ENCLOSURE 1

EXAMINATION REPORT - 50-261/OL-87-02

Facility Licensee: Carolina Power and Light Company
P. O. Box 1551
Raleigh, N.C. 27602

Facility Name: H. B. Robinson Steam Electric Plant

Facility Docket No.: 50-261

Written examinations and operating tests were administered at H. B. Robinson Steam Electric Plant near Hartsville, South Carolina.

Chief Examiner: _____ 9 MAR 88
Jesse Arildsen — Date Signed

Approved by: _____ 14 MAR 88
Ken Brockman, Chief, Operator Licensing Section 2 — Date Signed

Summary:

Examinations on December 15-17, 1987.

Written examinations were administered to four SROs. Operating tests were administered to four SROs and one RO. All SRO's passed the written examination. For the operating test, three SROs and one RO passed.

Based upon these results, four SROs and one RO passed the overall examination. There were no generic problems identified in any phase of the examination.

REPORT DETAILS

1. Facility Employees Contacted:

*R. Morgan, General Manager, Robinson
*G. Beatty, Vice President, Robinson
*F. Lowery, Manager, Operations
*D. McCaskill, Shift Foreman
*C. Bethea, Manager, Training
*S. Allen, Senior Specialist, Operations Training

2. Examiners:

*C. Julian, Chief, Operations Branch, Division of Reactor Safety
*J. Arildsen, Chief Examiner
*F. Jaggar, EG&G
*W. Dean, NRC Lead Examiner
*G. Salyers, Examiner (observation training)
*D. Lew, Examiner (observation training)
*M. Morgan, Examiner (observation training)
*R. Latta, Resident Inspector, NRC

*Attended Exit Meeting

3. Examination Review Meeting

At the conclusion of the written examinations, the examiners provided your training staff with a copy of the written examination and answer key for review. The comments made by the facility reviewer are included as Enclosure 3 to this report. The NRC Resolution to facility comments are listed below:

a. NRC Resolution to Written Examination Comments

Question 5.04 Part 3

Facility comment partially accepted. The parameter being changed is not clearly rods from an "all out" to an "all in" position. This confusion could lead to either "a" or "b" as a correct response. The question will be deleted. Section and total points will be adjusted appropriately.

Question 5.04 Part 4

Facility comment partially accepted. The answer could be either "a" or "c". The question will be deleted. Section and total points will be adjusted appropriately.

Question 5.05

Facility comment accepted. The answer key will be changed to allow the more detailed response, "the description of the effects of p and f" on MTC.

Question 5.07 Part 1

Facility comment accepted. The answer will be changed to "true" in accordance with the material presented by the facility.

Question 5.10 Part 2

Facility comment not accepted. The material is covered in the utility lesson plan. No change to the examination is justified.

Question 5.11 Part 1

Facility comment accepted. The answer key will be modified to show required information.

Question 12 Part 2

Facility comment accepted. The relevance of this question does not justify its retention. The question will be deleted. Section and total points will be adjusted appropriately.

Question 5.13

Facility comment acknowledged. The recommended change is equivalent to the answer key. No change is necessitated.

Question 5.14

Facility comment accepted. The answer key will be changed to indicate a tolerance of + or - of 100 PCM (0.001) for the reactivity calculation.

Question 5.15

Facility comment accepted. The answer key will be amended to indicate accepting either method of calculation.

Question 5.18 Part 2

Facility comment accepted. The answer key will be changed to read "any power change or any evolution that results in rod movements."

Question 5.19

Facility comment acknowledged. The percent height information was provided only as guidance for the grader and is not required information. No change to the answer key is necessitated.

Question 5.20 Part 1

Facility comment acknowledged. No action required for this examination. The recommendation will be considered for inclusion in future exam preparation.

Question 6.02 Part 1

Facility comment acknowledged. The recommended change is equivalent to the answer key. No change is necessitated.

Question 6.02 Part 2

Facility comment not accepted. While it is acknowledged that an SI signal must be present, this is the only condition where redundant bus stripping features are present. No change to the exam is justified.

Question 6.02 Part 3

Facility comment acknowledged. The recommended change is equivalent to the answer key. No change is necessitated.

Question 6.03

Facility comment accepted. The answer key will be modified to not require the specific temperature of the interaction.

Question 6.04

Facility comment not accepted. The comment was not accepted for the following reasons:

(1) RVLIS has it's own System description SD 051.

(2) It is covered under OP - 307, "INADEQUATE CORE COOLING MONITOR", Section 6.1, "Reactor Vessel Level Instrumentation System".

(3) It has five (5) objectives under the HBR RCS-TP-11.1a.

(4) The RVLIS is testable under 10 CFR 55. The three parts of the question are independent with respect to double jeopardy.

Question 6.05

Facility comment acknowledged. "Key" words and phrases are not required as long as the question is answered completely. No change to the answer key is required.

Question 6.06 Parts 1 and 2

Facility comment accepted. The answer key will be changed to read: Parts 1.1 and 2.1, "NIS rod drop signal or 5%/5 seconds", and Part 2.2, "Rod bottom signal from any rod or rod bottom signal from RPI".

Question 6.09

Facility comment acknowledged. The answer key will be changed to indicate 0.75 pt. for Parts 2.1 and 2.2 of the question. In Part 2.1, the words "the load would increase or decrease, depending on the direction and magnitude" have been changed to be not required as part of the answer. In Part 2.2 the words "Tracking meter would be displaced from zero" have been added to the answer.

Question 6.12 Part 1

Facility comment acknowledged. The proper name for the valve, per OP-103, "Pressurizer Relief Tank Operations" Attachment 9.1, is "Primary Water to Pressurizer Relief Tank valve"; but, the answer key will be changed to include "Primary Water makeup to CV" as an alternate response.

Question 6.13 Part 1

Facility comment not accepted. A reactor trip with low Tave does not result in a "Feedwater Isolation." Credit will not be given for "reactor trip with low Tave"; since the FRV does close under these conditions, however, credit will not be deducted for including this response.

Question 7.01

Facility comment accepted. The answer key will be changed to accept full credit for either #1 or #2 as an answer.

Question 7.02

The point value has been changed from 1.5 to 2.5 to agree with the answer key. The typographical error was noticed while grading.

Question 7.04

Facility comment acknowledged. The answer key's typographical error will be changed to read Part 1 = 10% and Part 2 = 1%.

Question 7.08

Facility comment partially accepted. The answer key will be changed for a point value distribution of 0.75 for each of the two key parts. The words "Maintain adequate SDM" verses "Diluting the RCS below the shutdown margin" are addressing the same concept and do not justify an alteration to the answer key.

Question 7.10 Part 2

Facility comment acknowledged. Due to the size of the "Fire Protection Building," (11x12) the answer key will be modified to only require "Fire Protection Building".

Question 7.10 Part 3

Facility comment not accepted. The Turbine Building Mezzanine Level is a very large area and is too vague of an answer to demonstrate an adequate knowledge level. No change to the answer key is justified.

Question 7.13

Facility comment acknowledged. Either method is acceptable. The answer key will indicate either valve name or number is acceptable for an answer.

Question 7.15

Facility comment acknowledged. The words "Stop all RCPs if both conditions listed below are met" is an implied statement and will be deleted from the answer key as a required part of the response.

Question 7.16 Part 1

Facility comment ackowledged. The answer key will be changed to read "Turn the pumps off".

Questions 7.16 Part 2

Facility comment partially accepted. The correct response to Part 2 depends on how the candidate answered Part 1. If the candidate answered "leave the pumps on" in Part 1, the answer as stated in the original answer key is correct. If the candidate answered "turn the pumps off" in Part 1, the answer key will be changed to read, "Continued operation of the RCPs will results in a more rapid depletion of the RCS inventory. (0.5) If the RCPs are tripped after saturation, (0.5) it is possible for the reactor coolant to settle out at a point beneath the level of the top of the core. (0.5)" The difference in the responses allows for applying "error carried forward " based upon the candidates use of the BWROG guidelines with respect to Recirc Pump trip criteria.

Question 7.19

Facility comment accepted. The question will be deleted. The Section and total exam points will be adjusted appropriately.

Question 8.08 Part 5

Facility comment partially accepted. Due to differences between plant procedures MMM-003 and OMM-01, the answer key will be changed to accept "BOTH" or "SF" as an answer. For continuity in the training process and for plant operations, it is encouraged that the facility correct discrepancies between procedures.

Question 8.14

Facility comment acknowledged. In reviewing the recommendation, inconsistencies between procedures PLP-007, PEP-204, and AP-004 were noted. For continuity in the training process and for safe plant operations, it is encouraged that the facility correct discrepancies between procedures.

