



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV

611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

September 9, 1997

NOTE TO: NRC Document Control Desk
Mail Stop 0-5-D-24

FROM: Laura Hurley, Licensing Assistant
Operations Branch, Region IV

SUBJECT: OPERATOR LICENSING EXAMINATIONS ADMINISTERED ON JUNE 16-20, 1997,
AT COOPER NUCLEAR STATION, UNIT 1

DOCKET #50-298

On June 16-20, 1997, Operator Licensing Examinations were administered at the referenced facility. Attached you will find the following information for processing through NUDOCS and distribution to the NRC staff, including the NRC PDR:

- Item #1 - a) Facility submitted outline and initial exam submittal, designated for distribution under RIDS Code A070.
- b) As given operating examination, designated for distribution under RIDS Code A070.
- Item #2 - Examination Report with the as given written examination attached, designated for distribution under RIDS Code IE42.

If you have any questions, please contact Laura Hurley, Licensing Assistant, Operations Branch, Region IV at (817) 860-8253.

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

Applicant Information

Name:	Region: I / II / III / <u>IV</u>
Date:	Facility/Unit: <u>Cooper Station</u>
License Level: <u>RO</u> SRO	Reactor Type: W / CE / BW / <u>GE</u>
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 four 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

REACTOR OPERATOR EXAMINATION

Question 1

With the plant operating at 50% power, which one of the following Main Generator faults will cause an automatic reactor scram?

- a. High Stator Temperature
- b. Low Hydrogen Pressure.
- c. Loss of Isolated Phase Bus Duct Cooling.
- d. High Differential Current.

Question 2

Which one of the following is the reason that the Reactor Mode Switch should be taken out of the RUN position soon after a Reactor Scram?

- a. Prevent loss of the Main Condenser as a heat sink.
- b. Allow movement of the SRM and IRM detectors.
- c. Allow reset of the SDV High Level Scram.
- d. Reset the RWM.

REACTOR OPERATOR EXAMINATION

Question 3

The following conditions exist:

- RPS Scram Group A&B lights on panel 9-5 are ON
- All rods are fully inserted.
- Both Recirc Pump field breakers have automatically tripped.

Which one of the following is the most likely cause of the scram?

- a. Automatic ARI initiation.
- b. RPS automatic scram.
- c. Manual initiation of ARI.
- d. Manual Reactor Scram.

Question 4

The plant is operating at 50% power when a Reactor Scram occurs. Which one of the following describes the expected response of the RPV Level Control system to this event?

- a. Immediately after the scram, the Feed Pump Discharge valves close and the Startup Flow Control Isolation valves open.
- b. Three minutes after the scram, the Feed Pump Discharge valves close and one RFPT trips.
- c. Immediately after the Main Turbine trips, the Feed Pump Discharge valves close and the Startup Flow Control Isolation valves open.
- d. Three minutes after the Main Turbine trip, the Feed Pump Discharge valves close and one RFPT trips.

REACTOR OPERATOR EXAMINATION

Question 5

A plant transient has caused a reactor scram and prolonged SRV actuation. Current conditions are as follows.

- Reactor pressure 900 psig and rising.
- All SRVs are closed.
- Suppression Pool water level is normal.

If Suppression Pool temperature were to rise to 185°F, which one of the following is closest to the maximum RPV pressure allowed by the EOPs?

- a. 1045 psig
- b. 940 psig
- c. 800 psig
- d. 600 psig

Question 6

The reactor is operating at 70 percent power during a power ascension when one Feedwater pump trips. Prior to the pump trip:

- The reactor was operating at the 100% load line.
- Two Feedwater pumps were operating.

Which one of the following describes the expected response of the Recirc System to this event?

- a. The Recirc pumps immediately runback to minimum speed to avoid power oscillations.
- b. If RPV level lowers to 27.5 inches the Recirc pumps will runback to minimum speed to avoid power oscillations.
- c. The Recirc pumps immediately runback to 45% to minimize the rate of level loss.
- d. If RPV level lowers to 27.5 inches, the Recirc pumps will runback to 45% to minimize the rate of level loss.

REACTOR OPERATOR EXAMINATION

Question 7

The following conditions exist.

- A small LOCA has occurred.
- Drywell pressure has raised to 3 psig.
- All four Drywell Fan Coil Units are in RUN.

Which one of the following describes the expected status of the Fan Coil Units under these conditions?

- a. All four will be in operation.
- b. All four will have tripped.
- c. All four will trip if a Group 2 Isolation occurs.
- d. All four will trip if Drywell pressure reaches 3.5 psig.

Question 8

The plant is operating at 50% power and 50% Core Flow when power starts to slowly raise for, as yet, unexplained reasons. Which one of the following is the appropriate immediate response to this event?

- a. Scram the reactor.
- b. Insert control rods.
- c. Reduce Recirc flow.
- d. Lockout Recirc Scoop Tube.

REACTOR OPERATOR EXAMINATION

Question 9

In the case of a persisting high Drywell pressure, Emergency RPV Depressurization will probably be required if Primary Containment Water Level exceeds 16 feet. Which one of the following describes why depressurization is required at this point?

- a. The vacuum breakers will become submerged and will no longer function.
- b. The free volume (airspace) of the Torus will become too small for adequate steam suppression.
- c. The backpressure on the SRV discharge path becomes high enough to damage the SRV steam quenching equipment in the Torus.
- d. Steam from the Drywell will bypass the Suppression Pool and discharge directly into the Torus free volume.

Question 10

The following conditions exist:

- The plant is operating at 50% power.
- Drywell pressure is 1.5 psig.
- Drywell temperature is 220°F.
- Suppression pool pressure is .25 psig.
- Suppression pool temperature is 90°F.
- Steam flow is less than Feed flow.
- RPV level is 25 inches.

Which one of the following is a possible cause of these conditions?

- a. Leaking SRV.
- b. Leaking Main Steam Safety Valve.
- c. Inadvertent RCIC start.
- d. Closure of an MSIV.

REACTOR OPERATOR EXAMINATION

Question 11

After a reactor scram, if one or more SRVs is cycling, EOP 1A, RPV Control, directs the operator to decrease RPV pressure to 940 psig. Which one of the following is a reason for choosing this value for the pressure limit?

- a. To avoid actuating ARI.
- b. To prevent excessive cycling of Non-Low-Low set SRVs.
- c. To allow reset of RPS logic.
- d. To ensure that RPV pressure control remains within the capability of the bypass valves.

Question 12

The reactor was operating at 100 percent power when a reactor scram occurred. Only about one-third of the control rods fully inserted due to an undetected high water level in the Scram Discharge Volume. Reactor power as indicated on the APRMs is 9 percent. Which one of the following actions, would you expect to be most effective in inserting control rods?

- a. Manually initiate ARI.
- b. De-energize scram solenoids.
- c. Manually insert control rods.
- d. Manually vent the CRD over-piston areas.

Question 13

Following the trip of one Recirc Pump with the reactor at power, the operators close the discharge valve of the tripped pump. Which one of the following is the reason that this is done?

- a. Prevents or stops reverse rotation of the tripped pump.
- b. Prevents backflow through the idle jet pumps.
- c. Prevents backflow through the idle recirc loop.
- d. Lowers the probability of entering the instability region of the power/flow map.

***** EXAMINATION CONTINUED ON NEXT PAGE *****

REACTOR OPERATOR EXAMINATION

Question 14

The plant is at 35% power when condenser vacuum degrades to a point that is close to where a manual turbine trip is required. Assuming no change in vacuum, a large reduction in power will result in which one of the following?

- a. Reducing power does not have any effect on this condition.
- b. The necessity of a turbine trip will become more likely.
- c. The necessity of a turbine trip will become less likely.
- d. A reactor scram is more likely to occur.

Question 15

Emergency Diesel Generator #1 is running and is tied to its bus for load testing when a complete loss of offsite AC occurs. Which one of the following describes the expected response of the Diesel Generator to this event?

- a. Tie Breaker 1FA will trip and the diesel will maintain Bus 1F loads.
- b. The governor will swap from Droop Parallel to Isochronous mode.
- c. The Diesel Output breaker will trip, the bus will load shed, then the breaker will reclose and the critical loads will sequence on.
- d. The engine will trip and then immediately go through a standard emergency start and load process.

Question 16

The 480 VAC bus supplying MCC-R has lost power. Which one of the following describes the ability to reenergize this MCC?

- a. The MCC will remain deenergized, 480 Volt MCCs do not have alternate power sources.
- b. The MCC can be supplied from its alternate source only by operator action.
- c. The power source will transfer after the 480 Volt bus has deenergized.
- d. The power source will fast transfer without interruption of 480 Volt power.

***** EXAMINATION CONTINUED ON NEXT PAGE *****

REACTOR OPERATOR EXAMINATION

Question 17

The Shutdown Cooling and LPCI Modes of one loop of RHR are inoperable due to the inability to operate the inboard injection valve. Loss of which one of the following busses could cause this?

- a. A single 24 VDC bus.
- b. A single 125 VDC bus.
- c. Loss of both 125 VDC busses.
- d. A single 250 VDC bus.

Question 18

Which one of the following describes the reason that HPCI trips on a high RPV water level?

- a. To prevent flowing reactor water through the condensing pots and reference legs, thus causing a loss of all level indications.
- b. To prevent filling the Main Steam Lines and pushing water through the SRVs to the Torus, possibly damaging the SRVs.
- c. To prevent filling the Main Steam Lines and losing water to the Main Condenser, possibly damaging bypass valves or the Main Turbine.
- d. To prevent damage to HPCI turbine blades.

REACTOR OPERATOR EXAMINATION

Question 19

Loss of 125 VDC panel AA2 will affect the ADS/SRV system in which one of the following ways?

- a. No effect, the logic power will swap to BB2.
- b. None of the ADS/SRV valves can be opened.
- c. All of the ADS valves will fail open.
- d. Only valves E, F, and G will remain fully functional.

Question 20

The control room has been abandoned and HPCI is being operated from the Alternate Shutdown Facility. Which one of the following automatic functions of HPCI is still active at this time?

- a. High RPV level trip.
- b. Low RPV level auto start.
- c. HPCI turbine protective trips.
- d. HPCI Auxiliary Oil Pump auto start and stop.

Question 21

An Alert has been declared due to high radioactivity release. Part of the response to this is to verify that the Turbine Building HVAC is in service. Which one of the following explains why this is necessary?

- a. Assures a negative pressure is maintained in the Turbine Building, precluding further releases to the atmosphere.
- b. Assures a slight positive pressure is maintained in the Turbine Building, precluding further releases to the environment.
- c. Assures that any releases will be from an elevated, monitored release point.
- d. Assures that any primary system discharges in the Turbine Building are filtered prior to release.

***** EXAMINATION CONTINUED ON NEXT PAGE *****

REACTOR OPERATOR EXAMINATION

Question 22

The following conditions exist:

- The plant is shutdown because both diesels are inoperable.
- REC pumps 'A' and 'D' are running with their Mode Switches in STBY.
- REC pumps 'B' and 'C' are off with their Mode Switches in NORMAL.
- All offsite power is lost.
- A few minutes later the Startup Transformer is restored and the vital busses are re-energized.

Assuming no operator action concerning the REC pumps, which one of the following describes the expected status of the REC pumps one minute after power is restored?

- a. None are running.
- b. All are running.
- c. 'A' and 'D' are running.
- d. 'B' and 'C' are running.

Question 23

Which one of the following explains why accumulators are installed on each MSIV pneumatic supply line?

- a. To dampen pressure transients caused by compressor cycling.
- b. To ensure that sufficient pneumatic pressure is available to operate the MSIVs for up to 30 minutes following a containment isolation event.
- c. To provide a surge volume large enough to assure that the pneumatic system solenoid design pressure is not exceeded and they do not open during a design basis main steam line break.
- d. To provide sufficient pneumatic pressure to stroke the valve through one half cycle after a loss of pneumatic system pressure.

REACTOR OPERATOR EXAMINATION

Question 24

The following events occur with the plant at 10% power:

- A maintenance error causes a complete loss of air pressure to one MSIV.
- After 5 minutes the error is corrected and normal air pressure is restored to the MSIV.
- No operator action is taken during this event.

Which one of the following describes the expected plant response to these events?

- a. While pressure is lost the affected MSIV will close more slowly in response to a close signal if one occurs, otherwise no effect.
- b. The affected MSIV will close and will have to be reopened by operator action.
- c. The affected MSIV will close and then reopen when pressure is restored.
- d. The ability to close the affected MSIV was lost until air pressure was restored.

Question 25

During a plant startup RPV pressure is 600 psig. Loss of CRD flow at this time will have which one of the following effects on control rod motion? (Assume all parameters normal and unchanged unless otherwise stated.)

- a. Normal rod and scram motion is unaffected until accumulator pressure lowers to less than 600 psig.
- b. Normal rod motion has been lost and scram times will exceed limits.
- c. Normal rod motion is unaffected but scram times will exceed limits.
- d. Normal rod motion is lost but scram times will be within limits.

REACTOR OPERATOR EXAMINATION

Question 26

During power operation with RHR pump 'A' in Suppression Pool Cooling, a Station Operator mistakenly manually opens RHR pump 'A' Shutdown Cooling Suction valve (MO-15A). This will have which one of the following consequences?

- a. There will be no consequences in this mode.
- b. When MO-15A reaches 5% open, it will disengage the handwheel and electrically drive back closed.
- c. When MO-15A reaches full open, the RHR Suppression Pool Cooling/Torus Spray outboard valve (MO-39A) will auto close.
- d. The RHR pump will trip on low suction pressure.

