown margin is greater than 1%. What would be the affect on shutdown margin if Group 6 Rod 2 were to drop fully into the core?

- A. The negative reactivity from the dropped rod may be used to offset the reactivity of the untrippable rod. Shutdown margin will be the same value as if all rods are operable and aligned.
- B. Group 6 Rod 2 is operable for shutdown margin purposes. Shutdown margin is not affected.
- C. Group 6 Rod 2 must be declared inoperable. Shutdown margin must be reduced by the worth of that control rod.
- D. Group 6 Rod 2 must be declared inoperable. Shutdown margin is increased by the worth of this rod.

4. Which of the following describes how PZR level is controlled on a loss of NNI-X power?

- A. A backup power supply will allow manual operation of MUV-31 following a loss of all NNI-X DC power.
- B. A backup power supply will allow automatic operation of MUV-31 following a loss of all NNI-X AC power.
- C. A loss of NNI-X AC or DC power will cause MUV-31 to fail closed. MUV-24 will be used for PZR level control.
- D. A loss of NNI-X AC or DC power will cause the valve controller to swap to NNI-Y for control power.

5. EOP-09, Natural Circulation Cooldown, contains a table which provides limits on natural circulation cooldown rates.

If RCS pressure is maintained above the Natural Circulation curve of Figure 1 and 2 in EOP-9, the cooldown rate is limited to a maximum of 25°F per half hour.

Which of the following describes the basis for this cooldown rate limit?

- A. To limit pressure / temperature stress on the OTSG tubesheet.
- B. To limit voiding in the reactor vessel head region.
- C. To maintain a stable or lowering core ΔT .
- D. To conserve EFT-2 inventory.

6. The following plant conditions exist:

- The plant is at 55% reactor power.
- The ICS +24 volt DC bus has degraded to +18 volts.

What is the plant's response to this situation?

- A. ATWS removes power from the safety rods and initiates EFIC.
- B. AMSAC trips the main turbine and initiates EFIC.
- C. DSS removes power from the regulating control rods.
- D. RPS trips the reactor due to the loss of both MFW pumps.

7. The following plant conditions exist:

- A "Control Complex Fire Alert" alarm has been received.
- A Halon bank has actuated in the Cable Spreading Room.
- Multiple plant components/equipment are cycling erratically causing a loss of plant control.

Based on the above conditions which of the following describes the action(s) that should be initiated?

- A. Enter AP-880, Fire Protection, and concurrently perform AP-510, Rapid Power Reduction.
- B. Enter AP-880, Fire Protection, only.
- C. Enter AP-990, Shutdown from Outside the Control Room, only.
- D. Enter AP-990, Shutdown from Outside the Control Room, and AP-880, Fire Protection.

8. The following plant conditions exist:

- A SBLOCA with ISCM has been in progress for 2 hours.
- RCP-1B and RCP-1C are running.
- RCS pressure and temperature indicate cladding temperatures now exceed 1800°F

Based on these conditions, which of the following is the proper action and basis for that action?

- A. RCP-1D and RCP-1A should be started to collapse RCS voids and limit off site dose consequences.
- B. RCP-1D and RCP-1A should be started to assist in forcing any remaining RCS liquid to the core.
- C. RCP-1B and RCP-1C should be stopped to allow non-condensable gases to reach high points in the RCS where they can be vented.
- D. RCP-1B and RCP-1C should be stopped to prevent thermally induced failures of OTSG tubes.

9. The plant has tripped due to a loss of off-site power. The following plant conditions exist:

- Reactor Coolant System pressure is 2100 psig.
- RCS temperature is 550°F.
- "A" OTSG pressure is 1025 psig.
- "B" OTSG pressure is 905 psig.
- The Intermediate Building Roof Cameras show no Main Steam Safeties open but MSV-26, "B" Atmospheric Dump Valve, is blowing steam through the roof tail pipe.

What action, if any, should be taken in regard to OTSG pressure?

- A. No action should be taken, MSV-26 is controlling properly.
- B. Select MSV-26 to hand and close. Control OTSG pressure with Turbine Bypass Valves.
- C. Select MSV-26 to hand and control OTSG pressure with the Atmospheric Dump Valve.
- D. Have the Secondary Plant Operator isolate MSV-26.

10. The following sequence of events have occurred:

- Instrument Air (IA) pressure dropped to 70 psig.
- The air leak is then isolated.
- Air pressure recovers to 110 psig.

Which of the following describes the response of IAV-30 and required operator actions(s), if any, to this sequence of events?

- A. IAV-30 will close and automatically open when IA pressure increases above 80 psig.
- B. IAV-30 will open and automatically close when IA pressure increases above 80 psig.
- C. IAV-30 will close and must be manually reset and opened when IA pressure increases above 80 psig.
- D. IAV-30 will open and must be manually reset and closed when IA pressure increases above 80 psig.

11. SCP-1A has been in operation for two hours when the open limit switch on its discharge valve malfunctions, indicating the valve is not full open. Which of the following describes the plant response to this failure?
- A. SCP-1A will trip, its discharge *and* suction valves will close and SCP-1B will auto start 10 seconds later.
 - B. SCP-1A will remain in operation. No auto start signal will be generated for SCP-1B.
 - C. SCP-1A will trip, its discharge valve will close and SCP-1B will auto start 10 seconds later.
 - D. SCP-1A will remain in operation because its discharge valve full open indication is only required for pump start.

12. A step in SP-354A, Monthly Test of EDG-1A, requires the PPO to ensure that the Speed Droop is set to '60' and the Unit-Parallel switch to 'Parallel'. Where would you direct the PPO to go to perform these functions and why are they necessary?

- A. Both switches are located in the EDG-1A control panel; Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.
- B. Speed droop switch is located on the engine governor and the Unit-Parallel switch is located in the EDG-1A control panel; Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.
- C. Both switches are located in the EDG-1A control panel; Speed droop setting is to allow sharing of reactive load; Parallel setting is to allow sharing of real load.
- D. Speed droop switch is located on the engine governor and the Unit-Parallel switch is located in the EDG-1A control panel; Speed droop setting is to allow sharing of reactive load; Parallel setting is to allow sharing of real load.

13. During a Station Blackout condition, EOP-12 has the RO direct the PPO to de-energize VBIT-1E by performing the following actions:

1. Open inverter "AC INPUT" Bkr.
2. Open inverter "AC OUTPUT" Bkr.
3. Open inverter "BATTERY INPUT" Bkr.

What is the basis of this action during a Station Blackout?

- A. This action prevents VBIT-1E overheating because of a loss of ventilation to the 108' of the control complex.
- B. This action prevents overheating of the plant computer hardware during a loss of control complex ventilation.
- C. This action is necessary to reduce loads on safety related station batteries and ensure they last the 4 hour design duration.
- D. This action removes heat input to the control complex, minimizing the likelihood of overheating relays and bistables.

14. Following an accident condition, which of the RM-A1, Reactor Building Purge Exhaust Duct Monitor, mid-range dose rates listed below would require the evacuation of the population out to 5 miles?

- A. Stability Class A, B or C with a reading of 90 mR/hr for 12 minutes.
- B. Stability Class A, B or C with a reading of 60 mR/hr for 22 minutes.
- C. Stability Class F or G with a reading of 90 mR/hr for 12 minutes.
- D. Stability Class F or G with a reading of 60 mR/hr for 22 minutes.

15. Which of the following actions must be completed prior to hanging an in-plant tagout on one of the Main Generator output breakers?

- A. A switching order from the Energy Control Center to the on-duty Nuclear Shift Manager must be in place.
- B. A grounding device must be installed on the Main Generator side of the Main Generator output breakers.
- C. The Emergency Diesel Generators must be tested and one left loaded on a 4160V bus.
- D. The Main Generator must be purged of hydrogen and filled with nitrogen prior to work on the output breakers.

16. The following conditions exist:

- A fire in the radiation monitoring panel has made the control room uninhabitable.
- Procedural guidance directs the operating crew to man the Remote Shutdown Panel.
- Control is being transferred to the RSD Panel by selecting four control switches to the "RSP" and pulled out position.

In addition to transferring control to the RSD Panel, what is accomplished by these switch selections?

- A. Control circuits for components necessary for shutdown of the plant are isolated from the control room.
- B. Back-up fire suppression systems within the control room and cable spreading room are enabled.
- C. Engineered Safeguards automatic starts are enabled for HPI pumps, LPI pumps and both Emergency Diesel Generators.
- D. SASS will now monitor RSD Panel controls for blown fuses and transfer to redundant control circuits if fuse failures occur.

17. The following plant conditions exist:

- A loss of Coolant Accident is in progress.
- The RCS leak is in the Reactor Building.
- Reactor Coolant Pressure is 1825 psig.
- RB pressure is 4.3 psig.
- The level in the Nuclear Services Closed Cycle Cooling Surge Tank is lowering and has reached ~~to~~ low level alarm setpoint.

THE case 9-22-00

Which of the following statements describes the automatic actuations and actions that should have occurred?

- A. RB Isolation and Cooling actuation has occurred; all reactor building penetrations, other than SW to the RCPs and those required for Engineered Safeguards, have been isolated.
- B. RB Isolation and Cooling actuation has occurred; all reactor building penetrations, other than those required for Engineered Safeguards, have been isolated.
- C. A High Pressure Injection actuation has occurred; all reactor building penetrations, other than SW to the RCPs and those required for Engineered Safeguards, have been isolated by Diverse Containment Isolation.
- D. A High Pressure Injection actuation has occurred; all reactor building penetrations, other than those required for Engineered Safeguards, have been isolated by Diverse Containment Isolation.

