ENCLOSURE 1

EXAMINATION REPORT - 50-261/OL-85-01

Facility Licensee: Carolina Power and Light Company
411 Fayetteville Street
Raleigh, NC 27602

Facility Name: H. B. Robinson

Facility Docket No. 50-261

Written and oral examinations were administered at H. B. Robinson near Hartsville, S.C.

Chief Examiner: W H Douglas for A. J. Vinnola — 7/16/85 Date Signed

Approved by: Bruce A. Wilson, Section Chief — 7/17/85 Date Signed

Summary:

Examinations on June 18 - 20, 1985

Written and oral examinations were administered to three candidates, all of whom passed.

REPORT DETAILS

1. Facility Employees Contacted:

*R. S. Allen, Project Specialist - Training
*J. F. Benjamin, Principle Engineer - Operations
*R. E. Morgan, General Manager
*C. A. Bethea, Director - Training
*V. L. Smith, Senior Specialist - Training
*J. B. Allen, Senior Specialist - Training
*Howard Whitcomb, Resident Inspector - NRC
*Harry Krug, Senior Resident Inspector - NRC
W. M. Blaisdell, Senior Specialist - Training

*Attended Exit Meeting

2. Examiner:

*A. J. Vinnola, EG&G

*Chief Examiner

3. Examination Review Meeting:

At the conclusion of the written examinations, the examiners met with W. M. Blaisdell, J. B. Allen, V. L. Smith, and R. S. Allen to review the written examination and answer key. The following comments were made by the facility reviewers:

1. Question 5.14

Facility Comment:

Recommend Item "d" also as correct answer since initial Keff was not given nor was there a statement in the stem of the question directing one to assume initial Keff.

NRC Resolution:

Even though the initial Keff was not provided, any assumed initial Keff would result in the correct answer. Therefore, only one answer is correct and "d" is not correct because there is enough data given to arrive at the correct relationship.

2. Question 6.1

Facility Comment:

Recommend changing correct answer from "b" to "c". Reference Drawing #5379-685.

NRC Resolution:

Typographic error corrected.

3. Question 6.19

Facility Comment:

Recommend accepting "b" or "c" as correct answers. Reference for "c" - SD-002, Page 11, 12 or Drawing #5379-1082.

NRC Resolution:

Choice "b" is the correct answer as stated on the master answer sheet. Choice "c" is also correct. System description - 002, Page 26, states the operator will take action to add a predetermined amount of sodium hydroxide (NaOH). This was originally understood by the examiner that NaOH has to be manually injected into the spray flow. However, the facility reviewers' reference does indicate that NaOH does, in fact, automatically inject into the spray flow and the operator then will throttle the amount of NaOH injected. Answer "c" was added to the master answer sheet.

4. Question 6.31

Facility Comment:

Recommend deleting this question as there is no correct answer to choose from in Column "B". Reference Drawing #5379-2759, Sheet 8.

NRC Resolution:

The facility reviewers' comment is correct. The examiner misinterpreted the referenced drawing to indicate that manual "P" signal caused the MSIV's to shut simultaneously. Part "b" was deleted, therefore, Section 6 total points available was changed to 34.5.

5. Question 7.05.a and 7.14

Facility Comment:

One of the facility reviewers stated he did not believe an operator needs to memorize this information and did not believe it should be questioned on the written examination.

NRC Resolution:

Examiner Standard ES-202.B.4 states that although the candidate is not expected to have normal procedures committed to memory, he/she is expected to be able to explain reasons, cautions and limitations of normal operating procedures. No change to question or answer key.

6. Question 7.16

Facility Comment:

Answers "a" and "c" are correct.

a. Immediate action says to manually insert rods if in manual.

c. Max power allowed prior to and during retrieval of rod is 70%.

- limiter will not allow increase of >70% until rod drop reset on NIS.

- also, it says to verify CAOC and Quadrant Power Tilt are within limits. This is done <u>after</u> the rod is retrieved.

Reference AOP-001, Section 4.0

NRC Resolution:

Choice "c" is accepted as a correct answer in addition to choice "a", because the rod drop reset is performed after the rod has been retrieved. The QPTR and CAOC verification is the <u>first</u> subsequent step listed in AOP-100 <u>prior</u> to rod retrieval, and therefore, does not restrict power level, if they are within limits.

7. Question 7.18

Facility Comment:

Recommend accepting item "a" or "b" as correct. AOP-002 directs the operator to Emergency Borate if two or more rod position indicators fail to indicate control rods inserted after a trip. Reference AOP-002, Page 3, 4. Also recommend accepting Item "c" as correct answer because successful completion would immediately mitigate the event and this action is taught and evaluated during simulator training.

Reference HBR Simulator Exercise Guide #HBR-RT-2.1E.

NRC Resolution:

The question stem references FRP-S.1 operator actions in the event that a manual reactor trip is not successful. The master answer sheet lists choice "a" to be the correct answer. Choice "b" (emergency borate) is listed in AOP-002 as stated by facility, however, it is listed in FRP-S.1 as the fourth step after the operator has verified reactor trip, verified turbine trip and checked AFW or FW pumps running. Item "c" (locally open reactor trip breakers) is not listed in FRP-S.1, but is listed on the reference provided by facility (HBR Simulator Exercise Guide #HBR-RT-2.1E).

If the facility trains their people to perform choices "b" and "c", in the event a manual reactor trip is unsuccessful, their training (HBR Simulator Exercise Guide #HBR-RT-2.1E) and AOP do not agree with the Function Restoration Procedure, FRP-S.1. It is, therefore, recommended that these references are to be revised in agreement with each other, and is listed as an open item.

To accept the facility review comment is to admit that FRP-S.1 does not provide adequate guidance to the operator, and that the order of operator actions in FRP-S.1 does not have to be followed. However, because of conflicting training and plant references, the question is deleted.

8. Question 7.21

Facility Comment:

During the review the reviewer stated that a stable or increasing RCS Delta T is an indication for monitoring RCS natural circulation cooldown.

NRC Resolution:

The facility was unable to provide a reference for the comment and it is not listed in the EPP-5 procedure, therefore, the comment was not accepted.

9. Question 7.27

Facility Comment:

Recommend deleting this question as it involves a task (operation of spent fuel crane) that operations personnel are not responsible for nor trained on. The steps in FHP-034 that address the operation of the spent fuel crane are performed by Maintenance personnel. Reference note in FHP-034, Page 3, Item 4.1 then reference Page 16, Item 5.3.6.

NRC Resolution:

The examiner verified the proceeding comment to be correct and question is deleted from the examination. Therefore, Section 7 total points available was changed to 33.5.

10. Question 8.27

Facility Comment:

Recommend additional answer; "Pressurizer pressure control is operable," since the question stated critical >350°F. Reference Technical Specification, Page 3.1-3a, Paragraph b.

NRC Resolution:

The facility comment is verified to be correct. The additional answer accepted is "Pressurizer pressure control system is operable." Any two of the three answers required for full credit.

11. Question 8.30

Facility Comment:

Additional answers for personnel who may relieve S.F. as Site Emergency Coordinator.

1. General Manager
2. Manager - Operations
3. Manager - Maintenance
4. Manager - Technical Support
5. Manager - E&RC
6. Operating Supervisor (Unit #2)
7. Mechanical Supervisor (Unit #2)
8. I&C Maintenance Supervisor (Unit #2)

9. Radiation Control Supervisor
10. Environmental & Chemistry Supervisor
11. Engineering - Plant Supervisor
12. Engineering - Performance Supervisor

Reference AP-001, Page 14

The PEP states that the shift foreman is the interim. We teach in lesson plan PROC-LP-9 that a shift foreman may relieve the on-shift shift foreman as Emergency Coordinator if none of the above personnel have arrived on site. This is for the purpose of allowing the on-shift shift foreman to involve himself in more detail with placing the plant in a safe condition. We recommend that shift foreman be allowed as an additional answer.

NRC Resolution:

The comment is verified to be correct and additional answers accepted.

4. Exit Meeting

At the conclusion of the site visit the examiners met with representatives of the plant staff to discuss the results of the examination. Those individuals who clearly passed the oral examination were identified.

There were no generic weaknesses (greater than 75 percent of candidates giving incorrect answers to one examination topic) noted during the oral examination.

The cooperation given to the examiners and the effort to ensure an atmosphere in the control room conducive to oral examinations was also noted and appreciated.

The licensee did not identify as proprietary any of the material provided to or reviewed by the examiners.

ENCLOSURE 3

U. S. NUCLEAR REGULATORY COMMISSION
SENIOR REACTOR OPERATOR LICENSE EXAMINATION

Reviewed By:
1. W.M. Blaisdell
2. J.B. Allen, Jr.
3. V.L. Smith
4. R.S. Allen

FACILITY: ROBINSON

REACTOR TYPE: PWR-WEC3

DATE ADMINISTERED: 85/06/18

EXAMINER: VINNOLA, A.

APPLICANT: Master

INSTRUCTIONS TO APPLICANT:

Use separate paper for the answers. Write answers on one side only. Staple question sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires at least 70% in each category and a final grade of at least 80%. Examination papers will be picked up six (6) hours after the examination starts.

