

FORT CALHOUN STATION - RO EXAM - 10/2001

1. A reactor startup is in progress. You are directed to maintain reactor power at approximately 1% power. Which one of the following should be used to monitor power?

- A. WR Nuclear Instrumentation
- B. Delta-T Power
- C. XC-105 Calorimetric
- D. Main Generator Output

2. The following conditions exist:

- River Temperature is 55°F
- The plant is operating at full power
- Raw Water pump AC-10A has been out of service for the past three days
- Containment Spray Pump SI-3B has just been declared inoperable

In order to satisfy the requirements of Tech Specs, these conditions require that the plant be taken to HOT SHUTDOWN within which one of the following times.?

- A. 12 hours
- B. 36 hours
- C. 4.5 Days
- D. 7.5 Days

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3. When can procedural steps be performed out of sequence at Fort Calhoun Station?

- A. Procedure steps can never be performed out of sequence.
- B. Procedure steps may be performed out of sequence only if approved by the Control Room Supervisor.
- C. Procedure steps may be performed out of sequence only if specified by the procedure.
- D. Procedure steps may be performed out of sequence only if specified by the procedure and approved by the control room supervisor.

4. What is indicated by an orange or orange taped control switch?

- A. The component operated by the switch is a "Maintenance Rule" component
- B. The component operated by the switch is a "Safe Shutdown" component
- C. Operation of the switch requires self-checking
- D. Operation of the switch requires peer-checking

5. During refueling, a fuel bundle has been removed from the core and the fuel hoist box on FH-1 has been returned to its up limit.

What action must be taken to enable the bridge and trolley to be moved?

- A. The empty hoist bypass switch must be turned to OFF.
- B. The bridge trolley lockout pushbutton must be depressed.
- C. The mast bump override button must be depressed
- D. The mast detent switch must be placed in DISENGAGE

6. Which one of the following operations is performed using the short-handled fuel handling tool?
- A. Placing a fuel assembly in the storage side upender.
  - B. Removing a fuel assembly from the storage side upender.
  - C. Placing a fuel assembly in the new fuel elevator.
  - D. Removing a fuel assembly from the new fuel elevator.
7. When performing a shutdown margin calculation at FCS, a correction to the boron concentration required for adequate shutdown margin is made if the actual full power boron concentration is higher than the predicted full power boron concentration. This correction accounts for:
- A. Boron-10 depletion in the RCS boron
  - B. Temperature difference between the RCS and the chemistry lab.
  - C. Changes in burnable poisons.
  - D. Variations in the boric acid calibration standards
8. The RWP Surveillance and ALARA coordinator has determined that an ALARA job briefing is required for performance of a job in the RCA.
- Which one of the following restrictions apply until all affected workers attend an ALARA job briefing?
- A. The affected workers will not be issued TLDs.
  - B. The affected workers will not be allowed to sign the RWP.
  - C. The affected workers will not be allowed to enter the RCA.
  - D. The affected workers will not be allowed to enter the protected area

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9. A radiological posted area at Fort Calhoun has the following conditions:

- A general area radiation of 75 mrem/hr
- A Beta/Gamma swipe reading of 90 dpm/100 cm<sup>2</sup>
- An Alpha swipe reading of 35 dpm/100 cm<sup>2</sup>

How will the area be posted?

- A. Radiation Area
- B. High Radiation Area
- C. Radiation Area, Contaminated
- D. High Radiation Area, Contaminated

10. The "Master Silence" button may be used to enhance control room communications following a reactor trip. What is the lowest level position authorized to approve use of the "Master Silence" button?

- A. The Reactor Operator
- B. The Control Room Supervisor
- C. The Shift Technical Advisor
- D. The Shift Manager

11. Why is "Reactivity Control" the first safety function to be verified following a reactor trip?
- A. The Reactor Operator is normally stationed at CB-4 where "Reactivity Control" is verified.
  - B. "Reactivity Control" is the only safety function that needs to be satisfied to prevent fuel damage.
  - C. "Reactivity Control" has high importance and is the only safety function that can be satisfied without instrument air.
  - D. "Reactivity Control" has high importance and can be verified quickly.

12. The following conditions exist:

- The reactor tripped due to a loss of DC bus #1
- DG-1 did not start and bus 1A3 is not energized.
- All offsite power (161 KV and 345 KV) is unavailable

Which one of the following must be accomplished before Bus1A3 can be energized?

- A. Start the diesel DG-1 locally, at AI-133.
- B. Transfer DG-1 DC Control Power to its emergency source.
- C. Transfer bus 1A3/1A1 DC control power to its emergency source
- D. Close the cross-tie breakers between instrument busses "A" and "C"

13. The plant is in mode 3 and surveillance tests are being performed. Annunciator window "flags" are being used in accordance with the OPD 6-04, "Annunciator Marking".?

Which one of the following situations is unexpected and requires use of the Annunciator Response Procedures?

