



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA STREET, N.W., SUITE 2900  
ATLANTA, GEORGIA 30323-0199

Report Nos.: 50-424/95-300 and 50-425/95-300

Licensee: Georgia Power Company

Docket Nos.: 50-424 and 50-425

License Nos.: DPR-71 and DPR-62

Facility Name: Alvin W. Vogtle Electric Generating Plant Units 1 and 2

Examination Conducted: December 11-15, 1995

Chief Examiner:

Richard S. Baldwin  
Richard S. Baldwin

1-11-96  
Date Signed

Accompanying Personnel: J. Bartley  
J. Moorman

Approved by:

Thomas A. Peebles  
Thomas A. Peebles, Chief  
Operator Licensing and Human  
Performance Branch  
Division of Reactor Safety

1/14/96  
Date Signed

SUMMARY

Scope:

NRC examiners and facility training personnel conducted an announced, pilot operator licensing initial examination during the period of December 11-15, 1995. The Facility administered the written examination on December 15, and the NRC examiners administered the operating examinations on December 11-14, 1995. All of the examinations were administered under the guidelines of the "Examiner Standards (ES)", NUREG-1021, Revision 7, and the requirements of 10 CFR 55, to six Senior Reactor Operator (SRO) and two Reactor Operator (RO) candidates.

## Results:

The examiners identified crew communications and board manipulations as areas needing improvement (paragraph 2.b).

## Candidate Pass/Fail:

	SRO	RO	Total	Percent
Pass	6	1	7	87.5%
Fail	0	1	1	12.5%

A post-examination analysis of written examination questions answered incorrectly revealed that greater than 50 percent of the candidates missed 4 questions in various topic areas (paragraph 2.b).

The examiners identified areas for improvement in the area of examination development (paragraph 2.c).

No violations or deviations were identified.

## REPORT DETAILS

### 1. Persons Contacted

- \*J. Beasley, Plant Manager
- \*C. Christiansen, Supervisor Safety Audit Engineering Review
- \*R. Dorman, Plant Training and EP Manager
- \*D. Huyck, Manager Nuclear Security
- \*L. Ray, Operations Training Supervisor
- \*A. Rickman, Independent Safety Engineering Group
- \*C. Tippins, Nuclear Specialist, NSAC
- \*T. Webb, Senior Engineer, NSAC

Other licensee employees contacted included instructors, engineers, technicians, operators, and office personnel.

#### NRC Personnel

- \*C. Ogle, Senior Resident Inspector

\*Attended exit interview

### 2. Discussion

#### a. Scope

Facility training personnel and NRC examiners conducted an announced, pilot operator licensing initial examination during the period of December 11-15, 1995. The Facility administered the written examination on December 15, and the NRC examiners administered the operating examinations on December 11-14. All of the examinations were administered under the guidelines of the "Examiner Standards (ES)," NUREG-1021, Revision 7, and the requirements of 10 CFR 55, to six Senior Reactor Operator (SRO) and two Reactor Operator (RO) candidates.

#### b. Candidate Performance

The examiners evaluated the candidates' performance during simulator scenarios and JPMS using the guidelines of NUREG-1021, "Examiner Standards," Revision 7, Supplement 1, and the requirements of 10 CFR 55 and concluded that the candidates' performance was generally satisfactory. All six of the SRO and one of the two RO candidates passed the operating tests. Three of the SRO candidates were considered to be marginal passes due to failure of one administrative topic.

During the performance of the simulator examinations, the examination team noted two areas where improvement was needed. The first concerned crew communications. Crew communications were considered marginal. Operator candidates did not require repeat

backs from other operator candidates. Individuals used local colloquialisms when describing plant characteristics (i.e.; "The rods are falling!"). Senior operator candidates provided very few crew briefings. The other area where improvement was needed was control board manipulations. Several errors were made due to the operator candidates not manipulating the correct control board equipment. An example of this was when an operator manipulated the letdown heat exchanger temperature controller instead of the letdown pressure controller. Other examples of poor performance during board manipulations were the lack of recognition of plant equipment not automatically starting following a safety injection signal, incorrect use of the boric acid totalizer while attempting to borate the reactor coolant system, and poor control of the atmospheric relief valves in attempting to cool down the reactor coolant system.

While the candidates' performance on the written examination test was generally satisfactory, an item analysis indicated generic weaknesses. This analysis revealed four questions with greater than 50 percent of the candidates choosing incorrect answers. The number of candidates and the areas the candidates missed are listed below. Six of the eight candidates did not know the count rate at which personnel would be considered contaminated with specific conditions provided (Question #7 RO/#7 SRO). Five of the eight candidates could not calculate the correct subcooling for conditions provided (Question #19 RO/#24 SRO). Six of eight candidates were unable to determine the correct statements concerning the design of the reactor coolant pump shaft seals (Question #16 RO/#20 SRO). Six of eight candidates were unable to predict the magnitude of the output signal from the reactor control unit for a step change in power with reactor power at two different power levels (Question #27 RO/#34 SRO).

All six of the SRO and one of the two RO candidates passed the written examinations.

c. Examination Development

(1) Written Examination Development

The written examination submitted by the licensee 30 days prior to the administration date, did not meet the requirements set forth in the corporate notification letter enclosure, "Pilot Examination Guidelines," dated August 10, 1995. The questions were not written at the comprehension, analysis or application level. The proposed examination did not discriminate a satisfactory operator from a less-than-

satisfactory operator. Considerable effort was expended by both the NRC and the licensee to make the examination acceptable. The following were examples of problems.

- (a) Distractors were a series of true and false statements resulting in an unfocused test item.
- (b) Distractors were not homogeneous resulting in answers which stood out from the other distractors.
- (c) Information in the question stem revealed the answer without testing the desired concept.
- (d) Questions contained distractors which were not plausible and readily eliminated.
- (e) Questions which were modified from facility examination bank questions did not contain sufficient changes to be classified as "modified."
- (f) Questions contained distractors which were additional correct answers.

The examination author worked diligently to resolve the NRC comments. He was very cooperative in working to develop an acceptable examination. The examiners determined that the poor quality of the initial examination submittal was due to the author's lack of experience in examination development and his unfamiliarity with NUREG-1021, "Operator Licensing Examiner Standards," and NUREG/BR-0122, "Examiner Handbook." The examiners also concluded that a detailed supervisory review by licensee staff familiar with the examination process would have identified most of these problems prior to submittal to the NRC.

## (2) Walk-through Examination Development

The 30-day submittal for the walk-through portion of the examination contained prescribed, follow-up questions that were considered to be direct look-up questions. The facility licensee made the interpretation, for example, if a topic area addressed a question concerning Technical Specifications, the stem of the question could be written, such that, it did not provide the reference to the Technical Specifications. Using this philosophy, the facility licensee did not consider this to be a direct look-up question. This assumption was contrary to the guidance provided in ES-602-1 as required by the corporate notification letter enclosure. If a question allowed the

candidate an opportunity to look up the answer and extract the answer verbatim with the use of one reference, whether or not it was listed in the stem of the question, this type of question was considered a direct look-up. Due to time constraints, the examination team corrected this problem by limiting the use of reference material available during the walk-through examination. Additionally, the examination team re-wrote some of the questions that were simple knowledge or direct look-up in order to produce an acceptable examination. By limiting the use of reference material, this created an additional problem, in that, the walk-through examination is supposed to be an open reference examination tool to determine the candidates knowledge with the use of plant reference material. The walk-through prescribed questions should have been written to the comprehension, analysis, or application level; however, they were not.

(3) Simulator Examination Development

The 30-day submittal of simulator scenarios in general was acceptable. The simulator scenarios had been reviewed and enhancements were recommended by regional reviewers prior to the 30-day submittal. The initially submitted scenarios were straight forward but did not place the operators in areas of decision making steps using decision paths within the Emergency Operating Procedures. Additionally, enhancements were made to construct the initial conditions for each scenario as similar as possible. This allows for decreased candidate stress and prevents the candidates from formulating preconceived ideas of the events that could take place based upon the initial conditions. Enhancements to scenarios also incorporated additional malfunctions that provided a well defined flow to the scenario set. These improvements provided a better evaluation tool for determining satisfactory as well as less-than-satisfactory performance.

d. Examination Administration

In general, the examination administration went smoothly. There was one problem with one of the Job Performance Measures (JPMs), in that, the procedure used for validation during the preparation week was revised one week prior to the administration of the examination. This revision was not detected until the JPM was administered. Every effort should be made to ensure the examination team is presented with current information being tested in order to administer a fair and correct examination.

3. Exit Interview

At the conclusion of the site visit, the examiners met with representatives of the plant staff listed in paragraph 1 to discuss the results of the examinations. The licensee did not identify as proprietary any material provided to, or reviewed by the examiners. No dissenting comments were received.

SIMULATOR FACILITY REPORT

Facility Licensee: Vogtle

Facility Docket No.: 50-424, 50-425

Operating Tests Administered On: December 11-15, 1995

This form is to be used only to report observations. These observations do not constitute, in and of themselves, 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 solely in response to these observations.

During the performance of Job Performance Measure, RQ-JP-37011-001-02, "Establish Natural Circulation," one operator was led to believe he was establishing natural circulation with the steam dumps without the steam dumps available. When the simulator was placed in run in a condition without natural circulation, the operator incorrectly attempted to achieve natural circulation with the steam dumps which were not available. The simulator eventually achieved natural circulation effectively without operator action.



RESOLUTION OF FACILITY COMMENTS

Facility Comments on the RO written examination:

The facility's post examination review of the written test shows that question 46 on the RO exam has two correct answers. The question asks for the procedurally used normal makeup supply to the spent fuel pool. There are two correct answers, choices "C" and "D," to this question based on the controlling plant procedure.

Facility Justification: System Operating Procedure 13719-1 lists the Refueling Water Storage Tank, the Demineralized Water System, and the Reactor Makeup Water Storage Tank as the possible sources for makeup to the Spent Fuel Pool. The procedure does not identify any of the sources as the "normal" makeup source. Since choices "C" and "D" each list a source from the controlling procedure, they are both correct.

NRC Resolution:

Accept facility comment. Answer "c" (in addition to answer "d") on question 46 of the RO exam was accepted as correct.

RO Exam  
PLANT VOGTLE TRAINING DEPT.

GRADING KEY for EXAM: NRC (RO) Test  
ASSEMBLED IN MANUAL MODE.

Total Points: 100.00

Page 1

- 1. (1.00pt)  
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- 2. (1.00pt)  
b.
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b.
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- 12. (1.00pt)  
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- 13. (1.00pt)  
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- 14. (1.00pt)  
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- 15. (1.00pt)  
c.
- 16. (1.00pt)  
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EXAM KEY

- 17. (1.00pt)  
a.
- 18. (1.00pt)  
c.
- 19. (1.00pt)  
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- 20. (1.00pt)  
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- 21. (1.00pt)  
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b.
- 33. (1.00pt)  
d.
- 34. (1.00pt)  
b.



EXAM KEY

35. (1.00pt)  
d.

36. (1.00pt)  
c.

37. (1.00pt)  
b.

38. (1.00pt)  
c.

39. (1.00pt)  
d.

40. (1.00pt)  
b.

41. (1.00pt)  
b.

42. (1.00pt)  
c.

43. (1.00pt)  
b.

44. (1.00pt)  
c.

45. (1.00pt)  
a.

46. (1.00pt) c. *OR D of 12-19-95*

47. (1.00pt)  
a.

48. (1.00pt)  
a.

49. (1.00pt)  
b.

50. (1.00pt)  
a.

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PLANT VOGTLE TRAINING DEPT.

GRADING KEY for EXAM: NRC RO Test  
ASSEMBLED IN MANUAL MODE.

Total Points: 100.00

Page 3

- 51. (1.00pt)  
c.
  - 52. (1.00pt)  
b.
  - 53. (1.00pt)  
b.
  - 54. (1.00pt)  
b.
  - 55. (1.00pt)  
a.
  - 56. (1.00pt)  
c.
  - 57. (1.00pt)  
a.
  - 58. (1.00pt)  
a.
  - 59. (1.00pt)  
c.
  - 60. (1.00pt)  
b.
  - 61. (1.00pt)  
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d.
  - 63. (1.00pt)  
c.
  - 64. (1.00pt)  
b.
  - 65. (1.00pt)  
a.
  - 66. (1.00pt)  
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d
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EXAM KEY

68. (1.00pt)  
d.

69. (1.00pt)  
d.

70. (1.00pt)  
d.

71. (1.00pt)  
a.

72. (1.00pt)  
d.

73. (1.00pt)  
a.

74. (1.00pt)  
d.

75. (1.00pt)  
a.

76. (1.00pt)  
d.

77. (1.00pt)  
a.

78. (1.00pt)  
b.

79. (1.00pt)  
c.

80. (1.00pt)  
d.

81. (1.00pt)  
b

82. (1.00pt)  
d.

83. (1.00pt)  
d.

84. (1.00pt)  
d.

85. (1.00pt)  
c.

EXAM KEY

- 86. (1.00pt)  
a.
- 87. (1.00pt)  
c.
- 88. (1.00pt)  
b.
- 89. (1.00pt)  
c.
- 90. (1.00pt)  
a.
- 91. (1.00pt)  
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- 92. (1.00pt)  
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- 93. (1.00pt)  
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- 94. (1.00pt)  
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- 96. (1.00pt)  
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PLANT VOGTLE TRAINING DEPT.

M A S T E R     K E Y

FOR

EXAM: NRC RO Test

Total Points: 100.00

ASSEMBLED IN MANUAL MODE.



EXAM KEY  
RO Exam

- =====
1. Q: A room you must enter in the auxiliary building is locked and posted with a general area dose rate of 1050 mrem/hr. The key to the room will be identified by a \_\_\_\_\_ and can be obtained from the \_\_\_\_\_.
- a. a red tag; HP supervisor.
  - b. a yellow tag; HP supervisor.
  - c. a yellow tag; support shift supervisor.
  - d. a red tag with a yellow dot; support shift supervisor.

A: b.

R: 00008-C,  
EB#: LO-LP-63008-01-01

Point Value: 1.00

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2. Q: Unit 1 is in a refueling outage. Train "A" ESFAS testing was started and then stopped to perform ILRT testing on critical path. The ILRT test took 27 hours to complete. Which ONE the following correctly states the required actions to be taken in order to restart the ESFAS test?
- a. The section of the ESFAS test that was in progress must be performed over again.
  - b. The initial conditions must be reverified and then the procedure may be restarted at the section where suspended if desired.
  - c. Since the control room personnel agree that nothing has changed that affects the section of the Train "A" ESFAS test being run, the test must be restarted at the same place where it was suspended.
  - d. Tests cannot be suspended. The ESFAS test must be started over from the beginning and run to completion.

A: b.

R: 00054-C,  
EB#: LO-LP-63054-01-06

Point Value: 1.00

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EXAM KEY  
RO Exam

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3. Q: The RO has been asked to meet with the Operations Manager outside the control room. Which ONE of the following is the MAXIMUM time that the RO can be away from his post WITHOUT conducting a full shift turnover?

- a. 30 minutes
- b. 45 minutes
- c. 1 hour
- d. 2 hours

A: b.

R: LO-LP-63504-04,  
EB#: LO-LP-63504-04-01

Point Value: 1.00

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4. Q: A clearance must be released to support the ongoing Unit 1 outage, but the subclearance holder is offsite. Which ONE of the following is the correct action to remove the subclearance holder from the clearance?

- a. The subclearance holder's supervisor can sign for him after determining the work is not affected by the clearance release.
- b. The subclearance holder's supervisor must complete a Subclearance Release Form and have it approved by the Shift Superintendent.
- c. The Clearance & Tagging Supervisor may sign-off the subclearance holder after verifying safe conditions exist.
- d. The Shift Superintendent must attach a justification for the subclearance removal to the clearance prior to signing for the subclearance holder.

A: b.

R: LO-LP-63304-01,  
EB#: LO-LP-63304-01-01

Point Value: 1.00

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KEY CONTINUED ON NEXT PAGE

EXAM KEY  
RO Exam

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5. Q: The Reactor Operator (RO) is returning to shift after 2 weeks vacation.

Which ONE of the following describes how far back the RO is required to review the Unit Control Log ?

- a. 24 hours
- b. 3 days
- c. 5 days
- d. 7 days

A: b

R: 10004-C,  
EB#: LO-LP-63504-01-01

Point Value: 1.00

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6. Q: Maintenance would like to remove the clearance on a breaker so they can cycle it in the TEST position. Which ONE of the following correctly describes how this should be accomplished?

- a. The hold tags must be temporarily removed, and a hold tag must be placed on the racking device.
- b. The hold tags must remain on the breaker and a caution tag must be placed on the racking device.
- c. The hold tags must be removed via a clearance release or functional release.
- d. The hold tags can only be removed by closing out the clearance.

A: c

R: 00306-C,  
EB#: LO-LP-63304-11-03

Point Value: 1.00

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EXAM KEY  
RO Exam

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7. Q: Given the following conditions:

- \* You are performing a whole body frisk using a portable frisker.
- \* Background radiation is at the MAXIMUM allowed level for performing a whole body frisk.

Which ONE of the following is the count rate at which you are considered to be "Contaminated"?

- a. 100 counts per minute
- b. 200 counts per minute
- c. 300 counts per minute
- d. 400 counts per minute

A: c.

R: LO-LP-63930-03,  
EB#: LO-LP-63930-03-01

Point Value: 1.00

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EXAM KEY  
RO Exam

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8. Q: Given the following:

- An operating procedure is being performed to restore a system to service following system maintenance during an outage.
- An error is discovered in the sequence of steps in the procedure which, if performed, would result in starting a pump without the required seal water.

Which ONE of the following actions should be taken ?

- a. Obtain the Unit Shift Supervisor's permission to perform the steps out of sequence.
- b. Stop the performance of the procedure at the incorrect step, and request a procedure change.
- c. Continue with the procedure, performing the steps in the correct sequence, since the errors are obviously typographical.
- d. Continue with the procedure performing the steps in the correct sequence, and request a procedure change to correct the order of the steps after completion.

A: b

R: 00054-C, LOL63054,  
EB#: LO-LP-63054-01-07

Point Value: 1.00

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EXAM KEY  
RO Exam

- =====
9. Q: A Fire Team consisting of at least \_\_\_\_ members (including a team leader) shall be maintained on site at all times. The Fire Team leader is designated by \_\_\_\_, per procedure.
- a. 4, the Shift Superintendent.
  - b. 5, the Shift Superintendent.
  - c. 4, the C & T Supervisor.
  - d. 5, the C & T Supervisor.

A: b.

R: 10003-C, PG 2, 10000-C, PG1 & 2,  
EB#: LO-LP-63503-05-08

Point Value: 1.00

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10. Q: Which ONE of the following statements concerning Standing Orders is correct?
- a. Standing Orders give special instructions for back shifts, weekends, and holidays.
  - b. Standing orders are used to modify existing plant procedures.
  - c. Standing orders are temporary instructions to plant operating personnel.
  - d. Standing orders address subjects limited to plant operating procedures.

A: c.

R: 10002-C, REV.5,  
EB#: LO-LP-63502-01-01

Point Value: 1.00

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EXAM KEY  
RO Exam

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11. Q: You are performing an operating procedure task involving multiple valve manipulations under the direction of the control room operator who is acting as the procedure coordinator.

Which ONE of the following is correct regarding performance of this task ?

- a. Write the valve numbers down on a piece of paper, perform the task, report back each specific valve position.
- b. Write the valve numbers down on a piece of paper, perform the task, report back that the valves are in the proper position.
- c. Use an actual copy of the procedure or procedure steps, perform the task, report back each specific valve position.
- d. Use an actual copy of the procedure or procedure steps, perform the task, report back that the valves are in their proper position .

A: c

R: 00054-C,  
EB#: LO-LP-63136-03-01

Point Value: 1.00

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EXAM KEY  
RO Exam

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12. Q: A low hydrogen pressure alarm has occurred on unit 2. Using the attached procedure 18010-C, MAIN GENERATOR MALFUNCTION Attachment "A" " Estimated Capability Curve", determine the corrective action to be taken for the conditions listed.

Generator Hydrogen Pressure	45 psig
Generator MW's	1150
Generator MVAR's	100 lagging

- a. Increase Generator Voltage
- b. Decrease Generator Voltage
- c. Reduce Turbine Load (MW)
- d. No action required

A: c.

R: 18010-C,  
EB#: LO-LP-60310-05-01

Point Value: 1.00

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13. Q: Who, by title, must authorize actions to be taken in accordance with 18015-C, SECONDARY PLANT CHEMISTRY, upon confirmation of one or more chemistry parameters outside normal operating range while in Mode 1?

- a. General Manager.
- b. Unit Superintendent.
- c. Shift Superintendent.
- d. Chemistry Duty Foreman.

A: a.

R: 18015-C,  
EB#: LO-LP-60313-02-01

Point Value: 1.00

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EXAM KEY  
RO Exam

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14. Q: With the unit at 65% power, N-43 Power Range Channel fails HIGH. Manual rod withdrawal is blocked by which ONE of the following?

- a. C-5
- b. C-2
- c. C-1
- d. C-4

A: b.

R: LOGICS,  
EB#: LO-LP-27101-07-15

Point Value: 1.00

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15. Q: Which ONE of the following statements is correct concerning indicated charging flow during normal, steady-state operation?

- a. Will be equal to indicated letdown flow.
- b. Will be less than indicated letdown flow.
- c. Will be equal to indicated letdown flow plus seal return flow.
- d. Will be equal to indicated letdown flow minus seal return flow

A: c.

R: CHAP 5A-26,  
EB#: LO-LP-09001-07-02

Point Value: 1.00

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EXAM KEY  
RO Exam

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16. Q: Which ONE of the following statements is correct regarding the DESIGN of the RCP shaft seals ability to withstand full RCS pressure?
- a. Only the #1 seal is capable of withstanding full RCS pressure.
  - b. Seals #1 and #2 are independently capable of withstanding full pressure but only for 30 minutes.
  - c. Seals #1 and #2 are independently capable of withstanding full pressure indefinitely.
  - d. Seal #1 is capable of withstanding full pressure indefinitely but seal #2 is only capable of withstanding full pressure for only 30 minutes.

A: d.

R: LO-LP-16401,  
EB#: LO-LP-16401-03-06

Point Value: 1.00

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17. Q: Which ONE of the following conditions is NOT necessary to generate an AMSAC actuation signal?
- a. 2/2 MFP's tripped
  - b. Turbine load greater than 40%.
  - c. Load dependent variable time delay expired.
  - d. 3 of 4 selected feed flow channels < setpoint.

A: a.

R: 12004-C,R20,PG.15, LOGICS,  
EB#: LO-LP-28301-02-01

Point Value: 1.00

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EXAM KEY  
RO Exam

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18. Q: Which one of the following is correct concerning the Channel Defeat lamp on the PR Detector Current Comparator Drawer:
- a. Indicates one channel signal not being averaged with the other three channels; lit at power under normal conditions.
  - b. Indicates one channel signal not being input to the auctioneered low circuit; lit at power under normal conditions.
  - c. Indicates one channel signal not being averaged with the other three channels; NOT lit at power under normal conditions.
  - d. Indicates one channel signal not being input to the auctioneered low circuit; NOT lit at power under normal conditions.

A: c.

R: CH 3C, SEC.II.B,  
EB#: LO-LP-17301-08-03

Point Value: 1.00

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EXAM KEY  
RO Exam

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19. Q: Given the following conditions:

- RCS Wide Range pressure 1635 psig
- Pressurizer Pressure 1710 psig
- RCS Hot Leg temperatures 571 degrees F
- RCS Cold Leg temperatures 560 degrees F
- Core Exit Thermocouple temperatures 568 degrees F

Which ONE of the following is the correct amount of subcooling for the above listed conditions ?

- a. 38 degrees F.
- b. 41 degrees F.
- c. 47 degrees F.
- d. 49 degrees F.

A: b.

R: None  
EB#: LO-LP-37012-15-01

Point Value: 1.00  
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20. Q: Which ONE of the following correctly states the requirements needed to reset a "Phase A Containment Isolation" signal actuated from an SI actuation?

- a. 1/2 handswitches to RESET: SI signal can still be present.
- b. 1/2 handswitches to RESET: SI signal must be cleared.
- c. 2/2 handswitches to RESET: SI signal can still be present.
- d. 2/2 handswitches to RESET: SI signal must be cleared.

A: c.

R: 1X6AA02, SHT 8,  
EB#: LO-LP-29160-05-01

Point Value: 1.00  
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KEY CONTINUED ON NEXT PAGE

EXAM KEY  
RO Exam

- =====
21. Q: A plant startup is in progress at 90% power. Main Feed Pump "A" trips and it's discharge valve goes SHUT. Which ONE of the following describes the required operator action(s) ?
- a. Run speed to zero (0) on the GE and Westinghouse controllers, reset the feed pump, and bring back on the GE potentiometer while emergency borating the RCS.
  - b. Reduce Turbine load to less than 850 MWe, start the third condensate pump, and insert rods to match Tave/Tref.
  - c. Trip the reactor and go to 19000-C, REACTOR TRIP OR SAFETY INJECTION if the Main Feed Pump cannot be restarted.
  - d. Push the LOAD SETBACK pushbutton on the Turbine Control Panel on the QMCB and emergency borate the RCS.

A: b.

R: 18016-C,  
EB#: LO-LP-60314-02-03

Point Value: 1.00

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22. Q: After a MANUAL Reactor Trip, which ONE of the following will close the Main Feed Isolation Valves?
- a. Cycling of the Rx Trip Breakers.
  - b. Low-Low level in all S/G's.
  - c. Trip of both Main Feedwater Pumps.
  - d. T average decreasing below 564 deg F.

A: d.