Question 27

The EOPs prohibit spraying the Drywell if the Drywell atmosphere is superheated. Which one of the following describes the consequences of ignoring this prohibition?

- a. Water sprayed into the Drywell will turn to steam raising pressure even further.
- b. The cold water will put excessive thermal stress on the Drywell which may lead to its failure.
- c. The effect is unpredictable and would result in putting the plant in an unanalyzed condition.
- d. Drywell pressure would drop more rapidly than could be handled by the vacuum breakers.

REACTOR OPERATOR EXAMINATION

Question 28

Both HPCI and RCIC are in operation when Suppression Pool level lowers to 11 feet. Which one of the following describes the appropriate course of action?

- a. Both HPCI and RCIC must be tripped in order to prevent overpressurizing the Torus
- b. HPCI must be tripped because it, alone has the capacity to overpressurize the Torus. RCIC does not have this capacity.
- c. HPCI must be tripped because the probability of cavitation damage to the pump increases sharply with the Suppression Pool level below 11 feet.
- d. In order to minimize Torus heat load HPCI and/or RCIC should be tripped if not required to maintain RPV level.

Question 29

The Drywell is being ventilated through the reactor building ventilation system when the exhaust plenum radiation level rises to 120 mr/hr. Which one of the following describes the expected response of the ventilation systems to this event?

- a. One train of SGT will start and the Primary Containment Ventilation system will be isolated.
- b. One train of SGT will start and the Primary Containment Ventilation will be re-routed through the operating SGT Train.
- c. Both trains of SGT will start and the Primary Containment Ventilation system will be isolated.
- d. Both trains of SGT will start and the Primary Containment Ventilation will be re-routed through both SGT Trains.

REACTOR OPERATOR EXAMINATION

Question 30

The Offgas System Isolation valve (OG-AO-254) has automatically closed. Which one of the following conditions could have caused this?

- a. Main Steam Line High Radiation.
- b. AOG Steam Supply low pressure.
- c. Condenser Air Removal High Temperature.
- d. Offgas Rad Monitor High-High.

Question 31

The reactor had been shut down for three (3) days when RHR Shutdown Cooling was lost. The reactor was in Cold Shutdown with an RPV temperature at the time of the loss of 130°F. Water level is just below full scale on the Narrow Range indicators. Which one of the following states how long the reactor will remain in Cold Shutdown.

- a. 1.8 hours
- b. 2.3 hours
- c. 2.5 hours
- d. 3.0 hours

Question 32

Which one of the following describes why it is important to establish forced Recirc flow during a Loss of Shutdown Cooling event?

- a. Coolant stratification may mislead the operators into assuming bulk water temperature is below 212°F.
- b. Coolant stratification will produce high RPV stress due to temperature differential between bottom and flange area.
- c. Prevents clad damage due to unstable transition boiling at low pressure.
- d. Steam build up RHR suction piping will lead to waterhammer when RHR flow is restored.

REACTOR OPERATOR EXAMINATION

Question 33

SGT has started as a result of Low RPV Level. The SGT Differential Pressure Control Valves are in AUTO. Under these conditions these valves will respond in which one of the following ways?

- a. They will close and cannot be controlled until the Group 6 isolation is reset.
- b. They will fully open and cannot be controlled until the Group 6 isolation is reset.
- c. They will modulate to maintain Reactor Building negative pressure at its setpoint.
- d. They will be under the manual control of the operator who will adjust them to maintain proper negative pressure.

Question 34

Following a reactor scram the pressure in the Scram Discharge Volume (SDV) rises to RPV pressure. Which one of the following describes the most likely reason for this condition?

- a. SDV pressure returns to CRDH system pressure following a reactor scram by system design.
- b. The scram has not been reset.
- c. The SDV vent valves have failed closed.
- d. The CRDH flow control valve has failed open.

Question 35

With Rod 26-27 selected, which one of the following RWM conditions will prevent the Emergency Insertion of this rod?

- a. None, Emergency In is never blocked.
- b. RWM Select Error.
- c. RWM Withdraw block.
- d. RWM Insert block.

REACTOR OPERATOR EXAMINATION

Question 36

Assuming both vital busses are energized from either the normal or emergency sources, which one of the following describes the response of the RHR pumps to an ECCS initiation signal?

- a. All four pumps always start immediately regardless of power source.
- b. With normal power available all four pumps start immediately. With a loss of offsite power, two pumps start immediately and the other two start after a 5 second time delay.
- c. Two pumps start immediately and the remaining two pumps start after a 5 second time delay regardless of the power source.
- d. The pumps are sequenced on at 5 second intervals regardless of the power source.

Question 37

Loss of 125 VDC Division 2 will have which one of the following effects on the high pressure injection systems (HPCI & RCIC)?

- a. Both HPCI and RCIC retain their auto start function but lose their high level trip protection.
- b. Both HPCI and RCIC lose their auto start function.
- c. RCIC loses its auto start function and HPCI loses its high level trip protection.
- d. HPCI loses its auto start function and RCIC loses its high level trip protection.

***** EXAMINATION CONTINUED ON NEXT PAGE *****

R. REACTOR OPERATOR EXAMINATION

Question 38

Operation of the 'A' Core Spray pump will have which one of the following effects on Torus/Containment Level Recorders PC-LR-1A (Panel 9-3) and PC-LR-1B (Panel 9-4)?

- a. Both PC-LR-1A and 1B will read lower than actual level.
- b. Both PC-LR-1A and 1B will read higher than actual level.
- c. PC-LR-1A will read lower than actual level. PC-LR-1B will read actual level.
- d. PC-LR-1A will read higher than actual level. PC-LR-1B will read actual level.

Question 39

The following events have occurred:

- A LOCA has occurred.
- RPV level decreased to -150 inches.
- The Core Spray pumps auto start.
- RPV level subsequently recovered to +50 inches.
- The operators took both Core Spray Pump Switches to STOP.
- Level then decreased to -175 inches.

Which one of the following describes the expected response of the Core Spray pumps to these events?

- a. After auto-starting they remain on throughout the transient.
- b. They auto stop when the level signal clears and restart when level lowers below the setpoint again.
- c. They stop when switched to STOP but restart when level decreases below their auto-start setpoint.
- d. They stop when switched to STOP and remain off.

REACTOR OPERATOR EXAMINATION

Question 40

In attempting to inject SLC, Train 'A' pump starts as expected, but the Train 'B' pump fails to start due to a motor thermal overload. Which one of the following describes the expected response of the Squib Valves and RWCU system Inboard (RWCU-MO-15) and Outboard (RWCU-MO-18) Isolation valves to these events?

- a. Only the 'A' Squib valve will fire. Both RWCU-MO-15 and RWCU-MO-18 will close.
- b. Only the 'A' Squib valve will fire. Both RWCU-MO-15 and RWCU-MO-18 will remain open.
- c. Both Squib valves will fire. RWCU-MO-15 will remain open and RWCU-MO-18 will close.
- d. Both Squib valves will fire. Both RWCU-MO-15 and RWCU-MO-18 will close.

Question 41

A loss of all AC power will have the following effect on the ability to inject SLC during a failure to scram?

- a. SLC will be unaffected, all essential components are powered by DC.
- b. The squib valves will fire but the pumps cannot be run.
- c. The pumps will start but the squib valves will not fire.
- d. The squib valves will not fire and the pumps will not start.

Question 42

With the reactor at full power, which one of the following is required before RPS will generate a reactor scram in response to a Main Turbine trip?

- a. Any signal producing a turbine trip also provides an output to the RPS producing a reactor scram.
- b. If both turbine stop valves leave fully open OR if a fast closure of the turbine control valves is detected.
- c. If either turbine stop valve leaves the fully open position AND a fast closure of the turbine control valves is detected.
- d. If either turbine stop valve leaves the fully open position OR a fast closure of any turbine control valve is detected.

***** EXAMINATION CONTINUED ON NEXT PAGE *****

REACTOR OPERATOR EXAMINATION

Question 43

Closure of two inboard MSIVs with the plant at 20% power will have which one of the following effects on the RPS?

- a. Always causes a Full Scram.
- b. Always causes a Half Scram.
- c. Full scram or Half Scram depending upon which valves close.
- d. No response or Half Scram depending upon which valves close.

Question 44

A normal plant startup is in progress and the following conditions exist:

- The Reactor Mode Switch is in STARTUP.
- All the IRM range switches are on Range 2.
- No IRMs are bypassed.

Which one of the following describes all the automatic actions that will occur if IRM 'A' Drawer Function Switch is placed in the STANDBY position?

- a. None, as long as its companion APRM is not downscale.
- b. Rod Withdrawal Block only.
- c. RPS Half Scram only.
- d. Rod Withdrawal Block and RPS Half Scram.

REACTOR OPERATOR EXAMINATION

Question 45

Which one of the following describes the conditions under which the Source Range Monitors will cause a full reactor scram?

- a Channel 'A' or 'C' upscale AND Channel 'B' or 'D' upscale with the Reactor Mode Switch in STARTUP.
- b Any two channels upscale with the Reactor Mode Switch not in RUN.
- c Any channel upscale with the Shorting Links closed and the Reactor Mode Switch in REFUEL.
- d Any channel upscale with the Shorting Links open.

Question 46

Which one of the following describes an LPRM input condition to an APRM that will automatically generate a Half Scram and Rod Block.

- a Less than 2 LPRM inputs per LPRM level.
- b Total inputs less than 11.
- c Total inputs less than 11 OR less than 2 LPRM inputs per LPRM level.
- d Total inputs less than 11 AND less than 2 LPRM inputs per LPRM level.

Question 47

Assuming no change in actual level, initiating Jet Pump flow will affect RPV level indication in which one of the following ways?

- a Fuel Zone raises, Wide Range no change, Narrow Range raises.
- b Fuel Zone raises, Wide Range lowers, Narrow Range no change.
- c Fuel Zone no change, Wide Range lowers, Narrow Range no change.
- d Fuel Zone lowers, Wide Range lowers, Narrow Range lowers.

REACTOR OPERATOR EXAMINATION

Question 52

The plant is operating at full power when the outlet valve of Feedwater Heater B-5 fails closed. Which one of the following is the most likely consequence of this event?

- a. RFP 'A' will trip on low suction pressure.
- b. RFP 'B' will trip on low suction pressure.
- c. Both RFPs will continue to operate.
- d. One RFP will trip on low suction pressure - which one can't be predicted.

Question 53

The plant is at 75% power when the Feedwater Control Signal for the 'A' Feed Pump is lost. Which one of the following describes the expected status of Reactor Feedwater control following this failure?

- a. The 'A' RFP will runback to minimum speed, the 'B' RFP speed will raise to max and the recirc system will run back as necessary.
- b. The 'A' RFP will trip, the 'B' RFP will raise to max. The operator will have to manually runback recirc as necessary.
- c. Auto control of the 'A' RFP is lost but the operator has full manual control. The 'B' RFP is unaffected.
- d. Auto control of the 'A' RFP is lost and the operator can only lower speed from the Manual S/U station. The 'B' RFP is unaffected.

REACTOR OPERATOR EXAMINATION

Question 54

The Standby Gas Treatment system has automatically started. The operators have subsequently placed one subsystem in STANDBY. Which one of the following conditions will cause the Standby subsystem to automatically restart?

- a. A new Group 6 Isolation signal is received.
- b. Reactor Building negative pressure becomes less than - .25 inches/H₂O.
- c. The running train's flow rate drops below 800 cfm.
- d. The running train's carbon filter outlet temperature raises above 200°F.

Question 55

A partial loss of offsite power has resulted in a 4160 VAC vital bus being powered by the emergency transformer. Which one of the following describes the expected status of its Emergency Diesel Generator?

- a. Diesel has not started.
- b. Diesel has Fast Started and is not loaded.
- c. Diesel has Fast Started and is loaded in parallel with the Emergency Transformer.
- d. Diesel has Slow Started and is unloaded.

Question 56

A loss of all offsite power has occurred and the Diesel Generator Breaker has just closed powering the vital bus. Which one of the following describes the status of the vital bus undervoltage trips under these conditions?

- a. They are disabled for as long as the Diesel is the only source of power to the bus.
- b. They remain fully operational during bus loading and afterward.
- c. They are disabled during the loading process but become operational when the loading phase is completed.
- d. They are operational during the loading phase but are disabled when loading is completed.

REACTOR OPERATOR EXAMINATION

Question 57

Which one of the following describes the control rods monitored for rod drift?

- a. All control rods.
- b. Only those not selected for movement.
- c. Only those in the current RWM group.
- d. Only those selected for movement.

Question 58

The Rod Worth Minimizer has just generated the following:

- Insert Block.
- Withdraw Block.
- Select Error.
- Out of Sequence Alarm.

Which one of the following is the most likely cause of these conditions?

- a. RWM deenergized.
- b. Drift of the selected rod.
- c. Reed switch at the current rod position has failed open.
- d. Steam flow has failed low with the plant at full power.

REACTOR OPERATOR EXAMINATION

Question 59

The plant is operating at full power when the following Recirc Pump Seal data is noted

- #1 Seal Cavity pressure is 1000 psig
- #2 Seal Cavity pressure is 150 psig

Which one of the following is the most likely cause of these conditions?

- a. Normal operation of both seals.
- b. Failure of both seals.
- c. Partial failure of the #1 seal.
- d. Partial failure of the #2 seal.

Question 60

The plant had been operating at 60% power when a transient reduced RPV level to -20 inches. Assuming no operator action which one of the following pumps should be in operation at this time?

