

U. S. NUCLEAR REGULATORY COMMISSION  
REGION 1

DOCKET/REPORT NOS: 50-317/94-16 (OL)  
50-318/94-16 (OL)

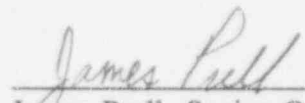
LICENSEE: Baltimore Gas and Electric Company

FACILITY: Calvert Cliffs Nuclear Power Plant, Units 1 and 2  
Lusby, Maryland

DATES: April 25-29, 1994

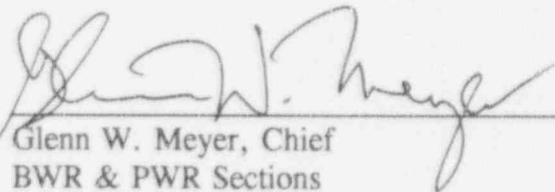
EXAMINERS: Sam Hansell, Operations Engineer, DRS  
Jim Nickolaus, PNL  
Tom Vehec, PNL

CHIEF EXAMINER:

  
James Prell, Senior Operations Engineer  
PWR Section  
Division of Reactor Safety

6/14/94  
Date

APPROVED BY:

  
Glenn W. Meyer, Chief  
BWR & PWR Sections  
Division of Reactor Safety

6/14/94  
Date

## EXECUTIVE SUMMARY

Operations: From April 25-29, 1994, the NRC administered examinations to 11 employees who had applied for licenses to operate the Calvert Cliffs Nuclear Power Plant, Units 1 and 2. The examinations were conducted in accordance with Revision 7 to NUREG-1021, "Operator Licensing Examiner Standards." These initial operator licensing examinations were administered to five reactor operator (RO), two senior reactor operator upgrade (SROU), and four senior reactor operator instant (SROI) candidates. One SROU, one SROI and all five RO candidates passed all parts of the examination and were issued licenses.

One SROU candidate failed the job performance measure (JPM) portion of the operating test, three SROI candidates failed the simulator portion of the operating test, and one of the three SROIs who failed the simulator exam also failed the administrative and JPM portions of the operating test. Four of the six SRO candidates had problems during a simulator test identifying and responding to a leak between the refueling water storage tank (RWT) and the suction side of a low pressure safety injection (LPSI) pump.

Multiple problems with the simulator were experienced during both the examination preparation week and the examination week. Some of these problems occurred during the administration of both the simulator and job performance measures (JPMs) portions of the operating examination. The problems resulted in examination delays that ranged from 15 minutes to up to two hours at a time preventing a smooth exam administration process, complicated the exams themselves, and potentially increased the stress on the candidates.

Two procedure problems were identified by the examiners regarding EOP-7, "Station Blackout," and OI-3A, "Safety Injection and Containment Spray." These problems were fixed prior to the examiners leaving the site.

## DETAILS

### 1.0 INITIAL EXAMINATION RESULTS

	RO Pass/Fail	SRO Pass/Fail	TOTAL Pass/Fail
Written	5/0	6/0	11/0
Operating	5/0	2/4	7/4
Overall	5/0	2/4	7/4

### 2.0 EXAMINATION OVERVIEW

#### 2.1 Written Examination

The written examinations were administered on April 25, 1994. Both the senior reactor operator (SRO) and reactor operator (RO) examinations were developed in accordance with the guidelines of 10 CFR 55.41, 55.43, and NUREG-0122, "Examiners Handbook for Developing Operator Licensing Written Examinations." All the candidates passed the written examination.

During a review of the graded written examinations, the following generic weaknesses were noted. A weakness is considered generic if more than one half of the candidates missed the same question. Question numbers are provided in the parenthesis. This information is being provided to assist in upgrading your training programs. A response to the below listed items is not needed.

- Sequence of actions that occur following a CEA withdrawal signal (SRO #1, RO #1)
- ESFAS actuation that may occur for a main steam line rupture outside containment (RO #5).
- Upper sequential limit CEA setpoint (RO #7b).
- Purpose of the hydrogen recombiner and hydrogen purge system (RO #31 a&c, SRO #27 a&c).
- Actions required when, at low power, the "11 and 12 SERV WATER HEAD TANK LEVEL" alarm comes in (RO #47).
- Actions required when two CEAs have been declared inoperable (RO #49, SRO #43).
- Definition of "derived airborne concentration" of 10 CFR 20 (RO #82, SRO #81).

- Which individual must authorize entry into containment via the emergency airlock (RO #83, SRO #82).
- Definition of a locked high radiation area as defined by CCI-800 (RO #84, SRO #83).
- Responsibilities of watchstanders (RO #87, SRO #86).
- Overtime requirements for operators per CCI-159 (RO #93, SRO #92).

## **2.2 Operating Test**

The operating tests were administered from April 25 through April 28, 1994. The operating tests consisted of two dynamic simulator scenarios and 10 JPMs for each of the five RO and four SRO-Instant candidates. The two SRO-Upgrade candidates were administered two dynamic simulator scenarios and five JPMs. Two oral questions were asked at the completion of each JPM. Each candidate was also examined on the administrative requirements of Calvert Cliffs, Units 1 and 2.

### **2.2.1 Dynamic Simulator Scenarios**

The examiners assessed the candidates' performance in the operating portion of the examination to be average overall. The following generic weaknesses were noted in the candidates' performance: (1) response to an inadvertent SIAS signal; (2) inability to identify and prioritize alarms during a SIAS/CIS/RWT event; and (3) response to a loss of seal oil to the main generator. Specific strengths noted in the simulator were good communication skills and the use of repeatbacks.

### **2.2.2 Job Performance Measures/Plant Walkthrough**

The examiners identified some strengths and weaknesses during the plant walkthroughs. The strengths were: (1) good plant knowledge and awareness of equipment location; and (2) familiarity with the main control room administrative procedures and layout. The weaknesses were: (1) overall performance on alternate path JPMs; and (2) knowledge of the new 10 CFR 20 information.

## **3.0 PREEXAMINATION REVIEW**

The SRO and RO written examinations originally consisted of 100 questions written in the multiple choice or matching format. The number of questions for both examinations was reduced to 99 in response to comments raised by the training department during their pre-exam review of the test. The facility feedback was incorporated into the exam to improve the quality of the exam and make it Calvert Cliffs specific.

#### **4.0 POST-EXAMINATION FACILITY COMMENTS AND SIMULATOR FIDELITY REPORT**

The facility provided post-examination comments on five questions from the written examinations. Their comments and recommendations were accepted on all five questions. Attachment 1 contains the facility's comments and Attachment 2 contains the NRC resolution of the comments. Attachment 3 contains the simulator fidelity report.

#### **5.0 EXIT MEETING ON 4/29/94**

The facility provided formal comments on the written examination. The NRC expressed its appreciation for the assistance provided by the Calvert Cliffs training, operations, and health physics personnel. The NRC noted some problem areas encountered during the validation and administration of the initial exams. Most of the areas for possible improvements were related to the plant simulator reliability and capabilities. The information was provided to the training personnel to improve the administration of future exams' and provide the candidates a fair opportunity to demonstrate their knowledge while minimizing added exam stress. Generic strengths and weaknesses observed in the operating test were also discussed.

##### **Calvert Cliffs Personnel**

R. Niedzielski, Supervisor - Initial Training  
D. Rosenbaum, Senior Operations Instructor  
D. Holm, AGS Operations Training  
M. Navin, General Supervisor Nuclear Plant Operations  
N. Millis, General Supervisor Nuclear Training  
J. Lemons, Manager - Nuclear Support Services Department  
J. Macklin, Supervisor Simulator  
R. Pace, License Instructor - Program Coordinator  
L. Wenger, PE - Compliance Unit  
R. Wenderlich, Operations Superintendent

##### **NRC Personnel**

J. Prell, Senior Operations Engineer - Lead Examiner  
S. Hansell, Operations Engineer

##### **Attachments:**

1. Facility Comments on Written Examination (w/o references)
2. NRC Resolution of Facility Comments
3. Simulation Facility Report
4. RO Examination and Answer Key/SRO Examination and Answer Key

**ATTACHMENT 1**

**FACILITY COMMENTS ON WRITTEN EXAMINATION**

Note: Supporting material referenced in the facility's comments are not included. This material is contained in the master docket file.

**ROBERT E. DENTON**  
Vice President  
Nuclear Energy

Baltimore Gas and Electric Company  
Calvert Cliffs Nuclear Power Plant  
1650 Calvert Cliffs Parkway  
Lusby, Maryland 20657  
410 586-2200 Ext. 4455 Local  
410 260-4455 Baltimore



May 6, 1994

U. S. Nuclear Regulatory Commission  
Region I  
475 Allendale Road  
King of Prussia, PA 19406

ATTENTION: Mr. T. T. Martin

SUBJECT: Calvert Cliffs Nuclear Power Plant  
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318  
Comments on Licensed Operator Exam Questions

In accordance with NUREG-1021, Examiner Standard-402, Baltimore Gas and Electric Company submits formal comments of five written examination questions for the Nuclear Regulatory Commission Initial Written Examination Administered during the week of April 25, 1994. Comments and recommendations, along with supporting documentation are provided for each of the five questions.

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

Very truly yours,

A handwritten signature in black ink, appearing to read 'R. E. Denton', written over a horizontal line.

RED/WDM/bjd

Enclosure

cc: (Enclosure with Attachments)  
J. A. Prell, NRC

(Enclosure without Attachments)  
Document Control Desk, NRC  
D. A. Brune, Esquire  
J. E. Silberg, Esquire  
R. A. Capra, NRC  
D. G. McDonald, Jr., NRC  
P. R. Wilson, NRC  
R. I. McLean, DNR  
J. H. Walter, PSC

ENCLOSURE

APRIL 25, 1994 LICENSED OPERATOR EXAM  
COMMENTS AND RECOMMENDATIONS

SRO EXAM

**QUESTION 3.** This question gives RCP parameter values and requires the student to diagnose the underlying causes. 11A and 12A RCPs are given as having high lower seal temperatures and the student is expected to determine that the cause is "loss of component cooling water to RCP." The expected answer is implausible as the given Controlled Bleedoff Temperatures are not abnormally elevated. As elevation in CBO temps is the primary parameter used to determine RCP condition on a loss of Component Cooling (Reference AOP-7C), the Exam item parameter values are not consistent with a loss of CCW to the RCP. Since the lower seal temperatures are elevated, however, the answer cannot be changed to any other listed choice.

**RECOMMENDATION:** The portion of this question that deals with 11A and 12A RCPs should be deleted while retaining the part addressing 11B and 12B RCPs.

**REFERENCES:** See Attachment (1).

**QUESTION 38.** This question asks which automatic functions protect the Shutdown Cooling System from overpressure if pressure approaches 350 psia. The key asserts that operator action is required. In reality SI-651 and 652-MOVs will close when pressure exceeds 284 psia (+ or - 16). This interlock, per OP-5, is active unless either the Pressurizer Manway is removed, or a dedicated overpressure watch has been stationed. If one of these conditions is met, the overpressure interlock may be jumpered out. OP-5 requires that if neither of the two stated objections is met the overpressure interlock must remain in service.

**RECOMMENDATION:** Answers B and D should be accepted as correct.

**REFERENCES:** See Attachment (2).

**QUESTION 39.** To successfully answer this question the student must be able to determine which of the listed Quench Tank parameters, if any, are off normal. The answer key states that none of the listed parameters are a concern. OI-1B states that normal QT pressure is 3 psig and 9.5 psig would therefore be considered very off normal. The Quench Tank Temp, Level, Pressure Alarm on 1C06 comes in between 9 and 11 psig. There are no required QT logs at CCNPP. In no case should a watchstander consider 9.5 psig in the Quench Tank "normal."

**RECOMMENDATION:** The answer to this questions should be changed to B.

**REFERENCES:** See Attachment (3).



ENCLOSURE

APRIL 25, 1994 LICENSED OPERATOR EXAM  
COMMENTS AND RECOMMENDATIONS

RO EXAM

*QUESTION 3.* Common to both Exams, see above.

*QUESTION 24.* This question requires that the candidate select a correct statement describing the SGIS blocking logic. The answer key is incorrect and the question lists two correct answers. SGIS may be manually blocked once three of four SG pressures are below 785 psia (Technical Specifications). If SGIS is blocked and 2 of 4 SG pressures rise above the 785 psia setpoint, SGIS will be automatically unblocked.

*RECOMMENDATION:* Both answers B and D should be accepted as correct, with the answer key response, C, being rejected.

*REFERENCES:* See Attachment (4).

*QUESTION 36.* This question requires that the candidate know what automatic actions, if any, will occur if RI-4014 alarms with the high temperature bypass valve open. The answer key is correct as it stands but must be augmented to include choice D which is always an automatic action should RI-4014 alarm.

*RECOMMENDATION:* Choice A and D should be accepted as correct answers.

*REFERENCES:* See Attachment (5).

*QUESTION 44:* Common to both Exams, see above comments, SRO Exam Question 38.

## ATTACHMENT 2

### NRC RESOLUTION OF FACILITY WRITTEN EXAMINATION COMMENTS

#### SRO Question # 3, RO Question #3

The facility's comment was accepted. The matching question, items 3.a. and 3.c., were deleted from the exam.

#### SRO Question #38, RO Question #44

The facility's comment that answers "b" and "d" were both correct was accepted.

#### SRO Question #39

The facility's statement that a quench tank pressure of 9.5 psig is off normal is correct. The answer key was changed to reflect "b" as the correct response and NOT "a".

#### RO Question #24

The facility's statement that there were two correct answers to this question depending on plant conditions was correct. The answer key was changed to reflect both "b" and "d" the correct responses and NOT "c".

#### RO Question #36

The facility's statement that there were two correct answers to this question, based on the alarm response procedure information, was correct. The answer key was changed to reflect both "a" and "d" as the correct responses.

### ATTACHMENT 3

#### SIMULATOR FIDELITY REPORT

Facility Licensee: Calvert Cliffs Unit 1 and 2

Facility Docket No: 50-317 and 50-318

Operating Tests Administered from: April 25-29, 1994

This form is to be used only to report observations. These observations do not constitute audit or inspection findings and are not, without further verification and review, indicative of noncompliance with 10 CFR 55.45(b). These observations do not affect NRC certification or approval of the simulation facility other than to provide information that may be used in future evaluations. No licensee action is required in response to these observations.

During the conduct of the simulator and JPM portions of the operating tests, the following item was observed:

<u>ITEM</u>	<u>DESCRIPTION</u>
Main feed pump digital control	The new MFP digital control station did not respond as expected for one JPM. The problem was discussed with the training personnel during the exam prep week and still existed the week of exam administration. The training personnel issued a deficiency report to correct the problem.
Simulator hardware	The simulator experienced a number of problems during the exam week that resulted in one- to two-hour delays on each day of the operating exams. The simulator experienced a number of problems during the exam week that resulted in one to two-hour delays on each day of the operating exams. One example of another type of simulator impact was noticed during the administration of simulator JPMs. The simulator clock was advancing in two-second increments, which resulted in slow equipment response to normal switch manipulations. The training management stated that they were in the process of purchasing a new and more reliable computer system for the simulator.
Alarm Panels 1C33 and 1C34	During a dynamic simulator scenario, the power supply breaker tripped open to alarm panels 1C33 and 1C34.

**ATTACHMENT 4**

**RO AND SRO WRITTEN EXAMINATIONS  
AND ANSWER KEYS**

Nuclear Regulatory Commission  
Operator Licensing  
Examination

This document is removed from  
Official Use Only category on  
date of examination.

U. S. NUCLEAR REGULATORY COMMISSION  
SITE SPECIFIC EXAMINATION  
REACTOR OPERATOR LICENSE  
REGION 1

CANDIDATE'S NAME: \_\_\_\_\_

FACILITY: Calvert Cliffs, Units 1 & 2

REACTOR TYPE: PWR-CE

DATE ADMINISTERED: 94/04/25

INSTRUCTIONS TO CANDIDATE:

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires a final grade of at least 80%. Examination papers will be picked up four (4) hours after the examination starts.

<u>TEST VALUE</u>	<u>CANDIDATE'S SCORE</u>	<u>%</u>	
<u>100.0</u>	_____	_____	% TOTALS
	<u>FINAL GRADE</u>		

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

\_\_\_\_\_  
Candidate's Signature

A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

If you change your answer, write your selection in the blank.

MULTIPLE CHOICE

001 a b c d \_\_\_\_

002 a b c d \_\_\_\_

003 MATCHING

a \_\_\_\_

b \_\_\_\_

c \_\_\_\_

d \_\_\_\_

MULTIPLE CHOICE

004 a b c d \_\_\_\_

005 a b c d \_\_\_\_

006 a b c d \_\_\_\_

007 MATCHING

a \_\_\_\_

b \_\_\_\_

c \_\_\_\_

d \_\_\_\_

MULTIPLE CHOICE

008 a b c d \_\_\_\_

009 a b c d \_\_\_\_

010 a b c d \_\_\_\_

011 a b c d \_\_\_\_

012 a b c d \_\_\_\_

013 a b c d \_\_\_\_

014 a b c d \_\_\_\_

015 a b c d \_\_\_\_

016 a b c d \_\_\_\_

017 a b c d \_\_\_\_

018 a b c d \_\_\_\_

019 a b c d \_\_\_\_

020 a b c d \_\_\_\_

021 MATCHING

A \_\_\_\_

B \_\_\_\_

C \_\_\_\_

D \_\_\_\_

MULTIPLE CHOICE

022 a b c d \_\_\_\_

023 a b c d \_\_\_\_

024 a b c d \_\_\_\_

025 a b c d \_\_\_\_

026 a b c d \_\_\_\_

027 a b c d \_\_\_\_

028 a b c d \_\_\_\_

029 a b c d \_\_\_\_

030 a b c d \_\_\_\_

A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

If you change your answer, write your selection in the blank.