Due to the discrepancies between these procedures, the answer key will be amended to accept the following additional answers:

(1) Manager - Technical Support

(2) Manager - E&RC

(3) Mechanical Maintenance Supervisor

(4) I&C Maintenance Supervisor

(5) RC Supervisor

(6) Environmental & Chemistry Supervisor

Question 8.16. Part 2

Facility comment acknowledged. Due to the potential for misinterpretation of the question, the answer key will be changed to accept either the original answer, or "NRC is notified prior to the deviation if time permits, or as soon as possible afterwards (0.5). NRC is notified via red telephone (ENC). (0.5)"

Question 8.17 Part 2

Facility comment accepted. The answer key will be changed to accept the following additional answers:

(1) Plant Technical Specifications

(2) E&RC Procedures, EMP-23

(3) OMM-003 (Minimum Equipment List)

Question 8.18

Facility comment acknowledged. The question has been deleted. The question content came from the HBR Technical Specifications, and is covered by HBR Training Objective PRC-TP 42.1 all of which qualifies it as a testable item. Learning Objectives are viewed as subject matter upon which the facility places a significant importance, not merely as a required item for a credible training program. Efforts should be made to ensure that learning objectives are appropriate indicators of required operator knowledges and abilities. The section and total exam points will be adjusted appropriately.

RESPONSE TO EXAMINATION GENERAL COMMENTS

1. A great deal of emphasis has been placed on the EPPs by the NRC, as well as the nuclear industry. It is important to understand the basis for the procedural actions; particularly key action steps contained within the emergency procedures.

   An operator can not make full use of the EPPs unless he understands the impact of his actions, and this information is contained within the E.R.G. Documents. The importance of evaluating this knowledge area is supported by NUREG-1122, "Knowledges and Abilities Catalogue for PWRs". This information will be an integral part of the evaluation criteria of the NRC on licensing examination.

2. Any question directed at subsequent actions of an AOP was searching for a conceptual understanding and not for a verbatim response.

3. Questions are always graded upon the merits of the individual's answer; "key" words and phrases are not required, as long as the question is answered completely.

4. The facility comment is acknowledged. Review of the examination does not raise a concern that the exam, on the whole, has "strayed from being operationally oriented". Each question on the exam was supported by either a "Knowledge & Ability" statement or a utility learning objective. It was developed in accordance with the guidance of NUREG-1021.

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.

There were no generic weaknesses 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 2

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

FACILITY: ROBINSON

REACTOR TYPE: PWR-WEC3

DATE ADMINISTERED: 87/12/15

EXAMINER: SALYERS, G.

CANDIDATE: -MASTER-

INSTRUCTIONS TO CANDIDATE:

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	CANDIDATE'S SCORE	% OF CATEGORY VALUE		CATEGORY
26.75 ~~28.25~~	24.60 ~~24.94~~			5.	THEORY OF NUCLEAR POWER PLANT OPERATION, FLUIDS, AND THERMODYNAMICS
29.50	27.13 ~~26.05~~			6.	PLANT SYSTEMS DESIGN, CONTROL, AND INSTRUMENTATION
26.50 ~~27.50~~	24.37 ~~24.28~~			7.	PROCEDURES - NORMAL, ABNORMAL, EMERGENCY AND RADIOLOGICAL CONTROL
26.00 ~~[illegible]~~	23.90 ~~24.72~~			8.	ADMINISTRATIVE PROCEDURES, CONDITIONS, AND LIMITATIONS
108.75 ~~113.25~~				%	Totals

Final Grade

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

Candidate's Signature

NRC RULES AND GUIDELINES FOR LICENSE EXAMINATIONS

During the administration of this examination the following rules apply:

1. Cheating on the examination means an automatic denial of your application and could result in more severe penalties.

2. Restroom trips are to be limited and only one candidate at a time may leave. You must avoid all contacts with anyone outside the examination room to avoid even the appearance or possibility of cheating.

3. Use black ink or dark pencil <u>only</u> to facilitate legible reproductions.

4. Print your name in the blank provided on the cover sheet of the examination.

5. Fill in the date on the cover sheet of the examination (if necessary).

6. Use only the paper provided for answers.

7. Print your name in the upper right-hand corner of the first page of <u>each</u> section of the answer sheet.

8. Consecutively number each answer sheet, write "End of Category __" as appropriate, start each category on a <u>new</u> page, write <u>only on one side</u> of the paper, and write "Last Page" on the last answer sheet.

9. Number each answer as to category and number, for example, 1.4, 6.3.

10. Skip at least <u>three</u> lines between each answer.

11. Separate answer sheets from pad and place finished answer sheets face down on your desk or table.

12. Use abbreviations only if they are commonly used in facility <u>literature</u>.

13. The point value for each question is indicated in parentheses after the question and can be used as a guide for the depth of answer required.

14. Show all calculations, methods, or assumptions used to obtain an answer to mathematical problems whether indicated in the question or not.

15. Partial credit may be given. Therefore, ANSWER ALL PARTS OF THE QUESTION AND DO NOT LEAVE ANY ANSWER BLANK.

16. If parts of the examination are not clear as to intent, ask questions of the <u>examiner</u> only.

17. You must sign the statement on the cover sheet that indicates that the work is your own and you have not received or been given assistance in completing the examination. This must be done after the examination has been completed.

18. When you complete your examination, you shall:

a. Assemble your examination as follows:

(1) Exam questions on top.

(2) Exam aids - figures, tables, etc.

(3) Answer pages including figures which are part of the answer.

b. Turn in your copy of the examination and all pages used to answer the examination questions.

c. Turn in all scrap paper and the balance of the paper that you did not use for answering the questions.

d. Leave the examination area, as defined by the examiner. If after leaving, you are found in this area while the examination is still in progress, your license may be denied or revoked.

QUESTION 5.01 (1.00)

1. Define Beta

QUESTION 5.02 (1.50)

Calculate Beta Core for BOL and EOL conditions. Show all work.

Beta for: U235 = .0064 , U238 = .0168 , Pu239 = .0021

QUESTION 5.03 (.50)

Reactivity is defined as which one of the following?

1. The ratio of the number of neutrons at some point in this generation to the number of neutrons at the same point in the previous generation.
2. The fractional change in neutron population per generation.
3. The factor by which neutron population changes per generation
4. The rate of change in neutrons per second.

QUESTION 5.04 (~~2.00~~ 1.00)

Match the parameter change in Column A to the direction it will change the MTC in Column B. Consider each case separately.

COLUMN A	COLUMN B
1. Moderator temperature increases	a. More Negative
2. Boron concentration increases	b. Less Negative
~~3. All rods in vs. all rods out~~	c. No Effect
~~4. Flux shape shifting towards the edge of the core~~	

Deleted

QUESTION 5.05 (1.00)

Describe how a control rod insertion has an effect on moderator temperature coefficient ?

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

QUESTION 5.06 (.50)

TRUE or FALSE
For one atom of U238, the total probability of absorption is the same as temperature increases.

QUESTION 5.07 (1.00)

Answer TRUE or FALSE each of the following questions concerning "Fuel Self Shielding".

1. The outer fuel shields the inner fuel from the resonant energy neutrons at higher temperature.

2. As fuel temperature increases the amount of fuel self-shielding is reduced and more neutrons are absorbed in the fuel pellet.

QUESTION 5.08 (.50)

Why does doppler coefficient become more negative from BOL to EOL ?

QUESTION 5.09 (1.00)

What two features make the fuel temperature coefficient a prime element in reactor safety ?

QUESTION 5.10 (1.50)

1. LIST the three (3) coefficients that make up Power Defect.

2. Why must Tave be on program in order for the power defect to be valid? (Address the three (3) basic concepts)

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

QUESTION 5.11 (1.50)

Given curve 1.1 "Critical Boron Letdown Curve" EXPLAIN :

1. The reason for the rapid decrease in the first part of the curve. (part 1)

2. The reason for the gradual decrease in the second part of the curve. (part 2)

QUESTION 5.12 (~~1.00~~ 0.50)

Answer each of the following TRUE or FALSE

1. Rod worth is greater at higher temperature than at lower temperatures.

~~2. Experiments have failed to verify a significant relationship between boron concentration and rod worth.~~ Deleted

QUESTION 5.13 (1.50)

The total rod worth of all rods (45 rods) is 7% delta k/k. If a reactor trip occurred and the center rod stuck all the way out, this control rod could have a worth of as much as 1.1% delta k/k.

Why is the rod worth so much?

QUESTION 5.14 (1.00)

The reactor is shut down by 6% delta k/k with a equilibrium source neutron count rate indication of 50 cps. Rods are withdrawn to raise the equilibrium source range indication to 285 cps. CALCULATE the value of reactivity (+ or -) when counts are 285 cps. (Show all work)

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

QUESTION 5.15 (1.25)

Given the following data:

core output 2700 MW
Th 606 deg. F
Tc 554 deg. F
Tave 580 deg. F
Steam Header pressure 900#
Temperature of the feedwater 480 deg. F

Calculate the primary coolant flow rate.

QUESTION 5.16 (1.50)

During your Shift, a PZR Relief Valve opens while the reactor is at 100% power. use a Mollier Diagram or the Steam Tables to answer the following:

(ASSUME A SATURATED SYSTEM AND INSTANTANEOUS HEAT TRANSFER)

1. STATE the tailpipe temperature, assuming atmospheric pressure in the Relief Tank and No Pressurizer Depressurization. (0.5)

2. If the Relief Tank Pressure were to INCREASE to 35 psig, State whether the Tailpipe Temperature would INCREASE, DECREASE OR REMAIN THE SAME.