- a. Recirc.
- b. RWCU
- c. RCIC
- d. HPCI

REACTOR OPERATOR EXAMINATION

Question 61

The following conditions exist:

- The plant is shut down.
- Reactor Coolant temperature is 265°F
- One Shutdown Cooling loop is in service.
- A LPCI initiation signal on low RPV level occurs.

Which one of the following describes the operator actions which must be taken in order for LPCI to start injecting?

- a. None, the system will realign for injection automatically.
- b. Reset the Group 2 isolation and reset the Injection valve isolation signal.
- c. Reset the LPCI Initiation Signal and Manually swap the suction path for the desired pump.
- d. Manually swap the suction path for the desired pump, manually start the pump, and reset the Injection valve isolation signal.

Question 62

In the process of withdrawing a control rod the operator notices that there is no position displayed and the rod drift annunciator in alarm for the rod. Which one of the following is the most likely cause of these symptoms?

- a. The RPIS is receiving data for that control rod from two positions indicating a stuck closed reed switch.
- b. The control rod indicated in that window is at an odd reed switch position.
- c. The RPIS Buffer Card or Position Indication Probe/Switch for that rod has failed.
- d. The RPIS for that control rod is in disagreement with the RWM position indication.

REACTOR OPERATOR EXAMINATION

Question 63

An LPRM assigned to a certain RBM group fails downscale. This is the third detector failure out of the group of eight detectors supplying this RBM channel. Which one of the following describes the response of the RBM to this failure?

- a. There will be no functional effect since the RBM still has sufficient LPRM inputs to function.
- b. The rod block setpoint will be automatically adjusted downward to compensate for the lost input.
- c. An Inop Rod Block will be generated until the detector is bypassed.
- d. An Inop Rod Block will be generated requiring that the rod be taken out of service.

Question 64

During a LOCA, excessive spraying of the Drywell may result in which one of the following problems?

- a. Unnecessary damage to equipment in the Drywell.
- b. De-inerting of the Drywell.
- c. Inability to vent the Primary Containment.
- d. Mechanical failure of the Torus to Drywell vacuum breakers.

Question 65

In attempting to recover from an inadvertent Group 1 isolation, the operators find that they are unable to reset the Group 1 isolation signal. Which one of the following conditions, if it existed, would cause this problem?

- a. One or more of the control switches for the MSIVs is in the OPEN position.
- b. The Reactor Mode Switch not in SHUTDOWN.
- c. The Main Steam Line Drain Isolation valves' control switches are in the OPEN position.
- d. The ΔP across the MSIVs exceeds 100 psid.

***** EXAMINATION CONTINUED ON NEXT PAGE *****

REACTOR OPERATOR EXAMINATION

Question 66

The following events occur:

- The plant is operating at 30% power.
- Breaker 1AN trips
- The Startup Transformer is deenergized.
- The Emergency Transformer is energized.
- The Diesel Generator is fully operational.
- After 2 minutes the Startup Transformer is reenergized.

Which one of the following describes how the 4160 VAC electrical distribution system responds to maintain power to bus 1F?

- a. The diesel generator starts and picks up the loads on the bus.
- b. A fast closure of Breaker 1FS occurs applying power from the Emergency Transformer with no UV trips of equipment running on 1F.
- c. Bus 1F loads are shed. Breaker 1FS closes to apply power from the Emergency Transformer. When the Startup Transformer is reenergized the power source is fast transferred back to the Startup Transformer.
- d. Bus 1F loads are shed. Breaker 1FS closes to apply power from the Emergency Transformer. Any change in source after the Startup Transformer becomes available must be done by operator action.

Question 67

Loss of the Division 1 250 VDC supply to the No Break Power Panel (NBPP) Inverter will result in which one of the following?

- a. The inverter will auto transfer to its Div 2 DC source.
- b. The inverter must be manually transferred to its Div 2 DC source.
- c. The NBPP will auto transfer to its standby AC source.
- d. The NBPP must be manually transferred to its standby AC source.

REACTOR OPERATOR EXAMINATION

Question 68

Loss of both divisions of 125 VDC would have which one of the following effects on the Emergency Diesel Engines?

- a. Diesels would auto start and load.
- b. Diesels would auto start, but would not auto load.
- c. Diesels could not be started either automatically or locally.
- d. Diesels could not auto start but could be started locally.

Question 69

Which one of the following describes the effect of one of the three control room Intake Radiation Monitor channels failing upscale?

- a. Alarm only. Logic requires two of three channels upscale for auto action.
- b. The Intake and Exhaust dampers close and the Recirc damper opens.
- c. The Control Room Supply fans trip and the Exhaust Damper closes, pressurizing the Control Room.
- d. The Emergency Supply fan starts and the Inlet filter system is placed in service.

Question 70

Which one of the following describes the plant response to inadequate REC cooling?

- a. The REC non-essential header auto isolates on high REC HX outlet temperature.
- b. The TEC system can be manually cross tied to the supply the REC critical loops if needed.
- c. The Service Water system will automatically cross tie to the REC critical loops on low REC pressure.
- d. The Service Water system can be manually cross tied to the REC critical loops if needed.

REACTOR OPERATOR EXAMINATION

Question 71

Which one of the following describes the response of any TIP detector not in its shield when a Containment Isolation Signal occurs?

- a. A Group 1 Isolation will cause the TIP to be fully withdrawn in Auto Mode.
- b. A Group 1 Isolation will cause the TIP to shift into Manual Reverse until it is fully withdrawn.
- c. A Group 2 Isolation will cause the TIP to shift into Auto Mode until it is fully withdrawn.
- d. A Group 2 Isolation will cause the TIP to shift into Manual Reverse until it is fully withdrawn.

Question 72

Which one of the following HVAC systems will isolate or trip on high radiation in the Reactor Building Exhaust Plenum?

- a. RRMG Set Ventilation
- b. CSCS Pump Room FCUs
- c. Control Building Ventilation
- d. Main Control Room Ventilation

Question 73

One of the Entry Conditions to Flowchart 5A, Secondary Containment Control and Radioactivity Release Control, is Reactor Building Differential Pressure at or above 0 inches water. Which one of the following describes what two areas the differential pressure is measured between?

- a. Between the Reactor Building and outside.
- b. Between the Reactor Building and the Drywell.
- c. Between the Reactor Building and the Torus.
- d. Between the Reactor Building and the Turbine Building.

REACTOR OPERATOR EXAMINATION

Question 74

The Control Room has been abandoned without having scrammed the reactor first. According to EP 5.2.1, Shutdown from Outside the Control Room, which one of the following operators will scram the reactor?

- a. ASD Operator
- b. Control Building Operator
- c. Reactor Feed Pump Operator
- d. Reactor Building Operator

Question 75

An orange hexagonal box with a numeral one (#1) in it appears immediately above Step DW/T-2 in the Drywell Temperature leg of the Primary Containment Control flowchart. Which one of the following describes the steps to which this Caution applies?

- a. It applies only to Step DW/T-2.
- b. It applies to Step DW/T-2 through Step DW/T-8 where the second orange hexagonal box (#5) appears.
- c. It applies to all steps in the DW/T leg below the orange hexagonal box.
- d. It applies to all steps below the orange hexagonal box in the DW/T leg as well as to all steps in any other legs being performed concurrently with the DW/T leg.

Question 76

If Fuel Pool Area Radiation Monitors alarm, the refueling floor is evacuated. Which one of the following requires the Reactor Building to also be evacuated?

- a. Water accumulation in the new fuel storage vault.
- b. The SGT system fails to start.
- c. Reactor Building HVAC fails to isolate.
- d. Spent fuel has been damaged.

***** EXAMINATION CONTINUED ON NEXT PAGE *****

REACTOR OPERATOR EXAMINATION

Question 77

Inadvertent closure of which one of the following CRD HCU valves will result in the inability to scram the affected rod?

- a. Scram Inl Valve - 126
- b. Insert Header Isolation - 101
- c. Exhaust Water Header Isolation - 105
- d. Withdraw Header Isolation - 102

Question 78

The plant is operating at 50% power with RCIC testing in progress. Under these conditions, Tech Specs requires an immediate reactor scram if Suppression Pool temperature reaches which one of the following temperatures?

- a. 95°F
- b. 105°F
- c. 110°F
- d. 120°F

***** EXAMINATION CONTINUED ON NEXT PAGE *****

REACTOR OPERATOR EXAMINATION

Question 79

A plant startup is in progress and the Reactor Mode Switch is in RUN with the APRMs reading as listed below:

-	Channel A	2.3%
-	Channel B	4.0%
-	Channel C	5.0%
-	Channel D	4.7%
-	Channel E	2.4%
-	Channel F	5.1%

Which one of the following describes the effect that this will have on further rises in reactor power?

- a. The power can be raised using rods or recirc flow.
- b. Power can be raised using rods only.
- c. Power can be raised using recirc only.
- d. Power cannot be raised until the Mode Switch is returned to STARTUP/HOT STBY.

Question 80

The plant is operating at full power with all parameters normal when the operators observe that RPV level slowly rises until the Feed Pumps trip causing a Reactor Scram. Which one of the following failures could have caused this behavior?

- a. A steam flow detector has failed high.
- b. Inverter 'A' has been lost.
- c. A feed flow detector has failed low.
- d. Loss of NBPP.

REACTOR OPERATOR EXAMINATION

Question 81

RCIC is in operation due to a small LOCA. Which one of the following describes the expected response of RCIC if RPV level rises to 60 inches?

- a. The Turbine Governor valve will close stopping the turbine.
- b. The Steam Supply Blocking valve (MO-131) will close stopping the turbine.
- c. The Minimum Flow Control valve (MO-27) will open diverting flow to the Suppression Pool.
- d. The Test Line Isolation valves (MO-30&33) will open diverting flow to the ECSTs

Question 82

The following events occur:

- A plant startup is in progress.
- The Main Generator has just been synchronized to the grid.
- Turbine Load Control is in Mode 3.
- Load Demand is set at 100 MW.

Withdrawing control rods under these conditions will result in which one of the following?

- a. Generated MWe will raise.
- b. The turbine bypass valves will move in the open direction.
- c. RPV pressure will raise but Turbine Governor and Turbine Stop valves do not respond.
- d. The Turbine Bypass valves will close and the DEH will switch to Mode 4.

REACTOR OPERATOR EXAMINATION

Question 83

The plant is operating at full power when REC flow to the RWCU system is lost. Which one of the following is the expected response of the RWCU system to this event?

- a. The RWCU pump will trip, the Holding pumps will start. The system will not isolate.
- b. The system will isolate and the RWCU pump and Holding pumps will trip.
- c. The RWCU pump and Holding pumps will trip but no isolation will occur.
- d. The system will isolate and the RWCU pump will trip. The Holding pumps will start.

Question 84

The plant is operating at 30% power with the following pumps running:

- Two Condensate pumps.
- Two Condensate Booster pumps.
- One RFP.

Which one of the following describes the effect that tripping one Condensate pump will have on the status of these running pumps?

- a. Remaining pumps continue to run.
- b. One Condensate Booster pump will trip on Low Suction Pressure after a time delay.
- c. Companion Condensate Booster pump will trip immediately.
- d. One Condensate Booster pump and the RFPT will trip on Low Suction Pressure.

REACTOR OPERATOR EXAMINATION

Question 85

Mechanical Vacuum pumps are used to assist in forming and maintaining condenser vacuum at low power. Which one of the following hazards makes it necessary to secure these pumps above 5% reactor power?

- a. Hydrogen explosion in the pump.
- b. Pump damage due to condensation in the pump.
- c. Inadequate capacity leading to loss of or insufficient condenser vacuum.
- d. Motor overload due to high pump flow rate.

Question 86

Fire Main use during a fire on site caused its pressure to lower to 120 psig for 30 seconds. Pressure subsequently recovered to 180 psig where it has remained for the past 10 minutes. Assuming no operator action concerning the Fire Pumps, which one of the following identifies the Fire pumps that should be running at this time?

- a. Jockey Pump
- b. Jockey Pump, 1E, 1D
- c. 1E, 1D, 1C
- d. 1E, 1D

REACTOR OPERATOR EXAMINATION

Question 87

On a loss of air system pressure, which one of the following automatic actions will occur to protect the availability of Instrument Air?

- a. Auto closure of Non-Crit Instrument Air Isolation valve (IA-MO-80) to isolate non critical Instrument Air loads.
- b. Auto opening of Station Air To Instrument Air Cross Tie (SA-MO-81) to bypass Instrument Air Dryers/Filters.
- c. Auto closure of Service Air Supply Isolation valve (SA-PCV-609) to isolate Service Air loads.
- d. Auto alignment of Standby Instrument Air Dryer.

Question 88

Which one of the following REC heat loads can continue to operate indefinitely after having lost REC cooling?

- a. RHR Pumps
- b. Core Spray Pumps
- c. Recirc Pumps
- d. Recirc MG sets

***** EXAMINATION CONTINUED ON NEXT PAGE *****

REACTOR OPERATOR EXAMINATION

Question 89

Which one of the following configurations will maintain Fuel Pool temperature below 150°F with a full core offload in the Fuel Pool?

- a. One Fuel Pool Cooling pump and one heat exchanger in service.
- b. Both Fuel Pool Cooling pumps and heat exchangers in service with maximum flow to the heat exchangers.
- c. Both Fuel Pool Cooling pumps and heat exchangers in service with a feed and bleed flowpath to the Condensate Storage Tank.
- d. Residual Heat Removal System, operating in the Fuel Pool Assist mode in parallel with Fuel Pool cooling.