18. Why is it desirable to steam the affected Once Through Steam Generator (OTSG) during a tube rupture, within Tube Rupture Alternate Control Criteria (TRACC) limits, instead of isolating the affected OTSG?

Steaming both OTSGs:

- A. Prevents depletion of available feedwater sources.
- B. Minimize the time to DHR operation.
- C. Ensures that natural circulation will not be required.
- D. Reduces the amount of contamination in the main condenser.

19. The plant is at 100% FP. What are the required actions when Reactor Coolant System activity is determined to be 65 $\mu\text{Ci/gm}$ Dose Equivalent I-131?

- A. Operation may continue for up to 48 hours and then be in Mode 3 with $T_{\text{ave}} < 500^\circ\text{F}$ within the next 6 hours.
- B. Operation may continue if reactor power is reduced to less than or equal to 78% FP within 48 hours.
- C. Perform the surveillance for Dose Equivalent I-131 and be in Mode 3 with $T_{\text{ave}} < 500^\circ\text{F}$ within the next 6 hours.
- D. The unit must be placed in at least Mode 3 with T_{ave} less than 500°F within 6 hours.

20. Following a pressure transient, the plant has been stabilized at 90% power. The RO notices the ultrasonic indicator for the PORV spiking periodically and suspects that the PORV may be leaking. Which of the following sets of conditions would be expected if the ROs suspicions are correct?

- A. The PORV amber indicating light illuminated.
RCDT pressure constant
RCDT level constant.
PORV tailpipe temperature near RCDT saturation temperature
Pressurizer level constant
MUT level constant.
- B. The PORV green indicating light illuminated.
RCDT pressure slowly increasing
RCDT level slowly increasing
PORV tailpipe temperature near RCDT saturation temperature
Pressurizer level constant
MUT level slowly lowering
- C. The PORV amber indicating light illuminated.
RCDT pressure constant
RCDT level slowly increasing
PORV tailpipe temperature near Pressurizer steam space temperature
Pressurizer level constant
MUT level constant
- D. The PORV green indicating light illuminated.
RCDT pressure slowly increasing
RCDT level slowly increasing
PORV tailpipe temperature near Pressurizer steam space temperature
Pressurizer level slowly lowering
MUT level slowly lowering

21. A cooldown is in progress with the "A" and "B" reactor coolant pumps (RCP-1A and RCP-1B) running. The following occurs:

- Instrument air has been lost to parts of the auxiliary building.
- MUV-16, seal injection control valve, has failed closed.
- A nuclear services closed cycle cooling (SW) piping failure has caused SWT-1 to empty.
- The reactor operator has shutdown all Nuclear Services Closed Cycle Cooling Pumps.

What effect will this have on RCP operation?

- A. RCPs may continue to operate as long as the control bleed off valve remains open.
- B. RCPs may run for 5 minutes without SW; there are no time restrictions on pump operation for the loss of seal injection.
- C. RCPs may be run for 5 minutes without seal injection; there are no time restrictions on pump operation for the loss of SW.
- D. RCPs must be shutdown within 2 minutes due to a loss of RCP cooling accompanied by a loss of seal injection.

22. A LOCA cooldown is being accomplished in accordance with the guidance of EOP-08, LOCA Cooldown.

- The leak rate is approximately 300 gpm
- Normal cooldown rates are being used.
- All 4 RCPs are running.

The crew reaches a step in EOP-8 which states "IF 4 RCPs are running, THEN stop RCP-1D". Which of the following statements describes the reason RCP-1D is specified in this step?

- A. RCP-1D is specified to reduce RCS leakage if the leak is located on the Make-up and Purification system letdown line which taps off of "D" cold leg.
- B. RCP-1D was selected because it produces the greatest flow of the 4 RCPs. Stopping this pump provides the maximum margin for core lift concerns.
- C. RCP-1D is specified because it is in the opposite loop from RCP-1B, which provides pressurizer spray. Later guidance will reduce RCPs to a 2/0 combination.
- D. RCP-1D was selected because it provides the greatest heat input to the RCS. Stopping this pump will provide maximum heat reduction while maintaining 3 pumps in operation.

23. CR-3 is conducting a plant shutdown with the following conditions established:

- Main Generator output 350 MWe.
- One condensate pump has been stopped
- The Main Feedwater Isolation Main Feedwater Pump Trip key switches have been selected to the "Both" position.
- Both MFWPs are still in operation
- FWV-28 (cross-tie) is closed.

With the conditions stated above present, a steam break occurs on the "A2" Main Steam Line resulting in the following:

- A Reactor and Main Turbine trip
- Depressurization of "A" OTSG to 580 psig.
- Depressurization of "B" OTSG to 870 psig
- Both OTSGs recover to normal post trip conditions.

Which of the following is the expected response of the Main Feedwater System for this transient?

- A. Both main feedwater pumps will continue to run.
- B. The "A" main feed pump will trip, "B" will continue to run.
- C. Both main feedwater pumps will trip.
- D. The "B" main feed pump will trip, "A" will continue to run.

24. The following conditions exist:

- Reactor Coolant temperature is 287°F
- Reactor Coolant pressure is 350 psig
- RB Building Spray pump 1A is out of service
- AHF-1A is operating.
- AHF-1B and AHF-1C are inoperable.

Which of the following Technical Specification action(s), if any, apply if DCP-1B is rendered unavailable due to pump failure?

- A. No action is required, there is adequate RB Spray and Cooling.
- B. ITS 3.0.3 must be entered due to loss of safety function.
- C. Restore BSP-1A or DCP-1B to operable within 72 hours.
- D. Restore AHF-1B or AHF-1C to operable within 72 hours.

25. Current plant conditions are:

- Annunciator F-03-02, AUX BLDG FIRE ALERT, is in alarm.
- Annunciator F-03-04, CNTRL COMPLEX FIRE ALERT, is in alarm.
- Pyrotronics Control Module 2 (95' Auxiliary Building) is in alarm.
- Pyrotronics Control Module 5 (124' Control Complex) is in alarm.

A chemist notifies the Control Room that while he was flushing the line in preparation for taking a pressurizer liquid space sample the valve control panel caught on fire. Which of the following actions are required to support proper damper operation?

- A. Stop the Control Complex supply fans (AHF-17A, 17B, 18A and 18B) and the Sampling Hood (AHF-44A and 44B) exhaust fans.
- B. Stop the Control Complex supply fans (AHF-17A, 17B, 18A and 18B) and the Control Complex return fans (AHF-19A and 19B).
- C. Stop the Chemical Lab supply fan (AHF-30) and the Controlled Access Area (AHF-20A and 20B) and the Sampling Hood (AHF-44A and 44B) exhaust fans .
- D. Stop the Chemical Lab supply fan (AHF-30) and the Controlled Access Area (AHF-20A and 20B) and the Control Complex return fans (AHF-19A and 19B).

26. CR-3 is operating at 100% power when the following indications are received:

- An Asymmetric Rod Fault alarm is illuminated.
- The Out-Inhibit Lamp is illuminated.
- Group 7 rod 3 rod in-limit light is illuminated.

Which of the following describes the plant response to these conditions?

- A. A manual runback is required because a sequence fault will exist for these conditions. Power must be reduced below 60%
- B. A manual runback is required. The in-limit bypass pushbutton must be depressed to permit inward motion of group 7.
- C. An automatic runback will occur. No operator action is required unless power stabilizes above 60%.
- D. An automatic runback will occur but the operator must hold the in-limit bypass pushbutton depressed until group 7 in motion is not required.

27. An uncontrolled depressurization of both OTSGs has occurred. "A" OTSG pressure is 530 psig and "B" OTSG pressure is 490 psig. Main Steam Line Isolation and Main Feedwater Line Isolation have correctly actuated for both OTSGs. The Procedure Director has given direction for the RO to isolate steam to EFP-2 from both OTSGs.

Which of the following statements describes the required operator actions to accomplish this isolation?

- A. The EFIC actuation must be reset, after which MSV-55 and MSV-56 can be closed by selecting their main control board switches to the "CLOSE" position.
- B. The EFIC actuation must be bypassed, after which MSV-55 and MSV-56 can be closed by selecting their main control board switches to the "CLOSE" position.
- C. The EFIC actuation must be selected to "Manual Permissive", after which MSV-55 and MSV-56 can be closed by selecting their main control board switches to the "CLOSE" position.
- D. The EFIC actuation status does not impact valve closure, MSV-55 and MSV-56 may be closed by selecting their main control board switches to the "CLOSE" position.

28. A plant transient accompanied by equipment failures has left EFP-3 as the only available Main, Auxiliary or Emergency Feedwater pump. As a plant cooldown to Decay Heat Removal operation is conducted, which of the following sources of EFW suction is /will become unavailable?

- A. Fire Service Tanks 1A and 1B
- B. The Condensate Storage Tank
- C. The Main Condenser Hotwell
- D. Emergency Feedwater Storage Tank

29. The following plant conditions exist:

- The plant is at 55% power.
- "A" Circulating Water Pump (CWP-1A) is out of service for bearing replacement.

Which of the following describes the expected plant response and/or operator actions required if the CWP-1B were to trip?