- A. A red flagged annunciator window is unlit
  - B. A blue flagged annunciator window is lit
  - C. A green flagged annunciator window is unlit
  - D. An red flagged annunciator window is lit
14. With the reactor critical and CEAs at their insertion limits, which one of the following events is most likely to result in a prompt critical condition at FCS?
- A. A CEA ejection from 10-3% power.
  - B. A CEA ejection from 100% power.
  - C. A CEA withdrawal from 10-3% power.
  - D. A CEA withdrawal from 100% power.
15. During physics testing, with the CEAs being operated in the Manual Sequential mode, the operator is directed to move CEAs so that group 3 CEAs are inserted from 51" to 50". Motion of all group 3 CEAs continues when the RO releases the IN-OUT-HOLD switch. Which one of the following alarms would be received first?
- A. PDIL
  - B. Continuous Rod Motion
  - C. Rod Position Deviation Low Limit
  - D. Rod Position Deviation Reed Switch

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16. Following a small break loss of coolant accident, the following conditions exist:

- Three HPSI pumps are running
- Three Containment Spray Pumps are running
- One LPSI Pump is Running
- SIRWT Level is 16"
- RCS Pressure is 600 psia
- Containment pressure is 8 psig

Which one of the following actions should be taken?

- A. Start a LPSI pump
- B. Shutdown a LPSI pump
- C. Shutdown a HPSI pump
- D. Shutdown all Containment Spray Pumps

17. The following conditions exist:

- The plant is operating at 100% power
- Quench tank pressure is being maintained at 7 psig
- Pressurizer safety valve RC-142 is leaking

Which one of the following is the temperature expected to be seen on tailpipe temperature monitor TIA-136?

- A. 175°F
- B. 230°F
- C. 280°F
- D. 643°F

18. The purpose of the flywheels on the reactor coolant pump motors is to:
- A. Minimize starting current for the RCP motors
  - B. Counterbalance the lift produced by operation of the oil lift pumps
  - C. Maintain core flow following a loss of power to the pump
  - D. Reduce pump vibration during a RCS cooldown and depressurization.
19. The reactor tripped on low flow due to a trip of RC-3B. RCS pressure then dropped to 1300 psia and T-cold lowered to 500°F. Which one of the following actions should be taken?
- A. Restart RC-3B
  - B. Trip RC-3A
  - C. Trip RC-3D
  - D. Trip all running RCPs
20. The plant is operating at 100% power when all charging pumps become inoperable. What will make an OP-4 shutdown without charging more difficult than a normal OP-4 shutdown
- A. Pressurizer pressure will be higher than during a normal OP-4 shutdown due to the loss of aux spray.
  - B. RCS temperatures will be lower than during a normal OP-4 shutdown because rod movement is not allowed in this situation.
  - C. ASI will be more positive than during a normal OP-4 shutdown because all negative reactivity changes must be made with control rods.
  - D. An OP-4 shutdown is not allowed without charging pumps available.

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21. A power increase is in progress. The reactor is at 80% power. Group 4 CEAs are at 52 inches. All other CEAs are fully withdrawn. What action must be taken as a result of these conditions?

- A. Immediately commence emergency boration
- B. Withdraw group 4 to above the short term insertion limit
- C. Withdraw group 4 until proper group overlap is achieved
- D. Place the plant in hot shutdown within 6 hours

22. The plant has been in mode 4 for a week while maintenance is being performed. A plant heatup to mode 3 is in progress.

The following conditions exist:

	<u>Level</u>	<u>Concentration</u>	<u>Temperature</u>
BAT A	58%	3.1%	50F
BAT B	28%	2.7%	55F
SIRWT	188 in	2225 ppm	53F

Which one of the following actions is required?

- A. Increase the borated water level in the SIRWT
- B. Increase the borated water temperature in BAT A
- C. Increase the boron concentration in BAT B
- D. Increase the boron concentration in the SIRWT

23. The following plant conditions exist:

- The reactor is in mode 4
- The pressurizer manway is in place
- Shutdown cooling is in service
- Shutdown cooling isolation valves (HCV-347/348) then go fully closed.

Which one of the following would cause those valves to isolate?

- A. Pressurizer pressure channel P-115 failed low
- B. Pressurizer pressure channel P-118 failed low
- C. A loss of power to pressurizer pressure channel P-115
- D. A loss of power to pressurizer pressure channel P-118

24. What cooling flowpath would be used following an inoperable LPSI header downstream of FCV-326?

- A. Charging pumps take a suction from the RCS loop and discharge through the shutdown cooling heat exchanger back to the RCS.
- B. HPSI pumps take a suction from the RCS loop and discharge through the shutdown cooling heat exchanger back to the RCS
- C. A containment spray pump takes a suction from the LPSI pump suction and discharges through the shutdown cooling heat exchanger to the HPSI pump suction, The HPSI pump discharge flows back to the RCS.
- D. A HPSI pump takes a suction from the LPSI pump suction and discharges through the shutdown cooling heat exchanger to the containment spray pump suction, The containment spray pump discharge flows back to the RCS.

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25. When should the reactor operator use both letdown control valves, LCV-101-1 and LCV-101-2 ?

- A. When operating 2 or more charging pumps.
- B. When performing a normal RCS cooldown and depressurization.
- C. When responding to high pressurizer level.
- D. When performing a normal RCS boron dilution.

26. The plant is operating at 100% power with pressurizer level Channel X selected as the controlling channel. Backup heater groups 1 and 2 are in the on position to maintain RCS pressure.

If LT-101X fails low, how will the pressurizer heaters respond?