3. If the Pressurizer depressurizes to 100 psig when the Relief Valve is opened, STATE whether the Tailpipe Temperature will INCREASE, DECREASE, OR REMAIN THE SAME from the temperature in part (1.).

QUESTION 5.17 (2.00)

LIST the five (5) indications for Natural Circulation given in EPP-4, Reactor Trip Response.

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

QUESTION 5.18 (2.00)

Concerning xenon :

1. What is an axial xenon oscillation?

2. What two (2) plant operations could cause it to occur?

QUESTION 5.19 (1.50)

On attachment A, draw the following flux profiles. (BOL 0% power is an example)
1. BOL 100% power
2. EOL 0% power
3. EOL 100% power

QUESTION 5.20 (2.50)

1. What are the failure induced mechanisms for PTS and what type of stresses do they impose upon the reactor vessel? ~~(1.75)~~ (2.00)

2. What is the metal that is the most significant contributor to PTS concern? (0.5)

QUESTION 5.21 (1.00)

Select the statement THAT IS TRUE regarding Power Distribution Limits:

1. Fq(z) limit is directly proportional to power.

2. F delta h is not applicable at less than 50% power.

3. Fq (z) limit is reduced at core height > 6 feet.

4. F delta h limit is increased a s/power increases.

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

QUESTION 5.22 (1.00)

A cooling water pump operates at 1200 rpm with a flow rate of 800 gpm. At these conditions it requires 60 KW of power. CALCULATE the power requirement for the pump if the rpm's were increased to 1800 rpm.

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

QUESTION 6.01 (1.50)

The Diesel Generator Governor has three (3) control knobs; (1) synchronizer, (2) speed droop, and (3) load limit. What are their functions?

QUESTION 6.02 (2.00)

GIVEN: A Plant Black Out (Diesels operate properly)

1. What is the difference between a loss of power to bus E 1 with no SI and on a loss of power to E 1 with SI?

2. What redundant design feature is incorporated into the bus stripping phase to ensure all emergency busses are isolated from the rest of the plant electrical system?

3. When does the Safeguards Sequencer start?

4. TRUE or FALSE
   On a High-High containment pressure, the containment Spray Pumps will receive a lock in start signal and will start 20 seconds after they sense power is available on thier respective emergency busses.

QUESTION 6.03 (2.00)

The Hydrogen recombiner was placed in service after a LOCA and the Hydrogen concentration was 4%. Over a period of time (1 week) the power requirement of the electrical heaters continually increases.

EXPLAIN why this is occurring. (Include in your answer any thermodynamic process and necessary temperatures).

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

QUESTION 6.04 (3.00)

Answer the following questions concerning the Reactor Vessel Level Instrumentation System.

1. Identify each of the three (3) ranges.
2. List the vessel regions that each monitors.
3. State the conditions when each is used.

QUESTION 6.05 (1.00)

STATE the input and how it is modified to determine the relief set point in the High Pressure - Low Temperature Protection System.

QUESTION 6.06 (2.50)

1. LIST the three (3) signals that cause a turbine load reference reduction.
2. LIST the two (2) signals that cause a turbine load limit reduction.

QUESTION 6.07 (1.50)

The Service Water Booster Pumps supply service water at increased pressure to the Containment Air Circulating Units and their associated motor coolers.

1. Why is the service water pressure increased?
2. What component is used to maintain pressure above saturation in the motor and fan coolers?

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

QUESTION 6.08 (1.50)

Concerning the Isolation Valve Seal Water System, STATE whether the isolation valves for each of the following header's are automatically actuated by Safety Features System or must manually be actuated.

1. Header "A" manifold 1914
2. Header "B" manifold 1919
3. Header "C" manifold 1920

QUESTION 6.09 (3.00)

Concerning the indications on the Turbine Generator Control Board in the Control Room:

1. REFERENCE INDICATION - LIST three (3) different pieces of information provided to the operator.

2. GOVERNOR VALVE TRACKING METER.
   There are two (2) inputs to the Governor Valve Tracking Meter; assuming full automatic operation, for each input, describe what happens if the input fails.

QUESTION 6.10 (2.00)

There are Two (2) turbine first stage pressure transmitters (PT 446 and PT 447) which supply eight (8) different circuits.

LIST these eight (8) circuits. (Note - channel A and channel B would be considered one (1) circuit)

QUESTION 6.11 (1.00)

The Steam Generator Power Operated Relief Valves are normally operated by their respective controllers. Under what condition will the steam dump controllers automatically take over control of these valves?

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

QUESTION 6.12 (2.50)

1. LIST the six (6) valves (groups) operated by key lock switches located on the Post Accident Sampling Phase A CV Isolation Override Panel in the control room .

2. What happens in the Isolation Valve Seal Water System if any of the above key lock valves are operated ?

QUESTION 6.13 (2.00)

Per the Feedwater Isolation Logic Diagram:

1. What signals are required for a Feedwater Isolation?
   NOTE: The circuit is to seal in.

2. What is actuated on a Feedwater Isolation Signal?

QUESTION 6.14 (1.00)

TRUE or FALSE
Answer the following questions per Auxiliary Feedwater Pump Start up logic.

1. The Safeguards or Blackout Sequencer will start the Turbine driven AFP.

2. An undervoltage signal on an E bus will directly start an MAFP.

QUESTION 6.15 (1.00)

R.G.197 NI channels covers twelve (12) decades of neutron flux. How does current detection differ between the lower range and the upper range?

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

QUESTION 6.16 (2.00)

Match the FUNCTION to the PERMISSIVE

NOTE: A permissive may be used more than once.

FUNCTION	PERMISSIVE
1. Allows Manual Block of Source Range Reactor Trip.	A. P2
2. Blocks Reactor Trip on: Low Flow, Reactor Coolant Pump Breakers Open, Undervoltage, Underfrequency, Turbine Trip, Pressurizer Low Pressure, Pressurizer High Level.	B. P6
3. Allows Manual Block of Intermediate Range Reactor Trip .	C. P7
4. Allows Manual Block of Intermediate Range Rod Stop.	D. P8
5. Blocks Automatic Rod Withdrawal at low power.	E. P10
6. Allows Manual Block of Power Range Reactor Trip. (low setpoint)	
7. Blocks Reactor Trip on low Flow in a Single Loop.	
8. Isolates the Load Dispatch Demand from the E/H Governor Unit.	

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

QUESTION 7.01 (1.00)

Which one (1) of the following is NOT one of the four (4) minimum conditions for criticality per T.S. 3.1.3

1. Except during low power physics tests. the reactor shall not be made critical with a positive moderator temperature coefficient. (~~0.5~~)

2. In no case shall the reactor be made critical below and to the right of the criticality limit per appropriate figure . (~~0.5~~)

3. When the reactor coolant temperature is in a range where the moderator temperature coefficient is greater than as specified in 1 above, (~~0.25~~) the reactor shall be subcritical by an amount equal to or greater than the potential reactivity insertion due to depressurization. (~~0.25~~)

4. The reactor shall be maintained subcritical until normal water level is established in the pressurizer. (~~0.5~~)

QUESTION 7.02 (1.50)

1. LIST three (3) types of events that could lead to PTS.

2. Per EPP Foldouts Red Path Summary, what conditions direct you to the integrity foldouts CFT - 4?

QUESTION 7.03 (2.00)

Per T.S 3.1.2 Heatup and Cooldown

1. LIST the maximum heatup and cooldown rates for the RCS.

2. LIST the maximum heatup and cooldown rates for the pressurizer.

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

QUESTION 7.04 (1.50)

1. WHAT is the shutdown margin requirement when the reactor is in the refueling mode?

2. WHAT is the shutdown margin requirement when the reactor is in cold shutdown mode?

3. What plant parameter is used to determine the required shutdown margin when in the Hot Shutdown condition?

QUESTION 7.05 (1.00)

EPP 5 "Natural Circulation Cooldown" procedure requires a 11 hour soak period.

WHEN would the 11 hour soak be required ?

QUESTION 7.06 (1.50)

Below 500 deg. F which procedure has a cooldown rate that is more restrictive?

1. EPP 5 - "Natural Circulation Cooldown"

OR

2. EPP 6 - "Natural Circulation Cooldown With Steam Voids in Vessel"

QUESTION 7.07 (1.50)

LIST the six (6) CFT (Critical Safety Function) categories in order of priority.

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

QUESTION 7.08 (1.50)

EPP 12 - Post-SGTR Cooldown Using Backfill (see attached procedure)

Step 4 states:

4. Verify Adequate Shutdown Margin
   a. sample ruptured S/G
   b. sample RCS
   c. sample Pressurizer
   d. shutdown margin is adequate

What is the basis for performing this procedural step?

QUESTION 7.09 (2.50)

LIST five (5) Major Action Categories in the SGTR.

QUESTION 7.10 (2.00)

Per AOP-004 "Control Room Inaccessibility"

1. Where are all available operators to report?

2. Where are the Keys for the execution of this procedure maintained?

3. LIST the three (3) places where copies of AOP-004 are located in the plant for use.

QUESTION 7.11 (.50)

TRUE or FALSE
Per AOP-004 "Control Room Inaccessibility ":

Main Feedwater is to be used for feeding the SG, if available.