CATEGORY VALUE	% OF TOTAL	APPLICANT'S SCORE	% OF CATEGORY VALUE		CATEGORY
~~35.00~~	25.00			5.	THEORY OF NUCLEAR POWER PLANT OPERATION, FLUIDS, AND THERMODYNAMICS
~~35.00~~	25.00			6.	PLANT SYSTEMS DESIGN, CONTROL, AND INSTRUMENTATION
~~35.00~~	25.00			7.	PROCEDURES - NORMAL, ABNORMAL, EMERGENCY AND RADIOLOGICAL CONTROL
~~35.00~~	25.00			8.	ADMINISTRATIVE PROCEDURES, CONDITIONS, AND LIMITATIONS
~~140.00~~					TOTALS

FINAL GRADE _____%

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

_____
APPLICANT'S SIGNATURE

QUESTION 5.01 (1.00)

If reactor power increases from 1000 cps to 5000 cps in 30 seconds, what is the SUR?

a. 1.0 DPM
b. 1.2 DPM
c. 1.4 DPM
d. 1.6 DPM

QUESTION 5.02 (1.00)

In which of the following conditions is the Moderator Temperature Coefficient most negative?

a. BOL, high temperature
b. BOL, low temperature
c. EOL, low temperature
d. EOL, high temperature

QUESTION 5.03 (1.00)

Which of the following cause the fuel centerline temperature to decrease over core life?

a. Fuel Densification
b. Clad Creep
c. Buildup of Fission Products
d. Higher Linear Power Density

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.04 (1.00)

During a Xenon-free reactor startup, critical data was inadvertently taken two decades below the required Intermediate Range (IR) level (1xE-10 amps). The critical data was taken again at the proper IR level (1xE-8 amps). Assuming RCS temperatures and boron concentrations were the same for each set of data, which of the following statements is correct?

a. The critical rod position taken at the proper IR level is LESS THAN the critical rod position taken two decades below the proper IR level.

b. The critical rod position taken at the proper IR level is THE SAME AS the critical rod position taken two decades below the proper IR level.

c. The critical rod position taken at the proper IR level is GREATER THAN the critical rod position taken two decades below the proper IR level.

d. There is not enough information given to determine the relationship between the critical rod position taken at the proper IR level and the critical rod position taken two decades below the proper IR level.

QUESTION 5.05 (1.00)

Which of the following statements concerning Xenon-135 production and removal is correct?

a. At full power, equilibrium conditions, about half of the Xenon is produced by Iodine decay and the other half is produced as a direct fission product.

b. Following a reactor trip from equilibrium conditions, Xenon peaks because delayed neutron precursors continue to decay to Xenon while neutron absorption (burnout) has ceased.

c. Xenon production and removal increases linearly as power level increases; i.e., the value of 100% equilibrium Xenon is twice that of 50% equilibrium Xenon.

d. At low power levels, Xenon decay is the major removal method. At high power levels, burnout is the major removal method.

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.06 (1.00)

Which of the following nuclear parameters are ALL contributors to differential rod worth?

a. Local gamma flux, peak gamma flux, slowing down length, thermal diffusion length.

b. Local neutron flux, peak neutron flux, slowing down length, thermal diffusion length.

c. Local gamma flux, average gamma flux, slowing down length, thermal diffusion length.

d. Local neutron flux, average neutron flux, slowing down length, thermal diffusion length.

QUESTION 5.07 (1.00)

Which of the following statements is correct, concerning water as the moderator?

a. Water has a HIGH scattering cross-section, a LOW absorption cross-section, and a LARGE energy decrement per collision.

b. Water has a LOW scattering cross-section, a HIGH absorption cross-section, and a LARGE energy decrement per collision.

c. Water has a HIGH scattering cross-section, a LOW absorption cross-section, and a SMALL energy decrement per collision.

d. Water has a LOW scattering cross-section, a HIGH absorption cross-section, and a SMALL energy decrement per collision.

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.08 (1.00)

Which of the following statements describes the relationship between integral and differential rod worth?

a. Integral rod worth (at any location) is the slope of the differential rod worth curve at that location.

b. Integral rod worth (at any location) is the total area under the differential rod worth curve from the end of the rod to that location.

c. Integral rod worth (at any location) is the square of the differential rod worth at that location.

d. There is no relationship between integral and differential rod worth.

QUESTION 5.09 (1.00)

Which of the following statements concerning Shutdown Margin (SDM) is correct?

a. The maximum SDM requirement occurs at EOL and is based on a rod ejection accident.

b. The maximum SDM requirement occurs at EOL and is based on a steam line break accident.

c. The maximum SDM requirement occurs at BOL and is based on having a positive moderator temperature coefficient.

d. The maximum SDM requirement occurs at BOL and is based on a rod withdrawal accident while in the source range.

QUESTION 5.10 (1.50)

For the following definitions, give the term that is defined.

a. The amount of reactivity that is needed to go from hot zero power to hot full power.

b. The fractional change in neutron population per generation.

c. The decay of a neutron into a proton with the simultaneous ejection of an electron (and antineutrino) from the nucleus.

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.11 (1.50)

Indicate whether the following statements concerning delayed neutrons are TRUE or FALSE.

a. If the reactor is supercritical, then a larger percentage of delayed neutrons is from the shorter lived precursors and the value of the effective decay constant (lambda) decreases, as compared to a critical reactor.

b. Due to the significant decrease in the percentage of fast fission occuring over core life, the value of the effective delayed neutron fraction decreases over core life.

c. Delayed neutrons are produced after fission as a result of the radioactive decay of fission products.

QUESTION 5.12 (1.00)

During a reactor trip recovery, the initial 1/M data point was 1.0. After a 1-hour delay, rod withdrawal was commenced. Upon stopping rod withdrawl to take 1/M data, the RO reported that the second 1/M data point was 1.1. Which of the following explains this increase in the 1/M value?

a. This is NOT possible, the RO must have made an error when taking count rate data.

b. The buildup of Xenon during the 1-hour delay added more negative reactivity than the rod withdrawal added positive reactivity.

c. The source-detector geometry is incorrect.

d. An inadvertent dilution is in progress.

QUESTION 5.13 (1.00)

With the reactor initially at a keff of 0.99, a certain reactivity change causes the count rate to double. If this same amount of reactivity is again added to the reactor, which of the following will be the status of the reactor?

a. Subcritical
b. Critical
c. Supercritical
d. Prompt Critical

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.14 (1.00)

During a reactor startup, the first reactivity addition caused count rate to increase from 10 cps to 16 cps. The second reactivity addition caused count rate to increase from 16 cps to 32 cps. Which of the following statements describing the relationship between the reactivity values of the first and second reactivity additions is correct?

a. The first reactivty addition was larger.

b. The second reactivity addition was larger.

c. The first and second reactivity additions were equal.

d. There is not enough data given to determine relationship of reactivity values.

QUESTION 5.15 (1.00)

Concerning equilibrium Samarium-149 (Sm) reactivity, which of the following statements is correct?

a. 50% equilibrium Sm reactivity is one-quarter of 100% equilibrium Sm reactivity.

b. 50% equilibrium Sm reactivity is one-half of 100% equilibrium Sm reactivity.

c. 50% equilibrium Sm reactivity is three-quarters of 100% equilibrium Sm reactivity.

d. 50% equilibrium Sm reactivity is equal to 100% equilibrium Sm reactivity.

QUESTION 5.16 (2.00)

If steam goes through a throttling process, indicate whether the following parameters will INCREASE, DECREASE, or REMAIN THE SAME.

a. Enthalpy
b. Pressure
c. Entropy
d. Temperature

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.17 (1.00)

A variable speed centrifugal pump is operating at 1800 rpm with a capacity of 400 gpm at a discharge head of 20 psi which requires a power of 40 kW. If pump speed is increased to 2000 rpm, which of the following best describes the new pump parameters?

a. 444 gpm, 22 psi, 55 kW
b. 444 gpm, 25 psi, 49 kW
c. 444 gpm, 25 psi, 55 kW
d. 444 gpm, 22 psi, 49 kW

QUESTION 5.18 (1.50)

Indicate whether the following are TRUE or FALSE.

a. During a RCS heatup, as temperature increases, it will take a smaller letdown flow rate to maintain a constant pressurizer level.

b. Increasing condensate depression (subcooling) will cause BOTH a decrease in plant efficiency AND an increase in condensate (hotwell) pump available NPSH.

c. The difference between pump suction pressure and the saturation pressure of the fluid being pumped is referred to as net positive suction head.

QUESTION 5.19 (1.00)

Which of the following describes the changes to the steam that occur between the inlet and outlet of a real (not ideal) turbine?

a. Enthalpy decreases, Entropy decreases, Quality decreases

b. Enthalpy increases, Entropy increases, Quality increases

c. Enthalpy constant, Entropy decreases, Quality decreases

d. Enthalpy decreases, Entropy increases, Quality decreases

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.20 (1.00)

Which of the following will cause plant efficiency to increase?

a. Total S/G blowdown is changed from 30 gpm to 40 gpm.

b. Steam quality changes from 99.7% to 99.9%.

c. Level increase to higher than normal in a feedwater heater.

d. Absolute condenser pressure changes from 1.0 psi to 1.5 psi.

QUESTION 5.21 (1.00)

The reactor is producing 100% rated thermal power at a core delta T of 60 degrees and a mass flow rate of 100% when a blackout occurs. Natural circulation is established and core delta T goes to 40 degrees. If decay heat is 2%, what is the core mass flow rate (in percent of total rated flow)?

a. 1.3
b. 2.0
c. 3.0
d. 4.0

QUESTION 5.22 (1.00)

Which of the following statements is correct if the discharge valve of a centrifugal pump is being partially closed from the full open position?

a. Pump head decreases as head loss decreases.

b. Pump head increases as head loss increases.

c. Volume flow rate increases as head loss decreases.

d. Volume flow rate decreasses as head loss decreases.

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.23 (1.00)

Which of the following does NOT provide assurance that the enthalpy rise hot channel limits are not violated?

a. Axial power distribution is maintained within limits.

b. Control rod banks are sequenced with proper overlap.

c. Control rod insertion limits are maintained.

d. The MTC is within its analyzed temperature range.

QUESTION 5.24 (1.50)

For the following definitions, give the term that is defined.

a. The amount of heat required to change 1 lbm. of water into 1 lbm. of steam at a constant temperature.

b. The ratio of the Critical Heat Flux to the actual heat flux.

c. The ratio of the peak heat flux at core elevation z to the core average heat flux. (Spell(out) ~~the term~~ defined.)

QUESTION 5.25 (1.00)

Which of the following would cause an INCREASE in the conductive heat transfer RATE across a slab?

a. Decrease heat transfer area of slab.

b. Decrease delta T across slab.

c. Decrease thickness of slab.

d. Decrease thermal conductivity of slab.

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.26 (1.00)

Which of the following statements describing the thermal stresses induced in the reactor vessel during a RCS cooldown is correct?

a. Tensile stress at OUTSIDE diameter and compressive stress at INSIDE diameter.

b. Tensile stress at INSIDE diameter and compressive stress at OUTSIDE diameter.

c. Tensile stress at OUTSIDE diameter and no stress at INSIDE diameter.

d. Tensile stress at INSIDE diameter and no stress at OUTSIDE diameter.

