July 10, 2000

Mr. Thomas J. Palmisano
Site Vice President and General Manager
Palisades Nuclear Generating Plant
Consumers Energy Company
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES - NRC EXAMINATION REPORT 50-255/2000301(DRS)

Dear Mr. Palmisano:

On June 2, 2000, the NRC completed initial operator licensing examinations at your Palisades Nuclear Generating Plant. The enclosed report presents the results of the examination.

Your training department personnel administered the written examination on May 26, 2000. NRC examiners administered the operating examination during the same week. Four of your applicants were administered senior reactor operator examinations. One re-applicant was administered a reactor operator written re-take examination. The license applicants' performance evaluations were finalized on June 27, 2000. All applicants passed all sections of their corresponding examinations and were issued senior reactor operator or reactor operator licenses, as applicable.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

We will gladly discuss any questions you have concerning this examination.

Sincerely

David E. Hills

David E. Hills, Chief
Operations Branch
Division of Reactor Safety

Docket No. 50-255
License No. DPR-20

Enclosures:
1. Operator Licensing Examination Report 50-255/2000301(DRS)
2. Facility Comments and NRC Resolutions
3. Simulation Fidelity Report
4. Written Examination and Answer Keys (SRO and RO)

cc w/encls 1, 2, 3:
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N. Haskell, Director, Licensing and Performance Assessment
R. Whale, Michigan Public Service Commission
Michigan Department of Environmental Quality
Department of Attorney General (MI)
Emergency Management Division, MI Department of State Police

cc w/encls 1, 2, 3, 4: D. Rogers, Training Department

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-255

License No: DPR-20

Report No: 50-255/2000301(DRS)

Licensee: Consumers Energy Company

Facility: Palisades Nuclear Generating Plant

Location: 27780 Blue Star Memorial Highway
Covert, MI 49043-9530

Dates: May 22–26, 2000
June 2, 2000

Examiners: H. Peterson, Chief Examiner
B. Hughes, Examiner

Approved by: David E. Hills, Chief Operations Branch
Division of Reactor Safety

NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas) reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety

- Initiating Events
- Mitigating Systems
- Barrier Integrity
- Emergency Preparedness

Radiation Safety

- Occupational
- Public

Safeguards

- Physical Protection

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: http://www.nrc.gov/NRR/OVERSIGHT/index.html.

EXAMINATION SUMMARY

Palisades Nuclear Generating Plant
NRC Examination Report 50-255/2000301(DRS)

During the week of May 22, 2000, NRC examiners conducted an announced operator licensing initial examination in accordance with the guidance of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 8. This examination implemented the operator licensing requirements of 10 CFR §55.41, §55.43 and §55.45.

Four senior reactor operator applicants were administered the written examination and operating tests. One reactor operator re-applicant was administered a written re-take examination. The licensee administered the written examination on May 26, 2000. The NRC administered the operating test during the same week.

Examination Summary:

- All applicants passed all portions of their respective examinations, and were issued senior reactor operator or reactor operator licenses, as applicable (Section 4OA5.1).

Report Details

4. OTHER ACTIVITIES

4OA5 Other

.1 Initial Licensing Examinations

a. Inspection Scope

The NRC examiners conducted announced operator licensing initial examinations during the week of May 22, 2000. The facility licensee developed the written examinations and operating tests. Four senior reactor operator applicants received written examinations and operating tests. One reactor operator re-applicant received a written re-take examination.

b. Issues and Findings

The licensee's training department personnel administered the written examination on May 26, 2000, in accordance with NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 8. The NRC examiners independently graded the written examination and concluded that all five applicants achieved the passing criteria of 80.0 percent. On June 2, 2000, the licensee submitted four post-examination comments on the written examination. Two comments potentially affected the overall grading, and two comments were submitted as informational comments for future enhancement prior to entry into the NRC written examination bank. The comments and the NRC's resolutions are contained in Enclosure 2 of this report.

The NRC examiners determined that the written examination, as originally submitted by the licensee, was outside the acceptable quality range expected by the NRC. This determination was based on the fact that 28 written questions required replacement or modification when reviewed in accordance with NUREG-1021. The problems identified with the written examination included, but were not limited to, questions submitted with low discriminatory value, that did not meet the selected knowledge and abilities criteria, questions with multiple correct answers, technically incorrect answers, and questions submitted containing inappropriate distractors. The operating examination submitted by the licensee was within the range of acceptability expected for the proposed examination.

Following the 1999 initial operator license examination, the licensee performed a post-examination root cause analysis to address examination quality and high failure rate. Although examination quality issues were identified during this recent operator license examination, the overall examination submitted by the licensee and the overall performance by the applicants showed improvements.

The NRC examiners administered the operating tests during the week of May 22, 2000. All applicants demonstrated satisfactory performance in all three areas of the operating examination (administrative, control room and systems walkthrough, and integrated plant response). The examiners identified the following generic performance deficiencies while administering the operating tests:

- During administration of dynamic simulator scenarios that included entry into Emergency Operating Procedure No. 9, an emergency contingency procedure, the examiners observed that applicants had some difficulty following and identifying appropriate procedure steps.

- Given plant conditions involving the local tending of the emergency diesel generator during a systems job performance measure, two applicants performed actions that were contrary to the written procedures. The applicants incorrectly removed additional fuses not required by procedures.

The NRC examiners also identified several individual deficiencies in applicant performance during the operating examination which are described in each individual's examination report, Form ES-303-1, "Operator Licensing Examination Report." The NRC forwarded copies of the evaluations under separate correspondence to the Site Training Manager.

The NRC examiners reviewed and observed the licensee's overall examination security practices during the examination. The examiners did not identify any significant security concerns associated with the development or administration of the tests.

4OA6 Meetings (Including Exit Meeting)

.1 Exit Meeting Summary

The inspectors presented the preliminary examination observations to Mr. Rogers and other members of licensee management at the conclusion of the operator licensing examination on June 2, 2000. The licensee acknowledged the issues presented. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

Gerald Boss, Operations Manager
Stephen Cogswell, Exam Team
Nathan Haskell, Licensing Director
Darrell Hensley, Operations Training Exam Lead
Sheri King, Licensing Senior Technical Analyst
Daniel Malone, Licensing Manager
Guy Packard, Operations Superintendent
Pat Pitcher, HLC Training Supervisor
Paul Rhodes, NPAD
David Rogers, Training Director
Bob Sailor, Training Instructor
Thomas Steffler, Operations Shift Supervisor
Ron Thurow, Operations Training Supervisor

NRC

Jay Lennartz, Senior Resident Inspector
Robert Krsek, Resident Inspector

Enclosure 2

Facility Comments and NRC Resolutions

The licensee submitted four post written examination comments. Two of the comments had the potential to affect the final grading of the written examination, questions 15, common for both SRO and RO, and question 27, SRO only. The other two post written examination comments did not affect the grading of the written examination. These two questions (questions 1 and 44, common to both SRO and RO) were submitted only for future enhancement prior to inclusion into the NRC question bank.

QUESTIONS AFFECTING EXAM GRADING

Question No. 15 (RO/SRO Common)

Comment:
"This question was modified during the exam administration. It became apparent that there may be more than one correct answer due to the nature of the questions raised by the students. The simulator C-33 panel was observed and it became apparent that all valves except CV-2130 were located there. The question and answer were changed during the exam to preclude subsequent deletion of the question due to three correct answers. The word "NOT" was inserted in the question stem as follows:

> Which of the following valves associated with Reactivity Control can NOT be operated from Control Panel C-33?

The answer for the modified question now becomes "a"."

NRC Resolution:
Recommendation accepted.

During the NRC review and pre-verification of the examination material with the licensee, no comments were made on Question 15. The licensee's reference and verification assured that the original selected answer "c" was the correct answer. It was initially verified by the licensee that only the valve MO-2169, choice "c", was controlled from Control Panel C-33, and that the other three distractors were not controlled from the same panel. Based on recent licensee recommendation, verification of panel C-33, the original question was technically incorrect. This was an example of poor verification by the licensee prior to submitting the examination material to the NRC. Based on review of the licensee's recent justification for question No. 15, changes to the question was accepted. The administered examination was updated to include "NOT" in the question stem, and the associated correct answer now becomes choice "a".

Question No. 27 (SRO Only)

Comment:
"Answer 'b' is not correct if a plausible assumption is made concerning the key word 'late'. If the candidate reasons that late is defined as *that time beyond the 2 hour limit*, then this condition becomes a non-emergency, 30 day reportable event and would require notification to the Duty and Call Superintendent. If the candidate assumes that late is defined as *that time beginning when the ill crew member relinquishes their control room duties*, then the condition

does not violate Technical Specifications and therefore would not be in violation and would not require notification. We request that question be deleted from the examination due to having no clearly correct answer. It is also recommended that the question be modified to be clearly correct in the future by modifying answer 'b' to read as follows:

> if shift staffing is less than permitted by Technical Specifications due to an ill crew member being sent home and the replacement operator reports 1.5 hours after the person's departure."

NRC Resolution:
Recommendation to delete the question accepted.

During NRC review of the examination material, the examiner's editorial comment recommended to avoid negatively stated questions, i.e., avoid "EXCEPT", but to query a positive response soliciting when you must make a notification. However, during the NRC pre-examination verification the licensee assured the examiner and noted that the assumption of the 1.5 hours was within the technical specification time limit, and therefore NO notification was warranted. The licensee emphasized that the answer implied that the replacement operator will not arrive for 1.5 hours making choice 'b' correct. Based on the licensee's information, the NRC accepted the licensee's question as submitted. The wording of the question could reasonably lead the applicant into believing that technical specifications had not been violated, in that, the time referenced in the question started when the crew member left. Subsequently, the licensee reevaluated the question and proposed deleting the question due to interpretation error by three out of four applicants. The licensee's proposed clarification to the question for future use in the examination bank was noted as an acceptable improvement.

QUESTIONS NOT AFFECTING EXAM GRADING (Only Recommendation for Future Enhancement)

Question No. 1 (RO/SRO Common)

Comment:
"The determination of whether or not the CETs will indicate either superheated or saturated conditions is subject to further analysis based on the assumption of how much power was being produced at the top one foot of the core. It is debatable that enough decay heat is present in this area to cause superheated indication on the CETs. Answer modification is not suggested; however, the question would test with better reliability if the stem were modified as follows:

> When the top *two (2)* feet of the Reactor Core becomes uncovered..."

NRC Resolution:
Recommendation accepted.

The added clarification of two feet appears to reinforce the question and answer.

Question No. 44 (RO/SRO Common)

Comment:

"A candidate assumed that operator action would have occurred - including isolating letdown to enhance emergency boration. We recommend an enhancement to the question as follows:1

> *Assuming no subsequent operator action occurs*, which of the following results in the greatest heat load on the Component Cooling Water System?"

NRC Resolution:
Recommendation accepted.

The added enhancement of no subsequent operator actions appears to reinforce the question and answer.

Enclosure 3

SIMULATION FIDELITY REPORT

Facility Licensee: Palisades Nuclear Generating Plant

Facility Licensee Docket No: 50-255

Operating Tests Administered: May 23–25, 2000

The following documents observations made by the NRC examination team during the initial operator license examination. These observations do not constitute audit or inspection findings and are not, without further verification and review, indicative of non-compliance with 10 CFR 55.45(b). These observations do not affect NRC certification or approval of the simulation facility other than to provide information which may be used in future evaluations. No licensee action is required in response to these observations.

During the conduct of the simulator portion of the operating tests, the following items were observed:

ITEM	DESCRIPTION
1.	None

Enclosure 4

WRITTEN EXAMINATION LAND ANSWER KEYS (SRO AND RO)

This document will be available from ADAMS within 30 days under the title "Palisades Initial Examination 05/2000".

FINAL-AS ADMINISTERED INITIAL EXAMINATION

FOR PALISADES THE WEEK OF MAY 22, 2000

FINAL-AS ADMINISTERED WRITTEN EXAMINATION

FOR PALISADES THE WEEK OF MAY 22, 2000

MASTER RO WRITTEN EXAM AND ANSWER KEY

U.S. Nuclear Regulatory Commission
Site-Specific
Written Examination

Applicant Information

Name: **ANSWER KEY**	Region: **III**
Date: MAY 26, 2000	Facility/Unit: **PALISADES**
License Level: **RO**	Reactor Type: **CE**
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected five hours after the examination starts.

Applicant Certification

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

____
Applicant's Signature

Results

Examination Value	________	Points
Applicant's Score	________	Points
Applicant's Grade	________	Percent

Palisades May 2000 RO Written Exam Key

1. b
2. b
3. b
4. d
5. b
6. a
7. a
8. c
9. b
10. a
11. c
12. a
13. d
14. a
15. ~~c~~ a
16. b
17. b
18. b
19. a
20. c
21. b
22. b
23. c
24. d
25. b
26. c
27. a
28. c
29. d
30. b
31. d
32. a
33. d
34. b
35. b
36. b
37. d
38. d
39. b
40. a
41. b
42. a
43. c
44. a
45. a
46. a
47. a
48. b
49. c
50. a
51. b
52. c
53. d
54. c
55. c
56. c
57. a
58. c
59. b
60. c
61. c
62. c
63. a
64. a
65. b
66. a
67. b
68. b
69. a
70. a
71. b
72. c
73. c
74. c
75. a
76. b
77. b
78. d
79. a
80. d
81. b
82. c
83. a
84. d
85. a
86. a
87. a
88. c
89. c
90. b
91. a
92. c
93. a
94. c
95. d
96. a
97. c
98. c
99. d
100. b

PALISADES WRITTEN EXAMINATION QUESTION REFERENCE

1.	SRO/RO	REF:	EOP-4.0, EOP-9.0, LP-ASGA
2.	SRO/RO	REF:	ONP-24.1, LP-ASGC
3.	SRO/RO	REF:	Steam tables, EOP-1.0
4.	SRO/RO	REF:	ONP-7.1
5.	SRO/RO	REF:	LP-IOT, DEA-TCA-91-03 (C744 0835)
6.	SRO/RO	REF:	E-4, Sheet 1, LP-ASFE
7.	SRO/RO	REF:	SOP-30
8.	SRO/RO	REF:	EOP Supplement 6, TS 3.6, ONP-4.1
9.	SRO/RO	REF:	FSAR Table 9-4, EOP-4.0
10.	SRO/RO	REF:	SOP-2A
11.	SRO/RO	REF:	EOP Supplement 24
12.	SRO/RO	REF:	EOP-1, EOP Supplement 5
13.	SRO/RO	REF:	SOP-1
14.	SRO/RO	REF:	SOP-22, D-PAL-89-131
15.	SRO/RO	REF:	ONP-25.2
16.	SRO/RO	REF:	ONP-4.2
17.	SRO/RO	REF:	ONP-17
18.	SRO/RO	REF:	EOP-4.0, LP-ASEC
19.	SRO/RO	REF:	EOP-4.0
20.	SRO/RO	REF:	ONP-24.2, ONP-24.3
21.	SRO ONLY	REF:	TS 3.8.1
22.	SRO ONLY	REF:	AP-1.00
23.	SRO ONLY	REF:	LP-TBAA
24.	SRO ONLY	REF:	AP-4.02
25.	SRO ONLY	REF:	AP-7.13
26.	SRO ONLY	REF:	TS 3.1.4
27.	SRO ONLY	REF:	AP-4.00
28.	SRO ONLY	REF:	Standing Order 54
29.	SRO ONLY	REF:	AP-4.06
30.	SRO ONLY	REF:	EOP-1.0
31.	SRO/RO	REF:	SOP-38
32.	SRO/RO	REF:	ONP-25.1, ONP-25.2
33.	SRO/RO	REF:	EOP-8.0, LP-TBAC, Steam Tables
34.	SRO/RO	REF:	TS 3.17.6, TS 3.8.1
35.	SRO/RO	REF:	Tech Data Book Fig. 1.9
36.	SRO/RO	REF:	SOP-11, A-PAL-89-151
37.	SRO/RO	REF:	E-17, Sheet 6
38.	SRO/RO	REF:	E-17, Sheet 4, LP-ASAC
39.	SRO/RO	REF:	ONP-6.1
40.	SRO/RO	REF:	ONP-6.2
41.	SRO/RO	REF:	ARP-21
42.	SRO/RO	REF:	ARP-5
43.	SRO/RO	REF:	EOP-1.0
44.	SRO/RO	REF:	FSAR Table 9-4

45. SRO/RO REF: SOP-38
46. SRO/RO REF: ARP-8
47. SRO/RO REF: EOP-4.0
48. SRO/RO REF: ONP23.2
49. SRO/RO REF: SOP-2A
50. SRO/RO REF: ONP-25.2

51. SRO ONLY REF: EOP-4.0, Standing Order 62
52. SRO ONLY REF: AP-5.01
53. SRO ONLY REF: EOP-6.0
54. SRO ONLY REF: AP-4.00
55. SRO ONLY REF: FPIP-7
56. SRO ONLY REF: SOP-2B
57. SRO ONLY REF: AP-9.31
58. SRO ONLY REF: EOP-1.0
59. SRO ONLY REF: AP-4.00
60. SRO ONLY REF: FPIP-7

61. SRO/RO REF: Tech Data Book Figure 3.3, LP-ASEA
62. SRO/RO REF: SOP-24
63. SRO/RO REF: SOP-30
64. SRO/RO REF: Tech Data Book Figure 1.1, EM-04-08
65. SRO/RO REF: EOP-5.0
66. SRO/RO REF: E-17, Sheet 5, LP-ASHA
67. SRO/RO REF: E-8, Sheet 2
68. SRO/RO REF: SOP-30
69. SRO/RO REF: ARP-8
70. SRO/RO REF: EOP-3.0, EOP Setpoint Basis
71. SRO/RO REF: ONP-5.1, Tech Spec 1.0
72. SRO/RO REF: ONP-3.0
73. SRO/RO REF: EOP Supplement 6
74. SRO/RO REF: SOP-38
75. SRO/RO REF: AP-4.10
76. SRO/RO REF: EOP Supplement 11
77. SRO/RO REF: ONP-14
78. SRO/RO REF: ONP-18
79. SRO/RO REF: ONP-2.3
80. SRO/RO REF: SOP-6
81. SRO/RO REF: Tech Data Book Figure 3.3
82. SRO/RO REF: AP-7.02
83. SRO/RO REF: Steam Tables
84. SRO/RO REF: ONP-26
85. SRO/RO REF: EOP-1.0
86. SRO/RO REF: M-656, M-218, Sh. 4
87. SRO/RO REF: TS 3.17.1
88. SRO/RO REF: Tech Data Book Figure 8.2
89. SRO/RO REF: LP-ADAA
90. SRO/RO REF: EOP-1.0, E-1, LP-ASAA
91. SRO/RO REF: EOP-6.0, EOP Supplement 1
92. SRO/RO REF: LP-TBAG

93.	SRO/RO	REF:	ONP-11.2
94.	SRO/RO	REF:	ONP-24.3
95.	SRO/RO	REF:	M-203, Sheet 2, EOP-4.0, LP-ASHA

96.	SRO ONLY	REF:	TS 4.0.3
97.	SRO ONLY	REF:	SOP-1, EOP Setpoint
98.	SRO ONLY	REF:	EOP Supplement 35
99.	SRO ONLY	REF:	AP-4.00
100.	SRO ONLY	REF:	TS 3.7.9

<u>RO QUESTIONS SUBSTITUTED INTO SRO ONLY QUESTIONS ABOVE</u>:

21	RO ONLY	REF:	EOP Supplement 6
22	RO ONLY	REF:	GOP-5
23	RO ONLY	REF:	EOP Intro
24	RO ONLY	REF:	AP-4.07
25	RO ONLY	REF:	ARP-4
26	RO ONLY	REF:	EOP Supplement 19, LP-ASLD
27	RO ONLY	REF:	AP-4.00
28	RO ONLY	REF:	SOP-2A
29	RO ONLY	REF:	AP-10.53
30	RO ONLY	REF:	QO-1

51	RO ONLY	REF:	SOP-12, LP-ASLD
52	RO ONLY	REF:	SOP-28, LP-ASIB
53	RO ONLY	REF:	EI-7.0, LP-ASHE
54	RO ONLY	REF:	AP-4.00
55	RO ONLY	REF:	FPIP-2
56	RO ONLY	REF:	SOP-6
57	RO ONLY	REF:	E-238, Sheet 2, LP-ASJB
58	RO ONLY	REF:	ARP-5, SOP-1
59	RO ONLY	REF:	SOP-16, LP-ISDA
60	RO ONLY	REF:	AP-4.02

96	RO ONLY	REF:	SOP-10
97	RO ONLY	REF:	ARP-8
98	RO ONLY	REF:	AP 4.00
99	RO ONLY	REF:	ONP-10
100	RO ONLY	REF:	AP-7.04

Question: 1

When the top one (1) foot of the Reactor Core becomes uncovered ...

a. CETs will indicate that saturated conditions exist.

b. CETs will indicate that superheated conditions exist.

c. incore NI readings will indicate abnormally low.

d. excore NI readings will indicate abnormally low.

Answer:

b. CETs will indicate that superheated conditions exist.

Question: 2

Following a loss of 120 VAC Preferred Bus Y-20, the Anticipated Transient Without Scram (ATWS) System trip logic is ...

a. 1-out-of-3.

b. 2-out-of-3.

c. 1-out-of-4.

d. 2-out-of-4.

Answer:

b. 2-out-of-3.

Question: 3

Given the following conditions:

- A loss of all offsite power has occurred.
- A small break LOCA has occurred concurrently.
- Tave is 559 °F.
- Tcold is 548 °F.
- Thot is 570 °F.
- Average Qualified CETs is 565 °F.
- Pressurizer pressure is 1500 psia.

While performing EOP-1.0, Standard Post-Trip Actions, PCS subcooling should be determined to be ...

a. 26 °F.

b. 31 °F.

c. 37 °F.

d. 48 °F.

Answer:

b. 31 °F.

Question: 4

Given the following conditions:

- The plant is operating at 100% power.
- Instrument air pressure lowers to 75 psig and stabilizes.
- RED indicating lights are observed ON for Air Compressors C-2A, C-2B, and C-2C.

What is the effect of continuing to operate the plant with an instrument air pressure of 75 psig?

a. Service air is isolated. However, this has **NO** effect on continued plant operation at 100% power.

b. The standby air compressor starts. However, there will be **NO** effect on continued plant operation unless erratic valve operation occurs.

c. Instrument air to containment and service air are isolated. However, this has **NO** effect on continued plant operation at 100% power.

d. Service air is isolated. This will eventually result in a trip due to the loss of the cooling tower pumps.

Answer:

d. Service air is isolated. This will eventually result in a trip due to the loss of the cooling tower pumps.

Question: 5

The consequence of installing an incore detector in the wrong core location would be ...

a. an error introduced into the Estimated Critical Position (ECP).

b. the improper length may unknowingly result in data being gathered at improper core elevations.

c. excessive radiation upon removal of the incore during the next refueling.

d. the incore detector could become an unanalyzed source of neutrons.

Answer:

b. the improper length may unknowingly result in data being gathered at improper core elevations.

Question: 6

A fault on 2400 VAC Bus 1C has caused the bus to de-energize and isolate.

Assuming **NO** operator action has been taken, which of the following Pressurizer Heaters have power available?

a.
- All 4 groups of Backup Heaters
- Both groups of Proportional Heaters

b.
- 2 groups of Backup Heaters
- 1 group of Proportional Heaters

c.
- All 4 groups of Backup Heaters
- Neither group of Proportional Heaters

d.
- 2 groups of Backup Heaters
- Neither group of Proportional Heaters

Answer:

a.
- All 4 groups of Backup Heaters
- Both groups of Proportional Heaters

Question: 7

The WHITE light associated with 4160 VAC Bus 1B Breaker 252-201, Station Power Transformer 1-1, being LIT indicates the breaker ...

a. closing springs are charged.

b. undervoltage relays are reset.

c. is racked to the TEST position.

d. has control power available.

Answer:

a. closing springs are charged.

Question: 8

With the plant in Hot Shutdown, which of the following would constitute a breech of Containment Integrity?

a. Containment pressure is at 3.7 psig

b. The Personnel Air Lock fails the inner door seal leak test

c. A spurious Containment High Pressure (CHP) occurs and CV-0155, Quench Tank Spray, fails to close

d. A spurious Containment High Pressure (CHP) occurs and CV-1103, Containment Sump Drain, fails to close

Answer:

c. A spurious Containment High Pressure (CHP) occurs and CV-0155, Quench Tank Spray, fails to close

Question: 9

Given the following conditions:

- A large break LOCA has occurred, resulting in an SIAS and a RAS.
- Pressurizer pressure has stabilized at approximately 50 psia.
- Containment pressure is approximately 14 psig.
- While responding to the LOCA in accordance with EOP-4.0, Loss of Coolant Accident Recovery, EK-1172, COMPONENT CLG SURGE TANK T-3 HI-LO LEVEL, alarms.
- Component Cooling Surge Tank level is 90% and rising slowly.
- Component Cooling Water to Containment has **NOT** been restored.

Assuming all systems are responding as expected, a potential cause of the high level in the CCW surge tank is leakage from the ...

a. SFP Heat Exchanger following the SIAS.

b. SDC Heat Exchanger following the RAS.

c. CVCS Letdown Heat Exchanger following the SIAS.

d. PCP Mechanical Seal Coolers following the RAS.

Answer:

b. SDC Heat Exchanger following the RAS.

Question: 10

Given the following conditions:

- The plant is at 100% power.
- CVCS charging and letdown are secured for a short period of time to perform maintenance.
- PCS temperature is maintained constant.

Which of the following describes the trend of pressurizer and VCT levels?

	PRESSURIZER LEVEL	**VCT LEVEL**
a.	Lowers	Rises
b.	Constant	Constant
c.	Lowers	Constant
d.	Constant	Rises

Answer:

a.	Lowers	Rises

Question: 11

Given the following conditions:

- A station blackout occurred 25 minutes ago.
- The crew is performing the actions of EOP-3.0.
- Prior to starting the first SW Pump after restoring power, the pump discharge valve is throttled such that the valve is two (2) turns open.

Which of the following describes the reason for throttling the SW Pump discharge valve?

a. Prevent the pump from tripping on overcurrent

b. Prevent the pump from tripping on undervoltage

c. Minimize hydraulic shock to the system

d. Minimize level rise of SW Bay

Answer:

c. Minimize hydraulic shock to the system

Question: 12

Which of the following describes the Containment Air Cooler and Fan configuration for a post-LOCA DBA condition?

	"A" FANS	"B" FANS	SW HIGH CAPACITY OUTLET VALVES OPEN	SW INLET VALVES OPEN
a.	Running	Tripped	VHX-1, VHX-2, VHX-3, VHX-4	VHX-1, VHX-2, VHX-3 **ONLY**
b.	Tripped	Running	VHX-1, VHX-2, VHX-3 **ONLY**	VHX-1, VHX-2, VHX-3, VHX-4
c.	Running	Tripped	VHX-1, VHX-2, VHX-3 **ONLY**	VHX-1, VHX-2, VHX-3 **ONLY**
d.	Tripped	Running	VHX-1, VHX-2, VHX-3, VHX-4	VHX-1, VHX-2, VHX-3, VHX-4

Answer:

a.	Running	Tripped	VHX-1, VHX-2, VHX-3, VHX-4	VHX-1, VHX-2, VHX-3 **ONLY**

Question: 13

Given the following conditions:

- LIA-0105, Reactor Vessel Level, is indicating 63%.
- The indicator position switch for LIA-0105 is in WIDE RANGE.
- PCS temperature is 150 °F.

The PCS level, in feet and inches, is ...

a. 619' 0".

b. 619' 4".

c. 624' 0".

d. 624' 4".

Answer:

d. 624' 4".

Question: 14

Given the following conditions:

- Diesel Generator 1-1 is operating at full load, paralleled with the grid.
- The Main Generator voltage is adjusted from 60 MVARs overexcited to 75 MVARs underexcited.

Assuming **NO** operator actions, an observable change may occur in Diesel Generator 1-1 ...

a. current.

b. frequency.

c. voltage.

d. speed.

Answer:

a. current.

Question: 15

While implementing ONP-25.2, Alternate Safe Shutdown Procedure, the crew is taking actions for Reactivity Control.

Which of the following valves associated with Reactivity Control can NOT be operated from Control Panel C-33?

a. Boric Acid Pump Recirc Valve, CV-2130

b. Charging Pumps Suction From SIRWT, MO-2160

c. Boric Acid Gravity Feed Valve, MO-2169

d. VCT Outlet Valve, MO-2087

Answer:

~~c. Boric Acid Gravity Feed Valve, MO-2169~~

a. Boric Acid Pump Recirc Valve, CV-2130

Question: 16

Emergency boration and a reactor trip are IMMEDIATE ACTIONS required during a(n) ...

a. steam line break caused by a failed weld.

b. breech of containment integrity caused by an earthquake.

c. excessive feedwater event caused by a failed controller.

d. uncontrolled 60 inch insertion of two (2) Group 4 regulating rods.

Answer:

b. breech of containment integrity caused by an earthquake.

Question: 17

Given the following conditions:

- The PCS is being filled from Reduced Inventory 5 days following a forced outage to replace a PCP seal package.
- Current PCS level is 628' 5".
- Both SGs have level at approximately 50%.
- Current Average Qualified CET temperature is 140 °F.
- Shutdown Cooling has been lost.

The PCS will reach 200 °F in approximately ...

a. 11 to 15 minutes.

b. 16 to 20 minutes.

c. 21 to 25 minutes.

d. 26 to 30 minutes.

Answer:

b. 16 to 20 minutes.

Question: 18

The Reactor Vessel Level Monitoring System (RVLMS) lights indicate **ALL** GREEN lights OFF and **ALL** RED lights LIT.

This indicates that the reactor vessel level is ...

a. completely full.

b. at or below the top of the fuel.

c. in the head region.

d. at or above the top of the hot legs.

Answer:

b. at or below the top of the fuel.

Question: 19

Which of the following describes the limitations of operating one (1) Containment Spray Pump following a RAS during a Loss of Coolant Accident?

A single Containment Spray Pump can supply ...

a. one (1) Containment Spray Valve AND one (1) HPSI Subcooling Valve simultaneously.

b. one (1) Containment Spray Valve OR one (1) HPSI Subcooling Valve at a time.

c. both Containment Spray Valves AND one (1) HPSI Subcooling Valve simultaneously.

d. one (1) Containment Spray Valve OR both HPSI Subcooling Valves at a time.

Answer:

a. one (1) Containment Spray Valve AND one (1) HPSI Subcooling Valve simultaneously.

Question: 20

Which of the following are the power supplies for the Reactor Protection System BC logic matrix?

a. Y-10 and Y-30

b. Y-10 and Y-40

c. Y-20 and Y-30

d. Y-20 and Y-40

Answer:

c. Y-20 and Y-30

Question: 21

A Containment High Pressure (CHP) signal will affect Primary Coolant Pump (PCP) operation by automatically ...

a. isolating charging flow.

b. isolating controlled bleedoff to the VCT.

c. starting the HP lift oil pumps.

d. tripping all four (4) PCPs.

Answer:

b. isolating controlled bleedoff to the VCT.

Question: 22

Given the following data during a power escalation:

TIME (min)	ΔT Power
0	81%
30	82%
60	84%
90	87%
120	88%

Given Attachment 2 and Attachment 5 of GOP-5, the calculated power escalation **RATE** at TIME = 90 is ...

a. 4%/hour.

b. 5%/hour.

c. 6%/hour.

d. 8%/hour.

Answer:

b. 5%/hour.

Question: 23

Which of the following sets of safety functions are listed in order of priority (from highest to lowest)?

a.
1. Reactivity control
2. Maintenance of vital auxiliaries - air
3. Core heat removal
4. PCS heat removal

b.
1. PCS pressure control
2. PCS heat removal
3. Maintenance of vital auxiliaries - water
4. Containment isolation

c.
1. Maintenance of vital auxiliaries - electric
2. PCS pressure control
3. PCS heat removal
4. Containment atmosphere

d.
1. PCS inventory control
2. Core heat removal
3. Maintenance of vital auxiliaries - air
4. Maintenance of vital auxiliaries - water

Answer:

c.
1. Maintenance of vital auxiliaries - electric
2. PCS pressure control
3. PCS heat removal
4. Containment atmosphere

Question: 24

An Auxiliary Operator will be assisting you in the performance of a surveillance test. A CSI 2120 Vibration Analyzer is required to perform the test.

Which of the following must **ALWAYS** be checked and recorded prior to issuing the instrument to the Auxiliary Operator?

a. Maximum and minimum range of the instrument

b. Name of technician who performed the calibration

c. Last surveillance the instrument was used to perform

d. Acceptable calibration date for the instrument

Answer:

d. Acceptable calibration date for the instrument

Question: 25

Which of the following two (2) automatic actions occur on a VCT LO-LO LEVEL of 7.9%?

a.
- Boric Acid Recirc Valves OPEN
- Boric Acid Pumps START

b.
- VCT Outlet Valve CLOSES
- SIRWT to Charging Pump Suction Valve OPENS

c.
- SIRWT to Charging Pump Suction Valve OPENS
- VCT Divert to VDT OPENS

d.
- SIRWT to Charging Pump Suction Valve OPENS
- Boric Acid Pumps START

Answer:

b.
- VCT Outlet Valve CLOSES
- SIRWT to Charging Pump Suction Valve OPENS

Question: 26

Given the following conditions:

An inadvertent Auxiliary Feedwater Actuation Signal (AFAS) has occurred.
AFW Pumps P-8A and P-8C are in MANUAL.
CV-0522B, Auxiliary Feedwater (AFW) Pump P-8B Normal Steam Supply, is in AUTO.

Which of the following describes the response of CV-0522B to the AFAS?

a. Automatically opens immediately

b. Automatically opens after a 30.5 second time delay

c. Automatically opens after a 112.5 second time delay

d. Must be opened by an Operator

Answer:

c. Automatically opens after a 112.5 second time delay

Question: 28

Given the following conditions:

- The plant is operating at 100% power.
- Charging Pump P-55C develops an oil leak and must be stopped.

To satisfy Technical Specifications and Standing Order 54, while maintaining **ALL** normal controls and interlocks, Charging Pump P-55B should be powered using ...

a. P-55A normal supply breaker (52-1205).

b. P-55B alternate supply breaker from LCC-13 (52-1308).

c. P-55C normal supply breaker (52-1105).

d. LCC-11 and LCC-12 bus crosstie breaker (52-1217).

Answer:

c. P-55C normal supply breaker (52-1105).

Question: 29

During the performance of the Emergency Operating Procedures a CAUTION applies ...

a. ONLY to the immediate action steps of the procedure containing the CAUTION statement.

b. to ALL steps following the CAUTION statement.

c. to the ENTIRE procedure containing the CAUTION statement.

d. ONLY to the step immediately following the CAUTION statement.

Answer:

d. ONLY to the step immediately following the CAUTION statement.

Question: 30

Given the following conditions:

- The plant is in Hot Shutdown.
- Technical Specification Surveillance Test, QO-1, Safety Injection System, is being performed.
- The WHITE push button light above Containment Spray Pump P-54B hand switch comes ON during the performance of the test.

Depressing the WHITE push button under these conditions will ...

a. reset the standby feature of P-54B and de-energize the WHITE light.

b. start P-54B and de-energize the WHITE light.

c. place P-54B in a standby condition.

d. **NOT** affect the operation of P-54B.

Answer:

b. start P-54B and de-energize the WHITE light.

Question: 31

The Radioactive Gas Effluent Monitoring (RGEM) System is used to monitor plant stack gas and ...

a. isolate the waste gas decay tanks on a high radiation level.

b. prevent workers, contaminated by radioactive gas, from leaving the RCA.

c. prevent a radioactive release by shutting down the reactor on a high radiation level.

d. record levels of radioactivity being released to the environment.

Answer:

d. record levels of radioactivity being released to the environment.

Question: 32

Operating the shunt trip push button located on DC Panel D-11A will ...

a. isolate selected loads on Station Battery #1 to ensure DG 1-1 has control power available.

b. remotely trip DG 1-1 if a fire occurs in the Diesel Generator room.

c. disconnect Station Battery #1 from ALL of its DC loads if a battery room fire occurs.

d. disable all remote trips for DG 1-1.

Answer:

a. isolate selected loads on Station Battery #1 to ensure DG 1-1 has control power available.

Question: 33

Given the following conditions:

- A loss of offsite power has occurred after operating the plant at full load for 154 days.
- The crew is responding to the event in accordance with EOP-8.0, Loss of Offsite Power/Forced Circulation Recovery.
- Offsite power will **NOT** be restored for another hour.

Assuming that all of the following parameters are stable, which of the following sets of conditions would require that SG steaming and feeding rates be adjusted due to **NOT** being able to verify natural circulation?