R: LCGICS,  
EB#: LO-LP-18201-07-10

Point Value: 1.00

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EXAM KEY  
RO Exam

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23. Q: Given the following sequence of events:

1. A Reactor trip occurred on Unit 1 causing a LO-LO level in all SG's.
2. All AFW pumps start with discharge valves full open.
3. The BOP throttles AFW flow to 10% OPEN position on all discharge valves.
4. Level has been returned to 60-70% NR level in all SG's.
5. Both MFPS trip.

Which ONE of the following states the position of the discharge valves if left unattended for 5 minutes?

- a. The MDAFW and the TDAFW discharge valve positions would not change.
- b. The TDAFW valves would stay as they are and the MDAFW valves would stroke full open.
- c. The MDAFW valves would stay as they are and the TDAFW valves would stroke full open.
- d. The MDAFW and TDAFW valves would stroke to the full open position.

A: b.

R: 13d, 1X5DN121,  
EB#: LO-LP-20101-04-05

Point Value: 1.00

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EXAM KEY  
RO Exam

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24. Q: Which ONE of the following must be performed prior to the Chemistry Department sampling the liquid radwaste system tank contents?
- a. The required Release Permit must be approved by the USS.
  - b. The sample area for the liquid radwaste system tank must be Caution Taped off due to airborne radiation concerns.
  - c. A clearance must be performed that will isolate the tank to prevent the over pressurization of the sample point.
  - d. The tank must be recirculated prior to the sample being taken.

A: d.

R: 13214-1,  
EB#: LO-LP-47110-04-03

Point Value: 1.00

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EXAM KEY  
RO Exam

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25. Q: Given the following plant parameters following a Reactor Trip:

- \* Tave is 430 deg F
- \* Steam Generator Pressure is 550 psig
- \* Pressurizer Pressure is 1890 psig
- \* All SG levels are 45% NR
- \* Containment Pressure is 0.5 psig

Which ONE of the following statements is TRUE?

- a. Adverse Containment numbers will NOT be required until containment pressure reaches 21.5 psig.
- b. A Main Steamline Isolation signal should have actuated.
- c. A Containment Spray signal should have actuated.
- d. A Safety Injection signal will not be required.

A: b.

R: LO-LP-21102-15,  
EB#: LO-LP-21102-15-01

Point Value: 1.00

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EXAM KEY  
RO Exam

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26. Q: A HIGH alarm on which ONE of the following radiation monitors will result in an automatic actuation of ESFAS equipment?

- a. SGBD process monitor, RE-0019.
- b. CVCS Letdown process monitor, RE-48000.
- c. Containment High Range monitor, RE-005.
- d. Control Room Air Intake monitor, RE-12116.

A: d.

R: CH 11A, TS 3.3.2,  
EB#: LO-LP-32101-12-05

Point Value: 1.00

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27. Q: Control rods are in AUTO. Compare the output signal from the Reactor Control Unit on a 2% step change in turbine load with power at 90% with a 2% step change at 40% power.

At 90% power the signal would be:

- a. The SAME as at 40% power
- b. LARGER due to the response of the Non-Linear Gain Unit
- c. SMALLER due to the response of the Non-Linear Gain Unit
- d. SMALLER due to the response of the Variable Gain Unit

A: d.

R: LO-LP-27101-07,  
EB#: LO-LP-27101-07-16

Point Value: 1.00

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EXAM KEY  
RO Exam

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28. Q: The normal flowpath of seal injection supplied by CVCS through the RCP #1 Seal is described by which ONE of the following?

- a. All of the leakoff passes through the #2 seal to the containment sump.
- b. Most of the flow returns via the #1 seal return line and the remainder flows down the pump shaft.
- c. Most of the flow goes down the pump shaft and the remainder goes down the #1 seal return line to the RCDT.
- d. Most of the flow goes down the pump shaft and the remainder comes back to the charging pump suction via the #1 Seal return line.

A: d.

R: CH 1A,  
EB#: LO-LP-16401-02-02

Point Value: 1.00  
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29. Q: Which ONE of the following describes the response of the containment coolers after an LOSP?

- a. All 4 coolers on the affected train start simultaneously on low speed.
- b. All 4 coolers on the affected train start simultaneously on high speed.
- c. All 4 coolers on the affected train start on low speed, however, the start of 2 of the coolers is delayed.
- d. All 4 coolers on the affected train start on high speed, however, the start of 2 of the coolers is delayed.

A: d.

R: None  
EB#: LO-LP-29130-02-01

Point Value: 1.00  
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EXAM KEY  
RO Exam

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30. Q: A manual reactor trip was initiated at 5% reactor power and a feedwater isolation signal was generated. Which ONE of the following must be performed to open the bypass feed reg valves.
- a. Momentarily close the reactor trip breakers only.
  - b. No action required, the FWI automatically resets.
  - c. Place both train A and train B FWI Reset Switches momentarily to the Reset position.
  - d. The Rx Trip Breakers must be closed and then the FWI Reset Switches held in the RESET position.

A: c.

R: LOGICS,  
EB#: LO-LP-18201-07-07

Point Value: 1.00

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31. Q: Which ONE of the following requires the immediate termination of a liquid radioactive release?
- a. Failure of RE-019, SGBD Process Monitor.
  - b. Dilution flow is 13500 gpm.
  - c. Release rate greater than that specified on the batch release permit.
  - d. Savannah River flow drops to less than 12,000 cu ft/sec due to drought conditions.

A: c.

R: CHAPTER 28,  
EB#: LO-LP-47110-05-01

Point Value: 1.00

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EXAM KEY  
RO Exam

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32. Q: Which ONE of the following tanks is continuously vented to the gaseous radwaste system during normal power operations?

- a. Waste Holdup Tank (WHUT).
- b. Volume Control Tank (VCT).
- c. Pressurizer Relief Tank (PRT).
- d. Refueling Water Storage Tank (RWST).

A: b.

R: 17C, SEC. I,  
EB#: LO-LP-46101-03-03

Point Value: 1.00

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33. Q: After a Reactor Trip, the TDAFW pump started and then tripped on mechanical overspeed due to a water slug through the turbine driver. Failure to close steam admission valve HV-5106 while resetting the Trip and Throttle Valve will result in which of the following conditions?

- a. Declaring the TDAFW pump INOPERABLE.
- b. Failure of the TDAFW pump to receive another start signal.
- c. Failure of the TRIP and Throttle Valve to reset.
- d. Failure of the Speed Governor Valve ramp circuit to reset.

A: d.

R: LO-LP-20101-10,  
EB#: LO-LP-20101-10-01

Point Value: 1.00

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EXAM KEY  
RO Exam

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34. Q: Which ONE of the following would be the response of VCT level indication on LI-185 if level transmitter LT-112 failed LOW. Assume VCT controls are in AUTO.
- a. VCT level indication on LI-185 indicates LOW.
  - b. VCT level indication on LI-185 continuously INCREASES until level reaches 97%.
  - c. VCT level indication on LI-185 continuously DECREASES until level reaches 5.7%.
  - d. VCT level indication would cycle between 30% and 50%.

A: b.

R: 17007-1,  
EB#: LO-LP-09101-03-01

Point Value: 1.00

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EXAM KEY  
RO Exam

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35. Q: Which ONE of the following correctly identifies those valves from the column below that receive an actuation signal on receipt of a manual SI?

1. CCP suction valves from VCT (112B & C).
2. CCP normal miniflow isolation valves (8111A & B).
3. RCP seal injection isolation valves (8103's).
4. RHR suction valves from RWST (8812A & B).
5. Accumulator discharge isolation valves (8808's).

- a. 2, 4, 5.
- b. 1, 3, 4.
- c. 2, 3, 5.
- d. 1, 2, 5.

A: d.

R: P&ID'S 1X4DB116-1,, 116-2,114,122,120,  
EB#: LO-LP-13001-01-04

Point Value: 1.00

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EXAM KEY  
RO Exam

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36. Q: With Unit 1 at 100% power, the RO takes the following data from the Power Range NI's. Assume the normalization factor for all detectors is 1.0.

Detector	N-41	N-42	N-43	N-44
UPPER	377	360	367	355
LOWER	370	360	365	360

Which ONE of the following is correct?

- a. QPTR is 1.017
- b. QPTR is 1.028
- c. QPTR is 1.034
- d. QPTR is 1.062

A: c.

R: LO-LP-17301-02,  
EB#: LO-LP-17301-02-01

Point Value: 1.00  
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37. Q: Which ONE of the following is an indication of an RCP # 1 seal failure?

- a. Affected RCP # 1 seal delta P increase.
- b. Affected RCP # 1 seal leakoff increase.
- c. Excess letdown header pressure decrease.
- d. Affected RCP seal injection flow decrease.

A: b.

R: None  
EB#: LO-LP-16401-04-01

Point Value: 1.00  
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EXAM KEY  
RO Exam

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38. Q: On unit 1, the Channel 1 Pressurizer Pressure instrument failed low. The BOP is tripping bistables per the appropriate AOP. The channel II Pressurizer Pressure instrument Low Pressure SI bistable is tripped instead of the Channel I bistable. An automatic reactor trip and safety injection occur. In order to terminate SI flow the control room operators must perform which of the following actions.

- a. Block the Pressurizer Low Pressure SI, then reset the SI.
- b. Block the Pressurizer Low Pressure SI, wait 60 seconds and then reset the SI.
- c. Wait 60 seconds and then reset the SI.
- d. Untrip the Channel II Low Pressure SI bistable and then reset the SI.

A: c.

R: 9A, LOGICS,  
EB#: LO-LP-13101-05-02

Point Value: 1.00

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EXAM KEY  
RO Exam

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39. Q: The Unit 1 BOP has initiated performance of OSP 14980-1, "DG Monthly Surveillance". Prior to starting DG 1A, the UNIT/PARALLEL switch is placed in the PARALLEL position. A drain valve breaks off in containment causing RCS pressure to drop to 1800 psig. Which ONE of the following CORRECTLY states the response of DG 1A and it's output breaker to this event?
- a. DG 1A would FAST start and the DG 1A output breaker would CLOSE.
  - b. DG 1A would FAST start and the DG 1A output breaker would remain OPEN.
  - c. DG 1A would SLOW start and the DG 1A output breaker would CLOSE.
  - d. DG 1A would SLOW start and the DG 1A output breaker would remain OPEN.

A: d.

R: LO-LP-11201-04,  
EB#: LO-LP-11201-04-01

Point Value: 1.00

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EXAM KEY  
RO Exam

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40. Q: The following sequence of events has occurred:

- Reactor Trip/ Safety Injection due to a LOCA.
- All RCP's have been secured.
- The reactor vessel has reached saturated conditions.

Pressurizer level will \_\_\_\_\_ in response to the saturated conditions in the reactor vessel, and then \_\_\_\_\_ when an RCP is restarted.

- a. Lower, rise.
- b. Rise, quickly drop.
- c. Lower, quickly drop.
- d. Rise, continue to rise.

A: b.

R: None

EB#: LO-LP-37012-10-01

Point Value: 1.00  
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41. Q: Which one of the following conditions exist when the Input Error Inhibit Switch is placed in the INHIBIT position?

- a. Inputs to the UV Driver Card are inhibited.
- b. Inputs to the Logic Cards are inhibited.
- c. 15 VDC is aligned to the Slave Relays.
- d. The Spray Test Panel is enabled.

A: b.

R: None

EB#: LO-LP-28101-06-01

Point Value: 1.00  
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EXAM KEY  
RO Exam

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42. Q: Given the following information:

- Rod bank selector switch in manual.
- The In-Hold-Out switch is held in the 'IN' position until the step counters count off 5 steps IN.
- DRPI indication does not change.

Which ONE of the following statements is true?

- a. Rods definitely moved inward as indicated by the step counter change even though DRPI did not indicate rods moved.
- b. Since rods did not move when 4 steps of rod movement was demanded, AOP 18003-C, "Rod Control System Malfunction", must be entered.
- c. Rods probably moved inward as indicated by the step counter change. Rods will have to move in another step before DRPI indication will change.
- d. Since DRPI indication did not change as expected when 4 steps of rod movement was demanded, operations should perform the Control Rod Operability surveillance test.

A: c.

R: CHAP 7,  
EB#: LO-LP-27201-03-02

Point Value: 1.00  
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EXAM KEY  
RO Exam

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43. Q: The loop 3 narrow range cold leg RTD fails high while at 100% power. Which ONE of the following describes how Loop 3 Delta T indication will react?

- a. increase.
- b. decrease.
- c. remain the same.
- d. not enough information is given.

A: b.

R: FIG 7.2.1-1/ SHT 9,  
EB#: LO-LP-16101-08-03

Point Value: 1.00  
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44. Q: Containment Spray is operating (and is required) after a large break LOCA in containment. Cold Leg Recirculation alignment per 19013 for the ECCS pumps has been performed earlier. The "RWST Empty" alarm is received and you verify RWST level is 9% and decreasing. Which ONE of the following actions should you perform?

- a. Stop the Containment Spray pumps when RWST level is less than 5% if auto swapover to sump suction did not occur at 9% RWST level.
- b. Minimize Containment Spray flow by stopping one of the Containment Spray pumps after verifying at least 4 containment coolers are running in low speed. When RWST level lowers to less than 5%, stop the remaining pump.
- c. Realign the containment spray pump suction to the containment sump while allowing the pumps to continue to run.
- d. Stop the Containment Spray pumps, realign Containment Spray suction to the containment sump. Then restart the Containment Spray pumps.

A: c.

R: 9B, PG.3, REV. 2,  
EB#: LO-LP-15101-08-03

Point Value: 1.00  
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EXAM KEY  
RO Exam

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45. Q: Containment pressure is 1.0 psig. Chemistry has issued a release permit to allow containment pressure relief. Which ONE of the following describes the initial mini-purge exhaust system lineup established to reduce the pressure?

Flow directed through:

- a. The filter inlet damper bypass line orifice, through the filter to the exhaust fan, then to the plant vent, with the exhaust fan OFF.
- b. The filter inlet damper bypass line orifice, through the filter to the exhaust fan, then to the plant vent, with the exhaust fan RUNNING.
- c. The filter inlet damper, through the filter to the exhaust fan, then to the plant vent, with the exhaust fan OFF.
- d. The filter inlet damper, through the filter to the exhaust fan, then to the plant vent, with the exhaust fan RUNNING.

A: a.

R: 13125-1,  
EB#: LO-LP-29110-03-03

Point Value: 1.00  
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46. Q: Which ONE of the following is procedurally used as the normal makeup water supply for the spent fuel pool?

- a. Waste Holdup Tank (WHT).
- b. Boric Acid Storage Tank (BAST).
- c. Refueling water storage tank (RWST).
- d. Reactor Makeup Water Storage Tank (RMWST)

A: c. or d. *both* 12/20/95

R: 1X4DB130,  
EB#: LO-LP-25102-08-02

Point Value: 1.00  
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EXAM KEY  
RO Exam

- =====  
47. Q: During a reactor startup, the BOP is maintaining steam generator levels near program. The steam dumps are in automatic in the Steam Pressure mode when PT-507 fails high. Which ONE of the following describes the steam generator level response, assuming no further operator action?
- a. SG level would initially increase and then lower gradually.
  - b. SG level would initially decrease and then continue to lower gradually.
  - c. SG level would initially increase and would result in water induction in the main steam lines.
  - d. SG level would initially decrease and then rise rapidly due to the lower SG pressure allowing more feed flow.

A: a.

R: None

EB#: LO-LP-21101-04-02

Point Value: 1.00  
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48. Q: Which ONE of the following statements correctly describes the operation of the Main Steam Line isolation logic?
- a. A SLI signal cannot be reset until all actuation signals have been reset.
  - b. Both SLI handswitches must be actuated in order for both train A & B MSIV's and bypasses to close.
  - c. A low steam line pressure signal in 1/3 channels of one main steam line will initiate an isolation signal.
  - d. Any ESFAS signal which isolates the MSIV's will also isolate steam to the turbine driven auxiliary feedwater pump.

A: a.

R: LOGICS,

EB#: LO-LP-21102-06-01

Point Value: 1.00  
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EXAM KEY  
RO Exam

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49. Q: Which ONE of the following radiation monitors automatically swaps the SPE & SJAE discharge through a HEPA filter?

- a. RE-00848.
- b. RE-12839.
- c. RE-12116.
- d. RE-12442C.

A: b

R: 1X4DB180-1 REV 17,  
EB#: LO-LP-26201-01-01

Point Value: 1.00

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50. Q: Which of the following describes the alignment of the Standby Auxiliary Transformer (SAT during normal plant operations?

- a. Wilson feeder HOT, 13.8kV breaker CLOSED, SAT HOT, 4.16kV breaker OPEN, and SAT disconnects OPEN.
- b. Wilson feeder HOT, 13.8kV breaker OPEN, SAT COLD, 4.16kV breaker CPEN, and SAT disconnects OPEN.
- c. Wilson feeder COLD, 13.8kV breaker OPEN, SAT COLD, 4.16kV breaker OPEN, and SAT disconnects OPEN.
- d. Wilson feeder HOT, 13.8kV breaker CLOSED, SAT HOT, 4.16kV breaker CLOSED, and SAT disconnects OPEN.

A: a.

R: LO-LP-01101-08,  
EB#: LO-LP-01101-08-01

Point Value: 1.00

EXAM KEY

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51. Q: While maintenance was performing a PM on 1BD1CA Battery Charger, 1BD1CB tripped due to a faulty relay. The battery has been supplying the 125 VDC vital bus with power for the past 30 minutes. Which of the following states the remaining time the batteries will continue to supply the fully loaded 125 VDC Vital Bus?

- a. 1 Hour and 30 minutes.
- b. 2 Hours.
- c. 2 Hours and 15 minutes.
- d. 2 Hours and 45 minutes.

A: c.

R: None

EB#: LO-LP-01201-04-05

Point Value: 1.00

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EXAM KEY

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52. Q: Given the following data:

- A PEO inadvertently deenergized 120 VAC Vital Bus 1BY1B.
- An SI actuation from low Pzr pressure occurs.

Which ONE of the following describes the expected response of the Unit 1, Train B Diesel Generator (DG) and the Train B SI Loads with 1BY1B deenergized?

- a. The B Train DG will start and the Train B SI Loads will be sequenced on.
- b. The B Train DG will not start nor will the Train B SI Loads be sequenced on.
- c. The B Train DG will start, however the Train B SI Loads will not be sequenced on.
- d. The B Train DG will not start, however the Train B SI Loads will be sequenced on.

A: b.

R: LO-LP-28201 OBJ 1,  
EB#: LO-LP-11201-02-02

Point Value: 1.00

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EXAM KEY

- =====
53. Q. Which ONE of the following describes the response of the Turbine Building Drains system to a high radiation condition on 1RE-0848?
- a. The drains to the waste water retention basin isolate and the waste water retention basin pumps trip on low flow.
  - b. The drains to the waste water retention basin isolates and the drains are automatically aligned to the Dirty Turbine Building Drain Tank.
  - c. The drains to the waste water retention basin isolates and the Turbine Building Drain Tank transfer pumps and Turbine Building sump pumps trip on low flow.
  - d. The drains to the waste water retention basin remain the same because there are no auto actions associated with 1RE-0848. It provides alarm functions only.

A: b.

R: 1X4DB180,  
EB#: LO-LP-45201-10-01

Point Value: 1.00

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EXAM KEY

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54. Q: Given the following conditions:

- \* Reactor Power is 60%
- \* Pressurizer pressure is 2240 psig
- \* Charging flow is being controlled in MANUAL
- \* The BACKUP HEATERS have just ENERGIZED

Which ONE of the following is the actual pressurizer level?

- a. 46%
- b. 51%
- c. 56%
- d. 60%

A: b.

R: LO-LP-16302,  
EB#: LO-LP-16302-02-01

Point Value: 1.00

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55. Q: Which ONE of the following signals will cause HV-9378, Instrument Air to Containment isolation valve, to CLOSE?

- a. Containment Pressure at 4 psig.
- b. Containment Radiation Monitor RE-003 in high alarm.
- c. Instrument Air header pressure of 70 psig.
- d. Containment Atmosphere Radiation Monitor RE-2562 in high alarm.

A: a.

R: P&ID1X4DB186-1,  
EB#: LO-LP-02110-14-02

Point Value: 1.00

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EXAM KEY

- =====
56. Q: Which ONE of the following correctly describes the primary purpose of the Seismic Category I Dry Standpipe System?
- a. Automatically deluge key safe shutdown equipment rooms in the event of a Safe Shutdown Event with a fire.
  - b. It provides for fire water for safe shutdown equipment whereas the normal fire water is for non safe shutdown equipment.
  - c. Provide a source of water for manual fire control in areas required for safe shutdown following an Safe Shutdown Event.
  - d. Provide off-site firefighters with a water source in the event that a fire cannot be contained by on-site personnel.

A: c.

R: 29A, FSAR 9.5.1,  
EB#: LO-LP-43101-06-02

Point Value: 1.00

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57. Q: Unit 1 is in mode 4 and preparations are being made to enter mode 3. In aligning the RHR system to a standby status, the RO places 1-HV-8812A, RHR pump suction valve from the RWST to OPEN, but the valve fails to OPEN. Which ONE of the following conditions is preventing the RHR pump suction valve from the RWST from opening?
- a. Cold leg recirculation to CCP and SI pumps suction valves 1-HV-8804A is OPEN.
  - b. Containment sump suction valve 1-HV-8811A to RHR pump is CLOSED.
  - c. Loop 1 hot leg suction valve 1-HV-8701A to RHR pump is OPEN.
  - d. CCP "A" miniflow valves 1-HV-8508A and 1-HV-8509B are OPEN.

A: a.

R: None  
EB#: LO-LP-12101-08-03

Point Value: 1.00

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EXAM KEY

- =====
58. Q: Which ONE of following states why the RCDT is used to recirculate the contents of the PRT:
- a. Cool the contents of the PRT.
  - b. Ensure adequate mixing for sampling.
  - c. Provide adequate flow for the RCDT pumps.
  - d. Prevent the boron from precipitating out of solution.

A: a.

R: None

EB#: LO-LP-16301-13-02

Point Value: 1.00

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59. Q: Both trains of CCW System are in service with the following pumps running:

- Train "A" - pumps 1 and 3
- Train "B" - pumps 2 and 6

Which of the following CCW pumps would be running after a Safety Injection Actuation?

- a. CCW Pumps 1, 2, 3, and 4
- b. CCW Pumps 1, 2, 3, and 6
- c. CCW Pumps 1, 2, 3, 4, and 6
- d. CCW Pumps 1, 2, 3, 4, 5, and 6

A: c.

R: LO-LP-10101-05,

EB#: LO-LP-10101-05-03

Point Value: 1.00

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EXAM KEY

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60. Q: Given the following conditions:

- A large break LOCA has occurred 3 hours ago on Unit 1.
- Containment pressure is 46 PSIG.
- Containment H2 concentration is 5% per the H2 monitors.
- DG1A is supplying 1AA02

Which ONE of the following is correct concerning Post Accident Hydrogen control using the attached procedure 13130-C?

- a. Dilute the containment hydrogen concentration using the Service Air System.
- b. The "A" train Post LOCA Electric Hydrogen Recombiner can be placed in service if 1AA02 bus loading is monitored.
- c. The "A" train Post LOCA Electric Recombiner can NOT be placed in service due to the DG1A carrying the 1AA02 bus.
- d. The hydrogen monitors are unreliable at this point. Three more hours must pass and another hydrogen sample taken.

A: b.

R: 13130-C,  
EB#: LO-LP-29110-03-05

Point Value: 1.00

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61. Q: Which ONE of the following is used to remove the fuel from the new fuel elevator to the upender?

- a. Cask Crane.
- b. Fuel transfer car.
- c. New fuel handling tool.
- d. Spent fuel handling tool.

A: d.

R: None  
EB#: LO-LP-25101-03-01

Point Value: 1.00

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KEY CONTINUED ON NEXT PAGE

EXAM KEY

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62. Q: Which ONE of the following describes conditions under which the steam dump system is used in the steam pressure mode?
- a. Immediately following a reactor trip.
  - b. Immediately following a load rejection from 70% power.
  - c. Plant is being shutdown from 100% power, plant is currently at 50% power.
  - d. ~~Plant in hot standby,~~ plant starting up with turbine just synched on line. *12-15-95*

A: d.

R: CH 12B, SEC. I. A. 1,  
EB#: LO-LP-21201-01-02

Point Value: 1.00

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63. Q: Unit one was operating at 100% power when a malfunction in the load control unit caused turbine load to decrease. The BOP placed the turbine in standby load control. Which ONE of the following is TRUE concerning the use of standby load control.
- a. The backup overspeed trip setpoint is lowered to 107% rated speed.
  - b. The load limit potentiometer can be used to limit load while in standby load control.
  - c. The power load unbalance circuit will still actuate on a 40% electrical load reduction.
  - d. Provides speed reference signals to the speed control and load control units.

A: c.

R: LO-LP-30303,  
EB#: LO-LP-30303-20-06

Point Value: 1.00

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KEY CONTINUED ON NEXT PAGE

EXAM KEY

- =====
64. Q: Which ONE of the following could eventually cause a Dual Unit Reactor Trip due to a loss of Unit 1 Turbine Building Instrument Air?
- a. Make-up valves to all NSCW Towers fail closed.
  - b. River make-up pump discharge valves fail closed.
  - c. Extraction steam stop and non-return valves for both units fail closed.
  - d. Air to both unit's EHC Control Units is lost causing all main stop and control valves to gradually fail closed.

A: b.