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

QUESTION 7.12 (2.00)

FILL IN THE BLANKS

Per AOP-018 Immediate Actions:

If any of the following limits are reached, THEN STOP the affected Reactor Coolant Pump(s).

1. Component Cooling Water to the Thermal Barrier Cooler is less than ____ gpm.

2. Component Cooling Water inlet temperature is greater than ____ deg. F.

3. Pump Bearing temperature exceeds ____ deg.F.

4. No. 1 Seal leak-off temperature exceeds ____ deg.F

QUESTION 7.13 (2.00)

Per AOP-002 Emergency Boration:
There are four paths for the charging pump to deliver boric acid to the reactor coolant system.

LIST the four (4) paths in preferential order

QUESTION 7.14 (.50)

TRUE or FALSE
In performing a reactor startup, you are allowed to use a "Test Exception Form" if necessary, to complete the Surveillance Test check list in the front of procedure GP-003," Normal Plant Startup From Hot Shutdown to Critical."

QUESTION 7.15 (1.50)

Per EPP - Foldout:

STATE the RCP Trip Criteria.

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

QUESTION 7.16 (2.00)

If an operator missed the RCP Trip Criteria Setpoint in the execution of the EPPs and notices this error of omission 10 minutes after the RCP trip was required:

1. What actions is he to take concerning the RCPs ?

2. What is the basis for this action ?

QUESTION 7.17 (1.50)

Per GP-005 Power Operation.

1. On a power increase when (what conditions) is the lab to sample the RCS for Iodine ?

2. LIST two (2) power levels (and associated special conditions) that a Power Range Calorimetric is to be run.
   NOTE: Supervisor discretion is not an acceptable response.

QUESTION 7.18 (1.00)

RWPs should be submitted as far as possible in advance (at least 24 hours)

What are the Two (2) exceptions to this?

QUESTION 7.19 (1.00) Delete Question.

If in the RC Supervisors judgment, an individual is guilty of gross negligence or serious violation of procedure, WHAT actions can the RC Supervisor take per PLP-031 Personnel Contamination Program?

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

QUESTION 7.20 (.50)

What is the alarm set point for the personnel monitoring frisker instrument?

(***** END OF CATEGORY 07 *****)

QUESTION 8.01 (2.00)

T.S. 3.1.1.2 "Steam Generator states":
At least two (2) steam generators shall be operable whenever the average primary coolant temperature is above 350 deg. F.

1. State the basis for the above T.S.

2. The reactor can not be critical with one SG dry? EXPLAIN (other than T.S.)

QUESTION 8.02 (1.00)

T.S. 3.4.1C States:

A minimum of 35,000 gallons of water in the condensate storage tank and an unlimited water supply from the lake via either leg of the plant service water system is required.

What is the basis for the 35,000 gallons of water?

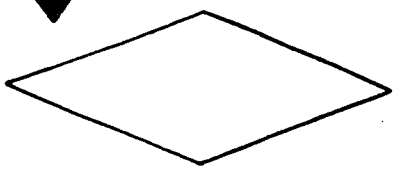
(***** CATEGORY 08 CONTINUED ON NEXT PAGE *****)

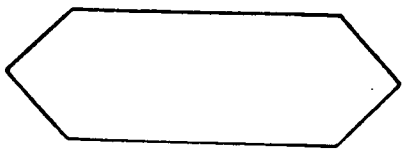
QUESTION 8.03 (1.50)

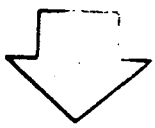
Per OMM - 13 "Emergency Operating Procedures Writers Guide", match the EPP flow chart symbol to its description.

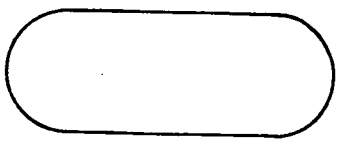
SYMBOL

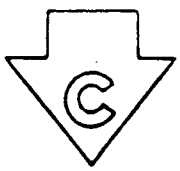
1. 

2. 

3. 

4. 

5. 

6. 

DESCRIPTION

A. Decision Symbol
B. Action Step Symbol
C. Note / Caution Information
D. Path to End Path Arrow
E. Path to Path Exit Arrow
F. Path Entry Point Arrow

QUESTION 8.04 (1.00)

Per OMM - 012 "Jumper and Wire Removal", WHAT must be done to make an alteration on an operable safety related system?

QUESTION 8.05 (1.50)

LIST the three of the four conditions which are excluded from the Temporary By Pass Jumper and Wire Removal per OMM - 12 "Jumper and Wire Removal".

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

QUESTION 8.06 (1.50)

Per PEP - 104 "Emergency Control" - Site Emergency;

LIST three (3) duties the Site Emergency Coordinator (SEC) can not delegate.

QUESTION 8.07 (.50)

What is the lowest Emergency Action Level at which the OSC must be activated?

QUESTION 8.08 (3.00)

For the following indicate whether the responsibility specifically applies to the SHIFT FOREMAN (SF), SENIOR CONTROL OPERATOR (SCØ), or BOTH .

Assume the duties of the fire Brigade Team Leader during fire emergencies.

2. Ensure tests assigned to shift are completed.

3. Update the status board at least once per shift.

4. Monitor records and evaluate data obtained from installed instrumentation and relay information to the load dispatcher.

5. Initiate requests for maintenance or repairs either directly or to the Maintenance Group or by the use of Work Request and Authorization forms, as appropriate.

6. Initiate requests to revise existing operating procedures or develop new procedures.

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

QUESTION 8.09 (1.00)

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

1. Each High Radiation Area with radiation intensity greater than _____mrem/hr shall be locked with a controlled key.

2. Access to locked High Radiation Areas is controlled by the _____.

QUESTION 8.10 (.50)

The minimum site manning requirements of the Plant Fire Brigade is at least _____ members, excluding members of the minimum shift crew necessary for safe shutdown.

QUESTION 8.11 (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 8.12 (1.50)

How many of each of the following will provide sufficient cooling to reduce containment pressure in the event of a Design Basis Accident?

1. Minimum number of containment fan coolers.

2. Minimum number of containment spray pumps.

3. Minimum combination of containment fan coolers and spray pumps.

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

QUESTION 8.13 (2.00)

Other than reactor trip and 1 and 4 hour NRC notifications, LIST five (5) general situations that require the Shift Foreman to make prompt notification to the Operating Supervisor.

QUESTION 8.14 (1.50)

The Shift Foreman is the interim Site Emergency Coordinator until the first qualified person to assume the position arrives on site.

Identify, by site management position, who is the Sits Emergency Coordinator ,and who are the four alternates.

QUESTION 8.15 (1.50)

1. What is the MINIMUM TECHNICAL SPECIFICATION SHIFT COMPLEMENT during cold operations?
2. What is the MAXIMUM NUMBER of consecutive days an individual may work without having two consecutive days off?
3. Who may authorize deviations from the overtime policy stated in the Technical Specifications?

QUESTION 8.16 (2.00)

Administrative Procedure, AP - 006 "Procedure Adherence", provides for deviation from a procedure under emergency conditions.

1. What facility APPROVALS are required to deviate from a procedure?
2. When and how must the NRC be notified upon a deviation from a procedure?

NOTE: Your answer should include who grants the approval, who is notified, method of notification, and criteria for notification. (2.0)

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

QUESTION 8.17 (1.50)

1. Define a Temporary Tank.

2. In what procedure in the control room would you find the limit for the Maximum quantity of radioactive material allowed in a temporary tank?

QUESTION 8.18 (2.00)

Per TS 6.10 Records Retention:

STATE whether the following records are to be retained for five (5) years or for the life of the facility.

1. Records of radioactive shipment.

2. Records of training and qualification for current members of the stall.

3. Reportable event reports.

4. Records of facility radiation and contamination surveys.

DELETED

QUESTION 8.19 (1.50)

PER OMM - 009 "Locked Valve List":

A valve is placed in the locked condition for one of two reasons.

STATE those two (2) reasons.

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

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 5.01 (1.00)

1. Beta is the total fraction of the delayed neutrons produced by fission of a particular fuel. (1.0)

REFERENCE

Rxth -ho-1 session 22 Pg 3 and 5
Objectives session 22
k/a 2.4
192003K103 ...(KA'S)

ANSWER 5.02 (1.50)

1. 0.2 points for % of power BOL and EOL 1.2 points total
2. 0.3 points for math set up.

	U235	U238	Pu239	
	.0064	.0156	.0021	
BOL	93%	7%	0%	+ or - 5% except Pu 239
EOL	55%	7%	38%	+ or - 5%

BOL = (0.0064)(0.93) + (0.0156)(0.07) =.007

EOL = (0.0064)(0.55) + (0.0156)(0.07) + (0.0021)(0.38) = .0054

REFERENCE

Rxth -ho-1 session 23 Pg 6 and 7
Objective session 23 and PLR/SRO -TP- 11.1
k/a 2.4
192003K104 ...(KA'S)

ANSWER 5.03 (.50)

2

REFERENCE

Rxth -ho-1 session 24 Pg 2
objective of session 24

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

k/a 3.0
192002K111 ...(KA'S)

ANSWER 5.04 (~~2.00~~ 1.00)

1. a
2. b (4 parts @ 0.5 ea.)
~~3. a~~
~~4. a or c~~ } Deleted KS

REFERENCE

Rxth -ho-1 session 25
objectives of session 25
k/a 3.1
192004K106 ...(KA'S)

ANSWER 5.05 (1.00)

As temperature increases (the slowing down length and thermal diffusion length,) there is a larger probability a neutron will be absorbed by a control rod. (1.0)(Increased length means the neutron could reach the control rod. For increased control rod insertion k/k moderator is more negative.) or the description of "p" and "f" in MTC.