	AVERAGE QUALIFIED CETs	**LOOP Thots**	**LOOP Tcolds**	**PRESSURIZER PRESSURE**
a.	500 °F	490 °F	460 °F	970 psia
b.	480 °F	480 °F	460 °F	740 psia
c.	510 °F	500 °F	495 °F	960 psia
d.	470 °F	460 °F	415 °F	720 psia

Answer:

d.	470 °F	460 °F	415 °F	720 psia

Question: 34

Given the following conditions:

- The plant is currently in Refueling Shutdown.
- Core alterations are in progress.

Which of the following would require that core alterations be immediately suspended?

a. The Shutdown Cooling Pump which is **NOT** operating is tagged out for oil replacement

b. The Source Range channel which is **NOT** providing audible indication in Containment fails low

c. One of the doors in the Emergency Air Lock is determined to be open

d. An automatic Containment Isolation valve is opened to perform stroke time testing

Answer:

b. The Source Range channel which is **NOT** providing audible indication in Containment fails low

Question: 35

Which of the following Group 4 Rod Positions would permit continued operations for the associated power level **WITHOUT** any operator actions?

	POWER LEVEL	**GROUP 4 ROD POSITION**
a.	40%	30 inches
b.	50%	50 inches
c.	60%	55 inches
d.	70%	60 inches

Answer:

b.	50%	50 inches

Question: 36

Given the following conditions:

- The plant is operating at 55% power.
- Both Main Feed Pumps are in service.
- Both Condensate Pumps are in service.
- Both Heater Drain Pumps are in service.

Assuming **NO** operator action, which of the following is most likely to lead to an automatic Reactor Trip?

a. P-10A, Heater Drain Pump, tripping

b. Condenser hotwell level lowering to 5%

c. CV-0711, Main Feed Pump Recirculation Valve, failing open

d. The output of LIC-0701, Main Feed to SG A, failing high

Answer:

b. Condenser hotwell level lowering to 5%

Question: 37

Given the following conditions and the included reference:

- The plant is operating at 100% power.
- Due to a failure, both Containment Pressure Switches, SW-1 and SW-2, associated with PS-1802A are tripped.
- A loss of Preferred AC Bus Y-10 occurs.

Which of the following describes the plant response?

a. An SIAS will be generated ONLY on the LEFT channel

b. An SIAS will be generated ONLY on the RIGHT channel

c. An SIAS will be generated on BOTH channels

d. An SIAS will **NOT** be generated on either channel

Answer:

d. An SIAS will **NOT** be generated on either channel

Question: 38

Given the following conditions:

- The plant is on Shutdown Cooling using LPSI Pump P-67B.
- A loss of offsite power has occurred.
- Diesel Generator (DG) 1-1 has started and loaded its associated bus.

Which of the following describes the operation of LPSI Pump P-67B?

a. P-67B should have restarted as soon as DG 1-1 output breaker closed.

b. P-67B should have restarted 13 seconds after DG 1-1 output breaker closed.

c. P-67B is **NOT** running, but will restart automatically when the NSD Sequencer is reset.

d. P-67B is **NOT** running and must be manually restarted.

Answer:

d. P-67B is **NOT** running and must be manually restarted.

Question: 39

Given the following conditions:

- The plant is operating at 8% power following a startup.
- The Operators have just synchronized the Main Generator to the grid.
- EK-1165, NON CRITICAL SERV WATER LO PRESS, alarms.
- Critical Service Water Header Pressures are noted to be 35 psig.
- An Auxiliary Operator reports a break in the Non-Critical Service Water Header downstream of CV-1359, Non-Critical Service Water Isolation.
- The Control Room Supervisor orders CV-1359 CLOSED to isolate the leak.

Which of the following actions should be taken?

a. Trip the turbine, verify the reactor automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

b. Trip the reactor, verify the turbine automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

c. Trip the turbine and stabilize reactor power above the point of adding heat.

d. Maintain the reactor and turbine on-line.

Answer:

b. Trip the reactor, verify the turbine automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

Question: 40

With the plant operating at 35% power, a loss of Component Cooling Water occurs.

Which of the following conditions will require a manual reactor trip?

a. PCP P-50B Thrust Bearing temperature at 187 °F

b. PCP P-50B Controlled Bleedoff temperature at 178 °F

c. Control Rod Drive Seal Leakoff temperatures all between 185 °F and 195 °F

d. PCP P-50B Lower Seal temperature at 177 °F

Answer:

a. PCP P-50B Thrust Bearing temperature at 187 °F

Question: 41

Given the following conditions:

- The reactor is operating at 19% power.
- Wide Range Nuclear Instrument channel NI-3 instantaneously fails high.

Assuming **NO** other failures, which of the following is required?

a. The reactor must be shut down in an orderly manner until NI-3 is repaired.

b. Continue power operations and repair NI-3.

c. Ensure the reactor automatically trips on high Startup Rate.

d. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

Answer:

b. Continue power operations and repair NI-3.

Question: 42

Given the attached drawing and the following conditions:

- Controlled Bleedoff temperature is 120 °F.
- Controlled Bleedoff flow is 1 gpm.
- Controlled Bleedoff pressure is 90 psig.

Which of the following PCP malfunctions have occurred?

a. The upper seal (3rd stage) has failed

b. The middle seal (2nd stage) has failed

c. The lower seal (1st stage) has failed

d. The upper (3rd stage) pressure breakdown device has plugged

Answer:

a. The upper seal (3rd stage) has failed

Question: 43

Given the following conditions:

- The Feed Reg Valve Controllers, LIC-0701 and LIC-0703, are both in AUTO.
- The Feed Pump Combined Speed Controller, HIC-0525, is in CASCADE.
- The Individual Speed Controllers, HIC-0526 and HIC-0529, are both in CASCADE.
- The plant is operating at 80% power when the Main Turbine trips.

Assuming **NO** operator action, which of the following describes the response of the Feed Water System?

a.
- Feed Reg Valves ramp closed
- Feed Pump Speed ramps to approximately 3250 rpm

b.
- Feed Reg Valves ramp closed
- Feed Pump Speed remains at pre-trip speed

c.
- Feed Reg Valves remain at pre-trip position
- Feed Pump Speed ramps to approximately 3250 rpm

d.
- Feed Reg Valves remain at pre-trip position
- Feed Pump Speed remains at pre-trip speed

Answer:

c.
- Feed Reg Valves remain at pre-trip position
- Feed Pump Speed ramps to approximately 3250 rpm

Question: 44

Ten (10) minutes have elapsed since an inadvertent SIAS.

Which of the following results in the greatest heat load on the Component Cooling Water System?

a. Letdown Heat Exchanger

b. Primary Coolant Pumps

c. Shutdown Cooling Heat Exchangers

d. Spent Fuel Pool Heat Exchanger

Answer:

a. Letdown Heat Exchanger

Question: 45

While obtaining a hydrogen sample from the containment atmosphere, the Hydrogen Monitoring System containment isolation valves must be opened prior to placing the system in ANALYZE to ...

a. prevent damage to the sample pump.

b. prevent damage to the analyzer.

c. prevent unnecessary Control Room annunciators from alarming.

d. ensure the valves remain open in the event of a CHP or CHR signal.

Answer:

a. prevent damage to the sample pump.

Question: 46

Given the following conditions:

- A liquid batch release is being performed from T-91 to the lake at 75 gpm.
- P-40A, Dilution Water Pump, is operating.
- RIA-1049, Liquid Radwaste Monitor, alarms.

Which of the following AUTOMATICALLY terminates the release as a result of the RIA-1049 alarm?

a. CV-1051, 1" Discharge Isolation, closes

b. CV-1054, Discharge Isolation (common), closes

c. P-40A, Dilution Water Pump, trips

d. CV-5021, Tie to Treated Waste, closes

Answer:

a. CV-1051, 1" Discharge Isolation, closes

Question: 47

During recovery from a LOCA inside containment, the operators have established simultaneous hot and cold leg injection in accordance with EOP-4.0, Loss of Coolant Accident Recovery.

Assuming all equipment is operating properly, which of the following describes the correct flow rates that should be observed?

	LOOP 1 HOT LEG FLOW FI-0316A	LOOP 1 HOT LEG FLOW FI-0317A	HPSI FLOW TO LOOP 1A FI-0308A	HPSI FLOW TO LOOP 1B FI-0310A	HPSI FLOW TO LOOP 2A FI-0312A	HPSI FLOW TO LOOP 2B FI-0313A
a.	275 gpm	275 gpm	137.5 gpm	137.5 gpm	137.5 gpm	137.5 gpm
b.	550 gpm	0 gpm	275 gpm	275 gpm	0 gpm	0 gpm
c.	183.3 gpm	183.3 gpm	183.3 gpm	183.3 gpm	183.3 gpm	183.3 gpm
d.	350 gpm	350 gpm	100 gpm	100 gpm	100 gpm	100 gpm

Answer:

a.	275 gpm	275 gpm	137.5 gpm	137.5 gpm	137.5 gpm	137.5 gpm

Question: 48

Given the following conditions:

- The plant is operating at 50% power.
- A Steam Generator Tube Leak is suspected.
- Total PCS Xenon-133 is 200 µCi/kg.
- Condenser off-gas flow is 2 cfm.
- RIA-0631, Condenser Off-Gas Monitor, is indicating 6.00E3 cpm.

The estimated steam generator tube leakage is ...

a. 0.008 gpm.

b. 0.015 gpm.

c. 0.030 gpm.

d. 0.045 gpm.

Answer:

b. 0.015 gpm.

Question: 49

Given the following conditions:

- The plant is operating at 100% power.
- Charging Pump P-55A is tagged out.
- P-55B, Charging Pump B, is in MANUAL control.
- P-55C, Charging Pump C, is in AUTO control.
- Charging flow is 40 gpm.
- Letdown flow is 44 gpm.

Pressurizer level will ...

a. stabilize at approximately 51%.

b. cycle between 51% and 62%.

c. cycle between 55% and 57%.

d. stabilize at approximately 62%.

Answer:

c. cycle between 55% and 57%.

Question: 50

Given the following conditions:

- The Control Room has been evacuated due to a fire in the Control Room.
- Auxiliary Shutdown Panel C-150 has been placed in service.

As a result of placing C-150 in service, AFW Pump P-8B ...

a. will **NOT** automatically trip on low suction pressure.

b. will **NOT** be available as a source of feedwater.

c. automatic speed control is disabled.

d. overspeed trip protection is disabled.

Answer:

a. will **NOT** automatically trip on low suction pressure.

Question: 51

The MAXIMUM running amp limits for the motor-driven Auxiliary Feedwater Pumps ensures ...

a. the pumps will **NOT** be "dead-headed."

b. the full-load motor heat will **NOT** be exceeded.

c. bus power supply overcurrent protection is maintained.

d. required work of the pumps during accident conditions are maintained within limits.

Answer:

b. the full-load motor heat will **NOT** be exceeded.

Question: 52

While operating the Spent Fuel Handling Machine (SFHM), you have received permission to use the OVERRIDE KEYSWITCH from the Refueling SRO to access a location beyond the computer software boundary at the pool edge.

What is the result of using the OVERRIDE KEYSWITCH to move the bridge and trolley?

a. The SFHM extreme travel limits are removed.

b. Movement into the tilt pit area is prohibited.

c. The SFHM boundary zone limits are removed.

d. Movement over the fuel elevator is prohibited.

Answer:

c. The SFHM boundary zone limits are removed.

Question: 53

Which of the following describes the type of override used to OPEN the PCS Sampling Valves, CV-1910 and CV-1911, after a closure caused by a CHR or CHP signal?

a. Override key switch

b. Operator action to manually isolate and bleed off the air supply to the valves

c. Operator action to manually handjack the valves

d. Jumpering the power supply to the solenoid valves to allow air to the valves

Answer:

d. Jumpering the power supply to the solenoid valves to allow air to the valves

Question: 54

For purposes of administrative control, the plant is considered to be above the COLD SHUTDOWN condition whenever PCS temperature is greater than or equal to ...

a. 200 °F as indicated on any operable cold leg temperature instrument.

b. 200 °F as indicated on any operable hot leg temperature instrument.

c. 210 °F as indicated on any operable cold leg temperature instrument.

d. 210 °F as indicated on any operable hot leg temperature instrument.

Answer:

c. 210 °F as indicated on any operable cold leg temperature instrument.

Question: 55

Given the following conditions:

- The plant is operating at 90% power.
- A fire in the Turbine Building has just been reported to the Control Room.

The Control Room Operator is required to ...

a. commence a rapid shut down of the plant.

b. trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

c. announce the fire location over the PA system and sound the fire alarm.

d. be immediately relieved and respond to the fire location as Fire Brigade Leader.

Answer:

c. announce the fire location over the PA system and sound the fire alarm.

Question: 56

Given the following conditions:

- A reactor shut down is in progress.
- Group 1 and Group 2 Regulating Rods are fully withdrawn.
- Group 3 Regulating Rods are at 105 inches.
- Group 4 Regulating Rods are at 25 inches.
- Manual Rod Sequençing is being used to insert rods.

The next rod insertion should be ...

a. Group 3 to 93 inches.

b. Group 3 to 85 inches.

c. Group 4 to 13 inches.

d. Group 4 to the LEL.

Answer:

c. Group 4 to 13 inches.

Question: 57

Given the following conditions:

- The plant is operating at 100% power.
- PCS Tave is 560 °F.
- All control systems are in automatic.
- The turbine trips on low condenser vacuum.
- Condenser vacuum stabilizes at 10"Hg.

Which of the following describes the response of the Atmospheric Dump Valves (ADVs) and Turbine Bypass Valve (TBV) to this event?

a.
  - The ADVs quick open and modulate closed as Tave lowers.
  - The TBV quick opens and modulates closed as steam pressure lowers.

b.
  - The ADVs quick open and modulate closed as Tave lowers.
  - The TBV remains closed.

c.
  - The ADVs quick open and modulate closed as steam pressure lowers.
  - The TBV quick opens and modulates closed as Tave lowers.

d.
  - The ADVs quick open and modulate closed as steam pressure lowers.
  - The TBV remains closed.

Answer:

a.
  - The ADVs quick open and modulate closed as Tave lowers.
  - The TBV quick opens and modulates closed as steam pressure lowers.

Question: 58

Given the following log of events:

TIME	EVENT
0800:00	Reactor at 40% power
0815:00	P-50A vibration logged at 3 mils (same as previous shift)
1300:00	EK-0913, PRI COOLANT PUMP VIB ALERT/MON TROUBLE, alarms
1300:30	P-50A vibration noted to be 9 mils
1300:45	P-50A bearing temperatures noted to have risen approximately 20 °F since beginning of shift
1305:00	Power reduction commenced
1307:00	EK-0914, PRI COOLANT PUMP VIBRATION DANGER, alarms
1307:30	P-50A vibration noted to be 26 mils
1307:30	Reactor at 32% power

Which of the following actions should be taken?

a. Continue lowering power per GOP-8, Plant Shutdown to Hot Standby/Shutdown: Power Reduction, and trip P-50A when below 15%

b. Trip P-50A immediately per ARP-5, Primary Coolant Pump Steam Generator and Rod Drives Scheme, and stabilize power below 15%

c. Manually trip the reactor, then trip P-50A, and go to EOP-1.0, Standard Post-Trip Actions.

d. Trip P-50A, then manually trip the reactor, and go to EOP-1.0, Standard Post-Trip Actions.

Answer:

c. Manually trip the reactor, then trip P-50A, and go to EOP-1.0, Standard Post-Trip Actions.

Question: 59

Shutdown Cooling has just been initiated.

What effect does this have on the Service Water (SW) System **INITIALLY**?

a. SW bay level will be significantly lower

b. SW system pressure will be lower

c. SW system pressure will be higher

d. SW intake screen differential pressure will be lower

Answer:

b. SW system pressure will be lower

Question: 60

Given the following conditions:

- The main flow through a pipe at normal pressure is 100 gpm.
- A vent valve on the pipe will allow 4 gpm if full open at normal pressure.
- A drain valve on the pipe will allow 8 gpm if full open at normal pressure.

Which of the following describes the locking device requirements for these valves?

	VENT VALVE	**DRAIN VALVE**
a.	Lock Required	Lock Required
b.	Lock Required	Lock **NOT** Required
c.	Lock **NOT** Required	Lock Required
d.	Lock **NOT** Required	Lock **NOT** Required

Answer:

c.	Lock **NOT** Required	Lock Required

Question: 61

Reactor Power is being lowered from 99.9% to 99.2% in preparation for Auxiliary Feed Pump testing by adjusting GV-4 closed.

WITHOUT making any adjustment in rod position or boron concentration, which of the following describes the response of Tave and Tref as turbine load is lowered?

	T-AVE	**T-REF**
a.	Lowers	Lowers
b.	Lowers	Rises
c.	Rises	Lowers
d.	Rises	Rises

Answer:

c.	Rises	Lowers

Question: 62

Given the following conditions:

- The reactor is shut down.
- PCS temperature is 230 °F.

The most acceptable method of reducing pressure inside Containment is to open ...

a. the personnel air lock doors.

b. CV-1805 and CV-1806, Containment Purge Exhaust Isolation Valves, and vent Containment through the stack.

c. CV-1065 and CV-1064, CWRT Vent Isolation Valves, and vent Containment through the VGCH to the stack.

d. the emergency escape lock.

Answer:

c. CV-1065 and CV-1064, CWRT Vent Isolation Valves, and vent Containment through the VGCH to the stack.

Question: 63

Given the following conditions:

- The plant is operating at 100% power.
- Permission has been given to test the Y-50 ABT Transfer Switch.
- The transfer operation occurs slowly.

Assuming **NO** further operator actions, which of the following is expected to occur?

a. The reactor will trip due to the turbine tripping.

b. The reactor will trip on high pressurizer pressure.

c. The turbine will runback to approximately 50%.

d. The reactor will trip on PCS low flow.

Answer:

a. The reactor will trip due to the turbine tripping.

Question: 64

Given the following conditions:

- The plant is operating at 60% power.
- While performing Technical Specification Surveillance Procedure QO-34, Control Rod Exercising, it is determined that Regulating Group 4 Rod 39 will **NOT** move and it is declared inoperable.
- Core Burnup is 5600 MWd/MTU.
- EM-04-08, Shutdown Margin Requirements, is being performed due to the inoperable rod.
- When calculating the Shutdown Margin Requirements, the maximum worth of the stuck rod is required to be determined and recorded.
- Reactor Engineering support is **NOT** available.

The maximum worth of Rod 39 should be recorded as approximately ...

a. 1.11 %$\Delta\rho$.

b. 1.23 %$\Delta\rho$.

c. 1.47 %$\Delta\rho$.

d. 7.52 %$\Delta\rho$.

Answer:

a. 1.11 %$\Delta\rho$.

Question: 65

Given the following conditions:

- A Steam Generator Tube Rupture has occurred in SG 'A'.
- SG 'A' has been isolated.
- Actions are being performed in accordance with EOP-5.0, Steam Generator Tube Rupture Recovery.
- PCS temperature is 505 °F.
- SG 'A' pressure is 980 psia.
- Condenser vacuum is 2"Hg.

Steam pressure in SG 'A' should be controlled by ...

a. unisolating and opening the MSIV Bypass to allow steaming of SG 'A' through the Turbine Bypass Valve.

b. unisolating and operating an Atmospheric Dump Valve on SG 'A'.

c. cooling down the PCS by steaming SG 'B' using the Turbine Bypass Valve.

d. cooling down the PCS by steaming SG 'B' using an Atmospheric Dump Valve.

Answer:

b. unisolating and operating an Atmospheric Dump Valve on SG 'A'.

Question: 66

Which of the following combination of SIRWT levels will provide the required logic to generate a Recirculation Actuation Signal (RAS)?

	LS-0327 (LEFT CHANNEL)	**LS-0328 (RIGHT CHANNEL)**	**LS-0329 (LEFT CHANNEL)**	**LS-0330 (RIGHT CHANNEL)**
a.	1%	5%	5%	1%
b.	1%	5%	1%	5%
c.	5%	1%	5%	1%
d.	5%	1%	5%	5%

Answer:

a.	1%	5%	5%	1%

Question: 67

Given the following conditions and the provided references, as needed:

- Battery Chargers #1 and #2 are in service.
- Battery Charger #3 is inoperable and is to be tagged out.

The following sequence of events occur:

- Breaker 52-285 (Station Battery Charger #3) is opened.
- Breaker 72-15 (Charger #1) is mistakenly opened.

Which of the following additional breaker trips will result in a reactor trip?

a. 72-10

b. 72-18

c. 72-36

d. 72-37

Answer:

b. 72-18

Question: 68

Which of the following air compressors is affected by a loss of LCC-11?

a. C-2B, Instrument Air Compressor 2B

b. C-2C, Instrument Air Compressor 2C

c. C-6B, High Pressure Air Compressor 6B

d. C-6C, High Pressure Air Compressor 6C

Answer:

b. C-2C, Instrument Air Compressor 2C

Question: 69

Annunciator EK-1309, Spent Fuel Pool Lo Level, alerts the operators that ...

a. makeup should be provided to maintain adequate shielding.

b. the SIRW Tank is potentially "backleaking" into the SFP.

c. the SFP Pumps must be secured due to loss of NPSH.

d. the SFP heat exchanger has a potential CCW leak.

Answer:

a. makeup should be provided to maintain adequate shielding.

Question: 70

During a sustained station blackout, the following conditions exist:

- PCS subcooling is determined to be 12 °F.
- The projected Reactor Shutdown calculation indicates the reactor will remain shutdown.

A natural circulation cooldown should be commenced to establish a subcooling margin of ...

a. between 25 °F and 50 °F.

b. between 50 °F and 75 °F.

c. between 75 °F and 100 °F.

d. greater than 100 °F.

Answer:

a. between 25 °F and 50 °F.

Question: 71

Given the following conditions:

- Reactor power is 1%.
- Alarms have come in indicating a dropped rod.
- The core mimic indicates a dropped rod.
- Tave is slowly lowering.

Which of the following actions should be taken?

a. Shut down the reactor and then recover the rod per SOP-6, Reactor Control System.

b. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

c. Stabilize the plant and recover the rod per SOP-6, Reactor Control System.

d. Lower power below the point of adding heat, stabilize the plant, and recover the rod per SOP-6, Reactor Control System

Answer:

b. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

Question: 72

Given the following conditions:

- ΔT power is 88.5%.
- NI power is 88%.
- A secondary plant transient occurs.

Which of the following would require a manual reactor trip?

a. EK-0962 and EK-0964, STEAM GEN E-50A/B LO LEVEL, both in alarm and steam generator levels both at 35% and stable

b. EK-0962 and EK-0964, STEAM GEN E-50A/B LO LEVEL, both in alarm and steam generator levels both at 45% and lowering

c. EK-0143, FW PUMP P1A TURBINE K7A TRIP, in alarm and the Throttle & Trip valves closed

d. EK-0968 and EK-0969, LOOP 1/2 T_{AVE}/T_{REF} GROSS DEVIATION, both in alarm and PCS Tave rising slowly

Answer:

c. EK-0143, FW PUMP P1A TURBINE K7A TRIP, in alarm and the Throttle & Trip valves closed

Question: 73

Which of the following valves will CLOSE on a Containment High Pressure signal, but will remain OPEN on a Containment High Radiation signal?

a. CV-2083, Controlled Bleed-off Containment Isol

b. CV-0770, SG 'B' Bottom Blowdown

c. CV-0701, SG 'A' Main Feed Reg Valve

d. SV-2414A, Hydrogen Monitor Right Channel

Answer:

c. CV-0701, SG 'A' Main Feed Reg Valve

Question: 74

To determine the current high alarm setpoint on an Analog Radiation Monitor, the operator must depress the HIGH push button after placing the selector switch in ...

a. OPERATE.

b. HV.

c. CAL.

d. OFF.

Answer:

c. CAL.

Question: 75

Given the following conditions and the supplied reference:

- The system is being tagged out for repairs on the flange AND realignment of the motor to the pump coupling.
- Tags are to be placed on the following components:
  - ➢ PUMP SUCTION VALVE - CLOSED
  - ➢ PUMP SUPPLY BREAKER - OPEN
  - ➢ LOOP #1 ISOLATION VALVE - CLOSED
  - ➢ LOOP #2 ISOLATION VALVE - CLOSED
  - ➢ DRAIN VALVE - OPEN
- The PUMP DISCHARGE VALVE is **NOT** to be tagged.

Which of the following would be a satisfactory **SEQUENCE** for performing this tagging?

a.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG LOOP #1 ISOLATION VALVE
3. CLOSE and TAG LOOP #2 ISOLATION VALVE
4. CLOSE and TAG PUMP SUCTION VALVE
5. OPEN and TAG DRAIN VALVE

b.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG PUMP SUCTION VALVE
3. CLOSE and TAG LOOP #1 ISOLATION VALVE
4. CLOSE and TAG LOOP #2 ISOLATION VALVE
5. OPEN and TAG DRAIN VALVE

c.
1. CLOSE PUMP DISCHARGE VALVE
2. CLOSE and TAG PUMP SUCTION VALVE
3. OPEN and TAG PUMP SUPPLY BREAKER
4. CLOSE and TAG LOOP #1 ISOLATION VALVE
5. CLOSE and TAG LOOP #2 ISOLATION VALVE
6. OPEN and TAG DRAIN VALVE

d.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG LOOP #1 ISOLATION VALVE
3. CLOSE and TAG LOOP #2 ISOLATION VALVE
4. **OPEN** and TAG DRAIN VALVE
5. **CLOSE** and TAG PUMP SUCTION VALVE

Answer:

a.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG LOOP #1 ISOLATION VALVE
3. CLOSE and TAG LOOP #2 ISOLATION VALVE
4. CLOSE and TAG PUMP SUCTION VALVE
5. OPEN and TAG DRAIN VALVE

Question: 76

Given the following conditions:

- Indicated SG level is 62%.
- Containment temperature is 215 °F.
- SG pressure is 300 psia.

Actual SG level is ...

a. 48%.

b. 53%.

c. 57%.

d. 62%.

Answer:

b. 53%.

Question: 77

Given the following conditions:

- The plant is operating at 85% power.
- Cooling Tower Pump 'B' trips.
- Main Condenser vacuum begins lowering.
- The crew begins lowering power using ONP-26, Rapid Power Reduction.
- When power level reaches 55% during the power reduction, EK-0111, VACUUM LO, alarms due to vacuum at 24" Hg.
- Vacuum **CONTINUES LOWERING** and will **NOT** recover to greater than 24" Hg.

Which of the following actions are required to be taken?

a. Trip the turbine, verify the reactor automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

b. Trip the reactor, verify the turbine automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

c. Continue the rapid power reduction until condenser vacuum stabilizes.

d. Continue the power reduction, using normal de-escalation rates, until condenser vacuum stabilizes.

Answer:

b. Trip the reactor, verify the turbine automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

Question: 78

Given the following conditions:

- PCS temperature is 430 °F.
- The Low Temperature Overpressure Protection System (LTOP) is in service.
- A plant transient causes an LTOP actuation.
- Following the actuation, with Pressurizer Pressure at 375 psia, the operator notes that Pressurizer PORV PRV-1042B is still OPEN.
- Placing the hand switch for PORV PRV-1042B to CLOSE has **NO** effect.

Which of the following actions is required to be taken?

a. Place the controlling pressurizer pressure controller in MANUAL with 0% output.

b. Depress the RED Reset Push Button on Channel A LTOP

c. Place the Channel A LTOP Defeat/Enable key switch to DEFEAT

d. Place PORV Isolation Valve MO-1042A to CLOSE

Answer:

d. Place PORV Isolation Valve MO-1042A to CLOSE

Question: 79

Given the following conditions:

- The plant is operating at 12% power.
- DC Bus D21-2 de-energizes and isolates due to a fault.

The reactor must be tripped due to a loss of cooling to ...

a. the Main Generator.

b. the Containment Coolers.

c. the Primary Coolant Pumps.

d. the Letdown Heat Exchanger.

Answer:

a. the Main Generator.

Question: 80

Given the following conditions:

- An approach to criticality is being performed per GOP-3.0.
- Regulating Group 3 rods are currently at 5 inches.

Which of the following rod matrix lights should be ON for each group of rods?

	SHUTDOWN RODS	**GROUP 1 RODS**	**GROUP 2 RODS**	**GROUP 3 RODS**	**GROUP 4 RODS**	**PART-LENGTH RODS**
a.	Red Blue	Red	White	Amber	White	Red
b.	Blue White	Amber	Amber	White	Green	Red
c.	Red Blue	Amber	Amber	White	White	Amber
d.	Red Blue	Red	White	White	Green	Red

Answer:

d.	Red Blue	Red	White	White	Green	Red

Question: 81

Assuming normal turbine and control rod operations are performed, which of the following describes the plant response as reactor power is raised from 5% to 100%?

	T-REF	**T-AVE**	**SG PRESSURE**
a.	Lowers	Rises	Rises
b.	Rises	Rises	Lowers
c.	Rises	Lowers	Lowers
d.	Rises	Rises	Rises

Answer:

b.	Rises	Rises	Lowers

Question: 82

According to AP-7.02, ALARA Program, an electrician who becomes aware of a potential radiation exposure problem (**NOT** having immediate overexposure implications) should ensure it is evaluated by documenting the problem and submitting it to the ...

a. Control Room Supervisor.

b. Plant Safety Coordinator.

c. Radiation Safety Supervisor.

d. Property Protection Supervisor.

Answer:

c. Radiation Safety Supervisor.

Question: 83

Given the following conditions:

- Tave and Tref are initially matched.
- A plant transient occurs which results in Tave being 5 °F higher than Tref.

Assuming **NO** rod movement or boron concentration changes were made ...

a. final main steam pressure is higher than initial conditions since main steam flow has lowered.

b. main steam pressure remains constant since reactor power remains constant.

c. final main steam pressure is lower than initial conditions since main steam flow has risen.

d. main steam pressure remains constant since governor valves will adjust to maintain constant pressure.

Answer:

a. final main steam pressure is higher than initial conditions since main steam flow has lowered.

Question: 84

Given the following conditions:

- Power has just been rapidly lowered from 60% to 20% in accordance with ONP-26, Rapid Power Reduction.
- SG levels are approximately 78% and rising slowly.
- Pressurizer pressure is 1985 psia and rising slowly.
- Pressurizer level is 39% and lowering slowly.
- PCS Tave is 523 °F and lowering slowly.

Which of the following requires that the reactor be tripped?

a. SG levels

b. Pressurizer pressure

c. Pressurizer level

d. PCS Tave

Answer:

d. PCS Tave

Question: 85

While performing Containment Isolation criteria verification in EOP-1.0, which of the following would **BOTH** require that Contingency Actions be taken?

a.
- Containment pressure > 4.0 psig
- Containment Area Monitor in alarm

b.
- Containment pressure > 4.0 psig
- Condenser Off Gas Monitor in alarm

c.
- Containment pressure > 4.0 psig
- Main Steam Line Monitor in alarm

d.
- Containment Area Monitor in alarm
- Condenser Off Gas Monitor in alarm

Answer:

a.
- Containment pressure > 4.0 psig
- Containment Area Monitor in alarm

Question: 86

RIA-1809, Auxiliary Building Radwaste Area Vent Rad Monitor, has reached the high alarm condition.

Which of the following fans will be tripped?

a. V-10, Auxiliary Building Radwaste Area Supply Fan

b. V-67, Radwaste Addition Supply Fan

c. V-68, Radwaste Addition Exhaust Fan

d. V-70, Radwaste Addition Fuel Handling Area Exhaust Fan

Answer:

a. V-10, Auxiliary Building Radwaste Area Supply Fan

Question: 87

While operating with reactor power above 15%, the power range safety channels ...

a. enable the loss of load reactor trip signals.

b. enable the high power rate reactor trip signals.

c. generate loss of load reactor trip signals.

d. generate high power rate reactor trip signals.

Answer:

a. enable the loss of load reactor trip signals.

Question: 88

Given the following conditions:

- The SIRW Tank boron concentration is to be raised from 1900 ppm to 2000 ppm.
- SIRW Tank level is currently 97% (289,955 gallons).
- Boric Acid Storage Tank "B" concentration is 13,100 ppm.

Approximately how many gallons of boric acid are required to be added to the SIRW Tank?

a. 2300 gallons

b. 2450 gallons

c. 2600 gallons

d. 2750 gallons

Answer:

c. 2600 gallons

Question: 89

Given the following conditions:

- While performing a valve alignment, an Auxiliary Operator must enter an area containing a radioactive hot spot.
- The radiological survey indicates that the dose rate two (2) feet from the hot spot is 200 mRem/hr.
- The AO will be four (4) feet from the hot spot while aligning the valve.

The AO will be exposed to a radiation field of approximately ...

a. 150 mRem/hr.

b. 100 mRem/hr.

c. 50 mRem/hr.

d. 25 mRem/hr.

Answer:

c. 50 mRem/hr.

Question: 90

Given the following conditions:

- The plant tripped from 40% power due to a loss of load.
- The reactor and the turbine tripped as designed.
- 'F' Bus in the Switchyard was also lost at the time of the trip.
- **NO** other equipment has malfunctioned.
- EOP-1.0, Standard Post-Trip Actions, has been completed.
- The operator reported that BOTH 2400 VAC Buses 1C and 1D are energized.

Buses 1C and 1D are being supplied by ...

a. their respective Diesel Generators.

b. Startup Transformer 1-2.

c. Safeguards Transformer 1-1.

d. Startup Transformer 1-1.

Answer:

b. Startup Transformer 1-2.

Question: 91

Given the following conditions:

- A steamline break has occurred inside containment.
- Containment pressure is currently 2.4 psig after peaking at 11.5 psig.
- Containment temperature is currently 155 °F after peaking at 205 °F.
- Pressurizer pressure is 240 psia and stable.
- Average Qualified CET temperature is 275 °F and stable.
- Average Loop Thot is 270 °F and stable.
- Corrected Pressurizer Level is 48% and stable (cold cal).

Which of the following actions must be taken PRIOR to placing Shutdown Cooling in service?

a. Lower pressurizer pressure

b. Raise pressurizer level

c. Lower Average Qualified CET temperature

d. Raise subcooling

Answer:

a. Lower pressurizer pressure

Question: 92

Given the following conditions:

- The plant was operating at 15% power.
- An automatic reactor trip and safety injection occurred as a result of lowering Pressurizer Pressure.
- Pressurizer pressure is currently 1000 psia.
- PCS temperature was stable prior to the Safety Injection, but has lowered since Pressurizer pressure dropped below 1200 psia.
- Pressurizer level was rising PRIOR to the Safety Injection and is continuing to rise.

This transient is indicative of a ...

a. steam line break.

b. double-ended hot leg break.

c. stuck open pressurizer safety valve.

d. steam generator tube rupture.

Answer:

c. stuck open pressurizer safety valve.

Question: 93

Given the following conditions:

- A spent fuel bundle has been dropped in the spent fuel pool.
- Radiation levels in the spent fuel pool area have reached the high radiation setpoint.
- All automatic actions have occurred.

Which fan must be manually aligned in response to this event?

a. V-7, Fuel Handling Supply Fan

b. V-8B, Fuel Handling Exhaust Fan

c. V-69, Fuel Handling Area Supply Fan

d. V-70A, Fuel Handling Area Exhaust Fan

Answer:

a. V-7, Fuel Handling Supply Fan

Question: 94

Which of the following Nuclear Instruments will become de-energized upon a loss of Preferred AC Bus Y-30?

a. Power Range channel NI-5

b. Power Range channel NI-6

c. Source/Wide Range channel NI-1/3

d. Source/Wide Range channel NI-2/4

Answer:

c. Source/Wide Range channel NI-1/3

Question: 95

Which of the following describes the interlock between MOV-3081, HPSI Train 1 Cold Leg Isolation Valve, and MOV-3083, Hot Leg Injection Valve?

a. The hand switch for MOV-3081 must be in AUTO before MOV-3083 may be opened

b. MOV-3083 must be closed before MOV-3081 may be opened

c. SS-3083B, Hot Leg Injection Selector Switch, must be in the "MO-3083" position before MOV-3081 may be closed

d. MOV-3081 must be closed before MOV-3083 may be opened

Answer:

d. MOV-3081 must be closed before MOV-3083 may be opened

Question: 96

Given the following conditions:

- The plant is operating at 100% power.
- Due to a leak, Feedwater heater E-6A must be bypassed and isolated for repairs.