- A. All pressurizer heaters will deenergize
- B. Backup heater groups 1 and 2 will remain energized
- C. Backup heater groups 1 and 2 only will deenergize
- D. All backup heaters will energize

27. The reactor tripped 20 minutes ago. The following conditions are observed:

- "PRESSURIZER PRESSURE OFF NORMAL HI-LO" channel X and Y are in alarm
- PRC-103x (controlling channel) indicates 2160 psia and stable
- All backup heaters in auto and energized
- LRC-101Y (controlling channel) indicates 60% and stable
- LRC-101X indicates 43% and increasing slowly
- LI-106 indicates 28%
- Letdown flow is 26 gpm
- One charging pump is running
- T-cold is 533F T-hot is 534F Both are stable

Select the probable cause and the action that should be taken.

- A. Low level on LRC-101X is maintaining B/U heaters on. Place the pressurizer heater cutout switch in the channel Y position
- B. The bistable for the backup heaters needs to be reset. Place the control switches for all B/U heaters to reset and back to auto.
- C. LRC-101Y has malfunctioned causing the B/U heaters to remain on. Place LRC-101X in service
- D. PRC-103X has malfunctioned causing the backup heaters to remain on. Place LRC-103Y in service.

28. The plant is operating at 2% power. CH-1B is operating. A reactor trip occurs and all CEAs fail to insert.

What actions should be taken with the charging pumps?

- A. Start CH-1A or CH-1C
- B. Start CH-1A and CH-1C
- C. Start CH-1A. Stop CH-1B.
- D. Stop CH-1B

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29. A main generator trip occurred from 100% power. The reactor and turbine failed to trip. What action should be taken to lower reactor power?

- A. Close the main steam isolation valves.
- B. Manually open the steam dump and bypass valves
- C. Start AFW pumps, FW-6 and FW-10
- D. Trip all reactor coolant pumps

30. A reactor startup is being performed. The reactor power is steady with the following WR NIS channel readings:

<u>Channel</u>	<u>Power</u>
A	$1.10 \times 10^{-3}\%$
B	$1.08 \times 10^{-3}\%$
C	$1.10 \times 10^{-3}\%$
D	$1.12 \times 10^{-3}\%$

An electrical disturbance causes the detector voltages for channel "A" to increase by 5 volts and the detector voltage for channel "C" to decrease by 5 volts. The detector voltages for channels "B" and "D" remain steady. Which channel will have the highest reading following the voltage changes?

- A. Channel "A"
- B. Channel "B"
- C. Channel "C"
- D. Channel "D"

31. Which of the following signals can cause a Rod Withdrawal Prohibit?
- A. TM/LP pretrip
  - B. High SUR pretrip
  - C. APD pretrip
  - D. ASGT pretrip
32. The reactor is operating at 100% power when a 10 gpm tube leak develops in RC-2B. Assuming power operation continues, what would be the long term response of the steam generator level control system?
- A. The system would act to maintain a higher level in RC-2B
  - B. The system would act to maintain a lower level in RC-2B
  - C. The system would act to maintain a higher FW flow into RC-2B
  - D. The system would act to maintain a lower FW flow into RC-2B
33. Which one of the following is true for reflux boiling natural convection?
- A. Steam flows from the reactor vessel to the steam generators in the cold legs
  - B. Water flows from the reactor vessel to the steam generators in the cold legs
  - C. Steam flows from the steam generators to the reactor vessel in the hot legs
  - D. Water flows from the steam generators to the reactor vessel in the hot legs

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34. A steam line break has occurred due to the rupture of the housing on MS-1040. How will steam flow out the break change as the pressure in S/G RC-2A lowers? (Assume all systems operate as designed. Operators take no actions)
- A. The leakrate will continuously lower as S/G pressure lowers.
  - B. The leakrate will lower until S/G pressure reaches 900 psia, then it will stop.
  - C. The leakrate will lower until S/G pressure reaches 700 psia, then it will stop.
  - D. The leakrate will lower until S/G pressure reaches 500 psia, then it will stop.
35. A large main Steam Line Break can result in a reactor vessel head void because:
- A. The RCS would rapidly depressurize to the saturation pressure corresponding to reactor head temperature
  - B. A void would form in the hottest portion of the RCS due to the sudden RCS inventory loss
  - C. The rapid RCS cooldown would cause the coolant in the upper head to shrink excessively
  - D. Core heat removal is ineffective and superheating of the coolant results in void formation

36. A small break loss of coolant accident has occurred. 161 KV offsite power was lost at the time of trip. D/G-2 failed to start. The immediate actions of EOP-00 have been completed. Pressurizer pressure is 1150 psia and total SI flow is 250 gpm.

What action must be taken to ensure minimum acceptable safety injection flow under these conditions?

- A. No action is required. HPSI flow is adequate.
  - B. Crosstie 480 volt buses and start an additional HPSI pump.
  - C. Establish 345 kv backfeed and start an additional HPSI pump.
  - D. Open PORVs to depressurize RCS below LPSI pump shutoff
37. The RCS was being cooled down with RCS cold leg temperature at 350°F and pressurizer pressure at 800 psia when a loss of an instrument bus made pressurizer level indicator, LI-106, inoperable. Which one of the following methods could be used to determine pressurizer level in this situation.
- A. Read the level directly from LC-101X
  - B. Use the LC-101X indication and the associated TDB correction curve
  - C. Use the level directly from LI-197
  - D. Use the LI-197 indication and the associated TDB correction curve

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38. While in the process of lining up to energize both instrument busses "A" and "C" from inverter "A", the operator should:
- A. Monitor load on inverter "A" to minimize the potential for tripping the inverter due to overload.
  - B. Monitor load on Instrument bus "C" because the cross-tie breakers are not sized to carry full instrument bus load.
  - C. Monitor the AC voltage output of inverter "A" to minimize the potential for the inverter tripping on undervoltage.
  - D. Monitor inverter temperature to minimize the potential for the inverter to overheat and start a fire.
39. An approved Release Permit is being used to release the "A" Monitor Tank. It is three (3) hours into the release and the EONA reports that flow recorder FR-690 does not appear to be operating and he can not determine the problem.