031 MATCHING

a \_\_\_\_\_

b \_\_\_\_\_

c \_\_\_\_\_

MULTIPLE CHOICE

032 a b c d \_\_\_\_\_

033 a b c d \_\_\_\_\_

034 a b c d \_\_\_\_\_

035 a b c d \_\_\_\_\_

036 a b c d \_\_\_\_\_

037 a b c d \_\_\_\_\_

038 a b c d \_\_\_\_\_

039 a b c d \_\_\_\_\_

040 a b c d \_\_\_\_\_

041 a b c d \_\_\_\_\_

042 a b c d \_\_\_\_\_

043 a b c d \_\_\_\_\_

044 a b c d \_\_\_\_\_

045 a b c d \_\_\_\_\_

046 a b c d \_\_\_\_\_

047 a b c d \_\_\_\_\_

048 a b c d \_\_\_\_\_

049 a b c d \_\_\_\_\_

050 a b c d \_\_\_\_\_

051 a b c d \_\_\_\_\_

052 a b c d \_\_\_\_\_

053 a b c d \_\_\_\_\_

054 a b c d \_\_\_\_\_

055 a b c d \_\_\_\_\_

056 a b c d \_\_\_\_\_

057 a b c d \_\_\_\_\_

058 a b c d \_\_\_\_\_

059 a b c d \_\_\_\_\_

060 a b c d \_\_\_\_\_

061 a b c d \_\_\_\_\_

062 a b c d \_\_\_\_\_

063 a b c d \_\_\_\_\_

064 a b c d \_\_\_\_\_

065 a b c d \_\_\_\_\_

066 a b c d \_\_\_\_\_

067 MATCHING

a \_\_\_\_\_

b \_\_\_\_\_

c \_\_\_\_\_

d \_\_\_\_\_



A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

If you change your answer, write your selection in the blank.

MULTIPLE CHOICE

- |     |          |     |   |   |     |     |   |   |   |   |     |
|-----|----------|-----|---|---|-----|-----|---|---|---|---|-----|
| 068 | a        | b   | c | d | ___ | 085 | a | b | c | d | ___ |
| 069 | a        | b   | c | d | ___ | 086 | a | b | c | d | ___ |
| 070 | a        | b   | c | d | ___ | 087 | a | b | c | d | ___ |
| 071 | a        | b   | c | d | ___ | 088 | a | b | c | d | ___ |
| 072 | a        | b   | c | d | ___ | 089 | a | b | c | d | ___ |
| 073 | a        | b   | c | d | ___ | 090 | a | b | c | d | ___ |
| 074 | a        | b   | c | d | ___ | 091 | a | b | c | d | ___ |
| 075 | a        | b   | c | d | ___ | 092 | a | b | c | d | ___ |
| 076 | a        | b   | c | d | ___ | 093 | a | b | c | d | ___ |
| 077 | a        | b   | c | d | ___ | 094 | a | b | c | d | ___ |
| 078 | a        | b   | c | d | ___ | 095 | a | b | c | d | ___ |
| 079 | MATCHING |     |   |   |     | 096 | a | b | c | d | ___ |
|     | a        | ___ |   |   |     | 097 | a | b | c | d | ___ |
|     | b        | ___ |   |   |     |     |   |   |   |   |     |
|     | c        | ___ |   |   |     |     |   |   |   |   |     |
|     | d        | ___ |   |   |     |     |   |   |   |   |     |

MULTIPLE CHOICE

- |     |   |   |   |   |     |
|-----|---|---|---|---|-----|
| 080 | a | b | c | d | ___ |
| 081 | a | b | c | d | ___ |
| 082 | a | b | c | d | ___ |
| 083 | a | b | c | d | ___ |
| 084 | a | b | c | d | ___ |

(\*\*\*\*\* END OF EXAMINATION \*\*\*\*\*)

## 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. After the examination has been completed, you must sign the statement on the cover sheet indicating that the work is your own and you have not received or given assistance in completing the examination. This must be done after you complete the examination.
3. Restroom trips are to be limited and only one applicant 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.
4. Use black ink or dark pencil ONLY to facilitate legible reproductions.
5. Print your name in the blank provided in the upper right-hand corner of the examination cover sheet and each answer sheet.
6. Mark your answers on the answer sheet provided. USE ONLY THE PAPER PROVIDED AND DO NOT WRITE ON THE BACK SIDE OF THE PAGE.
7. Before you turn in your examination, consecutively number each answer sheet, including any additional pages inserted when writing your answers on the examination question page.
8. Use abbreviations only if they are commonly used in facility literature. Avoid using symbols such as < or > signs to avoid a simple transposition error resulting in an incorrect answer. Write it out.
9. The point value for each question is indicated in parentheses after the question.
10. Show all calculations, methods, or assumptions used to obtain an answer to any short answer questions.
11. Partial credit may be given except on multiple choice questions. Therefore, ANSWER ALL PARTS OF THE QUESTION AND DO NOT LEAVE ANY ANSWER BLANK.
12. Proportional grading will be applied. Any additional wrong information that is provided may count against you. For example, if a question is worth one point and asks for four responses, each of which is worth 0.25 points, and you give five responses, each of your responses will be worth 0.20 points. If one of your five responses is incorrect, 0.20 will be deducted and your total credit for that question will be 0.80 instead of 1.00 even though you got the four correct answers.
13. If the intent of a question is unclear, ask questions of the examiner only.

14. When turning in your examination, assemble the completed examination with examination questions, examination aids and answer sheets. In addition, turn in all scrap paper.
15. Ensure all information you wish to have evaluated as part of your answer is on your answer sheet. Scrap paper will be disposed of immediately following the examination.
16. To pass the examination, you must achieve a grade of 80% or greater.
17. There is a time limit of four (4) hours for completion of the examination.
18. When you are done and have turned in your examination, leave the examination area (EXAMINER WILL DEFINE THE AREA). If you are found in this area while the examination is still in progress, your license may be denied or revoked.

QUESTION: 001 (1.00)

Unit 2 is at 25 percent power. Figure 1 illustrates the basic Control Element Drive Mechanism. Using Figure 1 for reference, identify which of the following electrical sequences correctly describe the sequence of actions which occur following the receipt of a CEA withdrawal signal.

- a. Lower gripper coil-on; load transfer coil-on; upper gripper coil-off; lift coil-on; pull down coil-on; upper gripper coil-on/pull down coil-off; load transfer coil-off; lower gripper coil-off
- b. Lift coil-on; load transfer coil-on; lower gripper coil-on; upper gripper coil-off; lift coil-off/pull down coil-on; upper gripper coil-on/pull down coil-off; load transfer coil-off; lower gripper coil-off.
- c. Lower gripper coil-on; load transfer coil-on; lift coil-on; upper gripper coil-off; pull down coil-on; upper gripper coil-on/pull down coil-off; load transfer coil-off; lower gripper coil-off
- d. Lift coil-on; lower gripper coil-on; load transfer coil-on; upper gripper coil-off; lift coil-off/pull down coil-on; upper gripper coil-on/pull down coil-off; load transfer coil-off; lower gripper coil-off.

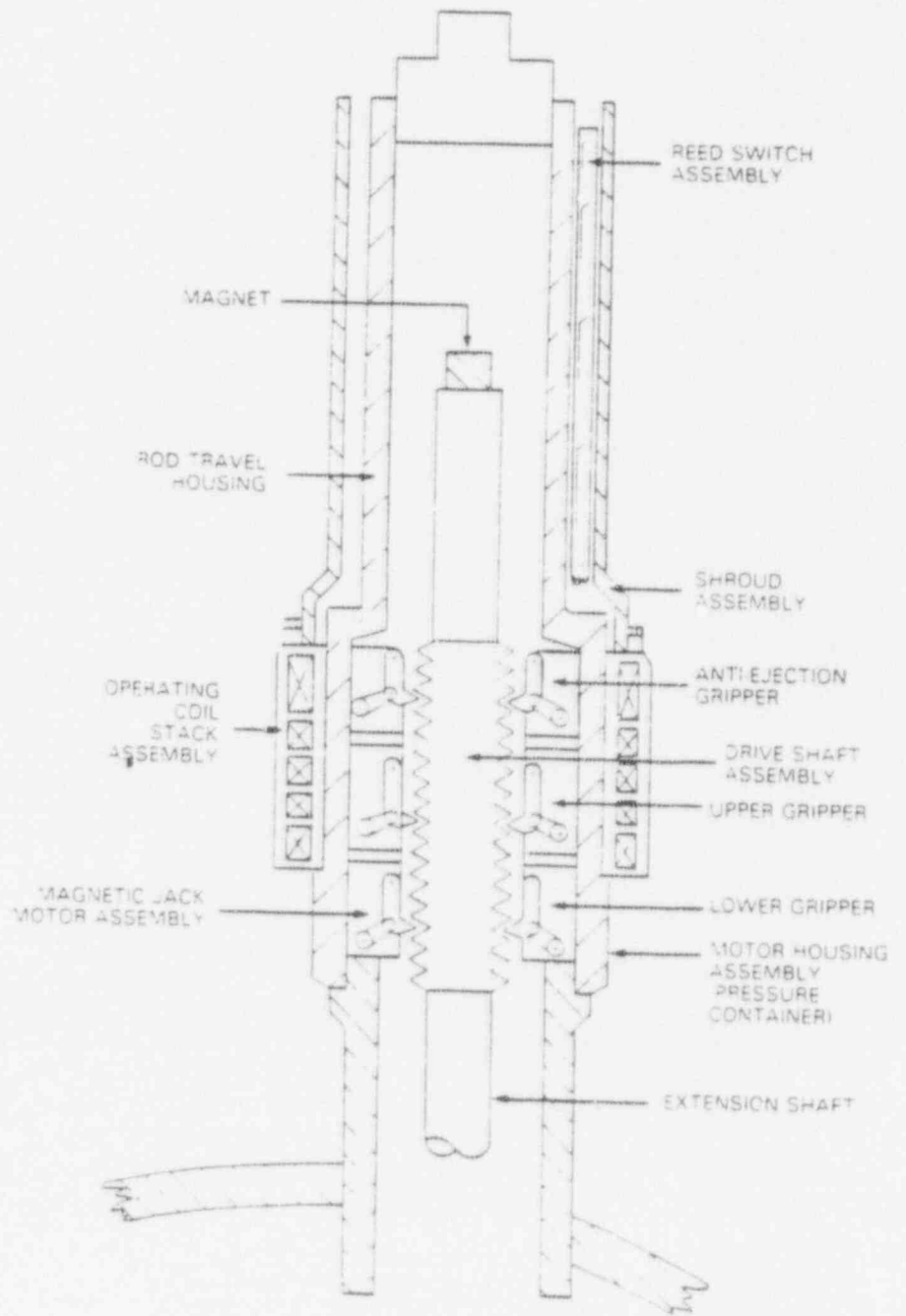


FIGURE 1  
BASIC CONTROL ELEMENT DRIVE MECHANISM

QUESTION: 002 (1.00)

During a Unit 2 startup, a loss of power occurs on Bus 2Y09. As a result, the CRO should expect to see which of the following Control Board indications:

- a. All the green lights on the mimic display will be illuminated.
- b. All CEAs indicate 0 inches on the metrascope.
- c. Metrascope screen goes blank.
- d. Mimic display lights go out.

QUESTION: 003 (2.00)

The following RCP readings were taken with Unit 1 operating at 100% power.

11A	11B	12A	12B	
785	1000	800	760	Upper seal pressure
1480	1500	1450	1525	Middle seal pressure
175 F	150 F	180 F	110 F	Lower seal temperature
110 F	118 F	115 F	105 F	CBO temperature

For each pump, select from the right hand column those items which apply. One answer per pump, but pump conditions (1-7) may be used more than once. [0.5 each]

- |                   |    |  |
|-------------------|----|--|
| a. <del>11A</del> | 1. | partial or complete upper seal failure           |
| b. 11B            | 2. | partial or complete middle seal failure          |
| c. <del>12A</del> | 3. | partial or complete lower seal failure           |
| d. 12B            | 4. | loss of component cooling water to RCP           |
|                   | 5. | high bleed off temperature                       |
|                   | 6. | low bleed off temperature                        |
|                   | 7. | all specifications within normal operating range |

QUESTION: 004 (1.00)

During a startup on the Unit 1 reactor (6% power) a transient occurs in which the plant experiences a rapid increase in RCS Tavg. After RCS temperature is returned to normal, the CRC observes the following conditions:

- Sharp increase in PZR level followed by a steady increase in level
- Letdown flow indicates 0 gpm
- Letdown stop valves 1-CVC-515-CV and 516 are open
- Letdown control valve indicates intermediate
- HIC-110 has a 100% output
- Backpressure regulating valves are shut
- Backpressure controller indicates 260 psi and decreasing
- Letdown pressure alarm is in
- Boronmeter/Process Rad Monitor flow low alarm is in
- Waste processing RMS monitor has remained constant
- Charging Header RHX outlet temperature is decreasing

Which of the following conditions has occurred?

- a. SIAS
- b. Excess flow check valve has shut
- c. Backpressure regulating controller has failed
- d. Letdown HX relief has failed open



QUESTION: 005 (1.00)

Given the following plant conditions:

- Unit 1 is being heated up per OP-1
- RCS temperature is 510 deg. F
- RCS pressure is 1800 psia

A main steam line rupture occurs outside containment. Will any ESFAS actuation occur to mitigate this event?

- a. Yes, SIAS
- b. Yes, SGIS
- c. Yes, CVCIS
- d. No

QUESTION: 006 (1.00)

From the following list, identify which NI indication is lost on a loss of 120 VAC bus 2Y02.

- a. 1C15 channel B wide range
- b. 1C15 channel B linear range
- c. 1C43 channel B aux excore wide range
- d. 2C43 channel A aux excore wide range

QUESTION: 007 (2.00)

Match the following CEA position indication setpoints in column A with the correct CEA position in column B. [Positions in column B may be used once, more than once, or not at all.]

A	B
a. upper computer stop (UCS)	1. 135 inches
b. upper sequential limit (USP)	2. 130.5 inches
c. lower exercise limit (EL)	3. 129 inches
d. lower electrical limit (LEL)	4. 95 inches
	5. 88 inches
	6. 45 inches
	7. 10 inches
	8. 6 inches
	9. 3 inches
	10. 0 inches

QUESTION: 008 (1.00)

FIVE MINUTES after core uncover following a small break LOCA, the CRO should expect to see CET temperatures that are \_\_\_\_\_.

- a. 15 to 30 degrees greater than  $T_{sat}$
- b. 15 to 30 degrees greater than  $T_{hot}$
- c. approximately equal to  $T_{sat}$
- d. 10 to 15 degrees less than  $T_{sat}$

QUESTION: 009 (1.00)

A LOCA has occurred and the following conditions exist:

containment temperature = 300 deg. F  
containment pressure = 50 psig

Which of the following automatic Containment Cooling System actions would "NOT" occur?

- a. An 8 inch control valve in a parallel Service Water supply line of each cooling unit would open.
- b. The fusible link doors of each cooling unit would open.
- c. A fourth cooling unit would be placed into service.
- d. Each cooling unit's fan drive would switch to high speed.

QUESTION: 010 (1.00)

Which signal will start the Containment iodine filters?

- a. CSAS
- b. CIS
- c. SIAS
- d. RAS

QUESTION: 011 (1.00)

Which statement is "NOT" a function of the Containment Spray System

- a. Fill the RCS during SDC
- b. Fill the SITs during Hot Standby
- c. Provide cooling water to HPSI pumps during post RAS conditions
- d. Maintain SDC flow when both LPSI pumps are inoperable

QUESTION: 012 (1.00)

Why are the Condensate booster pump hand switches placed in PTL on a loss of offsite power?

- a. To prevent overloading the diesel generator when its output breaker is closed.
- b. The pumps are not required since AFW would be in service.
- c. To prevent cavitation due to insufficient NPSH following restoration of off-site power.
- d. To prevent a water hammer condition from a possible low header pressure condition following restoration of off-site power.



QUESTION: 013 (1.00)

The Unit-2 S/G level setpoint for the Full Range Digital Feedwater Control System is generated from:

- a. the MFV controller when in the High Power Mode and the BFV controller when in the Low Power Mode.
- b. the MFV controller only
- c. the BFV controller only
- d. the microMax 6000 computers

QUESTION: 014 (1.00)

Main feedwater has been lost to SG #11. Present SG level is minus (-)30 inches and SG temperature is 232 deg. F. What actions should the operator take to restore SG level?

- a. Shut the main feedwater (MFW) isolation valve and restore level with the AFW pump.
- b. Trip the main feed pump and restore level with the condensate booster pump.
- c. Transfer Main Feedwater Regulating Valve (MFRV) control from Automatic to Manual and then take necessary steps to restore main feedwater.
- d. Place the MFRV in manual, switch to and verify alternate level transmitter provides correct readings, return MFRV to auto and monitor SG level response.

QUESTION: 015 (1.00)

A Unit 1 turbine trip has just occurred due to low bearing oil pressure. What is the response of the main feedwater regulating bypass valve to this event?

- a. Bypass controller output signal is grounded to shut the valve.
- b. Valve goes to the position determined by the bypass controller output signal.
- c. Valves goes to the 50% output position from the bypass trip setpoint controller.
- d. Valve goes to the 33% output position from the bypass trip setpoint controller.

QUESTION: 016 (1.00)

Which of the following actions will NOT occur, upon a loss of instrument air to the Auxiliary Feedwater System (AFW)?

- a. AFW pump turbine governor will fail to a HIGH mechanical stop (4500 RPM).
- b. The AFW unit cross connect valve, 1(2) AFW 4550, will fail to the OPEN position.
- c. AFAS Block valve, 1(2) AFW 4522, will fail to the OPEN position.
- d. Flow control valve, 1(2) AFW 4511, will fail to the OPEN position.

QUESTION: 017 (1.00)

Which of the following factors may cause AFW pump cavitation?

- a. High steam generator pressure
- b. Closed AFW recirculation line valve
- c. High condensate water temperature
- d. Improper AFW Flow Control Valve setting

QUESTION: 018 (1.00)

An alarm occurs on the liquid waste discharge radiation monitor (RE-2201) during a discharge of the number 11 Reactor Coolant Waste Monitoring Tank (RCWMT). The rad. monitor is flushed with demineralized water in an attempt to reduce background radiation levels. Where is the flush water discharged to?