Which of the following actions must be taken prior to bypassing and isolating the heater?

a. Lower power to less than 97% to prevent exceeding reactor thermal power limits

b. Lower power to less than 97% to prevent exceeding turbine backpressure limits

c. Lower load to less than 600 MWe to prevent exceeding turbine backpressure limits

d. Lower load to less than 600 MWe to prevent exceeding lower feedwater temperature limits

Answer:

a. Lower power to less than 97% to prevent exceeding reactor thermal power limits

Question: 97

Which of the following signals will prevent an automatic start of the Engineered Safeguards Room Sump Pumps?

a. Recirculation Actuation Signal (RAS)

b. Safety Injection Actuation Signal (SIAS)

c. Containment High Radiation (CHR)

d. Containment High Pressure (CHP)

Answer:

c. Containment High Radiation (CHR)

Question: 98

Which of the following is the **MINIMUM** number of licensed operators required in the Control Room during Refueling Operations?

a. One (1) RO

b. One (1) SRO

c. One (1) RO **AND** one (1) SRO

d. One (1) RO **AND** two (2) SROs

Answer:

c. One (1) RO **AND** one (1) SRO

Question: 99

The plant is operating at full power when the following conditions are noted:

	LEVEL	PRESSURE	FEED FLOW	STEAM FLOW
SG 'A'	65% - Stable	770 psia - Stable	5.6×10^6 lbm/hr	5.6×10^6 lbm/hr
SG 'B'	92% - Rising	730 psia - Lowering	5.85×10^6 lbm/hr	5.6×10^6 lbm/hr

- Pressurizer pressure is lowering.
- Pressurizer level is lowering.
- PCS Tave is lowering.
- **NO** operator actions have been taken.

Which of the following actions should be taken?

a. Take manual control of the malfunctioning feed water pump and lower speed to return SG level to normal

b. Trip the turbine, ensure the reactor trips, and go to EOP-1.0, Standard Post-Trip Actions.

c. Rapidly lower plant load to within the capacity of a single feed water pump and trip the malfunctioning feed water pump

d. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

Answer:

d. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

Question: 100

A 26 year-old Auxiliary Operator has received a total effective dose equivalent (TEDE) of 1200 mRem this year (all at Palisades).

What is the MAXIMUM additional exposure he can receive prior to obtaining an extension from the General Manager Plant Operations due to exceeding his Annual Dose Control Level?

a. 300 mRem

b. 800 mRem

c. 2800 mRem

d. 3800 mRem

Answer:

b. 800 mRem

PALISADES NRC WRITTEN EXAMINATION
REACTOR OPERATOR
SUPPLIED REFERENCES

NOTE: References are listed and supplied in alphabetical order with the exception of Steam Tables and Drawings, which are listed last.

EM-04-08, Attachment 1

EOP Supplement 1

EOP Supplement 6

EOP Supplement 11

EOP-6.0, Step 61

GOP-5, Attachment 2

GOP-5, Attachment 5

ONP-17, Attachment 1 (all pages)

ONP-23.2, Attachment 1

SOP-1, Attachment 6 (Pages 1-3)

SOP-6, Attachment 3

Technical Data Book Figure 1.1

Technical Data Book Figure 1.9

Technical Data Book Figure 8.2

Steam Tables

M-218, Sh. 4

M-656

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

1. **INOPERABLE OR DROPPED CONTROL ROD IDENTIFICATION:**

GROUP ________ NUMBER ________ CORE LOCATION ___________

CONDITION ____________________ *(Inoperable or Dropped)*

2. **WORTH OF INOPERABLE OR DROPPED CONTROL ROD** __________ %$\Delta\rho$
(TDB Figure 1.1 or Reactor Engineering)

3. **SOURCE OF INOPERABLE OR DROPPED CONTROL ROD WORTH DATA:**

____

4. **REFERENCE DATA**

A. CURRENT CYCLE BURNUP __________ MWd/MTU
(TDB Fig 1.10)

B. CURRENT REACTOR POWER LEVEL __________ %
(Percent of Rated Power)

C. CONTROL ROD WORTH INSERTED INTO CORE __________ %$\Delta\rho$
(TDB Fig 1.3)

GROUP _____ INCHES _________

This Control Rod worth does not include the worth of a dropped Control Rod.

D. PCS BORON CONCENTRATION __________ ppm
(Chemistry Log or Reactor Logbook)

TDB = Technical Data Book

5. GENERAL DATA

E. WORTH OF ALL CONTROL RODS AT **A** (TDB Fig 1.1) ________ %Δρ

F. MAXIMUM WORTH OF STUCK CONTROL ROD AT **A** (TDB Fig 1.1) ________ %Δρ

G. PCS BORON AT 100% POWER AT **A** **OR** ACTUAL PCS BORON IF AT 100% POWER (TDB Fig 6.1, Reactor Log, or Chemistry Log) ________ ppm

H. POWER DEFECT AT 100% POWER (TDB Fig 3.2 and **G**) ________ %Δρ

I. POWER DEFECT AT POWER **B**

$$\frac{H \times B}{100} = \frac{(\quad\quad) \times (\quad\quad)}{100} = \_\_\_\_\_\_\_\_ \%\Delta\rho$$

J. REQUIRED SHUTDOWN MARGIN (4 PCPs Operating) 2.0 %Δρ

6. CALCULATION

$$\frac{(E - C - F)}{1.1} - I - J$$

NET AMOUNT OF SHUTDOWN MARGIN

$$= \frac{((\quad\quad) - (\quad\quad) - (\quad\quad))}{1.1} - (\quad\quad) - (\quad\quad) = \_\_\_\_\_\_\_\_ \%\Delta\rho$$

K.

TDB = Technical Data Book

L. WORTH OF INOPERABLE OR DROPPED CONTROL ROD ________ $\%\Delta\rho$

Step 2

M. EXCESS SHUTDOWN MARGIN WITH ONE INOPERABLE OR DROPPED CONTROL ROD

$$\mathbf{K} - \mathbf{L} = (\quad) - (\quad) = \_\_\_\_\_\_\_\_ \%\Delta\rho$$

NOTE: Step 7 only refers to Shutdown Margin. Off Normal Procedure ONP-5.1, "Control Rod Drop," requires a reduction in reactor power by boration to less than 75% within two hours of a dropped rod event due to hot channel factor concerns.

7. IF excess Shutdown Margin **(M)** is **NEGATIVE, THEN** borate the PCS to reduce reactor power until **M** is **POSITIVE** performing Steps **N** through **Q** to calculate the minimum reduced reactor power level.

N. POWER DEFECT AT REDUCED POWER

$$\mathbf{I} + \mathbf{M} = (\quad) + (\quad) = \_\_\_\_\_\_\_\_ \%\Delta\rho$$

O. MAXIMUM REDUCED POWER LEVEL

$$\frac{\mathbf{N} \times \mathbf{B}}{\mathbf{I}} = \frac{(\quad) \times (\quad)}{(\quad)} = \_\_\_\_\_\_\_\_ \%$$

P. Caution Tag the Control Rod joy-stick on **panel** C-02 that the new PDIL is Control Rod position at **C**.

Q. IF power reduction is required, THEN after power reduction re-perform Attachment 1 to verify Shutdown Margin requirements are satisfied.

TDB = Technical Data Book

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

NOTE: Step 8 only refers to Shutdown Margin. Off Normal Procedure ONP-5.1, "Control Rod Drop," requires a reduction in reactor power by boration to less than 75% within two hours of a dropped rod event due to hot channel factor concerns.

8. IF **M** is **POSITIVE**, THEN sufficient Shutdown Margin is available and no power reduction is necessary to ensure required Shutdown Margin. Perform Steps **R** though **U** to determine maximum allowable Control Rod insertion limit corresponding to excess Shutdown Margin available **(M)**.

R. PPC PDIL FOR CURRENT POWER LEVEL (TDB Fig 1.9)
Group ________
Inches ________

S. CONTROL ROD POSITION CORRESPONDING TO EXCESS SHUTDOWN MARGIN IN **M** (TDB Fig 1.3 or 5.1 and **M**)
Group ________
Inches ________

T. PDIL FOR INOPERABLE OR DROPPED CONTROL ROD CONDITION (**R** or **S**, whichever is farthest withdrawn)
Group ________
Inches ________

U. IF the Control Rod position in **S** is farther withdrawn than the Control Rod position in **R**, THEN Caution Tag the Control Rod joy-stick on panel C-02, identifying that the new PPC PDIL as the Control Rod position in **S**.

TDB = Technical Data Book

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

9. REVIEWS

______________________ / ________
Performed By Date

______________________ / ________
Reviewed By Date

Forward Completed Form to Reactor Engineering Supervisor

______________________ / ________
Reactor Engineering Supervisor Date

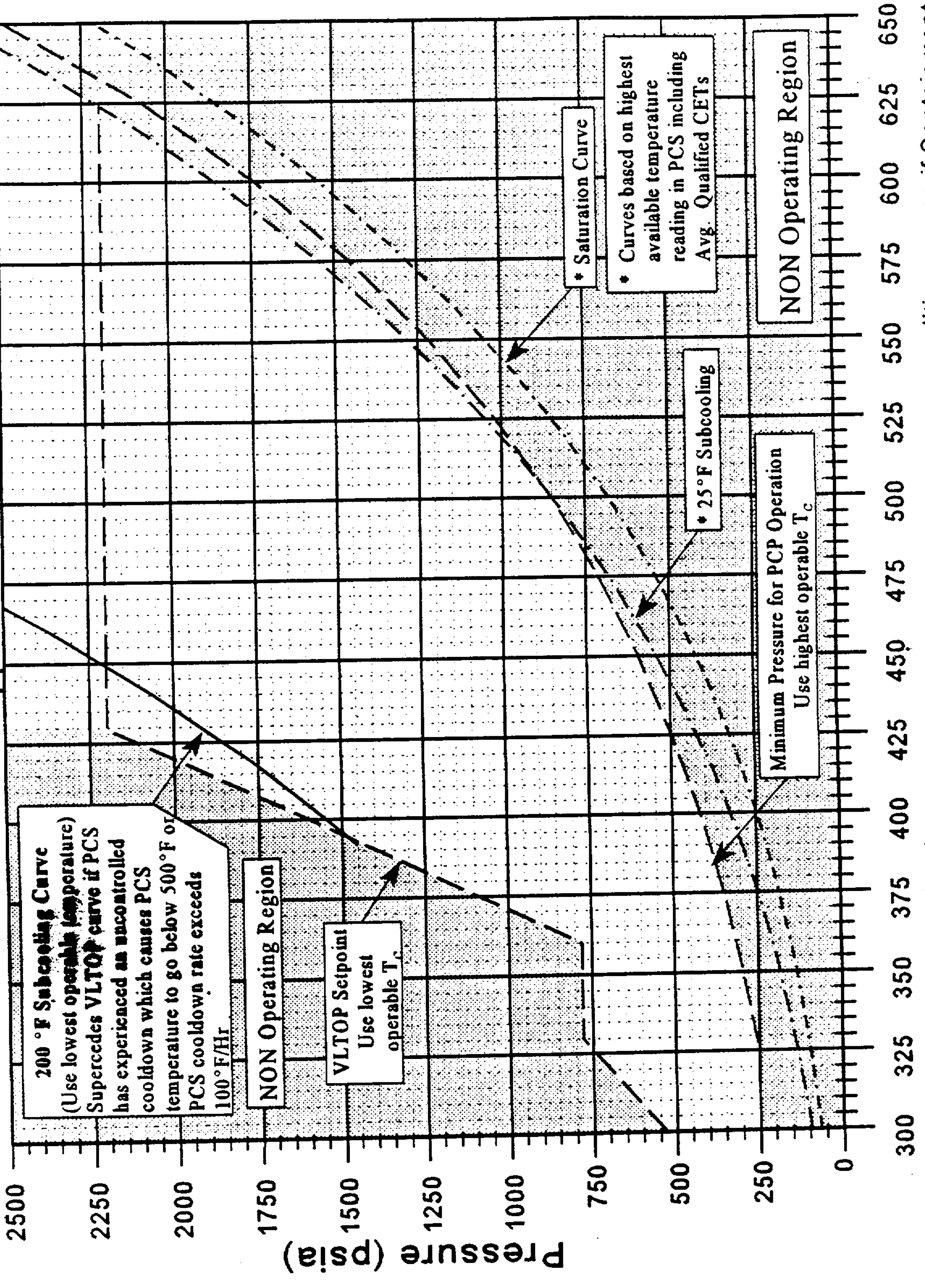
TDB = Technical Data Book

PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE	
Proc No	EOP Supplement
Supplement	1
Revision	5
Page	1 of 5

TITLE: Pressure Temperature Limit Curves

Pressure and Temperature Limit Curves

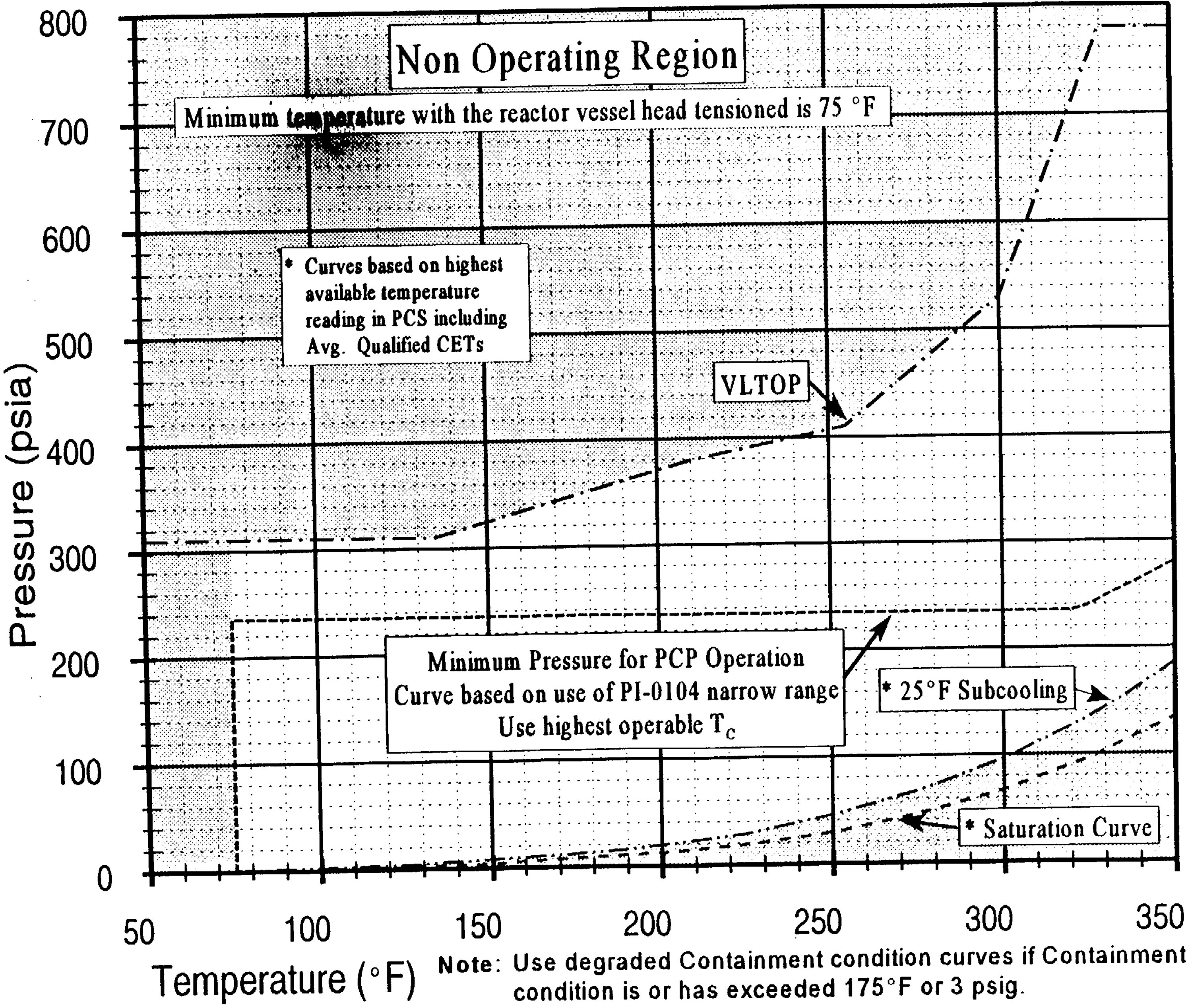
Upper Portion



Note: Use degraded Containment condition curves if Containment condition is or has exceeded 175°F or 3 psig.

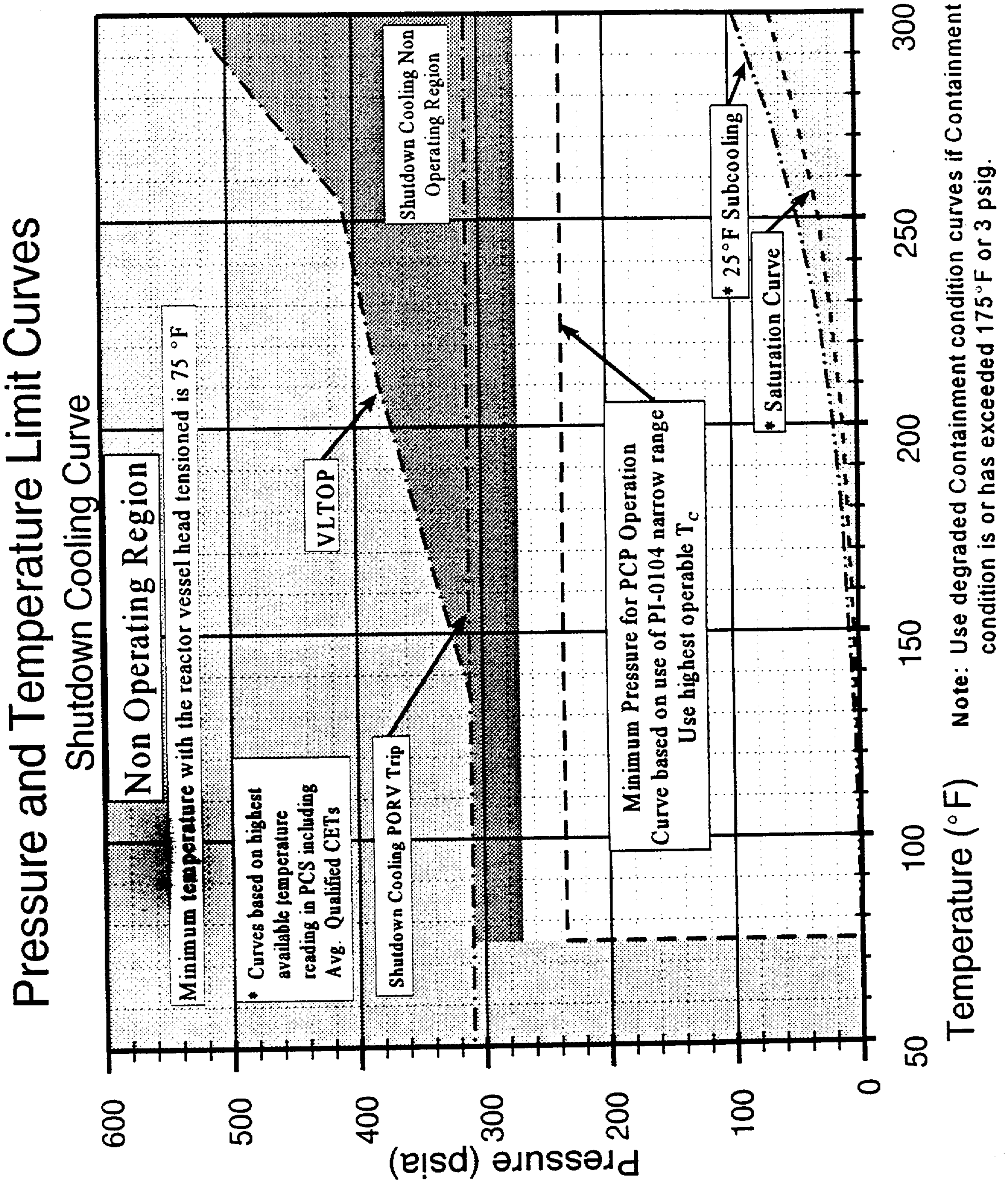
Pressure and Temperature Limit Curves

Lower Portion



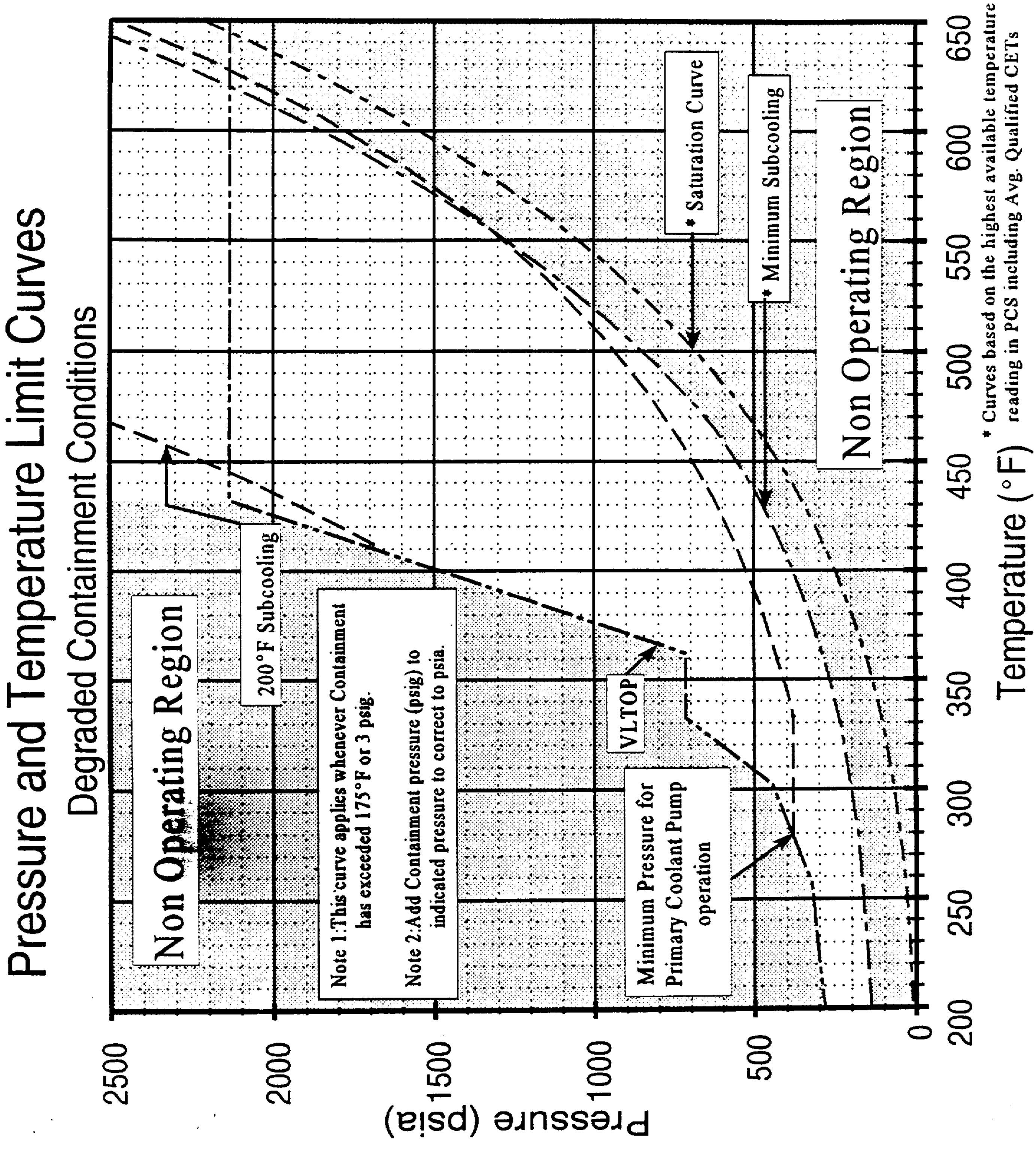
Note: Use degraded Containment condition curves if Containment condition is or has exceeded 175°F or 3 psig.

TITLE: Pressure Temperature Limit Curves



Note: Use degraded Containment condition curves if Containment condition is or has exceeded 175°F or 3 psig.

TITLE: Pressure Temperature Limit Curves



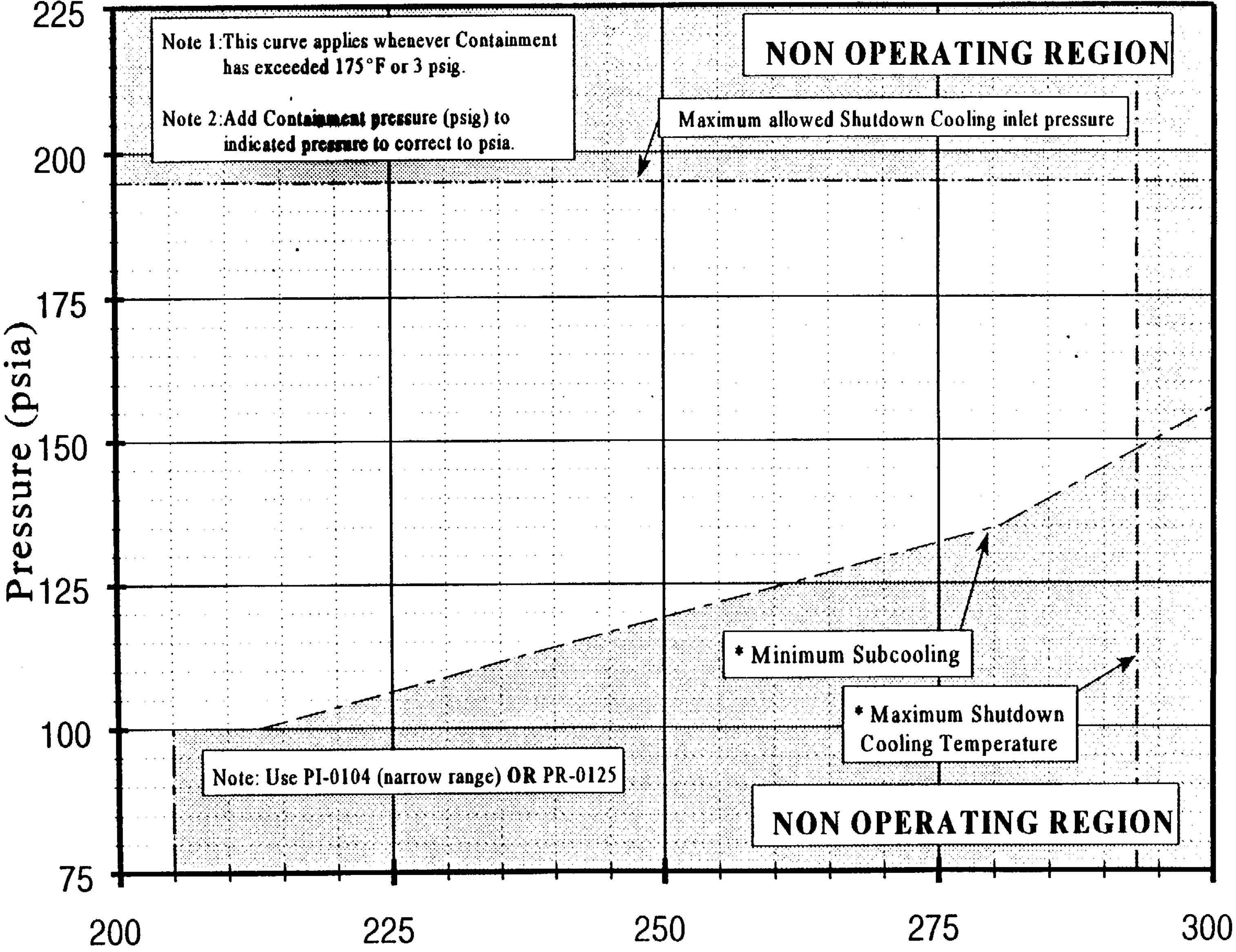
PALISADES NUCLEAR PLANT
EMERGENCY OPERATING
PROCEDURE

TITLE: Pressure Temperature Limit Curves

Proc No	EOP Supplement
Supplement	1
Revision	5
Page	5 of 5

Shutdown Cooling Entry Window

For Degraded Containment Conditions



* Curves based on the highest available temperature reading in PCS including Avg. Qualified CETs

PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE	
Proc No	EOP Supplement
Supplement	6
Revision	6
Page	1 of 2

TITLE: Checksheet For Containment Isolation And CCW Restoration

1. Ensure closed ALL valves unless otherwise specified by the notes.

Valve	Note	Description	L	R	C
PANEL C 13					
CV-1101		Containment Vent Header	☐		
CV-1806		Containment Purge Exhaust	☐		
CV-1814		Air Room Supply	☐		
CV-1808		Containment Purge Exhaust	☐		
CV-1807		Containment Purge Exhaust		☐	
CV-1813		Air Room Supply		☐	
CV-1805		Containment Purge Exhaust		☐	
CV-1102		Containment Vent Header		☐	
CV-1064		CWRTs Vent	☐		
CV-1044		CWRTs Outlet	☐		
CV-1036		CWRTs Recirc	☐		
CV-1002		PSDT Outlet	☐		
CV-0911	1, 4	CCW Return	☐		
CV-1103	5	Containment Sump Drain	☐		
CV-1104	5	Containment Sump Drain		☐	
CV-0940	1, 4	CCW Return		☐	
CV-1007		PSDT Outlet		☐	
CV-1038		CWRTs Recirc		☐	
CV-1045		CWRTs Outlet		☐	
CV-1065		CWRTs Vent		☐	
CV-0770		S/G 'B' Bottom Blowdown	☐		
CV-0771		S/G 'A' Bottom Blowdown	☐		
CV-0767		[illegible] 'A' Bottom Blowdown		☐	
CV-0768		[illegible] 'B' Bottom Blowdown		☐	
CV-0738		S/G 'B' Surface Blowdown			☐
CV-0739		S/G 'A' Surface Blowdown			☐
CV-0910	1, 4	CCW to Containment			☐
CV-0939		Shield Cooling Surge Tank Fill			☐
CV-1004		CWRTs Inlet Isol			☐
CV-1037		CWRTs Recirc Isol			☐
CV-1358		Nitrogen to Containment			☐
CV-1001		PSDT Recirc Isol			☐
CV-1910	2	Primary System Sample Isol	☐		
CV-1911	2	Primary System Sample Isol		☐	

Valve	Note	Description	L	R	C
PANEL C 02					
CV-2009		Letdown Containment Isol			☐
CV-2083		Controlled Bleed-off Containment Isol	☐		
CV-2099		Controlled Bleed-off Containment Isol		☐	
CV-0155		Quench Tank Spray Valve			☐
PANEL C 01					
CV-0510	4	S/G 'A' MSIV			☐
CV-0501	4	S/G 'B' MSIV			☐
CV-0701	4	S/G 'A' Main Feed Reg Valve	☐		
CV-0703	4	S/G 'B' Main Feed Reg Valve		☐	
CV-0735	4	S/G 'A' Bypass Feed Reg Valve	☐		
CV-0734	4	S/G 'B' Bypass Feed Reg Valve		☐	
PANEL C 11A (BACK)					
SV-2412A	3	Hydrogen Mon. Right Channel			☐
SV-2412B	3	Hydrogen Mon. Right Channel			☐
SV-2414A	3	Hydrogen Mon. Right Channel			☐
SV-2414B	3	Hydrogen Mon. Right Channel			☐
SV-2413A	3	Hydrogen Mon. Left Channel			☐
SV-2413B	3	Hydrogen Mon. Left Channel			☐
SV-2415A	3	Hydrogen Mon. Left Channel			☐
SV-2415B	3	Hydrogen Mon. Left Channel			☐

NOTES: L = Left Channel R = Right Channel C = Common

1. Refer to reverse side (Page 2) to open valves post CHP
2. Refer to EI-7.0 to bypass CHP and CHR
3. Refer to in-use EOP AND SOP-38 to bypass CHP and CHR
4. CHP only; equipment required in specific position ONLY if Containment pressure is greater than or equal to 4.0 psig.
5. CHR only

2. Additional actions required.

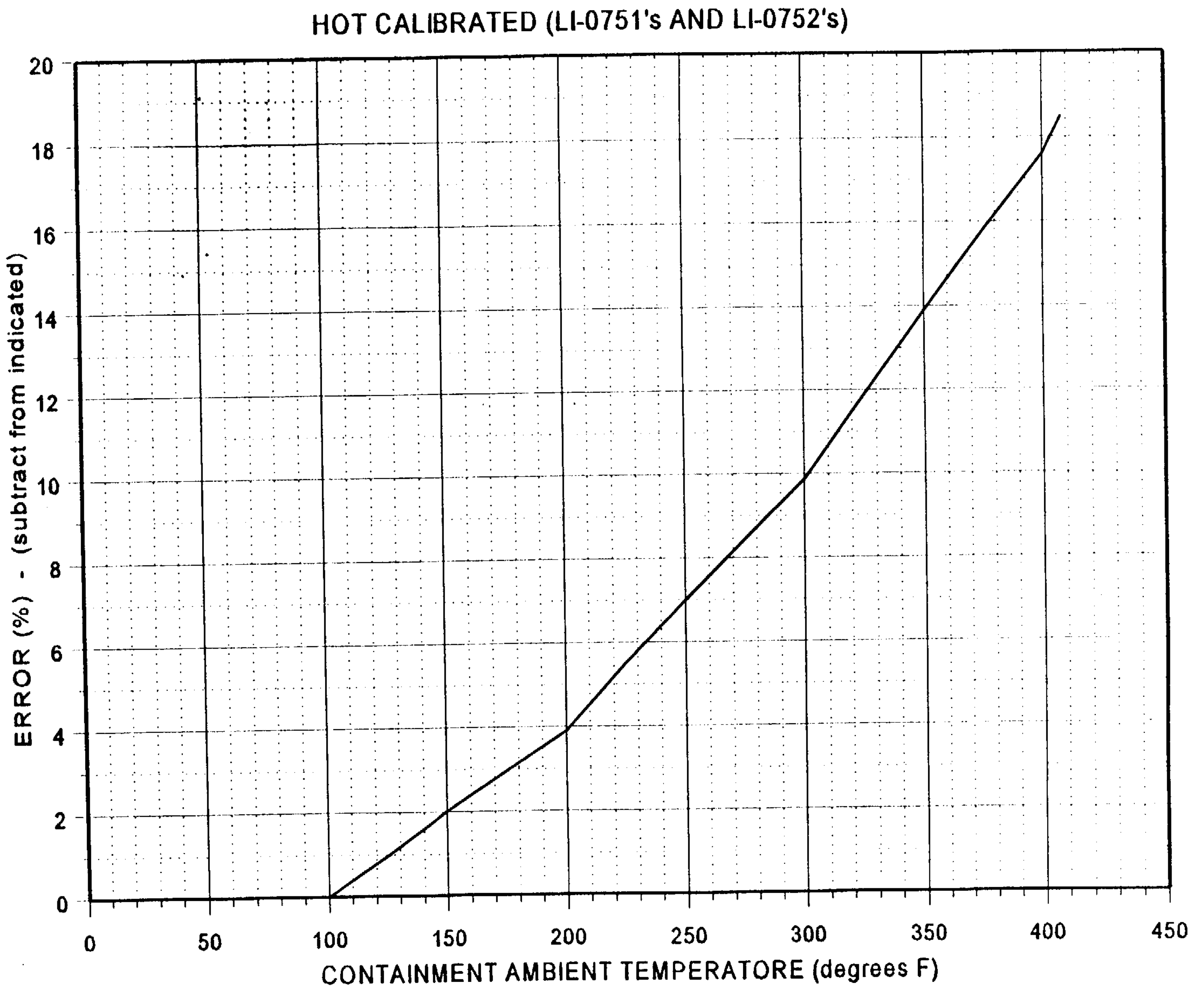
DESCRIPTION	(X)
HS-2003 to CLOSE (Letdown Orifice on panel C-02)	☐
HS-2004 to CLOSE (Letdown Orifice on panel C-02)	☐
HS-2005 to CLOSE (Letdown Orifice on panel C-02)	☐
WITH CHP Position CV-0910 keyswitch CLOSED (C-13)	☐
WITH CHP Position CV-0911 keyswitch CLOSED (C-13)	☐
WITH CHP Position CV-0940 keyswitch CLOSED (C-13)	☐

PALISADES
EOPs
NUCLEAR PLANT

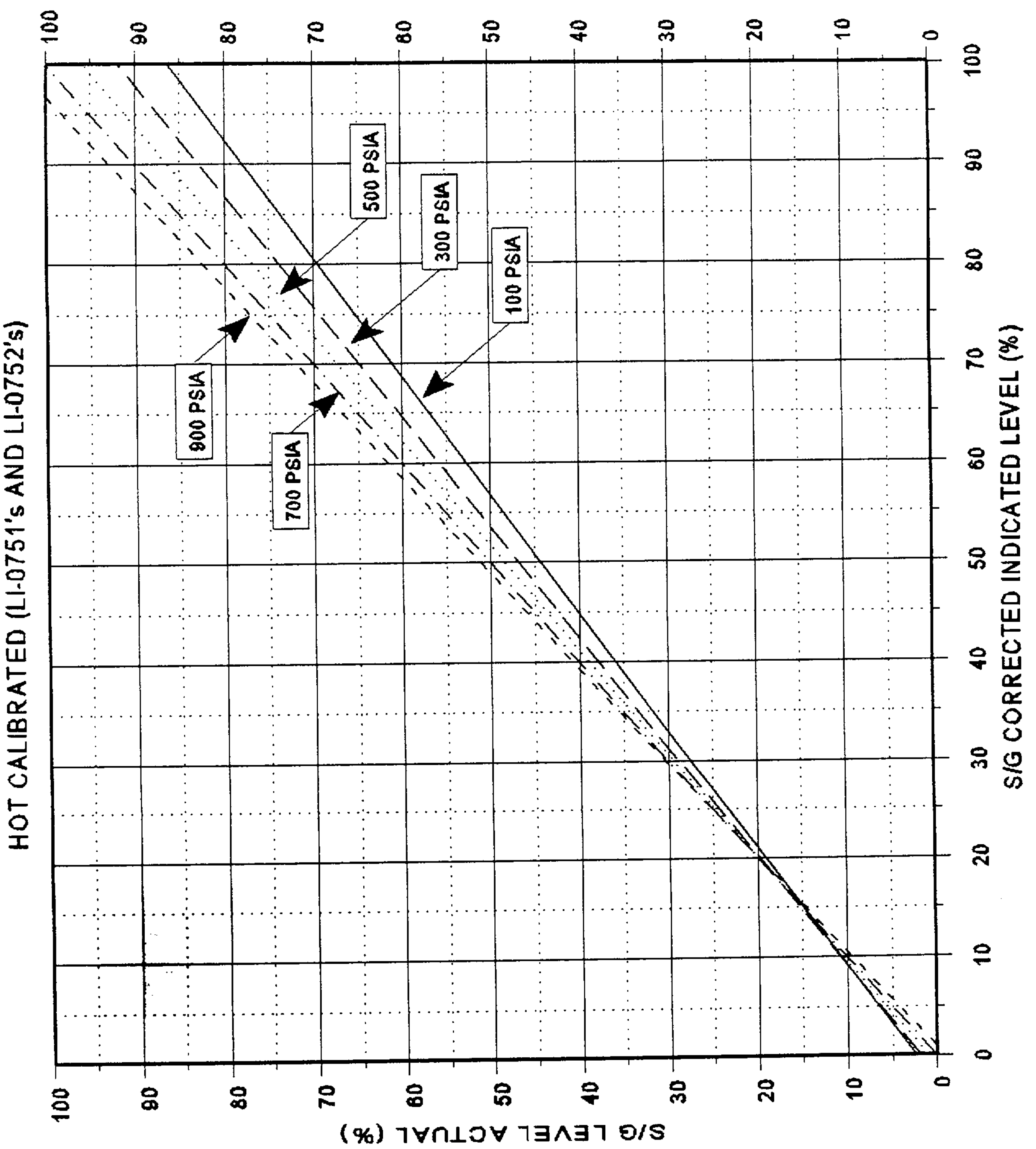
PALISADES NUCLEAR PLANT
EMERGENCY OPERATING PROCEDURE

Proc No	EOP Supplement
Supplement	11
Revision	5
Page	1 of 2

TITLE: S/G Level Correction



TITLE: S/G Level Correction



NOTE: Page 1 of this supplement should be used to obtain the corrected indicated level prior to using this figure.