R: 18028-C,  
EB#: LO-LP-60321-08-04

Point Value: 1.00

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65. Q: The reactor was at 80% power when an instrument failure occurred that caused the rods to move. Which ONE of the following is correct?
- a. With NI-43 failed HIGH, rods will initially move IN then stop.
  - b. With NI-43 failed HIGH, rods will continually move IN.
  - c. With NI-43 failed LOW, rods will initially move OUT then stop.
  - d. With NI-43 failed LOW, rods will continually move OUT.

A: a.

R: 18001-C,  
EB#: LO-LP-60301-01-06

Point Value: 1.00

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KEY CONTINUED ON NEXT PAGE



EXAM KEY

- =====
66. Q: During a plant startup on Unit 1 with power at 29%, RCP #2 shears a pump shaft. Which ONE of the following is an IMMEDIATE OPERATOR ACTION after the RCP trips?
- a. Trip the reactor and enter EOP 19000-C, Rx Trip or SI.
  - b. Commence a rapid power reduction and shutdown the plant.
  - c. Commence a power reduction to less than 10% power.
  - d. Verify the affected Steam Generator level is trending to 65%.

A: a.

R: (3.7/4.0),  
EB#: LO-LP-60305-03-04

Point Value: 1.00

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67. Q: An ATWT condition has just occurred on Unit 1. The crew is on step 5 of 19211 "ATWT" and the USS requests the RO to start an emergency boration. Which of the following meets the requirements per 13009-1 for an adequate emergency boration flowpath.
- a. The reactor makeup control system is set for normal boration and boric acid flow meter indicates 28 gpm, with total charging flow at 75 gpm.
  - b. 1-HV-8104 is open and 1FI-183, emergency boration flow meter, indicates 30 gpm with charging flow at 40 gpm.
  - c. RWST aligned to CCP "B" and BIT flow plus total seal injection flow less total seal return flow is 85 gpm.
  - d. RWST aligned to PDP with charging flow at 102 gpm through normal charging flowpath and seal leakoff flow is 9 gpm.

A: d

R: 13009-1,  
EB#: LO-LP-09401-04-07

Point Value: 1.00

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EXAM KEY

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68. Q: Which ONE of the following conditions require an emergency  
boration to be started?

- a. Axial flux not within Tech. Spec. limits.
- b. Boron concentration is 2200 PPM during refueling.
- c. One control rod fails to insert on a reactor trip.
- d. Rod Bank Lo-Lo Limit alarms during rapid power decrease.

A: d.

R: None

EB#: LO-LP-09401-04-05

Point Value: 1.00

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EXAM KEY

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69. Q: Given the following information:

- Unit 1 is entering Mode 4.
- RHR train "A" and CCP "A" are in service.
- Various Train "A" CCW Annunciators are in alarm.
- All train "A" CCW Pumps are running with discharge pressure at 75 psig.
- CCW Train "A" Surge Tank level is decreasing.
- The crew enters AOP 18020-C "LOSS OF CCW"

Which ONE of the following is the correct action to take per 18020-C?

- a. Place CCW Train "A" in single pump operation after verifying NSCW Train "A" is in service.
- b. Stop CCW Train "A" pumps and place non-affected CCP "B" in service after verifying CCW Train "B" is in service.
- c. Stop CCW Train "A" pumps and stop Train "A" NSCW pumps after verifying CCW Train "B" is in service.
- d. Stop CCW Train "A" pumps and place non-affected RHR Train "B" in service after verifying CCW Train "B" is in service.

A: d.

R: LO-LP-60316, 18020-C,  
EB#: LO-LP-60316-04-01

Point Value: 1.00

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EXAM KEY

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70. Q: Given that pressurizer pressure channel selector switch 1-PS-455F is in the "455/456" position. Listed below are two (2) possible failures to pressurizer pressure instrumentation:

- Channel I Pressurizer detector 1-PT-455 fails HIGH.
- Channel II Pressurizer detector 1-PT-456 fails HIGH.

Assume that the failures occur separately, with the plant stable at full power. No operator action is taken. Which ONE of the following statements correctly compares the severity of the plant pressure transient produced by each failure.

- a. The pressure drop RATE will be SMALLER for the PT-455 failure.
- b. The pressure drop RATE will be the SAME for the two failures, but the PR-456 failure will result in a lower final plant pressure.
- c. The pressure drop RATE and overall plant pressure drop will be the SAME for the two failures.
- d. The pressure drop RATE and overall plant pressure drop will be GREATER for the PT-455 failure.

A: d.

R: LO-LP-60301,  
EB#: LO-LP-60301-10-01

Point Value: 1.00  
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EXAM KEY

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71. Q: Which ONE of the following parameters can be used to distinguish between a primary leak and a secondary leak?

- a. Tavg.
- b. Pressurizer level.
- c. Containment pressure.
- d. Pressurizer pressure.

A: a.

R: 18004-C,  
EB#: LO-LP-60308-02-01

Point Value: 1.00  
=====

72. Q: The unit 2 main generator has just been synchronized to the grid and power has been raised to 18% power. The BOP was preparing to swap feedwater flow from the Bypass Feed Regulation Valves (BFRV) to the Main Feed Regulation Valves (MFRV) when condenser vacuum decreased to 21.5 inches of water generating a turbine trip. Which of the following are the correct actions the crew should take in response to the turbine trip?

- a. Enter 18011-C, Turbine Trip below P-9, and reduce reactor power below 5% and control Tave using steam dumps.
- b. Trip the reactor and go to 19000-C, Reactor Trip or Safety Injection.
- c. Enter 18016-C, Condensate and Feedwater Malfunctions, start all available AFW pumps, and reduce reactor power to 10%.
- d. Enter 18011-C, Turbine Trip below P-9, reduce reactor power below 5%, and control Tave using atmospheric relief valves.

A: d.

R: LO-LP-60311, 18011-C,  
EB#: LO-LP-60311-03-03

Point Value: 1.00  
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EXAM KEY

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73. Q: Immediately following a loss of all onsite and offsite AC power, the reactor is tripped and the SSS reports the following Critical Safety Function Status:

- ORANGE path on Core Cooling.
- RED path on Heat Sink.
- YELLOW path on Inventory.

Which ONE of the following describes the proper procedural usage in this condition ?

- a. Loss of All AC Power, 19100-C.
- b. Reactor Trip or Safety Injection 19000-C.
- c. Response to Degraded Core Cooling, 19221-C.
- d. Response to Loss of Secondary Heat Sink, 19231-C.

A: a.

R: 19100-C,  
EB#: LO-LP-37031-06-05

Point Value: 1.00  
=====

74. Q: Which ONE of the following responses below describes why the Rod Control System is placed into manual operation when 1AY1A is lost?

- a. Loop 1 Tave instruments fail low.
- b. N41 power range channel fails high.
- c. Loop 1 Delta Temperature fails high.
- d. PT-505, Tref instrument, fails low.

A: d.

R: 18032-1,R4,PG. 2,  
EB#: LO-LP-60301-18-05

Point Value: 1.00  
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EXAM KEY

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75. Q: A fire has occurred in the unit 1 control room that has caused the unit 1 and unit 2 control rooms to be evacuated. When the operators assemble in the shutdown panel rooms, which ONE of the following states how the operators would know if an instrument is fire qualified.

- a. Meter bezels painted "Red".
- b. Listed in 18038-1/2, "Operations from the Remote Shutdown Panel".
- c. "FQ" engraved on the equipment nameplate.
- d. Marked with an "Orange Dot" by the handswitch.

A: a.

R: 18038-C,  
EB#: LO-LP-60327-05-02

Point Value: 1.00  
=====

76. Q: Given the following conditions:

- A fire has occurred in the Control Room.
- Both Unit 1 and Unit 2 control rooms are evacuated.
- Unit 1 was at 100%.
- Unit 2 is defueled.
- Prior to evacuation of the control room, Unit 1 reactor and turbine are tripped, #1 and #4 RCP's are tripped and an automatic safety injection occurs.

Which ONE of the following procedures should the Unit 1 operators enter upon leaving the control room?

- a. 18005, Partial Loss of RCS Flow.
- b. 18035, Toxic/Flammable Gas Release.
- c. 19000, Reactor Trip and Safety Injection.
- d. 18038, Operation from Remote Shutdown Panels.

A: d.

R: 18038-1,  
EB#: LO-LP-60328-01-01

Point Value: 1.00  
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KEY CONTINUED ON NEXT PAGE

EXAM KEY

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77. Q: Which of the following conditions describes a loss of Containment Integrity, as defined by Technical Specifications?

- a. Both containment airlock doors are blocked open for maintenance in MODE 4.
- b. The leakage rate of a containment penetration exceeds Tech Spec limits in MODE 5.
- c. The outer containment airlock door is opened for normal transit entry while in MODE 2.
- d. The inner containment airlock door is left open while performing maintenance on its 'O' rings in MODE 3.

A: a.

R: TECH SPECS,  
EB#: LO-LP-39210-01-01

Point Value: 1.00

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78. Q: Given the following plant conditions, which Critical Safety Function is being challenged?

SR SUR = 0  
CETC's = 800 degrees  
RVLIS = 35% full range  
S/G Pressure = 1100 psig in all S/G's  
S/G Level = 38% in all S/G's  
RCS Pressure = 2335 psig

- a. Subcriticality.
- b. Core Cooling.
- c. Heat Sink.
- d. Integrity.

A: b.

R: WEST MCD, 19200-C,  
EB#: LO-LP-36102-05-05

Point Value: 1.00

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EXAM KEY

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79. Q: Which ONE of the following process radiation monitors would provide indication of a failed fuel rod?

- a. RE-005, Containment High Range Monitor
- b. RE-12442, Plant Vent Monitor
- c. RE-48000, CVCS Letdown Monitor
- d. RE-12839, SJAE / SPE Exhaust Monitor

A: c.

R: None

EB#: LO-LP-32101-07-01

Point Value: 1.00

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80. Q: After a reactor trip, FOUR rods have not fully inserted into the core. In accordance with 19001-C, Reactor Trip Response, the operator is required to increase RCS boron concentration by which ONE of the following amounts?

- a. 345 ppm.
- b. 416 ppm.
- c. 432 ppm.
- d. 460 ppm.

A: d.

R: 19001-C,

EB#: LO-LP-37011-04-02

Point Value: 1.00

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EXAM KEY

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81. Q: Given the following plant conditions:

- Due to a misaligned rod, one control rod in control bank (CB) "D" was withdrawn 15 steps to realign it with CB "D" in accordance with AOP-18003-C, "Malfunction of Rod Control System."
- The P/A converter for CB "D" was not adjusted as required.

Which ONE of the following conditions will occur because CB "D" P/A converter was not adjusted?

- a. ROD CONT SYS NON-URGENT FAILURE alarm will actuate when Control Bank D rods are initially moved.
- b. CONTROL ROD BANK POSITION LO alarm will NOT actuate when Control Bank D rods are initially moved below the setpoint.
- c. ROD CONT SYS URGENT FAILURE alarm will actuate when Control Bank D rods are initially moved.
- d. COMPUTER ALARM ROD SEQ/DEV OR PR FLUX TILT alarm will actuate when Control Bank D rods are initially moved.

A: b

R: LO-LP-60303-00,  
EB#: LO-LP-60303-04-01

Point Value: 1.00  
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EXAM KEY

- =====
82. Q: During the recovery of a dropped rod, you discover that DRPI for the affected rod has been lost. Which ONE of the following actions must you take and why is this action taken?
- a. Send an operator to the P/A converter, to determine actual rod position prior to proceeding with the recovery.
  - b. Run an incore flux map, to determine the rod position prior to proceeding with the recovery.
  - c. Discontinue the recovery and place the unaffected rods in that bank to the position of the rod being recovered to prevent causing unacceptable flux shifts in the core.
  - d. Notify reactor engineering so they can determine the rod position and the actions required to prevent exceeding core thermal limits.

A: d.

R: 18003-C, REV 3, 35, REV 0,  
EB#: LO-LP-60303-02-03

Point Value: 1.00

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EXAM KEY

- =====  
83. Q: If all three expected responses for step 1 of 19000-C "Rx trip or SI" cannot be met, then the actions in the RNO must be performed. Select which of the following describes the RNO actions:
- a. Immediately go to 19211-c "Response to Nuclear Power Generation/ATWT."
  - b. Manually trip the Rx from the redundant switch at the remote SD panel; if Rx not tripped, then manually open the supply breakers to NB08 and NB09.
  - c. Manually trip the Rx; if not tripped, then trip the redundant switch on the ECCS portion of the QMCB. If still not tripped, Then locally open the Rx trip breakers.
  - d. Manually trip the Rx; if Rx not tripped, then trip using the redundant trip switch on the ECCS portion of the QMCB. If still not tripped, then manually open the supply feeder breakers to NB08 and NB09.

A: d.

R: 19000-C,  
EB#: LO-LP-37011-02-04

Point Value: 1.00  
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EXAM KEY

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84. Q: Given the following conditions:

- RCS at NOP/NOT for 100% RTP,
- PORV 456A has seat leakage to the PRT,
- PRT pressure is 20 PSIG.
- Use steam tables provided.

Which ONE of the following is the approximate tailpipe temperature?

- a. 212 degrees F.
- b. 228 degrees F.
- c. 248 degrees F.
- d. 258 degrees F.

A: d.

R: None

EB#: LO-LP-16301-09-04

Point Value: 1.00  
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85. Q: Which ONE of the following describes which loss of reactor coolant accidents causes the greatest PTS challenge to the RCS and why?

- a. Small break LOCA because RCP's keep the RCS pressurized.
- b. Large break LOCA because of the rapid RCS cooldown.
- c. Small break LOCA because re-pressurization from ECCS flow is more likely.
- d. Large break LOCA because more cold ECCS flow enters the beltline region of the reactor vessel.

A: c.

R: WOG ERG FR P-Z,

EB#: LO-LP-37071-01-04

Point Value: 1.00  
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KEY CONTINUED ON NEXT PAGE

EXAM KEY

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86. Q: A large break LOCA has occurred. The control room operators have transitioned from 19000-C to 19010-C, "Loss of Reactor or Secondary Coolant". The RWST Lo-Lo Level annunciator (ALB06-F4) sounds and RWST level indicates 38%. The USS directs the control room operators to initiate 19013-C, "Transfer to Cold Leg Recirculation". The extra operator, monitoring CSFST's, then reports that a valid red path condition exists on Core Cooling.

The USS should direct the operators to:

- a. Perform the first six (6) steps of 19013-C, then transfer to 19221-C, "Response to Inadequate Core Cooling".
- b. Perform 19013-C to completion, then transfer to 19221-C, "Response to Inadequate Core Cooling".
- c. Immediately perform the actions of 19221-C, "Response to Inadequate Core Cooling".
- d. Immediately perform the actions of 19221-C, "Response to Inadequate Core Cooling", while the extra operator concurrently performs the actions of 19013-C.

A: a.

R: LO-LP-37111-10,  
EB#: LO-LP-37111-10-01

Point Value: 1.00  
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EXAM KEY

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87. Q: You are the reactor operator and the following alarms come in:

- Charging line Hi/Lo flow alarm.
- RCP seal water injection Lo Flow alarm
- Regen Hx LTDN hi temp alarm

Which of the following is likely to have occurred?

- a. RCP seal failure.
- b. Letdown has isolated.
- c. Loss of charging flow.
- d. Loss of cooling water to the letdown heat exchanger.

A: c.

R: 18007-1, REV 2, 35, REV 0,  
EB#: LO-LP-60307-03-01

Point Value: 1.00

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EXAM KEY

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88. Q: Given the following information:

- Unit 2 is in Mode 6.
- RCS drained to 188.6 feet.
- RCS temperature is 125 degrees F.
- RCS pressure ~ atmospheric.
- Reactor was shutdown 21 days ago.
- Core reload is complete, replacing 1/3 of core with new fuel.
- A total loss of RHR cooling has occurred.

Which ONE of the following is correct concerning the amount of time it will take to reach saturated conditions in the RCS?

Use attached figures from AOP-18019-C, "Loss of RHR"

- a. 27 minutes.
- b. 38 minutes.
- c. 50 minutes.
- d. 62 minutes.

A: b.

R: 18019-C,  
EB#: LO-LP-60315-03-03

Point Value: 1.00

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EXAM KEY

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89. Q: Given the following conditions:

- RCS pressure = 2335 psig.
- RCS Tave = 588.3 deg. F.
- The reactor is not tripped.
- The crew is currently in 19211-C, "FR-S.1, Response to Nuclear Power Generation/ ATWT", step 5.

Which ONE of the following describes the reason why RCS pressure should be maintained less than 2335?

- a. Prevents the Pressurizer Relief Tank from going solid, due to an open PORV or PRZR Code Safety, and blowing the rupture disc causing a LOCA inside containment.
- b. To prevent the Reactor from tripping on high RCS pressure.
- c. To ensure a sufficient amount of boric acid is injected into the core to reduce reactor power.
- d. To ensure the Pressurizer Spray valves don't short cycle when the PORV's open to lower RCS pressure.

A: c.

R: 19211-C,  
EB#: LO-LP-37041-05-02

Point Value: 1.00

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EXAM KEY

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90. Q: Following a unit trip, it is determined that intermediate range instrument N-36 is UNDER-COMPENSATED. Which ONE of the following will describe the effect it will have on the re-energization of the source range detectors, if any?
- a. The source range detectors will have to be manually energized.
  - b. No effect, the source range detectors will automatically re-energize < P-10.
  - c. No effect, the source range detectors will automatically re-energize when 1/2 intermediate range detector is < P-6.
  - d. The source range detectors can not be energized manually or automatically until 2/2 intermediate range detectors are < P-6.

A: a.

R: None

EB#: LO-LP-17201-08-01

Point Value: 1.00

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EXAM KEY

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91. Q: Given the following conditions:

- Reactor power is 22%.
- Turbine load is increasing at 1%/minute.
- The rod control system is in manual.
- Tave starts decreasing.
- The operator starts a dilution to raise Tave.
- N-35 has just failed low.

Which ONE of the following actions should the operator perform in response to the N-35 failure?

- a. Continue the power increase, IR NIS is not required above 10% power IAW UOP 12004-C.
- b. Stop the dilution, stop turbine loading, and decrease load below 10%. Notify I&C to investigate the problem.
- c. Stop the dilution, stop turbine loading, and enter 18002-C, NUCLEAR INSTRUMENT SYSTEM MALFUNCTION.
- d. Stop the dilution, stop turbine loading, match Tave with Tref using the rod control system, and enter AOP 18001-C, PRIMARY SYSTEM MALFUNCTIONS.

A: c.

R: 18002-C,  
EB#: LO-LP-60302-01-05

Point Value: 1.00

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EXAM KEY

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92. Q: Given the following condition:

- Leakage into #3 steam generator is determined to be 0.5 gpm.
- No leakage is detectable into the other steam generators.
- Other leakage which cannot be identified is determined to be 0.6 gpm.
- Leakage from known sources other than steam generator leakage is determined to be 4.0 gpm.

Which ONE of the following identifies whether or not Technical Specification leakage limits are exceeded?

With these conditions in existence, Technical Specification leakage limits:

- a. Are not exceeded.
- b. Are exceeded due to the total leakage into the steam generator and unidentified leakage exceeding 1 gpm.
- c. Are exceeded due to steam generator leakage exceeding limits for pressure boundary leakage.
- d. Are exceeded due to excessive leakage into one steam generator.

A: d.

R: LO-LP-39208-02,  
EB#: LO-LP-39208-02-01

Point Value: 1.00

EXAM KEY

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93. Q: A steam generator tube rupture was determined to exist on the #2 steam generator. During the Reactor Trip and Safety Injection, a steam line break inside containment also occurred on the #2 steam generator. Which ONE of the following actions should be taken for controlling feedwater to the #2 steam generator?

- a. Isolate feedwater flow to the #2 steam generator.
- b. Maintain feedwater flow to the #2 steam generator until level is greater than 10% narrow range.
- c. Maintain feedwater flow to the #2 steam generator until level is greater than 32% narrow range.
- d. Control level in the #2 steam generator from 10% to 65% narrow range.

A: a.

R: LO-LP-37311-11,  
EB#: LO-LP-37311-11-01

Point Value: 1.00  
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94. Q: The plant is operating at 75% power. Common steam header pressure transmitter PT-0507 failed high. Which ONE of the following describes the effect, if any, the failure of PT-0507 will have on the main feedwater regulating valve positions, relative to their positions prior to the failure?

- a. The failure had no effect on the valve position.
- b. The valves are further open than before the failure.
- c. The valves should have received a full closed signal.
- d. The valves are further closed than before the failure.

A: d.

R: FSAR LOGIC 7.2.1-1,  
EB#: LO-LP-18201-01-01

Point Value: 1.00  
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EXAM KEY

- =====
95. Q: The train "B" D/G is running for performance of surveillance 14980. Which ONE of the following will be the result if DC bus 1BD1 is lost?
- a. The D/G output breaker will trip OPEN and the engine will remain running.
  - b. The D/G output breaker will trip OPEN and the engine will shut down.
  - c. The D/G output breaker will remain CLOSED and the engine will remain running.
  - d. The D/G output breaker will remain CLOSED and the engine will shut down.

A: c.

R: 18034-1,  
EB#: LO-LP-60329-03-03

Point Value: 1.00

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96. Q: A high radiation signal from RE-0021, SG Blowdown Rad. Monitor, will automatically close which ONE of the following valves?
- a. SGBD Isolation Valves (HV-7603 A, B, C, D)
  - b. SGBD Demineralizer Inlet Isolation Valve (FV-1150)
  - c. SGBD sample isolation valves (HV-9451, 9452, 9453, and 9454)
  - d. SGBD pipe break protection valves (HV-15212A, B, C, D and HV-15216A, B, C, D).

A: b.

R: CH 13C, SEC.1B, R.2,  
EB#: LO-LP-24101-13-05

Point Value: 1.00

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EXAM KEY

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97. Q: A Waste Gas Decay Tank release is in progress. Which ONE of the following malfunctions occurring during the release could result in a release outside of permitted limits assuming no operator action?

- a. RE-13, Waste Gas Processing Rad Monitor, fails Low.
- b. FI-14, Waste Gas flow indicator, fails Low.
- c. RE-14, Waste Gas Processing Rad Monitor, fails low.
- d. Loss of power to RV-14, Waste Gas Effluent Isolation Valve.

A: c.

R: None

EB#: LO-LP-46101-11-04

Point Value: 1.00

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98. Q: Given the following information:

- The unit is at 80% power.
- All control systems are in automatic.
- Pressurizer level transmitter LT-459 fails high.
- The pressurizer level control selector switch is in the 459/460 position.

Which of the following is the correct plant response assuming no operator action is taken?

- a. Pressurizer high pressure reactor trip.
- b. Pressurizer low level reactor trip.
- c. Pressurizer high level reactor trip.
- d. Pressurizer low pressure reactor trip.

A: c.

R: None

EB#: LO-LP-16302-04-06

Point Value: 1.00

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EXAM KEY

- =====
99. Q: During refueling which ONE of the following would require operators to enter 18006-C, FUEL HANDLING EVENT?
- a. Loss of FHB normal HVAC.
  - b. Trip of the running RHR pump.
  - c. Release of bubbles from irradiated fuel.
  - d. Loss of communications between the control room and the containment.

A: c.

R: 18006-C,  
EB#: LO-LP-60306-02-02

Point Value: 1.00

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EXAM KEY

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100. Q: Given the following conditions:

- Unit 2 is in Mode 3.
- Tave = 557 degrees F.
- A loss of all instrument air has occurred.
- The crew enters 18028-C, LOSS OF INSTRUMENT AIR.
- The crew proceeds to Attachment A, Establishing Charging without Instrument Air.
- Charging flow is observed to be 150 gpm.

Select which ONE of the following is correct concerning Attachment A in this case? (See attached Attachment A).

- a. It will restore VCT level.
- b. It places the Positive Displacement Pump (PDP) in service to control charging flow.
- c. It is designed to reduce and control charging flow.
- d. It is necessary in order to re-establish RCP seal injection flow.

A: c.

R: 18028-C,  
EB#: LO-LP-60307-02-02

Point Value: 1.00

END OF TEST KEY

NRC SRO Exam  
PLANT VOGTLE TRAINING DEPT.

GRADING KEY for EXAM: NRC SRO Exam  
ASSEMBLED IN MANUAL MODE.

Total Points: 100.00

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- 1. (1.00pt)  
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EXAM KEY

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19. (1.00pt)  
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20. (1.00pt)  
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21. (1.00pt)  
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31. (1.00pt)  
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32. (1.00pt)  
c.

33. (1.00pt)  
d.

34. (1.00pt)  
d.



EXAM KEY

35. (1.00pt)  
c.

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37. (1.00pt)  
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38. (1.00pt)  
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39. (1.00pt)  
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40. (1.00pt)  
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41. (1.00pt)  
b.

42. (1.00pt)  
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43. (1.00pt)  
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44. (1.00pt)  
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45. (1.00pt)  
a

46. (1.00pt)  
d.

47. (1.00pt)  
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48. (1.00pt)  
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49. (1.00pt)  
b.

50. (1.00pt)  
b.

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PLANT VOGTLE TRAINING DEPT.

GRADING KEY for EXAM: NRC SRO Exam  
ASSEMBLED IN MANUAL MODE.

Total Points: 100.00

Page 3

- 51. (1.00pt)  
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- 54. (1.00pt)  
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EXAM KEY

- 68. (1.00pt)  
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EXAM KEY

- 86. (1.00pt)  
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b.

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PLANT VOGTLE TRAINING DEPT.

M A S T E R     K E Y

FOR

EXAM: NRC SRO Exam

Total Points: 100.00

ASSEMBLED IN MANUAL MODE.