Question 90

The Reactor Mode switch is in the REFUEL position, and the Refueling Platform (bridge) is over the Reactor Vessel. Which one of the following would cause a Rod Block under these conditions?

- a. The Fuel Grapple is loaded with fuel.
- b. The Fuel Grapple is in the FULL UP position.
- c. The Frame Mounted Hoist is unloaded and not FULL UP.
- d. All rods are Full-In, except for a selected rod at position 02.

REACTOR OPERATOR EXAMINATION

Question 91

During a system realignment with the reactor at full power a Primary Containment valve has been closed and independently verified. Which one of the following is required to sign off completion of this action in the Control Room Log?

- a. The Operator at the Controls.
- b. The Operator who closed the valve.
- c. The Operator who closed the valve and the Independent Verifier.
- d. The operator who closed the valve, the Independent Verifier, and the Operator at the Controls.

Question 92

If an Operator Aid is part of a controlled procedure, which one of the following describes what assures that the Operator Aid is kept updated with procedure changes?

- a. When use of the Operator Aid is complete, it is returned to the Shift Supervisor who will verify it to be current before its next use.
- b. The Posted Operator Aid Log Index includes the procedure numbers for all active Operator Aids. This Index is checked when procedures are revised.
- c. A copy of the Operator Aid Request Form is kept with the applicable procedure. This form indicates the part of the procedure being used and the locations of all copies of the Operator Aid.
- d. The front of the Control Room procedure is marked that part of the procedure is being used as an Operator Aid.

REACTOR OPERATOR EXAMINATION

Question 93

A loss of Shutdown Cooling has occurred. Which one of the following RWCU lineups will provide the maximum cooling of reactor water?

- a. Suction from the A RR loop only.
- b. Suction from both the A RR loop and the Reactor bottom head drain.
- c. Flow is bypassed around the tube side of the regenerative heat exchangers directly to the non-regenerative heat exchangers.
- d. The Inboard and Outboard Isolation Valve interlocks are bypassed to preclude RWCU pump trips should the valves not be full open.

Question 94

Which one of the following explains the precaution to not operate the CRD charging water header at a pressure greater than 1510 psig?

- a. CRDM damage may result during a reactor scram.
- b. Control rods may inadvertently insert or drift in.
- c. The mini-purge lines to the reactor recirculation pumps may be damaged.
- d. The mini-purge lines to the RWCU pumps may be damaged.

REACTOR OPERATOR EXAMINATION

Question 95

A surveillance test is being performed that requires a manual valve to be opened. The station operator has reported that the valve cannot be opened by hand and has requested permission to use a valve wrench. Having granted this permission, you also direct the station operator to hang a tag on the valve handle. Which one of the following tags is required to be used?

- a. Caution Tag
- b. Danger Tag
- c. Permanent Tag
- d. Test Tag

Question 96

Which ONE of the following is the Technical Specification safety limit for reactor pressure with fuel in the vessel?

- a. 1045 psig
- b. 1080 psig
- c. 1240 psig
- d. 1337 psig

Question 97

Refueling operations are in progress. One control rod is to be withdrawn and bypassed. Which one of the following describes who shall verify that all fuel has been removed from the appropriate control cell before the control rod may be withdrawn?

- a. Refueling Supervisor
- b. Reactor Engineering staff member
- c. Licensed Operator and Reactor Engineering staff member
- d. Two Licensed Operators

REACTOR OPERATOR EXAMINATION

Question 98

A 34 year old licensed operator has a total accumulated dose (TEDE) to date this year of 1800 mrem. If this operator receives the maximum dose extension, which one of the following states the maximum additional dose this operator may receive without exceeding CNS limits?

- a. 200 mrem
- b. 1200 mrem
- c. 2200 mrem
- d. 3200 mrem

Question 99

Your accumulated lifetime dose exceeds the CNS TEDE guideline. Your TEDE for the current year is 820 mrem. Which one of the following describes the maximum amount of time you may work in a 60 mrem field during the current calendar year?

- a. Having exceeded the lifetime TEDE guideline, you cannot work in this field until the next calendar year.
- b. Having exceeded the lifetime TEDE guideline, you cannot work in this field until your lifetime TEDE falls below the lifetime TEDE guideline.
- c. Three hours
- d. Three hours unless a dose extension is granted.

Question 100

The EOPs have been entered and you have been asked by the CRS for the current reactor water level. Actual level is about 20 inches referenced to Instrument Zero. Which one of the following instrument pairs will give you an independent evaluation of level?

- a. Fuel Zone A and Narrow Range C
- b. Wide Range A and Narrow Range B
- c. Wide Range B and Fuel Zone B
- d. Narrow Range A and Fuel Zone C

REACTOR OPERATOR EXAMINATION

***** END OF EXAMINATION *****

RO ANSWER KEY

1)	D	26)	A	51)	C	76)	D
2)	A	27)	D	52)	A	77)	D
3)	A	28)	B	53)	D	78)	C
4)	C	29)	C	54)	C	79)	D
5)	C	30)	D	55)	B	80)	C
6)	D	31)	A	56)	C	81)	B
7)	B	32)	A	57)	A	82)	B
8)	C	33)	B	58)	C	83)	D
9)	C	34)	B	59)	D	84)	A
10)	B	35)	D	60)	A	85)	A
11)	B	36)	C	61)	D	86)	D
12)	C	37)	D	62)	C	87)	C
13)	A	38)	C	63)	A	88)	A
14)	B	39)	D	64)	B	89)	D
15)	A	40)	D	65)	A	90)	A
16)	B	41)	D	66)	D	91)	C
17)	D	42)	B	67)	C	92)	D
18)	D	43)	D	68)	C	93)	C
19)	A	44)	D	69)	D	94)	A
20)	D	45)	D	70)	D	95)	A
21)	C	46)	B	71)	D	96)	D
22)	A	47)	B	72)	A	97)	C
23)	D	48)	C	73)	A	98)	C
24)	C	49)	B	74)	B	99)	C
25)	D	50)	A	75)	C	100)	B

RO EXAM LIST OF ATTACHMENTS

5.8, Page 29, EOP Graph 7

AP 2.4.2.4.1, Attachment 5, ppg. 15, 16, 17

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

Applicant Information

Name:	Region: I / II / III / <u>IV</u>
Date:	Facility/Unit: <u>Cooper Nuclear Station</u>
License Level: RO / <u>SRO</u>	Reactor Type: W / CE / BW / <u>GE</u>
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 four 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

SENIOR REACTOR OPERATOR EXAMINATION

Question 1

With the plant operating at 50% power, which one of the following Main Generator faults will cause an automatic reactor scram?

- a. High Stator Temperature
- b. Low Hydrogen Pressure
- c. Loss of Isolated Phase Bus Duct Cooling
- d. High Differential Current

Question 2

Which one of the following is the reason that the Reactor Mode Switch should be taken out of the RUN position soon after a Reactor Scram?

- a. Prevent loss of the Main Condenser as a heat sink.
- b. Allow movement of the SRM and IRM detectors
- c. Allow reset of the SDV High Level Scram.
- d. Reset the RWM.

SENIOR REACTOR OPERATOR EXAMINATION

Question 3

The following conditions exist:

- RPS Scram Group A&B lights on panel 9-5 are ON.
- All rods are fully inserted.
- Both Recirc Pump field breakers have automatically tripped.

Which one of the following is the most likely cause of the scram?

- a. Automatic ARI initiation.
- b. RPS automatic scram.
- c. Manual initiation of ARI.
- d. Manual Reactor Scram.

Question 4

The plant is operating at 50% power when a Reactor Scram occurs. Which one of the following describes the expected response of the RPV Level Control system to this event?

- a. Immediately after the scram, the Feed Pump Discharge valves close and the Startup Flow Control Isolation valves open.
- b. Three minutes after the scram, the Feed Pump Discharge valves close and one RFPT trips.
- c. Immediately after the Main Turbine trips, the Feed Pump Discharge valves close and the Startup Flow Control Isolation valves open.
- d. Three minutes after the Main Turbine trip, the Feed Pump Discharge valves close and one RFPT trips.

SENIOR REACTOR OPERATOR EXAMINATION

Question 5

A plant transient has caused a reactor scram and prolonged SRV actuation. Current conditions are as follows:

- Reactor pressure 900 psig and rising.
- All SRVs are closed.
- Suppression Pool water level is normal.

If Suppression Pool temperature were to rise to 185°F, which one of the following is closest to the maximum RPV pressure allowed by the EOPs?

- a. 1045 psig
- b. 940 psig
- c. 800 psig
- d. 600 psig

Question 6

The reactor is operating at 70 percent power during a power ascension when one Feedwater pump trips. Prior to the pump trip:

- The reactor was operating at the 100% load line.
- Two Feedwater pumps were operating.

Which one of the following describes the expected response of the Recirc System to this event?

- a. The Recirc pumps immediately runback to minimum speed to avoid power oscillations.
- b. If RPV level lowers to 27.5 inches the Recirc pumps will runback to minimum speed to avoid power oscillations.
- c. The Recirc pumps immediately runback to 45% to minimize the rate of level loss.
- d. If RPV level lowers to 27.5 inches, the Recirc pumps will runback to 45% to minimize the rate of level loss.

SENIOR REACTOR OPERATOR EXAMINATION

Question 7

The following conditions exist:

- A small LOCA has occurred.
- Drywell pressure has raised to 3 psig.
- All four Drywell Fan Coil Units are in RUN.

Which one of the following describes the expected status of the Fan Coil Units under these conditions?

- a. All four will be in operation.
- b. All four will have tripped.
- c. All four will trip if a Group 2 Isolation occurs.
- d. All four will trip if Drywell pressure reaches 3.5 psig.

Question 8

The plant is operating at 50% power and 50% Core Flow when power starts to slowly raise for, as yet, unexplained reasons. Which one of the following is the appropriate immediate response to this event?

- a. Scram the reactor.
- b. Insert control rods.
- c. Reduce Recirc flow.
- d. Lockout Recirc Scoop Tube.

SENIOR REACTOR OPERATOR EXAMINATION

Question 9

In the case of a persisting high Drywell pressure, Emergency RPV Depressurization will probably be required if Primary Containment Water Level exceeds 16 feet. Which one of the following describes why depressurization is required at this point?

- a. The vacuum breakers will become submerged and will no longer function.
- b. The free volume (airspace) of the Torus will become too small for adequate steam suppression.
- c. The backpressure on the SRV discharge path becomes high enough to damage the SRV steam quenching equipment in the Torus.
- d. Steam from the Drywell will bypass the Suppression Pool and discharge directly into the Torus free volume.

Question 10

The following conditions exist:

- The plant is operating at 50% power.
- Drywell pressure is 1.5 psig.
- Drywell temperature is 220°F.
- Suppression pool pressure is .25 psig.
- Suppression pool temperature is 90°F.
- Steam flow is less than Feed flow.
- RPV level is 25 inches.

Which one of the following is a possible cause of these conditions?

- a. Leaking SRV.
- b. Leaking Main Steam Safety Valve.
- c. Inadvertent RCIC start.
- d. Closure of an MSIV.

***** EXAMINATION CONTINUED ON NEXT PAGE *****

SENIOR REACTOR OPERATOR EXAMINATION

Question 11

After a reactor scram, if one or more SRVs is cycling, EOP 1A, RCV Control, directs the operator to decrease RPV pressure to 940 psig. Which one of the following is a reason for choosing this value for the pressure limit?

- a. To avoid actuating ARI
- b. To prevent excessive cycling of Non-Low-Low set SRVs
- c. To allow reset of RPS logic
- d. To ensure that RPV pressure control remains within the capability of the bypass valves.

Question 12

The reactor was operating at 100 percent power when a reactor scram occurred. Only about one-third of the control rods fully inserted due to an undetected high water level in the Scram Discharge Volume. Reactor power as indicated on the APRMs is 9 percent. Which one of the following actions, would you expect to be most effective in inserting control rods?

- a. Manually initiate ARI
- b. De-energize scram solenoids
- c. Manually insert control rods
- d. Manually vent the CRD over-piston areas

Question 13

Following the trip of one Recirc Pump with the reactor at power, the operators close the discharge valve of the tripped pump. Which one of the following is the reason that this is done?

- a. Prevents or stops reverse rotation of the tripped pump.
- b. Prevents backflow through the idle jet pumps.
- c. Prevents backflow through the idle recirc loop.
- d. Lowers the probability of entering the instability region of the power/flow map.

SENIOR REACTOR OPERATOR EXAMINATION

Question 14

The plant is at 35% power when condenser vacuum degrades to a point that is close to where a manual turbine trip is required. Assuming no change in vacuum, a large reduction in power will result in which one of the following?

- a. Reducing power does not have any effect on this condition.
- b. The necessity of a turbine trip will become more likely.
- c. The necessity of a turbine trip will become less likely.
- d. A reactor scram is more likely to occur.

Question 15

Emergency Diesel Generator #1 is running and is tied to its bus for load testing when a complete loss of offsite AC occurs. Which one of the following describes the expected response of the Diesel Generator to this event?

- a. Tie Breaker 1F^A will trip and the diesel will maintain Bus 1F loads.
- b. The governor will swap from Droop Parallel to Isochronous mode.
- c. The Diesel Output breaker will trip, the bus will load shed, then the breaker will reclose and the critical loads will sequence on.
- d. The engine will trip and then immediately go through a standard emergency start and load process.

Question 16

The 480 VAC bus supplying MCC-R has lost power. Which one of the following describes the ability to reenergize this MCC?