- a. RCWMT 11
- b. RCWMT 12
- c. Miscellaneous waste system
- d. in-service degasifier

QUESTION: 019 (1.00)

Which of the following conditions would cause an uncontrolled release to the environment that would bypass all filters contained in the normal ventilation systems?

- a. Resin transfer operation
- b. Waste gas discharge isolation valve open
- c. Waste gas surge tank relief valve open
- d. Waste gas discharge pressure control valve open

QUESTION: 020 (1.00)

The Wide Range Noble Gas Monitor (RIC-5415) would detect radioactivity during which of the following accidents?

- a. 40 gpm RCS cold leg leak
- b. 40 gpm Letdown Nonregenerative Heat Exchanger to Component Cooling leak
- c. 40 gpm leak from the Volume Control Tank
- d. 40 gpm Spent Fuel Pool Heat Exchanger to Service Water leak



QUESTION: 021 (2.00)

Match the Containment Radiation Monitor in column A with the Tech Spec purpose for the monitor in column B. (Purpose in column B may be used once, more than once, or not at all) [0.5 each]

COLUMN A CONTAINMENT MONITORS		COLUMN B PURPOSE	
A.	Ctmt. Area Radiation Monitor (RE-5316A-D)	1.	Monitor effluent noble gas content
B.	Ctmt. Gaseous Monitor (RE-5281)	2.	Monitor containment rad. levels during accidents
C.	Ctmt. High Range Area Rad. Monitor (RE-5317A/B)	3.	Detect RCS Leakage
D.	Ctmt. Particulate Monitor (RE-5280)	4.	Stop release of fission product activity during refueling
		5.	Monitor radioactive liquid effluent

QUESTION: 022 (1.00)

Pressurizer level is 40 inches high due to a transient. If all systems are in auto, what should letdown flow be?

- a. 29 GPM
- b. 58 GPM
- c. 128 GPM
- d. 256 GPM

QUESTION: 023 (1.00)

Which design feature protects the charging pump from a loss of NPSH?

- a. suction relief to degassifier
- b. low suction pressure trip
- c. Suction stabilizers
- d. Dissolved gas in the RCS

QUESTION: 024 (1.00)

Which statement describes SGIS block permitted per Technical Specifications?

- a. Actuated by 2/4 logic on low SG pressure < 785 psia.
- b. Automatically bypassed on 2/4 logic at > or = 785 psia SG pressure.
- c. Automatically bypassed on 3/4 logic at > or = 785 psia SG pressure.
- d. Actuated by 3/4 logic on low SG pressure < 785 psia.

QUESTION: 025 (1.00)

All of the following RCP components are cooled by CCW EXCEPT:

- a. Upper Oil Reservoir
- b. Thermal Barrier
- c. Integral Heat Exchanger
- d. Journal Bearing

QUESTION: 026 (1.00)

Which of the following conditions indicate that the reactor vessel flange is leaking by the inner seal?

- a. An alarm actuation on panel 1(2) C09
- b. Containment temperature and humidity increasing
- c. A mismatch in charging and letdown flows
- d. An alarm actuation on panel 1(2)C06

QUESTION: 027 (1.00)

Following a LOCA on Unit 1, 13 HPSI pump is operating when RAS actuates. Loop flow values prior to RAS are:

11A - 140 gpm	11B - 150 gpm
12A - 135 gpm	12B - 150 gpm

What action, if any is SPECIFIED by EOP-5, "Loss of Coolant Accident"?

- a. Flows can be left as is, no throttling is necessary
- b. Throttle flow equally in each loop to 145 gpm
- c. Throttle flow equally in each header to 250 gpm
- d. Decrease total flow to 550 gpm

QUESTION: 028 (1.00)

Given the following conditions:

- 1) OP-2 Reactor startup is in progress
- 2) PRZ Press. Ch. Sel. (HS-100) selected to PIC-100-X
- 3) Pressure setpoint is set to 2200 psia
- 4) Equalizing RCS and PZR boron within 10 ppm
- 5) PRZ Spray Vlv. Sel. (HS-100-8) selected to both

At what PZR pressure should spray valves 100E and 100F be fully open?

- a. 2225 psia
- b. 2250 psia
- c. 2275 psia
- d. 2300 psia



QUESTION: 029 (1.00)

Given the following conditions:

- 1) 100% reactor power
- 2) PRZ Lvl. Ch. Sel. (HS-110) selected to 110Y
- 3) PRZ Htr. Lo. Lvl. Cut-off Sel. (HS-100-3) in X/Y position
- 4) LT-110Y fails low

Operator response is required to prevent which of the following conditions?

- a. Filling the PZR solid
- b. Low PZR level followed by a low pressure reactor trip
- c. All PZR heaters energized
- d. Low PZR level followed by a TM/LP trip

QUESTION: 030 (1.00)

Which of the following ten RPS trips CANNOT be automatically BYPASSED?

- 1) High power (VOPT)
- 2) Rate of change of power (SUR)
- 3) Low RCS flow
- 4) Low S/G level
- 5) Low S/G pressure
- 6) High pressurizer pressure
- 7) Thermal Margin/Low Pressure/Asymmetric S/G transient
- 8) Loss of load
- 9) High containment pressure
- 10) Axial power distribution (APD)

a. 1,3,6,9

b. 1,4,6,9

c. 1,2,3,6

d. 1,2,3,4

QUESTION: 031 (1.00)

Match the following containment systems used to remove or control hydrogen with the purpose they serve. [Each system MAY have more than one purpose. There also may be some purposes listed which do not apply.]

SYSTEM	PURPOSE
a. Hydrogen Recombiner	1. Not placed into service until 8 days after accident.
b. Hydrogen Analyzer	2. Automatically starts upon receiving a SIAS and CIS .
c. Hydrogen Purge System	3. Primary system for maintaining hydrogen concentration less than 1% following a LOCA.
	4. Uses natural circulation for air flow.
	5. Determines hydrogen concentration within containment.
	6. Does not have any Technical Specifications Operability requirements.

QUESTION: 032 (1.00)

The following spent fuel pool (SFP) conditions exist:

boron concentration	-	2250 ppm
SFP level	-	66 ft. 7 inches
SFP temperature	-	105 deg. F
SFP cooling pump disch. press.	-	80 psig

Based upon the above conditions what is the current status of the SFP?

- a. All conditions within the normal operating band
- b. Boron concentration low
- c. SFP temperature low
- d. SFP level low

QUESTION: 033 (1.00)

During a plant startup on U-2, a loss of instrument air occurs with reactor power at 16%. What is the response of the main feedwater level control system?

- a. Main Feed Regulating Valves fail to the mid position
- b. Bypass Feed Regulating Valves fail shut
- c. Bypass Feed Regulating Valves fail to 33% open
- d. Main Feed Regulating Valves fail as is (modulated open)

QUESTION: 034 (1.00)

Given the following conditions for Unit 1:

- 1) Mode 5
- 2) RCS temperature 140 deg. F
- 3) RCS pressure 250 psig
- 4) SG pressure 0 psig
- 5) SG temperature 79 deg. F

What is the SG status in regards to Technical Specifications?

- a. Pressure/temperature limitation satisfied
- b. SG temperature high and RCS pressure high, pressure/temperature LCO not met
- c. SG pressure and temperature low, pressure/temperature LCO not met
- d. SG temperature low and RCS pressure high, pressure/temperature LCO not met

QUESTION: 035 (1.00)

How is water hammer minimized when main feedwater is unavailable and SG temperature is greater than 200 deg. F?

- a. If SG level is below -50 inches, shut or maintain shut the MFW isolation valve and restore level to 0" with AFW.
- b. If SG level is below -26 inches, shut or maintain shut the MFW isolation valve and restore level to 0" with AFW.
- c. If SG level is below -50 inches, trip the main feed pump and restore level with the condensate booster pump and AFW.
- d. If SG level is below -26 inches, trip the main feed pump and restore level with the condensate booster pump and AFW.

QUESTION: 036 (1.00)

SG Blowdown tank rad monitor RI-4014 alarms HIGH. The high temperature dump valve is open. Identify what automatic actions will occur, if any.

- a. Blowdown shifts to MWS
- b. Blowdown shifts to CWS
- c. None, manual operator action is required
- d. Blowdown isolation CVs go shut



QUESTION: 037 (1.00)

The site has experienced a Loss of Offsite Power event. Assuming no operator action takes place, which of the following statements concerning Unit 2 is correct.

- a. None of Unit 2's 4.16 KV buses will be repowered following the event.
- b. Both 4.16 KV buses 21 and 24 will be repowered following the event.
- c. Only 4.16 KV bus 21 will be repowered following the event.
- d. Only 4.16 KV bus 24 will be repowered following the event.

QUESTION: 038 (1.00)

Which of the following conditions will NOT trip an EDG during a SIAS condition?

- a. Lube oil pressure low and overspeed
- b. Lube oil level low and water pressure low
- c. Jacket coolant pressure low and temperature high
- d. High crank case pressure and jacket coolant pressure

QUESTION: 039 (1.00)

To automatically close #12 EDG output breaker onto 4KV bus #14, which of the following criteria must occur with the breaker hand switch in auto, a normal electrical lineup (output breakers open and disconnects are shut), and no operator action?

- a. EDG is at rated speed and voltage, a load shed has occurred (UVA), a U-2 SIAS A has occurred, and no lockouts exist on normal and alternate 4KV bus feeders and the diesel output breaker.
- b. EDG is at rated speed and voltage, a load shed has occurred (UVB), a U-1 SIAS B is present, and no lockout exists on the normal and alternate 4KV bus feeders and the diesel output breaker.
- c. EDG is at rated speed and voltage, a load shed has occurred (UVB), a U-2 SIAS B has occurred, and no lockout exists on the diesel output breaker.
- d. EDG is at rated speed and voltage, a load shed has occurred (UVA), a U-1 SIAS A has occurred, and no lockouts exist on the normal and alternate 4KV bus feeder breakers.

QUESTION: 040 (1.00)

Which of the following statements best describes the relationship of the 120 VAC and 125 VDC power to the plant computer?

- a. The static inverter feeding the computer has both a 120 VAC and a 125 VDC power supply and it automatically switches on a loss of the 125 VDC.
- b. The static inverter feeding the computer has both a 120 VAC and 125 VDC power supply which manually has to be switched to the 120 VAC when the 125 VDC is lost.
- c. The static inverter is a backup to the normal 120 VAC power source. When 120 VAC is lost, power is automatically switched to the 125 VDC powered inverter.
- d. The 125 VDC powered static inverter supplies the #11 120 VAC inverter bus which in turn supplies power to the plant computer.

QUESTION: 041 (1.00)

The Salt Water Air Compressors (SWACs) are NOT designed to provide emergency air to:

- a. Auxiliary feedwater valves
- b. Safety systems within containment
- c. Service water heat exchanger SW normal outlet valves
- d. Feedwater control system valves

QUESTION: 042 (1.00)

Which of the following conditions will AUTOMATICALLY trip a running circulating water (CW) pump?

- a. 2 of 4 intake structure level switches sensing 3.5" of water
- b. CW motor temperature greater than 170 deg. F
- c. CW water temperature greater than 95 deg. F
- d. High traveling screen differential pressure of 21"

QUESTION: 043 (1.00)

125 VDC bus 12 has been lost. Determine which of the following results is valid.

- a. Loss of 12 120 VAC vital instrument bus
- b. Loss of all annunciators on Unit 1
- c. Loss of 12 EDG field flash and control power
- d. Unit 1 turbine trip

QUESTION: 044 (1.00)

Unit 1 is on SDC when RCS pressure inadvertently drifts up to 350 psia. What automatic functions will protect the SDC system from over pressurizing?

- a. SDC suction line relief between SDC return isolation valves, 1-SI-651-MOV and 1-SI-652-MOV, will lift to protect the return header.
- b. Operator action is required to reduce RCS pressure and protect SDC system.
- c. LPSI pumps will trip and their discharge check valves will shut.
- d. SDC return isolation valves SI-651-MOV & SI-652-MOV shut and SDC suction line relief will lift to protect the return header.



QUESTION: 045 (1.00)

Given the following data on the Quench Tank:

- 1) pressure 9.5 psig
- 2) level 28.5 inches
- 3) temperature 115 deg. F

Analyze the quench tank parameters and determine if any off normal conditions exist per log sheets.

- a. no concern, all parameters within acceptable operating band
- b. pressure too high
- c. level too low
- d. temperature too high


QUESTION: 046 (1.00)

All of the following indications may be used to determine CCW availability to an RCP EXCEPT for:

- a. CCW Flow Low alarm lit in RCP auxiliary status panel
- b. RCP seal pressure alarms on 1C06
- c. Controlled bleed off high temperature alarms from the computer
- d. CCW Temp High alarm on the RCP auxiliary status panel

QUESTION: 047 (1.00)

Unit 1 is operating at 4.5% power when the following alarms are received "11 and 12 SERV WATER HEAD TANK LEVEL". Both SRW Head tank levels are decreasing rapidly. What actions are you required to take according to the alarm manual?

- a. Trip the reactor and enter AOP-7B, Loss of Service Water.
  - b. Isolate SRW to the Turbine Building, trip the reactor and carry out EOP-0.
  - c. Isolate SRW to the Turbine Building, start SWACs and monitor SRW Head Tank levels.
  - d. Trip one of the SRW pumps and initiate makeup to the SRW tanks from the condensate storage tank.
- 

QUESTION: 048 (1.00)

When the upender is NOT vertical or the CEA change machine is not in the HOME position, which direction of travel is prohibited to the bridge and trolley?

- a. Bridge forward travel and trolley right travel
- b. Bridge forward travel and trolley left travel
- c. Bridge reverse travel and trolley left travel
- d. Bridge reverse travel and trolley right travel

QUESTION: 049 (1.00)

Per AOP-1B, "CEA Malfunctions", which one of the following is the correct operator response when two CEAs which have been declared inoperable?

- a. trip the reactor and implement EOP-0
- b. be in hot standby within six hours
- c. restore CEA operability within 1 hour or reduce power to less than 50% of rated Thermal Power within the following hour
- d. restore CEA operability within 1 hour or reduce power to less than 75% of initial Thermal Power within the following hour

QUESTION: 050 (1.00)

Which one of the following indications would be used to differentiate between a LOCA inside containment and a steam line rupture inside containment?

- a. Increasing containment sump level
- b. Increasing containment temperature
- c. Decreasing Pressurizer level
- d. Decreasing subcooling margin

QUESTION: 051 (1.00)

Given the following conditions:

- 1) Plant is in Mode 5, RCS Heatup is in progress
- 2) RCS pressure is 275 PSIA
- 3) SG secondary temperature is 170 deg. F
- 4) RCS temperature is 160 deg. F
- 5) PZR level 160 inches
- 6) 11A RCP running for 2 minutes

What action should be taken if 11B RCP fails to start?

- a. Start the 12B RCP immediately
- b. Continue the RCS heatup, one RCP is sufficient
- c. Attempt to start the 11B RCP within 30 minutes
- d. Stop the 11A RCP within 3 minutes

QUESTION: 052 (1.00)

What action should be taken in regards to the RCPS on a loss of CCW?

- a. Trip all RCPS immediately
- b. Trip RCPS within 10 minutes
- c. Commence an expeditious unit shutdown and then trip RCPS
- d. RCPS may operate as long as pump temperatures remain  $<$  or  $=$  to operating limits



QUESTION: 053 (1.00)

Unit 2 is operating at rated load with RCS boron concentration at 900 ppm when a reactor trip occurs (no SIAS). The RO determines that one CEA has failed to insert and begins emergency boration. In order to meet the requirements of EOP-0 and EOP-1, boration must continue until RCS boron concentration is:

- a. 1000 ppm
- b. 1100 ppm
- c. 2100 ppm
- d. 2300 ppm

QUESTION: 054 (1.00)

Unit 1 is at 75% power when the RO discovers that component cooling water (CCW) has been lost due to a trip of the operating component cooling water pump. Which of the following immediate actions should the RO take?

- a. Attempt to restart the affected pump
- b. Place the hand switch of the affected pump in PULL TO LOCK and start the standby CCW pump
- c. Place the hand switch of the affected pump in PULL TO LOCK and determine the cause for the failure of the failed CCW pump
- d. Trip the reactor and perform the immediate actions of E-0.

QUESTION: 055 (1.00)

During the implementation of EOP-0, "Post-Trip Immediate Actions", it was necessary to de-energize the CEDM Motor Generator sets from the control room in order to trip the reactor.

Which one of the following describes the reason for the Note regarding returning the breaker lineup to that existing before the trip when reenergizing the buses?

- a. To ensure that the bus amperages remain balanced.
- b. To provide power to components necessary for fast boration.
- c. To prevent inadvertent parallel of vital buses and loss of train separation.
- d. To satisfy the Technical Specifications requirement for PZR heater operability.

QUESTION: 056 (1.00)

Unit 1 is at 80% power when annunciator 1C06, PRESSURIZER PRESS CH 100, alarms due to low PZR pressure, 2100 PSIA.

Which of the following possible actions would the RO "NOT" take in responding to this malfunction?

- a. Manually trip the reactor
- b. Shift pressure control channels
- c. Manually energize PRZ heaters
- d. Place CEDS in Manual Sequential and reduce Tavg.

QUESTION: 057 (1.00)

Which one of the following represent the HPSI throttling criteria during implementation of EOP-4 (Excess Steam Demand Event).

- a. 30 deg. F loop subcooling, PZR level <180", 1 S/G available as a heat sink and RVLMS indicates level above mid-loop of the hot leg.
- b. 30 deg. F loop subcooling, PZR level >101", 1 S/G available as a heat sink and no indicated RCS voids.
- c. 30 deg. F CET subcooling, PZR level >101", 1 S/G available as a heat sink and RVLMS indicates level above mid-loop of the hot leg.
- d. 30 deg. F CET subcooling, PZR level >101", 1 S/G available as a heat sink and RVLMS indicates level above top of the hot leg.

QUESTION: 058 (1.00)

Unit 1 is at 300 MWE with condenser vacuum at 23.5 inches Hg. Which of the following actions should the operator take with the approval of the SS/CRS?