EXAM KEY  
NRC SRO Exam

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1. Q: A room you must enter in the auxiliary building is locked and posted with a general area dose rate of 1050 mrem/hr. The key to the room will be identified by a \_\_\_\_\_ and can be obtained from the \_\_\_\_\_.
- a. a red tag; HP supervisor.
  - b. a yellow tag; HP supervisor.
  - c. a yellow tag; support shift supervisor.
  - d. a red tag with a yellow dot; support shift supervisor.

A: b.

R: 00008-C,  
EB#: LO-LP-63008-01-01

Point Value: 1.00

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2. Q: Unit 1 is in a refueling outage. Train "A" ESFAS testing was started and then stopped to perform ILRT testing on critical path. The ILRT test took 27 hours to complete. Which ONE the following correctly states the required actions to be taken in order to restart the ESFAS test?
- a. The section of the ESFAS test that was in progress must be performed over again.
  - b. The initial conditions must be reverified and then the procedure may be restarted at the section where suspended if desired.
  - c. Since the control room personnel agree that nothing has changed that affects the section of the Train "A" ESFAS test being run, the test must be restarted at the same place where it was suspended.
  - d. Tests cannot be suspended. The ESFAS test must be started over from the beginning and run to completion.

A: b.

R: 00054-C,  
EB#: LO-LP-63054-01-06

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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3. Q: The RO has been asked to meet with the Operations Manager outside the control room. Which ONE of the following is the MAXIMUM time that the RO can be away from his post WITHOUT conducting a full shift turnover?

- a. 30 minutes
- b. 45 minutes
- c. 1 hour
- d. 2 hours

A: b.

R: LO-LP-63504-04,  
EB#: LO-LP-63504-04-01

Point Value: 1.00

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4. Q: A clearance must be released to support the ongoing Unit 1 outage, but the subclearance holder is offsite. Which ONE of the following is the correct action to remove the subclearance holder from the clearance?

- a. The subclearance holder's supervisor can sign for him after determining the work is not affected by the clearance release.
- b. The subclearance holder's supervisor must complete a Subclearance Release Form and have it approved by the Shift Superintendent.
- c. The Clearance & Tagging Supervisor may sign-off the subclearance holder after verifying safe conditions exist.
- d. The Shift Superintendent must attach a justification for the subclearance removal to the clearance prior to signing for the subclearance holder.

A: b.

R: LO-LP-63304-01,  
EB#: LO-LP-63304-01-01

Point Value: 1.00

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KEY CONTINUED ON NEXT PAGE

EXAM KEY  
NRC SRO Exam

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5. Q: The Reactor Operator (RO) is returning to shift after 2 weeks vacation.

Which ONE of the following describes how far back the RO is required to review the Unit Control Log ?

- a. 24 hours
- b. 3 days
- c. 5 days
- d. 7 days

A: b

R: 10004-C,  
EB#: LO-LP-63504-01-01

Point Value: 1.00

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6. Q: Maintenance would like to remove the clearance on a breaker so they can cycle it in the TEST position. Which ONE of the following correctly describes how this should be accomplished?

- a. The hold tags must be temporarily removed, and a hold tag must be placed on the racking device.
- b. The hold tags must remain on the breaker and a caution tag must be placed on the racking device.
- c. The hold tags must be removed via a clearance release or functional release.
- d. The hold tags can only be removed by closing out the clearance.

A: c

R: 00306-C,  
EB#: LO-LP-63304-11-03

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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7. Q: Given the following conditions:

- \* You are performing a whole body frisk using a portable frisker.
- \* Background radiation is at the MAXIMUM allowed level for performing a whole body frisk.

Which ONE of the following is the count rate at which you are considered to be "Contaminated"?

- a. 100 counts per minute
- b. 200 counts per minute
- c. 300 counts per minute
- d. 400 counts per minute

A: c.

R: LO-LP-63930-03,  
EB#: LO-LP-63930-03-01

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

8. Q: Given the following:

- An operating procedure is being performed to restore a system to service following system maintenance during an outage.
- An error is discovered in the sequence of steps in the procedure which, if performed, would result in starting a pump without the required seal water.

Which ONE of the following actions should be taken ?

- a. Obtain the Unit Shift Supervisor's permission to perform the steps out of sequence.
- b. Stop the performance of the procedure at the incorrect step, and request a procedure change.
- c. Continue with the procedure, performing the steps in the correct sequence, since the errors are obviously typographical.
- d. Continue with the procedure performing the steps in the correct sequence, and request a procedure change to correct the order of the steps after completion.

A: b

R: 00054-C, LOL63054,  
EB#: LO-LP-63054-01-07

Point Value: 1.00

EXAM KEY  
NRC SRO Exam

9. Q: A Fire Team consisting of at least \_\_\_\_ members (including a team leader) shall be maintained on site at all times. The Fire Team leader is designated by \_\_\_\_, per procedure.
- a. 4, the Shift Superintendent.
  - b. 5, the Shift Superintendent.
  - c. 4, the C & T Supervisor.
  - d. 5, the C & T Supervisor.

A: b.

R: 10003-C, PG 2, 10000-C, PG1 & 2,  
EB#: LO-LP-63503-05-08

Point Value: 1.00

10. Q: Per procedure 00304-C clearance and tagging philosophy, which ONE of the following is the PREFERRED method of tagging solenoids?
- a. Open links to isolate power rather than remove fuses.
  - b. Fuses pulled, bagged, and tagged with each fuse individually bagged.
  - c. Fuses pulled, bagged, and tagged with all fuses kept together in one bag.
  - d. Fuses pulled, bagged, and tagged with each fuse individually bagged and links open.

A: a.

R: 00304-C,  
EB#: LO-LP-63304-04-01

Point Value: 1.00

EXAM KEY  
NRC SRO Exam

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11. Q: You are performing an operating procedure task involving multiple valve manipulations under the direction of the control room operator who is acting as the procedure coordinator.

Which ONE of the following is correct regarding performance of this task ?

- a. Write the valve numbers down on a piece of paper, perform the task, report back each specific valve position.
- b. Write the valve numbers down on a piece of paper, perform the task, report back that the valves are in the proper position.
- c. Use an actual copy of the procedure or procedure steps, perform the task, report back each specific valve position.
- d. Use an actual copy of the procedure or procedure steps, perform the task, report back that the valves are in their proper position .

A: c

R: 00054-C,  
EB#: LO-LP-63136-03-01

Point Value: 1.00

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12. Q: Which ONE of the following statements concerning Standing Orders is correct?

- a. Standing Orders give special instructions for back shifts, weekends, and holidays.
- b. Standing orders are used to modify existing plant procedures.
- c. Standing orders are temporary instructions to plant operating personnel.
- d. Standing orders address subjects limited to plant operating procedures.

A: c.

R: 10002-C, REV.5,  
EB#: LO-LP-63502-01-01

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

13. Q: Who, by title, must authorize actions to be taken in accordance with 18015-C, SECONDARY PLANT CHEMISTRY, upon confirmation of one or more chemistry parameters outside normal operating range while in Mode 1?
- a. General Manager.
  - b. Unit Superintendent.
  - c. Shift Superintendent.
  - d. Chemistry Duty Foreman.

A: a.

R: 18015-C,  
EB#: LO-LP-60313-02-01

Point Value: 1.00

14. Q: A low hydrogen pressure alarm has occurred on unit 2. Using the attached procedure 18010-C, MAIN GENERATOR MALFUNCTION Attachment "A" " Estimated Capability Curve", determine the corrective action to be taken for the conditions listed.

Generator Hydrogen Pressure	45 psig
Generator MW's	1150
Generator MVAR's	100 lagging

- a. Increase Generator Voltage
- b. Decrease Generator Voltage
- c. Reduce Turbine Load (MW)
- d. No action required

A: c.

R: 18010-C,  
EB#: LO-LP-60310-05-01

Point Value: 1.00



EXAM KEY  
NRC SRO Exam

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15. Q: Which ONE of the following is the purpose for using hydrazine for plant chemistry control?
- a. Minimize corrosion of the reactor vessel.
  - b. Demineralize well water.
  - c. Minimize O2 content of condensate and feedwater.
  - d. For pH control of the stainless steel in the NSCW system.

A: c.

R: 35217-C,  
EB#: LO-LP-35102-12-01

Point Value: 1.00

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16. Q: Which ONE of the following is a NON-DELEGABLE duty of the Emergency Director?
- a. Deploying radiological emergency teams.
  - b. Request OSC support for emergency maintenance.
  - c. Deciding to request assistance from federal support groups.
  - d. Coordinating VEGP Emergency operations.

A: c

R: 91102-C REV 10,  
EB#: LO-LP-40101-08-01

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

17. Q: Which ONE of the following describes the maximum time requirements for notification of state/local authorities and NRC upon declaration of a SITE AREA EMERGENCY ?

	STATE/LOCAL	NRC
a.	15 minutes	30 minutes
b.	15 minutes	1 hour
c.	30 minutes	30 minutes
d.	30 minutes	1 hour

A: b

R: LOL40101,  
EB#: LO-LP-40101-17-01

Point Value: 1.00

18. Q: With the unit at 65% power, N-43 Power Range Channel fails HIGH. Manual rod withdrawal is blocked by which ONE of the following?

- a. C-5
- b. C-2
- c. C-1
- d. C-4

A: b.

R: LOGICS,  
EB#: LO-LP-27101-07-15

Point Value: 1.00

EXAM KEY  
NRC SRO Exam

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19. Q: Which ONE of the following statements is correct concerning indicated charging flow during normal, steady-state operation?
- a. Will be equal to indicated letdown flow.
  - b. Will be less than indicated letdown flow.
  - c. Will be equal to indicated letdown flow plus seal return flow.
  - d. Will be equal to indicated letdown flow minus seal return flow

A: c.

R: CHAP 5A-26,  
EB#: LO-LP-09001-07-02

Point Value: 1.00

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20. Q: Which ONE of the following statements is correct regarding the DESIGN of the RCP shaft seals ability to withstand full RCS pressure?
- a. Only the #1 seal is capable of withstanding full RCS pressure.
  - b. Seals #1 and #2 are independently capable of withstanding full pressure but only for 30 minutes.
  - c. Seals #1 and #2 are independently capable of withstanding full pressure indefinitely.
  - d. Seal #1 is capable of withstanding full pressure indefinitely but seal #2 is only capable of withstanding full pressure for only 30 minutes.

A: d.

R: LO-LP-16401,  
EB#: LO-LP-16401-03-06

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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21. Q: Which ONE of the following conditions is NOT necessary to generate an AMSAC actuation signal?
- a. 2/2 MFP's tripped
  - b. Turbine load greater than 40%.
  - c. Load dependent variable time delay expired.
  - d. 3 of 4 selected feed flow channels < setpoint.

A: a.

R: 12004-C,R20,PG.15, LOGICS,  
EB#: LO-LP-28301-02-01

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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22. Q: Given the following information:

- Rod bank selector switch in manual.
- The In-Hold-Out switch is held in the 'IN' position until the step counters count off 5 steps IN.
- DRPI indication does not change.

Which ONE of the following statements is true?

- a. Rods definitely moved inward as indicated by the step counter change even though DRPI did not indicate rods moved.
- b. Since rods did not move when 4 steps of rod movement was demanded, AOP 18003-C, "Rod Control System Malfunction", must be entered.
- c. Rods probably moved inward as indicated by the step counter change. Rods will have to move in another step before DRPI indication will change.
- d. Since DRPI indication did not change as expected when 4 steps of rod movement was demanded, operations should perform the Control Rod Operability surveillance test.

A: c.

R: CHAP 7,  
EB#: LO-LP-27201-03-02

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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23. Q: Which one of the following is correct concerning the Channel Defeat lamp on the PR Detector Current Comparator Drawer:
- a. Indicates one channel signal not being averaged with the other three channels; lit at power under normal conditions.
  - b. Indicates one channel signal not being input to the auctioneered low circuit; lit at power under normal conditions.
  - c. Indicates one channel signal not being averaged with the other three channels; NOT lit at power under normal conditions.
  - d. Indicates one channel signal not being input to the auctioneered low circuit; NOT lit at power under normal conditions.

A: c.

R: CH 3C, SEC.II.B,  
EB#: LO-LP-17301-08-03

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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24. Q: Given the following conditions:

- RCS Wide Range pressure 1635 psig
- Pressurizer Pressure 1710 psig
- RCS Hot Leg temperatures 571 degrees F
- RCS Cold Leg temperatures 560 degrees F
- Core Exit Thermocouple temperatures 568 degrees F

Which ONE of the following is the correct amount of subcooling for the above listed conditions ?

- a. 38 degrees F.
- b. 41 degrees F.
- c. 47 degrees F.
- d. 49 degrees F.

A: b.

R: None

EB#: LO-LP-37012-15-01

Point Value: 1.00

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25. Q: Which ONE of the following correctly states the requirements needed to reset a "Phase A Containment Isolation" signal actuated from an SI actuation?

- a. 1/2 handswitches to RESET: SI signal can still be present.
- b. 1/2 handswitches to RESET: SI signal must be cleared.
- c. 2/2 handswitches to RESET: SI signal can still be present.
- d. 2/2 handswitches to RESET: SI signal must be cleared.

A: c.

R: 1X6AA02, SHT 8,

EB#: LO-LP-29160-05-01

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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26. Q: Which ONE of the following sets of signals BOTH actuate Containment Spray?
- a. 1 of 2 Containment Spray handswitches taken to ACTUATE or 2 of 4 Containment Pressure Channels > 21.5 #.
  - b. 2 of 2 Containment Spray handswitches taken to ACTUATE or 2 of 4 Containment Pressure Channels > 21.5 #.
  - c. 1 of 2 Containment Spray handswitches taken to ACTUATE or 2 of 3 Containment Pressure Channels > 14.5 #.
  - d. 2 of 2 Containment Spray handswitches taken to ACTUATE or 2 of 3 Containment Pressure Channels > 14.5 #.

A: b.

R: LOGICS,  
EB#: LO-LP-15101-06-02

Point Value: 1.00

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27. Q: A plant startup is in progress at 90% power. Main Feed Pump "A" trips and it's discharge valve goes SHUT. Which ONE of the following describes the required operator action(s) ?
- a. Run speed to zero (0) on the GE and Westinghouse controllers, reset the feed pump, and bring back on the GE potentiometer while emergency borating the RCS.
  - b. Reduce Turbine load to less than 850 MWe, start the third condensate pump, and insert rods to match Tave/Tref.
  - c. Trip the reactor and go to 19000-C, REACTOR TRIP OR SAFETY INJECTION if the Main Feed Pump cannot be restarted.
  - d. Push the LOAD SETBACK pushbutton on the Turbine Control Panel on the QMCB and emergency borate the RCS.

A: b.

R: 18016-C,  
EB#: LO-LP-60314-02-03

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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28. Q: Which ONE of the following tanks is continuously vented to the gaseous radwaste system during normal power operations?
- a. Waste Holdup Tank (WHUT).
  - b. Volume Control Tank (VCT).
  - c. Pressurizer Relief Tank (PRT).
  - d. Refueling Water Storage Tank (RWST).

A: b.

R: 17C, SEC. I,  
EB#: LO-LP-46101-03-03

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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29. Q: Given the following sequence of events:

1. A Reactor trip occurred on Unit 1 causing a LO-LO level in all SG's.
2. All AFW pumps start with discharge valves full open.
3. The BOP throttles AFW flow to 10% OPEN position on all discharge valves.
4. Level has been returned to 60-70% NR level in all SG's.
5. Both MFPs trip.

Which ONE of the following states the position of the discharge valves if left unattended for 5 minutes?

- a. The MDAFW and the TDAFW discharge valve positions would not change.
- b. The TDAFW valves would stay as they are and the MDAFW valves would stroke full open.
- c. The MDAFW valves would stay as they are and the TDAFW valves would stroke full open.
- d. The MDAFW and TDAFW valves would stroke to the full open position.

A: b.

R: 13d, 1X5DN121,  
EB#: LO-LP-20101-04-05

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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30. Q: Which ONE of the following must be performed prior to the Chemistry Department sampling the liquid radwaste system tank contents?
- a. The required Release Permit must be approved by the USS.
  - b. The sample area for the liquid radwaste system tank must be Caution Taped off due to airborne radiation concerns.
  - c. A clearance must be performed that will isolate the tank to prevent the over pressurization of the sample point.
  - d. The tank must be recirculated prior to the sample being taken.

A: d.

R: 13214-1,  
EB#: LO-LP-47110-04-03

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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31. Q: Given the following plant parameters following a Reactor Trip:

- \* Tave is 430 deg F
- \* Steam Generator Pressure is 550 psig
- \* Pressurizer Pressure is 1890 psig
- \* All SG levels are 45% NR
- \* Containment Pressure is 0.5 psig

Which ONE of the following statements is TRUE?

- a. Adverse Containment numbers will NOT be required until containment pressure reaches 21.5 psig.
- b. A Main Steamline Isolation signal should have actuated.
- c. A Containment Spray signal should have actuated.
- d. A Safety Injection signal will not be required.

A: b.

R: LO-LP-21102-15,  
EB#: LO-LP-21102-15-01

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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32. Q: While maintenance was performing a PM on 1BD1CA Battery Charger, 1BD1CB tripped due to a faulty relay. The battery has been supplying the 125 VDC vital bus with power for the past 30 minutes. Which of the following states the remaining time the batteries will continue to supply the fully loaded 125 VDC Vital Bus?

- a. 1 Hour and 30 minutes.
- b. 2 Hours.
- c. 2 Hours and 15 minutes.
- d. 2 Hours and 45 minutes.

A: c.

R: None

EB#: LO-LP-01201-04-05

Point Value: 1.00

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33. Q: A HIGH alarm on which ONE of the following radiation monitors will result in an automatic actuation of ESFAS equipment?

- a. SGBD process monitor, RE-0019.
- b. CVCS Letdown process monitor, RE-48000.
- c. Containment High Range monitor, RE-005.
- d. Control Room Air Intake monitor, RE-12116.

A: d.

R: CH 11A, TS 3.3.2,

EB#: LO-LP-32101-12-05

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

34. Q: Control rods are in AUTO. Compare the output signal from the Reactor Control Unit on a 2% step change in turbine load with power at 90% with a 2% step change at 40% power.

At 90% power the signal would be:

- a. The SAME as at 40% power
- b. LARGER due to the response of the Non-Linear Gain Unit
- c. SMALLER due to the response of the Non-Linear Gain Unit
- d. SMALLER due to the response of the Variable Gain Unit

A: d.

R: LO-LP-27101-07,  
EB#: LO-LP-27101-07-16

Point Value: 1.00

35. Q: A manual reactor trip was initiated at 5% reactor power and a feedwater isolation signal was generated. Which ONE of the following must be performed to open the bypass feed reg valves.

- a. Momentarily close the reactor trip breakers only.
- b. No action required, the FWI automatically resets.
- c. Place both train A and train B FWI Reset Switches momentarily to the Reset position.
- d. The Rx Trip Breakers must be closed and then the FWI Reset Switches held in the RESET position.

A: c.

R: LOGICS,  
EB#: LG-LP-18201-07-07

Point Value: 1.00

KEY CONTINUED ON NEXT PAGE

EXAM KEY  
NRC SRO Exam

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36. Q: The normal flowpath of seal injection supplied by CVCS through the RCP #1 Seal is described by which ONE of the following?

- a. All of the leakoff passes through the #2 seal to the containment sump.
- b. Most of the flow returns via the #1 seal return line and the remainder flows down the pump shaft.
- c. Most of the flow goes down the pump shaft and the remainder goes down the #1 seal return line to the RCDT.
- d. Most of the flow goes down the pump shaft and the remainder comes back to the charging pump suction via the #1 Seal return line.

A: d.

R: CH 1A,  
EB#: LO-LP-16401-02-02

Point Value: 1.00

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37. Q: Which ONE of the following is an indication of an RCP # 1 seal failure?

- a. Affected RCP # 1 seal delta P increase.
- b. Affected RCP # 1 seal leakoff increase.
- c. Excess letdown header pressure decrease.
- d. Affected RCP seal injection flow decrease.

A: b.

R: None  
EB#: LO-LP-16401-04-01

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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38. Q: On unit 1, the Channel 1 Pressurizer Pressure instrument failed low. The BOP is tripping bistables per the appropriate AOP. The channel II Pressurizer Pressure instrument Low Pressure SI bistable is tripped instead of the Channel I bistable. An automatic reactor trip and safety injection occur. In order to terminate SI flow the control room operators must perform which of the following actions.
- a. Block the Pressurizer Low Pressure SI, then reset the SI.
  - b. Block the Pressurizer Low Pressure SI, wait 60 seconds and then reset the SI.
  - c. Wait 60 seconds and then reset the SI.
  - d. Untrip the Channel II Low Pressure SI bistable and then reset the SI.

A: c.

R: 9A, LOGICS,  
EB#: LO-LP-13101-05-02

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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39. Q: The Unit 1 BOP has initiated performance of OSP 14980-1, "DG Monthly Surveillance". Prior to starting DG 1A, the UNIT/PARALLEL switch is placed in the PARALLEL position. A drain valve breaks off in containment causing RCS pressure to drop to 1800 psig. Which ONE of the following CORRECTLY states the response of DG 1A and it's output breaker to this event?
- a. DG 1A would FAST start and the DG 1A output breaker would CLOSE.
  - b. DG 1A would FAST start and the DG 1A output breaker would remain OPEN.
  - c. DG 1A would SLOW start and the DG 1A output breaker would CLOSE.
  - d. DG 1A would SLOW start and the DG 1A output breaker would remain OPEN.

A: d.

R: LO-LP-11201-04,  
EB#: LO-LP-11201-04-01

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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40. Q: The following sequence of events has occurred:

- Reactor Trip/ Safety Injection due to a LOCA.
- All RCP's have been secured.
- The reactor vessel has reached saturated conditions.

Pressurizer level will \_\_\_\_\_ in response to the saturated conditions in the reactor vessel, and then \_\_\_\_\_ when an RCP is restarted.

- a. Lower, rise.
- b. Rise, quickly drop.
- c. Lower, quickly drop.
- d. Rise, continue to rise.

A: b.

R: None

EB#: LO-LP-37012-10-01

Point Value: 1.00

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41. Q: Which one of the following conditions exist when the Input Error Inhibit Switch is placed in the INHIBIT position?

- a. Inputs to the UV Driver Card are inhibited.
- b. Inputs to the Logic Cards are inhibited.
- c. 15 VDC is aligned to the Slave Relays.
- d. The Spray Test Panel is enabled.

A: b.

R: None

EB#: LO-LP-28101-06-01

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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42. Q: Which ONE of the following is correct concerning Steam Generator Water Level Control?
- a. Each steam generator's Steam Flow/Feed Flow mismatch only controls its Main Feed Regulation Valve (MFRV) position.
  - b. Each steam generator's Steam Flow/Feed Flow mismatch and level control its Bypass Feed Regulation Valve (BFRV) position.
  - c. Total Steam Flow/Feed Flow mismatch controls Main Feed Pump speed.
  - d. Total Steam Flow/Delta P Program control Main Feed Pump delta P setpoint.

A: d.

R: None

EB#: LO-LP-18502-05-01

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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43. Q: Given the following conditions:

- A large break LOCA has occurred 3 hours ago on Unit 1.
- Containment pressure is 46 PSIG.
- Containment H2 concentration is 5% per the H2 monitors.
- DG1A is supplying 1AA02

Which ONE of the following is correct concerning Post Accident Hydrogen control using the attached procedure 13130-C?

- a. Dilute the containment hydrogen concentration using the Service Air System.
- b. The "A" train Post LOCA Electric Hydrogen Recombiner can be placed in service if 1AA02 bus loading is monitored.
- c. The "A" train Post LOCA Electric Recombiner can NOT be placed in service due to the DG1A carrying the 1AA02 bus.
- d. The hydrogen monitors are unreliable at this point. Three more hours must pass and another hydrogen sample taken.

A: b.

R: 13130-C,  
EB#: LO-LP-29110-03-05

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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44. Q: Containment pressure is 1.0 psig. Chemistry has issued a release permit to allow containment pressure relief. Which ONE of the following describes the initial mini-purge exhaust system lineup established to reduce the pressure?

Flow directed through:

- a. The filter inlet damper bypass line orifice, through the filter to the exhaust fan, then to the plant vent, with the exhaust fan OFF.
- b. The filter inlet damper bypass line orifice, through the filter to the exhaust fan, then to the plant vent, with the exhaust fan RUNNING.
- c. The filter inlet damper, through the filter to the exhaust fan, then to the plant vent, with the exhaust fan OFF.
- d. The filter inlet damper, through the filter to the exhaust fan, then to the plant vent, with the exhaust fan RUNNING.

A: a.

R: 13125-1,  
EB#: LO-LP-29110-03-03

Point Value: 1.00  
=====

45. Q: Which of the following is the preferred method of cooling the spent fuel pool on a loss of CCW to both trains of spent fuel pool cooling?

- a. Feed and Bleed using Train "B" SFPC.
- b. Feed and Bleed using Train "A" SFPC.
- c. Feed and Bleed using SFP Purification Pump.
- d. Feed and Bleed using the Recycle Evaporator Feed Pump.

A: a

R: LO-LP-25102, 18030-C PG 5,  
EB#: LO-LP-25102-15-01

Point Value: 1.00  
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EXAM KEY  
NRC SRO Exam

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46. Q: Which ONE of the following is used to remove the fuel from the new fuel elevator to the upender?

- a. Cask Crane.
- b. Fuel transfer car.
- c. New fuel handling tool.
- d. Spent fuel handling tool.

A: d.

R: None

EB#: LO-LP-25101-03-01

Point Value: 1.00

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47. Q: During a reactor startup, the BOP is maintaining steam generator levels near program. The steam dumps are in automatic in the Steam Pressure mode when PT-507 fails high. Which ONE of the following describes the steam generator level response, assuming no further operator action?