REFERENCE

Rxth-ho-1 session 26 Pg 4
objectives of session 26
k/a 3.1
192004K103 192004K106 ...(KA'S)

ANSWER 5.06 (.50)

TRUE (0.5)

REFERENCE

Rxth-ho-1 session 27 Pg 2
objectives of session 27
k/a 2.9
192004K107 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 5.07 (1.00)

1. ~~False~~ True
2. True

REFERENCE

Rxth-ho-1 session 28 Pg 3
objectives of session 28
k/a 2.4
192004K105 ...(KA'S)

ANSWER 5.08 (.50)

Due to the build up of Pu 240 and other resonant absorbers. (0.5)
(resonance peaks of Pu 240 are about 30 times larger than U238)

REFERENCE

Rxth-ho-1 session 29 Pg 2
objectives of session 29
k/a 2.9
192004K107 ...(KA'S)

ANSWER 5.09 (1.00)

1. It is always negative. (0.5)
2. It acts immediately to inhibit a power increase. (0.5)

REFERENCE

Rxth-ho-1 session 29 Pg 3
objectives of session 29
k/a 2.9
192004K107 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 5.10 (1.50)

1. The Power defect curve is composed of the fuel temperature, (0.2) moderator temperature (0.2) and void coefficients. (0.2)

2. Moderator density is not a linear function of temperature. (0.3) The effect on the resonance escape probability and thermal utilization are more pronounced at higher temperatures. (0.3) because moderator to fuel ratio changes more per deg. F change at higher temperatures. (0.3)

REFERENCE

Rxth-ho-1 session 32 Pg 4 session 26 Pg 2
objectives of session 32
k/a 3.1
192004K108 ...(KA'S)

SWER 5.11 (1.50)

1. The initial sharp drop is due to the build up of fission products (with a large neutron absorption cross section). (0.75)

2. It then drops linearly through out core life due to fuel burn up. (.75)

REFERENCE

Rxth-th-1 session 33 Pg 3
objectives of session 33
k/a 2.9
192004K104 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 5.12 (~~1.00~~) 0.50

1. True (0.5)

~~2. True (0.5)~~ Deleted

REFERENCE

Rxth-ho-1 session 35 Pg 3
objectives of session 35
192005K107 ...(KA'S)

ANSWER 5.13 (1.50)

With all rods inserted, the reactor is shutdown and flux average is very small. (0.5) If the control rod is fully withdrawn, the flux in the area of the withdrawn rod increases substantially (0.5) and core multiplication increases. Because this rod causes the value of flux local / flux average squared to be large, (0.5) (worth in this condition is quite high.)

REFERENCE

Rxth-ho-1 session 35 Pg 3
objectives of session 35
192005K107 ...(KA'S)

ANSWERS --- ROBINSON -87/12/15-SALYERS, G.

ANSWER 5.14 (1.00)

Given p = -6% CR(1) = 50 cps
CR(2) = 285 cps

$$\frac{1}{1-p} = K1 = \frac{1}{1.06} = 0.943$$ OK if estimated p = k-1

$$\frac{CR1}{CR2} = \frac{1-K2}{1-K1} = \frac{50}{285} = \frac{1-K2}{1-0.943}$$

$$\frac{50(0.057)}{285} = 1 - K2$$ therefore K2 = 0.99

$$p = \frac{K-1}{K} = \frac{0.99-1}{0.99} = -0.01$$ (± 100 pcm (0.001) tolerance)

1% shutdown (4 parts @ 0.25 ea.)

REFERENCE

Rxth-oh-1 session 42
objectives of session 42
k/a 2.3
192003K102 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 5.15 (1.25)

1. $Mpri = \frac{Qpri}{(hh - hc)}$ or $\dot{Q} = \dot{M} C_p \Delta T$ (0.5 for equation)

$Mpri = \frac{2700 \text{ MW } (3.41 \text{ btu/w})}{622.8 - 552.3 \text{ btu/lbm}}$ (0.5 for correct "h" determination)

or $\dot{M} = \frac{(2700 \text{ MW})(3.413 \times 10^6 \text{ BTU/hr/MW})}{(1.3625)(606 - 554)}$ (.5 for correct value determination)

$Mpri = \frac{9207 \text{ E6 btu}}{70.5 \text{ btu/lbm}}$ (0.25 for calculation)

or $\dot{M} = 1.3006 \times 10^8$ lbm/hr

Mpri = 130.6 E6 lbm/hr + 10E6

(1.5)

REFERENCE

Heat Transfer Thermodynamics and Fluid Flow Fundamentals Section II Part A Chapter 2
Objective HT/FF-TP-4.1
HT/FF-TP-15.1
191004K105 193007K108 ...(KA'S)

ANSWER 5.16 (1.50)

1. 212 deg. F (+ or - 0 deg. F) (0.5)

2. ~~REMAIN THE SAME~~ KA INCREASE (0.5)

3. INCREASE (0.5)

REFERENCE

Heat Transfer Thermodynamics and Fluid Flow Fundamentals Section II Part A Chapter 2
Objective HT/FF-TP-12.1
193004K115 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 5.17 (2.00)

1. RCS subcooling greater than 25 deg.F
2. Steam pressure stable or decreasing
3. RCS hot leg temperature stable or decreasing
4. Core exit T/C stable or decreasing
5. RCS cold leg temperature trending to or at saturation temperature for steam pressure

(5 parts @ 0.4 ea.)

REFERENCE

EPP-4 Pg 13 of 16
objective HF/TT-TP-50.1
193108K122 ...(KA'S)

ANSWER 5.18 (2.00)

1. An axial xenon oscillation is the result of oscillation of power between the upper half and the lower half of the core (0.5) causing xenon to be either building in or being removed in that portion of the core. (0.5)

2. ~~The oscillation can be induced by either an up power response (0.5) or control rod movement at power. (0.5)~~
any power change or any evolution that results in rod movements. (1.0)

REFERENCE

Rxth-ho-1 session 49 Pg 4 & 5
objectives of session 49
objective PLR/SRO-TP-12.1
k/a 3.4
192006K108 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 5.19 (1.50)

SEE ATTACHMENT (3 parts @ 0.5 ea.)

REFERENCE

Reactor Theory SHNPP
RT-HO-1.10
objective PLR/SRO-TP-21.1
k/a 3.4
192006K108 ...(KA'S)

ANSWER 5.20 (2.50)

1. A substantial temperature gradient can be produced by rapid cooling of the inner surface.(0.5) This gradient results in thermal stresses that are tensile in nature. (0.5) If the system is pressurized (0.5) during or after the cooldown occurs, an additional pressure stress is imposed on the vessel wall, again being tensile (0.5) (This combination of stresses represents a significant load RPV on the metal and could under a certain set of conditions lead to loss of vessel integrity.)

2. Copper (0.5)

REFERENCE

Westinghouse ERG Executive Summary Generic Letter
objective ATAA-TP-34.1
193010K106 ...(KA'S)

ANSWER 5.21 (1.00)

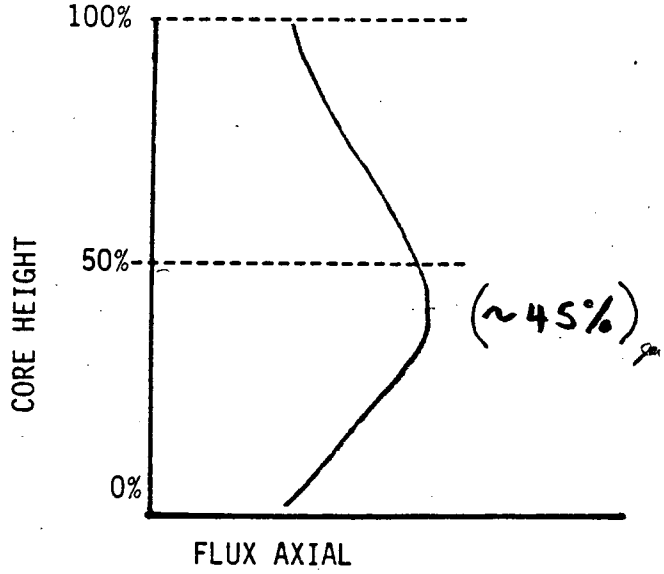
3

REFERENCE

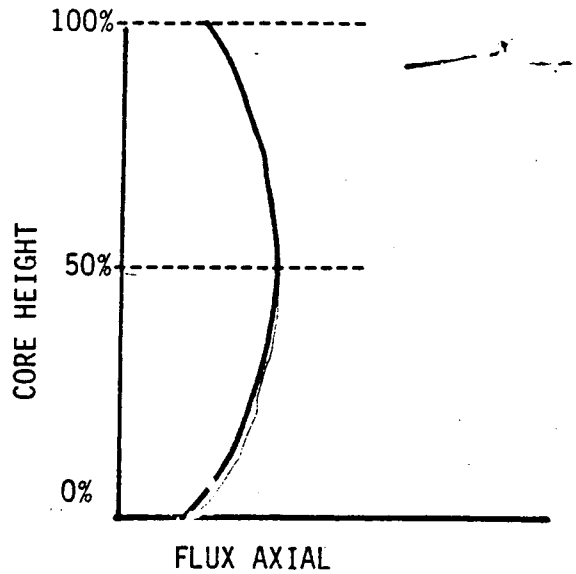
T.S. 3.10.2
193009K107 ...(KA'S)