QUESTION 5.27 (1.00)

During the life of the reactor vessel, the RTNDT increases due to radiation exposure from neutron bombardment. Which of the following is the main contributing element that causes this increase?

a. Cu
b. Fe
c. Ni
d. Sr

QUESTION 5.28 (2.00)

The reactor is operating at 30% power when one RCP trips. Assuming no reactor trip or turbine load change occur, indicate whether the following parameters will INCREASE, DECREASE, or REMAIN THE SAME.

a. Flow in operating reactor coolant loops

b. Core delta T

c. Reactor vessel delta P

d. Operating loop steam generator pressure

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.29 (1.00)

The reactor is operating at 50% power with rod control in MANUAL and turbine controls in AUTOMATIC when a S/G PORV fails open. Assuming no reactor trip or operator actions, choose the answer below that describes the resulting steady state conditions.

a. Final Tavg greater than initial Tavg, Final power equal to initial power.

b. Final Tavg greater than initial Tavg, Final power greater than initial power.

c. Final Tavg less than initial Tavg, Final power equal to inital power.

d. Final Tavg less than initial Tavg, Final power greater than initial power.

QUESTION 5.30 (1.00)

The Technical Specifications allow operations for a 2-hour time period with a Quadrant Power Tilt Ratio (QPTR) of greater than 1.02. Which of the following is the reason for allowing these operations?

a. To allow time for corrective action in the event of Xenon redistribution following power changes.

b. To allow time for correction of a dropped or misaligned control rod.

c. To allow time for boron concentration changes to restore the QPTR to less than 1.02.

d. To allow time from correction of RCS flow imbalances.

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.31 (1.00)

The Technical Specifications limit on the Heat Flux Hot Channel Factor varies depending on certain parameters. Which of the following sets of parameters vary this limit?

a. RCS Flowrate and Rod Bow Penalty

b. RCS Flowrate and Fraction of Rated Power

c. Core Height Location and Rod Bow Penalty

d. Core Height Location and Fraction of Rated Power

(***** END OF CATEGORY 05 *****)

QUESTION 6.01 (1.00)

If power is at 100 % and the Steam Dump is in Tavg mode when the first stage pressure channel 447 fails low, which of the following best describes the response?

a. All 5 condenser dump valves and 3 steam generator PORV's arm.

b. All 5 condenser dump valves arm and trip open.

c. All 5 condenser dump valves arm.

d. There will be no effects to the Steam Dump system because there has not been a load rejection nor trip.

QUESTION 6.02 (1.50)

Indicate whether the following statements are TRUE or FALSE concerning the Main Steam System.

a. The flow nozzel (venturi) in the steam lines is used for flow instrumentation and will reduce steam flow in case of a steam line break.

b. When all the MSR motor operated purge valves reach their fully open position, the air operated vent valves to the condenser will open.

c. For loads below 10%, all the MSR timer valves shall be open.

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.03 (1.50)

Match the Tavg.-Tref. deviation from Column B which would cause the valves in Column A to trip open during a load rejection. (which deviation will give the response in Column A? There may be more than one deviation for each response, Only one is needed for full credit.

Column A	Column B (degrees F)
a. Only the 5 condenser valves	1. 3
	2. 5
b. Only 3 of the condenser valves	3. 10
c. 5 condenser valves and 3 PORV's	4. 14
	5. 18
	6. 30
	7. 35

QUESTION 6.04 (1.50)

Match the type of Main Turbine control in Column A to its corresponding turbine generator condition in Column B.

Column A	Column B
a. Speed control	1. Turbine latched, OCB's closed, imp in
b. Turbine load (%)	2. Turbine latched, OCB's closed, imp out
c. Control valve position (%)	3. Turbine latched, OCB's open, imp out
	4. Turbine unlatched, OCB's open imp out

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.05 (1.50)

Indicate whether the following statements are TRUE or FALSE concerning the Main Turbine and Controls.

a. The reheat stop valve and interceptor valve actuators can position these valves in any position from fully open to fully closed.

b. With the turbine auto-stop mechanism latched, the pilot-operated dump valve closes to build up fluid pressure under the cylinder piston, opening the reheat stop and interceptor valves.

c. Lubricating oil is used as the control medium for the interface emergency trip valve in the mechanical-hydraulic trip system.

QUESTION 6.06 (1.00)

If the Main Turbine Emergency Lubricating Oil Pump has been running and then the white lights on the RTGB go out, which of the following is correct? ASSUME no further operator action.

a. Pump discharge pressure is greater than 25 psig. and the pump is still running.

b. Pump discharge pressure is greater than 25 psig. and the pump has automatically stopped.

c. Pump discharge pressure is less than 25 psig. and the pump is stopped.

d. Pump discharge pressure is less than 25 psig. and the pump is still running.

QUESTION 6.07 (1.00)

During Main Generator startup operations, before it is tied to the grid, which of the below adjustments will zero the regulator second stage output?

a. Voltage Regulator in "Test", using the Manual Field Current Adjuster.

b. Voltage Regulator in "Auto", using the Voltage Adjuster.

c. Voltage Regulator in "Test", using the Voltage Adjuster.

d. Voltage Regulator in "Off", using the Manual Field Current Adjuster.

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.08 (1.00)

Which of the following statements concerning the CVCS is correct?

a. If the DEBORATING demineralizers are in operation, the letdown passes through deborating demineralizers, then through mixed bed demineralizers and then into the VCT.

b. During plant cooldown, when RHR is in operation, none of the RHR flow goes through the CVCS non-regenerative heat exchanger.

c. The CATION demineralizer is normally in service to remove fission products and some corrosion products.

d. The letdown orifice isolation valves (CVC-200 A, B, C) receive a Phase 'A' Containment Isolation (T) signal.

QUESTION 6.09 (.50)

TRUE or FALSE?

The effluent of the Excess Letdown Heat Exchanger may be aligned to either the Reactor Coolant Drain Tank or the Volume Control Tank.

QUESTION 6.10 (1.00)

If a loss of power to the CVCS Diversion Valve (TCV-143) occurs, the valve will fail in the _____-(choose one of the following)-_____ position.

a. fully open

b. Reactor Coolant Filter

c. "as is"

d. mix bed demineralizer

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.11 (1.00)

Choose from the below choices the correct order of the following CVCS components located on the letdown line, beginning with the component that is furthermost upstream.

CVCS Components

1. Non-regenerative Heat Exchanger
2. Regenerative Heat Exchanger
3. Diversion Valve (TCV-143)
4. Low Pressure Letdown Valve (PCV-145)
5. VCT Level Control Valve (LCV-115)
6. Letdown Orifice Isolation Valves (CVC-200 A, B, C)
7. Letdown Line Isolation Valves (CVC-204 A, B)
8. Letdown to VCT Relief Valve (CVC-209)

a. 1, 6, 7, 2, 8, 4, 3, 5.

b. 2, 7, 6, 1, 4, 8, 3, 5.

c. 2, 6, 7, 1, 4, 8, 3, 5.

d. 2, 6, 1, 7, 8, 4, 3, 5.

QUESTION 6.12 (1.00)

Which of the following is NOT cooled by the Component Cooling Water System?

a. Waste Evaporator condenser.

b. RHR pumps.

c. Emergency Diesel Generator lube oil coolers.

d. Waste Gas compressors.

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.13 (1.00)

Indicate whether the following are TRUE or FALSE in regard to the Instrument Air system.

a. When the air compressor is operating in automatic it will run continously with the air receiver pressure automatically being maintained between 98 - 102 psig. by the unloader.

b. Instrument Air low pressure alarm will be received when the pressure drops to 95 psig.

QUESTION 6.14 (1.00)

Which of the following statements is correct concerning the Liquid Waste Disposal System?

a. Normally, fluids in the reactor coolant drain tanks are pumped to the Waste Holdup Tank.

b. Manual operator action is required to pump the Containment Vessel sump to the Waste Holdup Tank.

c. Nitrogen is routed to the top of the Spent Resin Storage Tank for purposes of agitating the resin prior to transferring.

d. The BORIC ACID evaporators can be aligned for processing liquid waste.

QUESTION 6.15 (.50)

TRUE or FALSE?

The Containment Vacuum Relief and Containment Pressure Relief Systems automatically maintain the pressure inside the containment between -0.3 psig. and +0.3 psig., during normal power operation.

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.16 (1.00)

To purge the radioactive gases from the Hydrogen Recombiner and piping if accessibility for maintenance would be required, which of the following would be used?

a. Portable inert Argon gas.

b. Instrument Air.

c. Portable Oxygen bottles.

d. Plant Nitrogen.

QUESTION 6.17 (1.00)

Indicate whether the following statements are TRUE or FALSE concerning the Steam Generator Level Control.

a. The manual control signal will override the high water level valve closure signal, and allow the operator to take control of the flow control valves.

b. Even though there are four input signals (turbine first stage pressure, actual water level, pressure compensated steam flow and feed flow), the control valve is controlled by a 3-element controller.

QUESTION 6.18 (1.50)

Indicate whether the following statements are TRUE or FALSE concerning the Emergency Diesel Generator.

a. The main lube oil pump and cooling water pump are driven by the diesel's upper crankshaft.

b. When the diesel receives a manual start signal, the signal will also start the diesel's ventilation equipment.

c. Three controls on the diesel speed governor are synchronizer, speed droop and load limit.

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.19 (1.00)

Which of the following statements concerning the Containment Spray System is correct?

a. The sodium hydroxide in the spray facilitates the converting of soluble iodine into insoluble iodine.

b. The sodium hydroxide in the spray minimizes chloride stress corrosion of stainless steel piping and components in the event of a LOCA inside the containment.

c. The containment spray pumps will automatically start on a 'P' signal and sodium hydroxide will automatically inject into the spray flow.

d. Due to the variance in the time that the spray pump actuation signal may be generated during an accident, the diesel generators are not capable of supplying power for the starting of the spray pumps in coincidence with the starting of any other load.