- A. With the plant at 55% power the remaining two CWPs are sufficient. No additional operator actions are required.
- B. The operator should immediately trip the turbine and enter EOP-2, Vital System Status Verification.
- C. The operator should enter AP-510, Rapid Power Reduction, reduce power to < 45% then enter AP-660, Turbine Trip, and trip the turbine.
- D. The operator should immediately trip the turbine, enter EOP-2 and ensure the ADVs for the 'A' OTSG are controlling due to the loss of CWP interlock closing the 'A' OTSG turbine bypass valves.

30. The plant was at 85% full power when the following conditions occurred:

- The "A" 4160V ES bus has a voltage of 3980 on the Main Control Board.
- Two of three SLUR relays for the "A" 4160V ES bus have actuated.
- The "B" 4160V ES bus has suffered a complete loss of voltage.
- No Emergency Diesel Generators (EDGs) are running.

As Procedure Director, which of the following procedures are required to be entered?

- A. AP-770, Emergency Diesel Generator Actuation only.
- B. AP-510, Rapid Power Reduction
AND
AP-770, Emergency Diesel Generator Actuation.
- C. EOP-2, Vital System Status Verification
AND
AP-770, Emergency Diesel Generator Actuation
- D. EOP-12, Station Blackout
AND
AP-770, Emergency Diesel Generator Actuation

31. Which of the following statements describes the function of an Instrument Air supplied overpressure in a Pre-action sprinkler system?

- A. The air pressure provides the initial driving force for the fire service water after the fusible links are open.
- B. The air pressure minimizes leakage past the deluge valve to maintain the sprinkler header empty of water.
- C. The air pressure operates the pilot valve in the associated deluge valve to ensure rapid and complete opening.
- D. The air pressure provides a monitored parameter to detect broken sprinkler heads, broken piping or system actuations.

32. The following conditions exist:

- An ICS failure causes a continuous group rod withdrawal.
- Reactor power is 104% and increasing.
- Reactor Coolant System (RCS) pressure is 2400 psig and increasing.
- The Reactor Protection System (RPS) has failed.

Assuming no other protective features actuate, what actions will the Diverse Scram System (DSS) perform when plant conditions reach the point that the Power Operated Relief Valve (PORV) opens?

- A. Trip all control rods when reactor power exceeds 104.9%.
- B. Trip all control rods when RCS pressure exceeds 2450 psig.
- C. Trip the regulating rods when reactor power exceeding 104.9%.
- D. Trip the regulating rods when RCS pressure exceeds 2450 psig.

33. Following a Reactor/Turbine trip caused by a loss of Main Condenser Vacuum, which of the following actions will/must occur to protect the Main Condenser from overpressurization?
- A. The Turbine Bypass Valves selected to automatic control on the MCB will fail closed. Turbine Bypass Valves in manual must be controlled at 1025 psig from the MCB.
 - B. All Turbine Bypass Valves will fail closed regardless of the status of the MCB control stations.
 - C. The Turbine Bypass Valves selected to automatic control on the MCB will have a new control setpoint of 1025 psig. The Turbine Bypass Valves in manual must be controlled at 1025 from the MCB.
 - D. All Turbine Bypass Valves will control at 1025 psig regardless of the status of the MCB control stations.

34. The following conditions exist:

- The plant is in Mode 3.
- An unacceptable increase in neutron flux has been observed.
- Boration has been initiated from the BAST via ~~MUV-60~~.
CAV cme 9-22-00

Which of the following describes the required action if ~~MUV-60~~ were to fail closed and could not be reopened?
CAV cme 9-22-00

- A. Dispatch the PPO to manually bypass ~~MUV-60~~ and regulate the boration flow rate.
CAV cme 9-22-00
- B. Realign the boration flowpath to establish flow from the BAST to the RCS via the Batch Controller.
- C. Establish the BWST as the suction source to a running MUP and open MUV-31 to maintain maximum flow rate.
- D. Establish maximum available HPI flow to the RCS with two MUPs and suction from the BWST.

35. The plant is in Mode 5 with "A" DH train aligned for core cooling

Which of the following describes the component or components affected if RC-132-PT, "B" loop low range RCS pressure transmitter, were to fail high and the setpoint at which the action should occur?

- A. DHV-4 only will close when RC-132-PT reaches approximately 265 psig.
- B. DHV-3 and DHV-4 will close when RC-132-PT reaches approximately 265 psig.
- C. DHV-4 only will close when RC-132-PT reaches approximately 385 psig.
- D. DHV-3 and DHV-4 will close when RC-132-PT reaches approximately 385 psig.

36. Following discovery of a Nuclear Services Closed Cycle Cooling (SW) leak in the "A" Spent Fuel Heat Exchanger (SFHE), a step in AP-330, Loss of Nuclear Service Cooling states:

IF SW was isolated to SFHEs,
AND any SFHE is available,
THEN restore available SFHE.

A detail in this step has the operator restore SFHE-1B by throttling SWV-24, SFHE-1B outlet isolation, 2 1/8 turns open. OP-408, Nuclear Services Cooling System, in its valve check list states SWV-24 is a sealed throttled valve. Which of the following is a reason for throttling this valve?

- A. Emergency diesel generator loading consideration.
- B. Flow considerations of the operating SW pump.
- C. Prevent damage to the flow instrument from over-ranging.
- D. Protection of the valve from flow erosion.

37. While in Mode 5 with containment purge in operation the following conditions exist:

- Outside ambient air temperature is 64°F
- Both CFTs are being depressurized for maintenance and are currently at 100 psig.
- Rosemont pressure transmitters associated with RCS Pressure are being calibrated by a team of I&C technicians in the RB.

A failure of all purge heaters has resulted in the following RB conditions:

- 95' RB Air Temperature is 65°F
- 119' RB Air Temperature is 66°F

Which of the following statements describe action required for these conditions and the basis of those actions?

- A. Depressurize both Core Flood Tanks to less than or equal to 40 psig to prevent possible brittle fracture.
- B. Fully depressurize and drain both Core Flood Tanks to prevent boron stratification and rocking up of core flood system piping.
- C. Suspend Rosemont transmitter calibration until RB Air Temperature is at or above 70°F to ensure design input data is within analyzed conditions.
- D. Ensure I&C calibration is corrected to include base line data that meets the new RB temperature conditions

38. With reactor power at 30%, the power range instrumentation agrees with the heat balance calculation. After increasing power to 85%, the power range indications do not agree with a new heat balance calculation. Which of the following explains why this is true?

- A. Downcomer temperature lowers as reactor power rises. Water in the reactor vessel downcomer acts as a better reflector thereby reducing neutron leakage. Therefore, indicated power will be lower than heat balance calculations.
- B. Downcomer temperature rises as reactor power rises. Water in the reactor vessel downcomer allows more neutron leakage. Therefore, indicated power will be higher than heat balance calculations.
- C. Downcomer temperature lowers as reactor power rises. Water in the reactor vessel downcomer will allow more neutron leakage. Therefore, indicated power will be higher than heat balance calculations.
- D. Downcomer temperature rises as reactor power rises. Water in the reactor vessel downcomer acts as a better reflector thereby reducing neutron leakage. Therefore, indicated power will be lower than heat balance calculations.

39. The plant is in Mode 5 with the following conditions:

- A Laundry Shower Sump Tank is being released.
- All SW RW pumps are secured.
- RM-L2/L7 Valve/Pump interlock bypass switch is selected to "Bypass".
- RM-L7 is reading below the warning setpoint.
- RM-L2 is in High Alarm.
- WDV-891 and WDV-892, liquid release isolation valves, are open.
- SDV-90, release isolation valve is closed.

Based on the conditions above, which of the following statements describes the associated plant response?

- A. A high radiation condition has been detected and the release has been terminated by closure of SDV-90, release isolation valve.
- B. Normal release radiation conditions are indicated and the release is continuing through WDV-891 and WDV-892, liquid release isolation valves.
- C. Normal release radiation conditions are indicated but the selection of the RM-L2/L7 valve/pump interlock bypass key switch to "bypass" has resulted in termination of the release by closure of SDV-90, release isolation valve.
- D. A high radiation condition has been detected, the release has failed to terminate and is continuing through WDV-891 and WDV-892, liquid release isolation valves.

40. The SPO is performing a condenser air in-leakage test in accordance with OP-607. ARP-1A has been selected to the recirculation mode and ARV-42, AR-32-FI isolation, is open.

Which of the following would be the adverse effect of maintaining this configuration for an extended period of time (>5 minutes)?

- A. ARP-1A temperatures will begin to increase. Overheating of the pump motor could result.
- B. RMA-12 will read high due to low dilution flow through the monitor.
- C. Condensation could build up in the ARP-1A exhaust line and cause a loss of the seal.
- D. Having ARP-1A in recirculation for > 5 minutes will send an auto-start signal to ARP-1B.

41. Step 3.5 in EOP-4, Inadequate Heat Transfer states:

Notify PPO to CONCURRENTLY PERFORM EOP-14, Enclosure 2, PPO Post Event Actions.

Which of the following is a reason that this enclosure is being performed?

- A. Early containment hydrogen monitoring is required if High Pressure Injection is used during this casualty.
- B. Waste Sampling Valve operation is required for determining the presence of boron precipitation.
- C. The high point vents may be needed if the Power Operated Relief Valve fails to open.
- D. The High Pressure Injection recirculation valves need power to enable the automatic functions associated with these valves.

42. Which one of the following parameters is controlled to limit the amount of iodine in the RB atmosphere following a LOCA?

- A. The volume of galvanized metal inside containment.
- B. The volume of aluminum inside containment.
- C. The pH of the RB sump.
- D. The temperature of the RB atmosphere.