- a. SG level would initially increase and then lower gradually.
- b. SG level would initially decrease and then continue to lower gradually.
- c. SG level would initially increase and would result in water induction in the main steam lines.
- d. SG level would initially decrease and then rise rapidly due to the lower SG pressure allowing more feed flow.

A: a.

R: None

EB#: LO-LP-21101-04-02

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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48. Q: Which of the following describes the alignment of the Standby Auxiliary Transformer (SAT during normal plant operations?
- a. Wilson feeder HOT, 13.8kV breaker CLOSED, SAT HOT, 4.16kV breaker OPEN, and SAT disconnects OPEN.
  - b. Wilson feeder HOT, 13.8kV breaker OPEN, SAT COLD, 4.16kV breaker OPEN, and SAT disconnects OPEN.
  - c. Wilson feeder COLD, 13.8kV breaker OPEN, SAT COLD, 4.16kV breaker OPEN, and SAT disconnects OPEN.
  - d. Wilson feeder HOT, 13.8kV breaker CLOSED, SAT HOT, 4.16kV breaker CLOSED, and SAT disconnects OPEN.

A: a.

R: LO-LP-01101-08,  
EB#: LO-LP-01101-08-01

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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49. Q: Given the following data:

- A PEO inadvertently deenergized 120 VAC Vital Bus 1BY1B.
- An SI actuation from low Pzr pressure occurs.

Which ONE of the following describes the expected response of the Unit 1, Train B Diesel Generator (DG) and the Train B SI Loads with 1BY1B deenergized?

- a. The B Train DG will start and the Train B SI Loads will be sequenced on.
- b. The B Train DG will not start nor will the Train B SI Loads be sequenced on.
- c. The B Train DG will start, however the Train B SI Loads will not be sequenced on.
- d. The B Train DG will not start, however the Train B SI Loads will be sequenced on.

A: b.

R: LO-LP-28201 OBJ 1,  
EB#: LO-LP-11201-02-02

Point Value: 1.00

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EXAM KEY  
NRC SRO Exam

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50. Q: Which ONE of the following describes the response of the Turbine Building Drains system to a high radiation condition on 1RE-0848?
- a. The drains to the waste water retention basin isolate and the waste water retention basin pumps trip on low flow.
  - b. The drains to the waste water retention basin isolates and the drains are automatically aligned to the Dirty Turbine Building Drain Tank.
  - c. The drains to the waste water retention basin isolates and the Turbine Building Drain Tank transfer pumps and Turbine Building sump pumps trip on low flow.
  - d. The drains to the waste water retention basin remain the same because there are no auto actions associated with 1RE-0848. It provides alarm functions only.

A: b.

R: 1X4DB180,  
EB#: LO-LP-45201-10-01

Point Value: 1.00

EXAM KEY

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51. Q: Given the following conditions:

- \* Reactor Power is 60%
- \* Pressurizer pressure is 2240 psig
- \* Charging flow is being controlled in MANUAL
- \* The BACKUP HEATERS have just ENERGIZED

Which ONE of the following is the actual pressurizer level?

- a. 46%
- b. 51%
- c. 56%
- d. 60%

A: b.

R: LO-LP-16302,  
EB#: LO-LP-16302-02-01

Point Value: 1.00

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52. Q: Which ONE of the following signals will cause HV-9378, Instrument Air to Containment isolation valve, to CLOSE?

- a. Containment Pressure at 4 psig.
- b. Containment Radiation Monitor RE-003 in high alarm.
- c. Instrument Air header pressure of 70 psig.
- d. Containment Atmosphere Radiation Monitor RE-2562 in high alarm.

A: a.

R: P&ID1X4DB186-1,  
EB#: LO-LP-02110-14-02

Point Value: 1.00

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EXAM KEY

- =====
53. Q: Which ONE of the following correctly describes the primary purpose of the Seismic Category I Dry Standpipe System?
- a. Automatically deluge key safe shutdown equipment rooms in the event of a Safe Shutdown Event with a fire.
  - b. It provides for fire water for safe shutdown equipment whereas the normal fire water is for non safe shutdown equipment.
  - c. Provide a source of water for manual fire control in areas required for safe shutdown following an Safe Shutdown Event.
  - d. Provide off-site firefighters with a water source in the event that a fire cannot be contained by on-site personnel.

A: c.

R: 29A, FSAR 9.5.1,  
EB#: LO-LP-43101-06-02

Point Value: 1.00

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54. Q: Unit 1 is in mode 4 and preparations are being made to enter mode 3. In aligning the RHR system to a standby status, the RO places 1-HV-8812A, RHR pump suction valve from the RWST to OPEN, but the valve fails to OPEN. Which ONE of the following conditions is preventing the RHR pump suction valve from the RWST from opening?
- a. Cold leg recirculation to CCP and SI pumps suction valves 1-HV-8804A is OPEN.
  - b. Containment sump suction valve 1-HV-8811A to RHR pump is CLOSED.
  - c. Loop 1 hot leg suction valve 1-HV-8701A to RHR pump is OPEN.
  - d. CCP "A" miniflow valves 1-HV-8508A and 1-HV-8509B are OPEN.

A: a.

R: None  
EB#: LO-LP-12101-08-03

Point Value: 1.00

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EXAM KEY

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55. Q: Which ONE of the following is a possible cause of an increase in Pressurizer Relief Tank level following an inadvertent CIA actuation?

- a. Seal return line relief valve lifted.
- b. ACCW supply line to the thermal barrier relief valve lifted.
- c. CVCS normal charging line discharge relief valve lifted.
- d. RCP seal injection line relief valve lifted.

A: a.

R: LO-LP-16301-02,  
EB#: LO-LP-16301-02-03

Point Value: 1.00

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56. Q: Both trains of CCW System are in service with the following pumps running:

- Train "A" - pumps 1 and 3
- Train "B" - pumps 2 and 6

Which of the following CCW pumps would be running after a Safety Injection Actuation?

- a. CCW Pumps 1, 2, 3, and 4
- b. CCW Pumps 1, 2, 3, and 6
- c. CCW Pumps 1, 2, 3, 4, and 6
- d. CCW Pumps 1, 2, 3, 4, 5, and 6

A: c.

R: LO-LP-10101-05,  
EB#: LO-LP-10101-05-03

Point Value: 1.00

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EXAM KEY

- =====
57. Q: Which ONE of the following describes conditions under which the steam dump system is used in the steam pressure mode?
- a. Immediately following a reactor trip.
  - b. Immediately following a load rejection from 70% power.
  - c. Plant is being shutdown from 100% power, plant is currently at 50% power.
  - d. <sup>At 12-15-25</sup> ~~Plant in hot standby,~~ plant starting up with turbine just synched on line.

A: d.

R: CH 12B, SEC. I. A. 1,  
EB#: LO-LP-21201-01-02

Point Value: 1.00

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EXAM KEY

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58. Q: Given the following plant conditions:

- Due to a misaligned rod, one control rod in control bank (CB) "D" was withdrawn 15 steps to realign it with CB "D" in accordance with AOP-18003-C, "Malfunction of Rod Control System."
- The P/A converter for CB "D" was not adjusted as required.

Which ONE of the following conditions will occur because CB "D" P/A converter was not adjusted?

- a. ROD CONT SYS NON-URGENT FAILURE alarm will actuate when Control Bank D rods are initially moved.
- b. CONTROL ROD BANK POSITION LO alarm will NOT actuate when Control Bank D rods are initially moved below the setpoint.
- c. ROD CONT SYS URGENT FAILURE alarm will actuate when Control Bank D rods are initially moved.
- d. COMPUTER ALARM ROD SEQ/DEV OR PR FLUX TILT alarm will actuate when Control Bank D rods are initially moved.

A: b

R: LO-LP-60303-00,  
EB#: LO-LP-60303-04-01

Point Value: 1.00

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EXAM KEY

- =====
59. Q: During the recovery of a dropped rod, you discover that DRPI for the affected rod has been lost. Which ONE of the following actions must you take and why is this action taken?
- a. Send an operator to the P/A converter, to determine actual rod position prior to proceeding with the recovery.
  - b. Run an incore flux map, to determine the rod position prior to proceeding with the recovery.
  - c. Discontinue the recovery and place the unaffected rods in that bank to the position of the rod being recovered to prevent causing unacceptable flux shifts in the core.
  - d. Notify reactor engineering so they can determine the rod position and the actions required to prevent exceeding core thermal limits.

A: d.

R: 18003-C, REV 3, 35, REV 0,  
EB#: LO-LP-60303-02-03

Point Value: 1.00

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60. Q: The reactor was at 80% power when an instrument failure occurred that caused the rods to move. Which ONE of the following is correct?
- a. With NI-43 failed HIGH, rods will initially move IN then stop.
  - b. With NI-43 failed HIGH, rods will continually move IN.
  - c. With NI-43 failed LOW, rods will initially move OUT then stop.
  - d. With NI-43 failed LOW, rods will continually move OUT.

A: a.

R: 18001-C,  
EB#: LO-LP-60301-01-06

Point Value: 1.00

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EXAM KEY

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61. Q: Given the following sequence of events

- Unit 1 was at 85% power.
- At 1330 a rod in Control Bank "D" is found mispositioned 11 steps.
- A blown fuse was identified and replaced in the Control Bank "D" power cabinet at 1425.
- Rod recovery has begun per SOP 13502-C at 1445.

Which ONE of the following actions is correct concerning this situation?

- a. Rod recovery should continue per SOP 13502-C.
- b. Rod recovery should stop and Reactor Engineering should be notified.
- c. Rod recovery should stop and AOP 18003-C, "Rod Control Malfunction", should be entered.
- d. Rod recovery should continue but must be complete by 1530 and then stop to have Reactor Engineering to evaluate.

A: b.

R: 18003-C, R8, PG. 5,  
EB#: LO-LP-60303-03-03

Point Value: 1.00  
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EXAM KEY

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62. Q: A large break LOCA has occurred. The control room operators have transitioned from 19000-C to 19010-C, "Loss of Reactor or Secondary Coolant". The RWST Lo-Lo Level annunciator (ALB06-F4) sounds and RWST level indicates 38%. The USS directs the control room operators to initiate 19013-C, "Transfer to Cold Leg Recirculation". The extra operator, monitoring CSFST's, then reports that a valid red path condition exists on Core Cooling.

The USS should direct the operators to:

- a. Perform the first six (6) steps of 19013-C, then transfer to 19221-C, "Response to Inadequate Core Cooling".
- b. Perform 19013-C to completion, then transfer to 19221-C, "Response to Inadequate Core Cooling".
- c. Immediately perform the actions of 19221-C, "Response to Inadequate Core Cooling".
- d. Immediately perform the actions of 19221-C, "Response to Inadequate Core Cooling", while the extra operator concurrently performs the actions of 19013-C.

A: a.

R: LO-LP-37111-10,  
EB#: LO-LP-37111-10-01

Point Value: 1.00

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EXAM KEY

- =====
63. Q: During a plant startup on Unit 1 with power at 29%, RCP #2 shears a pump shaft. Which ONE of the following is an IMMEDIATE OPERATOR ACTION after the RCP trips?
- a. Trip the reactor and enter EOP 19000-C, Rx Trip or SI.
  - b. Commence a rapid power reduction and shutdown the plant.
  - c. Commence a power reduction to less than 10% power.
  - d. Verify the affected Steam Generator level is trending to 65%.

A: a.

R: (3.7/4.0),  
EB#: LO-LP-60305-03-04

Point Value: 1.00

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64. Q: An ATWT condition has just occurred on Unit 1. The crew is on step 5 of 19211 "ATWT" and the USS requests the RO to start an emergency boration. Which of the following meets the requirements per 13009-1 for an adequate emergency boration flowpath.
- a. The reactor makeup control system is set for normal boration and boric acid flow meter indicates 28 gpm, with total charging flow at 75 gpm.
  - b. 1-HV-8104 is open and 1FI-183, emergency boration flow meter, indicates 30 gpm with charging flow at 40 gpm.
  - c. RWST aligned to CCP "B" and BIT flow plus total seal injection flow less total seal return flow is 85 gpm.
  - d. RWST aligned to PDP with charging flow at 102 gpm through normal charging flowpath and seal leakoff flow is 9 gpm.

A: d

R: 13009-1,  
EB#: LO-LP-09401-04-07

Point Value: 1.00

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EXAM KEY

- =====
65. Q: Which ONE of the following conditions require an emergency  
boration to be started?
- a. Axial flux not within Tech. Spec. limits.
  - b. Boron concentration is 2200 PPM during refueling.
  - c. One control rod fails to insert on a reactor trip.
  - d. Rod Bank Lo-Lo Limit alarms during rapid power decrease.

A: d.

R: None

EB#: LO-LP-09401-04-05

Point Value: 1.00

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EXAM KEY

66. Q: Given the following information:

- Unit 1 is entering Mode 4.
- RHR train "A" and CCP "A" are in service.
- Various Train "A" CCW Annunciators are in alarm.
- All train "A" CCW Pumps are running with discharge pressure at 75 psig.
- CCW Train "A" Surge Tank level is decreasing.
- The crew enters AOP 18020-C "LOSS OF CCW"

Which ONE of the following is the correct action to take per 18020-C?

- a. Place CCW Train "A" in single pump operation after verifying NSCW Train "A" is in service.
- b. Stop CCW Train "A" pumps and place non-affected CCP "B" in service after verifying CCW Train "B" is in service.
- c. Stop CCW Train "A" pumps and stop Train "A" NSCW pumps after verifying CCW Train "B" is in service.
- d. Stop CCW Train "A" pumps and place non-affected RHR Train "B" in service after verifying CCW Train "B" is in service.

A: d.

R: LO-LP-60316, 18020-C,  
EB#: LO-LP-60316-04-01

Point Value: 1.00

EXAM KEY

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67. Q: Given the following conditions:

- RCS pressure = 2335 psig.
- RCS Tave = 588.3 deg. F.
- The reactor is not tripped.
- The crew is currently in 19211-C, "FR-S.1, Response to Nuclear Power Generation/ ATWT", step 5.

Which ONE of the following describes the reason why RCS pressure should be maintained less than 2335?

- a. Prevents the Pressurizer Relief Tank from going solid, due to an open PORV or PRZR Code Safety, and blowing the rupture disc causing a LOCA inside containment.
- b. To prevent the Reactor from tripping on high RCS pressure.
- c. To ensure a sufficient amount of boric acid is injected into the core to reduce reactor power.
- d. To ensure the Pressurizer Spray valves don't short cycle when the PORV's open to lower RCS pressure.

A: c.

R: 19211-C,  
EB#: LO-LP-37041-05-02

Point Value: 1.00

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EXAM KEY

- =====
68. Q: Which ONE of the following is the basis for isolating feedwater to a FAULTED steam generator with a steamline break in containment?
- a. To minimize the energy input into containment.
  - b. To minimize the potential of rupturing a steam generator tube.
  - c. To maximize the cooldown capability of the non-faulted steam generators.
  - d. To maximize the steam generator blowdown capability of the non-faulted steam generators.

A: a.

R: LO-LP-37121-03, WOG,  
EB#: LO-LP-37121-03-02

Point Value: 1.00

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69. Q: The unit 2 main generator has just been synchronized to the grid and power has been raised to 18% power. The BOP was preparing to swap feedwater flow from the Bypass Feed Regulation Valves (BFRV) to the Main Feed Regulation Valves (MFRV) when condenser vacuum decreased to 21.5 inches of water generating a turbine trip. Which of the following are the correct actions the crew should take in response to the turbine trip?
- a. Enter 18011-C, Turbine Trip below P-9, and reduce reactor power below 5% and control Tave using steam dumps.
  - b. Trip the reactor and go to 19000-C, Reactor Trip or Safety Injection.
  - c. Enter 18016-C, Condensate and Feedwater Malfunctions, start all available AFW pumps, and reduce reactor power to 10%.
  - d. Enter 18011-C, Turbine Trip below P-9, reduce reactor power below 5%, and control Tave using atmospheric relief valves.

A: d.

R: LO-LP-60311, 18011-C,  
EB#: LO-LP-60311-03-03

Point Value: 1.00

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KEY CONTINUED ON NEXT PAGE

EXAM KEY

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70. Q: A loss of all AC has occurred. The control room operators have completed the immediate operator actions of 19100-C "Loss of All AC Power," and have attempted without success, to restore power. Per procedure 19100-C, the control switches for ESF 4160V loads are placed in the Pull-To-Lock position. The defeat of the auto start for this equipment is designed to prevent which one of the following actions?
- a. The unnecessary use of water that may be needed for long term cooldown.
  - b. Overloading of a bus that may not be capable of handling automatic load sequencing of large electrical loads.
  - c. An uncontrolled overpressurization of the RCS.
  - d. An uncontrolled cooldown of the RCS and possible reactor startup.

A: b.

R: 19100-C,  
EB#: LO-LP-37031-07-02

Point Value: 1.00

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EXAM KEY

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71. Q: Given the following conditions:

- Reactor power is 6%.
- Main Feed pump "B" is in service.
- Main Feed Pump "A" is still tripped.
- AFW is in standby readiness.
- Pressurizer Pressure Control select switch is in the 455/456 position.
- 1BY1B is deenergized for 2 seconds by an inadvertent operator action.

Which ONE of the following actions will occur? (Assume no operator action is taken and no instruments remain failed after the bus is restored.)

- a. Both MDAFW pumps would start.
- b. All pressurizer heaters would cut off.
- c. A reactor trip would occur.
- d. No automatic protective action would occur.

A: c.

R: 18032-1, 18002-C,  
EB#: LO-LP-60324-01-03

Point Value: 1.00

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EXAM KEY

- =====
72. Q: A high radiation signal from RE-0021, SG Blowdown Rad. Monitor, will automatically close which ONE of the following valves?
- a. SGBD Isolation Valves (HV-7603 A, B, C, D)
  - b. SGBD Demineralizer Inlet Isolation Valve (FV-1150)
  - c. SGBD sample isolation valves (HV-9451, 9452, 9453, and 9454)
  - d. SGBD pipe break protection valves (HV-15212A, B, C, D and HV-15216A, B, C, D).

A: b.

R: CH 13C, SEC.1B, R.2,  
EB#: LO-LP-24101-13-05

Point Value: 1.00

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73. Q: A fire has occurred in the unit 1 control room that has caused the unit 1 and unit 2 control rooms to be evacuated. When the operators assemble in the shutdown panel rooms, which ONE of the following states how the operators would know if an instrument is fire qualified.
- a. Meter bezels painted "Red".
  - b. Listed in 18038-1/2, "Operations from the Remote Shutdown Panel".
  - c. "FQ" engraved on the equipment nameplate.
  - d. Marked with an "Orange Dot" by the handswitch.

A: a.

R: 18038-C,  
EB#: LO-LP-60327-05-02

Point Value: 1.00

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EXAM KEY

- =====
74. Q: Which ONE of the following actions should be taken by operators evacuating the control room due to a fire?
- a. Trip 1 & 4 RCP's.
  - b. Start an additional air compressor.
  - c. Place pressurizer pressure control in AUTO.
  - d. Place steam generator atmospheric relief valves in AUTO.

A: a.

R: 18038-1,  
EB#: LO-LP-60328-02-02

Point Value: 1.00

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75. Q: Which of the following conditions describes a loss of Containment Integrity, as defined by Technical Specifications?
- a. Both containment airlock doors are blocked open for maintenance in MODE 4.
  - b. The leakage rate of a containment penetration exceeds Tech Spec limits in MODE 5.
  - c. The outer containment airlock door is opened for normal transit entry while in MODE 2.
  - d. The inner containment airlock door is left open while performing maintenamce on its 'O' rings in MODE 3.

A: a.

R: TECH SPECS,  
EB#: LO-LP-39210-01-01

Point Value: 1.00

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KEY CONTINUED ON NEXT PAGE

EXAM KEY

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76. Q: Given the following information:

- The crew is in 19221-C "FR-C.1 RESPONSE TO INADEQUATE CORE COOLING."
- The crew has attempted unsuccessfully to establish adequate core cooling using high head SI.
- The intact steam generators are depressurized to less than 200 psig and then to atmospheric pressure.

Which ONE of the following states why the SG's are depressurized in 19221-C?

- a. It depressurizes the RCS in order to preclude a potential PTS concern.
- b. It depressurizes the RCS which will allow all available ECCS flow to inject and cool the core.
- c. As S/G pressure drops the steam in the RCS loops is condensed promoting single phase flow by the RCPS.
- d. Depressurizing the S/G's will allow a low pressure water source to be lined up to the S/G's.

A: b.

R: WOG BACKGROUND DOC., 19221-C,R6,PG. 6,  
EB#: LO-LP-37061-02-01

Point Value: 1.00  
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EXAM KEY

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77. Q: Which ONE of the following process radiation monitors would provide indication of a failed fuel rod?

- a. RE-005, Containment High Range Monitor
- b. RE-12442, Plant Vent Monitor
- c. RE-48000, CVCS Letdown Monitor
- d. RE-12839, SJAE / SPE Exhaust Monitor

A: c.

R: None

EB#: LO-LP-32101-07-01

Point Value: 1.00  
=====

78. Q: Control Bank "D" rod H8 has been discovered to be greater than 12 steps misaligned from the rest of Control Bank "D" rods. The procedure, 18003-C ROD CONTROL SYSTEM MALFUNCTION, has been entered. During the opening of the lift disconnect switches a loss of power to the DRPI cabinet occurs. The operator should:

- a. Immediately open both reactor breakers
- b. Notify I & C of the failure, maintain the reactor in its current condition, realign the rod only after DRPI is repaired.
- c. Get Reactor Engineering to determine current rod position and perform core thermal power limit surveillances.
- d. Reconnect lift disconnect switches, reduce power to less than 50%, reset high flux setpoints to 55%, maintain power less than 50% until DRPI is operational.

A: c.

R: 18003-C,

EB#: LO-LP-60303-13-01

Point Value: 1.00  
=====

EXAM KEY

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79. Q: Given the following conditions:

- A total loss of ACCW has occurred at 0115 EST.
- The RCP temperatures are being monitored on the IPC.
- The RCP vibration is being monitored.
- Reactor power is 30%.
- The time is currently 0121 EST.

Which ONE of the following is the required action for the operator?

- a. Trip the reactor then trip all RCP's before 0125 EST.
- b. If #1 seal leakoff temperature exceeds 195F, trip that RCP.
- c. Trip any RCP that has its thermal barrier isolation valve shut.
- d. Any RCP with shaft vibration in excess of 5 mils must be tripped.

A: a.

R: 18022-C,  
EB#: LO-LP-60318-05-01

Point Value: 1.00

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EXAM KEY

80. Q: An ATWT occurred from 84% power. The control room operators enter 19211-C, "Response to Nuclear Power Generation ATWT". The reactor did not trip. In step two (2), one (1) Turbine Stop Valve has failed to close. Which ONE of the following actions is an acceptable response to this condition?

- a. Verify the corresponding control valve is closed.
- b. Trip the turbine from the front standard.
- c. Close the MSIV's and BSIV's
- d. Place the EHC pumps in Pull-to-Lock.

A: c.

R: LO-LP-37041-07,  
EB#: LO-LP-37041-07-01

Point Value: 1.00

81. Q: The crew is performing step 2 (Check pressure in all SGs - Any STABLE or RISING) of EOP 19020-C, "Faulted SG Isolation", in response to a main steam line break on #2 SG. The BOP reports that level in the #3 SG is rising in an uncontrolled manner with all feed flow isolated. The USS should:

- a. Have the BOP complete SG #2 isolation per 19020-C while the USS transitions to 19030-C, "SGTR".
- b. Terminate 19020-C and transition to 19030-C, "SGTR".
- c. Remain in 19020-C until directed to transition.
- d. Immediately transition to 19010-C, "Reactor Coolant or Secondary LOCA", and transition to 19030-C, "SGTR", when directed.

A: c.

R: LO-LP-37121-07,  
EB#: LO-LP-37121-07-01

Point Value: 1.00

EXAM KEY

- =====
82. Q: If all three expected responses for step 1 of 19000-C "Rx trip or SI" cannot be met, then the actions in the RNO must be performed. Select which of the following describes the RNO actions:
- a. Immediately go to 19211-c "Response to Nuclear Power Generation/ATWT."
  - b. Manually trip the Rx from the redundant switch at the remote SD panel; if Rx not tripped, then manually open the supply breakers to NB08 and NB09.
  - c. Manually trip the Rx; if not tripped, then trip the redundant switch on the ECCS portion of the QMCB. If still not tripped, Then locally open the Rx trip breakers.
  - d. Manually trip the Rx; if Rx not tripped, then trip using the redundant trip switch on the ECCS portion of the QMCB. If still not tripped, then manually open the supply feeder breakers to NB08 and NB09.

A: d.

R: 19000-C,  
EB#: LO-LP-37011-02-04

Point Value: 1.00

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EXAM KEY

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83. Q: Given the following conditions:

- RCS at NOP/NOT for 100% RTP,
- PORV 456A has seat leakage to the PRT,
- PRT pressure is 20 PSIG.
- Use steam tables provided.

Which ONE of the following is the approximate tailpipe temperature?

- a. 212 degrees F.
- b. 228 degrees F.
- c. 248 degrees F.
- d. 258 degrees F.

A: d.

R: None

EB#: LO-LP-16301-09-04

Point Value: 1.00  
=====



EXAM KEY

- =====
84. Q: A Reactor Trip and SI have occurred and the crew is currently in 19000-C, "Reactor Trip/Safety Injection". Which ONE of the following conditions describes when the RCP's are required to be tripped?
- a. Containment pressure is 2.0 psig
  - b. RCS pressure is 1200 psig and NO Charging or SI pumps are injecting.
  - c. RCS pressure is 1500 psig and ALL Charging and SI pumps are injecting.
  - d. RCS pressure is 1300 psig and ONLY one train of Charging and SI pumps are injecting.

