MAY 20 1985

Westinghouse Nuclear Training
Center
ATTN: Mr. Jerry Scholand
505 Shiloh Blvd.
Zion, IL 60099

Gentlemen:

SUBJECT: EXAMINATION REPORT

On May 2, 1985, we mailed you a cover letter with the examination report attached. At that time, we neglected to send you a copy of the examinations and answer keys. Enclosed please find the above mentioned items.

We regret any inconvenience this matter may have caused you.

Sincerley,

ORIGINAL SIGNED BY L. A. REYES

L. A. Reyes, Chief
Operations Branch

Enclosure: Examinations
and Answer Key(s) (SRO/RO)

cc w/encls:
DMB Document Control (RIDS)
T. West, Plant Training Mgr.
B. Boger, Branch Chief, OLB

RIII McMillen/lc 5/20/85

RIII Reyes 5/20/85

8505280348 850520
PDR ADOCK 05000482
V PDR

IE 42.1

MASTER- QUESTIONS

REVIEWERS:
- WARREN BROWN
- John Fields
- Bob Adams
- Mike Cullen

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

FACILITY: SNUPPS-1

REACTOR TYPE: PWR-WEC4

DATE ADMINISTERED: 85/04/15

EXAMINER: R.R.FERRELL

APPLICANT: ________________________

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
25.00	25.00	________	________	5. THEORY OF NUCLEAR POWER PLANT OPERATION, FLUIDS, AND THERMODYNAMICS
25.00	25.00	________	________	6. PLANT SYSTEMS DESIGN, CONTROL, AND INSTRUMENTATION
25.00	25.00	________	________	7. PROCEDURES - NORMAL, ABNORMAL, EMERGENCY AND RADIOLOGICAL CONTROL
25.00	25.00	________	________	8. ADMINISTRATIVE PROCEDURES, CONDITIONS, AND LIMITATIONS
100.00	100.00	________	________	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 (.50)

Reactor power decreases from 1 watt to 0.1 watt in three minutes. The Startup Rate is____ DPM and the reactor period is____ seconds.

Choose the correct answer.

A.-3,-47
B.-1,-56
C.-1/4,-96
D.-1/3,-78

QUESTION 5.02 (.50)

If the Keff of a reactor is 1.05, then the reactivity is_____Delta K/K.

Choose the correct answer.

A..1378
B..0005
C..04762
D..0007

QUESTION 5.03 (1.50)

Explain how the moderator temperature coefficient changes with rods in the core verses out of the core.

QUESTION 5.04 (.50)

The two factors that have the most significant effect on axial power distribution following a transient are __________ and ___________.

A.Core Burnup, Boron Concentration
B.Power Level, Boron Concentration
C.Xenon, Power Defect
D.Control Rod position, Xenon

QUESTION 5.05 (.75)

At the point where pump runout is reached, the volumetric flow rate goes to _______ and the system backpressure is ______ than the inlet pressure. It can be stated that pump runout is the volumetric flow rate at which the available NPSH is ______ than the required NPSH.

Choose the answer which completes the above statement.

A.minimum, more, more
B.maximum, less, less
C.minimum, less, more
D.maximum, more, less

QUESTION 5.06 (1.50)

What are the three bases behind the Control Rod Insertion Limits.

QUESTION 5.07 (1.75) ASSUME RODS IN AUTO/NO OPERATOR ACTION

Assume one Reactor Coolant Pump trips at 30% power. Without a reactor protective system actuation or a change in turbine load, indicate whether the following parameters will increase,decrease,or remain the same.

A.Flow in the OPERATING reactor coolant loops.
B.The ratio of the core flow compared to the total loop flow. (Core Flow/Total Loop Flow).
C.Reactor Vessel Delta P.
D.Core Delta T.
E.An OPERATING LOOP Steam Generator Pressure. [1.75]

QUESTION 5.08 (1.50)

How does the Differential Boron Worth change with temperature and Boron Concentration? Explain and consider each seperately.

QUESTION 5.09 (.50)

The power distribution limits (Heat Flux Hot Channel Factors) are height dependent per the Technical Specifications.

Choose the response that explains why the above statement is true.

A. It is based on a small break LOCA and the limit is most restrictive at power levels less than 50%.
B. Based on LOCA analysis and is most restrictive at 0-6 feet of fuel rod height.
C. Based on a LOCA where the top of the core is uncovered for a longer period between blowdown and reflood.
D. More restrictive at power levels greater than 50% and must not exceed 1.9 kw/ft for the lower 6 feet of fuel rod height.

QUESTION 5.10 (2.25)

A. Define DNB and explain what core parameters must be monitored to ensure that it does not occur. [.75]

B. How will the following affect the operating characteristics of centrifugal pumps (Increase, Decrease, or Remain the same)

1. Pump head as speed doubles
2. Total flow as a second pump (in series) is started
3. Minimum required NPSH as flow rate increases [.50 ea.]

QUESTION 5.11 (2.00)

The effects of Emergency Boration for 1 minute on power and Tave can be different depending on reactor power. Answer the following:

A. What happens to power and Tave if emergency boration is performed at 100% power? Assume Rod Control is in manual. [1.0]

B. What happens to power and Tave if emergency boration is performed at 10 to the -8 amps in the IR with Tave at 547 degrees F. [1.0]

QUESTION 5.12 (1.50)

The reactor is at 1% power with the Steam Dumps in the steam pressure mode. A rod withdrawl accident causes bank D to move out at 40 SPM. Explain what happens to the following. Assume no operator action.

A.Tave
B.Steam Pressure
C.Reactor power [.50 ea.]

QUESTION 5.13 (1.25)

What is 'core stretchout' and how is it accomplished? In your answer also explain the effects on the plant if stretchout is performed.

QUESTION 5.14 (2.75)

The reactor has been operating with the rods at 1 step above the rod insertion limit for 12 hours while at 75% power. Answer the following.

A.Explain what has occured between the top and bottom of the core during this time and what happens over the next 12 hours after the rods are withdrawn to 220 steps. [1.50]

B.What indication does the operator have of what is happening in the core during this time? [.50]

C.How is this condition prevented when operating? [.75]

QUESTION 5.15 (3.00)

How will the following paramater changes affect control rod worth? Explain.

A.Tave increases 5 degrees F [1.00]

B.Boron Concentration increases 50 PPM [1.00]

C.Fuel Burnup over core life [1.00]

QUESTION 5.16 (.50)

The SHUTDOWN MARGIN REACTIVITY can best be described by which of the following statements.

A.Sum of the Xenon,control rods,and temperature reactivity
B.Difference between the Shutdown reactivity and Xenon reactivity
C.Difference between the shutdown reactivity and reference reactivity data
D.Sum of the Reference reactivity and Xenon plus temperature reactivity

QUESTION 5.17 (.50)

The predicted critical rod height on a reactor startup is chosen to ensure which of the following?