Select the correct response to this situation.

- A. Commence logging calculated flow and process monitor readings on the Liquid Discharge Log every hour.
- B. Have two (2) independent samples reanalyzed.
- C. Verify recorder RR-049/A is operating and continue release.
- D. Commence logging the calculated flow readings on the Liquid Discharge Log every four (4) hours.

40. Following a loss of all AC that removes the automatic start signals from fire pumps FP-1A and FP-1B, the diesel fire pump maybe be started by:
- A. Control switch operation from the Control Room and manual engagement of the local starter.
  - B. Control switch operation at the intake structure and manual engagement of the local starter.
  - C. Manual engagement of the local starter only.
  - D. Automatically started by the mechanical pressure sensor when header pressure is less than 99 psig.
41. Which one of the following fires could create a common mode failure that prevents the operator from initiating emergency boration from the control room?
- A. A fire in room 19 affecting all 3 air compressors
  - B. A fire in the battery room affecting DC bus #2
  - C. A fire in the switchgear room affecting Instrument Inverter #1
  - D. A fire in the switchgear room affecting electrical bus 1A3
42. The crew has just evacuated the control room due to a fire and established control at the Alternate Shutdown Panel (AI-185) and (AI-179). Steam Generator Pressures are 850 psig and rising.
- What will control S/G pressure in this situation?
- A. Opening main steam bypass control valves HCV-1041C and HCV-1042C locally.
  - B. Operating main steam safety valve control switches on AI-179.
  - C. Use of the steam driven AFW pump, FW-10.
  - D. Lifting of the main steam safety valves

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43. Operation is taking place at AI-179 due to Control Room evacuation. The transfer switches on AI-179 have been taken to local. Which one of the following actions will occur if S/G levels decrease to the AFAS low level setpoint?
- A. AFAS will open valves HCV-1107A and B and 1108A and B, FW-10 will auto start.
  - B. AFAS will open HCV-1107A and 1108A, HCV-1107B and 1108B can be throttled, FW-10 will auto start.
  - C. The AFAS signals to HCV-1107A and B and 1108A and B, FW-10 are blocked.
  - D. AFAS will open valves HCV-1107A and B and 1108A and B, FW-10 must be manually started.
44. Under which one of the following conditions will the Subcooled Margin Monitors on CB-4 provide invalid results?
- A. With containment pressure greater than 5 psig
  - B. With pressurizer pressure below 1700 psia.
  - C. With RCS coolant temperatures below 465°F.
  - D. With containment temperature above 180°F.
45. Choose the following that is most correct concerning the actions to reset (re-energize) the CEDM clutches when tripped by an automatic 2/4 RPS trip. (Assume all automatic RPS trip signals have cleared.)
- A. Reclose the clutch power supply breakers to re-energize the CEDM clutches.
  - B. After a 30 second time delay, depress the black reactor trip "reset" button (on CB-4) to re-energize the CEDM clutches.
  - C. Immediately depress the black reactor trip "reset" button (on CB-4) to re-energize the CEDM clutches.
  - D. Reclose the clutch power supply breakers THEN depress the black reactor trip "reset" button (on CB-4) to re-energize the CEDM clutches.

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46. Following a refueling outage, the control rod spiders are reconnected to the drive shafts by:
- A. Lowering the upper guide structure onto the core support barrel
  - B. Using the CEDM drive motors to drive the shafts down until they latch with the spiders
  - C. Operating the coupling/uncoupling tool through the tool access flange opening
  - D. Tripping the drive shafts so that they latch with the spiders
47. Which one of the following events would cause reactor power to increase at Fort Calhoun Station?
- A. Beginning of cycle, 2% power. PCV-910 fails closed.
  - B. Beginning of cycle, full power. One turbine control valve fails closed.
  - C. End of cycle, 2% power. PCV-910 fails closed.
  - D. End of cycle, full power. One turbine control valve fails closed.
48. The middle seal on RC-3C has failed. The upper and lower seals are functioning properly. What action would be required by AOP-35?
- A. Monitor the seals. Full power operation can continue.
  - B. Perform a normal plant shutdown using OP-4. Then shutdown RC-3C
  - C. Perform an emergency plant shutdown using AOP-05. Then shutdown RC-3C.
  - D. Trip the reactor. Then shutdown RC-3C

49. The following conditions exist:

- The reactor has tripped from full power as a result of a loss of all offsite power.
- Diesel Driven Feed Pump, FW-54, is tagged out of service
- DG-1 failed to start and bus 1A3 is deenergized
- Steam generator levels are currently 50% WR and lowering slowly
- All safety functions, other than heat removal, are satisfied.

What action should be taken to establish heat removal?

- A. Start AFW Pump, FW-6
- B. Start AFW Pump, FW-10
- C. Establish Once-through-Cooling
- D. Initiate Shutdown cooling

50. The heated junction thermocouples measure percent of level over which one of the following ranges?

- A. Top of the vessel (100%) to bottom of the vessel (0%)
- B. Top of the core (100%) to bottom of the core (0%)
- C. Top of the vessel (100%) to top of the core (0%)
- D. Top of the core (100%) to bottom of the vessel (0%)

51. A RCS cooldown is in progress. One reactor coolant pump is running in each loop. Which one of the following would cause the motor current on the two running RCPs to rise?