- a. Reduce power and try to restore vacuum to greater than 24.5 inches Hg. If vacuum has not been restored to greater than 24.5 inches Hg within 10 minutes, trip the reactor.
- b. Reduce power and try to restore vacuum to greater than 24.5 inches Hg. If differential pressure between condensers becomes greater than 2 inches Hg, then trip the reactor.
- c. Since condenser vacuum is less than 25 inches Hg, trip the reactor.
- d. Reduce power and try to restore vacuum to greater than 25 inches Hg. If condenser vacuum drops to 22.5 inches Hg, trip the reactor.

QUESTION: 059 (1.00)

Natural circulation flow is determined to have been established

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- a. when pressurizer level begins to slowly decrease.
- b. when CET temperatures consistently trend with Thot.
- c. when the RCS is at least 30 degrees F subcooled.
- d. when steam generator saturation pressure becomes greater than RCS saturation pressure.



QUESTION: 060 (1.00)

Which one of the following is the reason the 4KV Bus load breakers must be opened prior to re-energizing the 4KV bus?

- a. Prevent the 4KV bus loads from tripping on under voltage
- b. An electrical interlock will prevent the 4KV Bus feeder breaker from closing
- c. Prevent overloading the power source from starting currents
- d. Prevent unnecessary equipment from starting



QUESTION: 061 (1.00)

An alarm occurs on the liquid waste discharge radiation monitor (RE-2201) during a discharge of the 11 RCWMT. The Rad monitor is flushed with demineralized water in an attempt to reduce background radiation levels. Where is the flush water discharged to?

- a. RCWMT 11
- b. RCWMT 12
- c. Miscellaneous Waste System
- d. Circulating water discharge system

QUESTION: 062 (1.00)

To override the fire induced signals from a control room fire, specific actions are taken to maintain positive control of plant equipment outside the control room. Which of the following set of conditions represent the actions taken?

- a. Close fuses pulled and breakers tripped locally, local/remote key switches placed in LOCAL, 480 V load centers are stripped, and vital MCCs are stripped of unnecessary loads.
- b. Breakers tripped and racked out, 4KV busses are stripped and close fuses are removed, and all vital MCCs are stripped and tied together.
- c. EDGs and 4KV breakers with local/remote key switches are placed in LOCAL to maintain positive control of operation; all other equipment affected by the fire continues to operate.
- d. EDGs placed in LOCAL, #12 EDG is used to supply two 4KV busses, 480 V load centers are stripped, and vital MCCs are deenergized and stripped then tied together.

QUESTION: 063 (1.00)

During AOP-9A, "Control Room Evacuation and Safe Shutdown Due to a Severe Control Room Fire", the Unit-1 Turbine Building Operator (TBO) must perform actions to restore power to 1Y09 and then tie 1Y10 to 1Y09. The Unit-2 TBO strips MCC-201BT. Select the statement that explains why these actions are being performed.

- a. To restore power to the lights in the switchgear rooms and the Unit-2 turbine turning gear motor only.
- b. To restore power to the ESFAS sensor cabinets and the ventilation to the switchgear rooms.
- c. To restore power to the control room ventilation system to aid in smoke removal and the CST makeup pump.
- d. To restore power to the plant paging system and a well water pump to provide a continued source of makeup water for use.

QUESTION: 064 (1.00)

When, if ever, is containment integrity "NOT" required by Technical Specifications?

- a. Mode 4
- b. Mode 5
- c. Mode 6
- d. Containment integrity is required in all modes of operation

QUESTION: 065 (1.00)

One of the major actions performed during EOP-3, "Loss of All Feedwater", is a cooldown to less than 465 deg. F. The consequences of failing to perform this cooldown results in the:

- a. inability of AFW to be initiated to the S/Gs after they have completely gone dry.
- b. loss of RCS integrity and the possibility of initiating a core melt sequence due to inadequate core cooling.
- c. initiation of a PTS event once the S/Gs have been lost as a heat sink.
- d. inability of the condensate booster pumps to be used as a backup source of feed to the S/Gs.

QUESTION: 066 (1.00)

Given the following plant conditions:

Unit 1 reactor tripped  
S/G 11 pressure is 890 psia  
S/G 12 pressure is 750 psia  
S/G 11 level is -180 inches  
S/G 12 level is -210 inches

Which one of the following actions is expected to have occurred?

- a. AFW blocking valves to #11 and #12 S/Gs should have closed.
- b. AFW blocking valves to #12 S/G should have closed.
- c. 11 and 13 AFW pumps should have tripped.
- d. 11 AFW pump should have tripped.

QUESTION: 067 (1.00)

Match the PZR pressure control signals in column A, with the PZR pressure deviation from setpoint in column B. (Setpoints in column B may only be used once or not at all.) [0.25 each]

COLUMN A CONTROL SIGNAL	COLUMN B DEVIATION FROM SETPOINT
a. Spray valves full open	1. -25 psi
b. Zero power to proportional heaters	2. 0 psi
c. Full power to proportional heaters	3. +25 psi
d. Spray valves start to open	4. +50 psi
	5. +75 psi
	6. +100 psi

QUESTION: 068 (1.00)

Select the VCT level from column B that initiates each automatic control function in column A. (Levels in column B may be used once, more than once, or not at all) [0.25 each]

COLUMN A AUTOMATIC CONTROL FUNCTIONS	COLUMN B VCT LEVELS
a. Automatic makeup starts	1. 116.0 inches
b. Automatic makeup stops	2. 112.5 inches
c. Charging pump suction transfers from VCT to RWT	3. 110.0 inches
d. Letdown diverts to waste processing system	4. 104.0 inches
	5. 90.0 inches
	6. 87.5 inches
	7. 8.7 inches
	8. 3.0 inches
a. 6,4,7,3	
b. 5,4,8,3	
c. 5,3,8,2	
d. 6,3,8,4	



QUESTION: 069 (1.00)

The following plant conditions exist:

RCS temperature	-	180 deg. F
Pressurizer Level	-	160" <i>AND DECREASING</i>
Pressurizer Pressure	-	197 psia
11 S/G level	-	+10"
12 S/G level	-	+20"
Aux Feedwater	-	Available
<del>RCS level</del>	-	<del>36.94</del>
Shutdown cooling flow	-	0 gpm

What action must be taken prior to re-establishing shutdown cooling?

- a. Fill the RCS with LPSI pump
- b. Fill the RCS with containment spray
- c. Fill the RCS with HPSI pump
- d. Begin steaming 11 and 12 S/Gs

QUESTION: 070 (1.00)

Which one of the following is the reason that RCS pressure must be below 170 psia when aligning the containment spray pumps to supply shutdown cooling flow?

- a. Prevents the CS pump from running at shutoff head
- b. Prevents over pressurization of the ECCS pump suction headers
- c. Prevents the automatic shutting at 200 psia of the SDC return valve, SI-652
- d. Prevents the lifting of the SDC heat exchanger relief valve at 190 psia

QUESTION: 071 (1.00)

How many decades of range overlap are required between the Wide Range NIs and the Power Range NIs at 1% power?

- a. Zero
- b. One
- c. Two
- d. Three

QUESTION: 072 (1.00)

Which NI indication is lost on a loss of 120 VAC bus 1Y01?

- a. 1C15 channel B Wide Range
- b. 1C15 channel B Linear Range
- c. 2C43 channel A aux excore wide range
- d. 1C43 channel A aux excore wide range

QUESTION: 073 (1.00)

Unit 2 has the following conditions:

RCS Th	-	530 deg. F and constant
RCS Tc	-	520 deg. F and constant
RCS Pressure	-	1550 psia and decreasing
Pressurizer Level	-	75" and decreasing
RCS Subcooling	-	70 deg. and slowly decreasing
Containment Rad Monitors	-	Clear
"Unit Cndsr Off-Gas" Alarm	-	Actuated
Containment pressure	-	0.3 PSIG
Containment Temperature	-	110 deg. F

Based upon the above conditions, IDENTIFY from below the current status of the unit.

- a. Unit 2 is experiencing a Loss of Coolant Accident.
- b. Unit 2 is experiencing a steam generator steam line break accident.
- c. Unit 2 is experiencing a steam generator tube leak incident.
- d. Unit 2 has experienced an uncomplicated reactor trip.

QUESTION: 074 (1.00)

One of the first strategies during EOP-6, Steam Generator Tube Rupture, is to cool the RCS to 515 deg. F. The importance of this action is based upon:

- a. minimizing the differential pressure across the break thereby reducing the flow rate.
- b. initiating natural circulation flow as soon as possible during the event.
- c. minimizing further uncontrolled radioactive releases to the environment.
- d. maintaining RCS subcooling greater than the saturation pressure for the affected S/G.

QUESTION: 075 (1.00)

EOP-3, Loss of All Feedwater, requires that Once Through Core Cooling be initiated prior to CETs reaching 560 deg. F. The reason it must be initiated prior to this temperature is:

- a. to ensure adequate cooling of the core takes place under all operating conditions
- b. to prevent fuel damage which would occur at a temperature higher than 560 deg. F
- c. because at this temperature RCS pressure is low enough to ensure a minimum adequate flow rate
- d. to ensure RCS voiding does not occur in sufficient amounts to prevent adequate flow through the core

QUESTION: 076 (1.00)

250 VDC bus 13 has been lost. Determine which of the following conditions is valid.

- a. An immediate turbine/generator trip will result.
- b. The seal oil system normal supply is lost.
- c. Turbine control power backup supply is lost.
- d. Emergency lube oil pumps are lost.



QUESTION: 077 (1.00)

During a waste gas decay tank release through the Unit 1 plant vent, the waste gas discharge radiation monitor (RI-2191) alarms. Which valve must be manually shut to prevent a possible waste gas decay tank discharge to the waste gas surge tank?

- a. Waste gas discharge isolation (WGS-2191-CV)
- b. Waste gas discharge to Unit 1 plant vent (WGS-683)
- c. Waste gas discharge pressure control (WGS-2191-PCV)
- d. Waste gas discharge final filter bypass (WGS-630)

QUESTION: 078 (1.00)

What details must be provided in the entry to the CRO's Log when declaring an RMS channel out of service?

- a. Method for pre-planned alternate sampling, what technical specification actions are required, and name of person notified of the inoperable channel.
- b. Alternate RMS channel placed in service, name of the person placing the alternate channel in service, and technical specification actions incurred.
- c. Name of person flushing the monitor prior to declaring it inoperable, name of person notified that the monitor is inoperable, and the technical specification actions incurred.
- d. Technical specification actions incurred and the name of the person notified of the inoperable channel

QUESTION: 079 (1.00)

Match the instrument air pressures in column A with the appropriate actions in column B. Each action can only be used once.

[0.25 points each]

- | A          | B   |
|------------|---|
| a. 39 psig | 1. standby instrument air compressor starts   |
| b. 75 psig | 2. affected IA and PA compressors should be stopped                                       |
| c. 85 psig | 3. reactor and turbine trip are warranted   |
| d. 93 psig | 4. instrument air to containment non-essential loads isolates                             |
|            | 5. plant air to instrument air cross-connect valve opens                                  |
|            | 6. PA header isolation valve closes to allow PA compressor to discharge to IA system only |

QUESTION: 080 (1.00)

The Refueling Control Room Operator (RCRO) gives the Fuel Handling Supervisor (FHS) the following information:

Shutdown margin	-	2450 ppm
Reactor fuel pool level	-	66 feet
Source Range Monitor, Ch. A	-	E-4 cps
" " " Ch. B	-	1200 cps
" " " Ch. C	-	erratic reading
" " " Ch. D	-	E-4 cps

Which of the following actions should the FHS take if a fuel assembly (FA) is being inserted into the core during this condition?

- The Refueling Machine Operator (RMO) should continue to insert the FA into the indexed core location, but does not ungrapple it and the Shift Supervisor should contact the NI System Engineer to investigate.
- The FHS should direct the RMO to stop insertion of the FA into the core until 2 NI channels are restored to operation.
- The Shift Supervisor should direct the NI Systems Engineer to investigate, but should also continue with refueling by stationing an additional watch to monitor the count rate.
- Core alterations should be stopped, the FA moved out of the core area to a safe location, and the RCS boron value verified to be equal to or greater than specified in NEOP-23 Fig. 2-II.A.6.

QUESTION: 081 (1.00)

In response to a loss of offsite power event, which of the following is one of the reasons for shutting both MSIVs and securing SG blowdown?

- a. prevent ADVs from lifting
- b. prevent overcooling of the RCS
- c. protect condenser from over pressurization
- d. provide a reliable steam source for the turbine driven AFW pump

QUESTION: 082 (1.00)

A worker spends 10 hours in an airborne contaminated area containing a radioactive isotope at the DERIVED AIRBORNE CONCENTRATION of 10 CFR 20. After exiting the area, it was determined that the operator's respirator was defective and provided no protection. "WHICH" of the following is the maximum committed effective dose equivalent (CEDE) he could have received?

- a. 5000 mrem
- b. 250 mrem
- c. 25 mrem
- d. 5 mrem

QUESTION: 083 (1.00)

Which one of the following individuals must authorize an entry into containment via the emergency airlock?

- a. Supervisor - Radiation Control Operations
- b. Radiation Control Shift Supervisor
- c. Shift Supervisor
- d. Control Room Supervisor

QUESTION: 084 (1.00)

A "locked" high radiation area by definition in CCI-800, "Calvert Cliffs Radiation Safety Manual", is an area in which radiation levels could result in an individual receiving \_\_\_\_\_ from the radiation source or from any surface that the radiation penetrates.

- a. in excess of 1 mSv in one hour at 30 cm
- b. in excess of 1 rem in one hour
- c. in excess of 100 mrem in one hour
- d. in excess of 10 mSv in one hour at 30 cm



QUESTION: 085 (1.00)

Fluid systems that are PRESENTLY OPERATING with temperatures greater than \_\_\_\_\_ or pressures greater than \_\_\_\_\_ should be isolated from the work area by two shut valves in series.

- a. 200 deg. F; 400 PSIG
- b. 200 deg. F; 500 PSIG
- c. 250 deg. F; 400 PSIG
- d. 250 deg. F; 500 PSIG

QUESTION: 086 (1.00)

Three of the four conditions listed below are valid conditions for performing maintenance on a fluid system without isolating and safety tagging the system. IDENTIFY which of the following conditions is NOT valid.

- a. The scope of work does NOT require breaching of pressure boundaries.
- b. The work scope is considered post maintenance followup of a minor nature necessary to satisfy post maintenance testing requirements.
- c. The scope of work has been evaluated by the Responsible Maintenance Group Supervisor and Shift Supervisor and it has been determined that both worker and plant safety will NOT be compromised AND the boundary that would be established by the tagout WOULD provide personnel or equipment protection.
- d. The work must be performed to ENHANCE plant reliability and safety AND the boundaries to be established would also REDUCE reliability and safety of the plant.

QUESTION: 087 (1.00)

Which of the responsibilities listed below is correct for watchstanders?

- a. A qualified watchstander may direct a trainee to take the required watchstation readings provided the watchstander was directed by the SS or CRS to perform a higher priority task and the watchstander takes full responsibility for reviewing the accuracy and completeness of the logs.
- b. Under minimum crew conditions, the CRS may direct a watchstander qualified on both units to take daily logs of both units' watchstations.
- c. Any log reading required by Technical Specifications which is out of its allowable range shall be reported to the control room immediately following the completion of the inspection round.
- d. In the event plant conditions preclude taking log readings within the specified time limit, readings may be omitted provided prior approval is obtained from either the SS or CRS.

QUESTION: 088 (1.00)

Units 1 and 2 are operating at rated power with minimum shift staffing. A loss of offsite power causes both units to trip. The Control Room Supervisor (CRS) begins implementing EOP-0, "Post-Trip Immediate Actions", for Unit 1. Which one of the following individuals is responsible for implementing EOP-0 as the CRS for Unit 2?

- a. Shift Supervisor
- b. Control Room Operator, Unit 2
- c. Shift Technical Advisor
- d. Plant Watch Supervisor

QUESTION: 089 (1.00)

Certain plant conditions require the establishment of a fire watch patrol. Which one of the following describes the normal control room reporting time(s) for the fire watch patrol?

- a. At the beginning, middle and end of shift only
- b. At the beginning and middle of shift only
- c. Every two hours on the hour
- d. Every hour on the hour

QUESTION: 090 (1.00)

Which ONE of the following describes the method to be used to perform the second check of a locked closed manual valve?

- a. Attempt to move the valve operator in the closed direction without removing the locking device.
- b. Remove the locking device and attempt to move the valve in the closed direction only, then relock the valve.
- c. Verify the locking device is installed properly without any attempt to move the valve and use valve stem rise to determine position.
- d. Remove the locking device, open the valve 1/8 of a turn, turn the valve in the opposite direction until tightly closed, then reinstall the locking device.

QUESTION: 091 (1.00)

For a Design Base Loss of Coolant Accident, what is the major contributor of hydrogen in the containment building?

- a. Metal water reaction
- b. Corrosion
- c. RCS hydrogen overpressure
- d. radiolysis

QUESTION: 092 (1.00)

Following a RAS, \_\_\_\_\_ prevents stress corrosion cracking of certain metals in containment by raising the pH of the recirculated borated water solution to a final value of 7.0.

- a. Lithium hydroxide
- b. Ammonia
- c. Morphaline
- d. Trisodium phosphate



QUESTION: 093 (1.00)

An operator makes a request to work the following hours:

BEGIN		END
4/4/94 - 1800		4/5/94 - 0600
4/5/94 - 1800		4/6/94 - 0700
4/6/94 - 1900		4/7/94 - 0600
4/7/94 - 1800		4/8/94 - 0600
4/8/94	OFF	4/9/94
4/10/94 - 0700		4/10/94 - 1900
4/11/94 - 0600		4/11/94 - 1900

Which of the following describes the response the supervisor should make to this request?

- Grant the request because it meets CCI-159 overtime limit requirements.
- Deny the request because it fails to meet the 7 day period overtime requirement of CCI-159.
- Deny the request because it fails to meet the 48 hour period overtime requirement of CCI-159.
- Deny the request because it fails to meet both the 7 day and 48 hour period overtime requirements of CCI-159.