43. Control complex ventilation was in the following alignment before the iodine channel of RM-A5 went into high alarm:

- Emergency duty supply fan AHF-18A is running.
- Control complex return fan AHF-19A is running.
- Controlled access area exhaust fan AHF-20A is running in fast.
- Controlled access area chemical laboratory supply fan AHF-30 is running.
- Sampling hood exhaust fan AHF-44A is running.

Which fans are still running after the RM-A5 actuation?

- A. AHF-18A, AHF-19A
- B. AHF-20A, AHF-30
- C. AHF-18A, AHF-30
- D. AHF-19A, AHF-20A

44. DPDP-1A is de-energized due to an internal fault on the bus coincident with a Loss of Offsite Power.

Based on these conditions which of the following describes the status of EDG-1A and the EFIC system?

- A. EDG-1A will start and load on the bus; the 'A' and 'C' EFIC cabinet will lose power.
- B. EDG-1A will start and come up to speed but its output breaker will remain open; the 'A' and 'C' EFIC cabinet will *not* lose power.
- C. EDG-1A will start and load on the bus; the 'A' train EFIC control valves will fail full open.
- D. EDG-1A will start and come up to speed but its output breaker will remain open; the 'B' train EFIC block valves will fail as is.

45. Which of the following control room indications is available to determine if any of the 52 Core Exit Thermocouples have failed low?

- A. Plant computer core map diagram.
- B. Flashing incore temperature on the SPDS screens.
- C. Flashing indication on the extended range core exit thermocouple display.
- D. Eurothermal Chessel Temperature recorder displays 000 for any of the 52 CETs failing down scale.

46. Reactor power has been reduced to 80% to investigate indicated Main Feedwater flow oscillations in the "A" loop. With the plant stable at this power, the "A" Main Feedwater flow transmitter fails low. Assuming no SASS transfer occurs, which of the following describes the expected ICS response to this failure? Consider the results if the transient is allowed to continue for at least one minute.

- A. ICS will increase FW to both OTSGs. Reactor Power will decrease.
- B. ICS will increase FW to the "A" OTSG and decrease FW to the "B" OTSG. Reactor Power will decrease.
- C. ICS will increase FW to both OTSGs. Reactor Power will increase.
- D. ICS will increase FW to the "A" OTSG and decrease FW to the "B" OTSG. Reactor Power will increase.

47. The following plant conditions exist:

- The nuclear services surge tank level is slowly decreasing.
- SWV-277 (SW Surge Tank fill valve) is full open.
- The RO has estimated the SW leak rate to be in excess of 80 gpm.
- The reactor building and auxiliary building sump levels are not increasing.
- All nuclear services heat exchangers have been rotated into operation with no change in conditions.
- RCS makeup, letdown and MUT level are steady.
- There are no reactor building system leak annunciators in alarm.

Where is the location of the SW leak?

- A. The reactor coolant drain tank.
- B. The industrial cooling system.
- C. The primary sample cooler.
- D. The in-service reactor coolant pump seal return cooler.

48. The following plant conditions exist:

- The plant is at 90% power.
- Seal injection flow has been lost.
- RCP-1B vibrations are in the "action" range on one monitor and in the "alert" range on another monitor for the same parameter.
- Cooling water leaving RCP-1B is 184° F.
- Thrust bearing temperatures for RCP-1B are 184° F.

Which of the following actions are required to be taken for the above conditions?

- A. Trip RCP-1B immediately.
- B. Secure RCP-1B after reducing power to 75%.
- C. Start available lift oil pumps for RCP-1B and notify engineering.
- D. Trip the reactor, enter EOP-02, complete all of the immediate actions of EOP-02, then trip RCP-1B.

49. The following plant conditions exist on Monday 12-01-00

- 0715 the Plant Auxiliary Bus is de-energized due to an internal fault.
- 0800 a failure of Pressurizer heater Banks A and B causes a plant transient.
- 0807 Pressurizer level is 298 inches and steady.
- 0808 Pressurizer heater banks A and B are de-energized from their MCC.
- 0842 Pressurizer level is 289 and being lowered to 220 inches.

Which of the following describes the Technical Specification actions, if any, that would be required for this transient?

- A. All parameters meet ITS LCO conditions. No action is required.
- B. Pressurizer level must be returned to 220" by 0907 on 12-01-00.
- C. Additional pressurizer heater capacity must be recovered by 0808 on 12-04-00.
- D. The Plant Auxiliary Bus must be recovered by 0715 on 12-04-00.

50. The following plant conditions exist:

- Plant is operating \approx 20% power
- Both Main Feedwater Loop Master Hand/Auto stations are in HAND
- SUCV position \approx 95% open.
- LLCV position \approx 5% open

I&C technicians have requested that the "B" train SUCV and LLCV hand/auto stations be taken to hand in order to record some data on the proportional/integral module supplying the input to these stations. Permission is received and these stations are placed in manual.

Which of the following describes the minimum required actions to return the FW control valve stations to automatic?

- A. Place the SUCV in auto first, then place the LLCV in auto.
- B. Place the LLCV in auto first, then place the SUCV in auto.
- C. Place the "B" Loop Master Hand/Auto station into auto first. Then place the SUCV to auto second and the LLCV to auto third.
- D. Place both Loop Master Hand/Auto stations into auto first. Then place the LLCV to auto second and the SUCV to auto third.

51. With the plant in Mode 1, the following sequence of events has occurred:

- A failure in the 'A' inverter (VBIT-1A) has caused its transfer switches (VBXS-1A and VBXS-3A) to automatically swap to the alternate power supplies.
- Operations manually bypasses the inverter and transfer switches to assist troubleshooting activities.
- Electricians replace a circuit board and report that the inverter is functioning properly and ready to supply the vital buses.

Prior to re-alignment of the inverter and transfer switches which of the following describes the operability condition for this equipment?

- A. The vital buses and inverter are *operable*.
- B. The vital buses and inverter are *inoperable*.
- C. The vital buses are *operable* but the inverter is *inoperable* until the transfer switches are placed back in service.
- D. The inverter is *operable* but the vital buses are *inoperable* until the transfer switches are placed back in service.

52. A reactor startup is in progress with VBDP-6 de-energized. While increasing power the following Nuclear Instrumentation indications are noted:

- NI-3 5×10^{-8} amps
- NI-5 3%
- NI-6 4%
- NI-7 3%
- ~~- NI-8 2%~~ *DELETE THIS INFORMATION
CML 9-22-00*

What action(s), if any, must be taken?

- A. NI-4 is the only inoperable NI; restore NI-4 to operable status prior to entry into Mode 1..
- B. NI-4 is the only inoperable NI; all required ITS actions are addressed by the Electrical Distribution Systems ITS action statement.
- C. Both NI-3 and NI-4 are inoperable. Control rod drive breakers must be opened within one hour if this condition persists.
- D. Both NI-3 and NI-4 are inoperable. One intermediate range NI must be restored to operable status prior to entry into Mode 1.

53. Given the following conditions:

- The plant is at 100% power.
- SP-181, Containment Air Lock Test, is in progress on the personnel hatch.
- The ISI test engineer informs you the personnel hatch has failed its leak rate test by leaking at a rate greater than the acceptance criteria of 22,200 SCCM.
- There are indications of leakage around the shaft of the handwheel for operating the outer hatch.
- The inner hatch's seal is degraded to the point that the test engineer can feel air passing by.

What are the required actions and the condition of containment integrity?

- A. Verify both doors are closed and initiate repairs. Containment integrity may not exist.
- B. Verify either door is closed and initiate repairs. Containment integrity does not exist.
- C. Evaluate overall containment leakage rate and verify one door is closed. Containment integrity may not exist.
- D. Be in Mode 3 in 6 hours; and Mode 5 in 36 hours. Containment integrity does not exist.

54. An electrical fault has resulted in ES MCC 3AB being de-energized. Which of the following components will be unavailable as a result of this malfunction?

- A. Reactor Building Air Handling Fan 1C (AHF-1C)
- B. Nuclear Services Raw Water Pump 1C (RWP-1C)
- C. Inverter 1C (VBIT-1C)
- D. Make-up Pump 1C Main Lube Oil Pump (MUP-2C)

55. A large rupture (> 3000 scfm) of the Station Air header has just occurred. What will be the initial operator actions or automatic system response?

- A. Enter AP-470, Loss of Instrument Air, and follow the guidance for ensuring automatic IA system responses have occurred.
- B. The back up sir system will activate and provide up to 500 scfm of air for approximately 30 minutes through IAV-30.
- C. SAV-6 will open and bypass flow through SAV-6 will maintain instrument air pressure using back up air supply.
- D. The discharge of the diesel driven air compressor will be directed to the station air header by the opening of SAV-6.

56. The following plant conditions exist following an extended Station Blackout :

- Reactor Coolant Pressure is 210 psig.
- Incore temperatures average 805°F.
- Reactor Building Spray is not operating.
- RM-G29 has read 120 R/hr for 30 minutes.
- RM-G30 has read 150 R/hr for 10 minutes.
- RM-A2, Auxiliary Building Ventilation Exhaust Duct Monitor, is in high alarm.
- Berm surveys indicate 600 mR/hr.
- Reactor Building water level is 4.3 feet.

What are the recommended protective actions, if any, for Zones 1, 2 and 3?

- A. No protective action recommendation is required.
- B. Evacuate Zone 1 only.
- C. Evacuate Zone 1 and Shelter Zones 2 and 3.
- D. Evacuate Zone 1 and Evacuate Zones 2 and 3.