INSTRUCTIONS

CONTINGENCY ACTIONS

61. **WHEN** ALL of the following Shutdown Cooling System entry conditions are met:

- PCS parameters are acceptable for existing Containment conditions:

Parameter	Containment Less Than 175°F AND Less Than 3 psig at all times during the event	Containment Greater Than Or Equal To 175°F OR Greater Than Or Equal To 3 psig at any time during the event
PCS Pressure	Less Than 270 psia	REFER TO EOP Supplement 1
PZR Level (corrected)	Greater than 36% and controlled	Greater than 40% and controlled
Avg of Qualified CETs Subcooling	Greater than 25°F	REFER TO EOP Supplement 1
Avg of Qualified CETs and Loop T_Hs Temperature	Less than 300°F	REFER TO EOP Supplement 1

- **TSC has** determined that PCS **activity** is acceptable for circulation outside Containment.

- Containment Spray Pumps are not in use for Containment Atmosphere safety function.

(Continue)

POWER ESCALATION RATE

1. Power Escalation rates shall be controlled as follows:

   a. Power Escalation rates shall be based on the rate of change of Reactor thermal power (PPC data point HB_PWR_STEADY or one or more delta T power channel as indicated on RPCIC), monitored at a maximum interval of 30 minutes utilizing the table.

NOTE: WHEN the Power Escalation Rate changes based on Percent Rated Thermal Power, THEN the Power Escalation Rate calculation should be based only on the time frame the Power Escalation Rate is applicable.

   b. The average Power Escalation rate in any one hour time period shall not exceed the allowable rate specified in Attachment 5.

   c. IF the Power Escalation rate for a time period of less than one hour exceeds the allowable rate, THEN

      1. Reduce the Power Escalation rate.

      2. Calculate Power Escalation rate using last data point and the data point 60 minutes earlier. IF the calculated Power Escalation rate exceeds the allowable rate, THEN initiate Condition Report.

2. Attachment 3, "MWe Gross Expected Band" and Attachment 4, "PCS Delta T Expected Band" are only accurate at steady state conditions. Therefore, the use of these attachments during a power escalation is intended to identify gross errors in NI calibration.

   (*) IF comparison of Indicated Power Range NI readings are in the "Actual Power Higher Than Indicated" region or in the "Actual Power Lower Than Indicated" region on Attachments 3 and 4, THEN:

   a. Evaluate plant status for possible reasons for discrepancy. Reasons may be (but not limited to):

      (1) Recent change in reactivity (rods or boration).

      (2) T_{ave} higher or lower than T_{ref}.

      (3) Main turbine governor valve response.

      (4) Accuracy of instrumentation used.

POWER ESCALATION RATE

b. IF reason for discrepancy is known and understood, THEN continue power escalation.

c. IF reason for discrepancy is not known, THEN:

  (1) Allow plant power to stabilize and perform another comparison using Attachments 3 and 4.

  (2) IF stabilizing plant power does not correct discrepancy, THEN perform a heat balance per General Operating Procedure GOP-12, "Heat Balance Calculation," and notify Reactor Engineer.

  (3) Do not raise reactor power above current level until reason for discrepancy is understood.

POWER ESCALATION RATE

Time (Min)	Reactor Thermal Power (PPC, HB_PWR_ STEADY) = (E)⊛	Change in Reactor Thermal Power = Δ(E)	Rate of Change (%/Hr) Δ(E)*60/ Δtime =	GOP-5 Max Rate: Att 5	MWe Compare Att 3 (√)*	PCS ΔT Compare Att 4 (√)*

NOTE: Δtime = Time interval from last reading and current reading (in minutes).

NOTE: Δ(E) = Change in Reactor Thermal Power from last reading and current reading.

NOTE: ⊛ One or more ΔT power channel as indicated on RPCIC may be used.

POWER ESCALATION RATES FOR CYCLE 14

NOTE: The escalation rates represent an average Reactor thermal power increase over the given period.

1.0 The following power escalation rates shall be utilized during Cycle 14 Initial Startup or post fuel shuffle (prior to Maintaining Full Power for Five Days, not necessarily continuous).

Percent Rated Thermal Power	Escalation Rate
0 - 50	No Restrictions
50 - 62	Target 6% / Hr*
62- 100	Limit 4.5% / Hr*

2.0 The following power escalation rates shall be utilized during Cycle 14 Operations after 5 days (not necessarily continuous) of Full Power Operation.

Percent Rated Thermal Power	Escalation Rate
0 - 50	No Restrictions
50 - 92	Target 6% / Hr*
92 - 100	Limit 4.5% / Hr*

2.1 For the power escalation rates listed in 1.0 and 2.0, control rod usage during power escalation is allowed provided the restrictions delineated in EM-04-17 are followed (ie, maintenance of ASI within the specified band about the target ASI and control bank withdrawal increments of ≤10 inches with recommended hold times between withdrawals).

NOTE: **Extended** reduced power operations is defined as Reactor Operation at **less than** 70% of rated power for longer than 3 weeks.

3.0 For power escalation following extended reduced power operation, contact Nuclear Engineering/Reactor Engineering Department for power

*NOTE: From a fuel reliability standpoint, the 6%/Hr target escalation rate should not be viewed as a limit. Exceeding 6%/Hr while targeting 6%/Hr is acceptable. The escalation rate of 4.5%/Hr is a limit for ≥ 62% rated thermal power following a Initial Startup/Fuel Shuffle and ≥ 92% rated thermal power after 5 days (not necessarily continuous) of full power operation.

APPROXIMATE TIME TO 200°F CURVES

1. Determine PCS level using all available indications.

2. Use initial PCS temperature from Step 4.1 or determine PCS temperature using an operable CET (preferred; refer to GOP-14 working copy) or select any other indication considered valid.

3. IF the following conditions exist, THEN the PCS is considered "**FILLED AND INTACT**":

   a. PCS was NOT drained below 623' 0" and current level is above 0% on LI-0103A/LIA-0102A.

   AND

   b. PCS is capable of being pressurized.

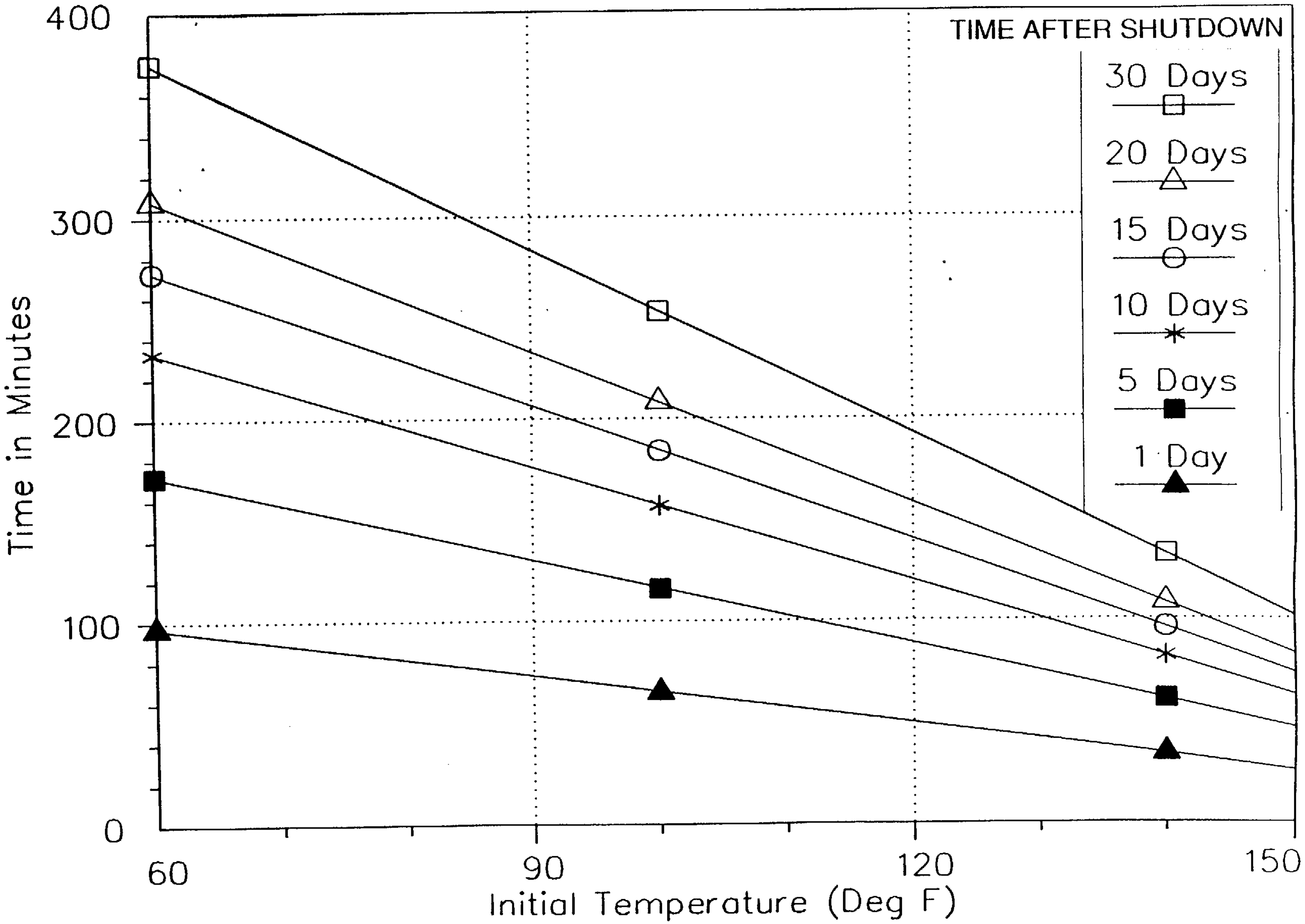
4. IF criteria of Step 3 are NOT met, THEN PCS is considered "**NOT FILLED/INTACT.**"

5. Refer to appropriate page in this attachment for PCS conditions. Time after shutdown curves may be interpolated.

CURVE TITLE	ATTACHMENT 1 PAGE NUMBER
PCS Filled/Intact, One or Both S/G's With Tubes Covered	2
NOTE: Assumes S/G tubes have not been drained. PCS NOT Filled/Intact, PCS Level at 639'	3
PCS NOT Filled/Intact, PCS Level at 628'5"	4
PCS **NOT Filled/Intact**, PCS Level at 623 (0 - 9 days)	5
PCS **NOT Filled/Intact**, PCS Level at 623 (≥ 10 days)	6
PCS **NOT Filled/Intact**, PCS Level at 618'2.5"	7
PCS NOT Filled/Intact, PCS Level at 617'6"	8
Refueling Cavity Flooded to 647'	9
Refueling Cavity Flooded to 632'	10
Refueling Cavity Flooded to 629'6"	11

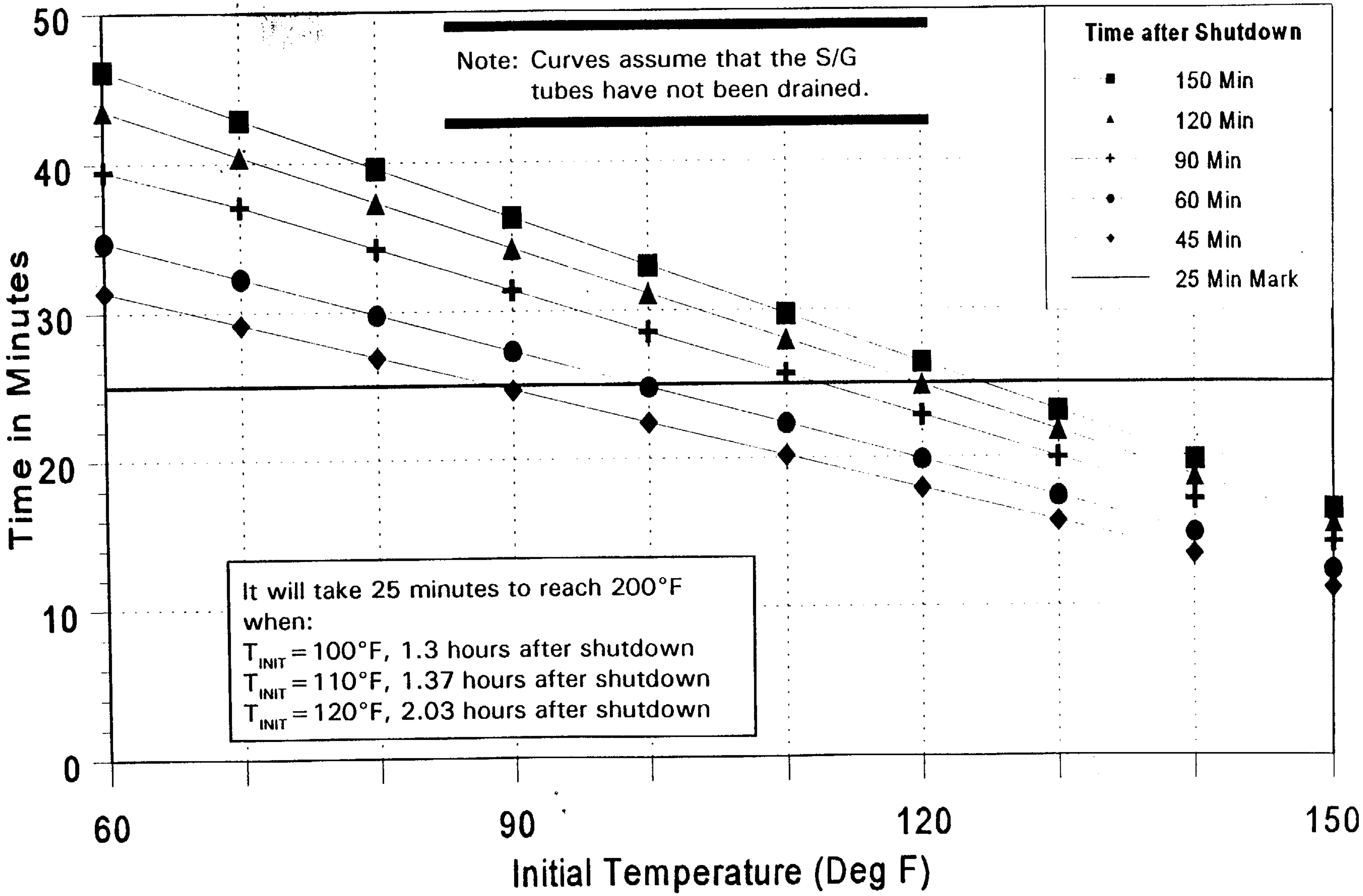
APPROXIMATE TIME TO 200°F CURVES

PCS FILLED AND INTACT, ONE OR BOTH S/G'S WITH TUBES COVERED



APPROXIMATE TIME TO 200°F CURVES

PCS NOT FILLED/INTACT, PCS LEVEL AT 639'0'

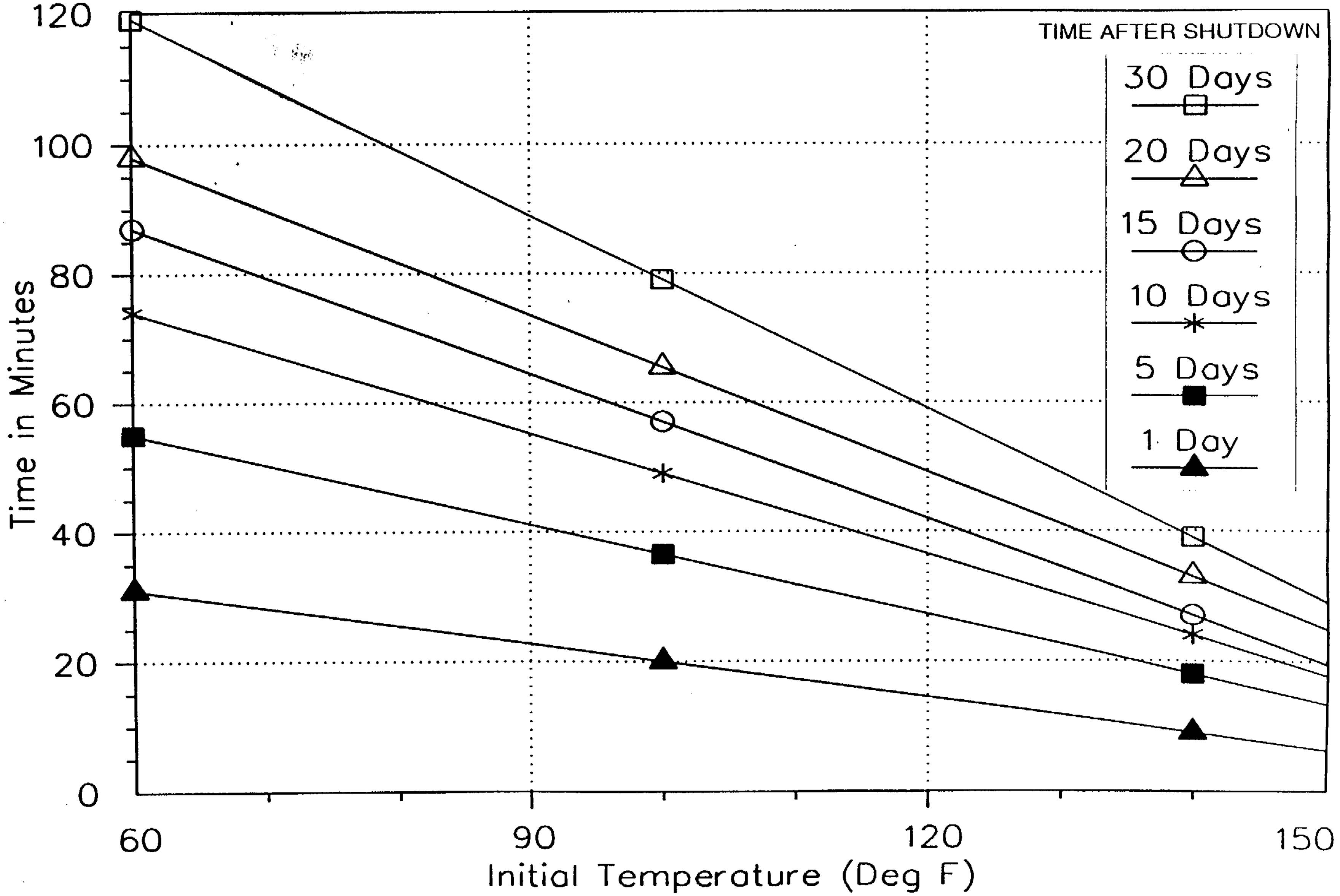


Note: Curves assume that the S/G tubes have not been drained.

It will take 25 minutes to reach 200°F when:
T_{INIT} = 100°F, 1.3 hours after shutdown
T_{INIT} = 110°F, 1.37 hours after shutdown
T_{INIT} = 120°F, 2.03 hours after shutdown

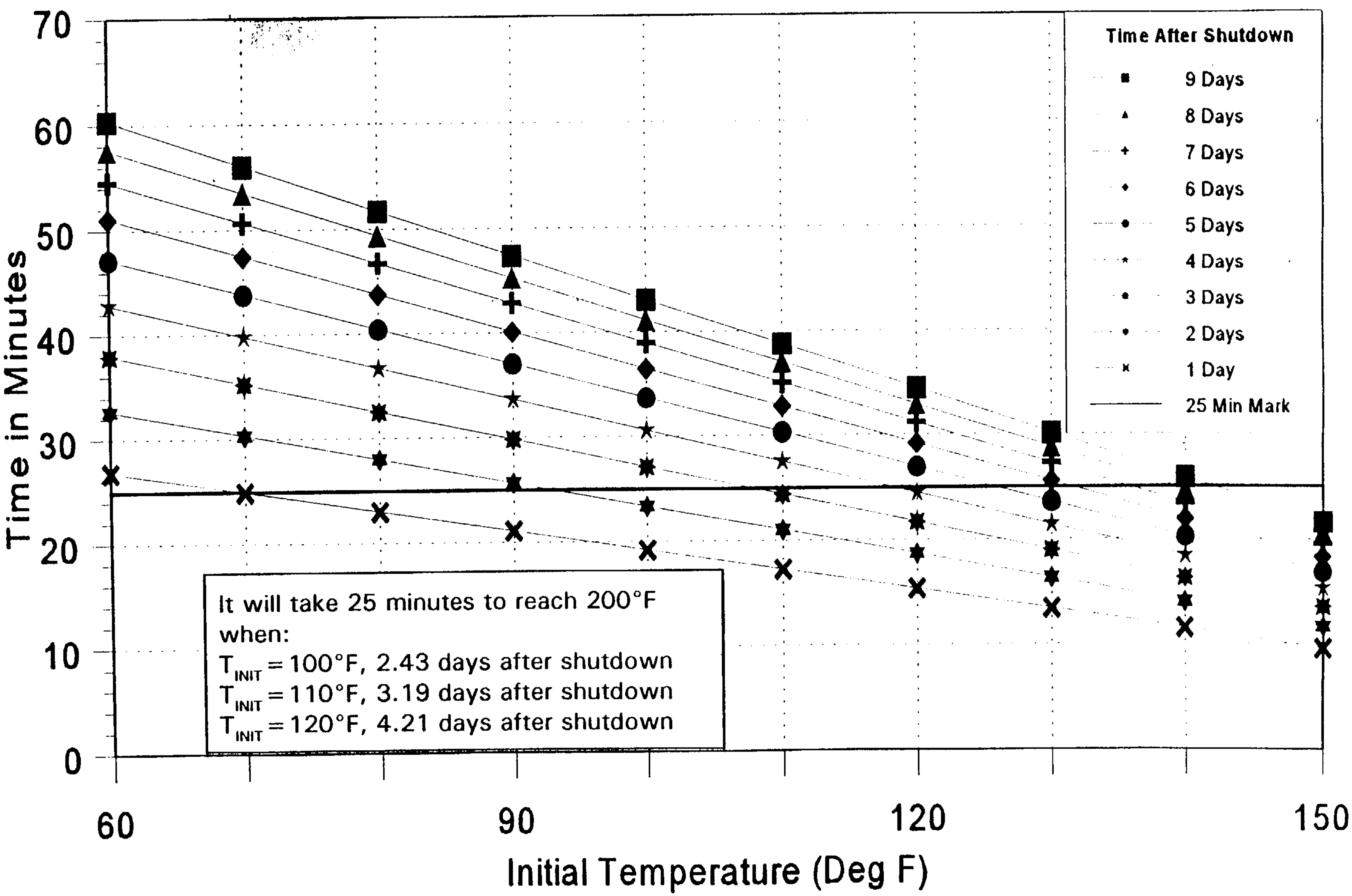
APPROXIMATE TIME TO 200°F CURVES

PCS NOT FILLED/INTACT, PCS LEVEL AT 628'5"



APPROXIMATE TIME TO 200°F CURVES

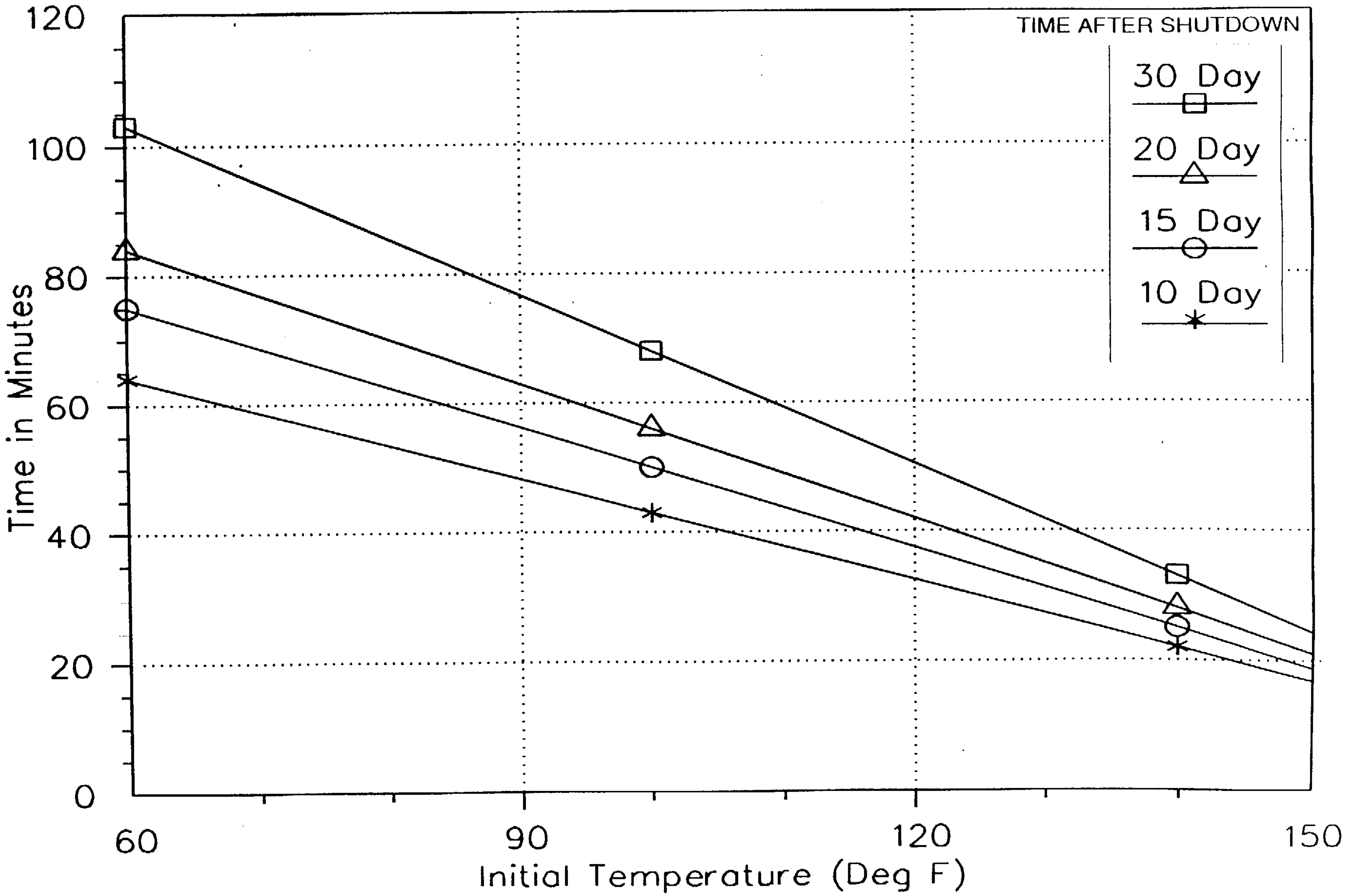
PCS NOT FILLED/INTACT, PCS LEVEL AT 623'



It will take 25 minutes to reach 200°F when:
T_{INIT} = 100°F, 2.43 days after shutdown
T_{INIT} = 110°F, 3.19 days after shutdown
T_{INIT} = 120°F, 4.21 days after shutdown

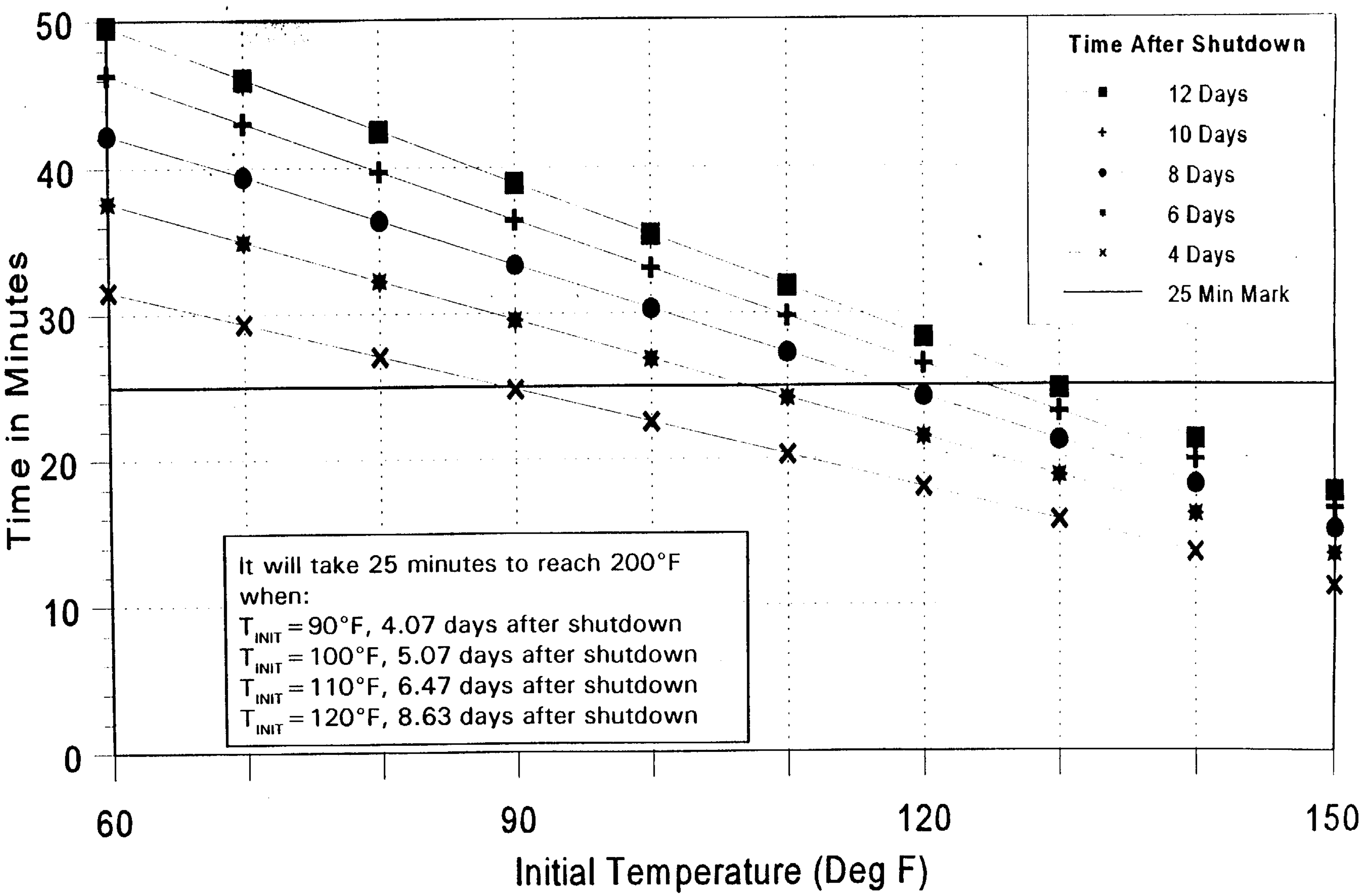
APPROXIMATE TIME TO 200°F CURVES

PCS NOT FILLED/INTACT, PCS LEVEL AT 623'



APPROXIMATE TIME TO 200°F CURVES

PCS NOT FILLED/INTACT, PCS LEVEL AT 618'2.5"

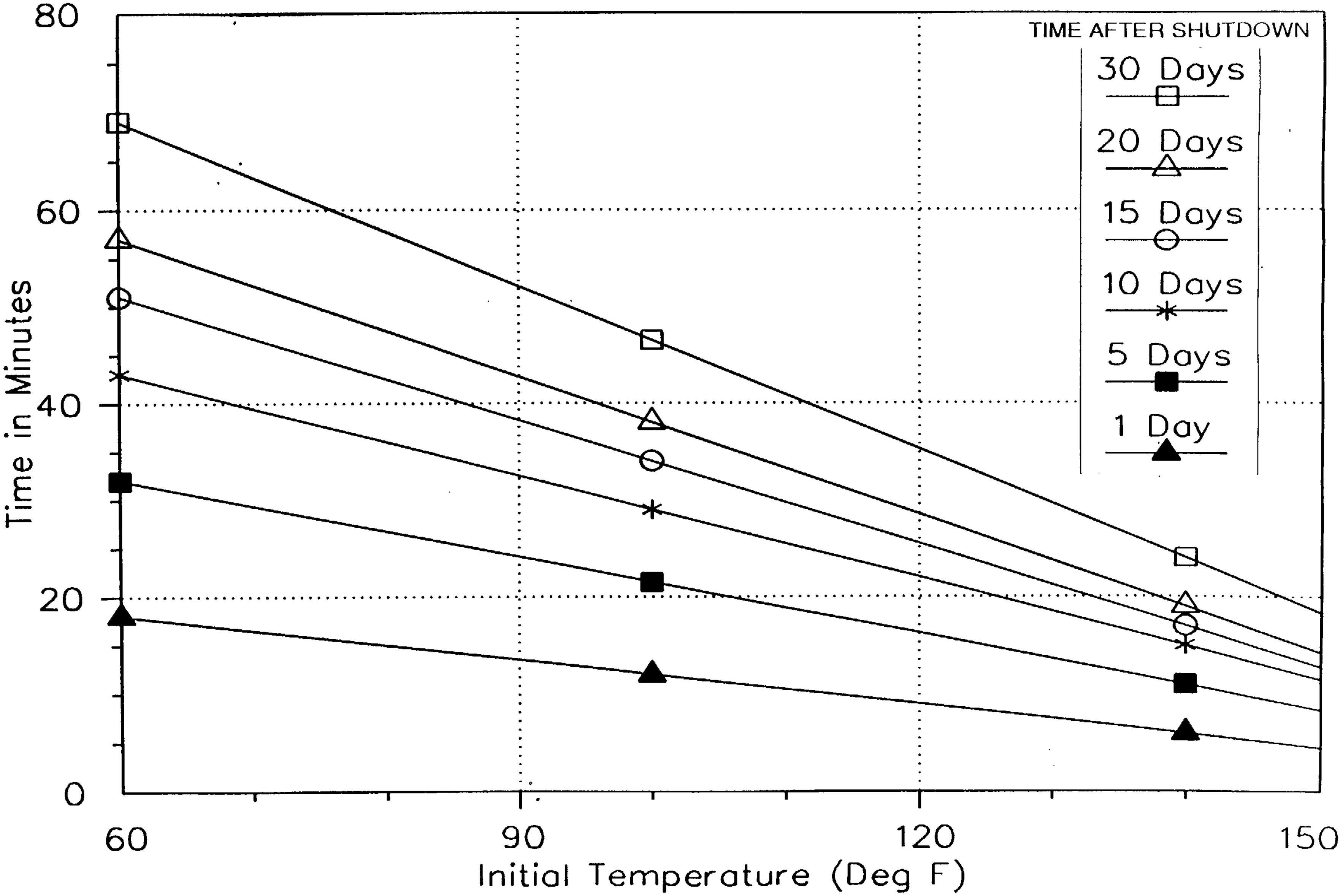


It will take 25 minutes to reach 200°F when:

T_{INIT} = 90°F, 4.07 days after shutdown
T_{INIT} = 100°F, 5.07 days after shutdown
T_{INIT} = 110°F, 6.47 days after shutdown
T_{INIT} = 120°F, 8.63 days after shutdown

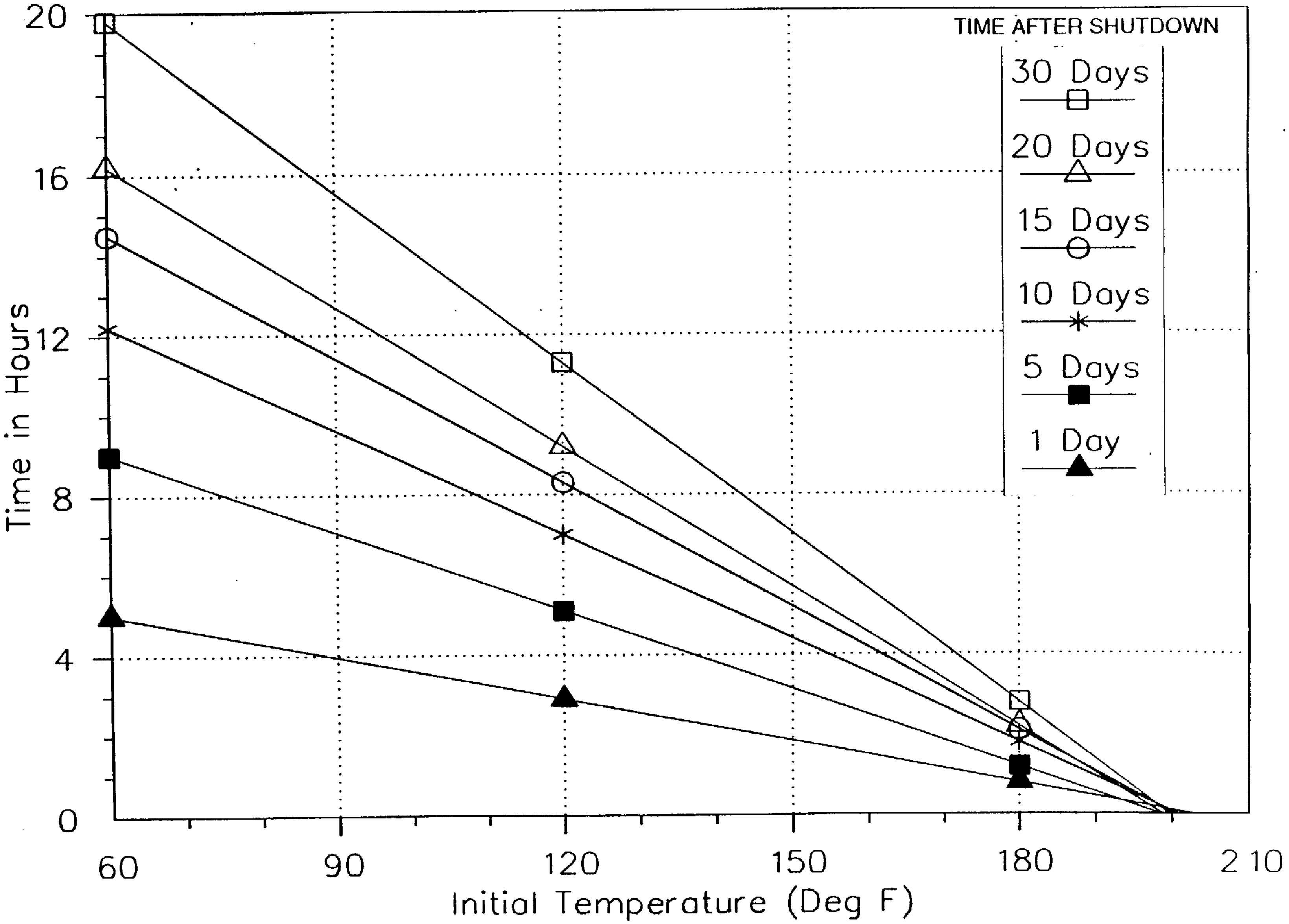
APPROXIMATE TIME TO 200°F CURVES

PCS NOT FILLED/INTACT, PCS LEVEL AT 617'6"



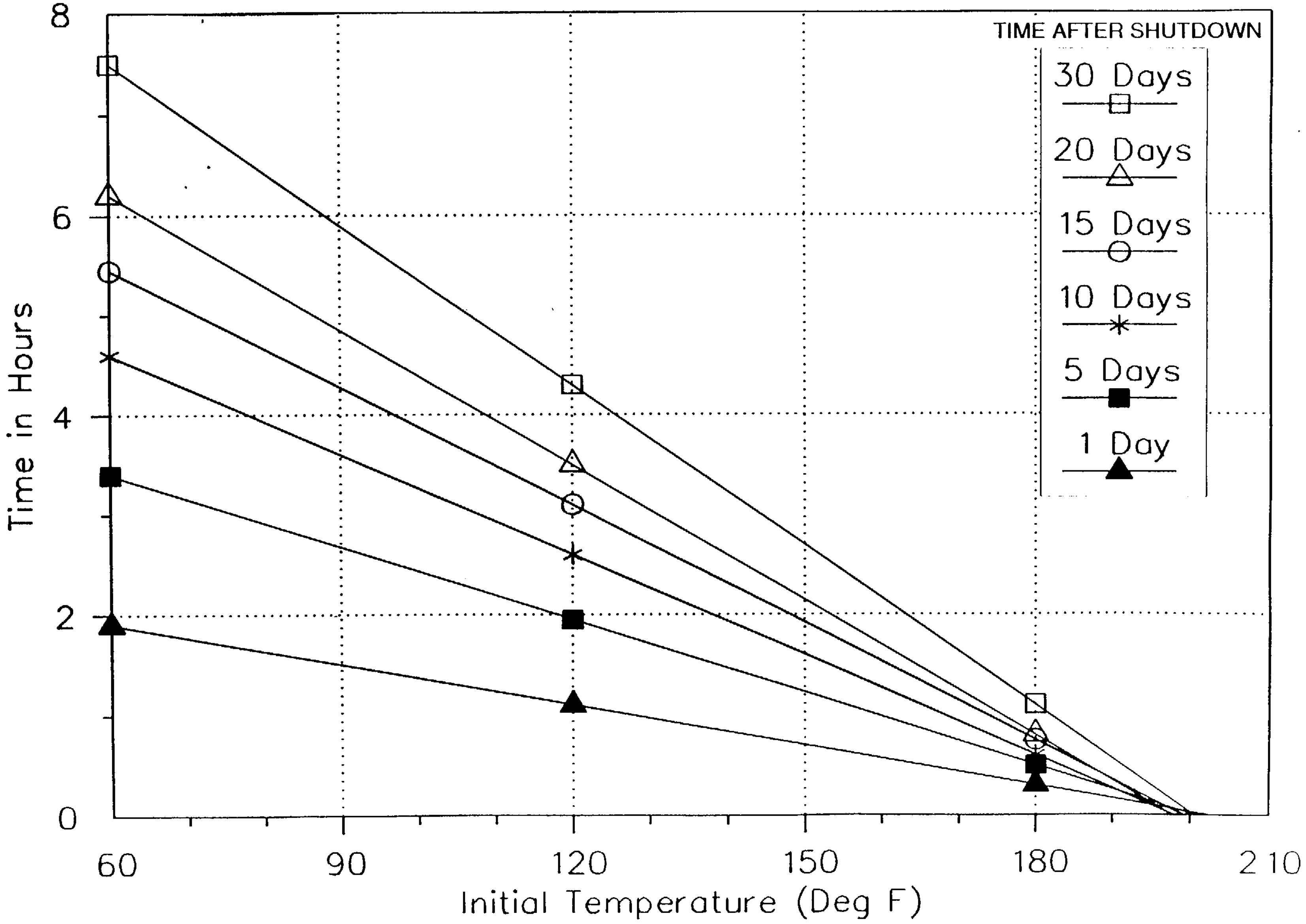
APPROXIMATE TIME TO 200°F CURVES

REFUELING CAVITY FLOODED TO 647'



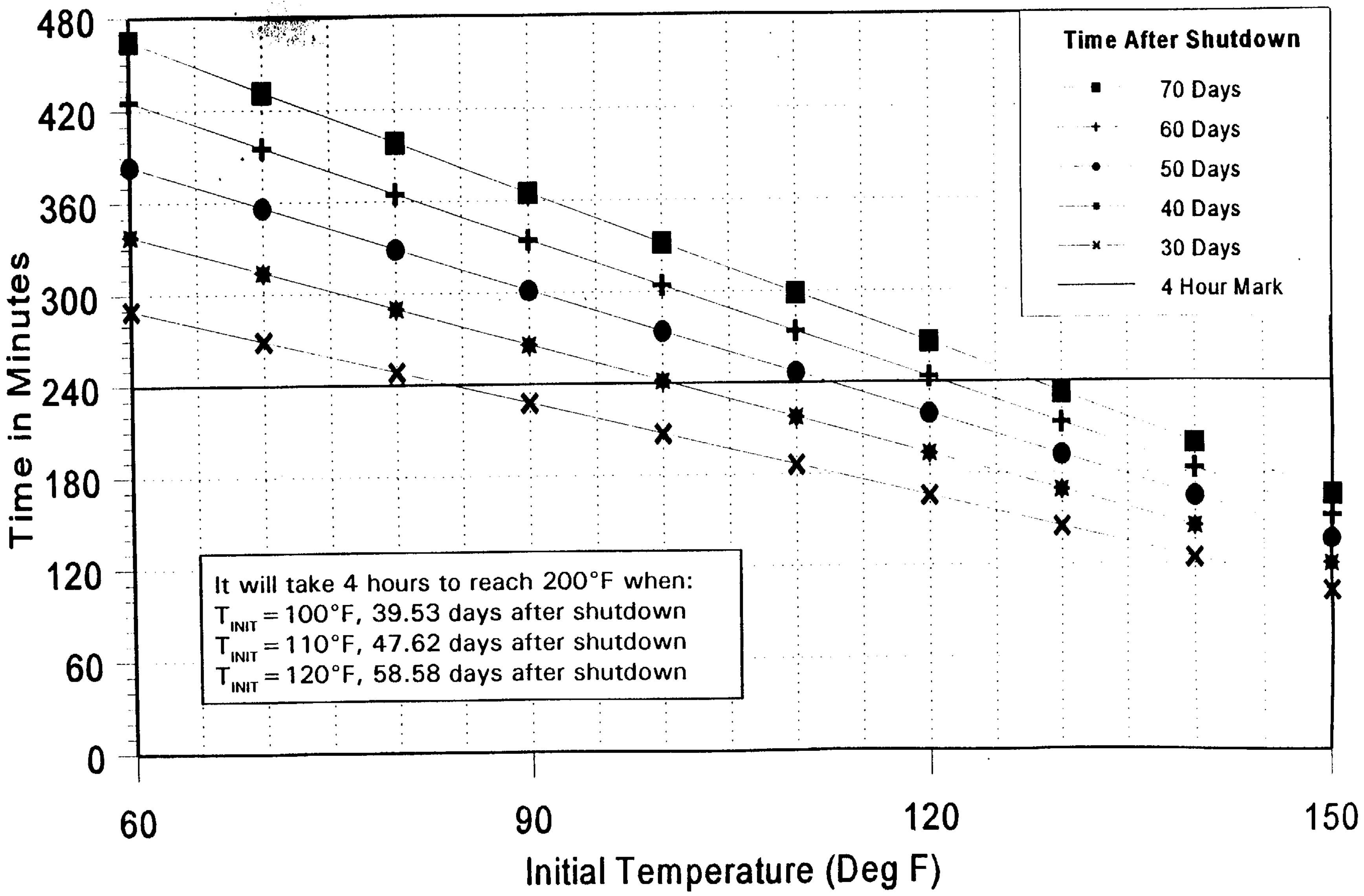
APPROXIMATE TIME TO 200°F CURVES

REFUELING CAVITY FLOODED TO 632'



APPROXIMATE TIME TO 200°F CURVES

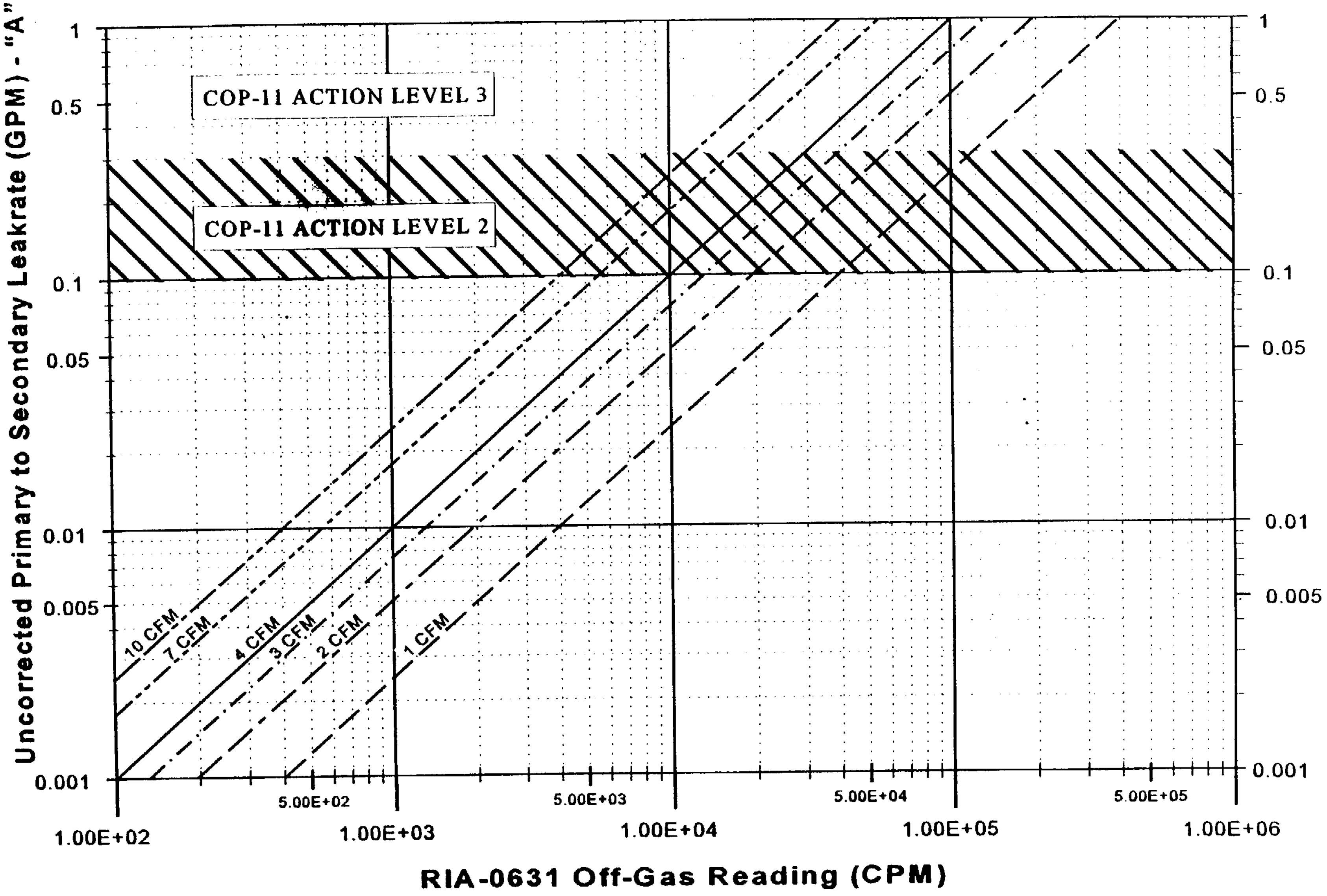
REFUELING CAVITY FLOODED TO 629'6"



It will take 4 hours to reach 200°F when:
T_{INIT} = 100°F, 39.53 days after shutdown
T_{INIT} = 110°F, 47.62 days after shutdown
T_{INIT} = 120°F, 58.58 days after shutdown

PRIMARY TO SECONDARY LEAKRATE

At Various Off-Gas Flow Rates



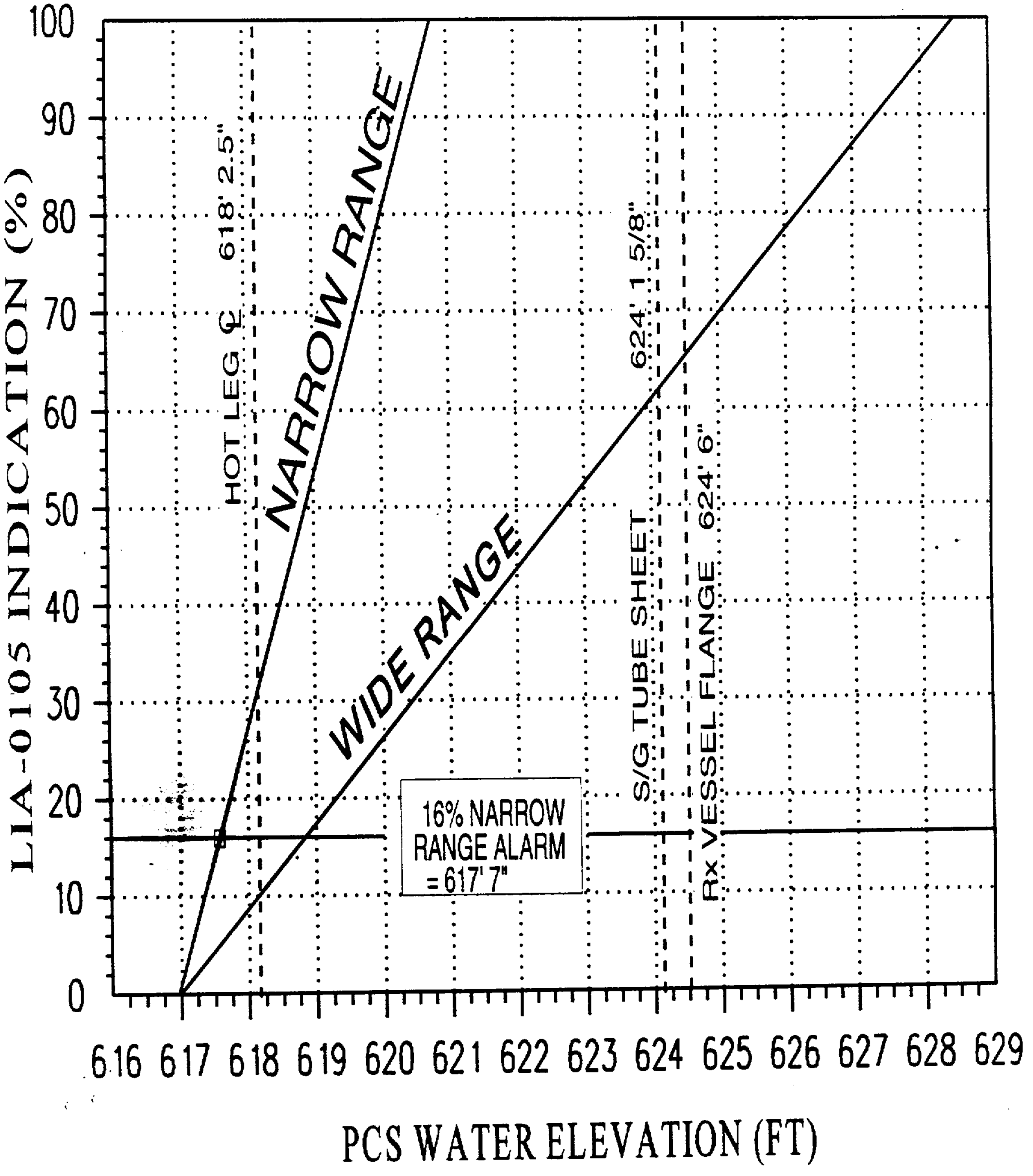
1) Using RIA-0631, determine uncorrected primary to secondary leakrate: "A".

2) Correct with the following equation.

$$\text{Corrected Primary to Secondary Leakrate} = A * \left(\frac{100}{\text{Total PCS Xenon 133 } (\mu\text{Ci/kg})} \right)$$

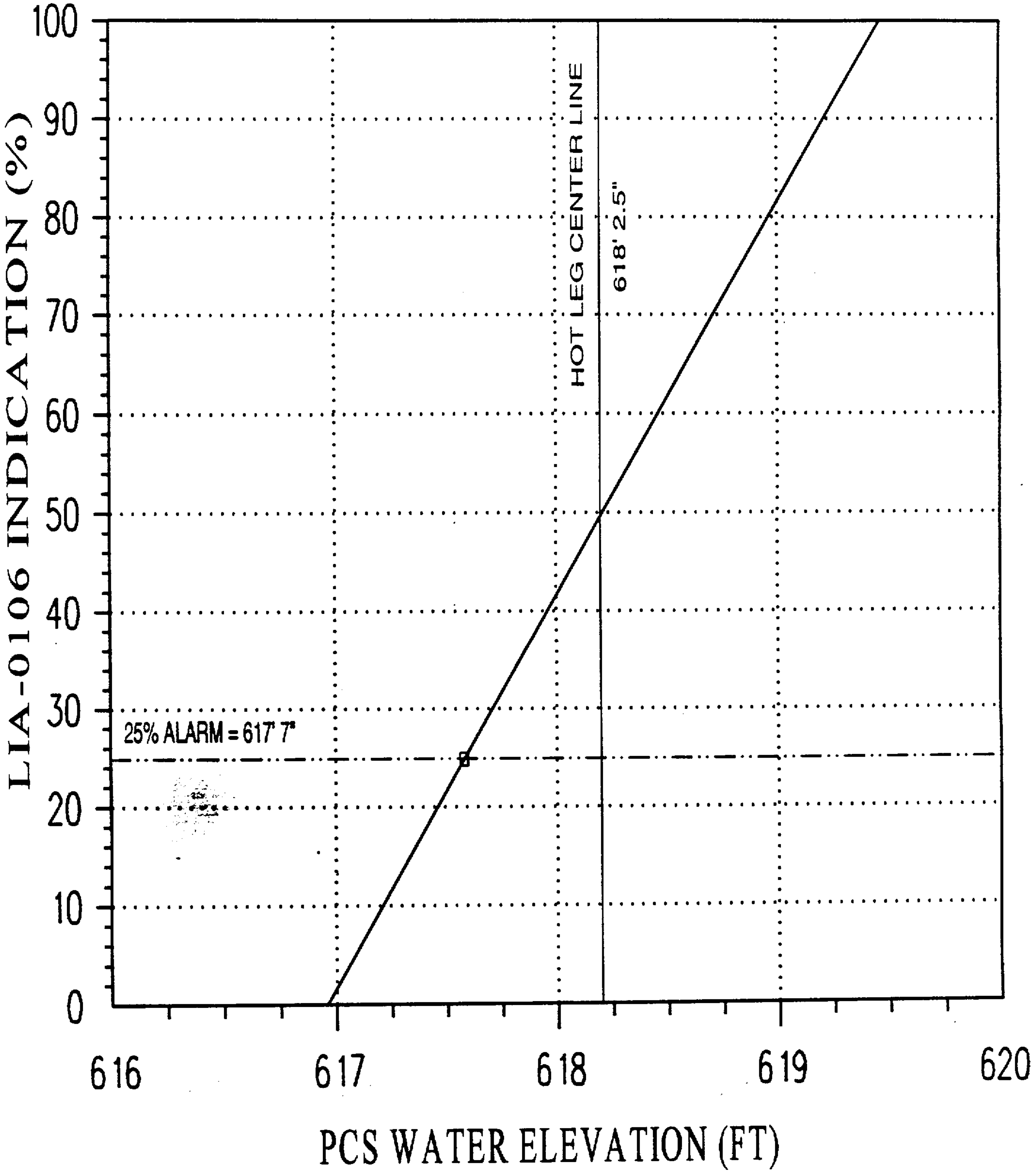
PCS WATER ELEVATION VS LIA-0105/LIA-0106 INDICATION

LIA-0105 INDICATION VS PCS WATER ELEVATION

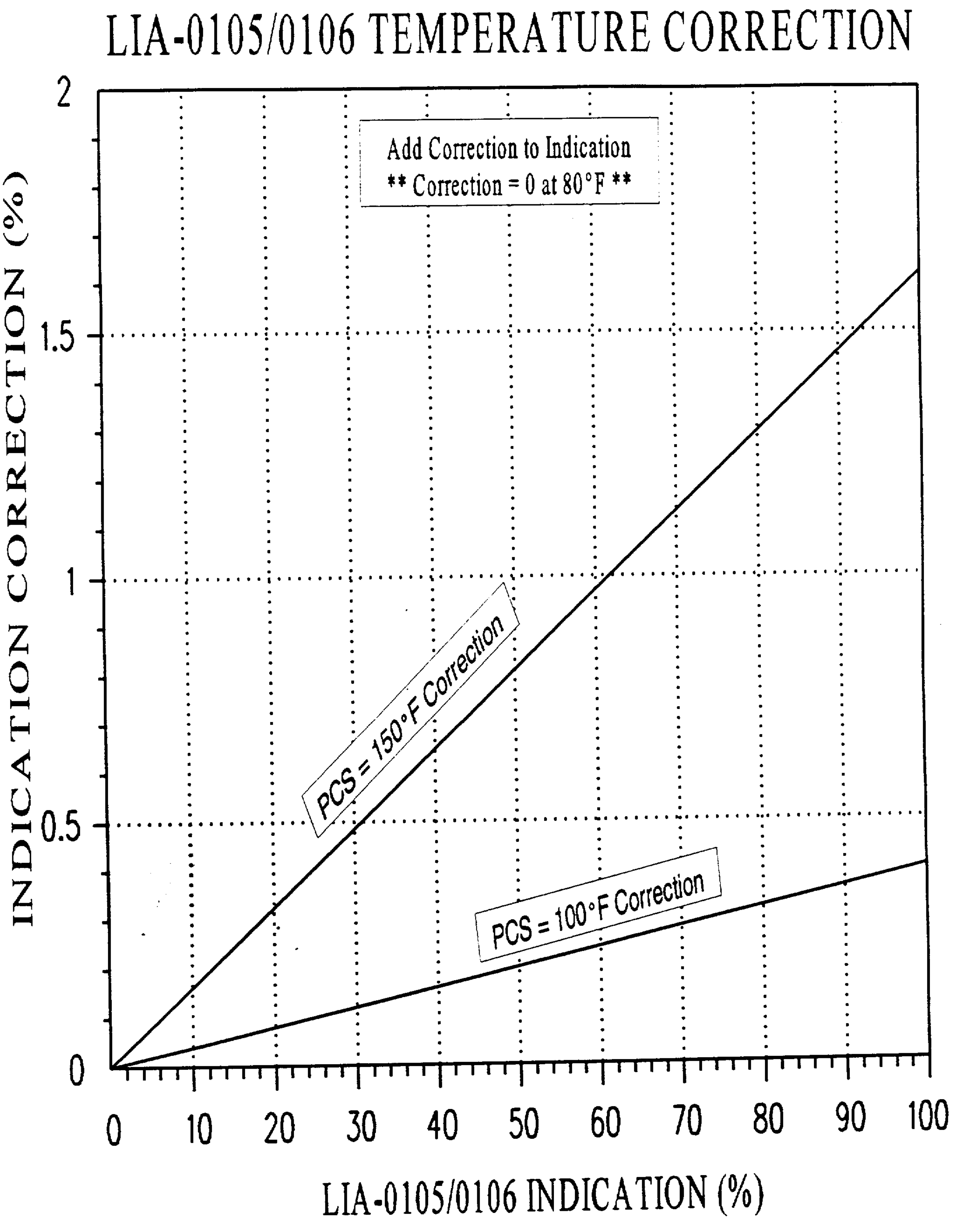


PCS WATER ELEVATION VS LIA-0105/LIA-0106 INDICATION

LIA-0106 INDICATION VS. PCS WATER ELEVATION



PCS WATER ELEVATION VS LIA-0105/LIA-0106 INDICATION



REGULATING ROD SEQUENCING PROGRAM AND MATRIX INDICATION

1.0 NORMAL REGULATING ROD WITHDRAWAL SEQUENCE

a. Group '1' moves alone from 3 to 83 inches withdrawal.

b. Group '2' moves from 3 to 51 inches withdrawal as Group '1' moves from 83 inches to fully withdrawn.

c. Group '2' moves alone from 51 to 83 inches withdrawal.

d. Group '3' moves from 3 to 51 inches withdrawal as Group '2' moves from 83 inches to fully withdrawn.

e. Group '3' moves alone from 51 to 83 inches withdrawal.

f. Group '4' moves from 3 to 51 inches withdrawal as Group '3' moves from 83 inches to fully withdrawn.

g. Group '4' moves alone from 51 inches to fully withdrawn.

2.0 NORMAL REGULATING ROD INSERTION SEQUENCE

a. Group '4' moves from fully withdrawn to 51 inches withdrawal alone.

b. Group '3' moves from fully withdrawn to 83 inches as Group '4' moves from 51 inches to fully inserted.

c. Group '3' moves from 83 to 51 inches withdrawal alone.

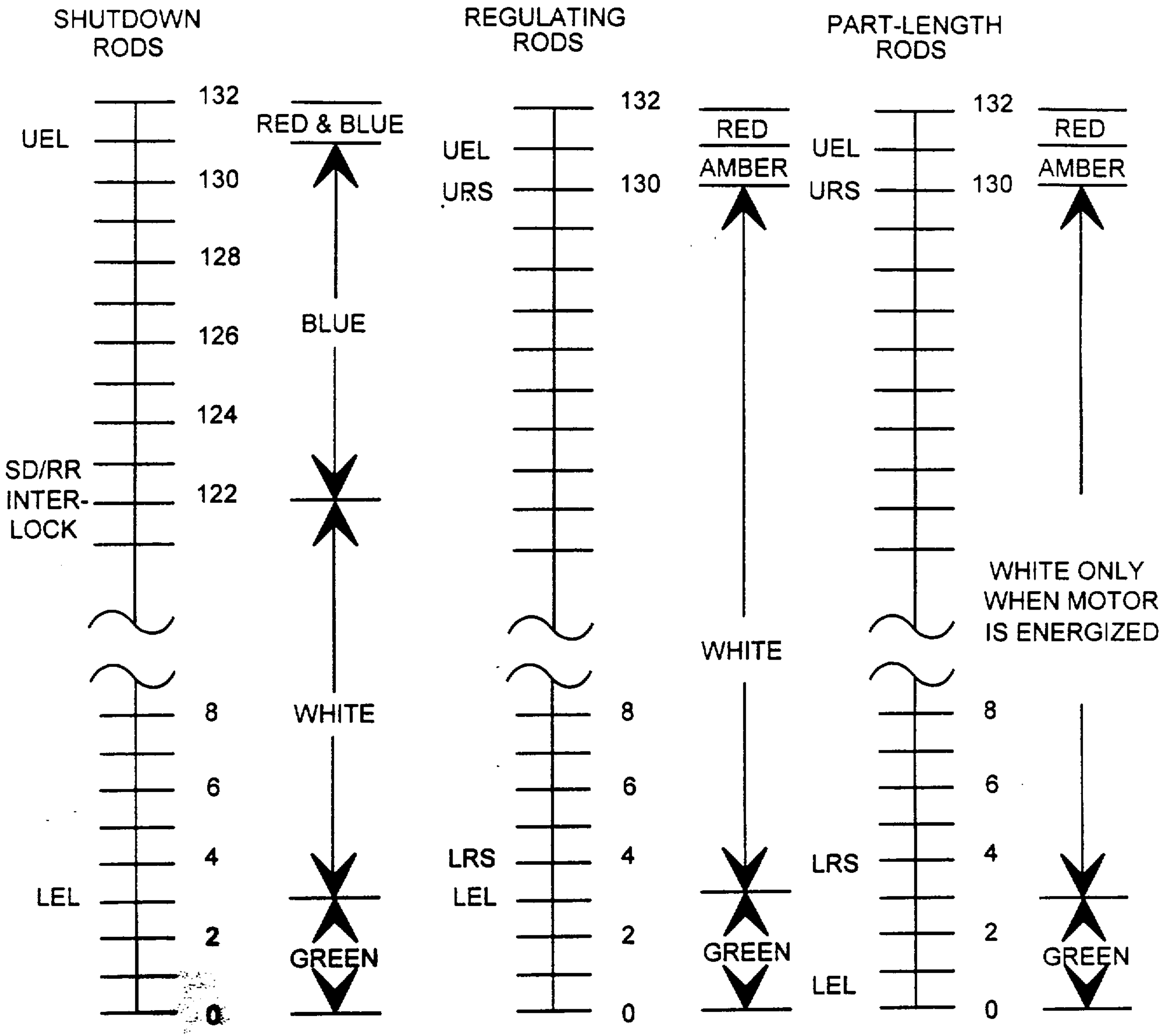
d. Group '2' moves from fully withdrawn to 83 inches as Group '3' moves from 51 inches to fully inserted.

e. Group '2' moves alone from 83 to 51 inches withdrawal.

f. Group '1' moves from fully withdrawn to 83 inches as Group '2' moves from 51 inches to fully inserted.

g. Group '1' moves from 83 inches to fully inserted alone.

REGULATING ROD SEQUENCING PROGRAM AND MATRIX INDICATION



UEL:	Upper Electrical Limit
LEL:	Lower Electrical Limit
URS:	Upper Rod Stop
LRS:	Lower Rod Stop
SD/RR:	Shutdown/Regulating Rod Interlock

Figure 1.1

SHUTDOWN MARGIN PARAMETERS

ROD WORTH	%Δρ, HFP
100 MWd/MTU	6.76
13810 MWd/MTU	7.52

STUCK ROD WORTH	%Δρ, HFP
100 MWd/MTU	0.87
13810 MWd/MTU	1.47

RECIPROCAL BORON WORTH	ppm/%Δρ, HFP
100 MWd/MTU	138.5
6500 MWd/MTU	128.7
13810 MWd/MTU	110.6

REFUELING BORON CONCENTRATION	ppm
	2339

Approved By: RSHaun 11-18-99
Reactor Engineering Supervisor

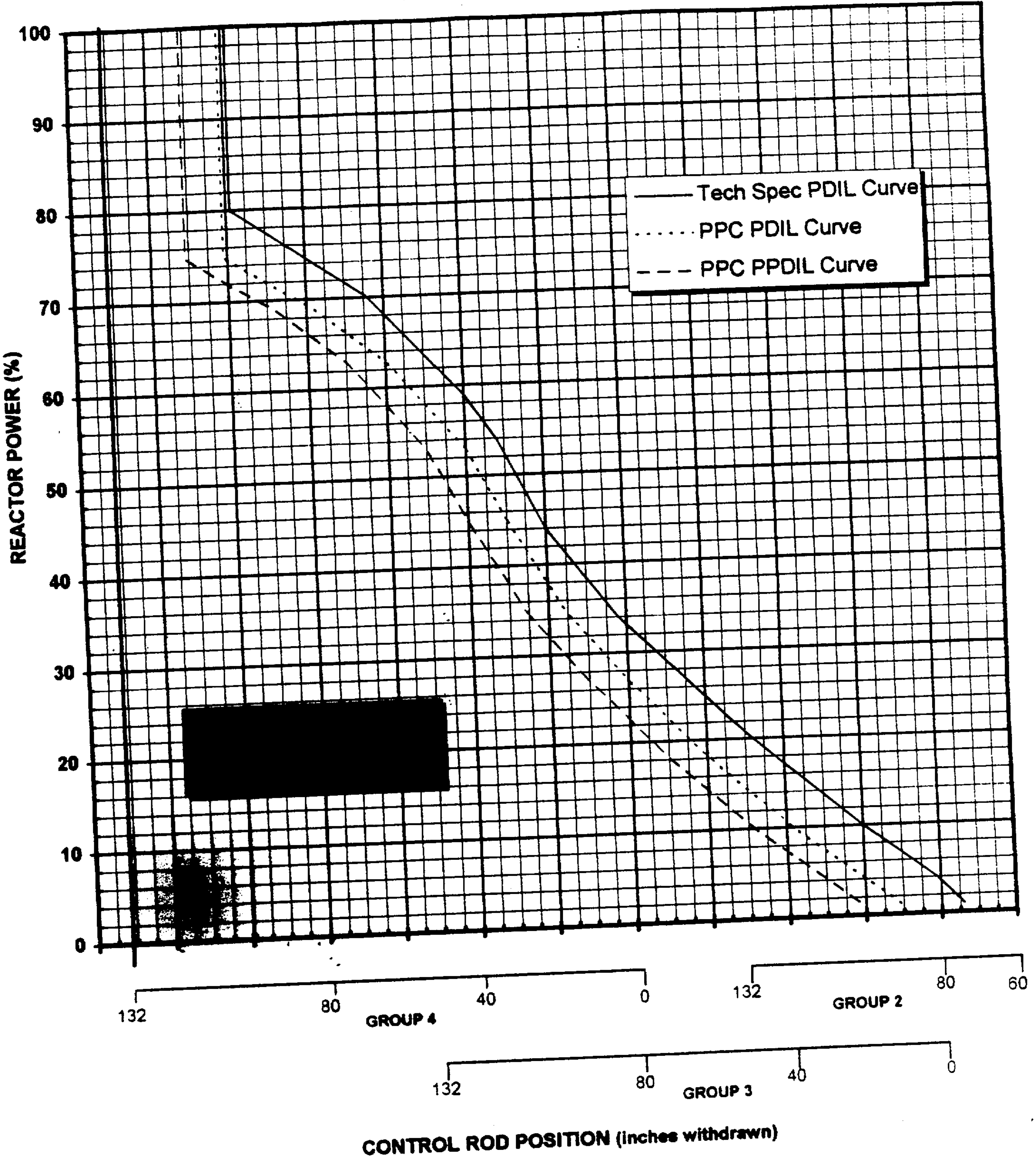
Reference: EMF-2309(P)
EMF-2259

Revision 2

Palisades Technical Data Book
Figure 1.9

POWER DEPENDENT INSERTION LIMITS

FOUR PUMP OPERATION



[redacted]

Reference: COLR 2.2
TDB 11.1

Approved By: RSHaun
Reactor Engineering Supervisor

FORMULA SHEET

NOTE: Hot equations should be used for a PCS temperature greater than or equal to 350 °F and cold equations should be used for a PCS temperature less than 350 °F.