QUESTION: 094 (1.00)

The purpose of the Operational Support Center (OSC) is to provide:

- a. technical support to plant operations personnel during emergency conditions.
- b. management of overall BG&E response during emergency conditions.
- c. coordination of radiological and environmental assessment and receipt and analysis of all field monitoring data during emergency conditions.
- d. plant operational, radiological, chemistry, maintenance, and materials support during emergency conditions.

QUESTION: 095 (1.00)

Following a plant trip from 100% power, the following plant conditions are noted:

core burnup	-	8,000 MWD/MTU
RCS Tc	-	522 deg. F and decreasing
ADVs	-	in auto; full closed
TBVs	-	in auto; full closed
11 S/G level	-	-100"
12 S/G level	-	-88"
S/G pressure	-	827 psia decreasing slightly
AFW	-	secured
MFW	-	in auto; increasing level to 0"
RCPS	-	all 4 running
PZR level	-	115" and decreasing
PZR pressure	-	2010 psia and decreasing

EOP-0 has been implemented. The cause for the above plant condition is:

- a. Excess steam demand with low amount of available decay heat
- b. Misoperation of the ADVs, TBVs or a stuck open S/G safety
- c. Excessive feedwater flow
- d. Small RCS leak

QUESTION: 096 (1.00)

Unit 2 has experienced a small break LOCA. Using the following plant conditions calculate the subcooling margin.

CET temperature	-	600 deg. F
RCPPs	-	all 4 stopped
PZR level	-	300"
Thot	-	590 deg. F
Tcold	-	560 deg. F
PZR pressure	-	1480 psia (lowest) - 1490 psia (highest)

- a. 5 deg. F subcooled
- b. 0 deg. F subcooled
- c. 5 deg. F above saturation temperature
- d. 10 deg. F above saturation temperature

QUESTION: 097 (1.00)

The plant has experienced a LOCA with the following plant conditions:

CET	-	510 deg. F
RWT level	-	22'10"
PZR level	-	180"
Thot	-	500 deg. F
Tcold	-	480 deg. F
PZR pressure	-	1320 psia (lowest)-1335 psia (highest)
RCP	-	all 4 OFF

Based upon the above plant conditions, which of the following action should the operator take in response to this event?

- a. Verify that SIAS, CIS and CSAS have properly initiated and realign safety injection to a recirculation mode upon receipt of a RAS.
- b. Establish and maintain core and RCS heat removal via natural circulation.
- c. Establish and maintain natural circulation flow while adjusting HPSI flow to provide inventory control.
- d. Maximize charging, minimize letdown, and monitor core and RCS heat removal for further degradation.

(\*\*\*\*\* END OF EXAMINATION \*\*\*\*\*)

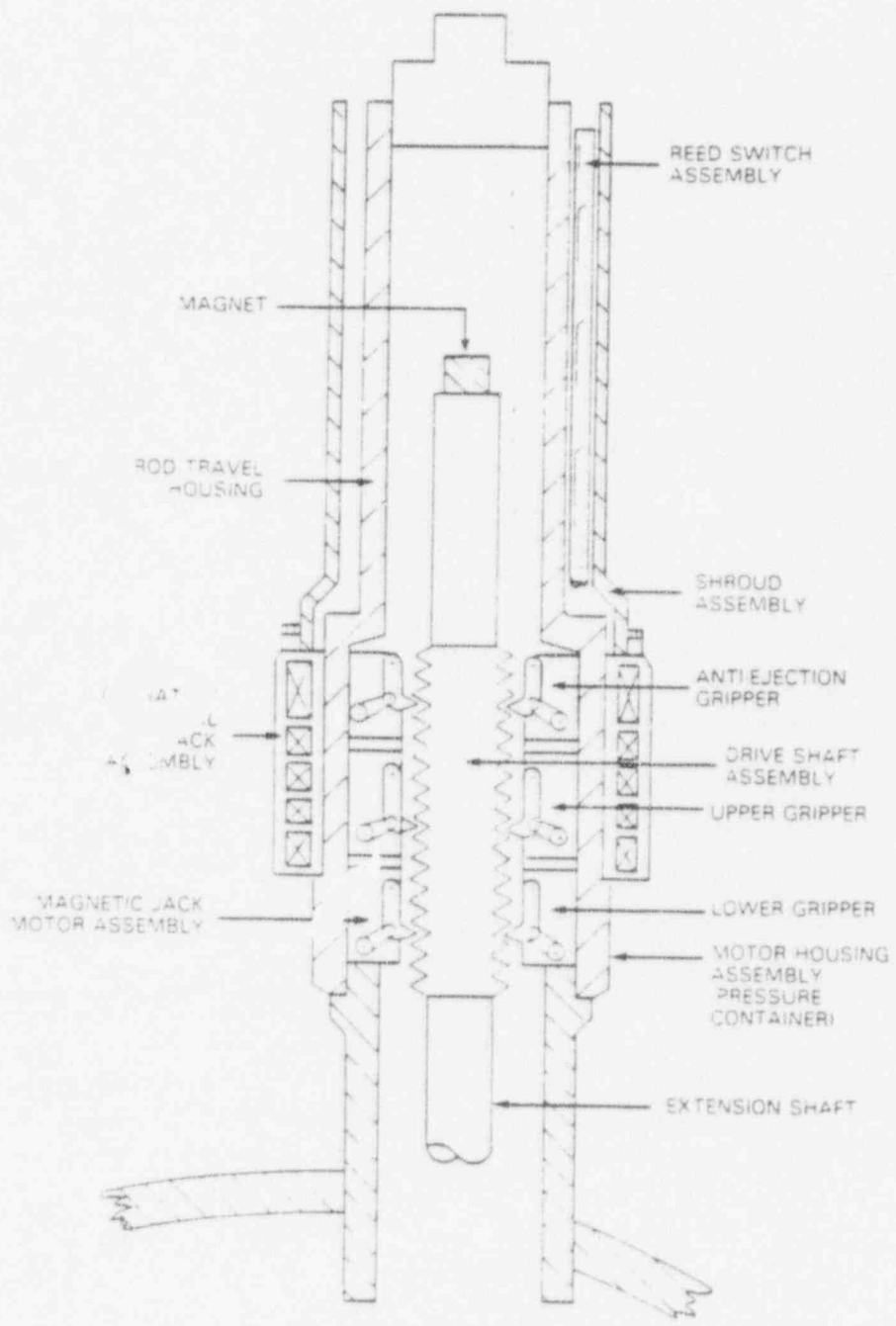


FIGURE 1  
 BASIC CONTROL ELEMENT DRIVE MECHANISM

A N S W E R   K E Y

MULTIPLE CHOICE

001 d

002 b

003 MATCHING (2)

~~a 4~~ deleted

b 2

~~e 4~~ deleted

d 6

MULTIPLE CHOICE (2)

004 b

005 a

006 c

007 MATCHING (2)

a 2

b 5

c 3

d 9

MULTIPLE CHOICE

008 c

009 d

010 c

011 b

012 d

013 b

014 a

015 d

016 b

017 d

018 c

019 c

020 c

021 MATCHING (2)

A 4

B 3

C 2

D 3

MULTIPLE CHOICE

022 c

023 b

024 ~~e~~ b, d

025 d

026 d

027 b

028 d

029 a

030 b

## ANSWER KEY

031 MATCHING(1)

a 4

b 5

c 6

## MULTIPLE CHOICE

032 b

033 b

034 d

035 b

036 a d

037 d

038 c

039 b

040 a

041 d

042 a

043 c

044 b d

045 a

046 b

047 b

048 d

049 b

050 d

051 d

052 d

053 b

054 c

055 a

056 d

057 d

058 d

059 b

060 c

061 c

062 a

063 d

064 b

065 d

066 b

067 MATCHING(1)

a 6

b 3

c 1

d 4



## A N S W E R   K E Y

## MULTIPLE CHOICE

		085	b
068	b	086	c
069	c	087	d
070	b	088	d
071	c	089	d
072	c	090	a
073	c	091	d
074	c	092	d
075	c	093	c
076	d	094	d
077	c	095	c
078	a	096	c
079	MATCHING (1)	097	b
	a		3
	b		4
	c		6
	d		1

## MULTIPLE CHOICE

080	d
081	c
082	c
083	a
084	d

(\*\*\*\*\* END OF EXAMINATION \*\*\*\*\*)

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U. S. NUCLEAR REGULATORY COMMISSION  
SITE SPECIFIC EXAMINATION  
SENIOR OPERATOR LICENSE  
REGION 1

CANDIDATE'S NAME: \_\_\_\_\_  
FACILITY: Calvert Cliffs, Units 1 & 2  
REACTOR TYPE: PWR-CE  
DATE ADMINISTERED: 94/04/25

INSTRUCTIONS TO CANDIDATE:

Use the answer sheets provided to document your answer. Staple this cover sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires a final grade of at least 80%. Examination papers will be picked up four (4) hours after the examination starts.

<u>TEST VALUE</u>	<u>CANDIDATE'S SCORE</u>	<u>%</u>	
<u>100.00</u>	<u>                    </u>	<u>                    </u>	TOTALS
	<u>FINAL GRADE</u>		

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

\_\_\_\_\_  
Candidate's Signature

A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

If you change your answer, write your selection in the blank.

MULTIPLE CHOICE

001 a b c d \_\_\_

002 a b c d \_\_\_

003 MATCHING

a \_\_\_

b \_\_\_

c \_\_\_

d \_\_\_

MULTIPLE CHOICE

004 a b c d \_\_\_

005 a b c d \_\_\_

006 a b c d \_\_\_

007 a b c d \_\_\_

008 a b c d \_\_\_

009 a b c d \_\_\_

010 a b c d \_\_\_

011 a b c d \_\_\_

012 a b c d \_\_\_

013 a b c d \_\_\_

014 a b c d \_\_\_

015 a b c d \_\_\_

016 a b c d \_\_\_

017 a b c d \_\_\_

018 a b c d \_\_\_

019 a b c d \_\_\_

020 a b c d \_\_\_

021 a b c d \_\_\_

022 a b c d \_\_\_

023 a b c d \_\_\_

024 a b c d \_\_\_

025 a b c d \_\_\_

026 a b c d \_\_\_

027 MATCHING

a \_\_\_

b \_\_\_

c \_\_\_

MULTIPLE CHOICE

028 a b c d \_\_\_

029 a b c d \_\_\_

030 a b c d \_\_\_

031 a b c d \_\_\_

032 a b c d \_\_\_

033 a b c d \_\_\_

034 a b c d \_\_\_

035 a b c d \_\_\_

036 a b c d \_\_\_

A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

If you change your answer, write your selection in the blank.

- |     |   |   |   |   |     |     |                 |     |   |   |     |
|-----|---|---|---|---|-----|-----|-----------------|-----|---|---|-----|
| 037 | a | b | c | d | ___ | 060 | a               | b   | c | d | ___ |
| 038 | a | b | c | d | ___ | 061 | a               | b   | c | d | ___ |
| 039 | a | b | c | d | ___ | 062 | a               | b   | c | d | ___ |
| 040 | a | b | c | d | ___ | 063 | a               | b   | c | d | ___ |
| 041 | a | b | c | d | ___ | 064 | a               | b   | c | d | ___ |
| 042 | a | b | c | d | ___ | 065 | MATCHING        |     |   |   |     |
| 043 | a | b | c | d | ___ |     | a               | ___ |   |   |     |
| 044 | a | b | c | d | ___ |     | b               | ___ |   |   |     |
| 045 | a | b | c | d | ___ |     | c               | ___ |   |   |     |
| 046 | a | b | c | d | ___ |     | d               | ___ |   |   |     |
| 047 | a | b | c | d | ___ |     | MULTIPLE CHOICE |     |   |   |     |
| 048 | a | b | c | d | ___ | 066 | a               | b   | c | d | ___ |
| 049 | a | b | c | d | ___ | 067 | a               | b   | c | d | ___ |
| 050 | a | b | c | d | ___ | 068 | a               | b   | c | d | ___ |
| 051 | a | b | c | d | ___ | 069 | a               | b   | c | d | ___ |
| 052 | a | b | c | d | ___ | 070 | a               | b   | c | d | ___ |
| 053 | a | b | c | d | ___ | 071 | a               | b   | c | d | ___ |
| 054 | a | b | c | d | ___ | 072 | a               | b   | c | d | ___ |
| 055 | a | b | c | d | ___ | 073 | a               | b   | c | d | ___ |
| 056 | a | b | c | d | ___ | 074 | a               | b   | c | d | ___ |
| 057 | a | b | c | d | ___ | 075 | a               | b   | c | d | ___ |
| 058 | a | b | c | d | ___ | 076 | a               | b   | c | d | ___ |
| 059 | a | b | c | d | ___ |     |                 |     |   |   |     |

## A N S W E R   S H E E T

Multiple Choice    (Circle or X your choice)

If you change your answer, write your selection in the blank.

077	MATCHING	095	a	b	c	d	___
	a	096	a	b	c	d	___
	b	097	a	b	c	d	___
	c	098	a	b	c	d	___
	d	099	a	b	c	d	___

## MULTIPLE CHOICE

078	a	b	c	d	___
079	a	b	c	d	___
080	a	b	c	d	___
081	a	b	c	d	___
082	a	b	c	d	___
083	a	b	c	d	___
084	a	b	c	d	___
085	a	b	c	d	___
086	a	b	c	d	___
087	a	b	c	d	___
088	a	b	c	d	___
089	a	b	c	d	___
090	a	b	c	d	___
091	a	b	c	d	___
092	a	b	c	d	___
093	a	b	c	d	___
094	a	b	c	d	___

(\*\*\*\*\* END OF EXAMINATION \*\*\*\*\*)

## 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. After the examination has been completed, you must sign the statement on the cover sheet indicating that the work is your own and you have not received or given assistance in completing the examination. This must be done after you complete the examination.
3. Restroom trips are to be limited and only one applicant 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.
4. Use black ink or dark pencil ONLY to facilitate legible reproductions.
5. Print your name in the blank provided in the upper right-hand corner of the examination cover sheet and each answer sheet.
6. Mark your answers on the answer sheet provided. USE ONLY THE PAPER PROVIDED AND DO NOT WRITE ON THE BACK SIDE OF THE PAGE.
7. Before you turn in your examination, consecutively number each answer sheet, including any additional pages inserted when writing your answers on the examination question page.
8. Use abbreviations only if they are commonly used in facility literature. Avoid using symbols such as < or > signs to avoid a simple transposition error resulting in an incorrect answer. Write it out.
9. The point value for each question is indicated in parentheses after the question.
10. Show all calculations, methods, or assumptions used to obtain an answer to any short answer questions.
11. Partial credit may be given except on multiple choice questions. Therefore, ANSWER ALL PARTS OF THE QUESTION AND DO NOT LEAVE ANY ANSWER BLANK.
12. Proportional grading will be applied. Any additional wrong information that is provided may count against you. For example, if a question is worth one point and asks for four responses, each of which is worth 0.25 points, and you give five responses, each of your responses will be worth 0.20 points. If one of your five responses is incorrect, 0.20 will be deducted and your total credit for that question will be 0.80 instead of 1.00 even though you got the four correct answers.
13. If the intent of a question is unclear, ask questions of the examiner only.

14. When turning in your examination, assemble the completed examination with examination questions, examination aids and answer sheets. In addition, turn in all scrap paper.
15. Ensure all information you wish to have evaluated as part of your answer is on your answer sheet. Scrap paper will be disposed of immediately following the examination.
16. To pass the examination, you must achieve a grade of 80% or greater.
17. There is a time limit of four (4) hours for completion of the examination.
18. When you are done and have turned in your examination, leave the examination area (EXAMINER WILL DEFINE THE AREA). If you are found in this area while the examination is still in progress, your license may be denied or revoked.



QUESTION: 001 (1.00)

Unit 2 is at 25 percent power. Figure 1 illustrates the basic Control Element Drive Mechanism. Using Figure 1 for reference, identify which of the following electrical sequences correctly describe the sequence of actions which occur following the receipt of a CEA withdrawal signal.

- a. Lower gripper coil-on; load transfer coil-on; upper gripper coil-off; lift coil-on; pull down coil-on; upper gripper coil-on/pull down coil-off; load transfer coil-off; lower gripper coil-off
- b. Lift coil-on; load transfer coil-on; lower gripper coil-on; upper gripper coil-off; lift coil-off/pull down coil-on; upper gripper coil-on/pull down coil-off; load transfer coil-off; lower gripper coil-off.
- c. Lower gripper coil-on; load transfer coil-on; lift coil-on; upper gripper coil-off; pull down coil-on; upper gripper coil-on/pull down coil-off; load transfer coil-off; lower gripper coil-off
- d. Lift coil-on; lower gripper coil-on; load transfer coil-on; upper gripper coil-off; lift coil-off/pull down coil-on; upper gripper coil-on/pull down coil-off; load transfer coil-off; lower gripper coil-off.