- a. The MCC will remain deenergized, 480 Volt MCCs do not have alternate power sources.
- b. The MCC can be supplied from its alternate source only by operator action.
- c. The power source will transfer after the 480 Volt bus has deenergized.
- d. The power source will fast transfer without interruption of 480 Volt power.

SENIOR REACTOR OPERATOR EXAMINATION

Question 17

The Shutdown Cooling and LPCI Modes of one loop of RHR are inoperable due to the inability to operate the inboard injection valve. Loss of which one of the following busses could cause this?

- a. A single 24 VDC bus.
- b. A single 125 VDC bus.
- c. Loss of both 125 VDC busses.
- d. A single 250 VDC bus.

Question 18

Which one of the following describes the reason that HPCI trips on a high RPV water level?

- a. To prevent flowing reactor water through the condensing pots and reference legs, thus causing a loss of all level indications.
- b. To prevent filling the Main Steam Lines and pushing water through the SRVs to the Torus, possibly damaging the SRVs.
- c. To prevent filling the Main Steam Lines and losing water to the Main Condenser, possibly damaging bypass valves or the Main Turbine.
- d. To prevent damage to HPCI turbine blades.

SENIOR REACTOR OPERATOR EXAMINATION

Question 19

Loss of 125 VDC panel AA2 will affect the ADS/SRV system in which one of the following way?

- a. No effect, the logic power will swap to BB2.
- b. None of the ADS/SRV valves can be opened.
- c. All of the ADS valves will fail open.
- d. Only valves E, F, and G will remain fully functional.

Question 20

The control room has been abandoned and HPCI is being operated from the Alternate Shutdown Facility. Which one of the following automatic functions of HPCI is still active at this time?

- a. High RPV level trip.
- b. Low RPV level auto start.
- c. HPCI turbine protective trips.
- d. HPCI Auxiliary Oil Pump auto start and stop

Question 21

An Alert has been declared due to high radioactivity release. Part of the response to this is to verify that the Turbine Building HVAC is in service. Which one of the following explains why this is necessary?

- a. Assures a negative pressure is maintained in the Turbine Building, precluding further releases to the atmosphere.
- b. Assures a slight positive pressure is maintained in the Turbine Building, precluding further releases to the environment.
- c. Assures that any releases will be from an elevated, monitored release point.
- d. Assures that any primary system discharges in the Turbine Building are filtered prior to release.

***** EXAMINATION CONTINUED ON NEXT PAGE *****

SENIOR REACTOR OPERATOR EXAMINATION

Question 22

The following conditions exist:

- The plant is shutdown because both diesels are inoperable.
- REC pumps 'A' and 'D' are running with their Mode Switches in STBY.
- REC pumps 'B' and 'C' are off with their Mode Switches in NORMAL.
- All offsite power is lost.
- A few minutes later the Startup Transformer is restored and the vital busses are re-energized.

Assuming no operator action concerning the REC pumps, which one of the following describes the expected status of the REC pumps one minute after power is restored?

- a. None are running.
- b. All are running.
- c. 'A' and 'D' are running.
- d. 'B' and 'C' are running.

Question 23

Which one of the following explains why accumulators are installed on each MSIV pneumatic supply line?

- a. To dampen pressure transients caused by compressor cycling.
- b. To ensure that sufficient pneumatic pressure is available to operate the MSIVs for up to 30 minutes following a containment isolation event.
- c. To provide a surge volume large enough to assure that the pneumatic system solenoid design pressure is not exceeded and they do not open during a design basis main steam line break.
- d. To provide sufficient pneumatic pressure to stroke the valve through one half cycle after a loss of pneumatic system pressure.

SENIOR REACTOR OPERATOR EXAMINATION

Question 24

The following events occur with the plant at 10% power:

- A maintenance error causes a complete loss of air pressure to one MSIV.
- After 5 minutes the error is corrected and normal air pressure is restored to the MSIV.
- No operator action is taken during this event.

Which one of the following describes the expected plant response to these events?

- a. While pressure is lost the affected MSIV will close more slowly in response to a close signal if one occurs, otherwise no effect.
- b. The affected MSIV will close and will have to be reopened by operator action.
- c. The affected MSIV will close and then reopen when pressure is restored.
- d. The ability to close the affected MSIV was lost until air pressure was restored.

Question 25

During a plant startup RPV pressure is 600 psig. Loss of CRD flow at this time will have which one of the following effects on control rod motion? (Assume all parameters normal and unchanged unless otherwise stated.)

- a. Normal rod and scram motion is unaffected until accumulator pressure lowers to less than 600 psig.
- b. Normal rod motion has been lost and scram times will exceed limits.
- c. Normal rod motion is unaffected but scram times will exceed limits.
- d. Normal rod motion is lost but scram times will be within limits.

SENIOR REACTOR OPERATOR EXAMINATION

Question 26

During power operation with RHR pump 'A' in Suppression Pool Cooling, a Station Operator mistakenly manually opens RHR pump 'A' Shutdown Cooling Suction valve (MO-15A). This will have which one of the following consequences?

- a. There will be no consequences in this mode.
- b. When MO-15A reaches 5% open, it will disengage the handwheel and electrically drive back closed.
- c. When MO-15A reaches full open, the RHR Suppression Pool Cooling/Torus Spray outboard valve (MO-39A) will auto close.
- d. The RHR pump will trip on low suction pressure.

Question 27

The EOPs prohibit spraying the Drywell if the Drywell atmosphere is superheated. Which one of the following describes the consequences of ignoring this prohibition?

- a. Water sprayed into the Drywell will turn to steam raising pressure even further.
- b. The cold water will put excessive thermal stress on the Drywell which may lead to its failure.
- c. The effect is unpredictable and would result in putting the plant in an unanalyzed condition.
- d. Drywell pressure would drop more rapidly than could be handled by the vacuum breakers.

SENIOR REACTOR OPERATOR EXAMINATION

Question 28

Both HPCI and RCIC are in operation when Suppression Pool level lowers to 11 feet. Which one of the following describes the appropriate course of action?

- a. Both HPCI and RCIC must be tripped in order to prevent overpressurizing the Torus.
- b. HPCI must be tripped because it, alone has the capacity to overpressurize the Torus. RCIC does not have this capacity.
- c. HPCI must be tripped because the probability of cavitation damage to the pump increases sharply with the Suppression Pool level below 11 feet.
- d. In order to minimize Torus heat load HPCI and/or RCIC should be tripped if not required to maintain RPV level.

Question 29

The Drywell is being ventilated through the reactor building ventilation system when the exhaust plenum radiation level rises to 120 mR/hr. Which one of the following describes the expected response of the ventilation systems to this event?

- a. One train of SGT will start and the Primary Containment Ventilation system will be isolated.
- b. One train of SGT will start and the Primary Containment Ventilation will be re-routed through the operating SGT Train.
- c. Both trains of SGT will start and the Primary Containment Ventilation system will be isolated.
- d. Both trains of SGT will start and the Primary Containment Ventilation will be re-routed through both SGT Trains.

SENIOR REACTOR OPERATOR EXAMINATION

Question 30

The Offgas System Isolation valve (OG-AO-254) has automatically closed. Which one of the following conditions could have caused this?

- a. Main Steam Line High Radiation
- b. AOG Steam Supply low pressure
- c. Condenser Air Removal High Temperature
- d. Offgas Rad Monitor High-High

Question 31

The reactor is being shut down for three (3) days when RHR Shutdown Cooling was lost. The reactor was in Cold Shutdown with an RPV temperature at the time of the loss of 130°F. Water level is just below full scale on the Narrow Range indicators. Which one of the following states how long the reactor will remain in Cold Shutdown.

- a. 1.8 hours
- b. 2.3 hours
- c. 2.5 hours
- d. 3.0 hours

Question 32

Which one of the following describes why it is important to establish forced Recirc flow during a Loss of Shutdown Cooling event?

- a. Coolant stratification may mislead the operators into assuming bulk water temperature is below 212°F.
- b. Coolant stratification will produce high RPV stress due to temperature differential between bottom and flange area.
- c. Prevents clad damage due to unstable transition boiling at low pressure.
- d. Steam build up RHR suction piping will lead to waterhammer when RHR flow is restored.

SENIOR REACTOR OPERATOR EXAMINATION

Question 33

SGT has started as a result of Low RPV Level. The SGT Differential Pressure Control Valves are in AUTO. Under these conditions these valves will respond in which one of the following ways?

- a. They will close and cannot be controlled until the Group 6 isolation is reset.
- b. They will fully open and cannot be controlled until the Group 6 isolation is reset.
- c. They will modulate to maintain Reactor Building negative pressure at its setpoint.
- d. They will be under the manual control of the operator who will adjust them to maintain proper negative pressure.

Question 34

Following a reactor scram the pressure in the Scram Discharge Volume (SDV) rises to RPV pressure. Which one of the following describes the most likely reason for this condition?

- a. SDV pressure returns to CRDH system pressure following a reactor scram by system design.
- b. The scram has not been reset.
- c. The SDV vent valves have failed closed.
- d. The CRDH flow control valve has failed open.

Question 35

With Rod 26-27 selected, which one of the following RWM conditions will prevent the Emergency Insertion of this rod?

- a. None, Emergency In is never blocked.
- b. RWM Select Error.
- c. RWM Withdraw block.
- d. RWM Insert block.

SENIOR REACTOR OPERATOR EXAMINATION

Question 36

Assuming both vital busses are energized from either the normal or emergency sources, which one of the following describes the response of the FWR pumps to an ECCS initiation signal?

- a. All four pumps always start immediately regardless of power source.
- b. With normal power available all four pumps start immediately. With a loss of offsite power, two pumps start immediately and the other two start after a 5 second time delay.
- c. Two pumps start immediately and the remaining two pumps start after a 5 second time delay regardless of the power source.
- d. The pumps are sequenced on at 5 second intervals regardless of the power source.

Question 37

Loss of 125 VDC Division 2 will have which one of the following effects on the high pressure injection systems (HPCI & RCIC)?

- a. Both HPCI and RCIC retain their auto start function but lose their high level trip protection.
- b. Both HPCI and RCIC lose their auto start function.
- c. RCIC loses its auto start function and HPCI loses its high level trip protection.
- d. HPCI loses its auto start function and RCIC loses its high level trip protection.

SENIOR REACTOR OPERATOR EXAMINATION

Question 38

Operation of the 'A' Core Spray pump will have which one of the following effects on Torus/Containment Level Recorders PC-LR-1A (Panel 9-3) and PC-LR-1B (Panel 9-4)?

- a. Both PC-LR-1A and 1B will read lower than actual level.
- b. Both PC-LR-1A and 1B will read higher than actual level.
- c. PC-LR-1A will read lower than actual level. PC-LR-1B will read actual level.
- d. PC-LR-1A will read higher than actual level. PC-LR-1B will read actual level.

Question 39

The following events have occurred:

- A LOCA has occurred.
- RPV level decreased to -150 inches.
- The Core Spray pumps auto start.
- RPV level subsequently recovered to +50 inches.
- The operators took both Core Spray Pump Switches to STOP.
- Level then decreased to -175 inches.

Which one of the following describes the expected response of the Core Spray pumps to these events?

- a. After auto-starting they remain on throughout the transient.
- b. They auto stop when the level signal clears and restart when level lowers below the setpoint again.
- c. They stop when switched to STOP but restart when level decreases below their auto-start setpoint.
- d. They stop when switched to STOP and remain off.

SENIOR REACTOR OPERATOR EXAMINATION

Question 40

In attempting to inject SLC, Train 'A' pump starts as expected, but the Train 'B' pump fails to start due to a motor thermal overload. Which one of the following describes the expected response of the Squib Valves and RWCU system Inboard (RWCU-MO-15) and Outboard (RWCU-MO-18) Isolation valves to these events?

- a. Only the 'A' Squib valve will fire. Both RWCU-MO-15 and RWCU-MO-18 will close.
- b. Only the 'A' Squib valve will fire. Both RWCU-MO-15 and RWCU-MO-18 will remain open.
- c. Both Squib valves will fire. RWCU-MO-15 will remain open and RWCU-MO-18 will close.
- d. Both Squib valves will fire. Both RWCU-MO-15 and RWCU-MO-18 will close.

Question 41

A loss of all AC power will have the following effect on the ability to inject SLC during a failure to scram?

- a. SLC will be unaffected, all essential components are powered by DC.
- b. The squib valves will fire but the pumps cannot be run.
- c. The pumps will start but the squib valves will not fire.
- d. The squib valves will not fire and the pumps will not start.

Question 42

With the reactor at full power, which one of the following is required before RPS will generate a reactor scram in response to a Main Turbine trip?

- a. Any signal producing a turbine trip also provides an output to the RPS producing a reactor scram.
- b. If both turbine stop valves leave fully open OR if a fast closure of the turbine control valves is detected.
- c. If either turbine stop valve leaves the fully open position AND a fast closure of the turbine control valves is detected.
- d. If either turbine stop valve leaves the fully open position OR a fast closure of any turbine control valve is detected.

SENIOR REACTOR OPERATOR EXAMINATION

Question 43

Closure of two inboard MSIVs with the plant at 20% power will have which one of the following effects on the RPS?

- a. Always causes a Full Scram.
- b. Always causes a Half Scram.
- c. Full scram or Half Scram depending upon which valves close.
- d. No response or Half Scram depending upon which valves close.

Question 44

A normal plant startup is in progress and the following conditions exist:

- The Reactor Mode Switch is in STARTUP.
- All the IRM range switches are on Range 2.
- No IRMs are bypassed.

Which one of the following describes all the automatic actions that will occur if IRM 'A' Drawer Function Switch is placed in the STANDBY position?