1. BORON ADDITION

A. $$V_{HOT}\ (\text{Gal B.A.}) = 5.77 \times 10^4 \ln\left[\frac{\text{BAST (ppm)} - PCS_{INITIAL}\ \text{(ppm)}}{\text{BAST (ppm)} - PCS_{FINAL}\ \text{(ppm)}}\right]$$

B. $$V_{COLD}\ (\text{Gal B.A.}) = 8.48 \times 10^4 \ln\left[\frac{\text{BAST (ppm)} - PCS_{INITIAL}\ \text{(ppm)}}{\text{BAST (ppm)} - PCS_{FINAL}\ \text{(ppm)}}\right]$$

C. $$V\ (\text{Gal B.A. for desired ppm increase}) = \frac{[\text{Gal of } H_2O \text{ to borate}] \times [\text{Desired ppm increase}]}{\text{BAST (ppm)}}$$

2. DILUTION

A. $$V_{HOT}\ (\text{Gal PMW}) = 5.77 \times 10^4 \ln\left[\frac{PCS_{INITIAL}\ \text{(ppm)}}{PCS_{FINAL}\ \text{(ppm)}}\right]$$

B. $$V_{COLD}\ (\text{Gal PMW}) = 8.48 \times 10^4 \ln\left[\frac{PCS_{INITIAL}\ \text{(ppm)}}{PCS_{FINAL}\ \text{(ppm)}}\right]$$

3. BLEND[illegible]

$$\frac{\text{\# of Gal PMW}}{\text{Gal of B.A.}} = \frac{\text{BAST (ppm)}}{\text{PCS (ppm)}} - 1$$

Approved By: ____________________
Reactor Engineering Supervisor

FORMULA SHEET

4. MIXING WATER AND CONCENTRATED BORIC ACID

A. $$\text{Final Concentration} = \frac{(\text{Initial Gal x Initial Conc})}{(\text{Initial Gal} + \text{Gal } H_2O \text{ Added})}$$

B. $$\begin{matrix}\text{Gal of } H_2O\\ \text{Needed for}\\ \text{Desired Conc}\end{matrix} = \frac{(\text{Initial Gal x Initial Conc})}{\text{Final Conc}} - \text{Initial Gal}$$

5. MIXING 2 TANKS OF DIFFERENT CONCENTRATIONS

A. $$\text{Final Concentration} = \frac{(\text{Conc}_A \text{ x Vol}_A) + (\text{Conc}_B \text{ x Vol}_B)}{(\text{Vol}_A + \text{Vol}_B)}$$

B. $$\text{Vol}_A = \frac{(\text{Final Concentration} - \text{Conc}_B) \text{ x Vol}_B}{\text{Conc}_A \text{ x} \left(1 - \dfrac{\text{Final Concentration}}{\text{Conc}_A}\right)}$$

OR

$$\begin{matrix}\text{Gal of Conc}\\ \text{B.A. for Desired}\\ \text{PPM Increase}\end{matrix} = \frac{(\text{Gal of Water to Borate x Desired PPM Increase})}{\text{PPM of Conc B.A. x} \left(1 - \dfrac{\text{Final Concentration}}{\text{PPM of Conc B.A.}}\right)}$$

Approved By: ______________________

Reactor Engineering Supervisor

FORMULA SHEET

6. TO PREDICT OR DETERMINE EVAPORATOR BOTTOMS CONCENTRATION

A. $$\frac{\text{Gal of Feed to Evap}}{} = \frac{\text{Increase in Bottom Conc}}{\text{Conc of Feed to Evap}} \times \text{Evap Concentrate Volume}$$

7. GAS PRESSURE, TEMPERATURE, VOLUME RELATIONSHIP

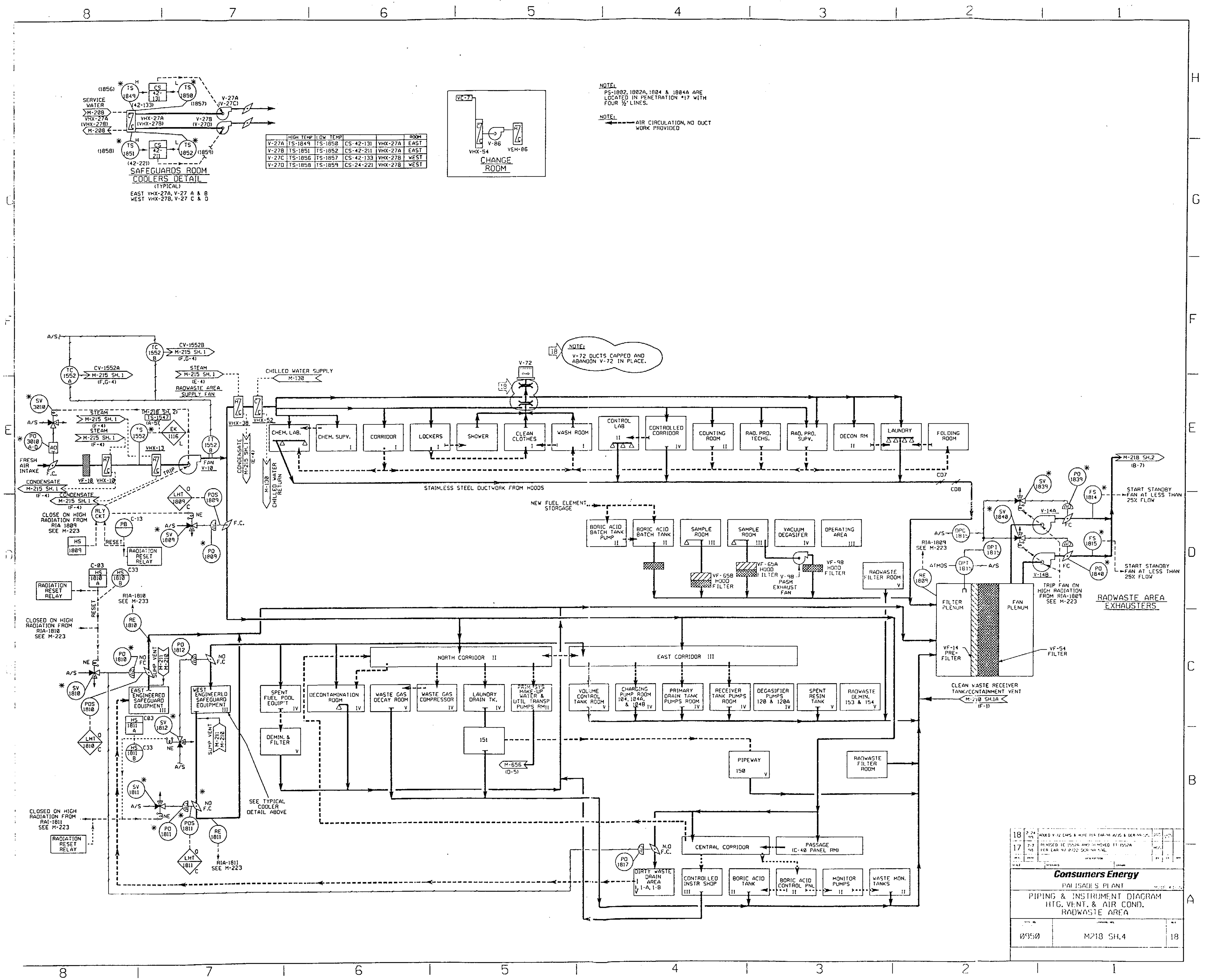
$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

P = Absolute Pressure

V = Volume

T = Temperature (°Rankine) [°F + 460]

Approved By: ______________________
Reactor Engineering Supervisor



	HIGH TEMP	LOW TEMP			ROOM
V-27A	TS-1849	TS-1850	CS-42-131	VHX-27A	EAST
V-27B	TS-1851	TS-1852	CS-42-211	VHX-27A	EAST
V-27C	TS-1856	TS-1857	CS-42-133	VHX-27B	WEST
V-27D	TS-1858	TS-1859	CS-24-221	VHX-27B	WEST

NOTE:
PS-1802, 1802A, 1804 & 1804A ARE LOCATED IN PENETRATION #17 WITH FOUR ½" LINES.

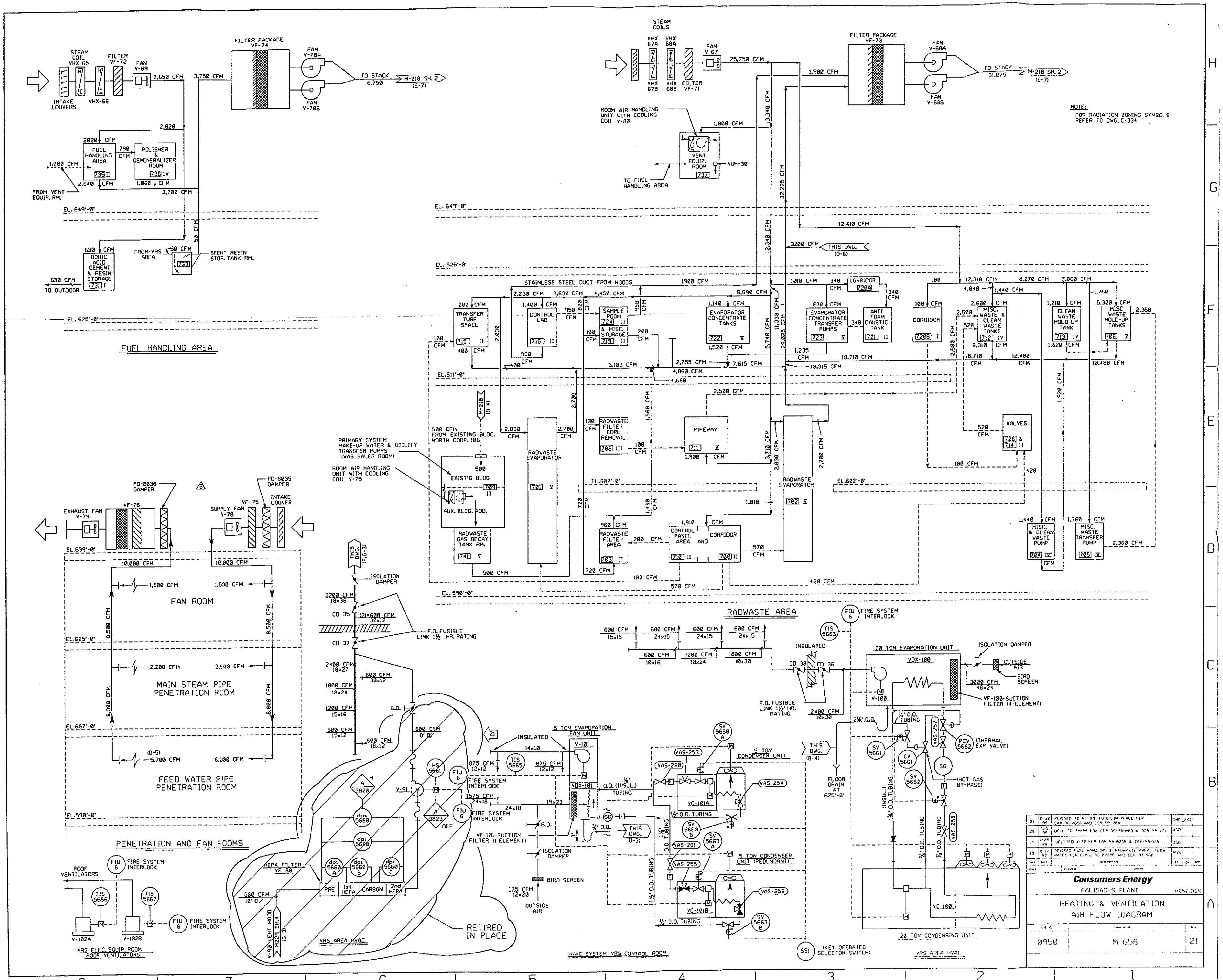
NOTE:
←- - - - - AIR CIRCULATION, NO DUCT WORK PROVIDED

Consumers Energy

PALISADES PLANT

PIPING & INSTRUMENT DIAGRAM
HTG. VENT. & AIR COND.
RADWASTE AREA

0950
M218 SH.4
18



REV	DATE	DESCRIPTION	BY	CK	APP
21	11-20-99	REVISED TO RETIRE EQUIP. IN PLACE PER EAR-98-M656 AND DCR 99-204	DMB	[illegible]	
20	5-5-99	DELETED TM-96 032 PER SC-98-003 & DCR 99-271	JGD		
19	2-24-99	DELETED V-72 PER EAR 98-0235 & DCR-99-125.	JGD		
18	11-17-97	REVISED FUEL HANDLING & RADWASTE AREAS FLOW RATES PER C-PAL 96-0709E AND DCR 97-060.	MOS		

Consumers Energy
PALISADES PLANT
M656.DGN

HEATING & VENTILATION
AIR FLOW DIAGRAM

0950	M 656	21

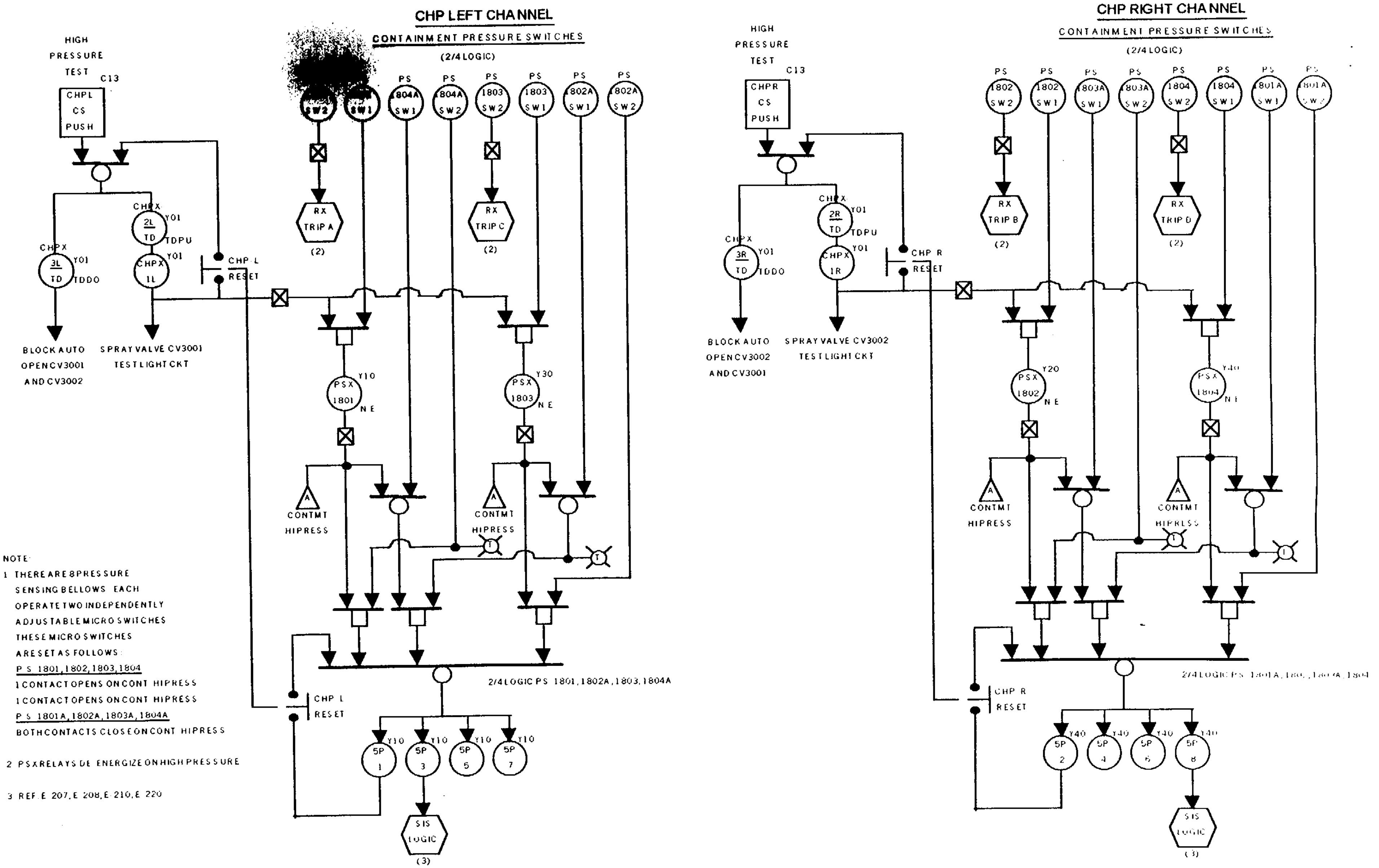
PALISADES NRC WRITTEN EXAMINATION

REACTOR OPERATOR

QUESTION ATTACHMENTS

1. Question #37 Attachment
2. Question #42 Attachment
3. Question #67 Attachment
4. Question #75 Attachment

QUESTION #37 ATTACHMENT



NOTE:

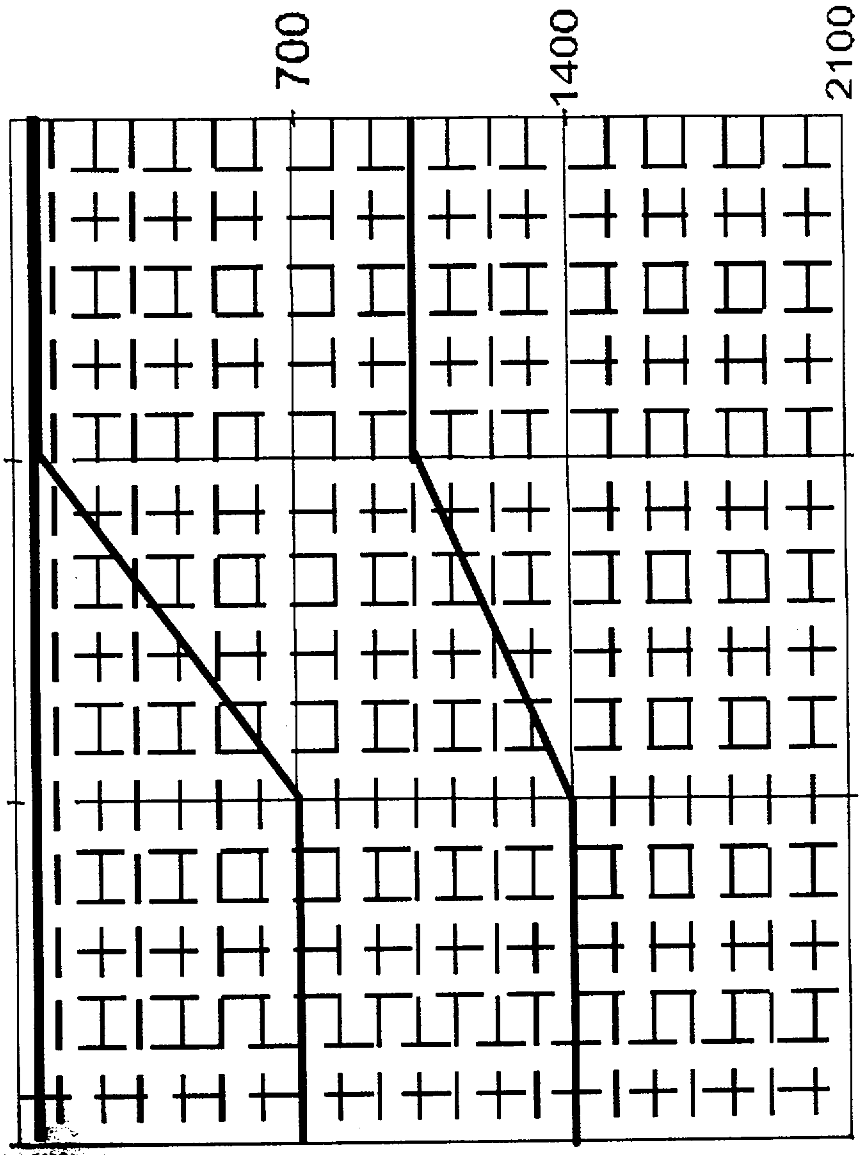
1 THERE ARE 8 PRESSURE SENSING BELLOWS. EACH OPERATE TWO INDEPENDENTLY ADJUSTABLE MICRO SWITCHES. THESE MICRO SWITCHES ARE SET AS FOLLOWS:

P.S. 1801, 1802, 1803, 1804
1 CONTACT OPENS ON CONT. HI PRESS
1 CONTACT OPENS ON CONT. HI PRESS
P.S. 1801A, 1802A, 1803A, 1804A
BOTH CONTACTS CLOSE ON CONT. HI PRESS

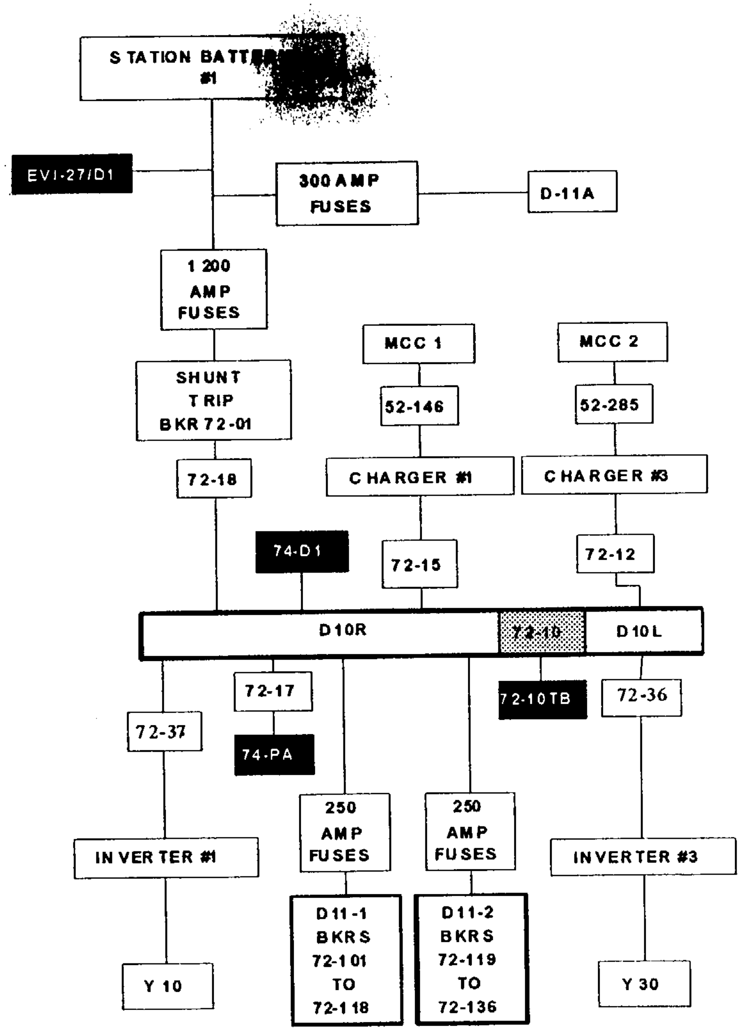
2 PSX RELAYS DE-ENERGIZE ON HIGH PRESSURE

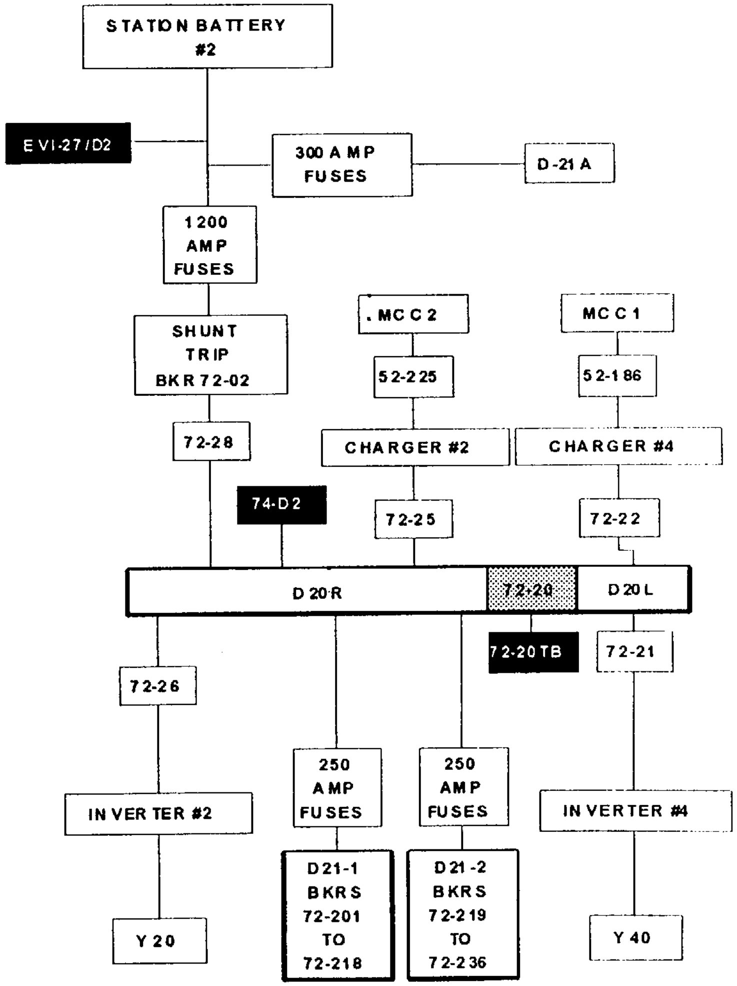
3 REF. E-207, E-208, E-210, E-220

QUESTION #42 ATTACHMENT

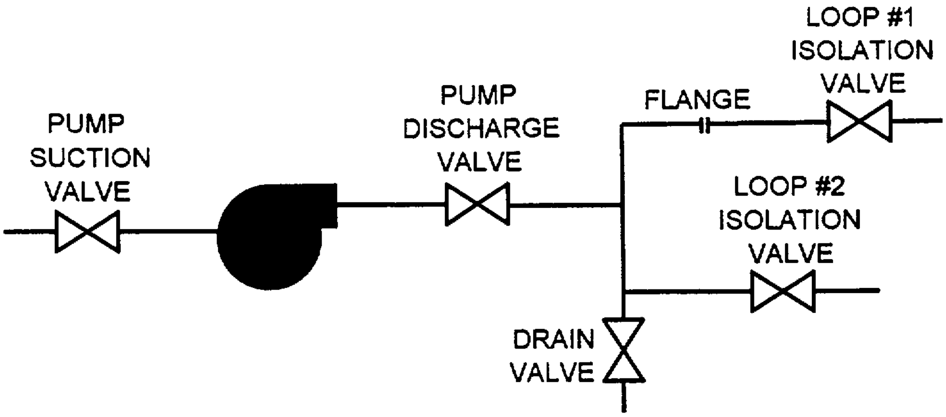


QUESTION #67 ATTACHMENT





QUESTION #75 ATTACHMENT



MASTER SRO WRITTEN EXAM AND ANSWER KEY

U.S. Nuclear Regulatory Commission
Site-Specific
Written Examination

Applicant Information

Name: ANSWER KEY	Region: III
Date: MAY 26, 2000	Facility/Unit: PALISADES
License Level: SRO	Reactor Type: CE
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected five hours after the examination starts.

Applicant Certification

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

____
Applicant's Signature

Results

Examination Value	______ Points
Applicant's Score	______ Points
Applicant's Grade	______ Percent

Palisades May 2000 SRO Written Exam Key

1. b
2. b
3. b
4. d
5. b
6. a
7. a
8. c
9. b
10. a
11. c
12. a
13. d
14. a
15. ~~c~~ a.
16. b
17. b
18. b
19. a
20. c
21. a
22. c
23. b
24. b
25. c
26. d
27. b
28. a
29. c
30. c
31. d
32. a
33. d
34. b
35. b
36. b
37. d
38. d
39. b
40. a
41. b
42. a
43. c
44. a
45. a
46. a
47. a
48. b
49. c
50. a
51. a
52. b
53. a
54. c
55. b
56. a
57. c
58. d
59. b
60. a
61. c
62. c
63. a
64. a
65. b
66. a
67. b
68. b
69. a
70. a
71. b
72. c
73. c
74. c
75. a
76. b
77. b
78. d
79. a
80. d
81. b
82. c
83. a
84. d
85. a
86. a
87. a
88. c
89. c
90. b
91. a
92. c
93. a
94. c
95. d
96. d
97. d
98. b
99. c
100. c

PALISADES WRITTEN EXAMINATION
QUESTION REFERENCE

1.	SRO/RO	REF:	EOP-4.0, EOP-9.0, LP-ASGA
2.	SRO/RO	REF:	ONP-24.1, LP-ASGC
3.	SRO/RO	REF:	Steam tables, EOP-1.0
4.	SRO/RO	REF:	ONP-7.1
5.	SRO/RO	REF:	LP-IOT, DEA-TCA-91-03 (C744 0835)
6.	SRO/RO	REF:	E-4, Sheet 1, LP-ASFE
7.	SRO/RO	REF:	SOP-30
8.	SRO/RO	REF:	EOP Supplement 6, TS 3.6, ONP-4.1
9.	SRO/RO	REF:	FSAR Table 9-4, EOP-4.0
10.	SRO/RO	REF:	SOP-2A
11.	SRO/RO	REF:	EOP Supplement 24
12.	SRO/RO	REF:	EOP-1, EOP Supplement 5
13.	SRO/RO	REF:	SOP-1
14.	SRO/RO	REF:	SOP-22, D-PAL-89-131
15.	SRO/RO	REF:	ONP-25.2
16.	SRO/RO	REF:	ONP-4.2
17.	SRO/RO	REF:	ONP-17
18.	SRO/RO	REF:	EOP-4.0, LP-ASEC
19.	SRO/RO	REF:	EOP-4.0
20.	SRO/RO	REF:	ONP-24.2, ONP-24.3
21.	**SRO ONLY**	**REF:**	**TS 3.8.1**
22.	**SRO ONLY**	**REF:**	**AP-1.00**
23.	**SRO ONLY**	**REF:**	**LP-TBAA**
24.	**SRO ONLY**	**REF:**	**AP-4.02**
25.	**SRO ONLY**	**REF:**	**AP-7.13**
26.	**SRO ONLY**	**REF:**	**TS 3.1.4**
27.	**SRO ONLY**	**REF:**	**AP-4.00**
28.	**SRO ONLY**	**REF:**	**Standing Order 54**
29.	**SRO ONLY**	**REF:**	**AP-4.06**
30.	**SRO ONLY**	**REF:**	**EOP-1.0**
31.	SRO/RO	REF:	SOP-38
32.	SRO/RO	REF:	ONP-25.1, ONP-25.2
33.	SRO/RO	REF:	EOP-8.0, LP-TBAC, Steam Tables
34.	SRO/RO	REF:	TS 3.17.6, TS 3.8.1
35.	SRO/RO	REF:	Tech Data Book Fig. 1.9
36.	SRO/RO	REF:	SOP-11, A-PAL-89-151
37.	SRO/RO	REF:	E-17, Sheet 6
38.	SRO/RO	REF:	E-17, Sheet 4, LP-ASAC
39.	SRO/RO	REF:	ONP-6.1
40.	SRO/RO	REF:	ONP-6.2
41.	SRO/RO	REF:	ARP-21
42.	SRO/RO	REF:	ARP-5
43.	SRO/RO	REF:	EOP-1.0
44.	SRO/RO	REF:	FSAR Table 9-4

45. SRO/RO REF: SOP-38
46. SRO/RO REF: ARP-8
47. SRO/RO REF: EOP-4.0
48. SRO/RO REF: ONP23.2
49. SRO/RO REF: SOP-2A
50. SRO/RO REF: ONP-25.2

51. **SRO ONLY REF: EOP-4.0, Standing Order 62**
52. **SRO ONLY REF: AP-5.01**
53. **SRO ONLY REF: EOP-6.0**
54. **SRO ONLY REF: AP-4.00**
55. **SRO ONLY REF: FPIP-7**
56. **SRO ONLY REF: SOP-2B**
57. **SRO ONLY REF: AP-9.31**
58. **SRO ONLY REF: EOP-1.0**
59. **SRO ONLY REF: AP-4.00**
60. **SRO ONLY REF: FPIP-7**

61. SRO/RO REF: Tech Data Book Figure 3.3, LP-ASEA
62. SRO/RO REF: SOP-24
63. SRO/RO REF: SOP-30
64. SRO/RO REF: Tech Data Book Figure 1.1, EM-04-08
65. SRO/RO REF: EOP-5.0
66. SRO/RO REF: E-17, Sheet 5, LP-ASHA
67. SRO/RO REF: E-8, Sheet 2
68. SRO/RO REF: SOP-30
69. SRO/RO REF: ARP-8
70. SRO/RO REF: EOP-3.0, EOP Setpoint Basis
71. SRO/RO REF: ONP-5.1, Tech Spec 1.0
72. SRO/RO REF: ONP-3.0
73. SRO/RO REF: EOP Supplement 6
74. SRO/RO REF: SOP-38
75. SRO/RO REF: AP-4.10
76. SRO/RO REF: EOP Supplement 11
77. SRO/RO REF: ONP-14
78. SRO/RO REF: ONP-18
79. SRO/RO REF: ONP-2.3
80. SRO/RO REF: SOP-6
81. SRO/RO REF: Tech Data Book Figure 3.3
82. SRO/RO REF: AP-7.02
83. SRO/RO REF: Steam Tables
84. SRO/RO REF: ONP-26
85. SRO/RO REF: EOP-1.0
86. SRO/RO REF: M-656, M-218, Sh. 4
87. SRO/RO REF: TS 3.17.1
88. SRO/RO REF: Tech Data Book Figure 8.2
89. SRO/RO REF: LP-ADAA
90. SRO/RO REF: EOP-1.0, E-1, LP-ASAA
91. SRO/RO REF: EOP-6.0, EOP Supplement 1
92. SRO/RO REF: LP-TBAG

93.	SRO/RO	REF:	ONP-11.2
94.	SRO/RO	REF:	ONP-24.3
95.	SRO/RO	REF:	M-203, Sheet 2, EOP-4.0, LP-ASHA

96.	SRO ONLY	REF:	TS 4.0.3
97.	SRO ONLY	REF:	SOP-1, EOP Setpoint
98.	SRO ONLY	REF:	EOP Supplement 35
99.	SRO ONLY	REF:	AP-4.00
100.	SRO ONLY	REF:	TS 3.7.9

<u>RO QUESTIONS SUBSTITUTED INTO SRO ONLY QUESTIONS ABOVE</u>:

21	RO ONLY	REF:	EOP Supplement 6
22	RO ONLY	REF:	GOP-5
23	RO ONLY	REF:	EOP Intro
24	RO ONLY	REF:	AP-4.07
25	RO ONLY	REF:	ARP-4
26	RO ONLY	REF:	EOP Supplement 19, LP-ASLD
27	RO ONLY	REF:	AP-4.00
28	RO ONLY	REF:	SOP-2A
29	RO ONLY	REF:	AP-10.53
30	RO ONLY	REF:	QO-1

51	RO ONLY	REF:	SOP-12, LP-ASLD
52	RO ONLY	REF:	SOP-28, LP-ASIB
53	RO ONLY	REF:	EI-7.0, LP-ASHE
54	RO ONLY	REF:	AP-4.00
55	RO ONLY	REF:	FPIP-2
56	RO ONLY	REF:	SOP-6
57	RO ONLY	REF:	E-238, Sheet 2, LP-ASJB
58	RO ONLY	REF:	ARP-5, SOP-1
59	RO ONLY	REF:	SOP-16, LP-ISDA
60	RO ONLY	REF:	AP-4.02

96	RO ONLY	REF:	SOP-10
97	RO ONLY	REF:	ARP-8
98	RO ONLY	REF:	AP 4.00
99	RO ONLY	REF:	ONP-10
100	RO ONLY	REF:	AP-7.04

Question: 1

When the top one (1) foot of the Reactor Core becomes uncovered ...

a. CETs will indicate that saturated conditions exist.

b. CETs will indicate that superheated conditions exist.

c. incore NI readings will indicate abnormally low.

d. excore NI readings will indicate abnormally low.