- A. A third reactor coolant pump is started.
- B. Voltage on the electrical grid is raised.
- C. RCS pressure is lowered from 1800 psia to 1600 psia
- D. RCS temperature is lowered from 400°F to 350°F

52. The following conditions exist in the plant:

- The reactor tripped from 100% power due to a small LOCA with a loss of offsite power.
- RCS pressure is 1000 psia
- S/G A pressure is 1100 psia
- S/G B pressure is 900 psia

Which one of the following statements is true?

- A. Natural Circulation flow is not possible in either loop
- B. Natural Circulation flow may be occurring in loop A but not in loop B
- C. Natural Circulation flow may be occurring in loop B but not in loop A
- D. Natural Circulation flow may be occurring in both loops

53. Why is the operator directed to close the VCT outlet valve, LCV-218-2, during Emergency Boration?
- A. To prevent cavitation of the Boric Acid pumps
  - B. To prevent overpressurization of the VCT
  - C. To prevent the VCT water from diluting the Emergency Boration flow
  - D. To prevent the VCT pressure from stopping flow from the Boric Acid Tanks
54. Which one of the following statements is true concerning pressurizer heater operation during RCS boron concentration changes?
- A. Backup heaters should be ON during boration or dilution
  - B. Backup heaters should be OFF during boration or dilution
  - C. Backup heaters should be ON during boration but OFF during dilution
  - D. Backup heaters should be OFF during boration but ON during dilution
55. When putting an additional charging pump into service, what control is operated to match charging and letdown flows without causing a pressurizer level transient?
- A. The letdown control valves, LC-101-1 or LC-101-2, are controlled manually when more than one charging pump is in operation
  - B. The level bias potentiometer is manually adjusted to match flows
  - C. The pressure setpoint on PIC-210 is changed until charging and letdown flows are matched
  - D. No manual adjustments are required. Charging and letdown are matched automatically with no change in pressurizer level

56. Plant conditions are as follows:

- RCS inventory is at Mid Loop of the hot legs
- The reactor has been shutdown for 5 days
- RCS temperature is 130F

Determine the approximate time before boiling occurs in the core following a loss of shutdown cooling.

- A. 12 minutes
- B. 21 minutes
- C. 27 minutes
- D. 34 minutes

57. Assume that a loss of coolant accident occurred from full power. All offsite power was lost shortly following the accident. DG-2 failed to start. What LPSI pumps would be running in this situation.

- A. No LPSI pumps would be running
- B. SI-1A would be the only LPSI pump running
- C. SI-1B would be the only LPSI pump operating
- D. Both LPSI pumps, SI-1A and SI-1B would be running in this situation.

58. The following plant conditions exist following a reactor trip:

- Pressurizer pressure = 1650 psia and lowering
- Containment Pressure = 6 psig and rising
- S/G pressures = 550 psia and lowering
- All radiation monitors are reading normal
- No ESF lockout relays have actuated

What action should be taken by the operator?

- A. Operate the PPLS test switch
- B. Operate the PPLS block switch
- C. Operate the CPHS test switch
- D. Operate the SGLS block switch

59. Which one of the following signals directly causes the SI Tank leakage cooler control valves, PCV-2909, -2929, -2949, and -2969, to close during a major LOCA?

- A. CIAS
- B. CPHS
- C. PPLS
- D. SIAS

60. The plant is operating at 50% power with CCW pump AC-3A operating. The control switches for AC-3B and AC-3C are in the after-stop position. How will the CCW system respond to an overcurrent trip of AC-3A

- A. There will be no automatic pump starts.
- B. AC-3B will automatically start. AC-3C will start 30 seconds later if AC-3B failed to start.
- C. AC-3C will automatically start. AC-3B will start 30 seconds later if AC-3C failed to start.
- D. AC-3B and AC-3C will automatically start.

61. The plant was operating in mode one when a plant transient caused pressurizer pressure to spike at 2780 psia. No reactor trip occurred. Pressurizer pressure returned to 2100 psia following the transient.

Which one of the following actions is required with respect to plant operations?

- A. Place the plant in HOT SHUTDOWN within 1 hour
- B. Place the plant in HOT SHUTDOWN within 6 hours
- C. Immediately block PPLS to enable LTOP protection..
- D. Make an immediate notification to the NRC and continue plant operation.

62. What design feature of the RPS prevents placing two TM/LP trip units in bypass at the same time?
- A. When a trip unit is bypassed with the bypass key, a contact opens in the logic ladder which prevents bypassing another TM/LP trip unit.
  - B. Only one channel can be selected using the bypass key to operate the 5-position TM/LP trip bypass switch.
  - C. Only one TM/LP trip unit can be bypassed at a time because the key locker contains only one TM/LP trip unit bypass key.
  - D. No design feature is provided. Bypassing two TM/LP trip units is prevented by administrative control only.
63. How long would it take to raise indicated PZR level 10% using CH-1A only? (Assume normal at-power plant conditions with letdown isolated)
- A. 9 - 11 minutes
  - B. 11 - 13 minutes
  - C. 13 - 15 minutes
  - D. 15 - 17 minutes

64. The following conditions exist:

- A small break LOCA has occurred
- All safeguards components are operating as desired
- SIAS actuated 31 minutes ago
- SIRWT level is 78 inches

What action should be taken by the RO following the receipt of LO-LO LEVEL alarms on both BATs?