- a. None, as long as its companion APRM is not downscale.
- b. Rod Withdrawal Block only.
- c. RPS Half Scram only.
- d. Rod Withdrawal Block and RPS Half Scram.

SENIOR REACTOR OPERATOR EXAMINATION

Question 45

Which one of the following describes the conditions under which the Source Range Monitors will cause a full reactor scram?

- a. Channel 'A' or 'C' upscale AND Channel 'B' or 'D' upscale with the Reactor Mode Switch in STARTUP.
- b. Any two channels upscale with the Reactor Mode Switch not in RUN.
- c. Any channel upscale with the Shorting Links closed and the Reactor Mode Switch in REFUEL.
- d. Any channel upscale with the Shorting Links open.

Question 46

Which one of the following describes an LPRM input condition to an APRM that will automatically generate a Half Scram and Rod Block.

- a. Less than 2 LPRM inputs per LPRM level.
- b. Total inputs less than 11.
- c. Total inputs less than 11 OR less than 2 LPRM inputs per LPRM level.
- d. Total inputs less than 11 AND less than 2 LPRM inputs per LPRM level.

Question 47

Assuming no change in actual level, initiating Jet Pump flow will affect RPV level indication in which one of the following ways?

- a. Fuel Zone raises, Wide Range no change, Narrow Range raises
- b. Fuel Zone raises, Wide Range lowers, Narrow Range no change
- c. Fuel Zone no change, Wide Range lowers, Narrow Range no change
- d. Fuel Zone lowers, Wide Range lowers, Narrow Range lowers

***** EXAMINATION CONTINUED ON NEXT PAGE *****

SENIOR REACTOR OPERATOR EXAMINATION

Question 48

An Automatic Depressurization System (ADS) initiation has occurred, and blowdown is in progress. The initiation signals are still present. Pressing and releasing the DIV I and DIV II RESET pushbuttons will have which one of the following effects on the ADS Valves?

- a. ADS Valves will close and remain closed.
- b. ADS Valves will close, then reopen when the RESET pushbuttons are released.
- c. ADS Valves will close for 120 seconds, and then will reopen.
- d. ADS Valves will remain open. Once initiated the reset pushbuttons have no effect.

Question 49

The following events occurred

- The plant was at 100% power when a small steam leak developed.
- Drywell pressure has risen to 3.0 psig.
- The reactor scrammed.
- RPV water level lowered to +2 inches before being restored to normal.

Which one of the following lists the PCIS group isolations that should have occurred?

- a. Groups 1, 2, 6.
- b. Groups 2, 3, 6.
- c. Groups 1, 6.
- d. Groups 2, 3.

SENIOR REACTOR OPERATOR EXAMINATION

Question 50

Which one of the following conditions will result in the automatic closure of the MSIVs?

- a. RPV Level is -150 inches.
- b. Drywell pressure is 3 psig.
- c. Main Steam Line radiation is 100 mr/hr.
- d. Reactor Building Ventilation exhaust plenum radiation is 50 mr/hr.

Question 51

The following events occur:

- A pressure transient results in the opening of SRVs D and F, at their setpoint of 1080 psig.
- The pressure switch in the tailpipe of SRV D has failed such that it does not sense that the valve is open.
- RPV pressure lowers and the SRVs close.

If pressure rises once again, which one of the following describes when SRVs D and F will reopen?

- a. Both will reopen at 1080 psig.
- b. SRV D at 1015 psig, SRV F at 1080 psig.
- c. SRV D at 1015 psig, SRV F at 1025 psig.
- d. SRV D at 1080 psig, SRV F at 1025 psig.

SENIOR REACTOR OPERATOR EXAMINATION

Question 52

The plant is operating at full power when the outlet valve of Feedwater Heater B-5 fails closed. Which one of the following is the most likely consequence of this event?

- a. RFP 'A' will trip on low suction pressure.
- b. RFP 'B' will trip on low suction pressure.
- c. Both RFPs will continue to operate.
- d. One RFP will trip on low suction pressure - which one can't be predicted.

Question 53

The plant is at 75% power when the Feedwater Control Signal for the 'A' Feed Pump is lost. Which one of the following describes the expected status of Reactor Feedwater control following this failure?

- a. The 'A' RFP will runback to minimum speed, the 'B' RFP speed will raise to max and the recirc system will run back as necessary.
- b. The 'A' RFP will trip, the 'B' RFP will raise to max. The operator will have to manually runback recirc as necessary.
- c. Auto control of the 'A' RFP is lost but the operator has full manual control. The 'B' RFP is unaffected.
- d. Auto control of the 'A' RFP is lost and the operator can only lower speed from the Manual S/U station. The 'B' RFP is unaffected.

***** EXAMINATION CONTINUED ON NEXT PAGE *****

SENIOR REACTOR OPERATOR EXAMINATION

Question 54

The Standby Gas Treatment system has automatically started. The operators have subsequently placed one subsystem in STANDBY. Which one of the following conditions will cause the Standby subsystem to automatically restart?

- a. A new Group 6 Isolation signal is received.
- b. Reactor Building negative pressure becomes less than - 25 inches/H₂O.
- c. The running train's flow rate drops below 800 cfm.
- d. The running train's carbon filter outlet temperature raises above 200°F.

Question 55

A partial loss of offsite power has resulted in a 4160 VAC vital bus being powered by the emergency transformer. Which one of the following describes the expected status of its Emergency Diesel Generator?

- a. Diesel has not started.
- b. Diesel has Fast Started and is not loaded.
- c. Diesel has Fast Started and is loaded in parallel with the Emergency Transformer.
- d. Diesel has Slow Started and is unloaded.

Question 56

A loss of all offsite power has occurred and the Diesel Generator Breaker has just closed powering the vital bus. Which one of the following describes the status of the vital bus undervoltage trips under these conditions?

- a. They are disabled for as long as the Diesel is the only source of power to the bus.
- b. They remain fully operational during bus loading and afterward.
- c. They are disabled during the loading process but become operational when the loading phase is completed.
- d. They are operational during the loading phase but are disabled when loading is completed.

***** EXAMINATION CONTINUED ON NEXT PAGE *****

SENIOR REACTOR OPERATOR EXAMINATION

Question 57

Which one of the following describes the control rods monitored for rod drift?

- a. All control rods.
- b. Only those not selected for movement.
- c. Only those in the current RWM group.
- d. Only those selected for movement.

Question 58

The Rod Worth Minimizer has just generated the following:

- Insert Block.
- Withdraw Block.
- Select Error.
- Out of Sequence Alarm.

Which one of the following is the most likely cause of these conditions?

- a. RWM deenergized.
- b. Drift of the selected rod.
- c. Reed switch at the current rod position has failed open.
- d. Steam flow has failed low with the plant at full power.

SENIOR REACTOR OPERATOR EXAMINATION

Question 59

The plant is operating at full power when the following Recirc Pump Seal data is noted

- #1 Seal Cavity pressure is 1000 psig
- #2 Seal Cavity pressure is 150 psig

Which one of the following is the most likely cause of these conditions?

- a. Normal operation of both seals
- b. Failure of both seals
- c. Partial failure of the #1 seal.
- d. Partial failure of the #2 seal.

Question 60

The plant had been operating at 60% power when a transient reduced RPV level to -20 inches. Assuming no operator action which one of the following pumps should be in operation at this time?

- a. Recirc
- b. RWCU
- c. RCIC
- d. HPCI

SENIOR REACTOR OPERATOR EXAMINATION

Question 61

The following conditions exist:

- The plant is shut down.
- Reactor Coolant temperature is 265°F
- One Shutdown Cooling loop is in service.
- A LPCI initiation signal on low RPV level occurs.

Which one of the following describes the operator actions which must be taken in order for LPCI to start injecting?

- a. None, the system will realign for injection automatically.
- b. Reset the Group 2 isolation and reset the Injection valve isolation signal.
- c. Reset the LPCI Initiation Signal and Manually swap the suction path for the desired pump.
- d. Manually swap the suction path for the desired pump, manually start the pump, and reset the Injection valve isolation signal.

Question 62

In the process of withdrawing a control rod the operator notices that there is no position displayed and the rod drift annunciator in alarm for the rod. Which one of the following is the most likely cause of these symptoms?

- a. The RPIS is receiving data for that control rod from two positions indicating a stuck closed reed switch.
- b. The control rod indicated in that window is at an odd reed switch position.
- c. The RPIS Buffer Card or Position Indication Probe/Switch for that rod has failed.
- d. The RPIS for that control rod is in disagreement with the RWM position indication.

SENIOR REACTOR OPERATOR EXAMINATION

Question 63

An LPRM assigned to a certain RBM group fails downscale. This is the third detector failure out of the group of eight detectors supplying this RBM channel. Which one of the following describes the response of the RBM to this failure?

- a. There will be no functional effect since the RBM still has sufficient LPRM inputs to function.
- b. The rod block setpoint will be automatically adjusted downward to compensate for the lost input.
- c. An Inop Rod Block will be generated until the detector is bypassed.
- d. An Inop Rod Block will be generated requiring that the rod be taken out of service.

Question 64

During a LOCA, excessive spraying of the Drywell may result in which one of the following problems?

- a. Unnecessary damage to equipment in the Drywell.
- b. De-inerting of the Drywell.
- c. Inability to vent the Primary Containment.
- d. Mechanical failure of the Torus to Drywell vacuum breakers.

Question 65

In attempting to recover from an inadvertent Group 1 isolation, the operators find that they are unable to reset the Group 1 isolation signal. Which one of the following conditions, if it existed, would cause this problem?

- a. One or more of the control switches for the MSIVs is in the OPEN position.
- b. The Reactor Mode Switch is in SHUTDOWN.
- c. The Main Steam Line Drain Isolation valves' control switches are in the OPEN position.
- d. The ΔP across the MSIVs exceeds 100 psid.

SENIOR REACTOR OPERATOR EXAMINATION

Question 66

The following events occur:

- The plant is operating at 30% power
- Breaker 1AN trips
- The Startup Transformer is deenergized.
- The Emergency Transformer is energized
- The Diesel Generator is fully operational.
- After 2 minutes the Startup Transformer is reenergized.

Which one of the following describes how the 4160 VAC electrical distribution system responds to maintain power to bus 1F?

- a. The diesel generator starts and picks up the loads on the bus.
- b. A fast closure of Breaker 1FS occurs applying power from the Emergency Transformer with no UV trips of equipment running on 1F.
- c. Bus 1F loads are shed. Breaker 1FS closes to apply power from the Emergency Transformer. When the Startup Transformer is reenergized the power source is fast transferred back to the Startup Transformer.
- d. Bus 1F loads are shed. Breaker 1FS closes to apply power from the Emergency Transformer. Any change in source after the Startup Transformer becomes available must be done by operator action.

Question 67

Loss of the Division 1 250 VDC supply to the No Break Power Panel (NBPP) Inverter will result in which one of the following?

- a. The inverter will auto transfer to its Div 2 DC source.
- b. The inverter must be manually transferred to its Div 2 DC source.
- c. The NBPP will auto transfer to its standby AC source.
- d. The NBPP must be manually transferred to its standby AC source.

SENIOR REACTOR OPERATOR EXAMINATION

Question 68

Loss of both divisions of 125 VDC would have which one of the following effects on the Emergency Diesel Engines?

- a. Diesels would auto start and load
- b. Diesels would auto start, but would not auto load
- c. Diesels could not be started either automatically or locally
- d. Diesels could not auto start but could be started locally

Question 69

Which one of the following describes the effect of one of the three control room Intake Radiation Monitor channels failing upscale?

- a. Alarm only. Logic requires two of three channels upscale for auto action.
- b. The Intake and Exhaust dampers close and the Recirc damper opens.
- c. The Control Room Supply fans trip and the Exhaust Damper closes, pressurizing the Control Room.
- d. The Emergency Supply fan starts and the Inlet filter system is placed in service.

Question 70

Which one of the following describes the plant response to inadequate REC cooling?

- a. The REC non-essential header auto isolates on high REC HX outlet temperature.
- b. The TEC system can be manually cross tied to the supply the REC critical loops if needed.
- c. The Service Water system will automatically cross tie to the REC critical loops on low REC pressure.
- d. The Service Water system can be manually cross tied to the REC critical loops if needed.

***** EXAMINATION CONTINUED ON NEXT PAGE *****

SENIOR REACTOR OPERATOR EXAMINATION

Question 71

Which one of the following describes the response of any TIP detector not in its shield when a Containment Isolation Signal occurs?

- a. A Group 1 Isolation will cause the TIP to be fully withdrawn in Auto Mode.
- b. A Group 1 Isolation will cause the TIP to shift into Manual Reverse until it is fully withdrawn.
- c. A Group 2 Isolation will cause the TIP to shift into Auto Mode until it is fully withdrawn.
- d. A Group 2 Isolation will cause the TIP to shift into Manual Reverse until it is fully withdrawn.

Question 72

Which one of the following HVAC systems will isolate or trip on high radiation in the Reactor Building Exhaust Plenum?

- a. RRMG Set Ventilation
- b. CSCS Pump Room FCUs
- c. Control Building Ventilation
- d. Main Control Room Ventilation

Question 73

One of the Entry Conditions to Flowchart 5A, Secondary Containment Control and Radioactivity Release Control, is Reactor Building Differential Pressure at or above 0 inches water. Which one of the following describes what two areas the differential pressure is measured between?

- a. Between the Reactor Building and outside.
- b. Between the Reactor Building and the Drywell.
- c. Between the Reactor Building and the Torus.
- d. Between the Reactor Building and the Turbine Building.