Answer:

b. CETs will indicate that superheated conditions exist.

Question: 2

Following a loss of 120 VAC Preferred Bus Y-20, the Anticipated Transient Without Scram (ATWS) System trip logic is ...

a. 1-out-of-3.

b. 2-out-of-3.

c. 1-out-of-4.

d. 2-out-of-4.

Answer:

b. 2-out-of-3.

Question: 3

Given the following conditions:

- A loss of all offsite power has occurred.
- A small break LOCA has occurred concurrently.
- Tave is 559 °F.
- Tcold is 548 °F.
- Thot is 570 °F.
- Average Qualified CETs is 565 °F.
- Pressurizer pressure is 1500 psia.

While performing EOP-1.0, Standard Post-Trip Actions, PCS subcooling should be determined to be ...

a. 26 °F.

b. 31 °F.

c. 37 °F.

d. 48 °F.

Answer:

b. 31 °F.

Question: 4

Given the following conditions:

- The plant is operating at 100% power.
- Instrument air pressure lowers to 75 psig and stabilizes.
- RED indicating lights are observed ON for Air Compressors C-2A, C-2B, and C-2C.

What is the effect of continuing to operate the plant with an instrument air pressure of 75 psig?

a. Service air is isolated. However, this has **NO** effect on continued plant operation at 100% power.

b. The standby air compressor starts. However, there will be **NO** effect on continued plant operation unless erratic valve operation occurs.

c. Instrument air to containment and service air are isolated. However, this has **NO** effect on continued plant operation at 100% power.

d. Service air is isolated. This will eventually result in a trip due to the loss of the cooling tower pumps.

Answer:

d. Service air is isolated. This will eventually result in a trip due to the loss of the cooling tower pumps.

Question: 5

The consequence of installing an incore detector in the wrong core location would be ...

a. an error introduced into the Estimated Critical Position (ECP).

b. the improper length may unknowingly result in data being gathered at improper core elevations.

c. excessive radiation upon removal of the incore during the next refueling.

d. the incore detector could become an unanalyzed source of neutrons.

Answer:

b. the improper length may unknowingly result in data being gathered at improper core elevations.

Question: 6

A fault on 2400 VAC Bus 1C has caused the bus to de-energize and isolate.

Assuming **NO** operator action has been taken, which of the following Pressurizer Heaters have power available?

a.
- All 4 groups of Backup Heaters
- Both groups of Proportional Heaters

b.
- 2 groups of Backup Heaters
- 1 group of Proportional Heaters

c.
- All 4 groups of Backup Heaters
- Neither group of Proportional Heaters

d.
- 2 groups of Backup Heaters
- Neither group of Proportional Heaters

Answer:

a.
- All 4 groups of Backup Heaters
- Both groups of Proportional Heaters

Question: 7

The WHITE light associated with 4160 VAC Bus 1B Breaker 252-201, Station Power Transformer 1-1, being LIT indicates the breaker ...

a. closing springs are charged.

b. undervoltage relays are reset.

c. is racked to the TEST position.

d. has control power available.

Answer:

a. closing springs are charged.

Question: 8

With the plant in Hot Shutdown, which of the following would constitute a breech of Containment Integrity?

a. Containment pressure is at 3.7 psig

b. The Personnel Air Lock fails the inner door seal leak test

c. A spurious Containment High Pressure (CHP) occurs and CV-0155, Quench Tank Spray, fails to close

d. A spurious Containment High Pressure (CHP) occurs and CV-1103, Containment Sump Drain, fails to close

Answer:

c. A spurious Containment High Pressure (CHP) occurs and CV-0155, Quench Tank Spray, fails to close

Question: 9

Given the following conditions:

- A large break LOCA has occurred, resulting in an SIAS and a RAS.
- Pressurizer pressure has stabilized at approximately 50 psia.
- Containment pressure is approximately 14 psig.
- While responding to the LOCA in accordance with EOP-4.0, Loss of Coolant Accident Recovery, EK-1172, COMPONENT CLG SURGE TANK T-3 HI-LO LEVEL, alarms.
- Component Cooling Surge Tank level is 90% and rising slowly.
- Component Cooling Water to Containment has **NOT** been restored.

Assuming all systems are responding as expected, a potential cause of the high level in the CCW surge tank is leakage from the ...

a. SFP Heat Exchanger following the SIAS.

b. SDC Heat Exchanger following the RAS.

c. CVCS Letdown Heat Exchanger following the SIAS.

d. PCP Mechanical Seal Coolers following the RAS.

Answer:

b. SDC Heat Exchanger following the RAS.

Question: 10

Given the following conditions:

- The plant is at 100% power.
- CVCS charging and letdown are secured for a short period of time to perform maintenance.
- PCS temperature is maintained constant.

Which of the following describes the trend of pressurizer and VCT levels?

	PRESSURIZER LEVEL	**VCT LEVEL**
a.	Lowers	Rises
b.	Constant	Constant
c.	Lowers	Constant
d.	Constant	Rises

Answer:

a.	Lowers	Rises

Question: 11

Given the following conditions:

- A station blackout occurred 25 minutes ago.
- The crew is performing the actions of EOP-3.0.
- Prior to starting the first SW Pump after restoring power, the pump discharge valve is throttled such that the valve is two (2) turns open.

Which of the following describes the reason for throttling the SW Pump discharge valve?

a. Prevent the pump from tripping on overcurrent

b. Prevent the pump from tripping on undervoltage

c. Minimize hydraulic shock to the system

d. Minimize level rise of SW Bay

Answer:

c. Minimize hydraulic shock to the system

Question: 12

Which of the following describes the Containment Air Cooler and Fan configuration for a post-LOCA DBA condition?

	"A" FANS	**"B" FANS**	**SW HIGH CAPACITY OUTLET VALVES OPEN**	**SW INLET VALVES OPEN**
a.	Running	Tripped	VHX-1, VHX-2, VHX-3, VHX-4	VHX-1, VHX-2, VHX-3 **ONLY**
b.	Tripped	Running	VHX-1, VHX-2, VHX-3 **ONLY**	VHX-1, VHX-2, VHX-3, VHX-4
c.	Running	Tripped	VHX-1, VHX-2, VHX-3 **ONLY**	VHX-1, VHX-2, VHX-3 **ONLY**
d.	Tripped	Running	VHX-1, VHX-2, VHX-3, VHX-4	VHX-1, VHX-2, VHX-3, VHX-4

Answer:

a.	Running	Tripped	VHX-1, VHX-2, VHX-3, VHX-4	VHX-1, VHX-2, VHX-3 **ONLY**

Question: 13

Given the following conditions:

- LIA-0105, Reactor Vessel Level, is indicating 63%.
- The indicator position switch for LIA-0105 is in WIDE RANGE.
- PCS temperature is 150 °F.

The PCS level, in feet and inches, is ...

a. 619' 0".

b. 619' 4".

c. 624' 0".

d. 624' 4".

Answer:

d. 624' 4".

Question: 14

Given the following conditions:

- Diesel Generator 1-1 is operating at full load, paralleled with the grid.
- The Main Generator voltage is adjusted from 60 MVARs overexcited to 75 MVARs underexcited.

Assuming **NO** operator actions, an observable change may occur in Diesel Generator 1-1 ...

a. current.

b. frequency.

c. voltage.

d. speed.

Answer:

a. current.

Question: 15

While implementing ONP-25.2, Alternate Safe Shutdown Procedure, the crew is taking actions for Reactivity Control.

Which of the following valves associated with Reactivity Control can NOT be operated from Control Panel C-33?

a. Boric Acid Pump Recirc Valve, CV-2130

b. Charging Pumps Suction From SIRWT, MO-2160

c. Boric Acid Gravity Feed Valve, MO-2169

d. VCT Outlet Valve, MO-2087

Answer:

~~c. Boric Acid Gravity Feed Valve, MO-2169~~

a. Boric Acid Pump Recirc Valve, CV-2130

Question: 16

Emergency boration and a reactor trip are IMMEDIATE ACTIONS required during a(n) ...

a. steam line break caused by a failed weld.

b. breech of containment integrity caused by an earthquake.

c. excessive feedwater event caused by a failed controller.

d. uncontrolled 60 inch insertion of two (2) Group 4 regulating rods.

Answer:

b. breech of containment integrity caused by an earthquake.

Question: 17

Given the following conditions:

- The PCS is being filled from Reduced Inventory 5 days following a forced outage to replace a PCP seal package.
- Current PCS level is 628' 5".
- Both SGs have level at approximately 50%.
- Current Average Qualified CET temperature is 140 °F.
- Shutdown Cooling has been lost.

The PCS will reach 200 °F in approximately ...

a. 11 to 15 minutes.

b. 16 to 20 minutes.

c. 21 to 25 minutes.

d. 26 to 30 minutes.

Answer:

b. 16 to 20 minutes.

Question: 18

The Reactor Vessel Level Monitoring System (RVLMS) lights indicate **ALL** GREEN lights OFF and **ALL** RED lights LIT.

This indicates that the reactor vessel level is ...

a. completely full.

b. at or below the top of the fuel.

c. in the head region.

d. at or above the top of the hot legs.

Answer:

b. at or below the top of the fuel.

Question: 19

Which of the following describes the limitations of operating one (1) Containment Spray Pump following a RAS during a Loss of Coolant Accident?

A single Containment Spray Pump can supply ...

a. one (1) Containment Spray Valve AND one (1) HPSI Subcooling Valve simultaneously.

b. one (1) Containment Spray Valve OR one (1) HPSI Subcooling Valve at a time.

c. both Containment Spray Valves AND one (1) HPSI Subcooling Valve simultaneously.

d. one (1) Containment Spray Valve OR both HPSI Subcooling Valves at a time.

Answer:

a. one (1) Containment Spray Valve AND one (1) HPSI Subcooling Valve simultaneously.

Question: 20

Which of the following are the power supplies for the Reactor Protection System BC logic matrix?

a. Y-10 and Y-30

b. Y-10 and Y-40

c. Y-20 and Y-30

d. Y-20 and Y-40

Answer:

c. Y-20 and Y-30

Question: 21

Why is Refueling Shutdown Margin higher than Cold Shutdown Margin requirements?

a. Refueling Operations require maintaining the core subcritical with all control rods withdrawn

b. The colder PCS temperature during Refueling Operations adds more positive reactivity

c. Refueling Operations include dry fuel storage (DFS) operations and compatibility with DFS conditions is necessary

d. The colder PCS temperature during Refueling Operations makes the Reactor Vessel more susceptible to brittle fracture

Answer:

a. Refueling Operations require maintaining the core subcritical with all control rods withdrawn

Question: 22

Given the following conditions:

- The time is currently 1445 on a Saturday.
- One of the oncoming 'C' Shift Control Room Operators has called in sick.

Which of the following Operators should be utilized to replace the sick Operator?

a. An operator who has worked his normal 'B' shift Saturday and came in at 0600 to relieve another operator early. His turnover time totaled 15 minutes.

b. An operator who has worked his normal 'B' shift Saturday and came in at 2345 on Friday to cover for vacation. His turnover time totaled 30 minutes.

c. An operator who worked the 'A' shift and was relieved at 0805 which included 20 minutes turnover time.

d. An operator who worked 'A' shift and 4 hours over on 'B' shift on Friday. He reported back to work at 1950 on Friday and was relieved at 0805. His total turnover time was 30 minutes.

Answer:

c. An operator who worked the 'A' shift and was relieved at 0805 which included 20 minutes turnover time.

Question: 23

Following an accident in the plant, which of the following would indicate that a Safety Function parameter is outside its acceptable range on the Critical Functions Monitoring System (CFMS)?

a. YELLOW border around CNMT PRESSURE HI used to monitor Containment Isolation

b. MAGENTA border around CNMT PRESSURE HI used to monitor Containment Isolation

c. YELLOW border around SW PUMP used to monitor Maintenance of Vital Auxiliaries - Water

d. MAGENTA border around SW PUMP used to monitor Maintenance of Vital Auxiliaries - Water

Answer:

b. MAGENTA border around CNMT PRESSURE HI used to monitor Containment Isolation

Question: 24

Given the following conditions:

- The plant is operating at 100% power.
- Planned LCO Maintenance is scheduled to be performed on LPSI Pump P-67B.
- The LCO allowed outage time (AOT) for LPSI Pump P-67B is 24 hours.
- P-67B is taken out of service for the maintenance at 1000 on Saturday.

WITHOUT any extensions granted by the Operations Support Supervisor, what is the **LATEST** time that the pump should be restored to operable status?

a. 1600 on Saturday

b. 2200 on Saturday

c. 0400 on Sunday

d. 1000 on Sunday

Answer:

b. 2200 on Saturday

Question: 25

Access to a Very High Radiation Area (> 500 Rads in one hour at one meter) requires prior authorization from the ...

a. Duty Health Physics Technician.

b. Shift Supervisor.

c. General Manager Plant Operations.

d. Plant Safety Coordinator.

Answer:

c. General Manager Plant Operations.

Question: 26

Chemistry reports that the PCS gross (beta-gamma) specific activity has exceeded the 100/E μCi/gm limit.

The plant is to be placed in Hot Shutdown with Tave less than 500 °F to ...

a. enhance the ability of the mixed bed demineralizers to remove fission products in the event of a small break LOCA.

b. minimize the deposition of fission products and activation products on the core surfaces in the event of a large break LOCA.

c. prevent additional fuel cladding oxidation from occurring in the event of a large break LOCA.

d. prevent the release of radioactivity to the environment in the event of a SGTR.

Answer:

d. prevent the release of radioactivity to the environment in the event of a SGTR.

Question: 27

The Duty and Call Superintendent is required to be notified for ALL of the following conditions **EXCEPT** ...

a. entry into ONP-5.1, Control Rod Drop, to recover a dropped rod at power.

b. if shift staffing is less than permitted by Technical Specifications due to an ill crew member being sent home and the replacement operator will be 1.5 hours late.

c. if work being performed by an outside contractor is progressing too slowly to be considered satisfactory as a result of poor interfacing.

d. for a 24-hour report to the NRC due to an unplanned contamination event that requires access to the contaminated area by workers be restricted by imposing additional radiological controls.

Answer:

b. if shift staffing is less than permitted by Technical Specifications due to an ill crew member being sent home and the replacement operator will be 1.5 hours late.

There is no correct answer.
Verified by PPitcher, BDusterhoft, DMalone, JWicks

(Question recommended for deletion by licensee. NOT ACCEPTED BY NRC. Question not deleted.)

* see post exam comments resolution in examination report

Question: 28

The basis for the Standing Order 54 restrictions on shipping cask movement is to prevent ...

a. fuel damage.

b. personnel injury.

c. cask contamination.

d. cask damage.

Answer:

a. fuel damage.

Question: 29

A step which directs the performance of action(s) whenever a specified set of conditions exist in an Emergency Operating Procedure is a ...

a. Continuous step.

b. Non-instructional step.

c. Non-sequential step.

d. Sequential step.

Answer:

c. Non-sequential step.

Question: 30

Given the following conditions:

- A plant heatup is in progress following a Refueling Outage.
- PCS temperature is 400 °F.
- PCS pressure is 1500 psia.
- Pressurizer level is 42%.
- SG levels are 75%.
- SG pressures are 300 psia.

If a loss of BOTH 2400 VAC Buses 1C and 1D were to occur due to bus lockouts, the event should be mitigated by performing the actions of ...

a. ONP-1.0, Loss of Load

b. EOP-1.0, Standard Post-Trip Actions

c. EOP-3.0, Station Blackout Recovery

d. EOP-8.0, Loss of Offsite Power/Forced Circulation Recovery

Answer:

c. EOP-3.0, Station Blackout Recovery

Question: 31

The Radioactive Gas Effluent Monitoring (RGEM) System is used to monitor plant stack gas and ...

a. isolate the waste gas decay tanks on a high radiation level.

b. prevent workers, contaminated by radioactive gas, from leaving the RCA.

c. prevent a radioactive release by shutting down the reactor on a high radiation level.

d. record levels of radioactivity being released to the environment.

Answer:

d. record levels of radioactivity being released to the environment.

Question: 32

Operating the shunt trip push button located on DC Panel D-11A will ...

a. isolate selected loads on Station Battery #1 to ensure DG 1-1 has control power available.

b. remotely trip DG 1-1 if a fire occurs in the Diesel Generator room.

c. disconnect Station Battery #1 from ALL of its DC loads if a battery room fire occurs.

d. disable all remote trips for DG 1-1.

Answer:

a. isolate selected loads on Station Battery #1 to ensure DG 1-1 has control power available.

Question: 33

Given the following conditions:

- A loss of offsite power has occurred after operating the plant at full load for 154 days.
- The crew is responding to the event in accordance with EOP-8.0, Loss of Offsite Power/Forced Circulation Recovery.
- Offsite power will **NOT** be restored for another hour.

Assuming that all of the following parameters are stable, which of the following sets of conditions would require that SG steaming and feeding rates be adjusted due to **NOT** being able to verify natural circulation?

	AVERAGE QUALIFIED CETs	**LOOP Thots**	**LOOP Tcolds**	**PRESSURIZER PRESSURE**
a.	500 °F	490 °F	460 °F	970 psia
b.	480 °F	480 °F	460 °F	740 psia
c.	510 °F	500 °F	495 °F	960 psia
d.	470 °F	460 °F	415 °F	720 psia

Answer:

d.	470 °F	460 °F	415 °F	720 psia

Question: 34

Given the following conditions:

- The plant is currently in Refueling Shutdown.
- Core alterations are in progress.

Which of the following would require that core alterations be immediately suspended?

a. The Shutdown Cooling Pump which is **NOT** operating is tagged out for oil replacement

b. The Source Range channel which is **NOT** providing audible indication in Containment fails low

c. One of the doors in the Emergency Air Lock is determined to be open

d. An automatic Containment Isolation valve is opened to perform stroke time testing

Answer:

b. The Source Range channel which is **NOT** providing audible indication in Containment fails low

Question: 35

Which of the following Group 4 Rod Positions would permit continued operations for the associated power level **WITHOUT** any operator actions?

	POWER LEVEL	**GROUP 4 ROD POSITION**
a.	40%	30 inches
b.	50%	50 inches
c.	60%	55 inches
d.	70%	60 inches

Answer:

b.	50%	50 inches

Question: 36

Given the following conditions:

- The plant is operating at 55% power.
- Both Main Feed Pumps are in service.
- Both Condensate Pumps are in service.
- Both Heater Drain Pumps are in service.

Assuming **NO** operator action, which of the following is most likely to lead to an automatic Reactor Trip?

a. P-10A, Heater Drain Pump, tripping

b. Condenser hotwell level lowering to 5%

c. CV-0711, Main Feed Pump Recirculation Valve, failing open

d. The output of LIC-0701, Main Feed to SG A, failing high

Answer:

b. Condenser hotwell level lowering to 5%

Question: 37

Given the following conditions and the included reference:

- The plant is operating at 100% power.
- Due to a failure, both Containment Pressure Switches, SW-1 and SW-2, associated with PS-1802A are tripped.
- A loss of Preferred AC Bus Y-10 occurs.

Which of the following describes the plant response?

a. An SIAS will be generated ONLY on the LEFT channel

b. An SIAS will be generated ONLY on the RIGHT channel

c. An SIAS will be generated on BOTH channels

d. An SIAS will **NOT** be generated on either channel

Answer:

d. An SIAS will **NOT** be generated on either channel

Question: 38

Given the following conditions:

- The plant is on Shutdown Cooling using LPSI Pump P-67B.
- A loss of offsite power has occurred.
- Diesel Generator (DG) 1-1 has started and loaded its associated bus.

Which of the following describes the operation of LPSI Pump P-67B?

a. P-67B should have restarted as soon as DG 1-1 output breaker closed.

b. P-67B should have restarted 13 seconds after DG 1-1 output breaker closed.

c. P-67B is **NOT** running, but will restart automatically when the NSD Sequencer is reset.

d. P-67B is **NOT** running and must be manually restarted.

Answer:

d. P-67B is **NOT** running and must be manually restarted.

Question: 39

Given the following conditions:

- The plant is operating at 8% power following a startup.
- The Operators have just synchronized the Main Generator to the grid.
- EK-1165, NON CRITICAL SERV WATER LO PRESS, alarms.
- Critical Service Water Header Pressures are noted to be 35 psig.
- An Auxiliary Operator reports a break in the Non-Critical Service Water Header downstream of CV-1359, Non-Critical Service Water Isolation.
- The Control Room Supervisor orders CV-1359 CLOSED to isolate the leak.

Which of the following actions should be taken?

a. Trip the turbine, verify the reactor automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

b. Trip the reactor, verify the turbine automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

c. Trip the turbine and stabilize reactor power above the point of adding heat.

d. Maintain the reactor and turbine on-line.

Answer:

b. Trip the reactor, verify the turbine automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

Question: 40

With the plant operating at 35% power, a loss of Component Cooling Water occurs.

Which of the following conditions will require a manual reactor trip?

a. PCP P-50B Thrust Bearing temperature at 187 °F

b. PCP P-50B Controlled Bleedoff temperature at 178 °F

c. Control Rod Drive Seal Leakoff temperatures all between 185 °F and 195 °F

d. PCP P-50B Lower Seal temperature at 177 °F

Answer:

a. PCP P-50B Thrust Bearing temperature at 187 °F

Question: 41

Given the following conditions:

- The reactor is operating at 19% power.
- Wide Range Nuclear Instrument channel NI-3 instantaneously fails high.

Assuming **NO** other failures, which of the following is required?

a. The reactor must be shut down in an orderly manner until NI-3 is repaired.

b. Continue power operations and repair NI-3.

c. Ensure the reactor automatically trips on high Startup Rate.

d. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

Answer:

b. Continue power operations and repair NI-3.

Question: 42

Given the attached drawing and the following conditions:

- Controlled Bleedoff temperature is 120 °F.
- Controlled Bleedoff flow is 1 gpm.
- Controlled Bleedoff pressure is 90 psig.

Which of the following PCP malfunctions have occurred?

a. The upper seal (3rd stage) has failed

b. The middle seal (2nd stage) has failed

c. The lower seal (1st stage) has failed

d. The upper (3rd stage) pressure breakdown device has plugged

Answer:

a. The upper seal (3rd stage) has failed

Question: 43

Given the following conditions:

- The Feed Reg Valve Controllers, LIC-0701 and LIC-0703, are both in AUTO.
- The Feed Pump Combined Speed Controller, HIC-0525, is in CASCADE.
- The Individual Speed Controllers, HIC-0526 and HIC-0529, are both in CASCADE.
- The plant is operating at 80% power when the Main Turbine trips.

Assuming **NO** operator action, which of the following describes the response of the Feed Water System?

a.
- Feed Reg Valves ramp closed
- Feed Pump Speed ramps to approximately 3250 rpm

b.
- Feed Reg Valves ramp closed
- Feed Pump Speed remains at pre-trip speed

c.
- Feed Reg Valves remain at pre-trip position
- Feed Pump Speed ramps to approximately 3250 rpm

d.
- Feed Reg Valves remain at pre-trip position
- Feed Pump Speed remains at pre-trip speed

Answer:

c.
- Feed Reg Valves remain at pre-trip position
- Feed Pump Speed ramps to approximately 3250 rpm

Question: 44

Ten (10) minutes have elapsed since an inadvertent SIAS.

Which of the following results in the greatest heat load on the Component Cooling Water System?

a. Letdown Heat Exchanger

b. Primary Coolant Pumps

c. Shutdown Cooling Heat Exchangers

d. Spent Fuel Pool Heat Exchanger

Answer:

a. Letdown Heat Exchanger

Question: 45

While obtaining a hydrogen sample from the containment atmosphere, the Hydrogen Monitoring System containment isolation valves must be opened prior to placing the system in ANALYZE to ...

a. prevent damage to the sample pump.

b. prevent damage to the analyzer.

c. prevent unnecessary Control Room annunciators from alarming.

d. ensure the valves remain open in the event of a CHP or CHR signal.

Answer:

a. prevent damage to the sample pump.

Question: 46

Given the following conditions:

- A liquid batch release is being performed from T-91 to the lake at 75 gpm.
- P-40A, Dilution Water Pump, is operating.
- RIA-1049, Liquid Radwaste Monitor, alarms.

Which of the following AUTOMATICALLY terminates the release as a result of the RIA-1049 alarm?

a. CV-1051, 1" Discharge Isolation, closes

b. CV-1054, Discharge Isolation (common), closes

c. P-40A, Dilution Water Pump, trips

d. CV-5021, Tie to Treated Waste, closes

Answer:

a. CV-1051, 1" Discharge Isolation, closes

Question: 47

During recovery from a LOCA inside containment, the operators have established simultaneous hot and cold leg injection in accordance with EOP-4.0, Loss of Coolant Accident Recovery.

Assuming all equipment is operating properly, which of the following describes the correct flow rates that should be observed?

	LOOP 1 HOT LEG FLOW FI-0316A	**LOOP 1 HOT LEG FLOW FI-0317A**	**HPSI FLOW TO LOOP 1A FI-0308A**	**HPSI FLOW TO LOOP 1B FI-0310A**	**HPSI FLOW TO LOOP 2A FI-0312A**	**HPSI FLOW TO LOOP 2B FI-0313A**
a.	275 gpm	275 gpm	137.5 gpm	137.5 gpm	137.5 gpm	137.5 gpm
b.	550 gpm	0 gpm	275 gpm	275 gpm	0 gpm	0 gpm
c.	183.3 gpm	183.3 gpm	183.3 gpm	183.3 gpm	183.3 gpm	183.3 gpm
d.	350 gpm	350 gpm	100 gpm	100 gpm	100 gpm	100 gpm

Answer:

a.	275 gpm	275 gpm	137.5 gpm	137.5 gpm	137.5 gpm	137.5 gpm

Question: 48

Given the following conditions:

- The plant is operating at 50% power.
- A Steam Generator Tube Leak is suspected.
- Total PCS Xenon-133 is 200 μCi/kg.
- Condenser off-gas flow is 2 cfm.
- RIA-0631, Condenser Off-Gas Monitor, is indicating 6.00E3 cpm.

The estimated steam generator tube leakage is ...

a. 0.008 gpm.

b. 0.015 gpm.

c. 0.030 gpm.

d. 0.045 gpm.

Answer:

b. 0.015 gpm.

Question: 49

Given the following conditions:

- The plant is operating at 100% power.
- Charging Pump P-55A is tagged out.
- P-55B, Charging Pump B, is in MANUAL control.
- P-55C, Charging Pump C, is in AUTO control.
- Charging flow is 40 gpm.
- Letdown flow is 44 gpm.

Pressurizer level will ...

a. stabilize at approximately 51%.

b. cycle between 51% and 62%.

c. cycle between 55% and 57%.

d. stabilize at approximately 62%.

Answer:

c. cycle between 55% and 57%.

Question: 50

Given the following conditions:

- The Control Room has been evacuated due to a fire in the Control Room.
- Auxiliary Shutdown Panel C-150 has been placed in service.

As a result of placing C-150 in service, AFW Pump P-8B ...

a. will **NOT** automatically trip on low suction pressure.

b. will **NOT** be available as a source of feedwater.

c. automatic speed control is disabled.

d. overspeed trip protection is disabled.

Answer:

a. will **NOT** automatically trip on low suction pressure.

Question: 51

Given the following conditions:

- The plant was operating at 40% power when a large break LOCA occurred inside containment.
- Containment Spray has actuated and both trains are operating.
- Actions are being performed per EOP-4.0, Loss of Coolant Accident Recovery.

How is the Containment Air Cooler System required to be operated in this condition?

a. At least one (1) Containment Cooler 'A' Fan running to prevent the formation of explosive/flammable pockets of hydrogen inside containment.

b. All four (4) Containment Cooler 'A' Fans running since the Containment Spray System, by itself, is **NOT** capable of maintaining containment pressure below design pressure.

c. At least one (1) Containment Cooler 'A' Fan running since the Containment Spray System, by itself, is **NOT** capable of maintaining containment temperature below design temperature.

d. All four (4) Containment Cooler 'A' Fans running to ensure adequate cooling to prevent concrete dryout from interfering with Containment Sump Recirculation, if needed.

Answer:

a. At least one (1) Containment Cooler 'A' Fan running to prevent the formation of explosive/flammable pockets of hydrogen inside containment.

Question: 52

Given the following conditions:

- The plant is operating at 50% power.
- A Technical Specification ACTION has been entered due to a Safety Injection Pump failing its surveillance test.

The Work Request issued to repair the pump should be clearly identified as ...

a. Emergency Maintenance.

b. Urgent Maintenance.

c. Rework Maintenance.

d. Fix-It-Now Maintenance.

Answer:

b. Urgent Maintenance.

Question: 53

Given the following conditions:

- The crew is performing EOP-6.0, Excess Steam Demand Event.
- The Main Steam Isolation Valves are closed.
- P-50B and P-50C PCPs are running
- SG 'B' has been isolated.

Which of the following indications is **NOT** used in verifying that the MOST AFFECTED SG has been isolated?

a. Loop T_{HOT} Temperatures

b. SG Level

c. SG Pressure

d. Loop T_{COLD} Temperatures

Answer:

a. Loop T_{HOT} Temperatures

Question: 54

Operating requirements and clarification or interpretation of Technical Specifications are found in the ...

a. Shift Supervisor's logbook.

b. Daily Orders logbook.

c. Standing Orders.

d. Shift Turnover Checklist.

Answer:

c. Standing Orders.

Question: 55

While conducting a plant tour, the Shift Supervisor notes the following conditions.

Which of these conditions would be a violation of fire protection procedures?

a. A piece of fixed fire protection equipment is removed from service for minor repairs after establishing contingency actions, but without prior approval of the Plant Property Protection Supervisor.

b. A temporary storage area for acetylene bottles is set up in the West Engineered Safeguards Room for an upcoming system modification.

c. A Fire Brigade member is sent home due to an illness and his relief will **NOT** be in for an hour from the time he went home.

d. Used anti-Cs are being temporarily stored in a metal container in the Charging Pump Room.

Answer:

b. A temporary storage area for acetylene bottles is set up in the West Engineered Safeguards Room for an upcoming system modification.

Question: 56

Which of the following describes the change in PCS pH and boron concentration if a fresh CVCS delithiating demineralizer is placed in service **WITHOUT** performing a resin saturation treatment?

	pH	**BORON CONCENTRATION**
a.	Lowers	Lowers
b.	Lowers	Rises
c.	Rises	Lowers
d.	Rises	Rises

Answer:

a.	Lowers	Lowers

Question: 57

Which of the following is considered a Temporary Modification?

a. Temporarily installing jumpers to bypass an automatic actuation as directed by a channel calibration procedure

b. Temporarily lifting leads on an inoperable valve motor operator for testing

c. Connecting cables from a 480 VAC MCC to a temporary power panel for outage maintenance work

d. Installing a temporary drain hose to allow changing oil in a pump

Answer:

c. Connecting cables from a 480 VAC MCC to a temporary power panel for outage maintenance work

Question: 58

Given the following conditions:

- A steam break on SG 'A' has occurred inside containment and the crew is responding per EOP-6.0, Excess Steam Demand Event.
- The Technical Support Center reports that SG 'A' also has indications of steam generator tube leakage.
- The indications of steam generator tube leakage are confirmed by the Control Room.

Which of the following actions should be taken?

a. Perform the actions of EOP-6.0 and EOP-5.0, Steam Generator Tube Rupture, in parallel.

b. Complete performing the actions of EOP-6.0, then go to EOP-5.0, Steam Generator Tube Rupture.

c. Go to EOP-5.0, Steam Generator Tube Rupture, and return to EOP-6.0 when the actions of EOP-6.0 are completed.

d. Go to EOP-9.0, Functional Recovery, and perform the actions necessary to recover/maintain the Safety Functions.

Answer:

d. Go to EOP-9.0, Functional Recovery, and perform the actions necessary to recover/maintain the Safety Functions.

Question: 59

An Auxiliary Operator reports that while performing a system checklist, several pages of the checklist have become contaminated.

Which of the following actions should the Shift Supervisor direct the AO to take?

a. Make a new copy of the checklist and transfer signatures to the new copy

b. Substitute copies of the contaminated pages and mark them "Original Contaminated"

c. Make an entry in the "Comment" section of the checklist detailing which pages are contaminated and note that the pages are available at Radiation Protection

d. Telephone the Control Room and have all data transposed to another copy

Answer:

b. Substitute copies of the contaminated pages and mark them "Original Contaminated"

Question: 61

Reactor Power is being lowered from 99.9% to 99.2% in preparation for Auxiliary Feed Pump testing by adjusting GV-4 closed.

WITHOUT making any adjustment in rod position or boron concentration, which of the following describes the response of Tave and Tref as turbine load is lowered?

	T-AVE	**T-REF**
a.	Lowers	Lowers
b.	Lowers	Rises
c.	Rises	Lowers
d.	Rises	Rises

Answer:

c.	Rises	Lowers

Question: 62

Given the following conditions:

- The reactor is shut down.
- PCS temperature is 230 °F.

The most acceptable method of reducing pressure inside Containment is to open ...

a. the personnel air lock doors.

b. CV-1805 and CV-1806, Containment Purge Exhaust Isolation Valves, and vent Containment through the stack.

c. CV-1065 and CV-1064, CWRT Vent Isolation Valves, and vent Containment through the VGCH to the stack.

d. the emergency escape lock.

Answer:

c. CV-1065 and CV-1064, CWRT Vent Isolation Valves, and vent Containment through the VGCH to the stack.

Question: 64

Given the following conditions:

- The plant is operating at 60% power.
- While performing Technical Specification Surveillance Procedure QO-34, Control Rod Exercising, it is determined that Regulating Group 4 Rod 39 will **NOT** move and it is declared inoperable.
- Core Burnup is 5600 MWd/MTU.
- EM-04-08, Shutdown Margin Requirements, is being performed due to the inoperable rod.
- When calculating the Shutdown Margin Requirements, the maximum worth of the stuck rod is required to be determined and recorded.
- Reactor Engineering support is **NOT** available.

The maximum worth of Rod 39 should be recorded as approximately ...

a. 1.11 %Δρ.

b. 1.23 %Δρ.

c. 1.47 %Δρ.

d. 7.52 %Δρ.

Answer:

a. 1.11 %Δρ.

Question: 65

Given the following conditions:

- A Steam Generator Tube Rupture has occurred in SG 'A'.
- SG 'A' has been isolated.
- Actions are being performed in accordance with EOP-5.0, Steam Generator Tube Rupture Recovery.
- PCS temperature is 505 °F.
- SG 'A' pressure is 980 psia.
- Condenser vacuum is 2"Hg.

Steam pressure in SG 'A' should be controlled by ...

a. unisolating and opening the MSIV Bypass to allow steaming of SG 'A' through the Turbine Bypass Valve.

b. unisolating and operating an Atmospheric Dump Valve on SG 'A'.

c. cooling down the PCS by steaming SG 'B' using the Turbine Bypass Valve.

d. cooling down the PCS by steaming SG 'B' using an Atmospheric Dump Valve.

Answer:

b. unisolating and operating an Atmospheric Dump Valve on SG 'A'.

Question: 66

Which of the following combination of SIRWT levels will provide the required logic to generate a Recirculation Actuation Signal (RAS)?

	LS-0327 (LEFT CHANNEL)	**LS-0328 (RIGHT CHANNEL)**	**LS-0329 (LEFT CHANNEL)**	**LS-0330 (RIGHT CHANNEL)**
a.	1%	5%	5%	1%
b.	1%	5%	1%	5%
c.	5%	1%	5%	1%
d.	5%	1%	5%	5%

Answer:

a.	1%	5%	5%	1%

Question: 67

Given the following conditions and the provided references, as needed:

- Battery Chargers #1 and #2 are in service.
- Battery Charger #3 is inoperable and is to be tagged out.