57. During a plant transient the RO observes the following Subcooling Margin indications on both of the Subcooling Margin monitor screens on SPDS.

The number 10 is displayed in yellow as a negative value.

Which of the following describes the status of RCS Subcooling indicated by this display?

- A. The RCS is approximately 10 degrees above the adequate subcooling margin line.
- B. The RCS is approximately 10 degrees below the adequate subcooling margin line.
- C. The RCS is approximately 10 degrees above the saturation line.
- D. The RCS is approximately 10 degrees below the saturation line.

58. Following an overcooling accident the following conditions exist:

- EFIC has actuated
- EFIC has been bypassed on all 4 channels
- EFW is the only FW source to the OTSGs
- "A" OTSG level is 14".
- "A" OTSG pressure is 400 psig.
- "B" OTSG level is 32".
- "B" OTSG pressure is 900 psig.
- RCS pressure is 1900 psig
- RCP-1A is shutdown.

Which of the following describes how EFIC will control the fill rate for "A" OTSG?

- A. EFIC will attempt to fill the "A" OTSG as quickly as possible (no rate limit) until Low Level Limit conditions are established.
- B. EFIC will attempt to fill the "A" OTSG as quickly as possible (no rate limit) until OTSG pressure is above 600 psig.
- C. EFIC will raise the level in "A" OTSG at a rate between 2" and 8" per minute based on OTSG pressure.
- D. EFIC will raise the level in "A" OTSG at a rate between 2" and 8" per minute based on RCS cooldown rate.

59. Following a loss of off-site power the following plant conditions exist:

- The "A" 4160V ES bus is being supplied from its respective diesel generator.
- The "B" 4160V ES bus is dead.
- Both steam generators (OTSGs) have a pressure of 800 psig.
- The Condensate Storage Tank level is 20 feet.
- Annunciator window H-08-03, EF PUMP 3 START FAILURE, is lit.
- Annunciator window H-07-04, EF PUMP 2 TRIP, is lit.

As procedure director, which of the following feedwater sources will you direct the RO to establish?

- A. EFP-1, Motor Driven Emergency Feedwater Pump.
- B. FWP-7, Auxiliary Feedwater Pump.
- C. EFP-2, Steam Driven Emergency Feedwater Pump.
- D. FWP-2A or FWP-2B, either of the Main Feedwater Pumps.

60. From a 100% power condition, a small break loss of coolant accident (LOCA) due to a letdown line break has resulted in a plant trip and loss of adequate subcooling margin. The following conditions exist:

- HPI has been initiated.
- Pressurizer level dropped to 17"
- Pressurizer level is now 50"
- Adequate subcooling margin has been restored.

Which of the following is a reason that RCS pressure may begin to decrease during this event?

- A. The SCR controlled Pzr heaters are de-energized.
- B. A continuous pressurizer insurge is occurring.
- C. Pressurizer spray valve bypass flow has increased.
- D. OTSG heat removal is inadequate for current plant conditions.

61. The following plant conditions exist:

- A Station Blackout has occurred.
- The Offsite Transformer is available.
- The "B" Emergency Diesel Generator is tagged out for maintenance
- Annunciator Q-02-03, Diesel Generator "A" Breaker Closed, is in alarm but Breaker 3209, "A" EDG 4160V ES Bus Supply Breaker has reopened.
- Electricians have reported that there is not fault on the "A" 4160V ES bus.

Which of the following actions by itself is sufficient to allow closure of Breaker 3211, "A" Offsite Transformer 4160V ES Bus Supply Breaker, and energize the "A" ES 4160V ES Bus?

- A. Defeat the "A" 4160 V ES Bus lockout.
- B. Depress the "4160V ESA UV Reset" pushbutton.
- C. De-energize the undervoltage relay for the "A" 4160V ES Bus.
- D. De-energize the DC control circuit for Breaker 3209.

62. The following conditions existed:

- A failure of RCS pressure control (Pzr heater control and Spray) induced a plant transient.
- At one point in this transient RCS pressure decreased to 1990 psig with Tave at 594°F, reactor inlet temperature 572°F and reactor outlet temperature 616°F.

Ten minutes following the onset of the transient the operating crew manually restored normal RCS conditions. Power remained at approximately 100% throughout this transient.

Which of the following is the limiting ITS required action and completion time for this transient?

- A. Normal conditions were re-established within the ITS 2 hour time limit. No additional actions are required.
- B. The plant should be in Mode 3 within 6 hours and have all CRD Breakers open within that same 6 hours.
- C. Actions should be initiated within 1 hour to place the plant in Mode 3 within 7 hours, Mode 4 within 13 hours and Mode 5 within 37 hours.
- D. ITS requires that actions be initiated to place the plant in Mode 3 within 1 hour.

63. The core is at 480 Effective Full Power Days (EFPD). A review of the SP-300 readings for the Control Room lists the following Nuclear Instruments (NI) readings:

NI-5 90%
NI-6 89%
NI-7 90%
NI-8 99%

Assuming these readings are the result of control rod misalignment, which of the following actions must be taken?

- A. Perform power peaking factors surveillance once per 2 hours and restore Quadrant Power Tilt (QPT) to less than or equal to the steady state limit in 24 hours.
- B. Reduce thermal power $\geq 2\%$ RTP from allowable thermal power for each 1% of QPT greater than the steady state limit in 30 minutes AND restore QPT to less than or equal to the transient limit in 2 hours.
- C. Reduce thermal power $\geq 2\%$ from the allowable thermal power for each 1% of QPT greater than the steady state limit in 2 hours and reduce nuclear overpower trip setpoint and nuclear overpower based on reactor coolant system flow and axial power for each 1% of QPT greater than the steady state limit in 10 hours.
- D. Reduce thermal power to $< 60\%$ of the allowable thermal power in 2 hours and reduce overpower trip setpoint to $\leq 65.5\%$ of the allowable thermal power in 10 hours.

64. A step in EOP-06, Steam Generator Tube Rupture, states:

IF at any time PZR level is < 100 in,
THEN trip Rx and **GO TO** EOP-02, Vital System Status Verification, beginning with step 2.1.

Which of the following is the reason for tripping the reactor under these conditions?

- A. To prevent reduced RCS pressure control.
- B. To reduce RCS leakage.
- C. To prevent a loss of subcooling margin.
- D. To maximize the capacity of the RCS makeup system.

65. While the Operator-at-the-Controls is performing the immediate actions of EOP-02, Vital System Status Verification, the following plant conditions exist:

- Reactor Building pressure is 5.3 psig.
- RCS pressure is 1860 psig.

Which of the following actions may be taken by the Balance-of-Plant operator without the concurrence from the Procedure Director?

- A. Bypass the Engineered Safeguards actuation.
- B. Shutdown both running Decay Heat pumps.
- C. Start the "A" Nuclear Services Closed Cycle Cooling Water pump which failed to start on an ES actuation.
- D. Make a Public Address announcement of entry into EOP-02 to notify plant personnel.

66. Which of the following describes the direct signal that decreases condensate flow demand on a loss of one MFW pump at 80% power?

- A. A signal from the deaerator high level interlock.
- B. A runback signal from the ULD sub-section of the ICS.
- C. A signal that compares existing CD flow with FW flow and hotwell level.
- D. A signal that compares existing CD flow with FW flow and deaerator level.

67. The Make-up Tank (MUT) low pressure alarm has just actuated with the level at 80 inches. Which of the following is the required pressure to operate in the preferred region without receiving further MUT alarms?

- A. 15 psig
- B. 17 psig
- C. 19 psig
- D. 21 psig

68. Following a loss of off site power, what are the indications, if any, that Control Rod groups 1 through 7 are fully inserted?

- A. The CRD panel is de-energized, there are no indications that CRD groups 1 through 7 are fully inserted.
- B. All in-limit lights on the position indication panel and the diamond control panel are on.
- C. Only the in-limit lights on the position indication panel are on.
- D. Only the in-limit lights on the diamond control panel are on.

69. The plant was at 100% full power when a loss-of-offsite power occurred. The following plant conditions exist:

- Emergency feedwater is maintaining the steam generator levels at approximately 72%.
- SPDS indicates subcooling margin is green and 37.
- EOP-02, Vital System Status Verification, immediate actions are complete.

As Procedure Director, which of the following describes your procedural flowpath during these conditions?

- A. Exit EOP-02.
Transition to AP-770, Emergency Diesel Generator Actuation.
Route from AP-770 to EOP-09, Natural Circulation Cooldown
- B. Exit EOP-02.
Transition to AP-770, Emergency Diesel Generator Actuation.
Route from AP-770 to OP-209, Plant Cooldown.
- C. Complete applicable follow-up steps of EOP-02.
Route to EOP-10, Post-Trip Stabilization.
Route from EOP-10 to OP-209, Plant Cooldown.
- D. Complete applicable follow-up steps of EOP-02
Route to EOP-10, Post Trip Stabilization,
Route from EOP-10 to EOP-09, Natural Circulation Cooldown.

70. The following plant conditions exist:

- A controlled plant shutdown is in progress due to a shaft failure of RWP-2A.
- The reactor is critical with RCS temperature at 545°F
- PZR level is 95"
- The SPO reports that CWTS-2 is completely clogged with debris and will not start and the flume water level is almost empty.

Based on these conditions, which of the following actions should be performed and what is the reason for performing the action?