A.Ensure position is above rod insertion limits and selected to anticipate changing reactivity conditions.
B.Ensure criticality is achieved within the limits of the ECP and selected to anticipate changing reactivity conditions.
C.Ensure position is above the rod insertion limits and boron changes at the POAH is minimal.
D.Ensures the boron changes at the POAH is minimal and to ensure criticality is achieved within the limits of the ECP.

QUESTION 5.18 (2.25)

A.What 4 parameters affect radial flux distribution in the core? [1.0]

B.What 5 parameters affect the axial power distribution in the core? [1.25]

End of Category

EQUATIONS

REACTOR THEORY

$P = P_o e^{t/\tau} = P_o 10^{SUR \cdot t}$

$\tau = \frac{\bar{l}^*}{\rho} + \frac{\beta - \rho}{\lambda\rho}$ or $\tau = \frac{\beta - \rho}{\lambda\rho}$

$\rho = \frac{k - 1}{k}$ $\quad \frac{k_2 - k_1}{k_2 k_1} = \Delta\rho$

$\frac{cps_2}{cps_1} = \frac{1 - k_1}{1 - k_2}$ $\quad k < 1$

$\frac{1}{M} = 1 - k$

$\frac{1}{M} = \frac{cps_e}{cps_n}$

$\rho_{net} = \Delta(\rho_{doppler} + \rho_{mod} + \rho_{void} + \rho_{Xe} + \rho_{Sm} + \rho_{Pu} + \rho_{Boron} + \rho_{rod} + \rho_{fuel} + \rho_{Poisons})$

$k_2 = k_1 + \delta k$

$\delta k = k - 1$

$SUR = \frac{26.06}{\tau}$

$P = \frac{\Sigma\phi V}{3.1 \times 10^{10}}$

$\Sigma = N\sigma$

$\phi = nv$

Defect = Coeff x Δ Parameter

RADIATION

$N = N_o e^{-\lambda t}$

$A = \lambda N$

$I = I_o e^{-\mu x} = I_o 10^{-x/TVT}$

$\lambda T_{1/2} = 0.693$

R/hr @ d feet $= \frac{6CE}{d^2}$

$I_1 d_1^2 = I_2 d_2^2$ point source

$I_1 d_1 = I_2 d_2$ - line source

R/hr x time = R

Rad x QF = Rem

$T_{1/2\,eff} = \frac{T_{1/2\,Bio} \times T_{1/2\,Rad}}{T_{1/2\,Bio} + T_{1/2\,Rad}}$

MATH

$y^a = b$

$\log_y b = a$

$\log x^c = c \log x$

$\log \frac{x}{y} = \log x - \log y$

$\log xy = \log x + \log y$

FLUIDS/THERMO/HEAT TRANSFER

$\dot{m} = A_1\rho_1 V_1 = A_2\rho_2 V_2$

$Q = A_1 V_1 = A_2 V_2$

$E_{in} = E_{out} + \Delta E_{stored}$

$E = KE + PE + U + pV + Q + W$

$PE = \frac{g}{g_c} z$

$KE = \frac{V^2}{g_c}$

reduced for - turbine, SG pump, nozzle, orifice, condenser, pipe, Rx

flow $\alpha \sqrt{dp}$

head loss $= f\frac{L}{D}\frac{V^2}{2g_c}$ or head loss $\alpha\ V^2$

head loss $\alpha\ \Delta p = k\frac{V^2}{2g_c}$

$p = h + p_{ambient}$

$F = pA$

$\Delta p_{2\,phase} = \Delta p_{1\,phase} \times K$

k = f(quality & Pressure)

Pump laws speed α flow

(speed)^2 α pressure

(speed)^3 α power

$Q = kA\Delta T = hA\Delta T = UA\Delta T$

$Q = \dot{m} c_p \Delta T$

$Q = \dot{m}\Delta h$

$Q = \epsilon\sigma T$

$\Delta H = mc_p\Delta T$

$\Delta U = mc_v\Delta T$

$H = U + pV$

$\Delta S = \frac{\Delta Q}{T}$

$pV = nRT$

$\frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$

$C_1 V_1 + C_2 V_2 = C_3(V_1 + V_2)$

QUESTION 6.01 (.50)

The secondary source used in the core is made of ______ which must be re-generated every _____ days.

Choose the correct answer.

A.Sb-Be,150
B.Pu-Be,300
C.Cf-Be,200
D.Sb-Be,300

QUESTION 6.02 (.50)

Thimble Plug Assemblies used in the reactor can best be described in the following manner (Choose the correct answer):

A.Required to equalize the flow through the fuel assemblies. They project into the upper ends of the guide thimbles and consist of a round plate with long stainless steel rods suspended from the bottom surface.
B.Required to equalize flow through the assemblies and limit the bypass flow through empty thimble tubes. They are used in guide thimble tubes which do not contain control rods.
C.Required to bypass flow through the fuel assemblies and equalize flow through empty thimble tubes. They are used in guide thimble tubes which do not contain neutron source rods.
D.Required to limit the bypass flow through empty thimble tubes. They are made of stainless steel and project into the lower ends of the guide thimble tubes.

QUESTION 6.03 (3.00)

List the functions of the following permissives. Include coincidence.

A.P-9
B.P-10
C.P-8 [1.0 ea.]

QUESTION 6.04 (1.00)

Give four inputs that will actuate the 'Computer Rod Deviation'alarm.

QUESTION 6.05 (1.00)

What four actions will initiate a Main Steam Line Isolation? Include set-points as applicable.

QUESTION 6.06 (1.50)

Answer the following TRUE or FALSE concerning the ECCS systems.

1. The ECCS cannot accept an active failure during the recirculation phase and still fulfill its design function.

2. The Charging pumps are designed to deliver 150 GPM/pump at 2500 psig and 550 GPM at 600 psig during an SI condition.

3. The SI pumps miniflow valves cannot be opened during hot leg recirculation unless the RHR discharge to charging and SI pump suction cross-ties (EJ-HV-8804A/B) are closed.

4. The Accumulators are maintained between 502 and 648 psig with a Boron concentration between 1900 and 2100 PPM.

5. The Containment Spray system nozzles are arranged such that one train of the CSS will spray at least 75% of the containment operating deck.

6. The hydrogen purge system would not be required unless there is a failure of both recombiners and would be manually initiated 9 days after a LOCA.

QUESTION 6.07 (2.00)

A. What are two purposes of the No.2 RCP seal? [1.0]

B. Why is the No.3 seal designed as a double dam seal? Explain the operation of the seal in your answer? [1.0]

QUESTION 6.08 (1.25)

Explain how the Component Cooling Water system is designed to be protected from a leak/rupture in the Thermal Barrier Heat Exchanger.