QUESTION 6.20 (1.00)

Which of the following radiation monitors will NOT immediately cause a a control room alarm when the monitor reaches the alarm setpoint?

a. R-16: Radioactive Liquid Monitor (containment HVH units).

b. R-37: Condensate Polisher Waste Radiation.

c. R-30: Fuel Handling Building Lower Level Gas.

d. R-18: Waste Disposal Liquid Effluent.

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.21 (1.00)

Using the following 7 actions, which of the below sequences is the correct sequence for a rod withdrawl?

Seven Rod Control Actions

1. Movable gripper coil energized (Latched).
2. Stationary coil energized (Latched).
3. Lift coil energized.
4. Stationary gripper energized (Hold).
5. Movable coil DEENERGIZED (Unlatched).
6. Stationary coil DEENERGIZED (Unlatched).
7. Lift coil DEENERGIZED.

Sequences to Choose From

a. 4, 3, 1, 6, 2, 5, 7.

b. 4, 1, 6, 3, 2, 5, 7.

c. 2, 4, 1, 6, 3, 7, 5.

d. 3, 1, 7, 5, 6, 4, 2.

QUESTION 6.22 (1.00)

Which of the following statements concerning the Individual Rod Position Indication system is correct?

a. The rod bottom bistable is adjustable and is normally set at 10 steps from the bottom of travel.

b. The rod bottom bistable only provides indication functions.

c. There is one control bank bypass bistable associated with each control bank except control banks A and B.

d. The control bank bypass bistable provides a blocking action on the turbine runback signal and the inhibiting of the automatic rod withdrawal when the rods of the associated bank are to be operated near or below the rod bottom bistable setpoints.

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.23 (2.00)

For the statements below concerning the rod control system indicate whether each is TRUE or FALSE.

a. The nonlinear gain unit adjusts circuit gain depending on turbine power.

b. The bank overlap unit sends a signal to each slave cycler for purposes of selecting a master cycler.

c. The rod drive mechanisms receive their power from two parrallel motor generator sets through two parallel generator output breakers and through two series Reactor Trip breakers.

d. A logic error would cause a power cabinet urgent alarm.

QUESTION 6.24 (1.00)

Which statement describes the signal path from the Source Range detector to the Source Range level meter on the main control board?

a. Detector, Pre Amp, Discriminator, Log Integrator, Meter

b. Detector, Log Integrator, Pulse Shaper, Pulse Counter, Meter

c. Detector, Pre Amp, Log Integrator, Discriminator, Meter

d. Detector, Log Amp, Meter

QUESTION 6.25 (1.00)

Which of the following statements is correct concerning the Nuclear Instrumentation?

a. Source Range level trips are automatically activated when power is below the P-10 permissive.

b. Blocking of rod withdrawal is initiated by either Intermediate Range channel on high flux level.

c. P-10 permissive alerts the operator to the fact that he must take administrative action to manually block the Source Range trips.

d. When the P-8 permissive light is lit the low flow reactor trip has a 1 of 3 coincidence.

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.26 (1.00)

Which of the following is correct concerning the operation and construction of the Power Range Excore detectors?

a. Uses Argon gas inside the detector to limit "dead time."

b. Has Boron Triflouride (BF3) gas in BOTH inner and outer volumes of the detector.

c. Operates in the proportional region of the gas amplification curve.

d. Uses no compensation circuitry to remove gamma current.

QUESTION 6.27 (1.00)

Which of the following would occur if a rod dropped when the Main Turbine was in "auto-imp in" and power was initially at 50 %?

a. A load limit runback (cutback) will occur.

b. A load reference runback (cutback) will occur.

c. Both a load reference and load limit runback (cutback) will occur.

d. No runback (cutback) will occur.

QUESTION 6.28 (1.00)

Indicate whether the following statements are TRUE or FALSE concerning the Reactor Protection system.

a. The 108 % Power Range nuclear flux trip does not provide protection until the low range trip is manually blocked.

b. The Intermediate Range high nuclear flux trip can be blocked if 1 of 4 Power Range channels is above 10 %.

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.29 (1.00)

Which of the following is NOT an SI actuation signal?

a. High steam line flow coincident with low steam line pressure.

b. High steam line flow coincident with Low Tavg.

c. Low steam line differential pressure.

d. Containment high pressure.

QUESTION 6.30 (1.00)

Which of the following flowpaths correctly describe the NORMAL power supply to Instrument Bus No. 1?

a. From 480 V a.c. vital bus, transformed to 118 V a.c., rectified to 125 V d.c, inverted to 120 V a.c.

b. From 480 V a.c. vital bus, transformed to 118 V a.c.

c. From 125 V d.c. battery bus, inverted to 110 V a.c.

d. From 480 V a.c. vital bus, transformed to 220 V a.c., rectified to 125 V d.c., supplied to battery, 125 V d.c. from battery bus, inverted to 120 V a.c.

QUESTION 6.31 (2.50)

Concerning MANUAL protection actuation from the RTGB, match the following actuations in Column A to their associated actions from Column B.
NOTE: Column B selections may or may not be used more than once.

Column A	Column B
a. Containment Spray ('P' signal)	1. Depress ONE pushbutton
b. All 3 Steam Isolation valves close	2. Depress TWO pushbuttons simultaneously
c. Safety Injection ('S' signal)	3. Change the position of a selector switch
d. Reactor trip	
e. Instrument air to C.V. overrride (with 'S' signal)	

(***** END OF CATEGORY 06 *****)

QUESTION 7.01 (1.00)

According to 10CFR20, which of the following is NOT equivalent to a dose of one rem?

a. A dose of 1 roentgen due to gamma radiation.

b. A dose of 1 rad due to beta radiation.

c. A dose of 0.3 rad due to neutrons.

d. A dose of 0.05 rad due to alphas.

QUESTION 7.02 (1.00)

If an individual had already received a whole body dose of 1000 mrem this quarter, which of the following would be the maximum additional exposure to the skin that he/she could receive this quarter without exceeding 10 CFR 20 limits?

a. 250 mrem

b. 2000 mrem

c. 6500 mrem

d. 7500 mrem

QUESTION 7.03 (1.50)

On your answer sheet indicate the word or words that correctly completes the following precautions and limitations of the "Normal Plant Startup From Hot Shutdown To Critical" Procedure (GP-003).

a. If the countrate on either Source Range channel increases by a factor of _____ or more during any step involving a boron concentration change, the operation must be stopped immediately and suspended until a satisfactory evaluation of the situation has been made.

b. The Control Banks must be maintained above their respective insertion limits while the reactor is critical. When at power, _____ must be initiated immediately if the "Rod Banks A/B/C/D EXTRA LO LIMIT" alarm is actuated.

c. Flux multiplication rates shall not be permitted to exceed _____ decade(s)/minute.

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.04 (2.00)

Match the chemistry control function in Column A with the chemical that provides this function, from Column B.

Column A	Column B
a. Oxidizing Agent used to facilitate crud removal in the RCS.	1. Ammonium Hydroxide
b. Minimize oxygen formation in the RCS during power operations.	2. Lithium Hydroxide
c. Scavages oxygen in the RCS prior to heatup from refueling.	3. Hydrazine
d. Primary purpose is for S/G pH control.	4. Hydrogen
	5. Potassium Chromate
	6. Hydrogen Peroxide
	7. Oxygen

QUESTION 7.05 (1.50)

Indicate whether the following statements are TRUE or FALSE concerning information found in the "Plant Cooldown From Hot Shutdown To Cold Shutdown" Procedure (GP-007).

a. With less than two Reactor Coolant Pumps in operation, at least one of the following conditions must be fulfilled:
   - Shutdown margin is at least 4% delta k/k.
   - Lift disconnect switches are open for all control rods not fully withdrawn.
   - Shutdown banks are fully withdrawn.

b. When the plant is in Hot Shutdown, the rate of feedwater addition to the Steam Generators should not exceed 400 gpm (200,000 lbm/hr).

c. The hydrogen concentration in the Reactor Coolant System must be reduced to less than 5 cc/kg and activity to less than 9 uCi/cc if the system is to be opened for refueling or repair.

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.06 (1.00)

On your answer sheet provide the missing information that correctly completes the following statements as found in your General Procedures.

a. When the RCS is less than _____ degres F and NCT vented to Containment Vessel, the S.I. pump power supply breakers must be racked out, and the S.I. accumulator isolation valves must be closed with their breakers open.

b. During a plant heatup, the RHR loop is isolated when RCS average temperature is between 250 degrees F and _____ degrees F.

QUESTION 7.07 (1.50)

Indicate whether the following are TRUE or FALSE concerning precautions and limitations for the CVCS system.

a. During plant startup, letdown flow should be initiated at as low an RCS pressure as possible BUT it could be done when RCS pressure is 525 psig.

b. Unless both Mixed Bed Demineralizers have been borated at the beginning of core life, care should be taken when placing the standby Mixed Bed demineralizer in service to avoid an undesirable positive reactivity insertion.

c. Except during periods of Reactor Coolant dilution or boration, the Reactor Makeup control should always be kept in "AUTO MAKEUP", with its control system energized.

QUESTION 7.08 (1.00)

During a reactor startup, if criticality is attained above the control rod low insertion limit, but below the estimated critical position (ECP) lower band, which of the following actions must be taken?

a. Insert rods to low insertion limit and recalculate ECP.

b. Notify Reactor engineering personnel, within 24 hours, and continue normal startup operations.

c. Reinsert all control banks to the bottom of the core, evaluate condition and recalculate ECP.

d. No special action is required; continue normal startup operations.

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.09 (1.00)

Which of the below choices best completes this Technical Specification requirement?

Whenever there is a load change exceeding _____ percent of rated thermal power in any one hour period, the Lab must be notified to perform an Iodine analysis in the next _____ hour(s).

a. 10%, 2 - 6

b. 10%, 4 - 10

c. 15%, 1

d. 15%, 2 - 6

QUESTION 7.10 (2.00)

On your answer sheet provide the missing numerical values that completes the following precautions and limitations, as found in the RCS and RCP startup and operation procedure (OP-101).

a. If component cooling water flow to the RCP motor is lost, the RCP must be stopped within _____ minute(s) or before either the upper bearing temperature has increased to _____ degrees F or the lower bearing temperature has increased to _____ degrees F.

b. The MINIMUM RCS pressure for RCP operation is _____ psig.