ATTACHMENT 1

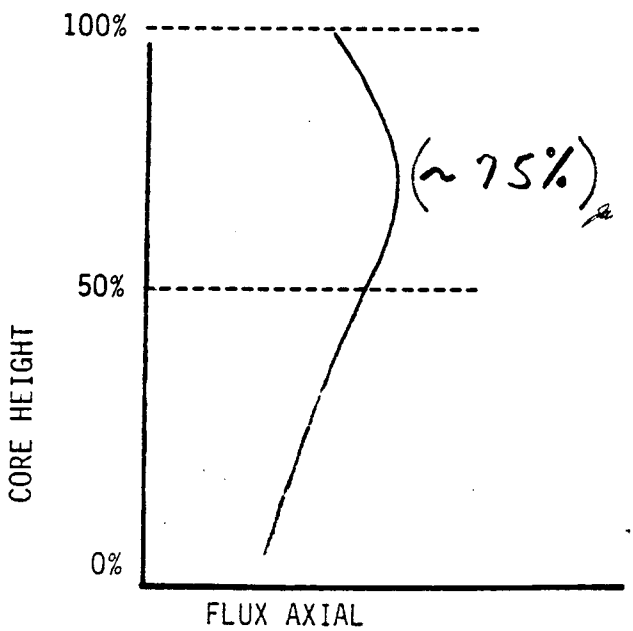
1. BOL 100% POWER



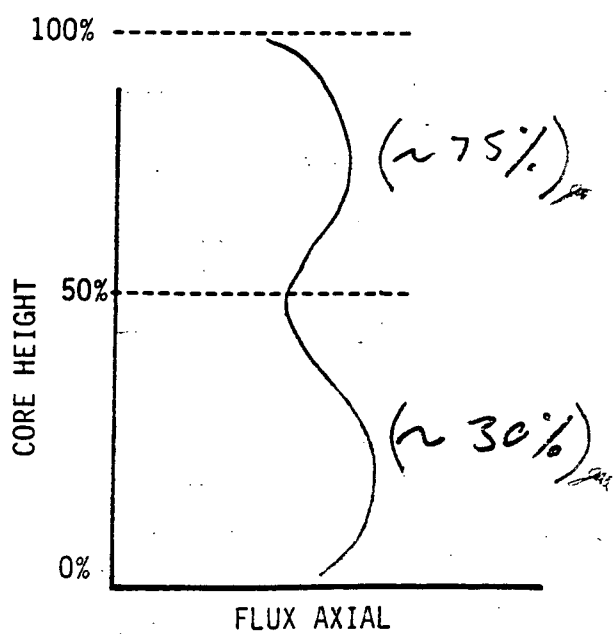
0% POWER



2. EOL 0% POWER



3. 100% POWER



ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 5.22 (1.00)

$$P1 * (N1/N2)^3 = P2$$

$$60 * (1800/1200)^3 = P2$$

$$60 * (1.5)^3 = P2 = 202.5 \text{ KW}$$

REFERENCE
Heat Transfer, Thermodynamics, and Fluid Flow Fundamentals, Section III Part B, Chapter 1
objective HT-FF-TP-44.1
191004K105 ...(KA'S)

ANSWER 6.01 (1.50)

1. Synchronizer - is used to change the engine speed when running alone or change engine load when the engine has been paralleled with another unit. (0.5)

2. Speed drop control can be set to automatically divide and balance load between engines in parallel in an electrical system. (0.5)

3. Load limit control can be set to limit the load that the engine can accept. (0.5)

REFERENCE

SD 005
objective DG-TP 2.1
DG-TP-4.1
064000K403 ...(KA'S)

ANSWER 6.02 (2.00)

1. The same action occur except the blackout sequence will be blocked by the SI Signal. (0.5)

2. During the bus clearing 52/1B and 52/2B will also be opened on the E1 side and 52/15B and 52/16B will be open on the E2 side. (0.5)

3. After the diesel generator output breakers are closed the safeguard sequence will take place. (0.5)

4. False (0.5)

REFERENCE

SD 006 Pg 14
objective ELEC-TP-24.1 AC-TP-4.1
064000K410 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 6.03 (2.00)

Complete hydrogen recombination occurs at a high temperature (of 1350 deg. F) ~~or 100 deg.F)~~ (0.5) which is maintained by the exothermic reaction of hydrogen and oxygen and the necessary amount of electric heat. (0.5) As the hydrogen in containment is depleted and recombined into water vapor, the electric resistance heaters make up more and more of the required heat until the system is shutdown. (1.0)

REFERENCE

SD 0048 Pg 10
objective ATAA-TP-12.1
028000A101 028000K601 ...(KA'S)

ANSWER 6.04 (3.00)

1. 1. The Upper Range (0.2)
   2. The Full Range (0.2)
   3. The Dynamic Head (0.2)

2. 1. Upper Range - measures the reactor vessel level above the hot leg pipes (when the RCP in that loop is not running.) (0.4)
   2. Full Range - measures level from the bottom to the top of the Reactor vessel (during natural circulation.) (0.4)
   3. Dynamic Head - provides an indication of reactor core and internals pressure drop (for any combination of operating RCPs.) (0.4)

3. 1. Upper Range is used for Head operation, if RCP in that loop is not running. (0.4)
   2. Full Range is used during natural circulation. (0.4)
   3. Dynamic Head is used as a symptom of degraded core cooling, if RCPs are running. (0.4)

REFERENCE

SD 051
objective RCS-TP-2.1
k/a 3.7 & 3.6
002000K107 002000K603 ...(KA'S)

ANSWER 6.05 (1.00)

The lowest of the three loop wide range Tc (0.5) is an input to a function generator to derive a pressure set point output. (0.5)

REFERENCE

Dwg No HBRZ - 8643
objective RCS - TP - 4.1
k/a 4.4
002000K410 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 6.06 (2.50)

1. 1. NIS Rod Drop Signal ~~(1/4)~~ or 5 % / 5 seconds (1/4) gw
   2. OT High (2/3)
   3. OP high (2/3) (3 parts @ 0.5 ea.)

2. 1. NIS Rod Drop Signal ~~(1/4)~~ or 5 % / 5 seconds (1/4) gw
   2. Rod Bottom Signal ~~any rod~~ (2 parts @ 0.5 ea.)
   from any rod or rod bottom signal from RPI. gw

REFERENCE

Rod Stop & Turbine Load Cutback Dwg.# GP-300 - 5379 - 2760
objective EH-TP-2.1 RPS-TP-3.1
045000K412 ...(KA'S)

ANSWER 6.07 (1.50)

1. The pumps are utilized to increase the pressure in the service water piping higher than the pressure inside the containment for a postulated MCA. (0.75)

2. Restriction orifices in the motor and fan cooler return lines. (0.75)

REFERENCE

SD 004 Pg 6
objective SW-TP-1.1
076000K119 ...(KA'S)

ANSWER 6.08 (1.50)

1. manual
2. automatic
3. automatic (3 parts @ 0.5 ea.)

REFERENCE

SD 038 Pg6
objective CSS-TP-3.1
103000K102 ...(KA'S)

ANSWERS -- ROBINSON --87/12/15--SALYERS, G.

ANSWER 6.09 (3.00)

1. REFERENCE INDICATION

   1. Indicates the turbine RPM (while the turbine is coming up to speed.) ~~(0.5)~~ (0.5)

   2. (After closure of one of the OCB's the indication will change over to) Valve Position % open, ~~(0.5)~~ (0.5)

   3. (When the IMP IN button is pushed the display will change to) % load. (0.5)

2. GOVERNOR VALVE TRACKING METER

   1. If Auto input failed it would transfer to Manual. ~~(0.5)~~ (The load would increase or decrease, depending on the direction and magnitude) the tracking meter is displaced from zero. ~~(0.4)~~ (0.75)

   2. If the Manual input failed while in Auto nothing would happen. ~~(1.0)~~ The Tracking meter would be displaced from zero. (0.75)

REFERENCE

SD-033
objective EH-TP-1.1
k/a 2.9
045000A305 ...(KA'S)

ANSWER 6.10 (2.00)

1. High steam line flow setpoint
2. Permissive (P7) (any 8 parts @ 0.25 ea.)
3. Turbine power load limit 70%
4. Steam dump (PT 446 Reference temperature)
   (Pt 447 Sudden loss of lead B/S)
5. Pressure indicator on RTGB
6. Steam generator water level control
7. Rod control system
8. Permissive P-2 (Block auto rod withdraw below 15% turbine power).