QUESTION 6.09 (1.50)

For the following questions concerning the RCS Pressure Control System, fill in the blank with the correct pressure:

1.Normal RCS system pressure is______ psig.
2.Variable heaters are completely off at______ psig.
3.Pressurizer sprays start opening at _______ psig.
4.Pressurizer sprays are full open at _____ psig.
5.The Power operated Relief valves open at _______ psig.
6.A Reactor high pressure trip occurs at ______ psig.
7.The Pressurizer Safety Valves open at _______ psig.
8.The RCS design pressure is _______ psig.
9.RCS hydro test pressure is _____ psig.
10.A low pressure safety Injection occurs at _____ psig.

[.15 ea]

QUESTION 6.10 (2.00)

The reactor is operating at 75% reactor power with all systems in automatic control. For the following failures, explain the plants response and indicate what reactor protection signal (if any) will cause the reactor to trip. Consider each independently and assume no operator action.

A.Controlling Pressurizer level channel fails high. [1.0]

B.Controlling Steam Generator level channel fails low. [1.0]

QUESTION 6.11 (.50)

The automatic shift of the Auxiliary Feedwater pump suction from the Condensate Storage Tank to the ESW system requires what conditions?

Choose the correct answer.

A.Low level in the CST and AFAS present
B.Low suction pressure on 2/3 sensors and AFAS present
C.SIS present and low suction pressure on 2/3 sensors
D.Low level in the CST and low suction pressure on 2/3 sensors

QUESTION 6.12 (1.25)

A. What three actions are initiated on an undervoltage condition on a safeguards electrical bus? [.75]

B. What two conditions/events actuate the shutdown sequencer associated with the safeguards electrical distribution? [.5]

QUESTION 6.13 (1.00)

What are 4 conditions that are required for the Emergency Diesel Generator output breaker to automatically close?

QUESTION 6.14 (1.50)

A. What are the 4 permissives associated with the Steam Dump System? Explain the function of each in your answer? [1.0]

B. What is the function of the HIGH-1 and HIGH-2 bistables associated with the load rejection controller? [.5]

QUESTION 6.15 (1.00)

What 5 protective features will override the automatic SGWLCS signals?

QUESTION 6.16 (.75)

The Gaseous Radwaste System collects radioactive fission gases which are primarily _________ (half-life of 9.09 hours) and __________ (half-life of 10.7 years) while the non-radioactive gas collected is mostly_________.

Choose the correct answer.

A. Xe-135, krypton-85, Helium
B. Xe-135, krypton-85, Hydrogen
C. Cs-137, Krypton-85, Helium
D. Xe-135, Radon-75, Hydrogen

QUESTION 6.17 (2.25)

A.What 3 conditions (interlocks) must be met to open the LETDOWN ISOLATION VALVES in the CVCS system from the main control board? [.75]

B.What conditions must exist in order to manually close the same valves from the main control board? [.75]

C.What is the basis for these interlocks? [.75]

QUESTION 6.18 (1.00)

Residual Heat Removal pump 'A', is used during the recirculation phase of a loss of coolant accident to supply water to the suction of the Centrifugal Charging pumps and SI pumps. The supply of this recirculated water is through valve HV-8804A.

Answer the following based on the above statement

A.What conditions must be met to open HV-8804A? [.75] .6

B.What are the two bases of these interlocks? [.50] .4

QUESTION 6.19 (1.50)

A.What two signals will generate a Containment Spray Activation Signal (CSAS). Include setpoints and coincidence. [1.00]

B ~~C~~.What two ways can the Containment Spray pumps be stopped when they are started on a CSAS signal? [.50]

QUESTION 7.01 (1.50)

Answer the following TRUE or FALSE concerning Radiation Exposure.

A. At a radiation exposure in the lethal range of 1000 REM, death is certain.

B. Just above 200 REM, or the threshold for death, a small number of people will die within 30 days.

C. The body burden of a particular radioactive species is simply the total amount of radioactivity accumulated within the body over a lifetime.

D. Somatic effects of radiation can be passed on to offspring of the exposed person.

E. A change in a cell's original genetic code is a mutation, and is passed on to subsequent generations.

QUESTION 7.02 (2.00)

A. What are three indications the SRO will use to identify which Steam Generator has the ruptured tube per E-3, 'Steam Generator Tube Rupture' procedure? [1.50]

b. What is the RCP tripping criterion per the above procedure? [.50]

QUESTION 7.03 (1.00)

List three conditions when the shutdown banks must be fully withdrawn when the reactor is shutdown? [1.0]

QUESTION 7.04 (1.50)

List 5 conditions when emergency boration must be initiated.

QUESTION 7.05 (2.25)

Per SF-0-01, 'Failure of Control Rod Bank(s) to Move', answer the following questions.

A. What are three immediate operator actions if the rods fail to move in automatic? [.75]

B. What conditions would have to be present to declare the rod inoperable? [.75]

C. What are two ways Tave can be maintained when the rods fail to move? [.75]

QUESTION 7.06 (.75)

The 10CFR20 limits for radiation exposure is as follows (fill in the blank)

A.____REM/Quarter,Whole Body
B.____REM/Quarter,Hands and Forearms
C.____REM/Quarter,Skin [.25 ea.]

QUESTION 7.07 (1.00)

Under what 3 conditions/requirements can a licensee permit an individual in a restricted area to receive a total occupational dose to the whole body greater than the 10CFR20 limits? Assume normal operating conditions only.

QUESTION 7.08 (1.50)

Per procedure ES-0.2, 'Natural Circulation Cooldown', answer the following questions.

A.What cooldown rate limitation is imposed for the RCS cold legs? [.5]

B.What levels must be maintained in the Steam Generators? [.5]

C.When depressurizing the RCS, what subcooling margin must be maintained? [.5]

QUESTION 7.09 (2.00)

The plant is in the following conditions:

1. Cold Shutdown, RCS on nitrogen pressure control (Pressurizer to PRT via the PORV's)
2. Letdown is via RHR to CVCS via crossconnect valve BG-HCV-128
3. Letdown flow is 75 GPM
4. Pressurizer level is 80%
5. Positive Displacement Charging pump running to maintain pressurizer level constant.

Answer the following questions concerning a plant heatup:

A. Name 2 indications the operator will use to determine that a bubble exists in the pressurizer. [.75]
B. Name 2 conditions that must be satisfied prior to starting a RCP during heatup. [.75]
C. How is RCS temperature maintained while on Nitrogen pressure control? [.5]

QUESTION 7.10 (2.25)

Per E-0, Reactor Trip or Safety Injection, how are the following verified by the operator to have actuated properly as part of the immediate actions?

A. Reactor Trip [3] [.75]
B. Turbine Trip [2] [.50]
C. Feedwater Isolation [4] [1.0]

[NOTE: Number in [] is required number of responses]

QUESTION 7.11 (1.25)

When entering ES-0.2, NATURAL CIRCULATION COOLDOWN, the first thing attempted is to restart a RCP after establishing the proper conditions. List 5 of the conditions that have to be established prior to starting the RCP.