A: d.

R: LO-LP-37021-06,  
EB#: LO-LP-37021-06-01

Point Value: 1.00

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EXAM KEY

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85. Q: Given the following conditions:

- Unit 1 - 100% power.
- Pressurizer level decreasing.
- REGEN HX LTDN HI TEMP alarm in.
- LTDN HX OUT HI TEMP alarm in.
- Seal injection flow indicates 19 gpm per RCP.

Which ONE of the following caused the above plant response ?

- a. Control valve PV-131 failed OPEN.
- b. Seal injection flow control valve HV-182 failed CLOSED.
- c. Charging flow control valve FV-121 failed OPEN.
- d. Letdown line isolation valves HV-459 or HV-460 CLOSED.

A: b.

R: 18007-C,  
EB#: LO-LP-60307-03-03

Point Value: 1.00

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EXAM KEY

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86. Q: Given the following information:

- Unit 2 is in Mode 6.
- RCS drained to 188.6 feet.
- RCS temperature is 125 degrees F.
- RCS pressure - atmospheric.
- Reactor was shutdown 21 days ago.
- Core reload is complete, replacing 1/3 of core with new fuel.
- A total loss of RHR cooling has occurred.

Which ONE of the following is correct concerning the amount of time it will take to reach saturated conditions in the RCS?

Use attached figures from AOP-18019-C, "Loss of RHR"

- a. 27 minutes.
- b. 38 minutes.
- c. 50 minutes.
- d. 62 minutes.

A: b.

R: 18019-C,  
EB#: LO-LP-60315-03-03

Point Value: 1.00  
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EXAM KEY

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87. Q: Per AOP-18007-C, Excess Letdown has been placed in service and normal letdown removed from service due to a letdown heat exchanger tube leak. Excess letdown flow is established at 23 gpm and RCP seal flows are normal.

Which ONE of the following would be the charging flow rate that would be required to balance charging and letdown?

- a. 23 gpm
- b. 35 gpm
- c. 43 gpm
- d. 55 gpm

A: b

R: 18007-C,  
EB#: LO-LP-60307-02-03

Point Value: 1.00  
=====

88. Q: Following a unit trip, it is determined that intermediate range instrument N-36 is UNDER-COMPENSATED. Which ONE of the following will describe the effect it will have on the re-energization of the source range detectors, if any?

- a. The source range detectors will have to be manually energized.
- b. No effect, the source range detectors will automatically re-energize < P-10.
- c. No effect, the source range detectors will automatically re-energize when 1/2 intermediate range detector is < P-6.
- d. The source range detectors can not be energized manually or automatically until 2/2 intermediate range detectors are < P-6.

A: a.

R: None  
EB#: LO-LP-17201-08-01

Point Value: 1.00  
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EXAM KEY

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89. Q: Given the following conditions:

- Reactor power is 22%.
- Turbine load is increasing at 1%/minute.
- The rod control system is in manual.
- Tave starts decreasing.
- The operator starts a dilution to raise Tave.
- N-35 has just failed low.

Which ONE of the following actions should the operator perform in response to the N-35 failure?

- a. Continue the power increase, IR NIS is not required above 10% power IAW UOP 12004-C.
- b. Stop the dilution, stop turbine loading, and decrease load below 10%. Notify I&C to investigate the problem.
- c. Stop the dilution, stop turbine loading, and enter 18002-C, NUCLEAR INSTRUMENT SYSTEM MALFUNCTION.
- d. Stop the dilution, stop turbine loading, match Tave with Tref using the rod control system, and enter AOP 18001-C, PRIMARY SYSTEM MALFUNCTIONS.

A: c.

R: 18002-C,  
EB#: LO-LP-60302-01-05

Point Value: 1.00  
=====

EXAM KEY

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90. Q: Given the following condition:

- Leakage into #3 steam generator is determined to be 0.5 gpm.
- No leakage is detectable into the other steam generators.
- Other leakage which cannot be identified is determined to be 0.6 gpm.
- Leakage from known sources other than steam generator leakage is determined to be 4.0 gpm.

Which ONE of the following identifies whether or not Technical Specification leakage limits are exceeded?

With these conditions in existence, Technical Specification leakage limits:

- a. Are not exceeded.
- b. Are exceeded due to the total leakage into the steam generator and unidentified leakage exceeding 1 gpm.
- c. Are exceeded due to steam generator leakage exceeding limits for pressure boundary leakage.
- d. Are exceeded due to excessive leakage into one steam generator.

A: d.

R: LO-LP-39208-02,  
EB#: LO-LP-39208-02-01

Point Value: 1.00

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EXAM KEY

91. Q: A steam generator tube rupture was determined to exist on the #2 steam generator. During the Reactor Trip and Safety Injection, a steam line break inside containment also occurred on the #2 steam generator. Which ONE of the following actions should be taken for controlling feedwater to the #2 steam generator?

- a. Isolate feedwater flow to the #2 steam generator.
- b. Maintain feedwater flow to the #2 steam generator until level is greater than 10% narrow range.
- c. Maintain feedwater flow to the #2 steam generator until level is greater than 32% narrow range.
- d. Control level in the #2 steam generator from 10% to 65% narrow range.

A: a.

R: LO-LP-37311-11,  
EB#: LO-LP-37311-11-01

Point Value: 1.00

92. Q: The plant is operating at 75% power. Common steam header pressure transmitter PT-0507 failed high. Which ONE of the following describes the effect, if any, the failure of PT-0507 will have on the main feedwater regulating valve positions, relative to their positions prior to the failure?

- a. The failure had no effect on the valve position.
- b. The valves are further open than before the failure.
- c. The valves should have received a full closed signal.
- d. The valves are further closed than before the failure.

A: d.

R: FSAR LOGIC 7.2.1-1,  
EB#: LO-LP-18201-01-01

Point Value: 1.00

EXAM KEY

93. Q: Unit ONE is operating at 100% power. Loss of which of the following Class 1E electrical buses is likely to result in a high pressurizer pressure reactor trip within seconds ?
- a. 1AY1A (120 VAC Vital).
  - b. 1BY2B (120 VAC Vital).
  - c. 1BD1 (125 VDC).
  - d. 1CD1 (125 VDC).

A: c.

R: 18034-1,  
EB#: LO-LP-60329-02-04

Point Value: 1.00

94. Q: A Waste Gas Decay Tank release is in progress. Which ONE of the following malfunctions occurring during the release could result in a release outside of permitted limits assuming no operator action?
- a. RE-13, Waste Gas Processing Rad Monitor, fails Low.
  - b. FI-14, Waste Gas flow indicator, fails Low.
  - c. RE-14, Waste Gas Processing Rad Monitor, fails low.
  - d. Loss of power to RV-14, Waste Gas Effluent Isolation Valve.

A: c.

R: None  
EB#: LO-LP-46101-11-04

Point Value: 1.00



EXAM KEY

- =====
95. Q: A containment pressure relief is in progress when a CVI, containment ventilation isolation, actuation occurs. Which ONE of the following is the cause of the CVI.
- a. Containment area high range monitor RE-005 in high alarm.
  - b. Containment area seal table monitor RE-011 in high alarm.
  - c. Plant vent effluent monitor RE-12442 in high alarm.
  - d. Containment area low range monitor RE-002 in high alarm.

A: d.

R: 17100-1, 17102-1,  
EB#: LO-LP-32101-12-06

Point Value: 1.00

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EXAM KEY

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96. Q: Given the following conditions:

- Unit 2 is in Mode 3.
- Tave = 557 degrees F.
- A loss of all instrument air has occurred.
- The crew enters 18028-C, LOSS OF INSTRUMENT AIR.
- The crew proceeds to Attachment A, Establishing Charging without Instrument Air.
- Charging flow is observed to be 150 gpm.

Select which ONE of the following is correct concerning Attachment A in this case? (See attached Attachment A).

- a. It will restore VCT level.
- b. It places the Positive Displacement Pump (PDP) in service to control charging flow.
- c. It is designed to reduce and control charging flow.
- d. It is necessary in order to re-establish RCP seal injection flow.

A: c.

R: 18028-C,  
EB#: LO-LP-60307-02-02

Point Value: 1.00

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EXAM KEY

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97. Q: Given the following conditions:

- An ATWT has occurred on Unit 1.
- Both reactor trip breakers are closed.
- All rods were inserted after the BOP opened the MG Set supply breakers on the QEAB.
- Neutron flux is lowering.
- Step 1 of 19000-C in progress.

Which ONE of the following states what the USS should do?

- a. Go to step 2 of 19000-C.
- b. Hold on step 1 of 19000-C until the RTB's are opened locally.
- c. Transition to 19211-C, ATWT, and complete all the steps of 19211 before transitioning back to 19000-C.
- d. Transition to 19211, ATWT, and return to 19000-C, after completing step 4 of 19211, Check Rx power <5% and IR SUR not positive.

A: a.

R: None

EB#: LO-LP-37011-06-03

Point Value: 1.00

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EXAM KEY

98. Q: Given the following information:

- The unit is at 80% power.
- All control systems are in automatic.
- Pressurizer level transmitter LT-459 fails high.
- The pressurizer level control selector switch is in the 459/460 position.

Which of the following is the correct plant response assuming no operator action is taken?

- a. Pressurizer high pressure reactor trip.
- b. Pressurizer low level reactor trip.
- c. Pressurizer high level reactor trip.
- d. Pressurizer low pressure reactor trip.

A: c.

R: None

EB#: LO-LP-16302-04-06

Point Value: 1.00

99. Q: During refueling which ONE of the following would require operators to enter 18006-C, FUEL HANDLING EVENT?

- a. Loss of FHB normal HVAC.
- b. Trip of the running RHR pump.
- c. Release of bubbles from irradiated fuel.
- d. Loss of communications between the control room and the containment.

A: c.

R: 18006-C,

EB#: LO-LP-60306-02-02

Point Value: 1.00

EXAM KEY

=====

100. Q: With a Loss of All AC power, 19100-C states we should stop all RCPs. Which ONE of the following is the reason for this?
- a. To minimize the heat input to the RCS.
  - b. Due to lack of cooling water from ACCW.
  - c. To minimize inventory loss in the steam generators.
  - d. For proper RVLIS indication since some of the RCP's may not be running.


A: b.

R: None

EB#: LO-LP-37031-02-02

Point Value: 1.00

END OF TEST KEY

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1.0

PURPOSE

This procedure provides instructions for operation of the Containment Hydrogen Monitoring System, the Electric Hydrogen Recombiners, the Post-LOCA Cavity Purge System, and the Post-LOCA Containment Hydrogen Purge System during normal and post-LOCA conditions. Instructions are provided in the following sections.

If entering this procedure for Post-Accident Containment Hydrogen reduction, then initiate Section 4.4.1.

- 4.1.1 Placing The Containment Hydrogen Monitoring System In Standby
- 4.1.2 Placing The Electric Hydrogen Recombiners In Standby
- 4.1.3 Placing The Post-LOCA Cavity Purge And Post-LOCA Containment Hydrogen Purge Systems In Standby
- 4.2.1 Containment Hydrogen Monitor 1-1513-P5-HMA Operation (Hydrogen Measurement)
- 4.2.2 Containment Hydrogen Monitor 1-1513-P5-HMB Operation (Hydrogen Measurement)
- 4.4.1 Post-LOCA Electric Hydrogen Recombiner Operation
- 4.4.2 Diluting Containment Hydrogen Concentration Using The Service Air System
- 4.4.3 Post-LOCA Containment Hydrogen Purge System Operation


2.0


PRECAUTIONS AND LIMITATIONS

2.1


**PRECAUTIONS**


- 2.1.1 Adhere to all applicable radiological controls.
- 2.1.2 Opening both an IRC and ORC Hydrogen Monitor Inlet Valve in the same path during Modes 1, 2, 3, or 4 results in Technical Specification 3.0.3 entry and shall not be performed except as allowed by Technical Specification 3.6.3.
- 2.1.3 1-HV-2790A (92A) and 1-HV-2790B (92B) OR 1-HV-2791A (91B) may be opened for up to four hours and Technical Specification 3.6.3 applies.
- 2.1.4 1-HV-2793A and 1-HV-2793B may be opened for up to four hours and Technical Specification 3.6.3 applies.
- 2.1.5 This procedure does not administratively control opening of both IRC and ORC Hydrogen Monitor Valves (on the same penetration) as allowed in Technical Specification 3.6.3 footnote.

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2.1.6	In the event that an operation for which the valves were opened (per Technical Specification 3.6.3 footnote) cannot be completed, the applicable Hydrogen Monitor Valves should be closed immediately.	
2.2	<b>LIMITATIONS</b>	
2.2.1	<p>Technical Specifications require the Hydrogen Monitors and the Electrical Hydrogen Recombiners to be operable as follows:</p> <ul style="list-style-type: none"> <li>a. Per Technical Specification 3.3.3.6, as part of the Accident Monitoring Instrumentation in Modes 1, 2 and 3,</li> <li>b. Per Technical Specification 3.6.4.1, two independent containment Hydrogen Monitors in Modes 1 and 2,</li> <li>c. Per Technical Specification 3.6.4.2, two independent Hydrogen Recombiner Systems in Modes 1 and 2.</li> </ul>	
2.2.2	When first energized, the Hydrogen Monitors require a 6 hour warm-up period in standby before accurate readings may be obtained.	
2.2.3	Hydrogen Recombiners should not be operated if containment hydrogen concentration is greater than 6% in dry air.	
2.2.4	In Analyze Mode, Low Analyzer Flow, Analyzer Cell Failure, Low Calibration Gas Pressure, Low Reagent Gas Pressure, Low Hot Box Temperature and switching between Standby and Analyze Modes will generate a Common Failure Alarm. In Standby Mode, low analyzer flow and analyzer cell failure are bypassed.	
3.0	<u>PREREQUISITES OR INITIAL CONDITIONS</u>	
3.1	Hydrogen Monitor sample line heat tracing is operating.	

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4.0	<u>INSTRUCTIONS</u>	
4.1	<b>STARTUP</b>	
4.1.1	<b>Placing The Containment Hydrogen Monitoring System In Standby</b>	
4.1.1.1	PERFORM Section A of 11130-1, "Post-Accident Hydrogen Control Alignment", if required.	
4.1.1.2	PERFORM Checklist 1 to align Containment Hydrogen Monitoring System remote - operated components for system startup.	
<b>NOTE</b>		
The Hydrogen Monitors require a 6 hour warm-up period in STANDBY before accurate readings may be obtained.		
4.1.1.3	On Control Room Panel QPCP, PLACE OFF/STAND BY/ANALYZE 1-HS-22900 in STANDBY and VERIFY SYSTEM ON light illuminates.	
4.1.1.4	At local Containment Hydrogen Monitor Panel 1-1513-P5-HMA (Auxiliary Building Level B), PERFORM the following:	
	a. If no lights are lit, PRESS the Circuit Breaker ON Pushbutton located inside the panel,	
	b. ENSURE FUNCTION SELECTOR Switch 1-HS-22902 in SAMPLE,	
	c. If Common Failure Light is lit, RESET by depressing RESET Button 1-HS-22955.	
4.1.1.5	On Control Room Panel QPCP, PLACE OFF/STAND BY/ANALYZE 1-HS-22901 in STANDBY and VERIFY SYSTEM ON light illuminates.	
4.1.1.6	At local Containment Hydrogen Monitor Panel 1-1513-P5-HMB (Fuel Handling Building Level A), PERFORM the following:	
	a. If no lights are lit, PRESS the Circuit Breaker ON Pushbutton located inside the panel,	
	b. ENSURE FUNCTION SELECTOR Switch 1-HS-22903 in SAMPLE,	
	c. If Common Failure Light is lit, RESET by depressing RESET Button 1-HS-22956.	
4.1.2	<b>Placing The Electric Hydrogen Recombiners In Standby</b>	
4.1.2.1	ENSURE both Electric Hydrogen Recombiners are off at their local Control Panels in Control Building Level B:	
	a. ENSURE OFF Power Out Switch on 1-1513-P5-ERA,	
	b. ENSURE OFF Power Out Switch on 1-1513-P5-ERB.	
4.1.2.2	PERFORM Section B of 11130-1, "Post-Accident Hydrogen Control Alignment" if required.	



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4.1.2.3	At 480V AC Switchgear 1AB05, CLOSE the Electric Hydrogen Recombiner 1-1513-P5-ERA Feeder Breaker 1AB05-08; independent verification required.	
4.1.2.4	At 480V AC Switchgear 1BB07, CLOSE the Electric Hydrogen Recombiner 1-1513-P5-ERB Feeder Breaker 1BB07-08; independent verification required.	
4.1.3	<b>Placing The Post-LOCA Cavity Purge And Post-LOCA Containment Hydrogen Purge Systems In Standby</b>	
4.1.3.1	PERFORM Section C of 11130-1, "Post-Accident Hydrogen Control Alignment" if required.	
4.1.3.2	PERFORM Checklist 2 to align the Post-LOCA Containment Hydrogen Purge System remote - operated valves for standby.	
4.2	<b>SYSTEM OPERATION</b>	
4.2.1	<b>Containment Hydrogen Monitor A 1-1513-P5-HMA Operation (Hydrogen Measurement)</b>	
<b>CAUTION</b>		
The Hydrogen Monitor Isolation Valves must remain closed except during Hydrogen Monitor operation while in Modes 5 or 6 or during post accident conditions to ensure containment integrity is maintained.		
<b>NOTE</b>		
The Hydrogen Monitors require a 6 hour warm-up period in STANDBY before accurate readings may be obtained.		
4.2.1.1	If the following conditions exist then notify maintenance to implement 28834-1 to provide power to Containment Isolation Valves 1-HV-2791B and 1-HV-2793B:	
	<ul style="list-style-type: none"> <li>a. A post accident condition (LOCA) exist <u>AND,</u></li> <li>b. 125 VDC Bus 1BD11 is not available <u>AND,</u></li> <li>c. Containment Hydrogen Concentration is required.</li> </ul>	
4.2.1.2	<p>ENSURE the Hydrogen Monitor A sample line heat tracing temperature is greater than 260°F.</p> <ul style="list-style-type: none"> <li>a. At Heat Tracing Panel 1-1817-U3-007B, READ the temperature for circuit C1-7 and C1-8,</li> <li>b. If less than 260°F, NOTIFY the Control Room immediately.</li> </ul>	

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- 4.2.1.3 OPEN the H2 MONITOR A SPLY ISO IRC:
- a. 1-HV-2792A,
  - b. 1-HV-2792B.
- 4.2.1.4 OPEN H2 MONITOR A SPLY ISO ORC 1-HV-2791B.
- 4.2.1.5 OPEN H2 MONITOR A RTN ISO ORC 1-HV-2793B.
- 4.2.1.6 PLACE OFF/STAND BY/ANALYZE 1-HS-22900 in ANALYZE.
- 4.2.1.7 ENSURE Function Selector Switch 1-HS-22904 in Sample position.
- 4.2.1.8 Momentarily DEPRESS Local/Remote Selector Pushbutton 1-HS-22944 and VERIFY Sample Light LIT.
- 4.2.1.9 NOTE containment hydrogen concentration as indicated by CONTAIN H2 MONITOR TRN A 1-AI-12979 and 1-AR-12979 on QMCB when indications stabilize.
- 4.2.1.10 When hydrogen monitoring is no longer desired, PLACE OFF/STAND BY/ANALYZE 1-HS-22900 in STAND BY.
- 4.2.1.11 CLOSE the Hydrogen Monitor A Isolations by placing their control switches to CLOSE:
- a. 1-HV-2792A,
  - b. 1-HV-2792B,
  - c. 1-HV-2791B,
  - d. 1-HV-2793B.

4.2.2 Containment Hydrogen Monitor B 1-1513-P5-HMB Operation  
(Hydrogen Measurement)

**CAUTION**

The Hydrogen Monitor Isolation Valves must remain closed except during Hydrogen Monitor operation while in Modes 5 or 6 or during post accident conditions to ensure containment integrity is maintained.

**NOTE**

The Hydrogen Monitors require a 6 hour warm-up period in STANDBY before accurate readings may be obtained.

4.2.2.1 If the following conditions exist then notify maintenance to implement 28834-1 to provide power to Containment Isolation Valves 1-HV-2791A and 1-HV-2793A:

- a. A post accident condition (LOCA) exist AND,
- b. 125 VDC Bus 1AD11 is not available AND,
- c. Containment Hydrogen Concentration is required.

4.2.2.2 ENSURE the Hydrogen Monitor B sample line heat tracing temperature is greater than 260°F.

- a. At Heat Tracing Panel 1-1817-U3-007A, READ the temperature for circuit C1-1 and C1-2,
- b. If less than 260°F, NOTIFY the Control Room immediately.

4.2.2.3 OPEN the Hydrogen Monitor Supply Isolations Inside Reactor Containment:


- a. 1-HV-2790A,
- b. 1-HV-2790B.

4.2.2.4 OPEN H2 MONITOR B SPLY ISO ORC 1-HV-2791A.

4.2.2.5 OPEN H2 MONITOR B RTN ISO ORC 1-HV-2793A.

4.2.2.6 PLACE OFF/STAND BY/ANALYZE 1-HS-22901 in ANALYZE.

4.2.2.7 ENSURE Function Selector Switch 1-HS-22905 in Sample position.

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**NOTE**


Indication of hydrogen concentration is available within 30 minutes of initiating flow through the monitors. This is accomplished by operating the monitors in standby during normal plant operation.

- 4.2.2.8 Momentarily DEPRESS Local/Remote Selector Pushbutton 1-HS-22945 and VERIFY Sample Light LIT.
- 4.2.2.9 NOTE containment hydrogen concentration as indicated by CONTAIN H2 MONITOR TRN B 1-AI-12980 and 1-AR-12979 on QMCB when indications stabilize.
- 4.2.2.10 PLACE OFF/STAND BY/ANALYZE 1-HS-22901 in STAND BY.
- 4.2.2.111 CLOSE the Hydrogen Monitor B Isolations by placing their control switches to CLOSE:
  - a. 1-HV-2790A,
  - b. 1-HV-2790B,
  - c. 1-HV-2791A,
  - d. 1-HV-2793A.

4.3 **SHUTDOWN**

NONE

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4.4	NON PERIODIC OPERATION	
4.4.1	Post-LOCA Electric Hydrogen Recombiner Operation	
<b>CAUTION</b>		
<p>An Electric Hydrogen Recombiner may require up to 75 kilowatts of power during post-LOCA operation. If emergency power is being supplied by the Emergency Diesel Generators, ensure their loading is maintained within limits.</p>		
<b>NOTE</b>		
<p>Hydrogen Recombiners should not be operated if containment hydrogen concentration is greater than 6% in dry air.</p>		
4.4.1.1	NOTE pre-LOCA containment temperature from 14000-1, "Operations Shift And Daily Surveillance Logs".	
4.4.1.2	NOTE and RECORD post-LOCA containment pressure from 1-PI-0934, 1-PI-0935, 1-PI-0936, and 1-PI-0937.	
4.4.1.3	DETERMINE and NOTE the Recombiner pressure factor using Figure 1.	
4.4.1.4	START one Electric Hydrogen Recombiner at its local Control Panel:	
	a. VERIFY the POWER IN AVAILABLE light is ON,	
	b. ENSURE POWER ADJUST Potentiometer is set to zero.	
	c. PLACE POWER OUT SWITCH in ON,	
	d. VERIFY the pilot light above the switch comes on,	
<b>NOTE</b>		
<p>POWER OUT Meter response will lag POWER ADJUST Potentiometer adjustments.</p>		
e.	MONITOR POWER OUT Meter and slowly RAISE POWER ADJUST to obtain between 4 and 6 kilowatts,	
f.	MAINTAIN between 4 and 6 kilowatts for 10 minutes by adjusting POWER ADJUST as required,	
g.	MONITOR POWER OUT and slowly RAISE POWER ADJUST to obtain between 9 and 11 kilowatts,	

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- h. MAINTAIN between 9 and 11 kilowatts for 10 minutes by adjusting POWER ADJUST as required,
- i. MONITOR POWER OUT and slowly RAISE POWER ADJUST to obtain between 18 and 22 kilowatts,
- j. MAINTAIN between 18 and 22 kilowatts for 5 minutes by adjusting POWER ADJUST as required,
- k. OBTAIN the current Hydrogen Recombiner Reference Power (kw) from PTDB Tab 13 and MULTIPLY by the pressure factor determined in Step 4.4.1.3 to obtain the post-LOCA power setting,

**CAUTION**


Do not exceed 75 kilowatts power output.

- l. MONITOR POWER OUT and slowly RAISE POWER ADJUST to obtain the post-LOCA power setting,
  - m. MAINTAIN the post-LOCA power setting by adjusting POWER ADJUST as required.
- 4.4.1.5 MEASURE and RECORD containment hydrogen concentration through sampling per Section 4.2.1 and/or 4.2.2 of this procedure.
- 4.4.1.6 WARMUP the second electric Hydrogen Recombiner at its local Control Panel:
- a. VERIFY the POWER IN AVAILABLE light is ON,
  - b. ENSURE POWER ADJUST Potentiometer is set to zero.
  - c. PLACE POWER OUT SWITCH in ON,
  - d. VERIFY the red pilot light above the switch comes on,

**NOTE**

POWER OUT Meter response will lag POWER ADJUST Potentiometer adjustments.

- e. MONITOR POWER OUT Meter and slowly RAISE POWER ADJUST to obtain between 4 and 6 kilowatts,
- f. MAINTAIN between 4 and 6 kilowatts for 10 minutes by adjusting POWER ADJUST as required,
- g. MONITOR POWER OUT and slowly RAISE POWER ADJUST to obtain between 9 and 11 kilowatts,
- h. MAINTAIN between 9 and 11 kilowatts for 10 minutes by adjusting POWER ADJUST as required.