- A. Continue the shutdown and inform maintenance of the problem.
Redundant equipment is available to compensate for CWTS-2 fouling,
- B. Trip the reactor and initiate EFIC due to the loss of Circulating Water cooling to the Condenser.
- C. The reactor should be tripped due to pressurizer level being under 100 inches.
- D. The reactor should be tripped due to a loss of Nuclear Services Raw Water flow.

71. While performing an EOP the Procedure Director reaches a step which states that the PPO is to be notified to perform a portion of the step.

Which of the following describes the person who should give this direction and the form in which the direction should be given?

- A. The Procedure Director should state all step actions, including the details, to the PPO.
- B. The Procedure Director should state the task and read the applicable step and detail number to the PPO.
- C. The Reactor Operator should read the entire step, including the details, to the PPO.
- D. The Reactor Operator should state the task and read the applicable step and detail number to the PPO.

72. During Mode 5 operation, the following plant status exists:

- "A" Decay Heat Pump (DHP-1A) is running with flow set to be controlled at 3000 gpm.
- Actual flow is fluctuating between 3000 and 2000 gpm.
- Observed DHP-1A motor amps are fluctuating.
- DHP-1B is not running but available.
- A-03-06 DECAY HEAT A PUMP LOW FLOW, is in alarm.

What actions should be taken for these conditions?

- A. Flow is too low, increase DHP-1A flow by throttling open DHV-110.
- B. Readjust DHP-1A amp monitor; the alarm setpoint is too high.
- C. Stop DHP-1A, it is not operating properly and immediately start DHP-1B.
- D. Stop DHP-1A and do not start a DHP until the cause for the conditions are corrected.

73. The Primary Plant Operator (PPO) reports the following Spent Fuel (SF) component readings:

- SF-9-FIT, SF cooling water flow is 880 gpm.
- SF-2FI, SF purification flow is 100 gpm.
- SF purification temperature is 129°F.
- SF Demineralizer Delta-P is 15 psid.
- SFP-1B is out-of-service for maintenance.
- Nuclear Services Cooling Water (SW) flow to the in-service SF cooler is 1000 gpm.

Which of the following is a valid reason for stopping SFP-1A?

- A. To protect the in-service SF cooler
- B. To protect the demineralizer resin
- C. To protect SFP-1A from being damaged
- D. To protect the demineralizer from inadequate flow

74. RM-G30 has been inoperable for 32 days. With the plant at full power, what technical specification action is required?

- A. No technical specification action is required as long as RM-G29 remains operable.
- B. RM-G30 should be repaired immediately or a special report will be required in the next 14 days.
- C. RM-G30 should be repaired in 7 days or power must be reduced to less than 60% of Rated Thermal Power within the next 6 hours.
- D. A special report is required to be generated and submitted within the next 12 days.

75. The Reactor Operator has made the following log entries in Mode 5:

- 0800 Startup "A" Decay Heat Train for core cooling. Shutdown "B" Decay Heat Train.
- 0820 DHP-1B and RWP-3B tagged for pump rebuild. RWP-1, RWP-2A and RWP-2B removed from service for SW-RW discharge header repair.
- 0910 "A" ECST release started permit # 000117.001.238.L.
- 0925 RWP-3A trips. Entered AP-404.
- 0930 PPO reports that the shaft has sheared on RWP-3A.
- 0930 NSM enters E-plan for Inability to Maintain Plant in Cold Shutdown, Alert declared.
- 1015 DHR re-established using OTSG cooling; E-plan exited.

At 1045 the RO notices that the release is still in progress and notifies you the Nuclear Shift Manager. After having the release secured, which of the following actions, if any, will apply?

- A. No actions are required, the release has been terminated.
- B. Have sample analysis performed to effluent to determine if any ODCM limits have been exceeded.
- C. Declare an Alert.
- D. Declare an Unusual Event.

76. Following an automatic Engineered Safeguards HPI actuation the RO notes that MUV-23 and MUV-24 (High Pressure Injection Valves) have lost power. Which of the following casualties is the reason for this loss of power?

- A. An electrical short has developed on VBDP-5
- B. An electrical short has developed on ES MCC 3B1
- C. A fire in the hallway between the PPO office and the entrance to the Control Complex / Chemistry Area.
- D. A fire in the hallway between the Make-up and Purification Pre-filter room and the Auxiliary Building Elevator.

77. Which of the following will require a notification to the NRC within a maximum of four (4) hours?

- A. Axial power imbalance is -61% at 92% power.
- B. State of Florida notification following the death of 7 turtles (endangered species) on the bar racks.
- C. Apprehension by security of 2 persons selling cocaine in the Ready Warehouse.
- D. The hospitalization of two employees following a crane accident in the Turbine Building.

78. During Mode 5 the following plant conditions exist:

- DHP-1A, "A" Decay Heat Removal Pump, is in service.
- DHP-1B, "B" Decay Heat Removal Pump, is operable but not in service.
- RCS level is 130 feet 4 inches.

DHP-1A trips, and the following actions have been taken:

- The RB has been evacuated
- Personnel notifications have been made.
- All 480V bus backfeed breakers are open.

Which of the following describes the proper sequence of remaining actions for this transient?

- A. Start DHP-1B and exit AP-404.
- B. Fill the RCS to ≥ 130.6 feet, fill and vent DHP-1B and start DHP-1B.
- C. Start DHP-1B, ensure RB cooling is established and establish containment closure.
- D. Establish containment closure, fill the RCS to ≥ 130.6 ft., ensure RB cooling is established and start DHP-1B.

79. On September first Nuclear Services Closed Cycle Cooling (SW) was lost to all Main RB Air Handling Fans (AHF-1A,B and C). Two Main RB Air Handling Fans are running with cooling water being supplied by Industrial Cooling (CI). The following containment average air temperatures have been recorded using the plant computer:

0800	SW flow is lost and fans are transferred to CI. - 119.6° F
0900	123.4° F
1000	130.1° F
1100	135.8° F
1200	140.6° F
1300	141.4° F
1400	143.9° F
1500	145.1° F
1600	145.2° F
1700	145.2° F

Assuming that RB conditions remain at approximately 145° F, which of the following statements describes the required operational mode and maximum allowable time to achieve that operational mode?

- A. Mode 3 at 1800 on September first
- B. Mode 3 at 2400 on September first.
- C. Mode 5 at 2400 on September second.
- D. Mode 5 at 0400 on September third

80. The initial power escalation following a refueling outage is being performed. The reactor power level is stabilized to perform testing. The following indications are available to the operator at the control board:

NI-5	26.0%
NI-6	29.0%
NI-7	26.0%
NI-8	29.0%

T-hot Loop A	588.5° F
T-hot Loop B	588.0° F
T-cold Loop A	569.5° F
T-cold Loop B	570.0° F
Tave	579.0° F

Which of the following is an accurate estimate of the thermal power level of the reactor at this point?

- A. 363 MWt
- B. 661 MWt
- C. 738 MWt
- D. 1041 MWt

81. A step in EOP-08, LOCA Cooldown, states:

IF at any time, all the following exist:

- Adequate SCM
- High PRESS Aux spray desired
- ICC Region 3 NOT previously entered

THEN CONCURRENTLY PERFORM EOP-14, Enclosure 13,
High PRESS Aux Spray Lineup (if accessible).

The Reactor Coolant Pumps are not running and a Reactor Coolant System pressure reduction is desired. If the Health Physics department says the RM-A6 area is *not accessible*, which of the following actions should you take as the Procedure Director?

- A. Hold at this step and arrange for shielding and / or system flushes to make the area accessible.
- B. Contact the TSC for further guidance.
- C. Implement 10 CFR 50.54X and determine an alternate method of aligning High Pressure Aux. Spray with equipment that is both accessible and available.
- D. Do NOT perform the enclosure, continue on in EOP-8.

82. The "A" 4160V ES bus is aligned to the Offsite Power transformer and the "B" 4160V ES bus is aligned to the BEST transformer. The "B" EDG is started for the monthly operability test, SP-354B, Monthly Functional Test of the Emergency Diesel Generator EGDG-1B. What impact, if any, will this have on the AC electrical distribution system?

- A. Diesel Cross-tie blocking prevents closure of the "A" EDG output breaker.
- B. Diesel Cross-tie blocking prevents closure of the Off-site Power Transformer feeder breaker to the "B" 4160V ES bus.
- C. Diesel Cross-tie blocking prevents closure of the BEST feeder breaker to the "A" 4160V ES bus.
- D. Diesel Cross-tie blocking will not be in effect; no interlocks will be actuated.

83. The following conditions exist:

- The plant is in Mode 5 following a refueling outage.
- SP-370, Quarterly Cycling of Valves, is being conducted.
- The operators testing CAV-2, Pressurizer and Letdown combined sample containment isolation, report that it has not met the requirements specified on its engineering data sheet.

What action(s), if any, should be taken prior to entry into Mode 4?

- A. No action is required prior to entry into Mode 4.
- B. Ascension into Mode 4 is prohibited until CAV-2 is repaired.
- C. Close CAV-2 and de-energize within 4 hours of entering Mode 4.
- D. Isolate the penetration associated with CAV-2 prior to entering Mode 4.

84. The following plant conditions exist:

- The plant is in Mode 5.
- The operating decay heat pump, DHP-1A, trips on overload.
- The standby decay heat pump, DHP-1B, is started, cavitates and trips.
- Reactor coolant level is 131'.
- Reactor coolant temperature is 93°F.
- Upper hand holds on the steam generators are removed.

Based on these conditions, which of the following methods should be used to restore core heat removal?