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.11 (2.00)

Which of the below choices of numbers would correctly complete the following precautions and limitations concerning starting and restarting of Reactor Coolant Pumps?

a. After any period of running, or after any attempt to start where the motor has failed to achieve full speed before it is stopped, a restart should not be attempted until the motor has been allowed to cool by standing idle for a period of not less than _____minutes. Starts should not average more than _____ per day throughout the life of the RCP motor.

1. 20, 5

2. 30, 6

3. 60, 5

4. 60, 6

b. Within any two-hour period, the number of starts should be limited to a maximum of _____ (starts) with a minimum idle period prior to each restart. When these starts or attempted starts have been made within a two-hour period, then an additional start should not be attempted until the motor has been allowed to cool by standing idle for at least _____ hour(s).

1. Two, Two

2. Three, Two

3. Two, One

4. Three, One

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.12 (2.00)

Which of the below choices best completes the following precautions and limitations?

a. The Pressurizer heatup rate shall not exceed _____ degrees F/hour and the cooldown rate shall not exceed _____ degrees F/hour.

1. 60, 100

2. 100, 60

3. 100, 100

4. 100, 200

b. The RCS heatup rate shall not exceed _____ degrees F/hour and the cooldown rate shall not exceed _____ degrees F/hour.

1. 60, 100

2. 100, 60

3. 100, 100

4. 100, 200

QUESTION 7.13 (1.00)

GP-003, "Normal Plant Startup From Hot Shutdown to Critical" states that the shutdown banks must be at the fully withdrawn position whenever positive reactivity is being inserted.

When can exceptions to this rule be applied, assuming necessary approvals have been received?

a. When the Shutdown Margin has been calculated to be 900 pcm.

b. When the RCS has been borated to the cold shutdown concentration.

c. When the reactor is in the source range with the High Flux at Shutdown alarm operable.

d. When the actual boron concentration is greater than the predicted critical boron concentration.

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.14 (1.00)

Which of the below choices best completes the following requirement?

To open the No. 1 Seal leakoff bypass valve (CVC-307), the following conditions must be met:

- RCS Pressure is between _____ psig.
- All 3 No. 1 Seal leakoff valves are open.
- Any No. 1 Seal leakoff flow rate is less than _____ gpm.
- Seal injection flow rate to each RCP is greater than _____ gpm.

a. 100 - 325, 0.2, 1.0

b. 100 - 1000, 0.2, 4.0

c. 100 - 1000, 1.0, 6.0

d. 325 - 1000, 3.0, 6.0

QUESTION 7.15 (1.00)

If a loss of condenser vacuum is impending, with 23" Hg and decreasing, which of the following is NOT an immediate operator action?

a. Reduce Turbine Generator load.

b. Verify the standby vacuum pump running.

c. Start the standby circulating pump.

d. Verify the Steam Generator levels not decreasing.

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.16 (1.00)

Which of the following statements concerning a dropped control rod and retrieval is correct?

a. Manually insert control rods to match Tref if rods are in manual.

b. The "Rod Control System Urgent Failure" alarm must be reset prior to commencing retrieval of the rod.

c. The maximum power allowed prior to, and during, retrieval of the rod is 70% power.

d. Tave should be controlled by boron changes during retrieval of the rod.

QUESTION 7.17 (1.00)

Which of the following methods of verifying a reactor trip is NOT a listed verification in the "Response to Nuclear Power Generation/ATWS" Procedure (FRP-S.1)?

a. Rod position indicator - Zero.

b. Power Range channels - Less than 5%.

c. Rod Bottom Lights - Lit.

d. Reactor Trip and bypass breakers - Open.

QUESTION 7.18 (1.00)

The first immediate action of the "Response to Nuclear Power Generation/ ATWS" Procedure (FRP-S.1), is to "verify reactor trip".

If the verification is not obtained and if the reactor will not trip, the Response Not Obtained Column directs the operator to do which of the following?

a. Manually insert all control rods.

b. Emergency Borate the RCS.

c. Dispatch an operator to manually open the reactor trip breakers.

d. Close the MSIVs and bypass valves.

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.19 (3.00)

On your answer sheet provide the correct values to complete the following Red Path Summary statements from Foldout A.

a. INTEGRITY - Cold leg temperature decrease greater than _____ degrees F in last 60 minutes AND RCS Cold leg temperature less than _____ degrees F.

b. CORE COOLING - Subcooling Monitor TCs greater than _____ degrees F.

c. HEAT SINK - Level in all S/Gs less then _____ percent AND total feedwater flow less than 300 gpm or 0.2 x 10-E6 pph.

d. CONTAINMENT - Containment pressure greater than _____ psig.

e. SUBCRITICALITY - Nuclear power greater than _____ percent.

QUESTION 7.20 (1.00)

Which of the following methods would be used to reduce RCS pressure to 1950 psig. as listed in the "Natural Circulation Cooldown" Procedure (EPP-5)?

a. Steam release via intact S/G PORV's.

b. Auxiliary pressurizer spray, with CVCS letdown in service.

c. Steam release via pressurizer PORV, with CVCS letdown in service.

d. Safety Injection Pump flow, with CVCS letdown in service.

QUESTION 7.21 (1.00)

Which of the following indications are NOT listed in the "Natural Circulation" Procedure (EPP-5), for monitoring an RCS cooldown?

a. Subcooling Monitor T/Cs - Decreasing.

b. RCS subcooling - Increasing.

c. RCS Delta T - Stable or Increasing.

d. RCS hot leg temperature - Decreasing.

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.22 (1.00)

Indicate whether the following are TRUE or FALSE according to EPP-5.

a. Prior to RCS depressurization, if all CRDM fans cannot be started, RCS pressure should be maintained at approximately 1950 psig until 190 degrees F subcooling is established to prevent formation of a steam void in the vessel during the cooldown.

b. After borating to RCS Cold Shutdown concentration, all intact steam generators should be steamed for 30 minutes prior to sampling for boron.

QUESTION 7.23 (1.00)

Indicate whether the following statements are TRUE or FALSE.

a. If while implementing a red Functional Restoration Procedure (FRP), a higher priority red condition occurs, then the operator should leave the lower priority red FRP and immediately implement the higher priority red FRP.

b. In using the End Path Procedures (EPP's), the right hand column of actions is to be used ONLY if the associated action in the left hand column does not result in the response specified.

QUESTION 7.24 (1.00)

Using the following 6 Status Tree Safety Functions, which of the below choices is the correct order of priority, beginning with the highest priority?

1. Subcriticality
2. Containment
3. RCS Integrity
4. Heat Sink
5. Core Cooling
6. Inventory

a. 1, 4, 5, 3, 6, 2.

b. 1, 5, 4, 3, 2, 6.

c. 5, 1, 4, 2, 3, 6.

d. 1, 4, 5, 2, 3, 6.

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.25 (1.00)

If a leak developed in the Refueling Cavity and was lost to the containment sump, what is the minimum level of water that must be on the Containment Vessel(CV) floor, prior to aligning the RHR pump suction to the CV?

a. 24 inches.

b. 18 inches.

c. 12 inches.

d. 6 inches.

QUESTION 7.26 (1.00)

What is the reason for having to have a minimum level of water on the CV floor prior to aligning the RHR pumps to take suction from the CV?

a. The benefits of removing the water does not outweigh the potential bad effects of pumping contaminated water into the RCS.

b. The sump pumps have sufficient capacity to pump this amount of water within 30 minutes.

c. This level is sufficient to provide the minimum NPSH for the RHR pumps.

d. The RHR pumps suction line taps into the containment at that level and any water below that level could not be extracted with the RHR pumps.

QUESTION 7.27 (.50)

How many people must be in the SFP Crane cab when it is out of the "Restricted Path" mode and operating in the Spent Fuel Building?

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.28 (1.00)

If the Plant Vent monitor (R-14) alarms, one of the required actions is to shift R-11 and R-12 to the plant vent. What must be done prior to shifting R-11 and R-12?

a. Ensure FCV-1436A is closed from the local panel.

b. Evacuate the containment.

c. Perform a source check on R-11 and R-12.

d. Verify R-15 is operating properly.

QUESTION 8.01 (1.00)

Which of the following is NOT a basis for the control rod insertion limits?

a. Control 50% load rejection without reactor trip.

b. Maintain required shutdown margin.

c. Minimize consequences of rod ejection accident.

d. Provide for acceptable nuclear peaking factors.

QUESTION 8.02 (1.00)

Which of the following REQUIRE activation of the TSC?

a. Either an Unusual Event, Alert, Site Emergency, or General Emergency.

b. Only an Alert, Site Emergency, or General Emergency.

c. Only a Site Emergency or General Emergency.

d. Only a General Emergency.

QUESTION 8.03 (1.00)

Which of the following is the basis for the high pressurizer water level reactor trip?

a. Prevents solid operations while the reactor is critical.

b. Prevents exceeding containment design pressure in event of LOCA with all RCS fluid flashing to steam.

c. Prevents loss of pressure control due to spray nozzle being submerged.

d. Protects the pressurizer safety valves against water relief.

(***** CATEGORY 08 CONTINUED ON NEXT PAGE *****)

QUESTION 8.04 (1.00)

If a proposed temporary change to an operating procedure does not violate the intended function of the procedure, the change can be implemented on a temporary basis following approval by which of the following?

a. Any two members of the Plant or C & A Management Staff.

b. Any two members of the Plant or C & A Management Staff, at least one which holds an SRO license.

c. Any member of the Plant or C & A Management Staff who holds an SRO license.

d. The Operating Supervisor - Unit 2.

QUESTION 8.05 (1.00)

Which of the following is the maximum time that a temporary change may remain in effect?

a. 21 days
b. 30 days
c. 45 days
d. 90 days

QUESTION 8.06 (1.00)

When performing equipment status checks on manual LOCKED valves, which of the following describes how their position is verified?

a. Verifying the lock is in place and securely locked.

b. Verifying local valve position indication is indicating the required position.

c. Operating the valve in the open direction.

d. Operating the valve in the closed direction.