***** EXAMINATION CONTINUED ON NEXT PAGE *****

SENIOR REACTOR OPERATOR EXAMINATION

Question 74

The Control Room has been abandoned without having scrammed the reactor first. According to EP 5.2.1, Shutdown from Outside the Control Room, which one of the following operators will scram the reactor?

- a. ASD Operator
- b. Control Building Operator
- c. Reactor Feed Pump Operator
- d. Reactor Building Operator

Question 75

An orange hexagonal box with a numeral one (#1) in it appears immediately above Step DW/T-2 in the Drywell Temperature leg of the Primary Containment Control flowchart. Which one of the following describes the steps to which this Caution applies?

- a. It applies only to Step DW/T-2.
- b. It applies to Step DW/T-2 through Step DW/T-8 where the second orange hexagonal box (#5) appears.
- c. It applies to all steps in the DW/T leg below the orange hexagonal box.
- d. It applies to all steps below the orange hexagonal box in the DW/T leg as well as to all steps in any other legs being performed concurrently with the DW/T leg.

SENIOR REACTOR OPERATOR EXAMINATION

Question 76

The reactor is operating at full power when the following events occur

- The Turbine Control Valves close
- The Turbine Bypass Valves fully open.
- The Reactor Scrams
- The SRVs open briefly

Which one of the following could have caused this chain of events?

- a. Turbine Load Reference signal has failed downscale.
- b. The MSIVs have closed.
- c. The Standby (B) Pressure Controller has failed low.
- d. The Flow Limiter has failed downscale.

Question 77

The plant is operating at full power with all parameters normal when the operators observe that RPV level slowly lowers by about 12 inches and restabilizes at this new lower level. Which one of the following instrument failures could have caused this behavior?

- a. A steam flow detector has failed fully downscale.
- b. All steam flow input to RVLCS has been lost
- c. A feed flow detector has failed fully downscale.
- d. All feed flow input to RVLCS has been lost.

SENIOR REACTOR OPERATOR EXAMINATION

Question 78

The reactor has recently scrammed and the MSIVs are closed. HPCI is maintaining RPV level and pressure. Suppression Pool Cooling is not available and Primary Containment Pressure is rising. Which one of the following describes the appropriate considerations if Primary Containment venting becomes necessary?

- a. Venting via the Torus will not keep up with decay heat production but will minimize the rate of radioactivity release.
- b. Venting via the Torus will keep up with decay heat production and will minimize the rate of radioactivity release.
- c. Venting via the Drywell will not keep up with decay heat but will minimize the rate of radioactivity release.
- d. Venting via the Drywell will keep up with decay heat production and will minimize the rate of radioactivity release.

Question 79

The following events occur:

- The reactor has just scrammed from full power.
- Power cannot be determined using the APRMs.
- All other conditions are as expected for these conditions.
- No post scram operator actions have been taken.

At this time which one of the following can provide the power level information necessary if entry into the EOPs is to be avoided?

- a. None, Entry into Failure to Scram is always required if power cannot be determined using APRMs.
- b. IRMs.
- c. SRMs.
- d. Steam flow.

SENIOR REACTOR OPERATOR EXAMINATION

Question 80

Following a LOCA you may have to decide between LPCI injection into the RPV and spraying the Primary Containment. Which one of the following describes the proper priority of these evolutions?

- a. LPCI injection always takes precedence over containment spray.
- b. Containment spray always takes precedence over LPCI injection.
- c. Containment spray takes precedence as long as the 2/3 core height interlock is not in force.
- d. Containment spray takes precedence if Containment pressure is above PCPL (Primary Containment Pressure Limit).

Question 81

The operators have noted that HPCI has tripped and then restarted with no operator action. Which one of the following was the cause of the trip?

- a. Low steam supply pressure.
- b. High steam flow rate.
- c. High RPV level.
- d. High HPCI area temperature.

SENIOR REACTOR OPERATOR EXAMINATION

Question 82

A LOCA has occurred and the following conditions exist:

- Drywell H₂ concentration is 7%
- Torus H₂ concentration is 4%
- Drywell O₂ concentration is 4%
- Torus O₂ concentration is 6%

Which one of the following describes the containment atmosphere?

- a. Both the Torus and the Drywell are below the flammable limit.
- b. The Torus is above the flammable limit and the Drywell is below the flammable limit.
- c. The Drywell is above the flammable limit and the Torus is below the flammable limit.
- d. Both the Torus and the Drywell are above the flammable limit.

Question 83

A loss of Drywell Cooling fans is causing a rise in Drywell temperature and pressure. Drywell pressure is 1.8 psig and slowly increasing. Which one of the following is required by AP 2.4.8.4.2, Loss of Drywell Coolers, to maintain Drywell pressure below 2 psig?

- a. Scram the reactor.
- b. Run both recirculation pumps back to minimum speed to reduce reactor power.
- c. Vent the Drywell through the Standby Gas Treatment System.
- d. Vent the Drywell through the Reactor Building Exhaust Plenum.

SENIOR REACTOR OPERATOR EXAMINATION

Question 84

A fire on site has caused an Emergency Diesel Generator to start inadvertently. Which one of the following is the major concern regarding this event?

- a. The engine will have lost fire protection
- b. The engine will have no trip protection
- c. The engine may be running without SW cooling.
- d. The engine may be running without lube oil circulation.

Question 85

You are the Refueling Supervisor when a Refuel Floor Area High Radiation alarm occurs. You have immediately determined that the alarm is due to the fact that a spent fuel assembly has been moved too close to the surface. Which one of the following specifies the course of action you should take?

- a. Direct the Refueling Machine Operator to terminate all fuel movement and order the immediate evacuation of the refueling floor.
- b. Contact the Shift Supervisor and recommend an Alert be declared and order the immediate evacuation of the Reactor Building.
- c. Contact Radiation Protection and follow their instructions.
- d. Direct the Refueling Machine Operator to lower the spent fuel assembly and order the evacuation of the refuel floor.

SENIOR REACTOR OPERATOR EXAMINATION

Question 86

EOP 5.8, Secondary Containment Control, has been entered due to high area temperatures. Other Secondary Containment parameters also have been increasing. No primary system is currently discharging into the Secondary Containment and Step SC-12 has been reached. Which one of the following combinations of parameter indications would require a reactor shutdown in accordance with OP 2.1.5?

- a. SW Quad temperature alarm High and HPCI Room radiation level of 1600 m²/hr.
- b. RCIC Room radiation level of 800m²/hr and SW Quad water level of 11 feet.
- c. SW Quad temperature of 205°F and SW Quad water level of 10 feet.
- d. SW Quad temperature of 202°F and NE Quad temperature of 210°F.

Question 87

During full power operation, which one of the following is the minimum Operations Department complement required for the Fire Brigade?

- a. Two
- b. Three
- c. Four
- d. Five

Question 88

Reactor thermal power may unintentionally exceed 2381 MWt for brief periods. Which one of the following is maximum thermal power level that may exist without requiring a Notification of Abnormal Condition report?

- a. 2386 MWt
- b. 2398 MWt
- c. 2404 MWt
- d. 2428 MWt

SENIOR REACTOR OPERATOR EXAMINATION

Question 89

The following conditions exist:

- The plant is operating at 100% power.
- HPCI is out of service with the turbine torn down.
- RCIC has just failed its quarterly full flow surveillance test and been declared inoperable.
- It has been 89 days since the previous full flow surveillance test was successfully completed.

Which one of the following actions is required as a result of these conditions?

- a. Initiate an orderly shutdown and reduce reactor pressure to less than 113 psig within 24 hours.
- b. Initiate an orderly shutdown and reduce reactor pressure to less than 150 psig within 24 hours.
- c. Return either HPCI or RCIC to operable status within the next seven days, or complete an orderly reactor shutdown within the next 24 hours.
- d. Provided that ADS is operable, continue reactor operation and return either HPCI or RCIC to operable status within the next seven days, or complete an orderly reactor shutdown and depressurization to less than 150 psig within the next 24 hours.

Question 90

Reactor power has been lowered to 5% to allow a Drywell entry. Which one of the following describes the requirement for closure of the inner and outer airlock doors after each entry and exit by personnel?

- a. Both doors may remain open to facilitate equipment staging.
- b. Only the inner door may remain open if necessary to facilitate staging of equipment.
- c. Either the inner or the outer door may remain open to facilitate staging of equipment, but at least one door must remain closed at all times.
- d. At least one door must remain closed at all times, and both doors must be closed after equipment and personnel have entered or exited.

SENIOR REACTOR OPERATOR EXAMINATION

Question 91

A reactor cooldown is in progress. Reactor pressure is 500 psig, and RWCU inlet temperature is 470 °F. Refer to Attachment 1, RWCU Acceptable Operating Range Curve, from SOP 2.2.66, RWCU. Which one of the following explains the results of operating RWCU under these conditions?

- a. The resulting high depressurization rate > 20 psig/min will cause a High NRHX outlet temperature isolation.
- b. RWCU pump cavitation will cause a Group 3 isolation.
- c. RWCU may cause an excessive reactor cooldown rate.
- d. It will be difficult to maintain regenerative heat exchanger pressure greater than 200 psig to prevent RWCU pump runout.

Question 92

Which one of the following conditions requiring a procedure change can you complete as a Pen-And-Ink change?

- a. A valve, referred to in the procedure, has been removed. You want to cross this step out of the procedure to complete the evolution.
- b. A new instrument has replaced the instrument referred to in the procedure and the tolerance has changed. The new tolerance is actually more conservative than the original value and you wish to change the procedure to reflect the new tolerance.
- c. Due to the installation of a new pressure gage, the sequence of steps to valve the gage into service should have been changed. Two steps are now irrelevant and you wish to remove them.
- d. Two tables were added to the procedure. A reference to one of these tables is made by its correct title but an incorrect table number. You wish to correct the reference to the table number.

SENIOR REACTOR OPERATOR EXAMINATION

Question 93

A pump previously tagged out of service is required to complete a system lineup. You have determined that the work on the pump has been completed, and that the person signed onto the Tagging Order has left the site and cannot be located. According to AP 0.9, Tagging Orders, which one of the following may authorize releasing the tags after ensuring that it is safe to lift the tags?

- a. Worker's Supervisor
- b. Control Room Supervisor
- c. Shift Supervisor
- d. Duty Station Operator

Question 94

The Shift Supervisor has determined that an Emergency MWR is needed. Which one of the following must concur with this decision before the action plan can be completed?

- a. Any other SRO
- b. Operations Supervisor
- c. Plant Manager
- d. Radiation Protection Manager

SENIOR REACTOR OPERATOR EXAMINATION

Question 95

According to the Technical Specification Bases, which one of the following describes how public safety is assured when Primary Containment Integrity is not required during open vessel physics tests performed at low power?

- a. The Control Rod Velocity Limiter prevents fuel damage at these low power levels.
- b. The Reactor Building and Standby Gas Treatment Systems provide sufficient barriers to keep off-site doses well below 10CFR100 limits.
- c. Since reactor pressure is low during these operations, a pipe break cannot occur.
- d. The pressure suppression pool water provides sufficient scrubbing of fission products at these low power levels to preclude off-site releases.

Question 96

A core reload is in progress. Which one of the following activities is specifically your responsibility as the Refueling Floor Supervisor?

- a. Authorize personnel access to the Refuel Floor.
- b. Review and approve Refueling Floor SWPs.
- c. Maintain the official copy of the SNM transfer form.
- d. Review and approve the SNM transfer form sequence of steps.

Question 97

A certain radiation worker has an accumulated TEDE of 800 mrem for the year. Which one of the following lists the individuals who must approve increasing this dose by an additional 1400 mrem?

- a. Department Supervisor and ALARA Supervisor
- b. Department Manager and Radiological Manager
- c. Department Supervisor, Radiological Manager, and ALARA Supervisor
- d. Department Manager, Radiological Manager, and ALARA Supervisor

***** EXAMINATION CONTINUED ON NEXT PAGE *****

SENIOR REACTOR OPERATOR EXAMINATION

Question 98

The reactor has been taken to hot shutdown for replacement of an instrument in Containment. The task has been completed and 18 hours after shutdown, a restart and Primary Containment nitrogen purge is ordered. Which one of the following actions is required?

- a. Reactor Building Exhaust System is to be used for the purge.
- b. Standby Gas Treatment is to be used for the purge.
- c. The Drywell is to be inerted first.
- d. The purge must be delayed for at least six hours after the reactor becomes critical.

Question 99

Which one of the following describes the prescribed method for marking the EOP flowcharts?

- a. Each CRS shall mark the flowcharts with a single color permanent marker (in the plant control room) assigned for his use only.
- b. The CRS is the only one who shall enter information on the EOP flowcharts.
- c. The SS and CRS should use different colored markers to enter information on the EOP flowcharts.
- d. The CRS should use a different color erasable marker each time he enters or re-enters a flowchart.

Question 100

The reactor has scrammed due to high pressure in the Drywell. All rods are in. The Scram Discharge Volume vent and drain valves have failed to close. Which one of the following subsequent additional conditions would require you to escalate this event to the General Emergency level?

- a. Drywell leak rate is confirmed to be > 50 gpm.
- b. Fire in switchyard causes total loss of offsite power.
- c. Drywell leak rate is confirmed to be > 50 gpm concurrent with loss of all offsite power due to fire in switchyard.
- d. SJAE monitor indicates 2400 mrem/hr.