QUESTION 7.12 (1.00)

List 4 symptoms the operator would have on a loss of a Main Feedwater Pump with power at 75%.

QUESTION 7.13 (2.50)

A. In addition to possible annunciator alarms, list 4 indications of a dropped rod. [1.0]

B. What are the immediate operator actions specified in SF-O-5, Dropped Rod Procedure? [.75]

C. If the QUADRANT POWER TILT RATIO is calculated to be greater than 1.10 due to a dropped rod at a reactor power of 65%, what is the time limit specified in Tech Specs for reducing power and how far must power be reduced in order to satisfy the action statement.? [.75]

QUESTION 7.14 (1.25)

A. During recovery from an inadvertent SI, list the 3 conditions which require the operator to manually reinstate SI [.75]

B. Why can't the operator rely on automatic reinitiation? [.50]

QUESTION 7.15 (2.25)

During a normal startup,

A. Why is the reactor brought up to 6-8% power before the generator is synchronized on to the power grid? [.75]

B. When are the Steam Dumps normally switched to the Tave mode? [.75]

C. What limits the loading rate of the turbine/generator? [list 3] [.75]

QUESTION 7.16 (1.00)

What are 4 conditions that have to be established in the plant before GEN-N-08, 'HEAT BALANCE CALCULATION', can be performed? [1.0]

QUESTION 8.01 (.50)

The Technical Specification Limit for the Quadrant Power Tilt Ratio is less than or equal to_____.

A.1.07
B.1.05
C.1.02
D.1.04

QUESTION 8.02 (1.75)

A. What are the four categories of ~~site~~ emergencies? [.50]

B. When is the on-site emergency organization called out? [.25]

C. When is the corporate emergency organization activated? [.25]

D. What are 3 responsibilities the emergency coordinator can not delegate? [.75]

QUESTION 8.03 (1.00)

Concerning EIP-ZZ-00101,"Callaway Plant Emergency Plan Implementing Procedure",answer the following TRUE or FALSE.

A. The above procedure is initiated when alarms,abnormal instrument readings or reports of conditions that indicate an emergency situation (either real or potential) has occored.
B. Decisions of who will receive doses in excess of occupational limits in life-saving situations will be made only by the Emergency coordinator.
C. Upon classification of an emergency,the Shift Supervisor will assume overall emergency management responsibilities as the emergency coordinator.
D. All non-essential personnel have to be evacuated from the site within 30 minutes of a declared SITE EMERGENCY.

[.25]

QUESTION 8.04 (1.50)

List 6 items the Operating Supervisor and Unit Supervisor (SRO) have to do in order to relieve the off-going shift per CAP-01,"Shift and Relief Turnover".

QUESTION 8.05 (1.00)

Procedure CAP-02,'Routine (Shift and Daily) Surveillance Requirements',sets the surveillance frequency for the following items which have limits per Technical Specifications. What are the limits established in Tech Specs?

A.Minimum Temperature for Criticality.
B.Shutdown Rods fully withdrawn.
C.RCS pressure/Tave
D.Pressurizer Water level.

QUESTION 8.06 (1.00)

A.What is the required action if the Tech Spec LCO for the Centrifugal Charging pumps can not be met when in Modes 1,2,3, and 4? [.50]

B.What are the surveillance requirements for the Centrifugal Charging pumps when in modes 1,2,3, and 4? [.50]

QUESTION 8.07 (1.00)

List ~~4~~ 3 Technical Specification limits on the Accumulators when in Modes 1,2 and 3 (Greater than 1000 psig).

CORRECTED TO CANDIDATE

QUESTION 8.08 (1.50)

What are the Technical Specification requirements for A.C.Sources when in Modes 1,2,3,and 4? Be specific and list all requirements for operability.

QUESTION 8.09 (2.00)

Per Section 6.0,Administrative Controls,answer the following TRUE or FALSE.

A.The Fire Brigade can include more than 3 members of the minimum shift crew necessary for safe shutdown of the unit.
B.The composition of the Fire Brigade may be less than the minimum requirements to account for unexpected absences of on-duty personnel.
C.The minimum shift crew composition when in Modes 1,2,3,or 4 shall be 1 STA,2 RO's,1 SRO,1 SS and 2 EO's.
D.The shift crew composition may be 1 less than the minimum requirements for a period not to exceed 2 hours.
E.The Operating Supervisor may leave the MCR when the controls are being manned by a licensed Reactor Operator to confer with the Shift Supervisor for a period not to exceed 5 minutes.

QUESTION 8.10 (2.00)

Answer the following TRUE or FALSE concerning Tech Specs.

A.Noncompliance with a Specification shall exist when the requirements of the LCO and associated ACTION requirements are not met within the specified time intervals.
B.Entry into an OPERATIONAL MODE or other specified condition shall not be made unless the conditions for the LCO are met without reliance on provisions contained in the ACTION requirements.
C.Failure to perform a Surveillance Requirement within the specified time interval does not constitute, a failure to meet the OPERABILITY requirements for a LCO.
D.If all Pressurizer power-operated relief valves(PORV's) and their associated block valves are not operable in Modes 1,2,and 3,the reactor shall be placed in hot standby within the next 6 hours.
E.With any RCS leakage greater than the limits specified in Tech Specs,excluding PRESSURE BOUNDARY LEAKAGE,reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours.

QUESTION 8.11 (1.50)

What are 3 requirements that have to be met to make changes to the Emergency or Security Plan implementations? [1.50]

QUESTION 8.12 (2.50)

A.What are the two safety limits associated with Technical Specifications? Explain the basis of each in your answer. [2.0]

B.If these safety limits are exceeded,the Tech Spec requirement is to be in HOT STANDBY within ______ . [.5]

Choose the correct answer.

A.15 minutes
B.30 minutes
C.1 hour
D.2 hours

QUESTION 8.13 (.50)

HOT SHUTDOWN is defined as being a Keff of______or less, a % rated thermal power of 0% and an average coolant temperature between_____degrees F.

Choose the CORRECT answer to complete the sentence.

A. .95, 350 and 200
B. .95, 200 and 140
C. .99, 500 and 350
D. .99, 350 and 200

QUESTION 8.14 (1.75)

A. At a power level of 80% it is noted that AFD has exceeded the target band by 2% for 78 minutes on two channels. What corrective action is required? [.75]

B. If the condition in part A above had occured at 36% power, what would have been required? Explain the reason for your answer. [.50]

C. Explain why the AFD target band changes from plus/minus 5% at BOL to plus 3 minus 12% at EOL. [.50]

QUESTION 8.15 (1.00)

Assume a weekly surveillance is performed according to the following schedule at noon :

Monday, 8/1
Tuesday, 8/9
Tuesday, 8/16
Wednesday, 8/24

Has the Tech Spec surveillance interval been properly complied with? Explain your answer.