(***** CATEGORY 08 CONTINUED ON NEXT PAGE *****)

QUESTION 8.07 (1.00)

Which of the following is NOT a responsibility of the Refueling SRO?

a. Provide watch relief for any refueling station for short periods.

b. Ensure proper documentation of fuel transfer by verifying the status board and all log entries in Containment.

c. Maintain overall supervision and coordination of all fuel movement operations.

d. Be aware of Source Range Nuclear Instrumentation operation, RCS temperature, and boron concentration during fuel handling operation.

QUESTION 8.08 (1.00)

Redundant RTGB indicators which require operator attention are checked once a shift. This check is made by comparing the highest and lowest channels of redundant indicators for the same parameter on the same scale. Which of following is the maximum acceptable deviation?

a. 4% of the full range of the indicator's movement.

b. 4% of the highest reading indicator.

c. 4% of the lowest reading monitor.

d. 4% of the average of the indicator's readings.

QUESTION 8.09 (1.00)

The injection of a simulated signal into a channel to verify that it is operable is defined in Technical Specifications as a:

a. Channel Calibration
b. Channel Check
c. Channel Functional Test
d. Channel Verification

(***** CATEGORY 08 CONTINUED ON NEXT PAGE *****)

QUESTION 8.10 (1.00)

Except during low power physics tests, the reactor shall not be made critical at any temperature above which the moderator temperature coefficient is more positive than: (Choose one)

a. +5 pcm/degree from 0 to 50% of rated power and linearly decreasing to 0 pcm/degree at rated power.

b. 0 pcm/degree for all powers up to rated power.

c. +5 pcm/degree for all powers up to rated power.

d. +5 pcm/degree at 0% of rated power and linearly decreasing to 0 pcm/degree at rated power.

QUESTION 8.11 (1.00)

Which of the following methods of RCS leakage detection is the most sensitive?

a. Containment Air Particulate Monitor

b. Containment Radiogas Monitor

c. Containment Humidity Monitor

d. Containment Sump Indication

QUESTION 8.12 (1.00)

Which of the following statements is the correct definition of the Quadrant Power Tilt?

a. The maximum local heat flux on the surface of a fuel rod divided by the average fuel rod heat flux.

b. The ratio of the maximum to average of the upper excore detector currents or the lower excore detector currents, whichever is greater.

c. The percent of full power in the top of the core minus the percent of full power in the bottom of the core.

d. The ratio of the difference between the highest and lowest excore detector currents to the average excore detector current.

(***** CATEGORY 08 CONTINUED ON NEXT PAGE *****)

QUESTION 8.13 (1.00)

Which of the following is the Technical Specification Safety Limit for RCS pressure with fuel assemblies installed in the reactor vessel?

a. 2735 psig
b. 2850 psig
c. 2935 psig
d. 3110 psig

QUESTION 8.14 (1.00)

An RCS cooldown using one train of RHR and one RCP is in progress. At 300 degrees, the operating RHR pump trips and can not be restarted. According to the Technical Specifications, which of the following is the REQUIRED action?

a. Proceed to establish a boron concentration in the RCS to that of or greater than that concentration needed to maintain a shutdown margin of 1000 pcm at 200 degrees.

b. Start all RCP's within one hour.

c. Establish the other train of RHR within one hour.

d. No action is required as long as RCP continues to operate.

QUESTION 8.15 (1.00)

Which of the following is the minimum boron concentration in the boron injection tank with which the reactor may remain in operation?
Assume - proper concentration when operations started and consider the time extensions allowed in Technical Specifications.

a. 21,000 ppm
b. 19,500 ppm
c. 17,500 ppm
d. 15,000 ppm

(***** CATEGORY 08 CONTINUED ON NEXT PAGE *****)

QUESTION 8.16 (1.00)

Which of the following is the basis of the minimum boron concentration requirement of 1950 ppm while loading and unloading fuel from the reactor?

a. Maintain reactor subcritical by at least 10000 pcm if no rods were inserted into the reactor.

b. Maintain reactor subcritical by at least 4000 pcm if no rods were inserted into the reactor.

c. Maintain reactor subcritical if no rods were inserted into the reactor.

d. Maintain primary temperature less than 200 degrees if no rods were inserted into the reactor.

QUESTION 8.17 (1.00)

Which of the following correctly describes the maximum allowable extension times for Technical Specification surveillance intervals?

a. Plus or minus 25%, not to exceed 3.5 times the specified interval for any 3 consecutive intervals.

b. Plus or minus 25%, not to exceed 3.25 times the specified interval for any 3 consecutive intervals.

c. Plus or minus 50%, not to exceed 3 times the specified interval for any 3 consecutive intervals.

d. Plus or minus 50%, not ot exceed 2.5 times the specified interval for any 2 consecutive intervals.

QUESTION 8.18 (1.00)

According to the Technical Specifications, which of the following is the minimum shift complement during hot operations? (SF = Shift Foreman, AO = non-licensed operator)

a. 1 SF (SRO), 1 SRO, 2 RO, 2 AO, 1 STA

b. 1 SF (SRO), 2 SRO, 2 RO, 2 AO, 1 STA

c. 1 SF (SRO), 1 SRO, 3 RO, 2 AO, 1 STA

d. 1 SF (SRO), 2 SRO, 3 RO, 2 AO, 1 STA

(***** CATEGORY 08 CONTINUED ON NEXT PAGE *****)

QUESTION 8.19 (1.00)

Which of the following correctly describes the site manning requirements of the Plant Fire Brigade?

a. At least 6 members, excluding 2 members of the minimum shift crew necessary for safe shutdown.

b. At least 6 members, excluding 3 members of the minimum shift crew necessary for safe shutdown.

c. At least 5 members, excluding 2 members of the minimum shift crew necessary for safe shutdown.

d. At least 5 members, excluding 3 members of the minimum shift crew necessary for safe shutdown.

QUESTION 8.20 (1.00)

Which of the following is the Technical Specification REQUIREMENT if the number of operable fire detection and actuation instruments is less than required? Assume - Affected Fire Zone is outside of Reactor Containment.

a. Within one hour, establish a continous fire watch in the affected zone.

b. Within one hour, increase the inspection frequency in the affected zone to once per hour.

c. Within one hour, log the temperature in the affected zone once per hour.

d. Within one hour, place the reactor in hot shutdown.

(***** CATEGORY 08 CONTINUED ON NEXT PAGE *****)

QUESTION 8.21 (2.00)

Indicate whether the following statements concerning the Operating Notes given in OMM-1009 are TRUE or FALSE.

a. The reactor may be taken critical in the intermediate range if indication is above 1E-10 amps; if below 1E-10 amps, wait until the source range is energized.

b. If necessary to operate control rods with system pressure less than 350 psig, when operating is started, have someone listen at the reactor head area for excessive noise.

c. Leave CCW to excess letdown HEX (CCW-739) normally closed.

d. Minimize the use of main feedwater pumps to feed S/G's while in hot shutdown.

QUESTION 8.22 (1.50)

Indicate whether the following statements concerning clearances are TRUE or FALSE.

a. More than one person may NOT hold separate clearances on the same equipment.

b. Equipment can be operated for testing purposes while the equipment is under clearance.

c. Only CP&L employees may hold clearances.

QUESTION 8.23 (1.50)

Match the RCS leakage types in Column A to the Technical Specification limit in Column B.

COLUMN A	COLUMN B
1. Unidentified	a. 0.00 gpm
	b. 0.35 gpm
2. Identified	c. 1.00 gpm
	d. 3.00 gpm
3. Primary to Secondary (all generators)	e. 5.00 gpm
	f. 10.00 gpm

(***** CATEGORY 08 CONTINUED ON NEXT PAGE *****)

QUESTION 8.24 (2.50)

Match the Reactor Trip signals in Column A to its basis in Column B.

COLUMN A	COLUMN B
1. Overtemperature Delta T	a. RCS Integrity
2. Overpower Delta T	b. Solid Plant Operation
3. Low Pressure	c. DNB
4. High Pressure	d. Startup Accident
5. Low Flow	e. Excessive Power Density
	f. Rod Ejection
	g. Loss of Heat Sink

QUESTION 8.25 (1.00)

Fill in the blanks for the following statements concerning Locked High Radiation Areas (LHRA).

a. Each High Radiation Area with radiation intensity greater than _____ mrem/hr shall be locked with a Controlled Key.

b. Access to Locked High Radiation Areas is controlled by the _____.

QUESTION 8.26 (1.50)

According to the Technical Specifications, what THREE conditions would require that a control rod be declared inoperable?

QUESTION 8.27 (1.00)

With the reactor critical at greater than 350 degrees, what TWO conditions must be met for the pressurizer to be considered operable?

(***** CATEGORY 08 CONTINUED ON NEXT PAGE *****)

QUESTION 8.28 (1.00)

Under what plant conditions is the overpressure protection system required to be operable?

QUESTION 8.29 (1.00)

When a system is determined to be inoperable solely because its normal power supply is inoperable, it may be considered operable for the purpose of satisfying the requirement of its applicable LCO, provided two conditions are met. List these TWO conditions.

QUESTION 8.30 (2.00)

List FIVE individuals (by title) who can relieve the Shift Foreman as the Site Emergency Coordinator, in accordance with PEP-001. If more than one reference lists other individuals, then answer the question to the best of your knowledge.