- A. Establish decay heat removal with DHP-1A.
- B. Establish high pressure injection.
- C. Establish fuel transfer canal fill.
- D. Establish decay heat removal using spent fuel cooling.

85. The following plant conditions exist:

- The plant is at 100% power.
- The turbine is selected to the "A" steam header pressure transmitter for control.

Which statement below describes the expected ICS/SASS response to a low failure of the selected "A" turbine header pressure transmitter coincident with a reactor trip? (Assume no operator actions)

- A. SASS will transfer the "A" header pressure input for the turbine and bypass valves to the unaffected transmitter.
- B. SASS will transfer the "A" header input to the turbine to the unaffected transmitter. The bypass valves will be demanded closed.
- C. SASS will transfer the header input to the turbine and bypass valves to the "B" steam header pressure transmitter.
- D. SASS will transfer the header input for the turbine to the "B" steam header pressure transmitter. The bypass valves will be demanded closed.

86. EOP-7, Inadequate Core Cooling, directs the operator to "Open all high point vents" when incore temperatures have reached region 3.

Which of the following is the reason this is done?

- A. This provides an additional flow path to assist HPI/PORV cooling in controlling/reducing core temperatures.
- B. This reduces reactor coolant system pressure allowing increased flowrates from a running injection system.
- C. This allows better control of reactor coolant pressure while maintaining it above OTSG pressure.
- D. This provides a vent path for non-condensable gasses that may be restricting natural circulation.

87. Which of the following is the order in which the Main Feedwater system is placed in service during a Plant Heatup (OP-202)?

- A.
 - 1. Long cycle clean-up is completed with the Feedwater Booster Pumps.
 - 2. Main Feedwater Pumps are placed on turning gear.
 - 3. The Start-up Feedwater Block Valves are opened.
 - 4. One Main Feedwater Pump is started.

- B.
 - 1. Main Feedwater Pumps are placed on turning gear.
 - 2. Long cycle clean-up is completed with the Feedwater Booster Pumps.
 - 3. One Main Feedwater Pump is started.
 - 4. The Start-up Feedwater Block Valves are opened.

- C.
 - 1. Main Feedwater Pumps are placed on turning gear.
 - 2. The Start-up Feedwater Block Valves are opened.
 - 3. Long cycle clean-up is completed with the Feedwater Booster Pumps.
 - 4. One Main Feedwater Pump is started.

- D.
 - 1. Main Feedwater Pumps are placed on turning gear.
 - 2. Long cycle clean-up is completed with the Feedwater Booster Pumps.
 - 3. The Start-up Feedwater Block Valves are opened.
 - 4. One Main Feedwater Pump is started.

88. Given the following plant conditions:

No OTSG cooling is available.

EOP-4 was entered due to increasing incore temperatures.

1 RCP/loop is running.

Incore temperatures are 563°F.

RCS pressure is 2010 psig.

While attempts to recover OTSG cooling are in progress, incore temperature increases to 616°F and RCS pressure increases to 2286 psig. The SRO has just directed you to stop all RCPs. What is the basis of this action?

- A. RCPs must be secured to ensure continued core cooling capability.
- B. RCPs must be secured to prevent seal failure and loss of RCS inventory.
- C. RCPs must be secured to prevent achieving excessive OTSG tube to shell differential temperatures.
- D. RCPs must be secured to reduce overall RCS heat input.

89. Which of the following radiological incidents would require the NRC to be notified within 24 hours of discovery?

- A. While inspecting a contaminated motor, an electrician receives an eye dose equivalent of 11 rem in a 12 hour time period.
- B. During radiography of a main steam line, a plant engineer accidentally receives a whole body dose of 5.2 rem over an 8 hour time span.
- C. A Facility Serviceman receives a shallow dose equivalent of 34 rems to his hands while transporting a contaminated tool to the hot shop.
- D. Due to an unanticipated change in radiological conditions, a mechanic with a weekly limit of 1000 mrem receives a whole body dose of 2250 mrem in one day.

90. The plant is at full power with the following equipment OOS for maintenance:

- SCP-1A, Secondary Services Closed Cycle Cooling Pump
- IAP-3B, Instrument Air Compressor
- AHF-14C, Auxiliary Building Exhaust Fan
- Breaker 2D on 480V Rx Aux Bus 3A (CRD power supply)
- All other equipment is in its normal configuration.

Which of the following equipment clearances if approved would result in a required or automatic power change?

- A. IAP-4, Diesel Driven Air Compressor
- B. AHF-14A, Auxiliary Building Exhaust Fan
- C. Breaker 3B on MTSW-4, Berm 480V Switch Gear Main Breaker.
- D. Breaker 3312 power supply for 480V Plant Aux Bus

91. The following conditions exist:

- Preparations are underway to release WDT-1B, "B" Waste Gas Decay Tank
- RM-A11 has failed low.
- All other radiation monitors are functional.

Under what conditions may the release take place?

- A. Two independent samples of WDT-1B are analyzed and two qualified persons independently verify the release rate calculations and discharge valve lineup.
- B. A continuous sample of WDT-1B is analyzed and two qualified persons independently verify the release rate calculations and suction valve lineup.
- C. At least two grab samples of WDT-1B are analyzed and two qualified persons independently verify the release rate calculations and suction valve lineup.
- D. Samples are taken every 4 hours and analyzed while WDT-1B is being released and two qualified persons independently verify the release rate calculations and discharge valve lineup.

92. Which of the following conditions will cause an automatic trip of both Main Feedwater Pumps (FWP-2A & 2B) with the plant at 80% power?

- A. Deaerator level of two feet.
- B. Both suction valves are 75% open.
- C. Lube oil pressure of 7 psig on 2 of 3 pressure switches.
- D. "A" OTSG pressure < 600 psig.

93. Due to a switching error, both the 'B' and 'D' battery charger's output breakers have been opened. What is the expected status light indication on the 'B' vital bus inverter for this condition?

- | | | |
|----|------------------------------|-----|
| A. | Normal Source Available | ON |
| | Battery Source Available | ON |
| | Normal Source Supplying Load | ON |
| | Battery Supplying Load | OFF |
| | In Sync | ON |
| B. | Normal Source Available | ON |
| | Battery Source Available | OFF |
| | Normal Source Supplying Load | ON |
| | Battery Supplying Load | OFF |
| | In Sync | OFF |
| C. | Normal Source Available | OFF |
| | Battery Source Available | ON |
| | Normal Source Supplying Load | OFF |
| | Battery Supplying Load | ON |
| | In Sync | ON |
| D. | Normal Source Available | ON |
| | Battery Source Available | OFF |
| | Normal Source Supplying Load | ON |
| | Battery Supplying Load | OFF |
| | In Sync | ON |

94. Failures within the Engineered Safeguards Actuation System can lead to the ECCS Acceptance Criteria of 10CFR50.46 being exceeded. Which of the following is this acceptance criteria designed to preclude?

- A. Increased centerline fuel melt
- B. Increased Iodine-131 gap activity
- C. Accelerated cladding oxidation
- D. Exceeding 10CFR20 dose guidelines

95. The following plant conditions exist:

- A reactor startup is in progress
- The reactor is critical at 4 E-10 amps on both intermediated range instruments.
- NI-3 fails low.

Based on these conditions determine if SR/IR overlap could have been verified and the applicable TS actions.

- A. Adequate SR/IR overlap could *not* be determined prior to this failure. Immediately decrease power to ≤ 5 E-10 amps.
- B. Adequate SR/IR overlap could *not* be determined prior to this failure. Restore channel to operable status prior to increasing thermal power.
- C. Adequate SR/IR overlap could be determined prior to this failure. Restore channel to operable prior to entry into Mode 1.
- D. Adequate SR/IR overlap could be determined prior to this failure. Restore channel to operable status prior to increasing thermal power.

96. During a startup the plant has been stabilized at 75% power for NI calibration when the RO notes the following indications;

- CRD out motion light illuminated
- CRD Group API and RPI indicate group out motion
- The "FW Limited by Reactor" annunciator alarm has just come in.
- Reactor Power is increasing.

To prevent further out motion, the RO depresses the "Sequence / Sequence override" pushbutton on the diamond control panel.

Which of the following describes the results of this action and the reason for those results?

- A. Rod motion will continue because the "Sequence / Sequence override pushbutton does not function with the CRD system in automatic.
- B. Rod motion will continue because even though the diamond control will be in Sequence override, only a single rod group is commanded to move.
- C. Rod motion will stop because having the diamond control station in Sequence override will force the diamond station to manual and remove insert and withdrawal signals to all rods.
- D. Rod motion will stop because having the diamond control station in Sequence override forces the Rx Demand station into "mini-track" which removes all rod withdrawal signals.

97. The following conditions exist:

- A reactor startup power is in progress.
- All source range and intermediate range instruments are on scale and indicating.

During rod withdrawal the RO notes the following readings:

NI-1 Start-up Rate - 0.4 DPM
NI-2 Start-up Rate - 0.4 DPM
NI-3 Start-up Rate - 0.4 DPM
NI-4 Start-up Rate - 0.7 DPM

Which of the following explains the reason for these readings and describes how the readings will change as power increases?

- A. NI-4 has its compensating voltage set too high. As power increases the difference between NI-4 Start-up Rate and the Start-up Rate on the other NIs will increase.
- B. NI-4 has its compensating voltage set too low. As power increases the difference between NI-4 Start-up Rate and the Start-up Rate on the other NIs will increase.
- C. NI-4 has its compensating voltage set too high. As power increases the difference between NI-4 Start-up Rate and the Start-up Rate on the other NIs will decrease.
- D. NI-4 has its compensating voltage set too low. As power increases the difference between NI-4 Start-up Rate and the Start-up Rate on the other NIs will decrease.