QUESTION 8.16 (2.50)

A. How many hours is a licensed operator permitted to work in a 48 hour period? [.5]

B. How many consecutive days is a licensed operator permitted to work? [.5]

C. How many fire teams must be on duty at all times? [.5]

D. Does the Fire Brigade Leader (Fire Chief) have any authority to require the plant to be shutdown? [.5]

E. Who assumes the duty of Fire Brigrade Leader on the back shifts when the need arises? [.5]

QUESTION 8.17 (2.00)

A. For each of the following leak locations, state the maximum allowable rate of leakage of reactor coolant specified in the Technical Specifications.

1. Unknown location
2. RHR valve packing leak with leakoff line
3. Through a wall crack in the line between the pressurizer code safety valve and the pressurizer
4. A Steam Generator tube [.375 ea.]

B. What is the basis for the Technical Specification limit on maximum RCS activity? [.50]

MASTER - ANSWERS

ANSWERS -- SNUPPS-1   -85/04/15-R.R.FERRELL

ANSWER 5.01 (.50)

D.

REF.Fundamentals of Nuclear Reactor Physics, p.7-20

ANSWER 5.02 (.50)

C.

REF.Fundamentals of Nuclear Reactor Physics, p.5-21

ANSWER 5.03 (1.50)

The moderator temperature coefficient is more negative when the control rods are in the core. Increasing the temperature decreases the waters moderating ability and thus increases the migration length of the neutrons. In the rods out condition, the increased migration length increases leakage only at the cores periphery. At elevated temperatures the migration length increases the rods 'sphere of influence'. With the rods in the core, increasing the temperature will increase the probability of neutron leakage into the rod and loss of fission chain reaction.Therefore, for a given temperature change, more negative reactivity is inserted when control rods are in the core.

With rods out, the PWR has little Buckling because of its size. Therefore an increase in slowing down length and diffusion length has little affect on the moderator temperature coefficient. Placing rods in the core forces flux to the perephery causing Buckling to increase. The change in Ls and Lth due to a temperature change becomes more signficiant causing the moderator temperature coefficient to become more negative.
[either answer acceptable]
REF.Reactor Core Control for Large PWR,P.3-22,23

ANSWER 5.04 (.50)

D.

REF.Rx Core Control For Large PWR, p.8-19

ANSWERS -- SNUPPS-1 -85/04/15-R.R.FERRELL

ANSWER 5.05 (.75)

B.

REF.Thermal-Hydraulic Principles and Applications to the PWR II,p.10-43,44

ANSWER 5.06 (1.50)

1.Sufficient negative reactivity must be available to achieve the required SDM at all times,especially in the event of a steam rupture accident
2.Minimize the positive reactivity which could be inserted should a rod ejection accident occur
3.Provide an acceptable radial flux distribution to minimize peaking factors [.50 ea.]

REF.SNUPPS Control and Instrument Systems,p.3-4

ANSWER 5.07 (1.75)

A.Increase
B.Decrease
C.Decrease
D.Increase
E.Decrease [.4 ea.]

REF.Reactor Core Control for Large PWR,p.

ANSWER 5.08 (1.50)

-With little boron concentration,there would be little competition for neutrons and a high probability that each boron atom would absorb a neutron.
-As the concentration increases boron atoms are in greater competition for neutrons which shields other boron atoms
-Therefore,as boron concentration increases,the Differential boron concentration decreases [0.5]

-As temperature decreases,there is a greater mass of boron in the core for the same PPM and more reactivity per PPM
-As temperature decreases,Differential Boron Worth increases
-As temperature increases,Differential Boron Worth decreases

REF.SNUPPS Plant Operations,p.3-38,39

ANSWERS -- SNUPPS-1 -85/04/15-R.R.FERRELL

ANSWER 5.09 (.50)

C.

REF.SNUPPS Plant Operations,p.4-9

ANSWER 5.10 (2.25)

A.The point of maximum heat transfer sustainable with nucleate boiling[.25]
operator monitors coolant temperatures,primary system pressure,core flow rates,and reactor power level [.50]

B.1.Increases [p.10-37]
2.Remains the same [p.10-47]
3.Increases [p.10-56] [.5 ea.]

REF.Thermal-Hydraulic Principles app.to the PWR,p.13-23,24

ANSWER 5.11 (2.00)

A.Power decreases at first due to boron
Primary to secondary mismatch causes Tave to decrease
Decrease in Tave adds positive reactivity
Power is restored to original value with a lower Tave

B.Tave is determined only by RCP heat and Steam Dumps
power decreases at a -1/3 DPM rate to the source range

REF.Reactor Core Control for large PWR's

ANSWER 5.12 (1.50)

A.Increases with power

B.Stays constant as Steam dumps actuate to maintain
WILL AFFECT STM PRESS AND STM DUMPS ACTUATE TO MAINTAIN CONSTANT

C.Power increases due to rod withdrawl until P-10 which causes a trip

REF.

ANSWERS -- SNUPPS-1 -85/04/15-R.R.FERRELL

ANSWER 5.13 (1.25)

A.EOL when it is possible to continue operations at less than full power to extend core life [.20]
Allowing Tave to decrease to the minimum allowable level [.20]
+ reactivity from decreased Tave will maintain power for limited period
When Tave is at lower limit,power is decreased to maintain Tave in allowable range [.45]
B.Increases possibility of shorter life in subsequent fuel cycles [.20]
may create undesireable neutron flux distribution in next cycle [.20]

REF.Reactor Core Control for large PWR,p.2-16

ANSWER 5.14 (2.75)

A.1.Flux is redistributed and forced toward the bottom (with rods in)
2.Production rate in top decreases and Xenon concentration increases due to decrease in burnout;burnout in bottom increases and formation of I-135 increases to decrease Xenon for next 6.7 hours.
3.As formation of Xenon in bottom increases,flux is pushed to top and Xenon oscillations will occur between top and bottom for a period of approximately one day (after rods are withdrawn) [1.50]

B.Operator can observe Axial Flux Difference (Delta-I meters) [0.5]

C.Operate with rods out
nsure Delta-I is maintained in band [.75]

REF.Reactor Core Control for Large PWR,p.4-29

ANSWER 5.15 (3.00)

A.~~Increases~~ [.25]:~~moderator~~ becomes less dense,neutrons can travel further, ~~higher~~ probability of reaching a control rod (increased sphere of influ-~~ence)~~ [.75]
B.~~Increases~~ [.25]:increase concentration shifts flux spectrum more to the epithermal energy range. Control rods are good absorbers in the epithermal range [.75]
C.Increases [.25] Explanation same as above [.75]

REF.Reactor Core Control for Large PWR,p.6-22 thru 28

ANSWER 5.16 (.50)

C.