(***** END OF CATEGORY 08 *****)
(************** END OF EXAMINATION ***************)

EQUATION SHEET

$f = ma$

$w = mg$

$E = mc^2$

$KE = 1/2\ mv^2$

$PE = mgn$

$V_f = V_o + at$

$W = v\ \Delta P$

$\Delta E = 931\ \Delta m$

$\dot{Q} = \dot{m} C_p \Delta t$

$\dot{Q} = UA\Delta T$

$Pwr = W_f \Delta h$

$P = P_o 10^{sur(t)}$

$P = P_o e^{t/T}$

$SUR = 26.06/T$

$SUR = 26\rho/\ell^* + (\beta - \rho)T$

$T = (\ell^*/\rho) + [(\beta - \rho)/\bar{\lambda}\rho]$

$T = \ell/(\rho - \beta)$

$T = (\beta - \rho)/(\bar{\lambda}\rho)$

$\rho = (K_{eff} - 1)/K_{eff} = \Delta K_{eff}/K_{eff}$

$\rho = [(\ell^*/(T K_{eff})] + [\bar{\beta}_{eff}/(1 + \bar{\lambda}T)]$

$P = (\ell\rho V)/(3 \times 10^{10})$

$\Sigma = \sigma N$

$v = s/t$

$s = V_o t + 1/2\ at^2$

$a = (V_f - V_o)/t$

$w = \theta/t$

$A = \frac{\pi D^2}{4}$

$\dot{m} = V_{av} A \rho$

Cycle efficiency = (Net work out)/(Energy in)

$A = \lambda N \qquad A = A_o e^{-\lambda t}$

$\lambda = \ln 2/t_{1/2} = 0.693/t_{1/2}$

$t_{1/2}^{eff} = \frac{[(t_{1/2})(t_b)]}{[(t_{1/2}) + (t_b)]}$

$I = I_o e^{-\Sigma x}$

$I = I_o e^{-ux}$

$I = I_o\ 10^{-x/TVL}$

$TVL = 1.3/u$

$HVL = -0.693/u$

$SCR = S/(1 - K_{eff})$

$CR_x = S/(1 - K_{effx})$

$CR_1(1 - K_{eff1}) = CR_2(1 - K_{eff2})$

$M = 1/(1 - K_{eff}) = CR_1/CR_o$

$M = (1 - K_{effo})/(1 - K_{eff1})$

$SDM = (1 - K_{eff})/K_{eff}$

$\ell^* = 10^{-4}$ seconds

$\bar{\lambda} = 0.1$ seconds^{-1}

$I_1 d_1 = I_2 d_2$

$I_1 d_1^{\ 2} = I_2 d_2^{\ 2}$

$R/hr = (0.5\ CE)/d^2$(meters)

$R/hr = 6\ CE/d^2$ (feet)

Water Parameters

1 gal. = 8.345 lbm.
1 gal. = 3.78 liters
1 ft^3 = 7.48 gal.
Density = 62.4 lbm/ft^3
Density = 1 gm/cm^3
Heat of vaporization = 970 Btu/lbm
Heat of fusion = 144 Btu/lbm
1 Atm = 14.7 psi = 29.9 in. Hg.
1 ft. H_2O = 0.4335 lbf/in.

Miscellaneous Conversions

1 curie = 3.7×10^{10} dps
1 kg = 2.21 lbm
1 hp = 2.54×10^3 Btu/hr
1 mw = 3.41×10^6 Btu/hr
1 in = 2.54 cm
°F = 9/5°C + 32
°C = 5/9 (°F-32)
1 BTU = 778 ft-lbf

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 5.01 (1.00)

c

REFERENCE
NUS, Nuclear Energy Training - Reactor Operation, p. 6.4-2
Westinghouse Reactor Physics, p. I-3.15
HBR, Reactor Theory, Session 43, p. 3

ANSWER 5.02 (1.00)

d

REFERENCE
VEGP, Training Text, Vol. 9, pp. 21-60 & 61
Westinghouse Reactor Physics, Sect. I-5
HBR, Reactor Theory, Session 26, p. 2

ANSWER 5.03 (1.00)

b

REFERENCE
VEGP, Training Text, Vol. 9, p. 2$_1$-63 and VEGP Question Bank, #57
HBR, Reactor Theory, Session 29, p. 2

ANSWER 5.04 (1.00)

b

REFERENCE
NUS, Nuclear Energy Training, Module 3, Unit 6
Westinghouse Reactor Physics, Sect. 3, Neutron Kinetics and Sect. 5, Core Physics
HBR, Reactor Theory, Sessions 20 and 24 - 31

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 5.05 (1.00)

d

REFERENCE
Westinghouse Reactor Physics, pp. I-5.63 - 76
HBR, Reactor Theory, Sessions 38 and 39

ANSWER 5.06 (1.00)

d

REFERENCE
Westinghouse Reactor Physics, pp. I-5.36 - 50
HBR, Reactor Theory, Session 35, p. 5

ANSWER 5.07 (1.00)

a

REFERENCE
Westinghouse Reactor Physics, pp. I-2.19 - 21
HBR, Reactor Theory, Session 14, p. 3

ANSWER 5.08 (1.00)

b

REFERENCE
Westinghouse Reactor Physics, p. I-5.40
HBR, Reactor Theory, Session 36, p. 2

ANSWER 5.09 (1.00)

b

REFERENCE
WBN, TS, p. B 3/4 1-1
HBR, TS, p. 3.10-10

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 5.10 (1.50)

a. Power Defect (-0.25 for power coefficient)
b. Reactivity (or K_{eff})
c. Beta (minus) Decay

REFERENCE
Westinghouse Reactor Physics, pp. I-5.26, I-3.2, and I-1.18 and A-13.
HBR, Reactor Theory, Session 32, p. 3 and Session 21, p. 2 and Session 4, p. 2

ANSWER 5.11 (1.50)

a. FALSE
b. FALSE
c. TRUE

REFERENCE
Westinghouse Reactor Physics, pp. I-3.9 and I-3.4
HBR, Reactor Theory, Sessions 22 and 23

ANSWER 5.12 (1.00)

b

REFERENCE
HBR, Reactor Theory, Session 42, pp. 4 & 10

ANSWER 5.13 (1.00)

c

REFERENCE
HBR, Reactor Theory, Session 42, pp. 3 & 4

ANSWER 5.14 (1.00)

a

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

REFERENCE
HBR, Reactor Theory, Sessions 41 and 42

ANSWER 5.15 (1.00)

d

REFERENCE
NUS, Nuclear Energy Training - Reactor Operation, p. 10.5-1 - 4
Westinghouse Reactor Physics, pp. I-5.77 - 79
VEGP, Training Text, Vol. 9, pp. 21-81 & 82
HBR, Reactor Theory, Session 37, p. 4

ANSWER 5.16 (2.00)

a. REMAIN THE SAME
b. DECREASE
c. INCREASE
d. DECREASE

REFERENCE
Steam Tables

ANSWER 5.17 (1.00)

c

REFERENCE
Pump Laws

ANSWER 5.18 (1.50)

a. FALSE
b. TRUE
c. TRUE

REFERENCE
General Physics, HT&FF, pp. 155, 319, and 320 and Subcooled Liquid Density Tables

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 5.19 (1.00)

d

REFERENCE
General Physics, Heat Transfer Thermodynamics and Fluid Flow, pp. 145 - 148

ANSWER 5.20 (1.00)

b

REFERENCE
General Physics, Heat Transfer Thermodynamics and Fluid Flow, pp. 145 - 160.

ANSWER 5.21 (1.00)

c

REFERENCE
General Physics, HT & FF, Section 3.2
WBN, HT & FF, p. 13

ANSWER 5.22 (1.00)

b

REFERENCE
General Physics, HT & FF, p. 328
WBN, HT & FF, p. 17

ANSWER 5.23 (1.00)

d

REFERENCE
Surry, TS 3.12-16 and 17
HBR, TS, p. 3.10-13

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 5.24 (1.50)

a. Latent Heat (of Vaporization)
b. DNBR
c. Heat Flux Hot Channel Factor

REFERENCE
WBN, HT & FF, pp. 11, 22, and 24
General Physics, HT & FF, pp. 38 & 231 and HBR, TS, p. 3.10-12

ANSWER 5.25 (1.00)

c

REFERENCE
WBN, HT & FF, p. 19
General Physics, HT&FF, p. 105

ANSWER 5.26 (1.00)

b

REFERENCE
HBR, TS, p. 3.1-7

ANSWER 5.27 (1.00)

a

REFERENCE
HBR, TS, p. 3.1-22 and HBR Question Bank, # 1-14

ANSWER 5.28 (2.00)

a. INCREASE
b. INCREASE
c. DECREASE
d. DECREASE

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

REFERENCE
General Physics, HTFF - Fluid Flow Applications for Systems and Components

ANSWER 5.29 (1.00)

d

REFERENCE
Westinghouse Reactor Physics, Section I-5, MTC and Power Defect
HBR, Reactor Theory, Session 48

ANSWER 5.30 (1.00)

b

REFERENCE
WBN, TS, p. B 3/4 2-1
HBR, TS, p. 3.10-17

ANSWER 5.31 (1.00)

d

REFERENCE
WBN, TS, p. 3/4 2-4
HBR, TS, pp. 3.10-2 & 3

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 6.01 (1.00)

c.

REFERENCE
HBR/SD-025, p. 16.

ANSWER 6.02 (1.50)

a. T.

b. T.

c. F.

REFERENCE
HBR/SD-025 pp. 1, 8, 11, 23a.

ANSWER 6.03 (1.50)

a. 5. or 6.

b. 4.

c. 7.

REFERENCE
HBR/SD-025. p 18.

ANSWER 6.04 (1.50)

a. 3

b. 1

c. 2

REFERENCE
HBR/SD-033, pp. 50, 70-72.

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 6.05 (1.50)

a. F

b. T

c. T

REFERENCE
HBR/SD-033 pp. 12-15.

ANSWER 6.06 (1.00)

a.

REFERENCE
HBR/SD-033, p. 20.

ANSWER 6.07 (1.00)

c.

REFERENCE

HBR/SD-034, p. 53.

ANSWER 6.08 (1.00)

d.

REFERENCE
HBR/SD-021 pp. 4-7 & 13.

ANSWER 6.09 (.50)

T.

REFERENCE
HBR/SD-021, p. 10.

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 6.10 (1.00)

b.

REFERENCE
HBR/DWG. No. 5379-685.

ANSWER 6.11 (1.00)

X. C

REFERENCE
HBR/DWG. No. 5379-685.

ANSWER 6.12 (1.00)

c.

REFERENCE
SD-013 pgs 1-2

ANSWER 6.13 (1.00)

a. F.

b. F.

REFERENCE
HBR/SD-017, pp. 7, 8.

ANSWER 6.14 (1.00)

d.

REFERENCE
HBR/SD-023, pp. 30-31.

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 6.15 (.50)

F.

REFERENCE
HBR/SD-035, pp. 15-16.

ANSWER 6.16 (1.00)

d.

REFERENCE
HBR/SD-048, p. 5.

ANSWER 6.17 (1.00)

a. F.

b. T.