SENIOR REACTOR OPERATOR EXAMINATION

***** END OF EXAMINATION *****

SRO ANSWER KEY

1) D
2) A
3) A
4) C
5) C
6) D
7) B
8) C
9) C
10) B
11) B
12) C
13) A
14) B
15) A
16) B
17) D
18) D
19) A
20) D
21) C
22) A
23) D
24) C
25) D

26) A
27) D
28) B
29) C
30) D
31) A
32) A
33) B
34) B
35) D
36) C
37) D
38) C
39) D
40) D
41) D
42) B
43) D
44) D
45) D
46) B
47) B
48) C
49) B
50) A

51) C
52) A
53) D
54) C
55) B
56) C
57) A
58) C
59) D
60) A
61) D
62) C
63) A
64) B
65) A
66) D
67) C
68) C
69) D
70) D
71) D
72) A
73) A
74) B
75) C

76) A
77) A
78) B
79) D
80) D
81) C
82) A
83) C
84) C
85) D
86) D
87) B
88) D
89) A
90) C
91) B
92) D
93) A
94) B
95) B
96) A
97) D
98) B
99) D
100) D

SRO EXAM LIST OF ATTACHMENTS

5.8, Page 29, EOP Graph 7

AP 2.4.2.4.1, Attachment 5, ppg. 15, 16, 17

EAL Matrix

SOP 2.2.66, Attachment 1, RWCU Acceptable Operating Range Curve

Tech Spec 3.5



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV

811 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

July 2, 1997

93745
226-239
9707150166
9707150168

G. R. Horn, Senior Vice President
of Energy Supply
Nebraska Public Power District
1414 15th Street
Columbus, Nebraska 68601

SUBJECT: NRC INSPECTION REPORT 50-298/97-01

Dear Mr. Horn:

An NRC inspection was conducted June 16-20, 1997, at your Cooper Nuclear Station reactor facility. The inspection included an evaluation of one applicant for a senior reactor operator license and six applicants for reactor operator licenses. We determined that the seven applicants satisfied the requirements and the appropriate licenses were issued. However, the applicants' written examination performance was marginal. In contrast, we observed good performance in all aspects of the operating examination.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

for Arthur T. Howell III, Director
Division of Reactor Safety

Docket No.: 50-298
License No.: DPR-46

Enclosure:
NRC Inspection Report
50-298/97-01

9707150166 4pp
exact copy

IEYR

cc w/enclosure (w/o Attachment 2):
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Kansas Radiation Control Program Director

bcc w/o Attachment 2:

E-Mail report to T. Boyce (THB)
E-Mail report to NRR Event Tracking System (IPAS)
E-Mail report to Document Control Desk (DOCDESK)

bcc to DCD (IE01)

bcc distrib. by RIV:

Regional Administrator	Resident Inspector
DRP Director	DRS-PSB
Branch Chief (DRP/C)	MIS System
Branch Chief (DRP/TSS)	RIV File
Project Engineer (DRP/C)	

bcc w/Attachment 2:
Laura Hurley (DRS/OPS)
Stuart Richards (NRR/HOLB)

DOCUMENT NAME: R:_CNS\CN701RP.TRM

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 50-298
License No.: DPR-46
Report No.: 50-298/97-01
Licensee: Nebraska Public Power District
Facility: Cooper Nuclear Station
Location: P.O. Box 98
Brownville, Nebraska
Dates: June 16-20, 1997
Inspectors: Thomas R. Meadows, Chief Examiner, Operations Branch
Mike E. Murphy, Reactor Engineer (Examiner), Operations Branch
Ryan E. Lantz, Reactor Engineer (Examiner), Operations Branch
Approved By: John L. Pellet, Chief, Operations Branch
Division of Reactor Safety

ATTACHMENTS:

Attachment 1: Supplemental Information
Attachment 2: Final Written Examinations and Answer Keys

970715 0168 9pp.

EXECUTIVE SUMMARY

Cooper Nuclear Station
NRC Inspection Report 50-298/97-01

NRC examiners evaluated the competency of one senior reactor operator and six reactor operator license applicants for issuance of operating licenses at the Cooper Nuclear Station. The licensee developed the initial license examinations using the pilot process program guidance contained in Generic Letter 95-06 and NUREG-1021, Supplement 1, "Operating Licensing Examiners Standards." NRC examiners reviewed, approved, and administered the examinations. The initial written examinations were administered to all seven applicants on June 13, 1997, by facility proctors in accordance with instructions provided by the chief examiner. The NRC examiners administered the operating tests on June 17-19, 1997. All of the applicants displayed the requisite knowledge and skills to satisfy the requirements of 10 CFR Part 55 and were issued the appropriate licenses. Four applicants passed with marginal scores on their written examinations.

Operations

- The control room operators exhibited professional demeanor and good communications (Section O1).
- All seven applicants passed the written examinations. Four applicants demonstrated marginal knowledge on the written examinations, with final scores of 80 or 81 percent. Overall, applicant scores on the written examination were marginal (Section O4.1).
- All seven applicants passed the operating test. The applicants appeared well prepared for their tests, with only minor performance deficiencies identified (Section O4.2).
- The licensee submitted an examination outline of adequate quality, but it was revised to enhance the examination (Section O5.1.1).
- The licensee submitted examination package was adequate for administration, but was enhanced to improve discrimination quality. The licensee staff was responsive in providing enhancements identified during the review process (Section O5.1.2).

Report Details

Summary of Plant Status

The plant operated at essentially 100 percent power for the duration of this inspection.

I. Operations

01 Conduct of Operations

a. Inspection Scope

During the in-plant main control room portion of the operating test walkthroughs, the examiners observed the on-shift operators during routine operations of the facility.

b. Observations and Findings

The demeanor of the operators was professional and crew communications were effective. The inspectors observed several spurious alarms that were acknowledged promptly by the operators.

c. Conclusions

The control room operators exhibited professional demeanor. Communications was effective.

04 Operator Knowledge and Performance

04.1 Initial Written Examination

a. Inspection Scope

On June 13, 1997, the facility licensee proctored the administration of the written examinations approved by the NRC to six individuals who had applied for initial reactor operator licenses, and one individual who had applied for initial upgrade senior operator license. The licensee graded the written examinations and the examiners reviewed its results. The licensee also performed a post-examination question analysis which was reviewed by the examiners.

b. Observations and Findings

The score for the senior reactor operator upgrade and two reactor operator applicants was the minimum passing score of 80 percent. The scores for the other four reactor operator applicants ranged from 81 to 87 percent, with the average score for all applicants at 83 percent. Overall, the applicants demonstrated a

marginal level of knowledge on the written examination. More than half of all applicants missed the following questions which had the same number on both examinations: 11, 14, 22, 26, 35, 58, 64, 89, 92, 07, and 99. Also, none of the applicants got question 77 right. All of the above questions were determined by the licensee to be valid and the chief examiner concurred with this determination. These questions break down in the following areas:

<u>AREA</u>	<u>Number of Questions Missed by Over 50%</u>
• EOPs/EOP Bases	two
• Procedure/Equipment Basis	one
• System Interlocks	one
• Electrical System	one
• System design and Operation	four
• Administration	two
• Radiological Protection	one

Reasons for missing these questions appeared to be related to question difficulty and isolated training weaknesses. The licensee initiated appropriate actions to upgrade candidate specific knowledge and correct specific training weaknesses.

c. Conclusions

All seven applicants passed their applicable written examinations. Overall, some applicants demonstrated a marginal knowledge level on the written examinations. However, no broad knowledge or training weaknesses were identified as a result of evaluation of the graded examinations.

04.2 Initial Operating Test

a. Inspection Scope

The examination team administered the various portions of the operating examination to the seven applicants on June 17-19, 1997. Each applicant participated in two dynamic simulator scenarios. Each reactor operator applicant also received a walkthrough test which consisted of ten system tasks and four administrative areas. The upgrade senior reactor operator applicant was tested in five system tasks and four administrative areas.

b. Observations and Findings

All applicants passed all portions of the operating test. The applicants performed well in the dynamic simulator scenarios. However, three isolated performance deficiencies were observed: (1) emergency operating procedure entry conditions were not always communicated to the control room supervisor by the reactor operators, although critical parameters were effectively monitored by the crews,

(2) annunciators were not always acknowledged immediately, which tended to delay addressing reemerging or degrading conditions to some extent, and (3) only one crew of three recognized that a containment vacuum breaker had stuck open in one of the scenarios. None of these deficiencies affected the overall effective performance of the three crews, but were communicated to the licensee's staff for incorporation into future training.

Overall, the applicants performed well on the walkthrough portion of the test. However, two of the seven applicants failed to start a service water booster pump when initiating drywell sprays. Although this oversight would not hinder drywell spray function, the inspectors found that it was a management expectation and procedural requirement to start the booster pump for this task.

c. Conclusions

All seven applicants passed the operating test. The applicants were well prepared.

O5 Operator Training and Qualification

O5.1 Initial Licensing Examination Development

The facility licensee developed the initial licensing examination in accordance with guidance provided in Generic Letter 95-06, "Changes in the Operator Licensing Program."

O5.1.1 Examination Outline

a. Inspection Scope

The facility licensee submitted the initial examination outline on April 22, 1997. The chief examiner reviewed the submittal against the requirements of NUREG-1021, "Licensed Operator Examiner Standards" Revision 7, Supplement 1, and NUREG/BR-0122, "Examiner's Handbook for Developing Operator Licensing Written Examinations," Revision 5.

b. Observations and Findings

The chief examiner determined that the initial examination outline satisfied NRC requirements. The chief examiner advised the licensee to enhance the simulator scenarios by adding additional component and instrument failures.

c. Conclusions

The licensee submitted an adequate examination outline on April 22, 1997.

O5.1.2 Examination Package

a. Inspection Scope

The facility licensee submitted the completed examination package on June 2, 1997. The chief examiner reviewed the submittal against the requirements of NUREG-1021, "Licensed Operator Examiner Standards" Revision 7, Supplement 1, and NUREG/BR-0122, "Examiner's Handbook for Developing Operator Licensing Written Examinations," Revision 5.

b. Observations and Findings

The draft written examination was transmitted by the licensee to the NRC on May 7, 1997. The draft written examination contained 125 questions, 75 of which were designated to be included on both reactor operator and senior reactor operator examinations. All of the questions were developed for this examination. The draft examination was considered technically valid, to discriminate at the proper level, and responsive to the sample plan submitted by the licensee on April 22, 1997. However, the chief examiner provided enhancement suggestions for about a third of the questions. The suggestions generally related to clarity of the question stem, inadvertent cues, distractor plausibility, or level of knowledge required. After extensive discussion of the chief examiner's suggestions, the licensee modified the examinations as agreed. The chief examiner concurred with the resolution of his suggestions and the final product. The licensee performed a post examination analysis and recommended that no further changes be made to the written examinations. The examiners concurred with this analysis and recommendation.

The licensee submitted two dynamic scenarios and one backup scenario, which was not used during the examination. The chief examiner made suggestions to enhance the examination quality by replacing some component and instrument failures to better discriminate applicant performance. Other comments, which the licensee incorporated, included editorial and enhancements to facilitate administration. The licensee initiated minor editorial enhancements to the scenarios to facilitate administration during the chief examiner's preparation week onsite.

To support the systems portion of the operating test, the facility licensee provided job performance measures developed to evaluate selected operator tasks that contained well written task elements, performance standards, and comprehensive evaluator cues. Fifteen job performance measure tasks with two followup

questions each were submitted. The chief examiner provided comments concerning enhancement of the walkthrough test, which were incorporated. The chief examiner challenged the critical step assignments for the job performance measures and the licensee revised these critical step assignments. Also, the licensee revised three job performance measure questions in response to the chief examiner's enhancement suggestions.

The licensee submitted two sets of job performance measures to cover the administrative section of the walkthrough test. One set was submitted for reactor operator applicants and another for the senior operator upgrade applicant. The job performance measures submitted were acceptable. However, to facilitate administration, some minor changes were made to some administrative job performance measures during preparation week.

c. Conclusions

Overall, the final written examination and operating test materials submitted were of high quality, discriminated at the appropriate license level, and were adequate for administration. Further, licensee staff were highly responsive in responding to enhancement suggestions developed during the review process. No significant changes to examination materials were required as a result of administration.

05.2 Simulation Facility Performance

a. Inspection Scope

The examiners observed simulator performance with regard to fidelity during the examination validation and administration.

b. Observations and Findings

The simulator performance was good. No fidelity problems were noted. The licensee's simulator support staff were very efficient and greatly enhanced the examination schedule. Turn around times between scenarios and job performance measures were very fast. This eliminated dead time and helped ease applicant stress levels.

c. Conclusions

The simulator and simulator staff supported the examinations well.

V. Management Meetings

X1 Exit Meeting Summary

The examiners presented the inspection results to members of the licensee management at the conclusion of the inspection on February 28, 1997. The licensee acknowledged the findings presented.

The licensee did not identify as proprietary any information or materials examined during the inspection.

ATTACHMENT 1

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

William Green, Lead Licensed Instructor
Tim Florence, Simulator Supervisor
Phil Graham, Vice President, Nuclear
Steve Jobe, Technical Training Supervisor
Mike Peckham, Plant Manager
Léon Croteau, Training Manager
Duane Shallenberger, Lead Licensed Instructor
Dave VanDerKamp, Operations Supervisor
Dave Robinson, Quality Assurance Assessment Manager
Brad Houston, Licensing Manager
Bob Creason, Senior Operator Training Specialist

NRC

None

INSPECTION PROCEDURES USED

NUREG 1021	Supplement 1, "Operator Licensing Examiner Standards," Revision 7
NUREG/BR-0122	"Examiners' Handbook for Developing Operator Licensing Written Examinations," Revision 5