- A. Stop the Boric Acid Pumps. Continue gravity feed to the charging pump suction.
- B. Stop all but one Charging pump. Continue emergency boration.
- C. Direct the Aux Building operator to batch to the BATs. Continue emergency boration
- D. Continue boration by transferring charging pump suction to the SIRWT

65. A pressurizer steam space LOCA has caused PPLS and SIAS actuation. CETs are stable at 550°F. RCS pressure is stable at 1300 psia, pressurizer level is 20% and rising. HPSI flow is 390 gpm.

With no operator action and assuming temperatures remain constant, how will pressurizer level, pressurizer pressure and HPSI flow respond?

- A. Pressurizer level will stabilize slightly above 50%, pressure will lower and HPSI flow will increase.
- B. Pressurizer level will rise to 100% , pressure and HPSI flow will remain constant.
- C. Pressurizer level will rise to 100%, pressure will rise and HPSI flow will decrease.
- D. Pressurizer level will stabilize slightly above 50%, pressure will rise and HPSI flow will decrease.

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66. The reactor is operating with the following powers being indicated by the power range NI detectors:

	<u>Channel A</u>	<u>Channel B</u>	<u>Channel C</u>	<u>Channel D</u>
Upper	100%	103%	98%	99%
Lower	101%	99%	99%	101%

What is the value of Azimuthal Tilt.?

- A. 0.01
- B. 0,02
- C. 0.03
- D. 0.04

67. With the reactor at 100% power, how will the output of a WR Nuclear Instrumentation Channel be affected if the discriminator circuit fails so that its threshold setting is lowered to 50% of its original setting?

- A. The indicated WR power will remain at 100% because the discriminator is not used at this power level.
- B. The indicated WR power will drop to 0% because a NON-OP signal will be generated
- C. The indicated WR power will indicate 50% because channel output is proportional to the threshold setting
- D. The indicated WR power will indicate 200% because channel output is inversely proportional to the threshold setting

68. The main purpose of the moisture separators and mist eliminators in the containment cooling and filtering units is to:

- A. Protect HEPA filters from water impingement damage
- B. Prevent charcoal filters from absorbing water
- C. Protect fans from water impingement damage
- D. Limit the current drawn by the fan motors

69. The containment cooling fan, VA-7C, is powered from:

- A. Bus 1B3B-4B
- B. Bus 1B3C-4C
- C. Bus 1A1
- D. Bus 1A4

70. A steam line break inside containment has occurred causing both PPLS and CPHS to actuate. Containment Spray pump, SI-3B, breaker failed to close.

What should be the status of the containment spray header valves, HCV-344 and HCV-345?

- A. HCV-344 and HCV-345 will both open
- B. HCV-344 will open. HCV-345 will remain closed
- C. HCV-344 will remain closed. HCV-345 will open
- D. HCV-344 and HCV-345 will both remain closed

71. Which one of the following statements is true concerning the Containment Pressure High Signal (CPHS) lockout relays?
- A. They normally reset automatically and only require manual reset after a loss of voltage.
  - B. They allow manual reset so that containment spray actuation can be overridden with a CPHS signal present.
  - C. They allow manual reset of the CPHS signal after containment pressure drops below the CPHS setpoint.
  - D. They allow manual reset of the CPHS so that containment spray pumps can be restarted following RAS.
72. The containment air cooling and filtering system charcoal filters are designed to remove \_\_\_\_\_ from the containment.
- A. Noble gasses
  - B. Iodine
  - C. Hydrogen
  - D. Smoke
73. Which one of the following actions must be taken while operating the Containment Hydrogen Analyzer if Containment humidity reaches 100% humidity?
- A. Utilize a percent error graph to correct for excessive humidity.
  - B. Calibrate the Hydrogen Analyzer for high humidity.
  - C. Take actions to reduce the humidity inside the Containment.
  - D. Utilize a percent error graph to correct for excessive temperature.

74. How would inoperability of the containment purge fans affect a refueling outage?
- A. Containment entry would be delayed due to higher airborne activity
  - B. Containment entry would be delayed due to higher temperatures in containment
  - C. Plant startup would be delayed because tech specs require operability of the purge fans
  - D. There would be no affect on the outage
75. The plant is operating at steady state full power when level in one steam generator is seen to decrease. Which one of the following is a possible cause of this decrease?
- A. Electrical control power has been lost to the affected S/G's reg valve.
  - B. Control air pressure has been lost to the affected S/G's feed reg valve
  - C. Steam pressure transmitter has failed low on the affected side
  - D. Steam flow transmitter has failed high on the affected side
76. The reactor is operating at 50% power near the end of an operating cycle. Group 4 CEAs are at 100". A transient occurs which causes reactor power to lower and RCS T-cold to rise.
- Which one of the following could be the cause of this event?
- A. Inadvertent CEA withdrawal
  - B. Inadvertent CEA insertion
  - C. Inadvertent opening of the turbine control valves
  - D. Inadvertent closing of the turbine control valves