REFERENCE

SD-025 Pg 18 & 19
Objective EH-TP-2.1

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

2.9
045000K401 ...(KA'S)

ANSWER 6.11 (1.00)

A load rejection of greater than 70% (1.0)

REFERENCE

SD-025 Pg 14
objective MS-TP-1.1
k/a 3.5
035010K602 ...(KA'S)

ANSWER 6.12 (2.50)

1. SG B-FCV-1933 a & b SG "A" blowdown sampling (6 parts @ 0.25 ea.)
   1934 a & b SG "B" blowdown sampling
   1935 a & b SG "C" blowdown sampling

   MS-1,2,3,4 Containment atmosphere sampling
   2 956 E & F RCS loop 2 & 3 hot leg sampling
   RC 519 A & B Primary water make up to PRT or primary water makeup to CV.

2. (The IVSW line to the above sampling lines are equiped with an air operated isolation valve). When the containment isolation valves are overridden open for post accident sampling the effected line is isolated. (1.0)

REFERENCE

SD-015 Pg 8
objective PASS-TP-1.1
k/a 3.1
000076K201 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 6.13 (2.00)

1. A reactor trip AND a Safety Injection Signal OR 2/3 SG High Level. (1.0)

2. Shuts the Feedwater Regulating Valves,(0.2) bypasses, (0.2) Feedwater Block Valves, (0.2) and trips the Main Feedwater Pumps,(0.2) and Turbine.(0.2)

REFERENCE

Logic Diagram Feedwater Isolation
Dwg # CP-300-5379-2761
objective PLR/SRO-TP-50.1
k/a 3.4
059000K419 ...(KA'S)

ANSWER 6.14 (1.00)

1. False (0.5)
2. False (0.5)

REFERENCE

Auxiliary Feedwater Pump Startup logic
Dwg # CP-300-5379-2762
objective FW-TP-3.1
k/a 4.6
061000K402 ...(KA'S)

ANSWER 6.15 (1.00)

The current is derived from the actual detector pulse count rate in the lower detector, (0.5) and from the means square of the detector output signal in the upper range. (0.5)

REFERENCE

SD-101 Pg 9
k/a 3.2
015000K501 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 6.16 (2.00)

1. B
2. C
3. E
4. E (8 parts @ 0.25 ea.)
5. A
6. E
7. D
8. A

REFERENCE
SD-011
objective RPS-TP-3.1
012000A007 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 7.01 (1.00)

2. or 1

REFERENCE

T.S. 3.1.3

k/a 4.1
0002020G00 ...(KA'S)

ANSWER 7.02 ~~(1.50)~~ (2.50)

1. 1. Loss of coolant (0.5)
   2. Excessive feedwter (0.5)
   3. Excessive steam flow (0.5)

Cold leg temperature decreases greater than 100 deg. F in the last 60 minutes (0.5) and RCS cold leg temperature less than 310 deg. F. (0.5)

REFERENCE

EPP Foldouts
ERG Executive Summary
objective ATAA - TP - 34.1 & EOP - TP - 2.1
k/a 4.1
193010K107 ...(KA'S)

ANSWER 7.03 (2.00)

1. heatup - 60 deg F/hr
   cooldown - 100 deg F/hr
   (4 parts @ 0.5 ea.)
2. heatup - 100 deg F/hr
   cooldown - 200 deg F/hr

REFERENCE

T.S. 3.1.2.1 & 3.1.2.3
k/a 4.1

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

002020G005 ...(KA'S)

ANSWER 7.04 (1.50)

1. ~~1%~~ (0.5) 10%

2. ~~10%~~ (0.5) 1%

3. Boron concentration

REFERENCE

T.S. 3.10.8
k/as 3.9 4.1
002020G005 192002K114 ...(KA'S)

ANSWER 7.05 (1.00)

CRDM Cooling Fans can not be started. (1.0)

REFERENCE

EPP5 step 13 and step 22
k/a 4.2
193008K121 ...(KA'S)

ANSWER 7.06 (.50)

1. EPP 5 -(25 deg. F/hr.) (0.5)

REFERENCE

EPP 5
EPP 6 step 6
k/a 4.2
193008K121 ...(KA'S)

ANSWER 7.07 (1.50)

1. Subcriticality
2. Core Cooling
3. Heat Sink
4. Integrity (6 parts @ 0.2 pt. ea.)
5. Containment (6 parts @ 0.05 pt. ea. for order)
6. Inventory

REFERENCE

EPP
k/a 4.3
000007G011 ...(KA'S)

ANSWER 7.08 (1.50)

The ruptured steam generator reverse flowing from the secondary through the tube leak into the primary, ~~(0.5)~~ (0.75) and diluting the RCS below the shutdown margin. ~~(1.0)~~ (0.75)

REFERENCE

ERG ES 3.2 Step 3
k/a 4.5
000038K306 ...(KA'S)

ANSWER 7.09 (2.50)

1. Identify and (6) isolate Ruptured SG
2. Cooldown to establish RCS subcooling margin
3. Depressurize RCS to restore inventory
4. Terminate SI to step primary to secondary leakage
5. prepare for cooldown to cold shutdown

(5 parts @ 0.5 pt ea.)

REFERENCE

ERG pg 40
k/a 4.5

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

000038K306 ...(KA'S)

ANSWER 7.10 (2.00)

1. Fire Equipment Building (0.5)

2. (Sealed cabinet to the right of the doorway in the) fire equipment building (0.5)

3. 1. Fire Equipment Building (0.33)
   2. Secondary Control Panel (0.33)
   3. Charging Pump Room Control Panel (0.33)

REFERENCE

AOP-004 pg 3
k/a 4.5
000068K318 ...(KA'S)

ANSWER 7.11 (.50)

True (0.5)

REFERENCE

AOP-004
K/A 4.3
000068K303 ...(KA'S)

ANSWER 7.12 (2.00)

1. 25
2. 105
3. 180
4. 170 (4 parts @ 0.5 ea.)

REFERENCE

AOP-018 pg 10
k/a 3.4
000015A107 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 7.13 (2.00)

1. Normal charging line through valve CVC-310B to loop 2 cold leg.
2. Alternate charging line through valve CVC-310A to loop 1 hot leg.
3. Seal water supply line to the reactor coolant pumps.
4. Charging line through valve CVC-311 auxiliary spray to the pressurizer.

(either valve name or number is acceptable identification)

(4 parts @ 0.4 points + 0.1 point ea. for proper order total of 2.0 pt.)

REFERENCE

AOP-002 pg 6
k/a 4.4
000024K302 ...(KA'S)

ANSWER 7.14 (.50)

False

REFERENCE

GP-003 pg 14
k/a 3.8
0020206013 ...(KA'S)

ANSWER 7.15 (1.50)

~~Stop all RCPs if Both conditions listed below are met -(0.5)~~
1. SI pump - at least one running ~~(0.5)~~ (0.75)
2. RCS Subcooling - less than 25 deg. F [45 deg. F] ~~(0.5)~~ (0.75)

REFERENCE

EPP - Foldout A
000007G012 ...(KA'S)

ANSWER 7.16 (2.00)

1. Turn the pumps off. ~~Leave the RCPs running~~ (0.5)

2. A vessel void fraction of 50% is used as a symptom of a core cooling challenge. (0.5) If the RCPs fail or are tripped after a 50% void fraction is reached, phase separations will occur (0.5) and core uncovery and clad heatup may occur. (0.5)

(If stated, "leave the RCPs running" in Part 1.) Continued operation of the RCPs will result in a more rapid depletion of the RCS inventory. (0.5) If the RCPs are tripped after saturation (0.5) it is possible for the reactor coolant to settle out at a point beneath the level of the top of the core. (0.5)

REFERENCE

ERG Executive Volume Generic Issue RCP Trip pg 60
000007G012 ...(KA'S)

ANSWER 7.17 (1.50)

1. Power change of 15% or greater in one hour. (0.5)

2. 1. 50% (if the turbine was shut down for greater than 24 hours.) (0.5)
   2. 90% power (0.5)

REFERENCE

GP-005 pg 26 & 29
k/a 3.8
0020200013 ...(KA'S)

ANSWER 7.18 (1.00)

1. Working priority one (1) work request. (0.5)

2. During a declared emergency condition. (0.5)

REFERENCE

PLP-016 pg 6
k/a 3.4
194001K103 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 7.19 (1.00)

Restrict the individual from entering the Radiation Control Area.