REF.Rx Core Control for Large PWR's,p.7-13

ANSWER 5.17 (.50)

A.

REF.Reactor Core Control for Large PWR,p.7-24

ANSWER 5.18 (2.25)

A.1.Fuel assembly loading pattern
FUEL DEPLETION
2.Burnable poision loading pattern
FISSION PROD POISION CONC. (MINOR)
3.Control rod pattern
PWR LEVEL & MOD DENSITY EFFECTS (MINOR)
4.Neutron leakage [.25 ea]

B.1.Rod Height
2.Moderator density variations
3.Power level
4.Fission product poision concentration
5.Fuel depletion variations along the length of the rod [.25 ea]

REF.Rx Core Control for Large PWR's, p.29-32

ANSWER 6.01 (.50)

D.

REF.Rx Core Control for Large PWR ,p.1-37

ANSWER 6.02 (.50)

B.

REF.Rx Core Control for Large PWR,p.1-39,40

ANSWER 6.03 (3.00)

A.P-9:Enabled below 50%,2/4,auto blocks reactor trip following turbine trip

B.P-10:1.allows block of PR low reactor trip at 25%,IR high reactor trip at
20% power,20% rod stop
2.auto block of SR high level trip at 10e5 CPS
3.Input to P-7 [2/4 PRNI]

C.P-8:auto blocks single loop loss of flow reactor trip-enabled below 48%
on 2/4 channels

REF.SNUPPS Control and Protection Instrument Systems,p.3-11

ANSWER 6.04 (1.00)

1.Rods operating out of sequence
2.Deviation of + or -12 steps between any rod and its bank demand
3. " " " " " " two rods in the same bank
4.Any shutdown rod below 220 steps

REF.SNUPPS Control and INSTRUMENT sYSTEMS,p.3-11

ANSWER 6.05 (1.00)

1.Low steam line pressure at 585 psig
2.High steam press rate-110 psi in 50 sec (with stm press SI blocked)
3.Containment pressure,hi 2-17 psig
4.Manual

REF.SNUPPS Engineered Safeguards Systems,p.1-21

ANSWER 6.06 (1.50)

1.FALSE [p.2-4]
2.TRUE [p.2-12]
3.TRUE [p.2-16]
4.FALSE [p.2-24]
5.FALSE [p.3-8]
6.TRUE [p.4-13,14]

REF.SNUPPS Engineered Safeguards Systems

ANSWER 6.07 (2.00)

A.Backpressure to force water from No.1 seal into return line
Backup for No.1 seal [.5 ea]

B.Permits injection of Reactor Makeup Water at a slightly elevated pressure between the dams to provide the No.3 seal with clean water for lubrication [.33] and to prevent dissolved radioactive gases in the discharge fluid of the No.2 seal from entering the containment atmosphere [.33]. A portion of the flow goes into the cavity between the No.2 and 3 seal and then out the No.2 seal leakoff. The remaining flow is discharged through the No.3 seal leakoff into the normal containment sump [.33]

REF.SNUPPS Reactor Systems and Components,p.4-16

ANSWER 6.08 (1.25)

1.Check valve in the CCW supply line to prevent backflow of RCS

2.Pipe from check valve to flange connection at RCP is designed for 2485 psig

3.FT-17,18,19,20 will shut MOV (BB-HV-13,14,15,16) downstream of the thermal barrier on a high sensed CCW flow in excess of 50 GPM

4.Common return line from TBHx MOV (EG-HV-62) will automatically close on a combined CCW flow of greater than 200 GPM as sensed by FT-62

5.Relief valve located between check valve upstream of each thermal barrier heat exchanger and the motor operated high flow isolation valve (BB-HV-13,14,15,16) downstream of each heat exchanger. Relief valve will relieve excess pressure caused by thermal expansion if high flow isolation valves are closed. [.25 ea.]

REF.SNUPPS Reactor Systems and Components,p.4-19

ANSWER 6.09 (1.50)

1.2235
2.2250
3.2260
4.2310
5.2335
6.2385
7.2485
8.2485
9.3107
10.1849 [.150 ea]

REF.SNUPPS Systems and Components,p.6-3

ANSWER 6.10 (2.00)

A.Charging flow decreases
  Pressurizer level decreases
  Letdown isolation/heater cutoff at 17%
  Pressurizer level increases
  Reactor trip on high level

B.Level increases until S/G high level (78.1%)
  Feedwater isolation
  MFP and Main Turbine Trip
  Turbine Trip (P-4)> 50% power causes Reactor Trip

REF.SNUPPS Control and Protection Instrument Systems (NPS) 227
Chapter 5,NPS 215 and 223,Chapter 6

ANSWER 6.11 (.50)

B.

REF.SNUPPS Steam Cycle Systems,p.5-15

ANSWER 6.12 (1.25)

A.1.Diesel Generator start signal generated
2.Load shed signals remove all loads from bus except 480 load centers and Centrifugal Charging pumps
3.Blocks LOCA sequencer from starting directly on SIS or CSAS [.25 ea.]

B.Diesel Generator output breaker closed
Preferred source breakers open [.25 ea.]

REF.Snupps Electrical Systems, p.3-14

ANSWER 6.13 (1.00)

1.Both feeder breakers to associated ESF bus open
2.DG Master Transfer Switch in auto
3.Generator up to voltage [4.16 KV]
4.Generator up to speed [>471 RPM]
5.No lockout relays energized [.2 ea.]

REF.SNUPPS Electrical Systems, p.4-21

ANSWER 6.14 (1.50)

A.P-4:shifts Tavg mode from load rejection to plant trip function [.25]

C-9:(Condenser available interlock)-protects the condenser from overpressurization by blocking steam dump actuation during periods of insufficient vaccum [.25]

C-7:(Loss of Load interlock)-arms the steam dumps for operation following a load rejection of greater than 10% in 120 seconds [.25]

P-12:(low-low Tavg interlock)-closes al dumps when Tavg reaches 550 degrees F, preventing an uncontrolled cooldown from occuring

B.HIGH-1:trips at deviation signal equal to 50% steam dump demand; trip solenoid valves for groups 1 and 2 dump valves energize to open valves

HIGH-2:Trips at deviation signal equal to 100% demand;groups 3 and 4 dump valves full open

[both bistables reset when condition clears]

REF.SNUPPS Steam Cycle Systems, p.4-6

ANSWER 6.15 (1.00)

1.manual
2.P-14
3.SI
4.Rx trip P-4 coiuncident w/a low low Tave signal (564 degrees F)
5.S/G lo-lo level on 2/4 channels on 1/4 S/G's [.2 ea.]
[coincidence/setpoints not necessary for full credit]
REF.SNUPPS Steam Cycle Systems,p.6-22

ANSWER 6.16 (.75)

A.