77. The main steam isolation valves are closed. Which one of the following statements is correct about operation of the manual shutoff valves?
- A. When placed in OPEN, the pneumatic cylinders are vented through the open solenoids and the valves remain closed. All automatic trips are defeated.
  - B. Placing the manual shutoff valve in OVERRIDE, the pneumatic cylinders are pressurized and the valves open. All automatic trips are defeated.
  - C. Placing the manual shutoff valve in OPEN, the pneumatic cylinders are pressurized and the valves open. All automatic trips are operable.
  - D. Placing the manual shutoff valve in OVERRIDE, the pneumatic cylinders are vented through the open solenoids and the valves remain closed. All automatic trips are operable.
78. Steam bypass valve controller, PIC-910, has been set to 870psia. What cold leg temperature will be maintained in the RCS15 minutes after the plant inadvertently trips from full power assuming all system operate as expected?
- A. 528°F
  - B. 532°F
  - C. 535°F
  - D. 540°F

79. The plant is operating at 100% power when the following annunciators alarm:

- Exhaust Hood A Temp Hi
- Exhaust Hood B Temp Hi

If this condition is not corrected, what would be the result of the high temperature on the main turbine?

- A. No effect on turbine operation
- B. The turbine would trip at 175°F
- C. The condensate system would increase flows to reduce temperature
- D. The turbine would trip at 225°F

80. The reactor is operating at 35% power when an EHC malfunction causing the turbine control valves to close fully. The turbine and the reactor do not trip. Which of the following sets of valves will open in this situation?

- A. The steam dump valves (TCV-909s) and the turbine bypass valve (PCV-910)
- B. The turbine bypass valve (PCV-910) and some of the S/G safety valves
- C. The steam dump valves (TCV-909s) and some of the S/G safety valves
- D. The turbine bypass valve (PCV-910), the steam dump valves (TCV-909s) and some of the S/G safety valves

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81. A Steam Generator Isolation Signal (SGIS) has isolated Feed Water to both Steam Generators. All Main Feedwater pumps are tripped. FW-6 is running. Which one of the following manual actions result in water being provided to FW-2B's Feed Ring?
- A. Open HCV-1384, Override and Open HCV-1104 and FCV-1102
  - B. Open HCV-1384, Override and Open HCV-1385 and HCV-1106
  - C. Open HCV-1385, Override and Open HCV-1104 and FCV-1102
  - D. Open HCV-1385, Override and Open HCV-1104 and HCV-1106
82. Which one of the following describes the consequences of late initiation of once through cooling during conditions when it is required?
- A. The flow rate through the PORVs may no longer be adequate to remove decay heat which may lead to core damage.
  - B. The decay heat level may not be adequate to support sufficient natural circulation flow to prevent core damage.
  - C. The HPSI flow rate may no longer be adequate to maintain RCS inventory high enough to prevent core damage.
  - D. The increase in RCS temperature may increase hydraulic forces on the fuel assemblies, which may lead to core damage.

83. The following plant conditions exist:

- A plant transient has occurred that resulted in an automatic reactor trip
- Pressure in the "A" S/G is 480 psia
- Level in the "A" S/G is 50% WR
- Pressure in the "B" S/G is 575 psia
- Level in the "B" S/G is 60% WR
- The MSIVs are closed

Assuming no operator action, which one of the following is the current status of the AFW system?

- A. AFW should be feeding the "A" S/G only.
- B. AFW should be feeding the "B" S/G only
- C. AFW should be feeding both S/Gs
- D. AFW should not have initiated yet

84. During a plant cooldown, all offsite power was lost. The CRS entered EOP-07 and the following plant conditions existed:

- Both D/G's failed to start
- FW-54 is not available
- FW-10 is supplying 100 gpm to each S/G
- EFWST level is 70 inches

If the present rate of feed is maintained to both S/Gs, how long will it take to empty the EFWST?

- A. 1 hour 30 minutes
- B. 2 hours
- C. 2 hours 30 minutes
- D. 3 hours 45 minutes

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85. The EONT reports a leak in the Emergency Feedwater Storage Tank has emptied it. Which one of the following should be used to feed the steam generators if the plant were to trip due to a loss of offsite power. Assume both D/G's start and load as designed.
- A. Motor driven AFW pump, FW-6
  - B. Turbine driven AFW pump, FW-10
  - C. Diesel driven AFW pump, FW-54
  - D. Diesel driven Fire pump, FP-1B
86. The plant is in cold shutdown with all 4160 buses powered from 345 KV. Shutdown cooling is in operation with LPSI pump SI-1A running. Emergency Diesel Generators #1 and #2 are aligned for normal operation. Assuming all system operate as designed and 345 KV power is lost. what will happen after both Diesels accelerate to full speed?
- A. Busses 1A3 and 1A4 will be powered by their associated DGs.
  - B. Neither bus 1A3 or 1A4 will be powered until SI-1A is tripped
  - C. DG-1 will power Bus 1A3. Bus 1A4 will not be powered until SI-1A is tripped
  - D. DG-2 will power Bus 1A4. Bus 1A3 will not be powered until SI-1A is tripped
87. Diesel generator D/G-1 has received a start signal as a result of a reactor trip. The engine lube oil pump discharge pressure switch has failed in the low pressure position. Which one of the following describes the expected response of D/G-1 to these events?
- A. It will not start
  - B. It will start but will trip after 15 seconds
  - C. It will start and then idle at 500 RPM
  - D. It will start and then run at 900 RPM