98. The following conditions exist:

- A reactor startup is in progress.
- Control rod groups 1 through 3 are fully withdrawn.
- Group 4 rod withdrawal is stopped at 48%
- Source range NI counts are 540 cps and slowly increasing on NI-1 and NI-2
- Start-up rate is 0.2 DPM and constant on NI-1 and NI-2
- All rod motion has been stopped

Which of the following states the appropriate actions for the conditions stated above?

- A. Monitor the increasing count rate and verify power stabilizes below the point of adding heat before continuing rod withdrawal.
- B. Insert group 4 control rods, verify a Shutdown Margin of more than 1% exists and inform the Reactor Engineer of plant conditions.
- C. Insert groups 1 through 4 sequentially, request Chemistry to resample the RCS for boron concentration, and recalculate the ECP.
- D. Trip the reactor and enter EOP-2, Vital System Status Verification.

99. The following conditions currently exist:

- CR-3 is recovering from a small break LOCA.
- RCS conditions entered Region 3 of ICC before returning to Region 1.
- RCS pressure is 220 psig
- Incore temperature is 250°F
- Both Saturation Monitors are displaying +90 in green.
- LPI is aligned
- All RCPs are stopped.

Procedural direction is given to "Control OTSG heat transfer" to maintain cooldown to < 5°F per 1/2 hr . Which of the following statements describes the reason for this procedural direction?

- A. Cooldown is slowed to stabilize the RCS while preparations for RCP restart can be completed.
- B. Cooldown is slowed to minimize the thermal transient on the RCS and prevent increasing the size of the LOCA.
- C. Cooldown is slowed to limit Pressurizer outsurge which could cause a subsequent loss of adequate subcooling margin.
- D. Cooldown is slowed to limit the rate at which non-condensable gasses come out of solution in the RCS.

100. While de-fueling is in progress the following radiation monitors just came into alarm:

- RM-A4, Fuel Handling Building Ventilation Duct Monitor.
- RM-G14, Auxiliary Building Fuel Storage Pool Monitor.
- RM-G15, Auxiliary Building Fuel Handling Bridge Monitor.
- RM-A2, Auxiliary Building and Fuel Handling Exhaust Duct Monitor.

If a spent fuel assembly has just been dropped to the bottom of the Spent Fuel Pool, as the Spent Fuel Coordinator, what direction are you going to give first?

- A. Contact the Control Room to enter AP-250, Radiation Monitor Actuation.
- B. Contact the Control Room to enter AP-1080, Refuel Canal Level Lowering.
- C. Have the refueling crew begin a leak check for the Spent Fuel Pool Liner.
- D. Have the refueling crew immediately evacuate the Spent Fuel Floor.

KEYSRO																											
LAST NAME																											
A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	
H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	
I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	
K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	
L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	
M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	
V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	

FIRST NAME																										
A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J	J
K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K
L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z

MI	
A	A
B	B
C	C
D	D
E	E
G	G
H	H
I	I
J	J
K	K
L	L
M	M
N	N
O	O
P	P
Q	Q
R	R
S	S
T	T
U	U
V	V
W	W
X	X
Y	Y
Z	Z

SOCIAL SECURITY NO.											
0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9

TEST ID.			
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

SPECIAL CODES							
0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

GRADE	
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

SEX	
<input type="checkbox"/>	FEMALE
<input type="checkbox"/>	MALE

MONTH	DAY	YEAR
BIRTHDATE		
<input type="checkbox"/> JAN	<input type="checkbox"/> JUL	0 0 0 0
<input type="checkbox"/> FEB	<input type="checkbox"/> AUG	1 1 1 1
<input type="checkbox"/> MAR	<input type="checkbox"/> SEP	2 2 2 2
<input type="checkbox"/> APR	<input type="checkbox"/> OCT	3 3 3 3
<input type="checkbox"/> MAY	<input type="checkbox"/> NOV	4 4 4 4
<input type="checkbox"/> JUN	<input type="checkbox"/> DEC	5 5 5 5
		6 6 6 6
		7 7 7 7
		8 8 8 8
		9 9 9 9

MONTH	DAY	YEAR
TODAY'S DATE		
<input type="checkbox"/> JAN	<input type="checkbox"/> JUL	0 0 0 0
<input type="checkbox"/> FEB	<input type="checkbox"/> AUG	1 1 1 1
<input type="checkbox"/> MAR	<input type="checkbox"/> SEP	2 2 2 2
<input type="checkbox"/> APR	<input type="checkbox"/> OCT	3 3 3 3
<input type="checkbox"/> MAY	<input type="checkbox"/> NOV	4 4 4 4
<input type="checkbox"/> JUN	<input type="checkbox"/> DEC	5 5 5 5
		6 6 6 6
		7 7 7 7
		8 8 8 8
		9 9 9 9

IMPORTANT

USE NO. 2 PENCIL ONLY

- MAKE DARK MARKS
- ERASE COMPLETELY TO CHANGE
- EX: A C D E

A B C D

TO USE SUBJECTIVE SCORE FEATURE:

- Mark total possible subjective points
- Only one mark per line on key
- 150 points maximum

EXAMPLE OF STUDENT SCORE:

90	80	70	60	125
50	40	30	20	10
9	8	7	6	0
4	3	2	1	0

TEACHER	
SUBJECT	SRO KEY
HOUR	

(May be used with Test Scoring Machines or 48 channel)

FOR INSTRUCTOR USE ONLY

100	90	80	70	60
50	40	30	20	10
9	8	7	6	5
4	3	2	1	0

(T)	(F)	KEY
(%)	(2)	(3) (5)
1(A)	(B)	(D) (E)
2(A)	(B)	(C) (E)
3(A)	(B)	(C) (D) (E)
4	(B)	(C) (D) (E)
5(A)	(B)	(C) (D) (E)
6(A)	(B)	(C) (D) (E)
7(A)	(B)	(C) (D) (E)
8(A)	(B)	(C) (D) (E)
9(A)	(B)	(C) (D) (E)
10(A)	(B)	(C) (D) (E)
11(A)	(B)	(C) (D) (E)
12(A)	(B)	(C) (D) (E)
13(A)	(B)	(C) (D) (E)
14(A)	(B)	(C) (D) (E)
15	(B)	(C) (D) (E)
16	(B)	(C) (D) (E)
17(A)	(B)	(C) (D) (E)
18(A)	(B)	(C) (D) (E)
19(A)	(B)	(C) (D) (E)
20(A)	(B)	(C) (D) (E)
2		

	(T) (%)	(F) (2)	(3)	KEY —	(5)
51	(A)	(B)	(C)	(D)	(E)
52	(A)	(B)	(C)	(D)	(E)
53	(A)	(B)	(C)	(D)	(E)
54	(A)	(B)	(C)	(D)	(E)
55	(A)	(B)	(C)	(D)	(E)
56	(A)	(B)	(C)	(D)	(E)
57	(A)	(B)	(C)	(D)	(E)
58	(A)	(B)	(C)	(D)	(E)
59	(A)	(B)	(C)	(D)	(E)
60	(A)	(B)	(C)	(D)	(E)
61	(A)	(B)	(C)	(D)	(E)
62	(A)	(B)	(C)	(D)	(E)
63	(A)	(B)	(C)	(D)	(E)
64	(A)	(B)	(C)	(D)	(E)
65	(A)	(B)	(C)	(D)	(E)
66	(A)	(B)	(C)	(D)	(E)
67	(A)	(B)	(C)	(D)	(E)
68	(A)	(B)	(C)	(D)	(E)
69	(A)	(B)	(C)	(D)	(E)
70	(A)	(B)	(C)	(D)	(E)
71	(A)	(B)	(C)	(D)	(E)
72	(A)	(B)	(C)	(D)	(E)
73	(A)	(B)	(C)	(D)	(E)
74	(A)	(B)	(C)	(D)	(E)
75	(A)	(B)	(C)	(D)	(E)
76	(A)	(B)	(C)	(D)	(E)
77	(A)	(B)	(C)	(D)	(E)
78	(A)	(B)	(C)	(D)	(E)
79	(A)	(B)	(C)	(D)	(E)
80	(A)	(B)	(C)	(D)	(E)
81	(A)	(B)	(C)	(D)	(E)
82	(A)	(B)	(C)	(D)	(E)
83	(A)	(B)	(C)	(D)	(E)
84	(A)	(B)	(C)	(D)	(E)
85	(A)	(B)	(C)	(D)	(E)
86	(A)	(B)	(C)	(D)	(E)
87	(A)	(B)	(C)	(D)	(E)
88	(A)	(B)	(C)	(D)	(E)
89	(A)	(B)	(C)	(D)	(E)
90	(A)	(B)	(C)	(D)	(E)
91	(A)	(B)	(C)	(D)	(E)
92	(A)	(B)	(C)	(D)	(E)
93	(A)	(B)	(C)	(D)	(E)
94	(A)	(B)	(C)	(D)	(E)
95	(A)	(B)	(C)	(D)	(E)
96	(A)	(B)	(C)	(D)	(E)
97	(A)	(B)	(C)	(D)	(E)
98	(A)	(B)	(C)	(D)	(E)
99	(A)	(B)	(C)	(D)	(E)
100	(A)	(B)	(C)	(D)	(E)