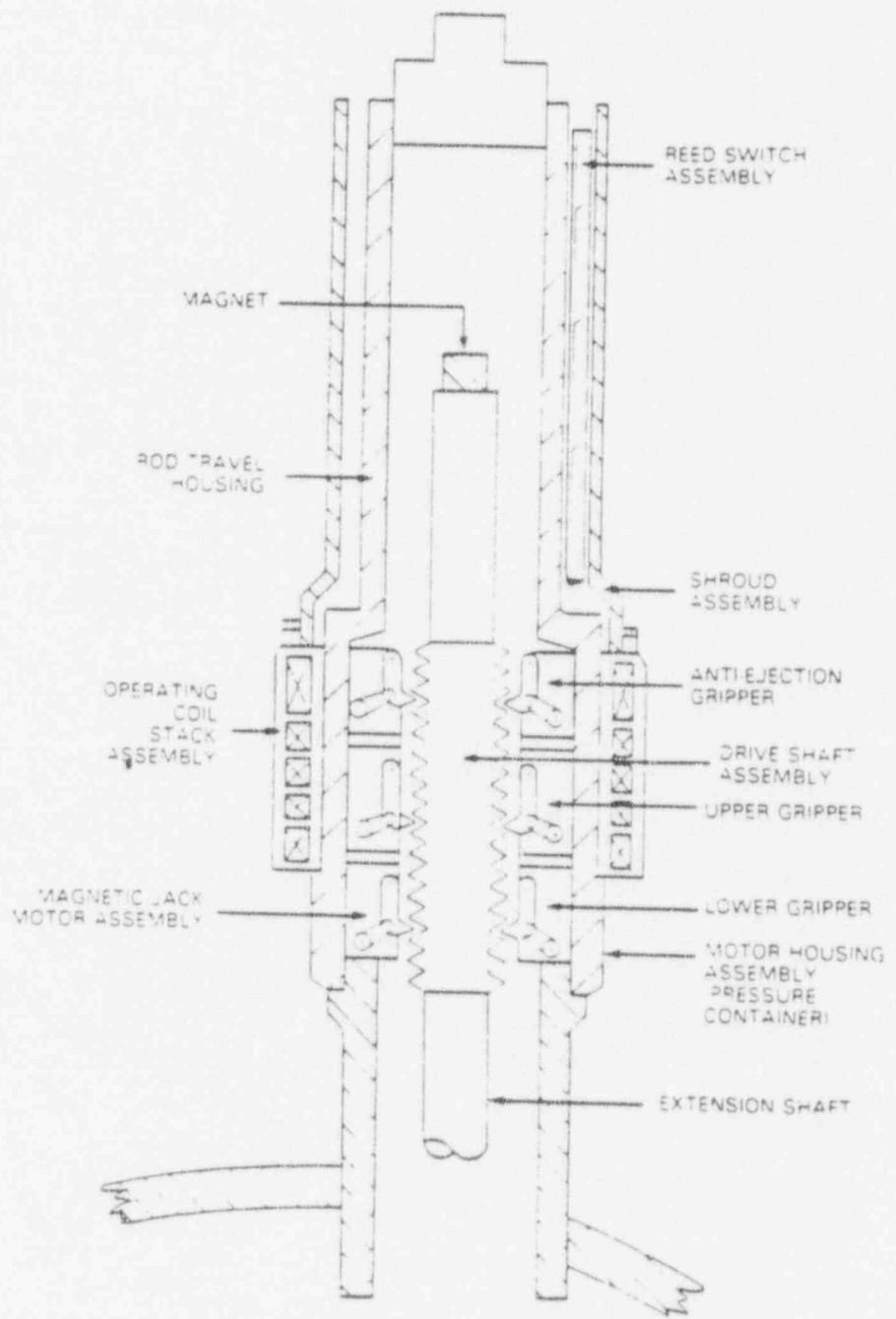


FIGURE 2  
 BASIC CONTROL ELEMENT DRIVE MECHANISM

QUESTION: 002 (1.00)

Which of the following conditions will cause a Shutdown Bank Permissive (MISH) CEA Motion Inhibit signal to be generated?

- a. Shutdown CEA position above 130.5 inches
- b. Shutdown CEA position below 129 inches
- c. Regulating CEA position above 10 inches
- d. Regulating CEA position below 10 inches

QUESTION: 003 (2.00)

The following RCP readings were taken with Unit 1 operating at 100% power.

11A	11B	12A	12B	
785	1000	800	760	Upper seal pressure
1480	1500	1450	1525	Middle seal pressure
175 F	150 F	180 F	110 F	Lower seal temperature
110 F	118 F	115 F	105 F	CBO temperature

For each pump, select from the right hand column those items which apply. One answer per pump, but pump conditions (1-7) may be used more than once. [0.5 each]

- ~~a. 11A~~  
 b. 11B  
~~c. 12A~~  
 d. 12B

*delete*  
*delete*

1. partial or complete upper seal failure
2. partial or complete middle seal failure
3. partial or complete lower seal failure
4. loss of component cooling water to RCP
5. high bleed off temperature
6. low bleed off temperature
7. all specifications within normal operating range

QUESTION: 004 (1.00)

Which of the following routine evolutions will NOT effect Letdown Temperature?

- a. Increasing charging flow from the CVCS system to the RCS system
- b. Increasing Salt Water flow to the Component Cooling Heat Exchangers
- c. Increasing Component Cooling Head Tank level via the Demineralized Water System
- d. Placing the Steam Generator Blowdown Radiation Monitor Sample Cooler into service

QUESTION: 005 (1.00)

Unit 2 is in Mode 3 with all CEAs inserted following a normal plant shutdown, when an invalid SIAS occurs. What set of procedures should be referenced to determine the operator actions required?

- a. Emergency Procedures
- b. Abnormal Operating Procedures
- c. Normal Operating Procedures
- d. Alarm Response Procedures

QUESTION: 006 (1.00)

Unit 1 is at 100% power when the "Actuation System Loss of Power" annunciator alarms due to a loss of the "ZG" Sensor Cabinet. Within one hour the inoperable channel was deenergized. After the ZG sensor channel was deenergized, what was the resultant SIAS trip logic for the remaining channels?

- a. 1 of 2
- b. 1 of 3
- c. 2 of 3
- d. 3 of 3

QUESTION: 007 (1.00)

During an extended loss of the Unit 1 plant computer, it becomes necessary to insert the group 5 CEAs at the end of the hour. The counter readings were taken before and after CEA insertion from an ARO condition. If the counter readings increased by 10, what is the new group 5 CEA height? Assume the UEL light was lit for ARO.

- a. 120 inches
- b. 120.5 inches
- c. 127.5 inches
- d. 128 inches



QUESTION: 008 (1.00)

Unit 1 is at 100% power when the high voltage to the B Upper Uncompensated Ion Chamber detector assembly is lost. As a result, which of the following RPS trips would NOT be activated in the B RPS channel.

- a. Axial Power Distribution (APD) trip
- b. Thermal Margin/Low Pressure (TM/LP) trip
- c. High Start Up Rate (SUR) trip
- d. Variable Over Power Trip (VOPT)

QUESTION: 009 (1.00)

FIVE MINUTES after core uncover following a small break LOCA, the CRO should expect to see CET temperatures that are \_\_\_\_\_.

- a. 15 to 30 degrees greater than  $T_{sat}$
- b. 15 to 30 degrees greater than  $T_{hot}$
- c. approximately equal to  $T_{sat}$
- d. 10 to 15 degrees less than  $T_{sat}$

QUESTION: 010 (1.00)

A LOCA has occurred and the following conditions exist:

containment temperature = 300 deg. F  
containment pressure = 50 psig

Which of the following automatic Containment Cooling System actions would "NOT" occur?

- a. An 8 inch control valve in a parallel Service Water supply line of each cooling unit would open.
- b. The fusible link doors of each cooling unit would open.
- c. A fourth cooling unit would be placed into service.
- d. Each cooling unit's fan drive would switch to high speed.

QUESTION: 011 (1.00)

The starting duty limitations for a containment spray pump are:

- a. Limited to no more than 6 starts per hour
- b. Limited to no more than 3 starts per hour
- c. Unlimited if the pump is operated for 15 minutes after each start
- d. Unlimited if the pump is operated for 5 minutes after each start

QUESTION: 012 (1.00)

Which statement is "NOT" a function of the Containment Spray System

- a. Fill the RCS during SDC
- b. Fill the SITs during Hot Standby
- c. Provide cooling water to HPSI pumps during post RAS conditions
- d. Maintain SDC flow when both LPSI pumps are inoperable

QUESTION: 013 (1.00)

Match the Unit 2 pump combination in column A with the "NORMAL" operating power limit in column B

	COLUMN A PUMP COMBINATION	COLUMN B POWER LIMIT
_____	A. 1 Condensate pump 1 Condensate booster pump	1. < 10% 2. < 25% 3. < 50%
_____	B. 2 Condensate pumps 2 Condensate booster pumps	4. 25 to 70% 5. 50 to 70% 6. 25 to 80%
_____	C. 3 Condensate pumps 2 Condensate booster pumps	7. 50 to 80% 8. > 70% 9. > 80%
a.	1, 4, 8	
b.	2, 4, 8	
c.	2, 6, 9	
d.	3, 7, 9	

QUESTION: 014 (1.00)

What is the maximum Technical Specification response time to reduce feedwater flow to 5% following a reactor trip?

- a. Within 60 seconds
- b. Within 45 seconds
- c. Within 30 seconds
- d. Within 20 seconds

QUESTION: 015 (1.00)

Main feedwater has been lost to SG #11. Present SG level is minus (-)30 inches and SG temperature is 232 deg. F. What actions should the operator take to restore SG level?

- a. Shut the main feedwater (MFW) isolation valve and restore level with the AFW pump.
- b. Trip the main feed pump and restore level with the condensate booster pump.
- c. Transfer Main Feedwater Regulating Valve (MFRV) control from Automatic to Manual and then take necessary steps to restore main feedwater.
- d. Place the MFRV in manual, switch to and verify alternate level transmitter provides correct readings, return MFRV to auto and monitor SG level response.



QUESTION: 016 (1.00)

A Unit 1 turbine trip has just occurred due to low bearing oil pressure. What is the response of the main feedwater regulating bypass valve to this event?

- a. Bypass controller output signal is grounded to shut the valve.
- b. Valve goes to the position determined by the bypass controller output signal.
- c. Valve goes to the 50% output position from the bypass trip setpoint controller.
- d. Valve goes to the 33% output position from the bypass trip setpoint controller.

QUESTION: 017 (1.00)

Given the following conditions for Unit 1:

- \* 12 Condensate Storage Tank - 75,000 gallons remaining
- \* RCS is in Hot Standby
- \* Loss of offsite power has occurred
- \* Steam generators are discharging steam to atmosphere to maintain RCS temperature

How long will 12 CST supply water to the AFW pumps?

- a. 3 hours
- b. 4 hours
- c. 6 hours
- d. 8 hours

QUESTION: 018 (1.00)

Which of the following factors may cause AFW pump cavitation?

- a. High steam generator pressure
- b. Closed AFW recirculation line valve
- c. High condensate water temperature *CS*
- d. Improper AFW Flow Control Valve setting

QUESTION: 019 (1.00)

A new liquid radioactive release permit must be issued if tank contents increase by a minimum of \_\_\_\_\_%.

- a. 1
- b. 2
- c. 5
- d. 10

QUESTION: 020 (1.00)

Why is it important to secure a waste gas discharge as soon as possible whenever the discharge control valves shut on a high RMS alarm?

- a. To prevent the header relief valve from lifting and discharging to the containment system headers.
- b. To prevent an unmonitored release.
- c. To prevent the header relief valve from lifting and discharging to the main vent.
- d. To prevent the header relief valve from lifting and discharging to the surge tank.

QUESTION: 021 (1.00)

Which radiation monitor does NOT provide an input to the SPDS?

- a. Condenser Offgas (RE-1752)
- b. Main Vent Gaseous (RE-5415)
- c. Gaseous Waste (RE-2191)
- d. Containment Hi-Range (RE-5317-B)

QUESTION: 022 (1.00)

When using the Auxiliary Spray valve CV-517, what temperature inputs are used to determine the 400 deg. F differential temperature limit required by Tech. Specs.?

- a. Charging inlet and RCS hot leg temperature
- b. Regenerative HX charging inlet temperature and CETs
- c. Regenerative HX charging outlet temperature and PZR temperature
- d. RCS cold leg temperature and PZR temperature

QUESTION: 023 (1.00)

A LOCA is in progress with RCS pressure at 1200 psia and RWT level at 153 inches. What condition can cause the receipt of the "11 HPSI PUMP DISCHARGE PRESSURE HI ALARM" and "SI PPs RECIRC MOV 659/660 CLOSED/RAS" alarms?

- a. HPSI Main Header Isolation MOV SI-654 shut
- b. HPSI AUX Header Isolation MOV-656 shut
- c. 11 HPSI Pump running at minimum flow
- d. Mini Flow Return to RWT Isolation MOV SI-659 closed



QUESTION: 024 (1.00)

Given the following conditions:

- 1) 100% reactor power
- 2) HS-100 selected to PIC-100-X (AUTO)
- 3) Pressure setpoint is set to 2250 psia
- 4) HS-100-8 selected to both

At what PZR pressure will the proportional heaters have full power and zero power?

- a. 2200 and 2250 psia
- b. 2225 and 2275 psia
- c. 2235 and 2265 psia
- d. 2250 and 2300 psia

QUESTION: 025 (1.00)

Given the following conditions:

- 1) 100% reactor power
- 2) PRZ Lvl. Ch. Sel. (HS-110) selected to 110Y
- 3) PRZ Htr. Lo. Lvl. Cut-off Sel. (HS-100-3) in X/Y position
- 4) LT-110Y fails low

Operator response is required to prevent which of the following conditions?

- a. Filling the PZR solid
- b. Low PZR level followed by a low pressure reactor trip
- c. All PZR heaters energized
- d. Low PZR level followed by a TM/LP trip

QUESTION: 026 (1.00)

Which of the following reactor variables will cause the TM/LP setpoint to INCREASE? [More than one answer may be correct]

- a. PZR. pressure increases
- b. RCS flow decreases
- c. Tc decreases
- d. ASI increases

QUESTION: 027 (1.00)

Match the following containment systems used to remove or control hydrogen with the purpose they serve. [Each system MAY have more than one purpose. There also may be some purposes listed which do not apply.]

SYSTEM	PURPOSE
a. Hydrogen Recombiner	1. Not placed into service until 8 days after accident.
b. Hydrogen Analyzer	2. Automatically starts upon receiving a SIAS and CIS .
c. Hydrogen Purge System	3. Primary system for maintaining hydrogen concentration less than 1% following a LOCA.
	4. Uses natural circulation for air flow.
	5. Determines hydrogen concentration within containment.
	6. Does not have any Technical Specifications Operability requirements.

QUESTION: 028 (1.00)

The makeup source to the Spent Fuel Pools is \_\_\_\_\_ and \_\_\_\_\_ is used to cool the heat exchangers in the system. CHOOSE from below the answer which correctly fills in the blanks.

- a. Demineralized water, Service Water
- b. Demineralized water, Component Cooling Water
- c. Condensate water, Service Water
- d. Condensate water, Component Cooling Water

QUESTION: 029 (1.00)

A failure of both Micromax 6000 computers on the Full Range Digital Feedwater Control System can be identified by:

- a. a solid LED lit on the MFV, BFV and SGFP controllers
- b. a solid LED lit on the MFV, BFV and SGFP controllers and all 3 controllers in manual
- c. a blinking LED lit on the MFV, BFV, FRV D/P and SGFP controllers
- d. a blinking LED lit on the MFV, BFV, SGFP controllers and all 3 controllers in manual

QUESTION: 030 (1.00)

Given the following conditions for Unit 1:

- 1) Mode 5
- 2) RCS temperature 140 deg. F
- 3) RCS pressure 250 psig
- 4) SG pressure 0 psig
- 5) SG temperature 79 deg. F

What is the SG status in regards to Technical Specifications?

- a. Pressure/temperature limitation satisfied
- b. SG temperature high and RCS pressure high, pressure/temperature LCO not met
- c. SG pressure and temperature low, pressure/temperature LCO not met
- d. SG temperature low and RCS pressure high, pressure/temperature LCO not met

QUESTION: 031 (1.00)

How is water hammer minimized when main feedwater is unavailable and SG temperature is greater than 200 deg. F?

- a. If SG level is below -50 inches, shut or maintain shut the MFW isolation valve and restore level to 0" with AFW.
- b. If SG level is below -26 inches, shut or maintain shut the MFW isolation valve and restore level to 0" with AFW.
- c. If SG level is below -50 inches, trip the main feed pump and restore level with the condensate booster pump and AFW.
- d. If SG level is below -26 inches, trip the main feed pump and restore level with the condensate booster pump and AFW.



QUESTION: 032 (1.00)

Unit 1 is performing a partial stroke test on a MSIV channel B. During the test a SGIS/CSAS occurs. How does the MSIV respond?

- a. Channel A (only) will shut the MSIV.
- b. The MSIV will not shut until the stroke test is completed.
- c. The channel B close signal will override the test signal and shut the MSIV and channel A will also close the MSIV.
- d. The channel B close signal will override the test signal and shut the MSIV. Channel A is inoperable when channel B is in test.

QUESTION: 033 (1.00)

The site has experienced a Loss of Offsite Power event. Assuming no operator action takes place, which of the following statements concerning Unit 2 is correct.

- a. None of Unit 2's 4.16 KV buses will be repowered following the event.
- b. Both 4.16 KV buses 21 and 24 will be repowered following the event.
- c. Only 4.16 KV bus 21 will be repowered following the event.
- d. Only 4.16 KV bus 24 will be repowered following the event.

QUESTION: 034 (1.00)

12 EDG is found to be inoperable with both units at 100% power. Determine which of the following statements is correct.

- a. Unit 1 is in a TS action statement.
- b. Both units, 1 and 2, are in a TS action statement.
- c. Either unit 1 or unit 2, but not both, is in a TS action statement.
- d. Neither unit is in a TS action statement.

QUESTION: 035 (1.00)

What is the effect on EDG stop/start signals when the Local-remote control switch (CSLR) is placed in "LOCAL"?

- a. All automatic start signals are bypassed but the control room stop signal remains operable.
- b. All automatic start and remote stop signals are bypassed.
- c. All automatic start signals are bypassed.
- d. All control room stop and start signals remain operable.

QUESTION: 036 (1.00)

To automatically close #12 EDG output breaker onto 4KV bus #14, which of the following criteria must occur with the breaker hand switch in auto, a normal electrical lineup (output breakers open and disconnects are shut), and no operator action?

- a. EDG is at rated speed and voltage, a load shed has occurred (UVA), a U-2 SIAS A has occurred, and no lockouts exist on normal and alternate 4KV bus feeders and the diesel output breaker.
- b. EDG is at rated speed and voltage, a load shed has occurred (UVB), a U-1 SIAS B is present, and no lockout exists on the normal and alternate 4KV bus feeders and the diesel output breaker.
- c. EDG is at rated speed and voltage, a load shed has occurred (UVB), a U-2 SIAS B has occurred, and no lockout exists on the diesel output breaker.
- d. EDG is at rated speed and voltage, a load shed has occurred (UVA), a U-1 SIAS A has occurred, and no lockouts exist on the normal and alternate 4KV bus feeder breakers.