REF.SNUPPS Reactor Support Systems Part II,p.3-5

ANSWER 6.17 (2.25)

A.1.All LETDOWN ORIFICE ISOLATION VALVES must be ~~open~~ SHUT
2.Pressurizer level greater than 17%
3.Proper air pressure and control mvoltage must be available

B.LETDOWN ORIFICE ISOLATION VALVES must be closed

C.Ensure Regenerative Hx always at RCS pressure which will prevent steam flashing and damage the tubes

REF.SNUPPS Rx Support Systems Part I,p.1-7

ANSWER 6.18 (1.00)

A.1.Valves HV-8701A or PV-8702A,suction valves from RCS hot leg loop 1 must be closed AND
2.Either both of the SI pump recirculation line isolation valves (HV-8814A/B) must be closed OR
3.The SI recirc line header isolation valve (HV-8813) must be closed
B.Prevents overpressurization of Charging/SI pump suctions whenever one of the RHR pump suctions are aligned to its respective hot legs and prevents radioactive recirc water from being pumped to the RWST via the SI mini-flow lines
REF.SNUPPS Rx Support Systems Part I,p.4-18

ANSWER 6.19 (1.50)

A.1.2/4 Containment pressure high at 27 psig
2.Either of 2 sets of 2 switches on MCB are taken to activate position
[.375 ea]

B.1.Pull to lock
2.Reset CSAS and stop [.375 ea]

REF.SNUPPS Engineered Safeguards Systems,p.3-11

ANSWERS -- SNUPPS-1 -85/04/15-R.R.FERRELL

ANSWER 7.01 (1.50)

A.TRUE [.3-23]
B.TRUE [p.3-23]
C.FALSE [p.3-28]
D.FALSE [p.3-30]
E.~~FALSE~~ [p.3-30] [.3 ea.]
TRUE

REF.Radiation,Chemistry,Corrosion Manual

ANSWER 7.02 (2.00)

A.1.Unexpected rise in any SG narrow range level
2.High radiation from any SG sample
3.High radiation from any SG steamline
4.High radiation from any SG blowdown line [3/4 at .5 ea.]
B.less than 1320 psig [.50]
REF.E-3,SG Tube Rupture

ANSWER 7.03 (1.00)

Whenever positive reactivity is being added by:
1.boron conc.changes
2.Xenon conc.changes
3.RCS temp.changes
4.control bank rod movement
[2/4 at .5 ea.]

REF.GEN-N-01,p.2

ANSWER 7.04 (1.50)

A.Control rod bank height below th ROD BANK LO-LO LIMIT alarm with the reactor critical
B.Failure of 2 or more rods to insert on a trip or shutdown indicated by IRPI
C.Uncontrolled cooldown of RCS following a trip
D.Uncontrolled or unexplained reactivity increase
E.Failure of RMCS to extent that it has to be bypassed to borate the RCS
[.3 ea.]

REF.BG-0-01,Emergency Boration

ANSWER 7.05 (2.25)

A.1.Terminate turbine load and/or boron concentration changes
2.Transfer rod control in attempt to maintain Tavg/Tref within +/- 2
3.If controllong bank will not move,adjust turbine load/boron concentration to restore/maintain Tave/Tref [.75]
B.full length rod that will not move in manual mode [.75]
C.adjust turbine load
adjust boron concentration [.75]

REF.SF-0-01,Failure of Control Rod Bank(s) to Move

ANSWER 7.06 (.75)

A.1.25
B.18.75
C.7.5

REF.10CFR20.101

ANSWER 7.07 (1.00)

1.The whole body limit shall not exceed 3 REM
2.Dose shall not exceed 5(N-18) REM where N=individuals age
3.NRC Form 4 has been completed. [.33 ea.]

REF.10CFR20.101

ANSWER 7.08 (1.50)

A.less than 50 degrees F/hour /25°F/HR

B.between 45 and 55%

C.50 degrees F /100°F [.50 ea.]

REF.ES-0.2,Natural Circulation Cooldown

ANSWER 7.09 (2.00)

A.Pressurizer vapor space temperature increases
PRT temperature increases
Close PORV and use aux spray to see if a pressure dewcrease is observed [.75]

B.Pressurizer pressure greater than/equal to 320 psig
Pressurizer level less than 70%
Seal Injection/return lined up [.75]

C.RHR system using flow through the RHR heat exchangers and bypass flow control valve;CCW is cooling medium [.5]

REF.SNUPPS Plant Operations,p.5 thru 9

ANSWER 7.10 (2.25)

A.1.Rod bottom lights lit
2.Reactor trip and bypass breakers open
3.Neutron flux decreasing [.25 ea]

B.1.Turbine stop valves closed
2.Turbine Control valves and CIV's closed [.25 ea]

C.1.Flow control valves closed
2.Flow control bypass valves closed
3.S/G blowdown isolation valves closed
4.S/G sample isolation valves closed [.25 ea]

REF.E-0,Rx Trip and SI

ANSWER 7.11 (1.25)

1.CCW supplied to RCP motor and thermal barrier
2.#1 seal leak off greater than .2 gpm
3.#1 seal differential pressure greater than 200 psid
4.RCPO lift oil pump running for at least 2 min.
5.Reactor makeup to contyainment isolation valve (BL-HIS-8047) open
6.Power to AC Service bus (PA-01 or PA-02)

[5/6 at .25 ea.]

REF.ES-0.2,NATURAL CIRCULATION COOLDOWN

ANSWER 7.12 (1.00)

1.MFP A/B trip alarm on / SPEED IN OR DISCH VLVS CLOSING
2.S/G A,B,C,D flow mismatch alarm
3.S/G A,B,L,D level deviation alarm LOW LEVEL
4.MFP header pressure decreasing
5.Decreasing S/G levels
6.Feedwater flow decreasing FEED REG VLVS OPENING
7.Load rejection to 60%

[4/7 at .25 ea]

REF.AE-0-01,Loss of a Feedwater Pump

ANSWER 7.13 (2.50)

A.1.Rods stepping out rapidly in auto
  2.Tavg decreasing
  3.Pzr level decreasing
  4.Pzr pres decreasing
  5.1 or more PR neutron flux decrease
  6.Rod position indication/Rod bottom LED [4/6 at .25 ea.]

B.If Control rods reach C-11,reduce turbine load to maintain Tavg=Tref [.5]

C.30 min [.25];power to be reduced by 30% of rated thermal power [.25], applies only above 50% of rated thermal power [.25] [.75]

REF.SF-0-5,Dropped Rod and Technical Specificaqtions p.3/4 2-12

ANSWER 7.14 (1.25)

A.1.Pzr drops below 1849 psig
2.pzr level drops below 10%
3.RCS subcooling drops below 20 degrees F [.25 ea.]