REFERENCE

PLP-031 pg 8
k/a 3.4
194001K103 ...(KA'S)

DELETED

ANSWER 7.20 (.50)

100 CPM above background (which equals approximately 5000 dpm/100 cm2)

REFERENCE

PLP-031
k/a 3.4
194001K103 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 8.01 (2.00)

1. One (1) steam generator capable of performing its heat transfer function will provide sufficient heat removal capability to remove core decay heat after a normal reactor shutdown. (1.0)

2. The reactor cannot be made critical without water in all three steam generators, since the low-low steam generator water level trip prevents this mode of operation. (Two operable steam generators are therefore adequate.) (1.0)

REFERENCE

T.S 3.1.1.2 Steam Generator
k/a 3.7
035010G006 ...(KA'S)

ANSWER 8.02 (1.00)

The minimum amount of water in the condensate storage tank is the amount needed for at least two (2) hours of operation (0.5) at hot standby conditions. (0.5)

REFERENCE

T.S. 3.4.1C
k/a 3.3
076000G006 ...(KA'S)

ANSWER 8.03 (1.50)

1. F
2. A
3. C
4. D (6 parts @ .25 ea.)
5. B
6. E

REFERENCE

AM - 13 Emergency Operating Procedures Writers Guide Pg 35

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 8.04 (1.00)

A modification must be submitted (per MOD -005, Modification Package Development and Revision.) (1.0)

REFERENCE

OMM - 012 Pg 8
k/a 4.1
194001K102 ...(KA'S)

ANSWER 8.05 (1.50)

1. Approved procedure that provides procedural steps for installation and removal of jumpers and wires.

2. Jumper and wire Removals in operable safety related systems are controlled by a modification.

3. Jumper and Wire Removals used when following standard troubleshooting techniques which may require momentary jumpers or lifted leads and the system condition is being monitored by Maintenance personnel.

4. Temporary or portable equipment powered from receptacles.

(3 parts @ 0.5 ea.)

REFERENCE

OMM - 012 Pg 11
k/a 4.1
194001K102 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 8.06 (1.50)

1. Making the decision to notify off site authorities
2. Making off site Protective action recommendations.
3. Reclassifying or terminating the emergency. (3 parts @ 0.5 ea.)

REFERENCE

PEP - 104 Pg 4
k/a 4.4
194001A116 ...(KA'S)

ANSWER 8.07 (.50)

Alert (0.5)

REFERENCE

PEP _ 162 Pg 5 step 5.1
k/a 4.4
194001A116 ...(KA'S)

ANSWER 8.08 (3.00)

1. SCO
2. SF
3. SF (6 parts @ 0.5 ea.)
4. SCO
5. SF or BOTH
6. SF

REFERENCE

OMM - 001 Pg 6-12
k/a 3.4
194001A103 ...(KA'S)

ANSWER 8.09 (1.00)

1. 1000 (0.5)

2. RC Foreman (0.5)

REFERENCE

HP - 001
AP - 031
k/a 3.4
194001A103 ...(KA'S)

ANSWER 8.10 (.50)

1. Five (0.5)

REFERENCE

T. S. Pg 6.2-2
k/a 4.2
194001K116 ...(KA'S)

ANSWER 8.11 (1.00)

1. Its emergency power source is operable (0.5)

2. Its redundant system is operable. (0.5)

REFERENCE

T.S. Pg 1-2
k/a 3.4
194001A103 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 8.12 (1.50)

1. Four (coolers) (0.5)
2. Two (spray pumps) (0.5)
3. Two coolers and one spray pump (0.5)

REFERENCE

T.S. Pg 3.10-7a
k/a 4.2
006050G005 ...(KA'S)

ANSWER 8.13 (2.00)

(any five (5) at 0.4 points ea.)

1. Inadvertent radioactivity release (liquid or gases)
2. Major equipment malfunction
3. Unexplained reactivity changes
4. Loss of offsite power
5. Employee injury
6. Radiation exposure
7. Accidents occurring on or near the plant

REFERENCE

Omm - 001 Pg 57
k/a 3.4
194001A103 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 8.14 (1.50)

SEC - General Manager

Alternate - 1. Manager - Maintenance Unit 2
2. Manager - Operations Unit 2
3. Director - Regulatory Compliance.
4. Operating Supervisor Unit 2

additional acceptable answers:
(1) Manager - Technical Support
(2) Manager - E & RC
(3) Mechanical Maintenance Supervisor
(4) I&C Maintenance Supervisor
(5) RC Supervisor
(6) Environmental & Chemistry Superv

(5 parts @ 0.3 points ea.)

REFERENCE

PLP - 007 sec. 5.3.2.1
k/a 4.4
194001A116 ...(KA'S)

ANSWER 8.15 (1.50)

1. One shift foreman holding a SRO license (0.3)
One control operator holding a RO license (0.3)
One additional shift member (0.3)

2. 14 (0.3)

3. Plant General Manager (0.3)

REFERENCE

TS 6.2.3
PWG - 23 (2.8/3.5)
k/a 3.4
194001A103 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 8.16 (2.00)

1. 1. If time exists the shift foreman shall consult with another member of plant management prior to approval. (0.5)

   2. If time does not exist to consult management, the shift foreman approves the deviation prior to performing the protective action. (0.5)

2. The NRC must be notified, via the red phone, (0.5) if protection action would violate Technical Specifications. (0.5)

REFERENCE

NRC is notified prior to or the deviation if time permits, or as soon as possible afterwards (0.5). NRC is notified via red telephone (ENC). (0.5)

AP - 006 para 5.2
PWG - 21 (3.8/4.1)
k/a 3.4
194001A103 ...(KA'S)

ANSWER 8.17 (1.50)

1. Any outdoor tank having a capacity of > 100 gallons (0.5) used for the receipt or transfer of radioactive liquids. (0.5)

2. OMM - 001 or Operations - Conduct of Operations. (0.5)

additional acceptable answers:
(1) Plant Technical Specifications
(2) E & RC Procedures, EMP-23
(3) OMM-003 (Minimum Equipment List)

REFERENCE

OMM - 001 sec 5.25
k/a 3.4
194001A103 ...(KA'S)

ANSWERS -- ROBINSON -87/12/15-SALYERS, G.

ANSWER 8.18 (2.00)

1. 5 years

2. life of the facility

3. 5 years

4. life of the facility

DELETED

REFERENCE

TS 6.10
objective PRC - TP 42.1
k/a 3.4
194001A106 ...(KA'S)

ANSWER 8.19 (1.50)

1. The valve is part of a safety related system and is in a major flow path, thus ensuring system availability. (0.75)

2. The valve serves an important function in maintaining plant and/or system reliability. (0.75)

REFERENCE

OMM - 009 Pg 5
k/a 3.7
194001K101 ...(KA'S)

QUESTION	VALUE	REFERENCE
[illegible].01	1.00	GWS0000236
[illegible].02	1.50	GWS0000237
05.03	.50	GWS0000238
05.04	2.00	GWS0000239
05.05	1.00	GWS0000240
05.06	.50	GWS0000241
05.07	1.00	GWS0000242
05.08	.50	GWS0000243
05.09	1.00	GWS0000244
05.10	1.50	GWS0000245
05.11	1.50	GWS0000246
05.12	1.00	GWS0000247
05.13	1.50	GWS0000248
05.14	1.00	GWS0000249
05.15	1.25	GWS0000250
05.16	1.50	GWS0000251
05.17	2.00	GWS0000252
05.18	2.00	GWS0000253
05.19	1.50	GWS0000254
05.20	2.50	GWS0000255
05.21	1.00	GWS0000256
05.22	1.00	GWS0000313
	28.25	
[illegible].01	1.50	GWS0000257
[illegible].02	2.00	GWS0000258
06.03	2.00	GWS0000259
06.04	3.00	GWS0000260
06.05	1.00	GWS0000261
06.06	2.50	GWS0000262
06.07	1.50	GWS0000263
06.08	1.50	GWS0000264
06.09	3.00	GWS0000265
06.10	2.00	GWS0000266
06.11	1.00	GWS0000267
06.12	2.50	GWS0000268
06.13	2.00	GWS0000269
06.14	1.00	GWS0000270
06.15	1.00	GWS0000272
06.16	2.00	GWS0000273
	29.50	
07.01	1.00	GWS0000274
07.02	1.50	GWS0000275
07.03	2.00	GWS0000276
07.04	1.50	GWS0000277
[illegible].05	1.00	GWS0000278
[illegible].06	.50	GWS0000279

QUESTION	VALUE	REFERENCE
07.07	1.50	GWS0000280
.08	1.50	GWS0000281
.09	2.50	GWS0000282
07.10	2.00	GWS0000283
07.11	.50	GWS0000284
07.12	2.00	GWS0000285
07.13	2.00	GWS0000286
07.14	.50	GWS0000287
07.15	1.50	GWS0000288
07.16	2.00	GWS0000289
07.17	1.50	GWS0000290
07.18	1.00	GWS0000291
07.19	1.00	GWS0000292
07.20	.50	GWS0000293
	27.50	
08.01	2.00	GWS0000294
08.02	1.00	GWS0000295
08.03	1.50	GWS0000296
08.04	1.00	GWS0000297
08.05	1.50	GWS0000298
08.06	1.50	GWS0000299
08.07	.50	GWS0000300
08.08	3.00	GWS0000301
08.09	1.00	GWS0000302
.10	.50	GWS0000303
.11	1.00	GWS0000304
08.12	1.50	GWS0000305
08.13	2.00	GWS0000306
08.14	1.50	GWS0000307
08.15	1.50	GWS0000308
08.16	2.00	GWS0000309
08.17	1.50	GWS0000310
08.18	2.00	GWS0000311
08.19	1.50	GWS0000312
	28.00	
	113.25	

DOCKET NO 261