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4.4.1.7 Periodically MONITOR the power output of each electric hydrogen recombiner and ADJUST as required:

- a. MAINTAIN the warmup Recombiner output between 9 and 11 kilowatts,

**CAUTION**

Do not exceed 75 kilowatts power output.

- b. MAINTAIN the operating Recombiner output greater than or equal to the post-LOCA power setting.

4.4.1.8 Periodically MONITOR all three temperature channels of each Recombiner using the TEMPERATURE CHANNEL SELECTOR Switch and the TEMPERATURE Meter.

**NOTE**

Recombiner temperatures should rise and then stabilize between 4 and 5 hours after startup.


4.4.1.9 When the operating Recombiner temperatures begin to stabilize, DETERMINE the difference between the reading of each channel with the reading of each of the other two channels:

- a. If the smallest temperature difference is greater than or equal to 60°F, temperature indication is unreliable. PROCEED to 4.4.1.11,
- b. If one temperature channel differs from both of the other two by 60°F or more, this channel is considered unreliable. DELETE this channel when determining average Recombiner temperature.

4.4.1.10 MAINTAIN the average temperature of the operating Recombiner between 1250 and 1450°F by adjusting POWER ADJUST if required.

4.4.1.11 About 24 hours after startup of the first Electric Hydrogen Recombiner:

- a. NOTE and RECORD containment pressure from 1-PI-0934, 1-PI-0935, 1-PI-0936, and 1-PI-0937,
- b. MEASURE containment hydrogen concentration through sampling per Section 4.2.1 and/or 4.2.2 of this procedure.

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4.4.1.12 If containment hydrogen concentration is greater than 3.5 percent or has risen by more than 0.5 percent above the previous value, RAISE Recombiner output:

- a. If the present power output of the operating electric Hydrogen Recombiner is less than 71 kilowatts, RAISE its output by 4 kilowatts,
- b. If the present power output of the operating Recombiner is greater than or equal to 71 kilowatts, PLACE the warmup Recombiner in full operation as follows:
  - (1) NOTE pre-LOCA containment temperature from 14000-1, "Operations Shift And Daily Surveillance Logs",
  - (2) NOTE current containment pressure on 1-PI-0934, 1-PI-0935, 1-PI-0936, and 1-PI-0937,
  - (3) DETERMINE and NOTE the Recombiner pressure factor using Figure 1,
  - (4) OBTAIN the current Hydrogen Recombiner Reference Power (kw) from PTDB Tab 13 and MULTIPLY by the pressure factor to obtain the post-LOCA power setting,

**CAUTION**

Do not exceed 75 kilowatts power output.


**NOTE**


POWER OUT Meter response will lag POWER ADJUST Potentiometer adjustments.

- (5) MONITOR warmup Recombiner POWER OUT and slowly RAISE POWER ADJUST to obtain the post-LOCA power setting,
- (6) MAINTAIN the post-LOCA power setting by adjusting POWER ADJUST as required.

4.4.1.13 If containment hydrogen concentration has risen less than 0.5 percent above the previous value, PROCEED to 4.4.1.15.



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<p>4.4.1.14 If containment hydrogen concentration has fallen or remained constant over the 24 hour period since last measurement:</p> <ul style="list-style-type: none"> <li>a. NOTE the containment pressure recorded 24 hours ago,</li> <li>b. NOTE the containment pressure recorded in 4.4.1.11a,</li> <li>c. If containment pressure has changed over the past 24 hours, ADJUST operating Recombiner power output: <ul style="list-style-type: none"> <li>(1) DETERMINE and NOTE the new Recombiner pressure factor using Figure 1,</li> <li>(2) MULTIPLY the reference power setting (PTDB Tab 13) by the new pressure factor to obtain the new post-LOCA power setting,</li> </ul> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">POWER OUT Meter response will lag POWER ADJUST Potentiometer adjustments.</p> <ul style="list-style-type: none"> <li>(3) MONITOR POWER OUT Meter and slowly ADJUST POWER ADJUST to obtain the new post-LOCA power setting,</li> <li>(4) MAINTAIN the new post-LOCA power setting by adjusting POWER ADJUST as required.</li> </ul> </li> </ul> <p>4.4.1.15 Periodically MONITOR and ADJUST the Recombiners per 4.4.1.7 through 4.4.1.10.</p> <p>4.4.1.16 About every 24 hours, MEASURE containment hydrogen concentration and ADJUST the Recombiners per 4.4.1.11 through 4.4.1.14.</p> <p>4.4.1.17 REPEAT 4.4.1.15 and 4.4.1.16 throughout the remainder of the Recombiner operating period.</p> <p>4.4.1.18 When Electric Hydrogen Recombiner operation is no longer required (containment hydrogen concentration at less than 0.5%), SHUT DOWN each Recombiner at its local Control Panel as follows:</p> <ul style="list-style-type: none"> <li>a. LOWER POWER ADJUST Potentiometer setting to zero,</li> <li>b. PLACE POWER OUT SWITCH in OFF,</li> <li>c. VERIFY the red pilot light above the switch turns off.</li> </ul>		

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4.4.2 Diluting Containment Hydrogen Concentration Using The Service Air System

**CAUTION**

Do not perform this section if containment pressure is greater than 40 psig unless so directed by the Emergency Director.

**NOTES**

- a. Containment design pressure is 52 psig.
- b. Containment Isolation Phase A Train A and Train B signals must be reset to open 1-HV-9385.

4.4.2.1 OPEN SERVICE AIR CNMT HDR ISOL 1-HV-9385 as follows:

- a. PLACE 1-HS-9385A on Main Control Room Panel QPCP to OPEN,
- b. HOLD 1-HS-9385B on Panel QPCP in OPEN until 1-HV-9385 is fully open.

4.4.2.2 OPEN one SERVICE AIR CNMT POST LOCA PURGE using its Control Switch on QPCP:


- a. 1-HV-9380A,
- b. 1-HV-9380B.


4.4.2.3 CHECK Service Air Header 1-PI-9377 and Instrument Air Dryer To SCS Equipment 1-PI-9361 pressures on Main Control Room Panel QMCB.


4.4.2.4 If air pressures fall to 80 psig or less, SERVICE AIR DRYER SUPPLY OUTLET ISO 1-PV-9375 isolates service air to dryers; RESTORE purge air flow as follows:

- a. UNLOCK and CLOSE Service Air Containment Building Supply Header Isolation 1-2401-U4-056,
- b. RESET 1-PSL-9375 on Instrument Rack 15 on Turbine Building Level 1 near the powdex vessels to restore Service Air Supply,
- c. THROTTLE OPEN 1-2401-U4-056 to maintain air pressures 1-PI-9377 and 1-PI-9361 greater than 85 psig.

4.4.2.5 MONITOR containment hydrogen concentration through sampling and per Section 4.2.1 and/or 4.2.2 of this procedure.

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4.4.2.6	MONITOR containment pressure 1-PI-0934, 1-PI-0935, 1-PI-0936, and 1-PI-0937. If pressure rises to 40 psig or to the value specified by the Emergency Director, TERMINATE dilution per Step 4.4.2.7.	
4.4.2.7	<p>When containment hydrogen concentration falls to 3.5%, TERMINATE dilution as follows:</p> <ul style="list-style-type: none"> <li>a. CLOSE SERVICE AIR CNMT HDR ISOL 1-HV-9385 using 1-HS-9385A or 1-HS-9385B on Control Room Panel QPCP,</li> <li>b. ENSURE CLOSED both Service Air Containment Post-LOCA Purge Valves using their Control Switches on Panel QPCP: <ul style="list-style-type: none"> <li>(1) 1-HV-9380A,</li> <li>(2) 1-HV-9380B.</li> </ul> </li> </ul>	
4.4.2.8	Periodically MONITOR containment hydrogen concentration and REPEAT this section as required to maintain the concentration below 4.0%.	
4.4.3	<b>Post-LOCA Containment Hydrogen Purge System Operation</b>	
<b>CAUTIONS</b>		
<ul style="list-style-type: none"> <li>a. The Post-LOCA Containment Hydrogen Purge System is to be operated <u>only</u> if the containment hydrogen concentration cannot be maintained below 4% by other means.</li> <li>b. The Post-LOCA Containment Hydrogen Purge System is designed to operate with a maximum pressure of 3 psi downstream of CNMT POST LOCA PURGE EXH DUCT CONTROL VLV 1-FV-2693.</li> </ul>		
<b>NOTE</b>		
<p>If plant conditions warrant, the Emergency Director may waive the Gaseous Release Permit requirement.</p>		
4.4.3.1	INITIATE a Gaseous Release Permit.	
4.4.3.2	ENSURE containment atmosphere is sampled and analyzed.	
4.4.3.3	ENSURE the Service Air System is operating.	
4.4.3.4	ENSURE compliance with Technical Specification 3.3.3.10 gaseous effluent monitoring requirements.	
4.4.3.5	ENSURE the Auxiliary Building Heating Ventilation And Air Conditioning System is operating.	

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<p>4.4.3.6 PLACE disconnect switch at local Heater Control Panel 1-1508-N7-001-H01 to on.</p> <p>4.4.3.7 PUSH RESET button at local Heater Control Panel 1-1508-N7-001-H01 and VERIFY that reset red light is ON.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;">Due to high radiation area potential, ensure Containment Inside Isolation Valves 1-HV-2624A and 1-HV-2624B are closed and remain closed during the performance of the next step and until personnel have exited the area.</p> <p>4.4.3.8 UNLOCK and OPEN POST LOCA PURGE CTB ISO VALVE 1-1508-U4-012.</p> <p>4.4.3.9 ENSURE all conditions of the Gaseous Release Permit that must be satisfied prior to the release are met, unless the permit requirement has been waived by the Emergency Director.</p> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">The Containment Ventilation Isolation Train A signal must be reset to open 1-HV-2624A. The Train B signal must be reset to open 1-HV-2624B.</p> <p>4.4.3.10 OPEN one CTB POST LOCA PURGE EXH IRC ISO VLV using its Control Switch on Main Control Room Panel QHVC:</p> <p style="margin-left: 40px;">a. 1-HV-2624A,</p> <p style="margin-left: 40px;">b. 1-HV-2624B.</p> <p>4.4.3.11 PLACE CNMT POST LOCA PURGE EXH DUCT CONTROL VLV 1-HS-2693 to the MOD position to initiate containment venting.</p> <p>4.4.3.12 VERIFY Post-LOCA Purge 1-UR-2693 flow rises to between 450 and 500 standard cubic feet per minute.</p> <p>4.4.3.13 MONITOR 1-UR-2693, plant vent stack flow, and vent stack radiation and ENSURE compliance with the Gaseous Release Permit, if required.</p>		

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NOTE

Containment Isolation Phase A Train A  
and Train B signals must be reset to  
open 1-HV-9385.

- 4.4.3.14 OPEN SERVICE AIR CNMT HDR ISOL 1-HV-9385 as follows:
- a. PLACE 1-HS-9385A on Main Control Room Panel QPCP to OPEN,
  - b. HOLD 1-HS-9385B on Panel QPCP in OPEN until 1-HV-9385 is fully open.
- 4.4.3.15 OPEN one SERVICE AIR CNMT POST LOCA PURGE Valve using its Control Switch on QPCP:
- a. 1-HV-9380A,
  - b. 1-HV-9380B.
- 4.4.3.16 CHECK Compressed Air Header 1-PI-9377 and Instrument Air Dryer Outlet Header 1-PI-9361 pressures on Main Control Room Panel QMCB.
- 4.4.3.17 If air pressures fall to 80 psig or less, SERVICE AIR DRYER SUPPLY INLET ISO 1-PV-9375 isolates service air to dryers; RESTORE purge air flow as follows:
- a. UNLOCK and CLOSE Service Air Containment Building Supply Header Isolation 1-2401-U4-056,
  - b. RESET 1-PSL-9375 on Instrument Rack 15 on Turbine Building Level 1 near the powdex vessels to restore Service Air Supply,
  - c. THROTTLE OPEN 1-2401-U4-056 to maintain air pressures 1-PI-9377 and 1-PI-9361 greater than 85 psig.
- 4.4.3.18 When containment hydrogen concentration falls to 3.5%, TERMINATE the purge as follows:
- a. CLOSE SERVICE AIR CNMT HDR ISOL 1-HV-9385 using 1-HS-9385A or 1-HS-9385B on Control Room Panel QPCP,
  - b. ENSURE CLOSED both SERVICE AIR CNMT POST LOCA PURGE Valves using their Control Switches on Panel QPCP:
    - (1) 1-HV-9380A,
    - (2) 1-HV-9380B,

- c. ENSURE CLOSED both CTB POST LOCA PURGE EXH IRC ISOL Valves using their Control Switches on Control Room Panel QHVC:
  - (1) 1-HV-2624A,
  - (2) 1-HV-2624B,
- d. CLOSE CNMT POST LOCA PURGE EXH DUCT CONTROL VLV 1-FV-2693 using 1-HS-2693,
- e. PLACE disconnect switch at local HEATER CONTROL PANEL 1-1508-N7-001-H01 to OFF.
- f. CLOSE and LOCK POST LOCA PURGE CTB ISO VALVE 1-1508-U4-012,
- g. COMPLETE processing of the Gaseous Release Permit if initiated.

4.4.3.19 Periodically MONITOR containment hydrogen concentration and MAINTAIN it less than 4.0%.

5.0 REFERENCES

5.1 VEGP FSAR Section 6.2.5

5.2 **PROCEDURES**

- 5.2.1 13305-1, "Auxiliary Building Heating, Ventilation, And Air Conditioning System"
- 5.2.2 13710-1, "Service Air System"
- 5.2.3 13901-1, "Heat Tracing"

5.3. **P&ID's**

- 5.3.1 1X4DB213-1 Purification And Clean-up System
- 5.3.2 1X4DB213-2 Purification And Clean-up System
- 5.3.3 1X4DB214-2 Containment, Control Rod Drive Mechanism, Cavity, And Reactor Support Cooling System
- 5.3.4 1X4DB203 Equipment Building Heating, Ventilation, And Air Conditioning System
- 5.3.5 1X4DB186-1 Service Air System
- 5.3.6 1X4DB175-2 Instrument And Service Air System


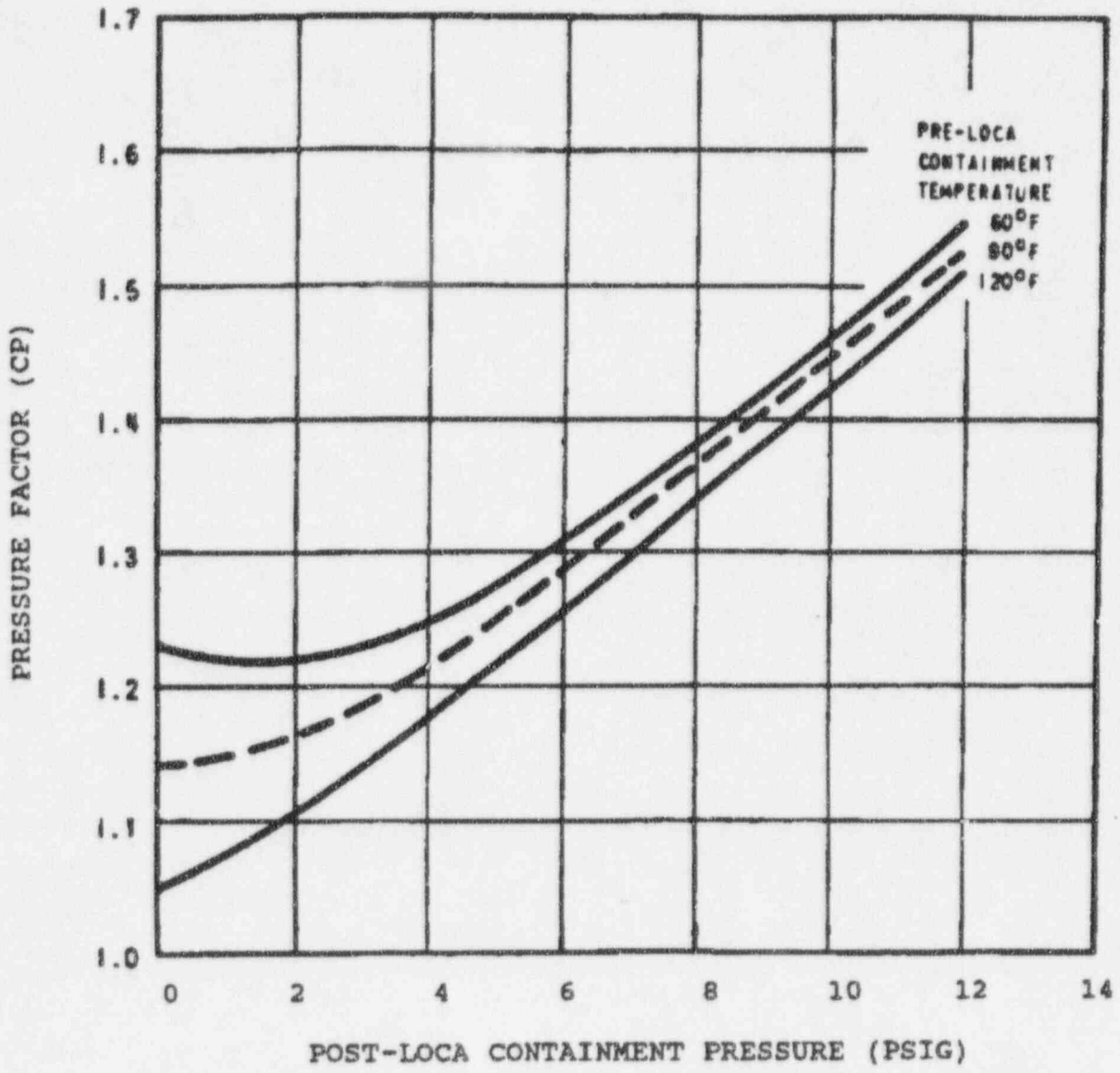
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5.4	<b>ELEMENTARY DIAGRAMS</b>		
5.4.1	1X3D-BG-B02U	Purification And Clean-up System: Hydrogen Recombiner	
5.4.2	1X3D-BG-B02V	Purification And Clean-up System: Hydrogen Recombiner	
5.4.3	1X3D-BG-B02X	Containment, Control Rod Drive Mechanism, Cavity And Reactor Support Cooling System	
5.4.4	1X3D-BG-B02Y	Containment, Control Rod Drive Mechanism, Cavity And Reactor Support Cooling System	
5.4.5	1X3D-BG-B04A	Purification And Clean-up System: 1-HV-2624A	
5.4.6	1X3D-BG-B04B	Purification And Clean-up System: 1-HV-2624B	
5.4.7	1X3D-BG-B05B	Purification And Clean-up System: 1-HV-2790A, B, 2791B And 2793B	
5.4.8	1X3D-BG-B05E	Purification And Clean-up System: 1-HV-2791A, 2792A, B And 2793A	
5.4.9	1X3D-BG-B05F	Containment Building Electrical Hydrogen Recombiner System: 1-HV-2793A	
5.4.10	1X3D-BG-B05G	Containment Building Electrical Hydrogen Recombiner System: 1-HV-2793B	
5.4.11	1X3D-BG-B05M	Containment Building Electrical Hydrogen Recombiner System: 1-HV-2790B	
5.4.12	1X3D-BG-B06F	Purification And Clean-up System: 1-HV-1508-012	
5.4.13	1X3D-BG-B06H	Containment Post-LOCA Purge Exhaust Duct Isolation Valves	
5.4.14	1X3D-BH-R01D	Service Air System 1-HV-9380A	
5.4.15	1X3D-BH-R01E	Service Air System 1-HV-9380B	
5.4.16	1X3D-BH-R01H	Containment Service Air Header Isolation 1-HV-9385	
5.5	<b>TECHNICAL MANUALS</b>		
5.5.1	AX5AA05-43	Containment Hydrogen Monitor	
5.5.2	1X6AE01-38	Electric Hydrogen Recombiner	
END OF PROCEDURE TEXT			

Figure 1 - Dry Containment Recombiner Power Correction Factor Versus Containment Pressure, 0.0 psig Initial Pressure





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## POST-ACCIDENT HYDROGEN CONTROL

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CHECKLIST 1

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### CONTAINMENT H2 MONITORING SYSTEM

#### REMOTE-OPERATED COMPONENTS

#### ALIGNMENT FOR SYSTEM STARTUP

<u>COMPONENT</u>	<u>DESCRIPTION</u>	<u>CONDITION REQUIRED</u>	<u>LINEUP (INITIALS)</u>	<u>VERIFICATION (INITIALS)</u>
1-HS-22900	H2 MONITOR HMA FUNCTION SELECT	OFF	_____	_____
1-HV-2792A	H2 MONITOR A SPLY ISO IRC	CLOSED	_____	_____
1-HV-2792B	H2 MONITOR A SPLY ISO IRC	CLOSED	_____	_____
1-HV-2791B	H2 MONITOR A SPLY ISO ORC	CLOSED	_____	_____
1-HV-2793B	H2 MONITOR A RTN ISO ORC	CLOSED	_____	_____
1-HS-22901	H2 MONITOR HMB FUNCTION SELECT	OFF	_____	_____
1-HV-2790A	H2 MONITOR B SPLY ISO IRC	CLOSED	_____	_____
1-HV-2790B	H2 MONITOR B SPLY ISO IRC	CLOSED	_____	_____
1-HV-2791A	H2 MONITOR B SPLY ISO ORC	CLOSED	_____	_____
1-HV-2793A	H2 MONITOR B RTN ISO ORC	CLOSED	_____	_____
1-HV-8221	CNMT ATMOSPHERE PASS SAMPLE ISOLATION	CLOSED	_____	_____

Reviewed By: \_\_\_\_\_

\_\_\_\_\_ Date

CHECKLIST 2

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POST-LOCA CONTAINMENT HYDROGEN  
PURGE SYSTEM REMOTE-OPERATED VALVE  
ALIGNMENT FOR STANDBY

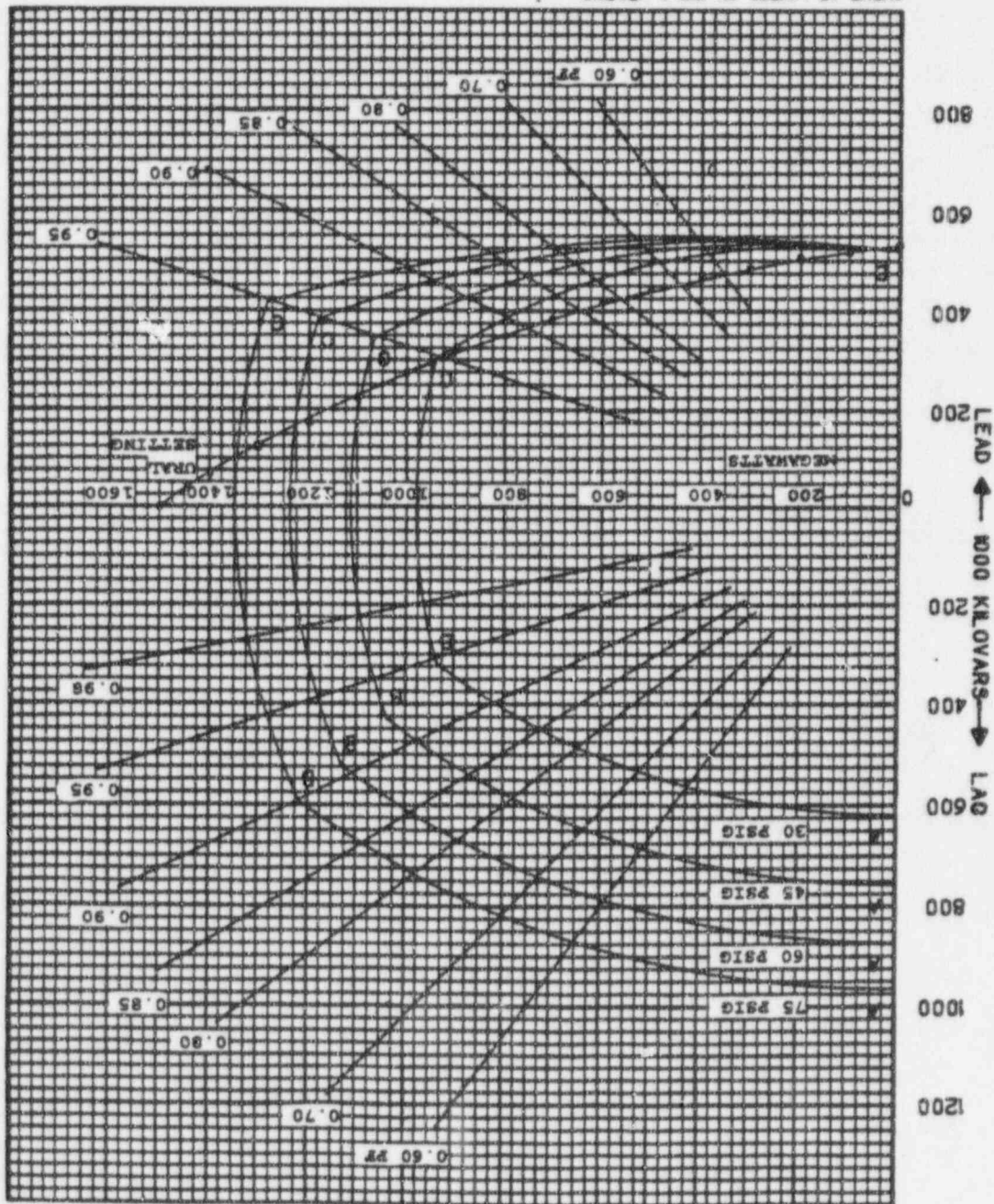
<u>COMPONENT</u>	<u>DESCRIPTION</u>	<u>CONDITION REQUIRED</u>	<u>LINEUP (INITIALS)</u>	<u>VERIFICATION (INITIALS)</u>
1-HV-2624A	CTB POST LOCA PURGE EXH IRC ISO VLV	CLOSED	_____	_____
1-HV-2624B	CTB POST LOCA PURGE EXH IRC ISOLATION	CLOSED	_____	_____
1-FV-2693	CNMT POST LOCA PURGE EXH DUCT CONTROL VLV	CLOSED	_____	_____
1-HV-9385	SERVICE AIR CONTAINMENT HEADER ISOLATION	CLOSED	_____	_____
1-HV-9380A	SERVICE AIR CNMT POST LOCA PURGE	CLOSED	_____	_____
1-HV-9380B	SERVICE AIR CNMT POST LOCA PURGE	CLOSED	_____	_____