B.SI will not automatically reinstate until the reactor trip breakers are reset [.50]

REF.ES-03

ANSWER 7.15 (2.25)

A.When the generator is synchronized to the grid it picks up about 5% power which causes no change in nuclear power since the steam dumps close most of the way. This will minimize the transient on the Rx. [.75]

B.When load is picked up and the steam dumps close fully. [.75]

C.Most limiting of:
1.Load Dispatcher request
2.Turbine loading curve
3.Fuel conditioning requirements [.75]

REF.Lesson Plan Plant Transient Operation

ANSWER 7.16 (1.00)

1.Rx has been at a constant power level and unit has been at a steady load for 5 minutes
2.S/G levels and steam pressure has been constant for 5 minutes
3.No rod motion for 5 minutes
4.Feedwater flow and temperature has been constant for 5 minutes
5.S/G Blowdown secured for duration

[4/5 at .25 ea]

ANSWERS -- SNUPPS-1 -85/04/15-R.R.FERRELL

ANSWER 8.01 (.50)

C.

REF.Rx Core Control for Large PWR,p.8-29

ANSWER 8.02 (1.75)

A.1.Unusual Event
2.Alert
3.Site Emergency
4.General Emergency [.125 ea]

B. Alert or higher [.25]
C.Site or General Emergency [.25]
D.1.Directing notifications to off-site agencies
2.Making protective action recommendations to off-site authorities
3.Requesting off-site assistance including federal,state, and local [.25 ea]

REF.EIP-ZZ-00101,Callaway Plant Emergency Plan, p.5-7

ANSWER 8.03 (1.00)

A.TRUE [p.1 of 39]
B.FALSE [p.6-29] OR TRUE
C.TRUE [p.5-8]
D.FALSE [p.6-21]

REF.Callaway Plant Emergency Plan

ANSWER 8.04 (1.50)

1.Read Unit Supervisor's log back through last previous day on shift
2.Read night orders
3.Discuss plant status,planned evolutions or maintenance w/Duty Supervisor
4.Check the Duty Supervisor has completed/signed off plant surveillance
5.Review forms of any releases of radioactive wastes
6.Review jumper and lifted lead log
7.Initial outstanding RWP's and terminate RWP's that are at time limit
8.Check minimum manning requirements are met
9.Read Standing Order Boob through last date on shift
10.Walk MCB for review of plant status

[6/10 at .25 ea.]

ANSWER 8.05 (1.00)

A.greater than 551 degrees F
B.228 steps
C.greater than or equal to 2205 psig/less than or equal to 595 degrees F
D.less than/equal to 92% [.25 ea]

REF.CAP-02,Routine Surveillance Requirements

ANSWER 8.06 (1.00)

A.with only 1 inoperable,restore both to operable within the next 72 hours ~~[.25]~~ or be in at least HOT STANDBY and borated to a SDM equivalent to at least 1% delta K/K (at a RCS temperature of 200 degrees F) within the next 6 hours [.25];restore both to operable within the next 7 days or be in COLD SHUTDOWN within the next 30 hours [.25] [.50]

B.Both demonstrated operable by verifying,that on recirc flow,the pump develops a discharge pressure of greater than or equal to 2390 psig. [.50]

REF.Technical Specifications,3/4 1-11

ANSWER 8.07 (1.00)

1.Isolation valve open
2.Volume between 6500 and 7000 gallons
3.Boron concentration between 1900 and 2100 ppm
4.Nitrogen cover pressure between 602 and 648 psig [3/4 at.33 ea.]

REF.TS,3/4 5-1

ANSWER 8.08 (1.50)

A.Two physically independent circuits between the off-site transmission network and the on-site Class 1E distribution. [.5]

B.Two seperate and independent diesel generators each with: [.55]
1.Seperate day tank with minimum volume of 390 gal of fuel [.15]
2.Seperate fuel oil storage system with minimum volume of 85,300 gal[.15]
3.Seperate fuel transfer pump [.15]

REF.TS 3/4 8-1

ANSWER 8.09 (2.00)

A.FALSE
B.TRUE
C.TRUE
D.TRUE
E.FALSE [.4 ea.]

REF.TS,Section 6,Administrative Controls,p.1-5

ANSWER 8.10 (2.00)

A.TRUE [3/4 0-1]
B.TRUE [3/4 0-1]
C.FALSE [3/4 0-1]
D.FALSE [3/4 4-10]
E.TRUE [3/4 4-18] [.4 ea]

REF.Tech Specs

ANSWER 8.11 (1.50)

1.Intent of the original procedure is not changed

2.Approved by 2 members of the plant management staff,at least 1 of whom is the Operating Supervisor, holding an SRO license on the affected unit

3.Change is documented, reviewed by the ORC, and approved by the Plant Superintendent within 14 days of implementation

[.5 ea.]

REF.TS, p.6-17

ANSWER 8.12 (2.50)

A.1.Combination of thermal power,pressurizer pressure,and the highest operating loop coolant Tave shall not exceed the limits of the curve.

BASIS:prevents overheating fuel and clad damage by preventing DNB [1.0]

2.RCS shall not exceed 2735 psig

BASIS:protects integrity of the RCS from overpressurization [1.0]

REF.T/S B 2-3

B.C

REF.TS,2-1

ANSWER 8.13 (.50)

D

REF.T/S p.1-8,Table 1.1

ANSWER 8.14 (1.75)

A.If AFD has been outside the +/- 5% target band for more than 1 hour [.25] reduce thermal power to less than 50% of rated thermal power within 30 minutes [.25] and reduce the Power range neutron flux high trip setpoints to less than or equal to 55% of rated thermal power [.25]. [.75]
B.Nothing-return to band since only earn 1 for 2 penalty minutes [.5]

C.AFD-Flux at top /flux at bottom;Thus over core life flus shifts toward the top of the core due to fuel depletion. [.5]

REF.T/S-3/4 2.1

ANSWER 8.15 (1.00)

NO. The normal surveillance interval is 7 days,which can be extended by 25% to 8 and 3/4 days,provuded 3 consecutive intervals do not exceed 325% (22 and 3/4 days) of the normal surveillance interval. In this case,no single interval exceeds 8 days,but the total of the 3 intervals is 23 days,exceeding the allowable time limit.

REF.T/S

ANSWER 8.16 (2.50)

A.24 hours
B.14 days without having 2 consecutive days off
C.2 OR 1
D.yes
E.Operating Supervisor | SHIFT SUPERVISOR [.5 ea]

REF.T/S, Section 6.1-2

ANSWER 8.17 (2.00)

A.1.1 gpm
  2.10 gpm
  3.0 gpm
  4.500 gpd through any 1 SG/1 gpm total [.375 ea.]
B.The potential release of activity to the atmosphere is below limits to protect the public [.50] in the event of a SG tube rupture [.25] [.50]

REF.T/S 3.1.1.4 and bases