QUESTION: 037 (1.00)

The Salt Water Air Compressors (SWACs) are NOT designed to provide emergency air to:

- a. Auxiliary feedwater valves
- b. Safety systems within containment
- c. Service water heat exchanger SW normal outlet valves
- d. Feedwater control system valves

QUESTION: 038 (1.00)

Unit 1 is on SDC when RCS pressure inadvertently drifts up to 350 psia. What automatic functions will protect the SDC system from over pressurizing?

- a. SDC suction line relief between SDC return isolation valves, 1-SI-651-MOV and 1-SI-652-MOV, will lift to protect the return header.
- b. Operator action is required to reduce RCS pressure and protect SDC system.
- c. LPSI pumps will trip and their discharge check valves will shut.
- d. SDC return isolation valves SI-651-MOV & SI-652-MOV shut and SDC suction line relief will lift to protect the return header.

QUESTION: 039 (1.00)

Given the following data on the Quench Tank:

- 1) pressure 9.5 psig
- 2) level 28.5 inches
- 3) temperature 115 deg. F

Analyze the quench tank parameters and determine if any off normal conditions exist per log sheets.

- a. no concern, all parameters within acceptable operating band
- b. pressure too high
- c. level too low
- d. temperature too high



QUESTION: 040 (1.00)

All of the following indications may be used to determine CCW availability to an RCP EXCEPT for:

- a. CCW Flow Low alarm lit in RCP auxiliary status panel
- b. RCP seal pressure alarms on 1C06
- c. Controlled bleed off high temperature alarms from the computer
- d. CCW Temp High alarm on the RCP auxiliary status panel

QUESTION: 041 (1.00)

Which one of the following RPS trips is required to provide automatic protection from an uncontrolled CEA withdrawal which initiates from a low initial power level of about 10 cps?

- a. Axial flux offset trip
- b. High RCS pressure trip
- c. Variable high power trip
- d. Thermal margin/low pressure (TM/LP) trip

QUESTION: 042 (1.00)

Which of the following plant conditions is the worst case related to a CEA drop event?

- a. BOC and high. CEA worth
- b. BOC and low CEA worth
- c. EOC and high. CEA worth
- d. EOC and low CEA worth

QUESTION: 043 (1.00)

Per AOP-1B, "CEA Malfunctions", which one of the following is the correct operator response when two CEAs which have been declared inoperable?

- a. trip the reactor and implement EOP-0
- b. be in hot standby within six hours
- c. restore CEA operability within 1 hour or reduce power to less than 50% of rated Thermal Power within the following hour
- d. restore CEA operability within 1 hour or reduce power to less than 75% of initial Thermal Power within the following hour

QUESTION: 044 (1.00)

Which one of the following indications would be used to differentiate between a LOCA inside containment and a steam line rupture inside containment?

- a. Increasing containment sump level
- b. Increasing containment temperature
- c. Decreasing Pressurizer level
- d. Decreasing subcooling margin

QUESTION: 045 (1.00)

Given the following conditions:

- 1) Plant is in Mode 5, RCS Heatup is in progress
- 2) RCS pressure is 275 PSIA
- 3) SG secondary temperature is 170 deg. F
- 4) RCS temperature is 160 deg. F
- 5) PZR level 160 inches
- 6) 11A RCP running for 2 minutes

What action should be taken if 11B RCP fails to start?

- a. Start the 12B RCP immediately
- b. Continue the RCS heatup, one RCP is sufficient
- c. Attempt to start the 11B RCP within 30 minutes
- d. Stop the 11A RCP within 3 minutes

QUESTION: 046 (1.00)

What action should be taken in regards to the RCPs on a loss of CCW?

- a. Trip all RCPs immediately
- b. Trip RCPs within 10 minutes
- c. Commence an expeditious unit shutdown and then trip RCPs
- d. RCPs may operate as long as pump temperatures remain  $<$  or  $=$  to operating limits

QUESTION: 047 (1.00)

Unit 2 is operating at rated load with RCS boron concentration at 900 ppm when a reactor trip occurs (no SIAS). The RO determines that one CEA has failed to insert and begins emergency boration. In order to meet the requirements of EOP-0 and EOP-1, boration must continue until RCS boron concentration is:

- a. 1000 ppm
- b. 1100 ppm
- c. 2100 ppm
- d. 2300 ppm



QUESTION: 048 (1.00)

Should more than one CEA not trip during a valid reactor trip then a boration to 2300 ppm is required. The need for the 2300 ppm is based on maintaining shutdown margin for:

- a. the 2 most reactive CEAs being stuck out
- b. the 10 most reactive CEAs being stuck out
- c. cooldown to Mode 4 with all CEAs removed
- d. all possible combinations of CEAs being stuck out

QUESTION: 049 (1.00)

Unit 1 is at 75% power when the RO discovers that component cooling (CC) water has been lost due to a trip of the operating component cooling water pump. Which of the following immediate actions should the RO take?

- a. Attempt to restart the affected pump
- b. Place the hand switch of the affected pump in PULL TO LOCK and start the standby CC pump
- c. Place the hand switch of the affected pump in PULL TO LOCK and determine the cause for the failure of the failed CC pump
- d. Trip the reactor and perform the immediate actions of E-0.

QUESTION: 050 (1.00)

During the implementation of EOP-0, "Post-Trip Immediate Actions", it was necessary to de-energize the CEDM Motor Generator sets from the control room in order to trip the reactor.

Which one of the following describes the reason for the Note regarding returning the breaker lineup to that existing before the trip when reenergizing the buses?

- a. To ensure that the bus amperages remain balanced.
- b. To provide power to components necessary for fast boration.
- c. To prevent inadvertent parallel of vital buses and loss of train separation.
- d. To satisfy the Technical Specifications requirement for PZR heater operability.

QUESTION: 051 (1.00)

Unit 1 is at 80% power when annunciator 1C06, PRESSURIZER PRESS CH 100, alarms due to low PZR pressure, 2100 PSIA.

Which of the following possible actions would the RO "NOT" take in responding to this malfunction?

- a. Manually trip the reactor
- b. Shift pressure control channels
- c. Manually energize PRZ heaters
- d. Place CEDS in Manual Sequential and reduce Tavg.

QUESTION: 052 (1.00)

Which one of the following represent the HPSI throttling criteria during implementation of EOP-4 (Excess Steam Demand Event).

- a. 30 deg. F loop subcooling, PZR level <180", 1 S/G available as a heat sink and RVLMS indicates level above mid-loop of the hot leg.
- b. 30 deg. F loop subcooling, PZR level >101", 1 S/G available as a heat sink and no indicated RCS voids.
- c. 30 deg. F CET subcooling, PZR level >101", 1 S/G available as a heat sink and RVLMS indicates level above mid-loop of the hot leg.
- d. 30 deg. F CET subcooling, PZR level >101", 1 S/G available as a heat sink and RVLMS indicates level above top of the hot leg.

QUESTION: 053 (1.00)

A main steam line break occurs on Unit 2. Which one of the following actions should the operator take if RCS voiding inhibits core heat removal?

- a. Lower the cooldown rate to allow temperatures to equalize
- b. Raise pressurizer level to accommodate void collapse
- c. Adjust pressurizer spray to reduce subcooling to 30 deg. F
- d. Raise HPSI flow to raise subcooling to 140 deg. F

QUESTION: 054 (1.00)

Unit 1 is at 300 MWE with condenser vacuum at 23.5 inches Hg. Which of the following actions should the operator take with the approval of the SS/CRS?

- a. Reduce power and try to restore vacuum to greater than 24.5 inches Hg. If vacuum has not been restored to greater than 24.5 inches Hg within 10 minutes, trip the reactor.
- b. Reduce power and try to restore vacuum to greater than 24.5 inches Hg. If differential pressure between condensers becomes greater than 2 inches Hg, then trip the reactor.
- c. Since condenser vacuum is less than 25 inches Hg, trip the reactor.
- d. Reduce power and try to restore vacuum to greater than 25 inches Hg. If condenser vacuum drops to 22.5 inches Hg, trip the reactor.

QUESTION: 055 (1.00)

Natural circulation flow is determined to have been established

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- a. when pressurizer level begins to slowly decrease.
- b. when CET temperatures consistently trend with Thot.
- c. when the RCS is at least 30 degrees F subcooled.
- d. when steam generator saturation pressure becomes greater than RCS saturation pressure.



QUESTION: 056 (1.00)

Which one of the following is the reason the 4KV Bus load breakers must be opened prior to re-energizing the 4KV bus?

- a. Prevent the 4KV bus loads from tripping on under voltage
- b. An electrical interlock will prevent the 4KV Bus feeder breaker from closing
- c. Prevent overloading the power source from starting currents
- d. Prevent unnecessary equipment from starting

QUESTION: 057 (1.00)

An alarm occurs on the liquid waste discharge radiation monitor (RE-2201) during a discharge of the 11 RCWMT. The Rad monitor is flushed with demineralized water in an attempt to reduce background radiation levels. Where is the flush water discharged to?

- a. RCWMT 11
- b. RCWMT 12
- c. Miscellaneous Waste System
- d. Circulating water discharge system

QUESTION: 058 (1.00)

To override the fire induced signals from a control room fire, specific actions are taken to maintain positive control of plant equipment outside the control room. Which of the following set of conditions represent the actions taken?

- a. Close fuses pulled and breakers tripped locally, local/remote key switches placed in LOCAL, 480 V load centers are stripped, and vital MCCs are stripped of unnecessary loads.
- b. Breakers tripped and racked out, 4KV busses are stripped and close fuses are removed, and all vital MCCs are stripped and tied together.
- c. EDGs and 4KV breakers with local/remote key switches are placed in LOCAL to maintain positive control of operation; all other equipment affected by the fire continues to operate.
- d. EDGs placed in LOCAL, #12 EDG is used to supply two 4KV busses, 480 V load centers are stripped, and vital MCCs are deenergized and stripped then tied together.

QUESTION: 059 (1.00)

AOP-9A, "Control Room Evacuation and Safe Shutdown Due to a Severe Control Room Fire", has been implemented. AFW and charging flow has been established at 24 and 55 minutes on Unit-1; 31 and 59 minutes on Unit-2. What EAL has been declared?

- a. None
- b. Unusual Event
- c. Alert
- d. Site Emergency

QUESTION: 060 (1.00)

During AOP-9A, "Control Room Evacuation and Safe Shutdown Due to a Severe Control Room Fire", the Unit-1 Turbine Building Operator (TBO) must perform actions to restore power to 1Y09 and then tie 1Y10 to 1Y09. The Unit-2 TBO strips MCC-201BT. Select the statement that explains why these actions are being performed.

- a. To restore power to the lights in the switchgear rooms and the Unit-2 turbine turning gear motor only.
- b. To restore power to the ESFAS sensor cabinets and the ventilation to the switchgear rooms.
- c. To restore power to the control room ventilation system to aid in smoke removal and the CST makeup pump.
- d. To restore power to the plant paging system and a well water pump to provide a continued source of makeup water for use.

QUESTION: 061 (1.00)

When, if ever, is containment integrity "NOT" required by Technical Specifications?

- a. Mode 4
- b. Mode 5
- c. Mode 6
- d. Containment integrity is required in all modes of operation

QUESTION: 062 (1.00)

One of the major actions performed during EOP-3, "Loss of All Feedwater", is a cooldown to less than 465 deg. F. The consequences of failing to perform this cooldown results in the:

- a. inability of AFW to be initiated to the S/Gs after they have completely gone dry.
- b. loss of RCS integrity and the possibility of initiating a core melt sequence due to inadequate core cooling.
- c. initiation of a PTS event once the S/Gs have been lost as a heat sink.
- d. inability of the condensate booster pumps to be used as a backup source of feed to the S/Gs.

QUESTION: 063 (1.00)

Should Once Through Core Cooling (OTCC) be required following a loss of all feedwater event, the generation of hydrogen may become a concern in trying to maintain containment integrity. One of the sources of hydrogen during OTCC is from the corrosion of aluminum and zinc. Hydrogen generated in this manner will become a significant hazard within:

- a. minutes of OTCC initiation.
- b. a few hours of OTCC initiation.
- c. 24 hours of OTCC initiation.
- d. a couple of weeks of OTCC initiation.



QUESTION: 064 (1.00)

Given the following plant conditions:

Unit 1 reactor tripped  
S/G 11 pressure is 890 psia  
S/G 12 pressure is 750 psia  
S/G 11 level is -180 inches  
S/G 12 level is -210 inches

Which one of the following actions is expected to have occurred?

- a. AFW blocking valves to #11 and #12 S/Gs should have closed.
- b. AFW blocking valves to #12 S/G should have closed.
- c. 11 and 13 AFW pumps should have tripped.
- d. 11 AFW pump should have tripped.

QUESTION: 065 (1.00)

Match the PZR pressure control signals in column A, with the PZR pressure deviation from setpoint in column B. (Setpoints in column B may only be used once or not at all.) [0.25 each]

COLUMN A CONTROL SIGNAL	COLUMN B DEVIATION FROM SETPOINT
a. Spray valves full open	1. -25 psi
b. Zero power to proportional heaters	2. 0 psi
c. Full power to proportional heaters	3. +25 psi
d. Spray valves start to open	4. +50 psi
	5. +75 psi
	6. +100 psi

QUESTION: 066 (1.00)

Select the VCT level from column B that initiates each automatic control function in column A. (Levels in column B may be used once, more than once, or not at all) [0.25 each]

COLUMN A AUTOMATIC CONTROL FUNCTIONS		COLUMN B VCT LEVELS	
a.	Automatic makeup starts	1.	116.0 inches
b.	Automatic makeup stops	2.	112.5 inches
c.	Charging pump suction transfers from VCT to RWT	3.	110.0 inches
d.	Letdown diverts to waste processing system	4.	104.0 inches
		5.	90.0 inches
		6.	87.5 inches
		7.	8.7 inches
		8.	3.0 inches
a.	6,4,7,3		
b.	5,4,8,3		
c.	5,3,8,2		
d.	6,3,8,4		

QUESTION: 067 (1.00)

The following plant conditions exist:

RCS temperature	-	180 deg. F
Pressurizer Level	-	160" <i>AND DECREASING</i>
Pressurizer Pressure	-	197 psia
11 S/G level	-	+10"
12 S/G level	-	+20"
Aux Feedwater	-	Available
<del>RCS level</del>	-	<del>36.9'</del>
Shutdown cooling flow	-	0 gpm

What action must be taken prior to re-establishing shutdown cooling?

- Fill the RCS with LPSI pump
- Fill the RCS with containment spray
- Fill the RCS with HPSI pump
- Begin steaming 11 and 12 S/Gs

QUESTION: 068 (1.00)

Which one of the following is the reason that RCS pressure must be below 170 psia when aligning the containment spray pumps to supply shutdown cooling flow?

- a. Prevents the CS pump from running at shutoff head
- b. Prevents over pressurization of the ECCS pump suction headers
- c. Prevents the automatic shutting at 200 psia of the SDC return valve, SI-652
- d. Prevents the lifting of the SDC heat exchanger relief valve at 190 psia

QUESTION: 069 (1.00)

How many decades of range overlap are required between the Wide Range NIs and the Power Range NIs at 1% power?

- a. Zero
- b. One
- c. Two
- d. Three

QUESTION: 070 (1.00)

Which NI indication is lost on a loss of 120 VAC bus 1Y01?

- a. 1C15 channel B Wide Range
- b. 1C15 channel B Linear Range
- c. 2C43 channel A aux excore wide range
- d. 1C43 channel A aux excore wide range

QUESTION: 071 (1.00)

Unit 2 has the following conditions:

RCS Th	-	530 deg. F and constant
RCS Tc	-	520 deg. F and constant
RCS Pressure	-	1550 psia and decreasing
Pressurizer Level	-	75" and decreasing
RCS Subcooling	-	70 deg. and slowly decreasing
Containment Rad Monitors	-	Clear
"Unit Cndsr Off-Gas" Alarm	-	Actuated
Containment pressure	-	0.3 PSIG
Containment Temperature	-	110 deg. F

Based upon the above conditions, IDENTIFY from below the current status of the unit.

- a. Unit 2 is experiencing a Loss of Coolant Accident.
- b. Unit 2 is experiencing a steam generator steam line break accident.
- c. Unit 2 is experiencing a steam generator tube leak incident.
- d. Unit 2 has experienced an uncomplicated reactor trip.



QUESTION: 072 (1.00)

One of the first strategies during EOP-6, Steam Generator Tube Rupture, is to cool the RCS to 515 deg. F. The importance of this action is based upon:

- a. minimizing the differential pressure across the break thereby reducing the flow rate.
- b. initiating natural circulation flow as soon as possible during the event.
- c. minimizing further uncontrolled radioactive releases to the environment.
- d. maintaining RCS subcooling greater than the saturation pressure for the affected S/G.

QUESTION: 073 (1.00)

EOP-3, Loss of All Feedwater, requires that Once Through Core Cooling be initiated prior to CETs reaching 560 deg. F. The reason it must be initiated prior to this temperature is:

- a. to ensure adequate cooling of the core takes place under all operating conditions
- b. to prevent fuel damage which would occur at a temperature higher than 560 deg. F
- c. because at this temperature RCS pressure is low enough to ensure a minimum adequate flow rate
- d. to ensure RCS voiding does not occur in sufficient amounts to prevent adequate flow through the core

QUESTION: 074 (1.00)

250 VDC bus 13 has been lost. Determine which of the following conditions is valid.

- a. An immediate turbine/generator trip will result.
- b. The seal oil system normal supply is lost.
- c. Turbine control power backup supply is lost.
- d. Emergency lube oil pumps are lost.

QUESTION: 075 (1.00)

During a waste gas decay tank release through the Unit 1 plant vent, the waste gas discharge radiation monitor (RI-2191) alarms. Which valve must be manually shut to prevent a possible waste gas decay tank discharge to the waste gas surge tank?