REFERENCE

HBR/SD-027, pp. 8-10.

ANSWER 6.18 (1.50)

a. F.

b. T.

c. T.

REFERENCE
HBR/SD-005 pp. 2-3.

ANSWER 6.19 (1.00)

b. Or C.

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

REFERENCE
HBR/SD-002, pp. 8, 26, 11, 12.

ANSWER 6.20 (1.00)

b.

REFERENCE
SD-019 pg. 3

ANSWER 6.21 (1.00)

b.

REFERENCE
SQN, Rod Control Lesson, p. 4 of 11.
HBR/SD-007, p. 4.

ANSWER 6.22 (1.00)

d.

REFERENCE
HBR/SD-009, p. 3.

ANSWER 6.23 (2.00)

a. F.

b. F.

c. T.

d. T.

REFERENCE
HBR/SD-007, pp. 5, 7, 14, 16, 21, 22.

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 6.24 (1.00)

a.

REFERENCE
SQN/System Manual, Chapter 11.5, Fig. 11.5-1, p. 11.5-39
HBR/SD-010, pp. 6-8.

ANSWER 6.25 (1.00)

b.

REFERENCE
HBR/SD-010; pp. 3, 29, 30.

ANSWER 6.26 (1.00)

d.

REFERENCE
HBR/SD-010, pp. 6, 19-22.

ANSWER 6.27 (1.00)

b.

REFERENCE
HBR/SD-011, p. 15.

ANSWER 6.28 (1.00)

a. F.

b. F.

REFERENCE
NBR/SD-011; pp. 2, 5.

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 6.29 (1.00)

c.

REFERENCE
HBR/SD-006, p. 3.

ANSWER 6.30 (1.00)

b.

REFERENCE
HBR/SD-016, pp. 15, 29; and diagram in Elec. Distribution Session 5, p. 13.

ANSWER 6.31 2.00 ~~(2.50)~~

a. 2.
~~b. 2.~~
c. 1.
d. 1.
e. 3.

REFERENCE
HBR Dwg. No.'s 300-5379-2753; -[illegible]759.
HBR/SD-006, pp. 4, 5, 10, 12.

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 7.01 (1.00)

c.

REFERENCE
10CFR20, Sec. 20.4c

ANSWER 7.02 (1.00)

c.

REFERENCE
10 CFR 20

ANSWER 7.03 (1.50)

a. 2.

b. Emergency[0.2] Boration[0.3].

c. 1.

REFERENCE
HBR/GP-003, pp. 10-12.

ANSWER 7.04 (2.00)

a. 6.

b. 4.

c. 3.

d. 1.

REFERENCE
HBR/GP-007, p. 25; HBR/SD-031, pp. 4, 8.

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 7.05 (1.50)

a. F.

b. T.

c. T.

REFERENCE
HBR/GP-007, pp. 8-9.

ANSWER 7.06 (1.00)

a. 350

b. 350

REFERENCE
HBR/GP-001. p. 9; HBR/T.S., 3.3.1.3; HBR/GP-002, p. 15, 41.

ANSWER 7.07 (1.50)

a. F.

b. T.

c. T.

REFERENCE
HBR/OP-301, pp. 7-10.

ANSWER 7.08 (1.00)

c.

REFERENCE
HBR/GP-003, p. 25.

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 7.09 (1.00)

d.

REFERENCE
HBR/GP-005, p. 25.
HBR/T.S., Table 4.1-2.

ANSWER 7.10 (2.00)

a. 2, 200, 225.

b. 325.

REFERENCE
HBR/OP-101, pp. 9-10.

ANSWER 7.11 (2.00)

a. 2

b. 4

REFERENCE
HBR/OP-101, pp. 10-11.

ANSWER 7.12 (2.00)

a. 4

b. 1

REFERENCE
HBR/T.S., p. 3.1-5; HBR/GP-002, p. 15.

ANSWER 7.13 (1.00)

b.

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

REFERENCE
SQNP/GOI-2, p. 2.
HBR/GP-003, p.12.

ANSWER 7.14 (1.00)

c.

REFERENCE
HBR/GP-001, p. 19.

ANSWER 7.15 (1.00)

d

REFERENCE
HBR/AOP-012, pp. 4-5.

ANSWER 7.16 (1.00)

a or C

REFERENCE
HBR/AOP-001. pp. 15-18.

ANSWER 7.17 (1.00)

b

REFERENCE
HBR FRP-S.1 pg. 3

ANSWER 7.18 (1.00)

a

REFERENCE
HBR/FRP-S.1, pp. 3-4.

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 7.19 (3.00)

a. 100, 310

b. 1200

c. 25

d. 42

e. 5

REFERENCE
HBR EPP-Foldouts, pg. 4

ANSWER 7.20 (1.00)

b.

REFERENCE
HBR EPP-5 pg. 7

ANSWER 7.21 (1.00)

c

REFERENCE
HBR EPP-5 pg 8

ANSWER 7.22 (1.00)

a. T

b. T

REFERENCE
HBR/EPP-5, pp. 9-10.

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 7.23 (1.00)

a. T.

b. T.

REFERENCE
HBR/EOP-HO-4 & -5.

ANSWER 7.24 (1.00)

b.

REFERENCE
HBR/CSFST Diagram.

ANSWER 7.25 (1.00)

b

REFERENCE
HBR/FHP-035, p. 11.

ANSWER 7.26 (1.00)

c

REFERENCE
HBR/FHP-035, p. 11.

~~ANSWER 7.27 (.50)~~

~~2~~

~~REFERENCE~~
~~HBR/FHP-034, p. 2.~~

} Deleted

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 7.28 (1.00)

b.

REFERENCE
HBR/AOP-005, p. 15.

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 8.01 (1.00)

a

REFERENCE
Surry, TS 3.12-11 and 12
HBR, TS, p. 3.10-10

ANSWER 8.02 (1.00)

b

REFERENCE
VEGP, Emergency Plan, p. 3-3
Surry, EPIP-3.02, p. 1 and EPIP-3.03, p. 1
WBN, IP-2, IP-3, IP-4, and IP-5
HBR, PEP-102 - 106

ANSWER 8.03 (1.00)

d

REFERENCE
Surry, TS 2.3-7
WBN, TS, p. B 2-5
HBR, TS, p. 2.3-5

ANSWER 8.04 (1.00)

b

REFERENCE
HBR, AP-004, p. 29

ANSWER 8.05 (1.00)

a

REFERENCE
HBR, AP-004, p. 30

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 8.06 (1.00)

d

REFERENCE
HBR, AP-027, p. 6

ANSWER 8.07 (1.00)

c

REFERENCE
HBR, OMM-006, pp. 5 & 6

ANSWER 8.08 (1.00)

a

REFERENCE
HBR, OMM-1006, p. 2

ANSWER 8.09 (1.00)

c

REFERENCE
McG, TS, p. 1-1
Surry, TS 1.0-3
Cat, TS, p. 1-1
WBN, TS, p. 1-1
HBR, TS, p. 1-3

ANSWER 8.10 (1.00)

a

REFERENCE
HBR, TS, p. 3.1-11

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 8.11 (1.00)

a

REFERENCE
HBR, TS, p. 3.1-18

ANSWER 8.12 (1.00)

b

REFERENCE
HBR, TS, p. 1-4

ANSWER 8.13 (1.00)

a

REFERENCE
HBR, TS, p. 2.2-1

ANSWER 8.14 (1.00)

d

REFERENCE
HBR, TS, p. 3.1-2

ANSWER 8.15 (1.00)

d

REFERENCE
HBR, TS, p. 3.3-4

ANSWER 8.16 (1.00)

c

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

REFERENCE
HBR, TS, p. 3.8-4a

ANSWER 8.17 (1.00)

b

REFERENCE
HBR, TS, p. 4.1-1

ANSWER 8.18 (1.00)

a

REFERENCE
HBR, TS, p. 6.2-1

ANSWER 8.19 (1.00)

d

REFERENCE
HBR, TS, p. 6.2-2

ANSWER 8.20 (1.00)

b

REFERENCE
HBR, TS, p. 3.14-1

ANSWER 8.21 (2.00)

a. TRUE
b. TRUE
c. FALSE
d. FALSE

REFERENCE
HBR, OMM-1009, pp. 5, 3, 4, and 6

ANSWER 8.22 (1.50)

a. FALSE
b. FALSE
c. FALSE

REFERENCE
HBR, OMM-005, pp. 6 & 8

ANSWER 8.23 (1.50)

1. c
2. f
3. c

REFERENCE
HBR, TS, p. 3.1-16

ANSWER 8.24 (2.50)

1. c
2. e
3. c
4. a
5. c

REFERENCE
HBR, TS, pp. 2.3-4 - 6

ANSWER 8.25 (1.00)

a. 1000
b. RC Foreman

REFERENCE
HBR, AP-027, p. 21

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 8.26 (1.50)

1. Misaligned (> 15 inches) with its bank
2. Can not be moved by its drive mechanism
3. Drop time is not met

REFERENCE
HBR, TS, p. 3.10-8

ANSWER 8.27 (1.00) [Any two of the following required]

1. All (three) safety valves operable.
2. At least 125 kW of heaters (0.25 pts) capable of being powered from an emergency power source (0.25 pts) operable.
3. PZR press control system operable.

REFERENCE
HBR, TS, p. 3.1-3a, items b & c.

ANSWER 8.28 (1.00)

1. RCS temperature less than 350 degrees
2. RCS not vented to containment

REFERENCE
HBR, TS, 3.1-4

ANSWER 8.29 (1.00)

1. Its emergency power source is operable
2. Its redundant system is operable

REFERENCE
HBR, TS, p. 1-2

ANSWERS -- ROBINSON -85/06/18-VINNOLA, A.

ANSWER 8.30 (2.00)

(Any 5 at 0.4 pts each)
1. Plant General Manager (7.)
2. (Manager - Operations) & Maintenance
3. Manager - Technical Support
4. Manager - E & RC
5. Operating Supervisor
6. Supervisor on call a. mechanical maintenance
b. I&C maintenance
c. Radiation Control
d. E&Chemistry
e. Engineering - Plant
f. Engineering - Performance

REFERENCE
HBR, PEP-001, p. 5