Reviewed By: \_\_\_\_\_

\_\_\_\_\_ Date

ESTIMATED CAPABILITY CURVE

CURVE AB LIMITED BY FIELD HEATING  
 CURVE BC LIMITED BY ARMATURE HEATING  
 CURVE CD LIMITED BY ARMATURE CORE END HEATING

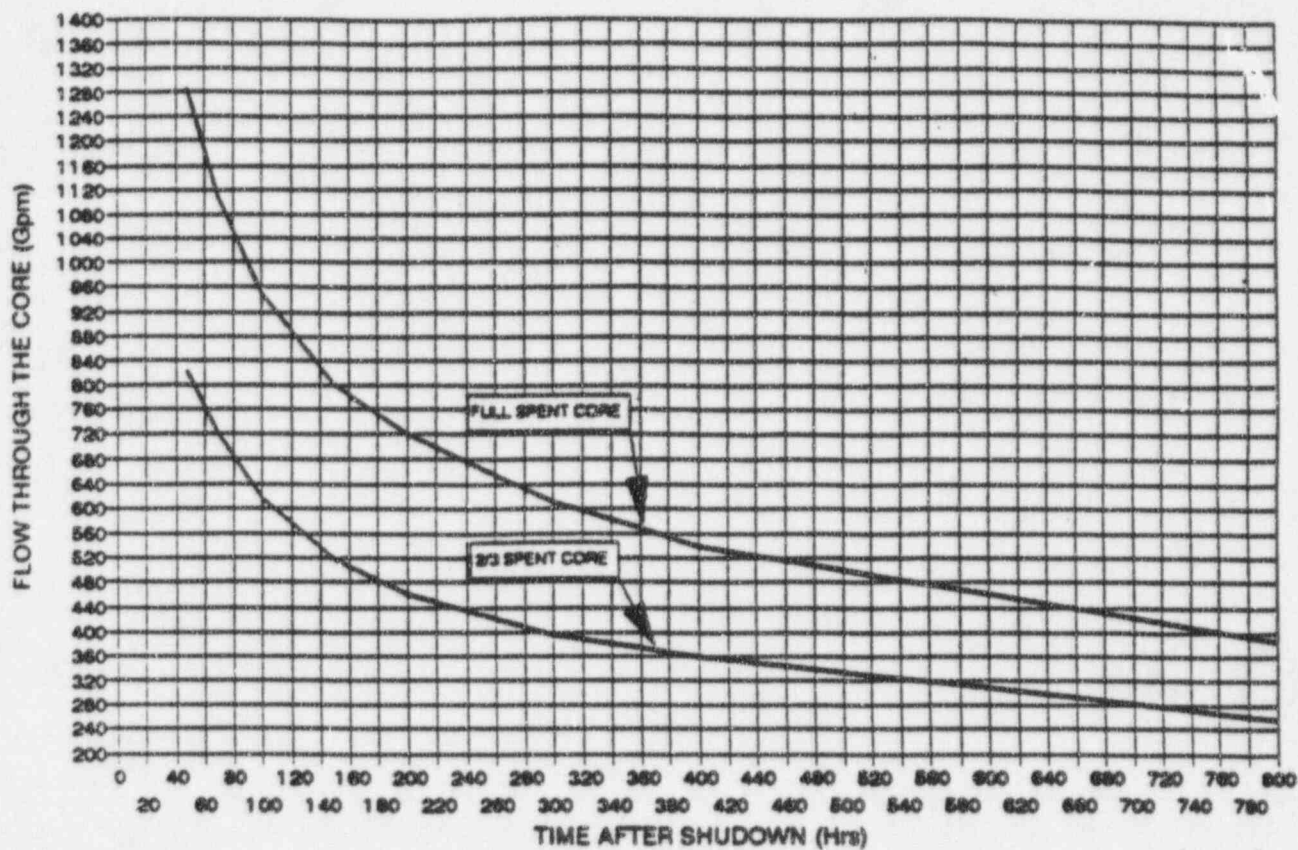


ATB 4 POLE, 1,350,000 KVA, 1800 RPM, 25000 VOLTS  
 .90 PF, .50 9CR, 75 PSIG HYDROGEN PRESSURE, 530VOLTS EXCITATION

ATTACHMENT A

Sheet 1 of 1

## CORE FLOW TO MAINTAIN 195 Deg F vs. TIME AFTER REACTOR SHUTDOWN

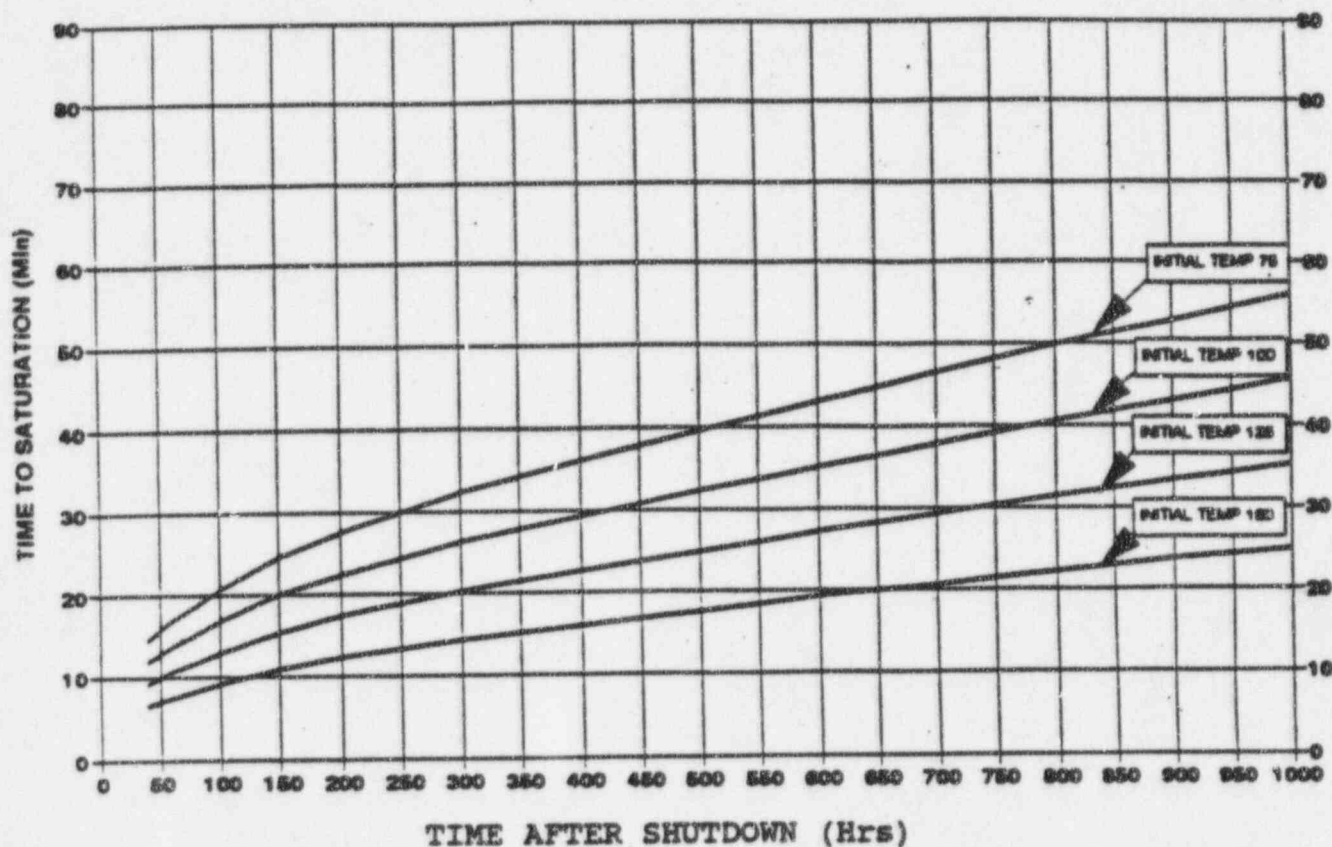


### Assumptions:

- 1) Mid Loop Conditions
- 2) RCS Vented To Atmosphere
- 3) Injection Flow Assumed at 100°F From RWST

FIGURE 1 - CORE FLOW TO MAINTAIN 195°F VERSUS TIME  
AFTER REACTOR SHUTDOWN

## RCS TIME TO SATURATION (FULL SPENT CORE)



### Assumptions:

- 1) Full Spent Core Heat Loads Assumes 193 Assemblies at 40,000 MWD/MTU are Residing in the Core
- 2) Mid Loop Conditions
- 3) RCS Vented To Atmosphere With or Without Loop Dams

FIGURE 2 - TIME TO BOILING

## RCS TIME TO SATURATION (2/3 SPENT CORE)

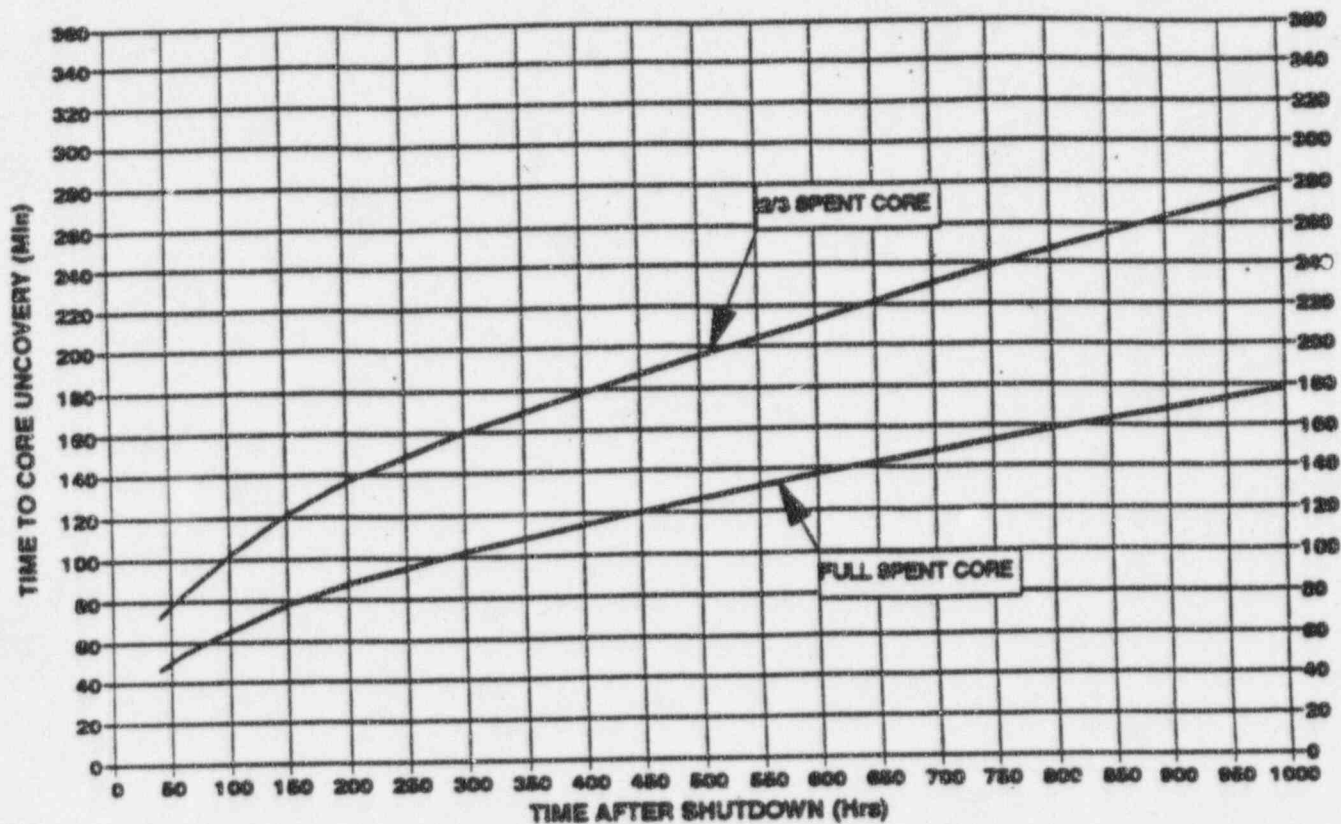


### Assumptions:

- 1) 2/3 Spent Core Heat Loads Assumes 125 Assemblies at 35,000 MWD/MTU are Residing in the Core
- 2) Mid Loop Conditions
- 3) RCS Vented To Atmosphere With or Without Loop Dams

FIGURE 3 - TIME TO BOILING

## TIME TO CORE UNCOVERY (RCS TEMPERATURE AT SATURATION)

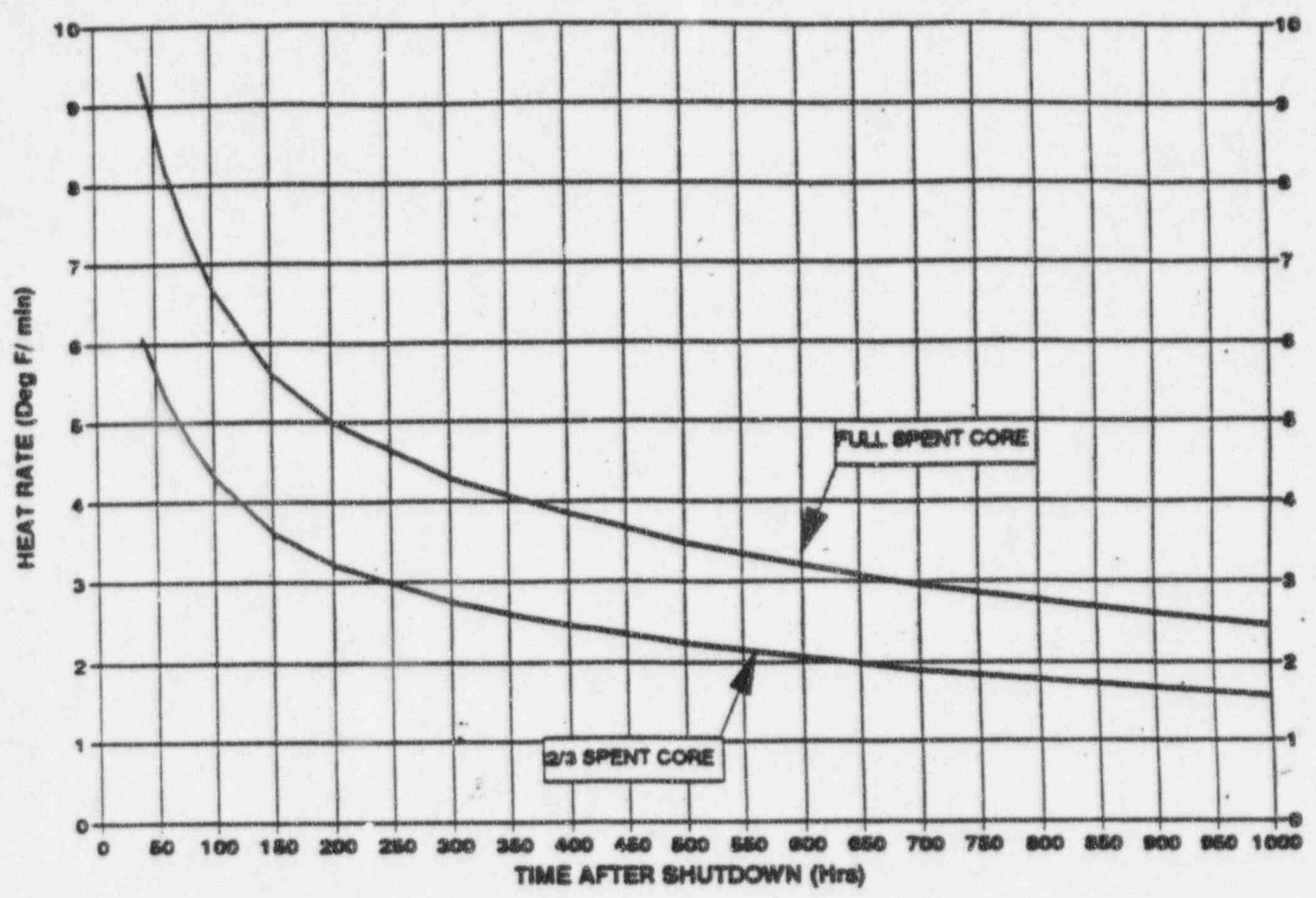


### Assumptions:

- 1) Initial RCS Temperature is 212°F
- 2) Initial RCS Level at Mid-Loop
- 3) RCS Vented To Atmosphere With or Without Loop Dams

FIGURE 4 - TIME FOR CORE UNCOVERY

### RCS HEAT-UP RATE



Assumptions:

- 1) Mid Loop Conditions
- 2) RCS Vented To Atmosphere With or Without Loop Dams

FIGURE 5 - HEATUP RATE



ATTACHMENT AESTABLISHING CHARGING WITHOUT INSTRUMENT AIR

## A. Establish Charging With Train A Emergency Bus Energized:

1. Verify at least one RWST TO CCP SUCTION - OPEN:
  - LV-0112D
  - LV-0112E
2. Verify at least one VCT OUTLET ISOLATION - SHUT:
  - LV-0112B
  - LV-0112C
3. Verify CCP-A RV TO RWST ISOLATION:
  - HV-8508A - ENABLE PTL
  - HV-8509B - OPEN
4. Verify - SHUT:
  - HV-8110 CCP A&B COMMON MINIFLOW
5. Verify Train A CCP - RUNNING.
6. Ensure Train A charging isolation valves - OPEN:
  - HV-8116 SAFETY GRADE CHARGING TO REGEN HX
  - HV-0190A CCP-A SAFETY GRADE CHG
  - HV-8105 CHARGING TO RCS ISOLATION (locally verify if Train B emergency bus de-energized)

UNIT 1 AB-A09UNIT 2 AB-A103

7. Dispatch operators to maintain 8 to 13 gpm seal injection flow by throttling OPEN:

UNIT 1UNIT 2

1-1208-U6-152 (AB-C114)

2-1208-U6-152 (AB-C10)

ATTACHMENT AESTABLISHING CHARGING WITHOUT INSTRUMENT AIR

8. Shut the following charging isolation valves:
  - HV-8485A CCP-A DISCHARGE ISOLATION
  - HV-8106 CHARGING TO RCS ISOLATION
  
9. Maintain desired charging flow as shown on FI-0138A using HV-0190A CCP-A SAFETY GRADE CHG.

ATTACHMENT AESTABLISHING CHARGING WITHOUT INSTRUMENT AIR

## B. Establish Charging With Train B Emergency Bus Energized:

1. Verify at least one RWST TO CCP SUCTION - OPEN:
  - LV-0112D
  - LV-0112E
2. Verify at least one VCT OUTLET ISOLATION - SHUT:
  - LV-0112B
  - LV-0112C
3. Verify CCP-B RV TO RWST ISOLATION:
  - HV-8508B - ENABLE PTL
  - HV-8509A - OPEN
4. Verify - SHUT:
  - HV-8111A CCP-A MINIFLOW
  - HV-8111B CCP-B MINIFLOW
5. Verify Train B CCP - RUNNING.
6. Ensure Train B charging isolation valve HV-0190B CCP-B SAFETY GRADE CHG - OPEN.
7. Dispatch operators to maintain 8 to 13 gpm seal injection flow by throttling OPEN:

UNIT 1UNIT 2

1-1208-U6-151 (AB-C119)

2-1208-U6-151 (AB-C19)

8. Shut HV-8485B CCP-B DISCHARGE ISOLATION.

ATTACHMENT AESTABLISHING CHARGING WITHOUT INSTRUMENT AIR

9. Shut the following charging isolation valves:

- HV-8105 CHARGING TO RCS ISOLATION
- Dispatch operator to shut CVCS CHG PMPS DISCH FV-0121  
OUT ISO:

UNIT 1UNIT 2

1-1208-U6-153 (AB-C112)

2-1208-U6-153 (AB-C09)

10. Verify Train B BIT outlet isolation valve HV-8801B BIT  
DISCH ISOLATION - OPEN.

11. Maintain desired charging flow as shown on FI-0917A using  
HV-0190B CCP-B SAFETY GRADE CHARGING.

END OF ATTACHMENT A

Approval  
J. B. Beasley, Jr.  
Date  
10/03/95

Vogtle Electric Generating Plant  
NUCLEAR OPERATIONS



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18020-C  
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Unit COMMON

Abnormal Operating Procedures

LOSS OF COMPONENT COOLING WATER

PURPOSE

This procedure addresses the loss of one CCW Train with both RHR and SFPC Systems in operation.

SYMPTOMS

- CCW TRAIN A(B) LO HDR PRESS Annunciator.
- CCW TRAIN A(B) LO FLOW Annunciator.
- CCW TRAIN A(B) SURGE TK LO-LO LVL Annunciator.
- CCW TRAIN A(E) RHR PMP SEAL LO FLOW Annunciator.
- NSCW TRAIN A(B) LO HDR PRESS Annunciator.
- NSCW CCW ACCW TRAIN A(B) TEMP ALARM Annunciator.
- CCW TRAIN A(B) RHR HX HI FLOW Annunciator.
- CCW TRAIN A(B) RHR HX LO FLOW Annunciator.

ACTION/EXPECTED RESPONSE

1. Verify two CCW pumps in the affected train - RUNNING.
2. Verify CCW train operation:
  - Flow - APPROXIMATELY 9000 GPM.
  - Pressure - APPROXIMATELY 90 PSIG.
3. Verify NSCW supply header total flow approximately 17000 gpm as read on FI-1640B (1641B).

RESPONSE NOT OBTAINED

1. Start two CCW pumps in the affected train.
2. Stop the CCW pumps in the affected train. Place the unaffected train in service by initiating 13715, COMPONENT COOLING WATER SYSTEM.  
  
 IF one train of CCW can NOT be placed in service, in normal, two pump operation, THEN attempt to place one train of CCW in single pump operation by initiating 13715, COMPONENT COOLING WATER SYSTEM.
3. Initiate 18021-C, LOSS OF NUCLEAR SERVICE COOLING WATER SYSTEM.

CAUTION:

RHR Pump seal cooling is provided by the respective CCW Train. Damage to the seal assembly may result from sustained operation of the pump without CCW flow to the seal cooler if RHR temperature is greater than 150 degrees F.

4. Place the non-affected RHR train in operation by initiating 13011, RESIDUAL HEAT REMOVAL SYSTEM.

4. Initiate 18019-C, LOSS OF RESIDUAL HEAT REMOVAL and applicable ACTION items for:
  - Tech Spec 3.4.1.3
  - Tech Spec 3.4.1.4.1
  - Tech Spec 3.4.1.4.2
  - Tech Spec 3.9.8.1
  - Tech Spec 3.9.8.2

ACTION/EXPECTED RESPONSE

5. Verify the CCW TRAIN A(B) SURGE TK LO-LO LEVEL and HI/LO LVL annunciators are reset or level is rising.

6. Verify the affected CCW train has - NO ABNORMAL LEAKAGE.
7. Restore the affected CCW loop to service by initiating 13715, COMPONENT COOLING WATER SYSTEM.

RESPONSE NOT OBTAINED

5. Verify DEMIN WTR TO CCW TK-1(2) open:

	<u>UNIT 1</u>	<u>UNIT 2</u>
LV-1850	AB-203	AB-227
LV-1851	AB-202	AB-226

-OR-

Open RX MU WTR TO CCW TK-1(2)

	<u>UNIT 1</u>	<u>UNIT 2</u>
LV-1848	AB-203	AB-227
LV-1849	AB-202	AB-226

6. Isolate the leak by:
- Stop the pumps in the affected train and place the control switches in PULL-TO-LOCK.
  - Isolate makeup water to the surge tank.
  - Close system isolation valves as necessary.
7. Implement the applicable Tech. Spec. ACTION statement for the current plant condition:
- Tech Spec 3.4.1.3
  - Tech Spec 3.4.1.4.1
  - Tech Spec 3.4.1.4.2
  - Tech Spec 3.7.3
  - Tech Spec 3.9.8.1
  - Tech Spec 3.9.8.2

ACTION/EXPECTED RESPONSE

8. Locally verify spent fuel pool temperature is - LESS THAN 130°F (temperature indicators located on the east and west walls of the fuel pool area).
9. Verify Fuel Handling Bldg. normal HVAC units 1541-A7-001(002) and 1541-N7-001(002) - IN OPERATION.
10. Return to the UOP in effect.

RESPONSE NOT OBTAINED

8. Place the non-affected SFPC train in service by initiating 13719, SPENT FUEL POOL COOLING AND PURIFICATION SYSTEM.
9. Start fuel pool area recirculating air handling unit 1541-A7-003(004) by initiating 13320-C, FUEL HANDLING BUILDING HVAC SYSTEM.

END OF PROCEDURE TEXT