- a. Waste gas discharge isolation (WGS-2191-CV)
- b. Waste gas discharge to Unit 1 plant vent (WGS-683)
- c. Waste gas discharge pressure control (WGS-2191-PCV)
- d. Waste gas discharge final filter bypass (WGS-630)

QUESTION: 076 (1.00)

What details must be provided in the entry to the CRO's Log when declaring an RMS channel out of service?

- a. Method for pre-planned alternate sampling, what technical specification actions are required, and name of person notified of the inoperable channel.
- b. Alternate RMS channel placed in service, name of the person placing the alternate channel in service, and technical specification actions incurred.
- c. Name of person flushing the monitor prior to declaring it inoperable, name of person notified that the monitor is inoperable, and the technical specification actions incurred.
- d. Technical specification actions incurred and the name of the person notified of the inoperable channel

QUESTION: 077 (1.00)

Match the instrument air pressures in column A with the appropriate actions in column B. Each action can only be used once.

[0.25 points each]

- | A          | B   |
|------------|---|
| a. 39 psig | 1. standby instrument air compressor starts   |
| b. 75 psig | 2. affected IA and PA compressors should be stopped                                       |
| c. 85 psig | 3. reactor and turbine trip are warranted   |
| d. 93 psig | 4. instrument air to containment non-essential loads isolates                             |
|            | 5. plant air to instrument air cross-connect valve opens                                  |
|            | 6. PA header isolation valve closes to allow PA compressor to discharge to IA system only |

QUESTION: 078 (1.00)

The Refueling Control Room Operator (RCRO) gives the Fuel Handling Supervisor (FHS) the following information:

Shutdown margin	-	2450 ppm
Reactor fuel pool level	-	66 feet
Source Range Monitor, Ch. A	-	E-4 cps
" " " Ch. B	-	1200 cps
" " " Ch. C	-	erratic reading
" " " Ch. D	-	E-4 cps

Which of the following actions should the FHS take if a fuel assembly (FA) is being inserted into the core during this condition?

- The Refueling Machine Operator (RMO) should continue to insert the FA into the indexed core location, but does not ungrapple it and the Shift Supervisor should contact the NI System Engineer to investigate.
- The FHS should direct the RMO to stop insertion of the FA into the core until 2 NI channels are restored to operation.
- The Shift Supervisor should direct the NI Systems Engineer to investigate, but should also continue with refueling by stationing an additional watch to monitor the count rate.
- Core alterations should be stopped, the FA moved out of the core area to a safe location, and the RCS boron value verified to be equal to or greater than specified in NEOP-23 Fig. 2-II.A.6.

QUESTION: 079 (1.00)

In response to a loss of offsite power event, which of the following is one of the reasons for shutting both MSIVs and securing SG blowdown?

- a. prevent ADVs from lifting
- b. prevent overcooling of the RCS
- c. protect condenser from over pressurization
- d. provide a reliable steam source for the turbine driven AFW pump



QUESTION: 080 (1.00)

When responding to a major leak, which parameter below would be a reactor trip requirement?

- a. PZR level 105 inches and decreasing
- b. Tavg 547 deg. F
- c. PZR pressure decreased to TM/LP pre trip value
- d. S/G tube leak greater than the capacity of one charging pump

QUESTION: 081 (1.00)

A worker spends 10 hours in an airborne contaminated area containing a radioactive isotope at the DERIVED AIRBORNE CONCENTRATION of 10 CFR 20. After exiting the area, it was determined that the operator's respirator was defective and provided no protection. "WHICH" of the following is the maximum committed effective dose equivalent (CEDE) he could have received?

- a. 5000 mrem
- b. 250 mrem
- c. 25 mrem
- d. 5 mrem

QUESTION: 082 (1.00)

Which one of the following individuals must authorize entry into containment via the emergency airlock?

- a. Supervisor - Radiation Control Operations
- b. Radiation Control Shift Supervisor
- c. Shift Supervisor
- d. Control Room Supervisor

QUESTION: 083 (1.00)

A "locked" high radiation area by definition in CCI-800, "Calvert Cliffs Radiation Safety Manual", is an area in which radiation levels could result in an individual receiving \_\_\_\_\_ from the radiation source or from any surface that the radiation penetrates.

- a. in excess of 1 mSv in one hour at 30 cm
- b. in excess of 1 rem in one hour
- c. in excess of 100 mrem in one hour
- d. in excess of 10 mSv in one hour at 30 cm

QUESTION: 084 (1.00)

Fluid systems that are PRESENTLY OPERATING with temperatures greater than \_\_\_\_\_ or pressures greater than \_\_\_\_\_ should be isolated from the work area by two shut valves in series.

- a. 200 deg. F; 400 PSIG
- b. 200 deg. F; 500 PSIG
- c. 250 deg. F; 400 PSIG
- d. 250 deg. F; 500 PSIG

QUESTION: 085 (1.00)

Three of the four conditions listed below are valid conditions for performing maintenance on a fluid system without isolating and safety tagging the system. IDENTIFY which of the following conditions is NOT valid.

- a. The scope of work does NOT require breaching of pressure boundaries.
- b. The work scope is considered post maintenance followup of a minor nature necessary to satisfy post maintenance testing requirements.
- c. The scope of work has been evaluated by the Responsible Maintenance Group Supervisor and Shift Supervisor and it has been determined that both worker and plant safety will NOT be compromised, AND the boundary that would ~~be~~ established by the tagout WOULD provide personnel or equipment protection.
- d. The work must be performed to ENHANCE plant reliability and safety AND the boundaries to be established would also REDUCE reliability and safety of the plant.

QUESTION: 086 (1.00)

Which of the responsibilities listed below is correct for watchstanders?

- a. A qualified watchstander may direct a trainee to take the required watchstation readings provided the watchstander was directed by the SS or CRS to perform a higher priority task and the watchstander takes full responsibility for reviewing the accuracy and completeness of the logs.
- b. Under minimum crew conditions, the CRS may direct a watchstander qualified on both units to take daily logs of both units' watchstations.
- c. Any log reading required by Technical Specifications which is out of its allowable range shall be reported to the control room immediately following the completion of the inspection round.
- d. In the event plant conditions preclude taking log readings within the specified time limit, readings may be omitted provided prior approval is obtained from either the SS or CRS.

QUESTION: 087 (1.00)

Units 1 and 2 are operating at rated power with minimum shift staffing. A loss of offsite power causes both units to trip. The Control Room Supervisor (CRS) begins implementing EOP-0, "Post-Trip Immediate Actions", for Unit 1. Which one of the following individuals is responsible for implementing EOP-0 as the CRS for Unit 2?

- a. Shift Supervisor
- b. Control Room Operator, Unit 2
- c. Shift Technical Advisor
- d. Plant Watch Supervisor



QUESTION: 088 (1.00)

Certain plant conditions require the establishment of a fire watch patrol. Which one of the following describes the normal control room reporting time(s) for the fire watch patrol?

- a. At the beginning, middle and end of shift only
- b. At the beginning and middle of shift only
- c. Every two hours on the hour
- d. Every hour on the hour

QUESTION: 089 (1.00)

Which ONE of the following describes the method to be used to perform the second check of a locked closed manual valve?

- a. Attempt to move the valve operator in the closed direction without removing the locking device.
- b. Remove the locking device and attempt to move the valve in the closed direction only, then relock the valve.
- c. Verify the locking device is installed properly without any attempt to move the valve and use valve stem rise to determine position.
- d. Remove the locking device, open the valve  $1/8$  of a turn, turn the valve in the opposite direction until tightly closed, then reinstall the locking device.

QUESTION: 090 (1.00)

For a Design Base Loss of Coolant Accident, what is the major contributor of hydrogen in the containment building?

- a. Metal water reaction
- b. Corrosion
- c. RCS hydrogen overpressure
- d. radiolysis

QUESTION: 091 (1.00)

Following a RAS, \_\_\_\_\_ prevents stress corrosion cracking of certain metals in containment by raising the pH of the recirculated borated water solution to a final value of 7.0.

- a. Lithium hydroxide
- b. Ammonia
- c. Morphaline
- d. Trisodium phosphate

QUESTION: 092 (1.00)

An operator makes a request to work the following hours:

BEGIN		END
4/4/94 - 1800		4/5/94 - 0600
4/5/94 - 1800		4/6/94 - 0700
4/6/94 - 1900		4/7/94 - 0600
4/7/94 - 1800		4/8/94 - 0600
4/8/94	OFF	4/9/94
4/10/94 - 0700		4/10/94 - 1900
4/11/94 - 0600		4/11/94 - 1900

Which of the following describes the response the supervisor should make to this request?

- Grant the request because it meets CCI-159 overtime limit requirements.
- Deny the request because it fails to meet the 7 day period overtime requirement of CCI-159.
- Deny the request because it fails to meet the 48 hour period overtime requirement of CCI-159.
- Deny the request because it fails to meet both the 7 day and 48 hour period overtime requirements of CCI-159.

QUESTION: 093 (1.00)

The purpose of the Operational Support Center (OSC) is to provide:

- a. technical support to plant operations personnel during emergency conditions.
- b. management of overall BG&E response during emergency conditions.
- c. coordination of radiological and environmental assessment and receipt and analysis of all field monitoring data during emergency conditions.
- d. plant operational, radiological, chemistry, maintenance, and materials support during emergency conditions.

QUESTION: 094 (1.00)

A VERY HIGH RADIATION AREA means an area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of \_\_\_\_\_ in one hour at \_\_\_\_\_ from a radiation source or from any surface that the radiation penetrates. FILL in the blanks from the choices given below

- a. 100 millirem; 30 centimeters
- b. 1000 millirem; 30 centimeters
- c. 100 rads; one meter
- d. 500 rads; one meter

QUESTION: 095 (1.00)

WHICH ONE of the following individuals should be DENIED access to the protected area at Calvert Cliffs?

- a. A control room operator who has consumed two cans of beer at home at 10:00 am prior to reporting to work at 4:00 pm.
- b. A maintenance employee who shared a bottle of wine with his wife at a 6:00 pm dinner party prior to being called in for unscheduled repair work at 10:00 pm and who tested to 0.05 blood alcohol concentration when he arrived on site.
- c. A contractor employee called in for emergency maintenance at 11:00 pm, who notified security that he had been to a happy hour at his motel at 5:00 pm and who tested to 0.03 blood alcohol concentration when he arrived on site.
- d. A health Physics technician who was found to have a cooler full of UNOPENED beer in the trunk of his car in the main parking lot outside the protected area.



QUESTION: 096 (1.00)

Identify on which of the following level instruments you would expect to find a RED Zoneband.

- a. Reactor vessel level indicator
- b. Pressurizer level indicator
- c. Steam generator level indicator
- d. Refueling Water Tank level indicator

QUESTION: 097 (1.00)

Following a plant trip from 100% power, the following plant conditions are noted:

core burnup	-	8,000 MWD/MTU
RCS Tc	-	522 deg. F and decreasing
ADVs	-	in auto; full closed
TBVs	-	in auto; full closed
11 S/G level	-	-100"
12 S/G level	-	-88"
S/G pressure	-	827 psia decreasing slightly
AFW	-	secured
MFW	-	in auto; increasing level to 0"
RCPs	-	all 4 running
PZR level	-	115" and decreasing
PZR pressure	-	2010 psia and decreasing

EOP-0 has been implemented. The cause for the above plant condition is:

- a. Excess steam demand with low amount of available decay heat
- b. Misoperation of the ADVs, TBVs or a stuck open S/G safety
- c. Excessive feedwater flow
- d. Small RCS leak

QUESTION: 098 (1.00)

Unit 2 has experienced a small break LOCA. Using the following plant conditions calculate the subcooling margin.

CET temperature	-	600 deg. F
RCPS	-	all 4 stopped
PZR level	-	300"
T <sub>hot</sub>	-	590 deg. F
T <sub>cold</sub>	-	560 deg. F
PZR pressure	-	1480 psia (lowest)-1490 psia (highest)

- a. 5 deg. F subcooled
- b. 0 deg. F subcooled
- c. 5 deg. F above saturation temperature
- d. 10 deg. F above saturation temperature

QUESTION: 099 (1.00)

The plant has experienced a LOCA with the following plant conditions:

CET	-	510 deg. F
RWT level	-	22'10"
PZR level	-	180"
T <sub>hot</sub>	-	500 deg. F
T <sub>cold</sub>	-	480 deg. F
PZR pressure	-	1320 psia (lowest)-1335 psia (highest)
RCP	-	all 4 OFF

Based upon the above plant conditions, which of the following action should the operator take in response to this event?

- Verify that SIAS, CIS and CSAS have properly initiated and realign safety injection to a recirculation mode upon receipt of a RAS.
- Establish and maintain core and RCS heat removal via natural circulation.
- Establish and maintain natural circulation flow while adjusting HPSI flow to provide inventory control.
- Maximize charging, minimize letdown, and monitor core and RCS heat removal for further degradation.

(\*\*\*\*\* END OF EXAMINATION \*\*\*\*\*)

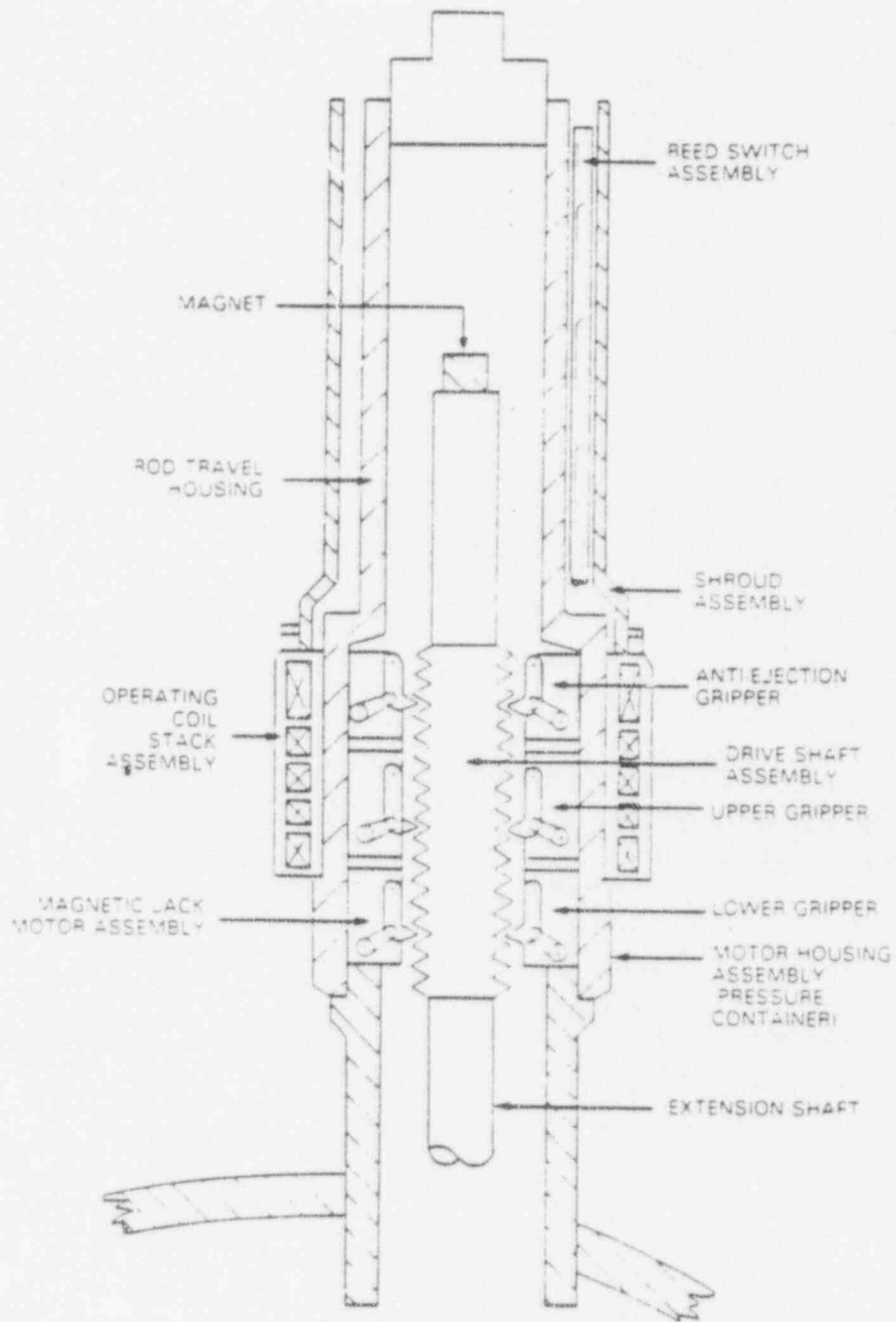


FIGURE 1  
 BASIC CONTROL ELEMENT DRIVE MECHANISM

## ANSWER KEY

## MULTIPLE CHOICE

- 001 d  
 002 b  
 003 MATCHING (2.0)  
~~a 4~~ deleted  
 b 2  
~~e 4~~ deleted  
 d 6

## MULTIPLE CHOICE

- 004 c  
 005 d  
 006 b  
 007 c  
 008 c  
 009 c  
 010 d  
 011 a  
 012 b  
 013 b  
 014 d  
 015 a  
 016 d  
 017 a

- 018 d  
 019 a  
 020 d  
 021 b  
 022 c  
 023 d  
 024 b  
 025 a  
 026 d  
 027 MATCHING (1.0)  
 a 4  
 b 5  
 c 6

## MULTIPLE CHOICE

- 028 a  
 029 d  
 030 d  
 031 b  
 032 c  
 033 d  
 034 b  
 035 b  
 036 b



## A N S W E R   K E Y

077    MATCHING (10)

a    3

b    4

c    6

d    1

095    b

096    d

097    c

098    c

099    b

## MULTIPLE CHOICE

078    d

079    c

080    c

081    c

082    a

083    d

084    b

085    c

086    d

087    d

088    d

089    a

090    d

091    d

092    c

093    d

094    d

(\*\*\*\*\* END OF EXAMINATION \*\*\*\*\*)