88. D/G-1 is operating fully loaded onto bus 1A3 during a test. Bus 1A3 is also being supplied by 161 KV offsite power. Which one of the following is the reason for placing the governor in the speed droop mode in this configuration?
- A. Prevent overspeed
  - B. Prevent undervoltage
  - C. Prevent overload
  - D. Prevent overvoltage
89. The purpose of the waste gas decay tanks is to:
- A. Collect combustible gasses from plant components until they can be inerted and released
  - B. Store radioactive noble gasses until their activity is low enough for release
  - C. Collect combustible gasses from plant components until they can be inerted and reused in the plant
  - D. Store radioactive noble gasses until their activity is low enough for reuse in the plant
90. A planned release of Waste Gas Decay tank "B" is in progress. Which one of the following describes the automatic action due to a high alarm on RM-062?
- A. Trips all waste gas compressors
  - B. Places control room ventilation into recirculation mode
  - C. Closes waste gas discharge valves
  - D. Stops all hydrogen purge fans

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91. The reactor is cold shutdown and containment purge is in operation. Which one of the following will result in isolation of the purge system?

- A. A high radiation alarm on containment area radiation monitor, RM-071.
- B. A high radiation alarm on containment noble gas monitor, RM-051
- C. A high radiation alarm on containment high range monitor, RM-091A
- D. A high hydrogen concentration Alarm on containment hydrogen analyzer

92. With the unit at 100% power, the following parameters were observed:

- VCT level is lowering
- CCW surge tank level and pressure are rising
- RM-053 countrate is rising

Which one of the following could produce these indications?

- A. A tube leak in one of the CCW heat exchangers
- B. A leak in one of the RCP seal coolers
- C. A tube leak in the spent fuel pool heat exchanger
- D. A coil leak in one of the containment cooling units

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93. A fire has been discovered in the main transformer, T-1. What would be the correct sequence for automatic starting of the fire pumps? (assume the fire protection system is fully operable)
- A. Deluge valve opening would cause only the motor-driven fire pump to start on low system pressure.
  - B. Deluge valve opening would cause only the diesel-driven fire pump to start on low system pressure.
  - C. Actuation of the T-1 deluge system will generate a direct start signal to the motor driven fire pump
  - D. A T-1 fire will not result in automatic starting of the fire pumps until the pull stations are operated in the service building
94. Which one of the following describes the expected response of the Fire Protection System to a fire in the East Switchgear Room?
- A. The first detector actuated causes the ventilation dampers to the affected space to shut. After a 60 second time delay, the halon bank discharge is initiated.
  - B. After two detectors have actuated in the same space, the ventilation dampers for both switchgear rooms shut and the halon bank discharge is initiated.
  - C. The first detector actuated causes the ventilation dampers in both switchgear rooms to shut. The second detector actuated causes the halon bank to discharge.
  - D. After two detectors have actuated in the same space, the ventilation dampers in both switchgear rooms shut. After a 60 second time delay, the halon bank discharge is initiated.

95. The plant is at power with containment integrity established. Which one of the following would be considered a loss of containment integrity?
- A. Containment pressure slowly increasing.
  - B. A locked closed containment isolation MOV is inoperable
  - C. HCV-746A (Pressure Relief) is open
  - D. Both PAL door seals have failed leak tests
96. The plant tripped from 100% power following a transient involving the loss of forced flow from all four reactor coolant pumps.

The following conditions exist:

- RCS pressure is 2000 psia
- Pressurizer level is 50%
- Steam Generator Pressures are 900 psia
- Steam Generator Wide Range Levels are 40%
- Hot leg temperatures are 575°F
- Cold leg temperatures are 532°F

Which one of the following actions would be most effective in enhancing natural circulation?

- A. Raise RCS pressure
- B. Raise Pressurizer Level
- C. Raise Steam Generator Pressures
- D. Raise Steam Generator Levels

97. Plant conditions are as follows:

- RCS pressure is 2050 psia and lowering
- PZR level is 51% and lowering
- Letdown flow is 26 gpm and steady
- Charging flow is 120 gpm with 75 amps being drawn by each pump
- Reactor power is 99.5% and steady
- Cold leg temperature is 541.5°F and constant
- Hot leg temperature is 593.5°F and constant
- RM-054A and RM-054B show 110 cpm and 250 cpm respectively. Both are constant
- Containment sump level is 18 inches and rising
- VCT level is 47% and lowering

Which one of the following is the probable cause of the above conditions?

- A. An uncontrolled heat extraction
- B. An RCS piping leak
- C. A S/G tube leak
- D. A VCT leak

98. EOP-06 directs the operators to trip all RCPs following a loss of all feedwater. What is the basis for this action?

- A. Flow from the RCPs would interfere with once through cooling
- B. To eliminate the RCPs as a source of heat input to the RCS
- C. To reduce the risk of clad damage due to quenching if a void forms in the vessel
- D. To allow the stratification of phases so that water remains in the reactor vessel

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99. An EOP-20 event has occurred involving a loss of DC bus# 2. DC bus #1 is being powered by a battery charger. What other condition must be met before the MVA-DC safety function is satisfied?

- A. Switchgear DC control power must be supplied by DC bus #1
- B. DC loads must be minimized
- C. The battery #2 output breaker must be opened
- D. DC bus #2 must be reenergized

100. In the Heat Removal section of EOP-20, Functional Recovery, operators are instructed to maintain NR S/G level above 85%.

What is the basis for this:

- A. To reduce thermal cycles on the AFW nozzles
- B. To prevent overpressurizing the feedwater ring
- C. To ensure adequate heat sink for once-through-cooling
- D. To enable adequate recirculation flow in the S/G.