The following sequence of events occur:

- Breaker 52-285 (Station Battery Charger #3) is opened.
- Breaker 72-15 (Charger #1) is mistakenly opened.

Which of the following additional breaker trips will result in a reactor trip?

a. 72-10

b. 72-18

c. 72-36

d. 72-37

Answer:

b. 72-18

Question: 68

Which of the following air compressors is affected by a loss of LCC-11?

a. C-2B, Instrument Air Compressor 2B

b. C-2C, Instrument Air Compressor 2C

c. C-6B, High Pressure Air Compressor 6B

d. C-6C, High Pressure Air Compressor 6C

Answer:

b. C-2C, Instrument Air Compressor 2C

Question: 69

Annunciator EK-1309, Spent Fuel Pool Lo Level, alerts the operators that ...

a. makeup should be provided to maintain adequate shielding.

b. the SIRW Tank is potentially "backleaking" into the SFP.

c. the SFP Pumps must be secured due to loss of NPSH.

d. the SFP heat exchanger has a potential CCW leak.

Answer:

a. makeup should be provided to maintain adequate shielding.

Question: 71

Given the following conditions:

- Reactor power is 1%.
- Alarms have come in indicating a dropped rod.
- The core mimic indicates a dropped rod.
- Tave is slowly lowering.

Which of the following actions should be taken?

a. Shut down the reactor and then recover the rod per SOP-6, Reactor Control System.

b. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

c. Stabilize the plant and recover the rod per SOP-6, Reactor Control System.

d. Lower power below the point of adding heat, stabilize the plant, and recover the rod per SOP-6, Reactor Control System

Answer:

b. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

Question: 72

Given the following conditions:

- ΔT power is 88.5%.
- NI power is 88%.
- A secondary plant transient occurs.

Which of the following would require a manual reactor trip?

a. EK-0962 and EK-0964, STEAM GEN E-50A/B LO LEVEL, both in alarm and steam generator levels both at 35% and stable

b. EK-0962 and EK-0964, STEAM GEN E-50A/B LO LEVEL, both in alarm and steam generator levels both at 45% and lowering

c. EK-0143, FW PUMP P1A TURBINE K7A TRIP, in alarm and the Throttle & Trip valves closed

d. EK-0968 and EK-0969, LOOP 1/2 T_{AVE}/T_{REF} GROSS DEVIATION, both in alarm and PCS Tave rising slowly

Answer:

c. EK-0143, FW PUMP P1A TURBINE K7A TRIP, in alarm and the Throttle & Trip valves closed

Question: 73

Which of the following valves will CLOSE on a Containment High Pressure signal, but will remain OPEN on a Containment High Radiation signal?

a. CV-2083, Controlled Bleed-off Containment Isol

b. CV-0770, SG 'B' Bottom Blowdown

c. CV-0701, SG 'A' Main Feed Reg Valve

d. SV-2414A, Hydrogen Monitor Right Channel

Answer:

c. CV-0701, SG 'A' Main Feed Reg Valve

Question: 74

To determine the current high alarm setpoint on an Analog Radiation Monitor, the operator must depress the HIGH push button after placing the selector switch in ...

a. OPERATE.

b. HV.

c. CAL.

d. OFF.

Answer:

c. CAL.

Question: 75

Given the following conditions and the supplied reference:

- The system is being tagged out for repairs on the flange AND realignment of the motor to the pump coupling.
- Tags are to be placed on the following components:
  - ➢ PUMP SUCTION VALVE - CLOSED
  - ➢ PUMP SUPPLY BREAKER - OPEN
  - ➢ LOOP #1 ISOLATION VALVE - CLOSED
  - ➢ LOOP #2 ISOLATION VALVE - CLOSED
  - ➢ DRAIN VALVE - OPEN
- The PUMP DISCHARGE VALVE is **NOT** to be tagged.

Which of the following would be a satisfactory **SEQUENCE** for performing this tagging?

a.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG LOOP #1 ISOLATION VALVE
3. CLOSE and TAG LOOP #2 ISOLATION VALVE
4. CLOSE and TAG PUMP SUCTION VALVE
5. OPEN and TAG DRAIN VALVE

b.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG PUMP SUCTION VALVE
3. CLOSE and TAG LOOP #1 ISOLATION VALVE
4. CLOSE and TAG LOOP #2 ISOLATION VALVE
5. OPEN and TAG DRAIN VALVE

c.
1. CLOSE PUMP DISCHARGE VALVE
2. CLOSE and TAG PUMP SUCTION VALVE
3. OPEN and TAG PUMP SUPPLY BREAKER
4. CLOSE and TAG LOOP #1 ISOLATION VALVE
5. CLOSE and TAG LOOP #2 ISOLATION VALVE
6. OPEN and TAG DRAIN VALVE

d.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG LOOP #1 ISOLATION VALVE
3. CLOSE and TAG LOOP #2 ISOLATION VALVE
4. OPEN and TAG DRAIN VALVE
5. CLOSE and TAG PUMP SUCTION VALVE

Answer:

a.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG LOOP #1 ISOLATION VALVE
3. CLOSE and TAG LOOP #2 ISOLATION VALVE
4. CLOSE and TAG PUMP SUCTION VALVE
5. OPEN and TAG DRAIN VALVE

Question: 76

Given the following conditions:

- Indicated SG level is 62%.
- Containment temperature is 215 °F.
- SG pressure is 300 psia.

Actual SG level is ...

a. 48%.

b. 53%.

c. 57%.

d. 62%.

Answer:

b. 53%.

Question: 77

Given the following conditions:

- The plant is operating at 85% power.
- Cooling Tower Pump 'B' trips.
- Main Condenser vacuum begins lowering.
- The crew begins lowering power using ONP-26, Rapid Power Reduction.
- When power level reaches 55% during the power reduction, EK-0111, VACUUM LO, alarms due to vacuum at 24" Hg.
- Vacuum **CONTINUES LOWERING** and will **NOT** recover to greater than 24" Hg.

Which of the following actions are required to be taken?

a. Trip the turbine, verify the reactor automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

b. Trip the reactor, verify the turbine automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

c. Continue the rapid power reduction until condenser vacuum stabilizes.

d. Continue the power reduction, using normal de-escalation rates, until condenser vacuum stabilizes.

Answer:

b. Trip the reactor, verify the turbine automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

Question: 78

Given the following conditions:

- PCS temperature is 430 °F.
- The Low Temperature Overpressure Protection System (LTOP) is in service.
- A plant transient causes an LTOP actuation.
- Following the actuation, with Pressurizer Pressure at 375 psia, the operator notes that Pressurizer PORV PRV-1042B is still OPEN.
- Placing the hand switch for PORV PRV-1042B to CLOSE has **NO** effect.

Which of the following actions is required to be taken?

a. Place the controlling pressurizer pressure controller in MANUAL with 0% output.

b. Depress the RED Reset Push Button on Channel A LTOP

c. Place the Channel A LTOP Defeat/Enable key switch to DEFEAT

d. Place PORV Isolation Valve MO-1042A to CLOSE

Answer:

d. Place PORV Isolation Valve MO-1042A to CLOSE

Question: 79

Given the following conditions:

- The plant is operating at 12% power.
- DC Bus D21-2 de-energizes and isolates due to a fault.

The reactor must be tripped due to a loss of cooling to ...

a. the Main Generator.

b. the Containment Coolers.

c. the Primary Coolant Pumps.

d. the Letdown Heat Exchanger.

Answer:

a. the Main Generator.

Question: 80

Given the following conditions:

- An approach to criticality is being performed per GOP-3.0.
- Regulating Group 3 rods are currently at 5 inches.

Which of the following rod matrix lights should be ON for each group of rods?

	SHUTDOWN RODS	**GROUP 1 RODS**	**GROUP 2 RODS**	**GROUP 3 RODS**	**GROUP 4 RODS**	**PART-LENGTH RODS**
a.	Red Blue	Red	White	Amber	White	Red
b.	Blue White	Amber	Amber	White	Green	Red
c.	Red Blue	Amber	Amber	White	White	Amber
d.	Red Blue	Red	White	White	Green	Red

Answer:

d.	Red Blue	Red	White	White	Green	Red

Question: 81

Assuming normal turbine and control rod operations are performed, which of the following describes the plant response as reactor power is raised from 5% to 100%?

	T-REF	**T-AVE**	**SG PRESSURE**
a.	Lowers	Rises	Rises
b.	Rises	Rises	Lowers
c.	Rises	Lowers	Lowers
d.	Rises	Rises	Rises

Answer:

b.	Rises	Rises	Lowers

Question: 82

According to AP-7.02, ALARA Program, an electrician who becomes aware of a potential radiation exposure problem (**NOT** having immediate overexposure implications) should ensure it is evaluated by documenting the problem and submitting it to the ...

a. Control Room Supervisor.

b. Plant Safety Coordinator.

c. Radiation Safety Supervisor.

d. Property Protection Supervisor.

Answer:

c. Radiation Safety Supervisor.

Question: 83

Given the following conditions:

- Tave and Tref are initially matched.
- A plant transient occurs which results in Tave being 5 °F higher than Tref.

Assuming **NO** rod movement or boron concentration changes were made ...

a. final main steam pressure is higher than initial conditions since main steam flow has lowered.

b. main steam pressure remains constant since reactor power remains constant.

c. final main steam pressure is lower than initial conditions since main steam flow has risen.

d. main steam pressure remains constant since governor valves will adjust to maintain constant pressure.

Answer:

a. final main steam pressure is higher than initial conditions since main steam flow has lowered.

Question: 84

Given the following conditions:

- Power has just been rapidly lowered from 60% to 20% in accordance with ONP-26, Rapid Power Reduction.
- SG levels are approximately 78% and rising slowly.
- Pressurizer pressure is 1985 psia and rising slowly.
- Pressurizer level is 39% and lowering slowly.
- PCS Tave is 523 °F and lowering slowly.

Which of the following requires that the reactor be tripped?

a. SG levels

b. Pressurizer pressure

c. Pressurizer level

d. PCS Tave

Answer:

d. PCS Tave

Question: 85

While performing Containment Isolation criteria verification in EOP-1.0, which of the following would **BOTH** require that Contingency Actions be taken?

a.
- Containment pressure > 4.0 psig
- Containment Area Monitor in alarm

b.
- Containment pressure > 4.0 psig
- Condenser Off Gas Monitor in alarm

c.
- Containment pressure > 4.0 psig
- Main Steam Line Monitor in alarm

d.
- Containment Area Monitor in alarm
- Condenser Off Gas Monitor in alarm

Answer:

a.
- Containment pressure > 4.0 psig
- Containment Area Monitor in alarm

Question: 86

RIA-1809, Auxiliary Building Radwaste Area Vent Rad Monitor, has reached the high alarm condition.

Which of the following fans will be tripped?

a. V-10, Auxiliary Building Radwaste Area Supply Fan

b. V-67, Radwaste Addition Supply Fan

c. V-68, Radwaste Addition Exhaust Fan

d. V-70, Radwaste Addition Fuel Handling Area Exhaust Fan

Answer:

a. V-10, Auxiliary Building Radwaste Area Supply Fan

Question: 87

While operating with reactor power above 15%, the power range safety channels ...

a. enable the loss of load reactor trip signals.

b. enable the high power rate reactor trip signals.

c. generate loss of load reactor trip signals.

d. generate high power rate reactor trip signals.

Answer:

a. enable the loss of load reactor trip signals.

Question: 88

Given the following conditions:

- The SIRW Tank boron concentration is to be raised from 1900 ppm to 2000 ppm.
- SIRW Tank level is currently 97% (289,955 gallons).
- Boric Acid Storage Tank "B" concentration is 13,100 ppm.

Approximately how many gallons of boric acid are required to be added to the SIRW Tank?

a. 2300 gallons

b. 2450 gallons

c. 2600 gallons

d. 2750 gallons

Answer:

c. 2600 gallons

Question: 89

Given the following conditions:

- While performing a valve alignment, an Auxiliary Operator must enter an area containing a radioactive hot spot.
- The radiological survey indicates that the dose rate two (2) feet from the hot spot is 200 mRem/hr.
- The AO will be four (4) feet from the hot spot while aligning the valve.

The AO will be exposed to a radiation field of approximately ...

a. 150 mRem/hr.

b. 100 mRem/hr.

c. 50 mRem/hr.

d. 25 mRem/hr.

Answer:

c. 50 mRem/hr.

Question: 90

Given the following conditions:

- The plant tripped from 40% power due to a loss of load.
- The reactor and the turbine tripped as designed.
- 'F' Bus in the Switchyard was also lost at the time of the trip.
- **NO** other equipment has malfunctioned.
- EOP-1.0, Standard Post-Trip Actions, has been completed.
- The operator reported that BOTH 2400 VAC Buses 1C and 1D are energized.

Buses 1C and 1D are being supplied by ...

a. their respective Diesel Generators.

b. Startup Transformer 1-2.

c. Safeguards Transformer 1-1.

d. Startup Transformer 1-1.

Answer:

b. Startup Transformer 1-2.

Question: 91

Given the following conditions:

- A steamline break has occurred inside containment.
- Containment pressure is currently 2.4 psig after peaking at 11.5 psig.
- Containment temperature is currently 155 °F after peaking at 205 °F.
- Pressurizer pressure is 240 psia and stable.
- Average Qualified CET temperature is 275 °F and stable.
- Average Loop Thot is 270 °F and stable.
- Corrected Pressurizer Level is 48% and stable (cold cal).

Which of the following actions must be taken PRIOR to placing Shutdown Cooling in service?

a. Lower pressurizer pressure

b. Raise pressurizer level

c. Lower Average Qualified CET temperature

d. Raise subcooling

Answer:

a. Lower pressurizer pressure

Question: 92

Given the following conditions:

- The plant was operating at 15% power.
- An automatic reactor trip and safety injection occurred as a result of lowering Pressurizer Pressure.
- Pressurizer pressure is currently 1000 psia.
- PCS temperature was stable prior to the Safety Injection, but has lowered since Pressurizer pressure dropped below 1200 psia.
- Pressurizer level was rising PRIOR to the Safety Injection and is continuing to rise.

This transient is indicative of a ...

a. steam line break.

b. double-ended hot leg break.

c. stuck open pressurizer safety valve.

d. steam generator tube rupture.

Answer:

c. stuck open pressurizer safety valve.

Question: 93

Given the following conditions:

- A spent fuel bundle has been dropped in the spent fuel pool.
- Radiation levels in the spent fuel pool area have reached the high radiation setpoint.
- All automatic actions have occurred.

Which fan must be manually aligned in response to this event?

a. V-7, Fuel Handling Supply Fan

b. V-8B, Fuel Handling Exhaust Fan

c. V-69, Fuel Handling Area Supply Fan

d. V-70A, Fuel Handling Area Exhaust Fan

Answer:

a. V-7, Fuel Handling Supply Fan

Question: 94

Which of the following Nuclear Instruments will become de-energized upon a loss of Preferred AC Bus Y-30?

a. Power Range channel NI-5

b. Power Range channel NI-6

c. Source/Wide Range channel NI-1/3

d. Source/Wide Range channel NI-2/4

Answer:

c. Source/Wide Range channel NI-1/3

Question: 95

Which of the following describes the interlock between MOV-3081, HPSI Train 1 Cold Leg Isolation Valve, and MOV-3083, Hot Leg Injection Valve?

a. The hand switch for MOV-3081 must be in AUTO before MOV-3083 may be opened

b. MOV-3083 must be closed before MOV-3081 may be opened

c. SS-3083B, Hot Leg Injection Selector Switch, must be in the "MO-3083" position before MOV-3081 may be closed

d. MOV-3081 must be closed before MOV-3083 may be opened

Answer:

d. MOV-3081 must be closed before MOV-3083 may be opened

Question: 96

Given the following conditions:

- The plant is in Hot Standby.
- At 1000 on May 13, 2000, it is determined that a required surveillance on a Technical Specification component was **NOT** performed within the required time schedule.
- The ACTION statement for the component requires that the plant be placed in Hot Shutdown within six (6) hours if found inoperable.

The plant must be placed in Hot Shutdown **NO LATER THAN** ...

a. 1600 on May 13th.

b. 2200 on May 13th.

c. 1000 on May 14th.

d. 1600 on May 14th.

Answer:

d. 1600 on May 14th.

Question: 97

When PCS temperature is below 450 °F, the PCP operation is limited to a MAXIMUM number of three (3) to ...

a. limit PCS heatup rates.

b. ensure an adequate NPSH.

c. limit steam generator tube stresses.

d. prevent core uplift.

Answer:

d. prevent core uplift.

Question: 98

Given the following conditions:

- EOP-5.0, Steam Generator Tube Rupture, is being performed.
- All rods are fully inserted.
- Latest PCS boron concentration is 780 ppm.
- Cold Shutdown PCS boron concentration is 1180 ppm.
- Refueling boron concentration is 2350 ppm.
- CBAST concentration is 12,100 ppm.
- CBAST level is 84%.

To ensure Cold Shutdown Boron Concentration is met prior to cooling down, CBAST level must be lowered to approximately ...

a. 44%.

b. 40%.

c. 36%.

d. 32%.

Answer:

b. 40%.

Question: 99

Following declaration of an emergency, the Shift Supervisor shall ensure the NRC is notified via the Emergency Notification System, as soon as possible, but in all cases within ...

a. 15 minutes.

b. 30 minutes.

c. 60 minutes.

d. 90 minutes.

Answer:

c. 60 minutes.

Question: 100

Given the following conditions and Technical Specification 3.7.9:

- The plant is at 25% power.
- 125 VDC Bus Section D10-L is inoperable due to a ground of undetermined origin.
- Preferred AC Bus Y-30 is being supplied by the Bypass Regulator.
- While preparing to work on D10-L, an Electrical Technician mistakenly goes to 125 VDC Bus Section D20-L and causes this bus section to de-energize.
- Due to the Technician's error, Bus Section D-20L **CANNOT** be immediately re-energized.

Which of the following actions should be taken?

a. Restore **EITHER** D10-L **OR** D20-L to OPERABLE status within 8 hours, or be in HOT STANDBY within the following 6 hours.

b. Restore **BOTH** D10-L **AND** D20-L to OPERABLE status within 8 hours, or be in HOT SHUTDOWN within the following 12 hours.

c. Make preparations within the next hour to be in HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the following 6 hours.

d. Restore **BOTH** D10-L **AND** D20-L to OPERABLE status within 8 hours, or be in HOT STANDBY within the following 6 hours.

Answer:

c. Make preparations within the next hour to be in HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the following 6 hours.

PALISADES NRC WRITTEN EXAMINATION
SENIOR REACTOR OPERATOR
SUPPLIED REFERENCES

NOTE: References are listed and supplied in alphabetical order with the exception of Steam Tables and Drawings, which are listed last.

EM-04-08, Attachment 1

EOP Supplement 1

EOP Supplement 6

EOP Supplement 11

EOP Supplement 35

EOP-6.0, Step 61

ONP-17, Attachment 1 (all pages)

ONP-23.2, Attachment 1

SOP-1, Attachment 6 (Pages 1-3)

SOP-6, Attachment 3

Technical Data Book Figure 1.1

Technical Data Book Figure 1.9

Technical Data Book Figure 8.2

Technical Specifications 3.7.9

Steam Tables

M-218, **Sh. 4**

M-656

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

1. **INOPERABLE OR DROPPED CONTROL ROD IDENTIFICATION:**

GROUP ________ NUMBER ________ CORE LOCATION ___________

CONDITION ____________________ *(Inoperable or Dropped)*

2. **WORTH OF INOPERABLE OR DROPPED CONTROL ROD** __________ %Δρ
(TDB Figure 1.1 or Reactor Engineering)

3. **SOURCE OF INOPERABLE OR DROPPED CONTROL ROD WORTH DATA:**

____

4. **REFERENCE DATA**

A. CURRENT CYCLE BURNUP __________ MWd/MTU
(TDB Fig 1.10)

B. CURRENT REACTOR POWER LEVEL __________ %
(Percent of Rated Power)

C. CONTROL ROD WORTH INSERTED INTO CORE __________ %Δρ
(TDB Fig 1.3)

GROUP _____ INCHES _________

This Control Rod worth does not include the worth of a dropped Control Rod.

D. PCS BORON CONCENTRATION __________ ppm
(Chemistry Log or Reactor Logbook)

TDB = Technical Data Book

5. GENERAL DATA

E. WORTH OF ALL CONTROL RODS AT **A** (TDB Fig 1.1) ________ $\%\Delta\rho$

F. MAXIMUM WORTH OF STUCK CONTROL ROD AT **A** (TDB Fig 1.1) ________ $\%\Delta\rho$

G. PCS BORON AT 100% POWER AT **A** **OR** ACTUAL PCS BORON IF AT 100% POWER (TDB Fig 6.1, Reactor Log, or Chemistry Log) ________ ppm

H. POWER DEFECT AT 100% POWER (TDB Fig 3.2 and **G**) ________ $\%\Delta\rho$

I. POWER DEFECT AT POWER **B**

$$\frac{\mathbf{H} \times \mathbf{B}}{100} = \frac{(\qquad) \times (\qquad)}{100} = \underline{\qquad\qquad} \; \%\Delta\rho$$

J. REQUIRED SHUTDOWN MARGIN (4 PCPs Operating) 2.0 $\%\Delta\rho$

6. CALCULATION

$$\frac{(\mathbf{E} - \mathbf{C} - \mathbf{F})}{1.1} - \mathbf{I} - \mathbf{J}$$

NET AMOUNT OF SHUTDOWN MARGIN

$$= \frac{((\qquad) - (\qquad) - (\qquad))}{1.1} - (\qquad) - (\qquad) = \underline{\qquad\qquad} \; \%\Delta\rho$$

K.

TDB = Technical Data Book

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

L. WORTH OF INOPERABLE OR DROPPED CONTROL ROD ______ %Δρ

Step 2

M. EXCESS SHUTDOWN MARGIN WITH ONE INOPERABLE OR DROPPED CONTROL ROD

$$\mathbf{K} - \mathbf{L} = (\quad) - (\quad) = \_\_\_\_\_\_ \ \%\Delta\rho$$

<u>**NOTE**</u>: Step 7 only refers to Shutdown Margin. Off Normal Procedure ONP-5.1, "Control Rod Drop," requires a reduction in reactor power by boration to less than 75% within two hours of a dropped rod event due to hot channel factor concerns.

7. <u>IF</u> excess Shutdown Margin **(M)** is **NEGATIVE**, <u>**THEN**</u> borate the PCS to reduce reactor power until **M** is **POSITIVE** performing Steps **N** through **Q** to calculate the minimum reduced reactor power level.

N. POWER DEFECT AT REDUCED POWER

$$\mathbf{I} + \mathbf{M} = (\quad) + (\quad) = \_\_\_\_\_\_ \ \%\Delta\rho$$

O. MAXIMUM REDUCED POWER LEVEL

$$\frac{\mathbf{N} \times \mathbf{B}}{\mathbf{I}} = \frac{(\quad) \times (\quad)}{(\quad)} = \_\_\_\_\_\_ \ \%$$

P. Caution Tag the Control Rod joy-stick on panel C-02 that the new PDIL is Control Rod position at C.

Q. <u>IF</u> power reduction is required, <u>THEN</u> after power reduction re-perform <u>Attachment 1</u> to verify Shutdown Margin requirements are satisfied.

TDB = Technical Data Book

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

NOTE: Step 8 only refers to Shutdown Margin. Off Normal Procedure ONP-5.1, "Control Rod Drop," requires a reduction in reactor power by boration to less than 75% within two hours of a dropped rod event due to hot channel factor concerns.

8. IF **M** is **POSITIVE,** THEN sufficient Shutdown Margin is available and no power reduction is necessary to ensure required Shutdown Margin. Perform Steps **R** though **U** to determine maximum allowable Control Rod insertion limit corresponding to excess Shutdown Margin available **(M)**.

R. PPC PDIL FOR CURRENT POWER LEVEL (TDB Fig 1.9)

Group ________

Inches ________

S. CONTROL ROD POSITION CORRESPONDING TO EXCESS SHUTDOWN MARGIN IN **M** (TDB Fig 1.3 or 5.1 and **M**)

Group ________

Inches ________

T. PDIL FOR INOPERABLE OR DROPPED CONTROL ROD CONDITION (**R** or **S**, whichever is farthest withdrawn)

Group ________

Inches ________

U. IF the Control Rod position in **S** is farther withdrawn than the Control Rod position in **R**, **THEN** Caution Tag the Control Rod joy-stick on panel C-02, identifying that the new PPC PDIL as the Control Rod position in **S**.

TDB = Technical Data Book

9. REVIEWS

______________________________ / ______________
Performed By Date

______________________________ / ______________
Reviewed By Date

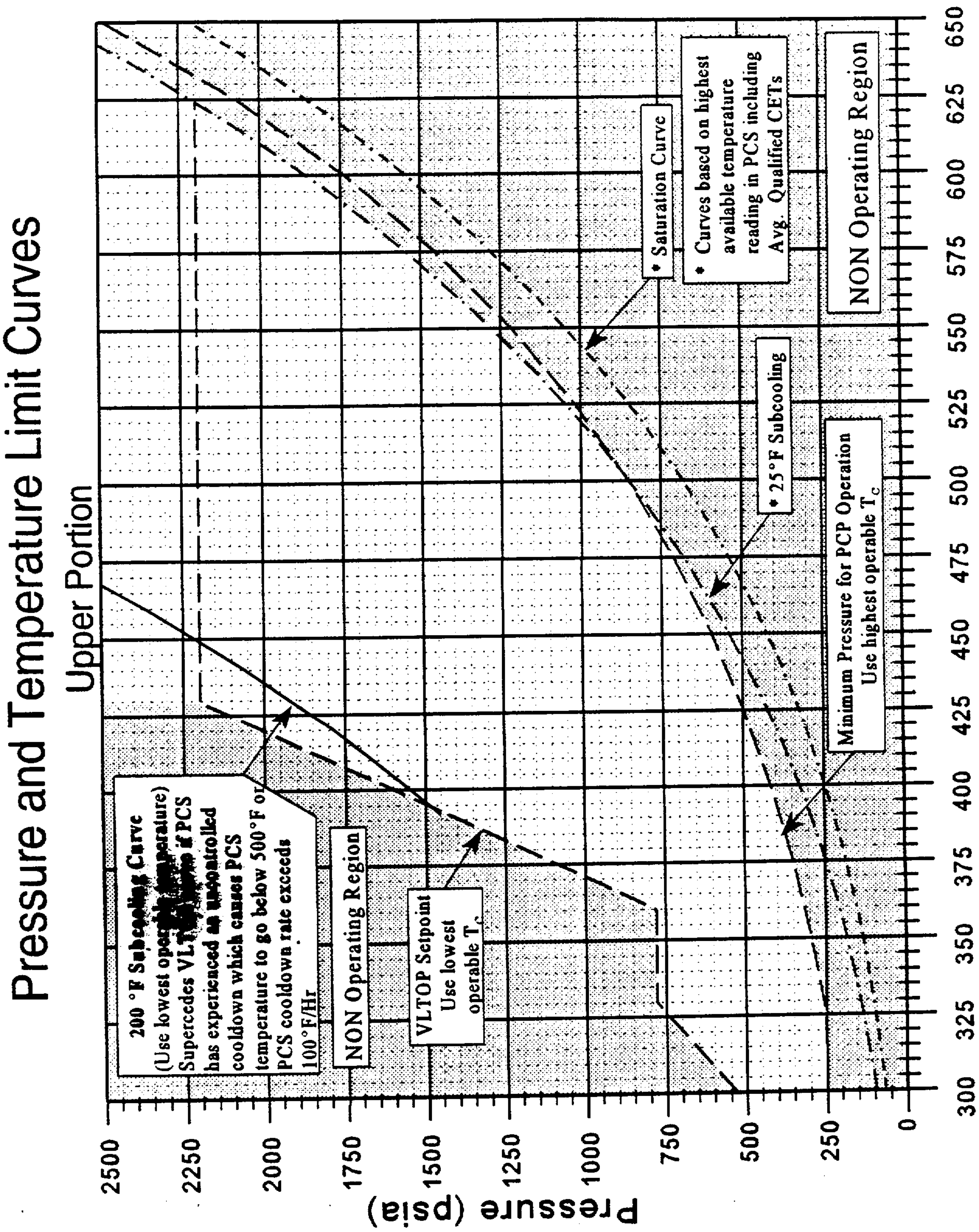
Forward Completed Form to Reactor Engineering Supervisor

______________________________ / ______________
Reactor Engineering Supervisor Date

TDB = Technical Data Book

PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE	Proc No EOP Supplement
	Supplement 1
	Revision 5
	Page 1 of 5

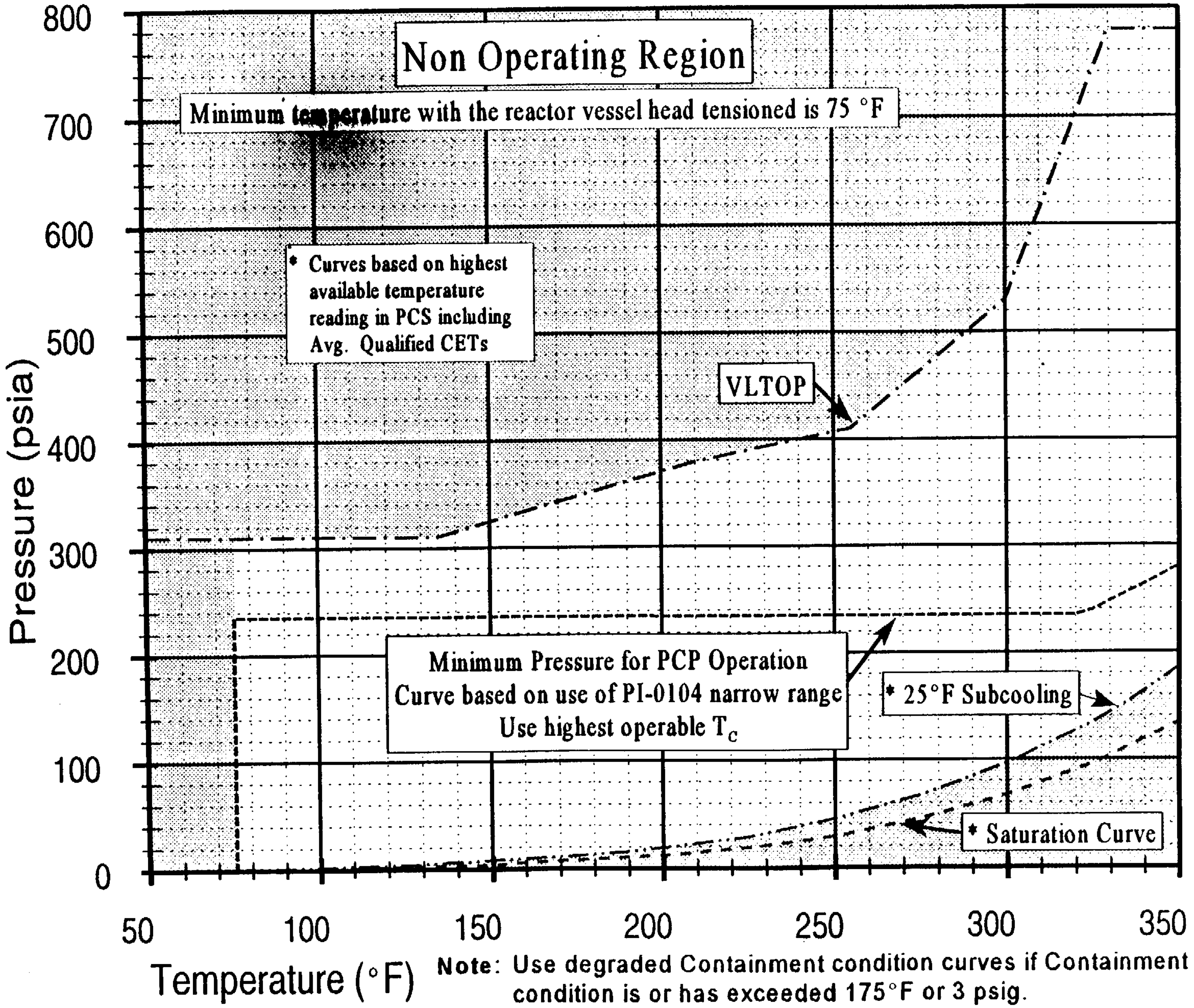
TITLE: Pressure Temperature Limit Curves



Note: Use degraded Containment condition curves if Containment condition is or has exceeded 175°F or 3 psig.

Pressure and Temperature Limit Curves

Lower Portion



Note: Use degraded Containment condition curves if Containment condition is or has exceeded 175°F or 3 psig.

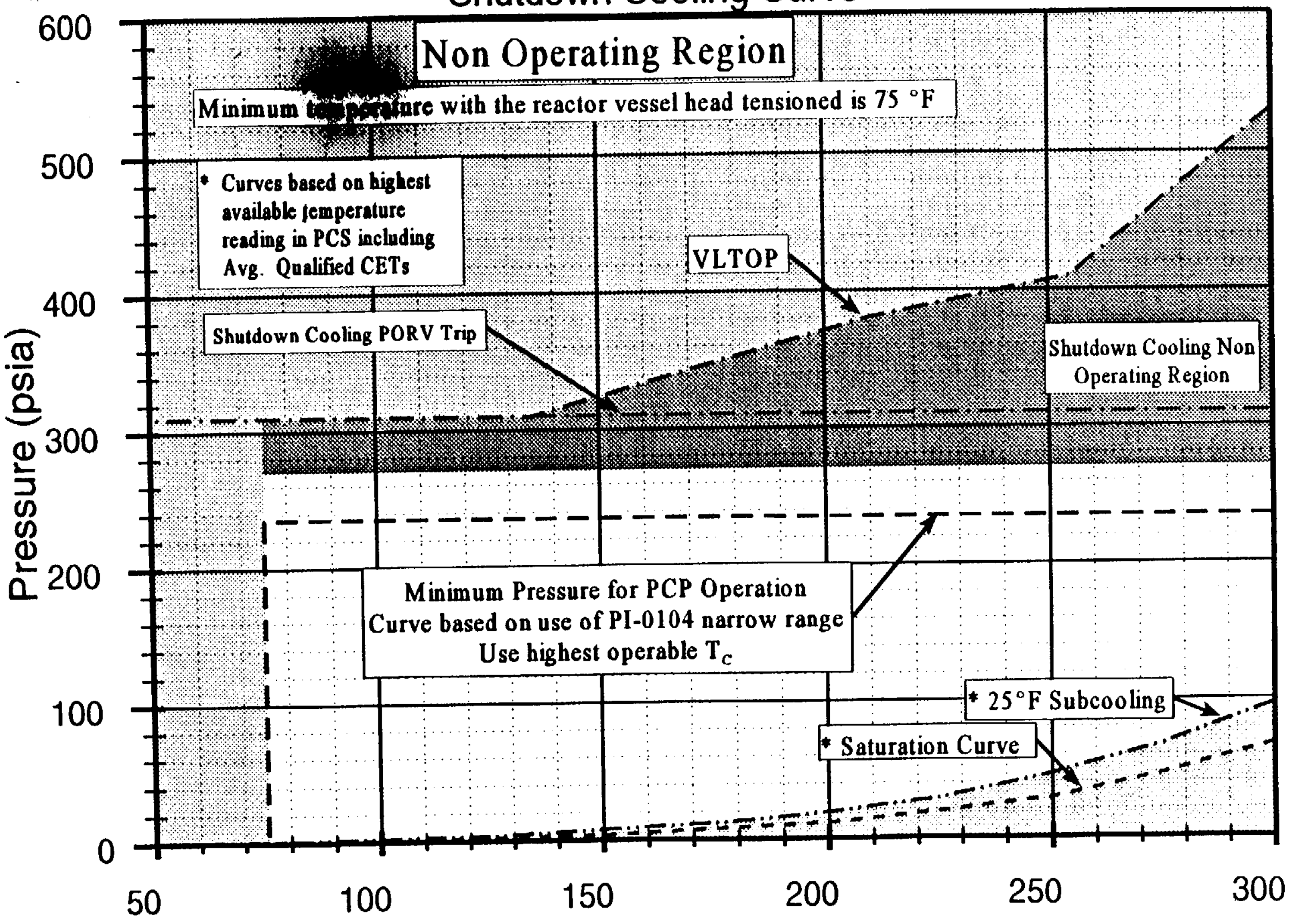
PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP Supplement
Supplement	1
Revision	5
Page	3 of 5

TITLE: Pressure Temperature Limit Curves

Pressure and Temperature Limit Curves

Shutdown Cooling Curve



Note: Use degraded Containment condition curves if Containment condition is or has exceeded 175°F or 3 psig.

PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE	Proc No EOP Supplement
	Supplement 1
	Revision 5
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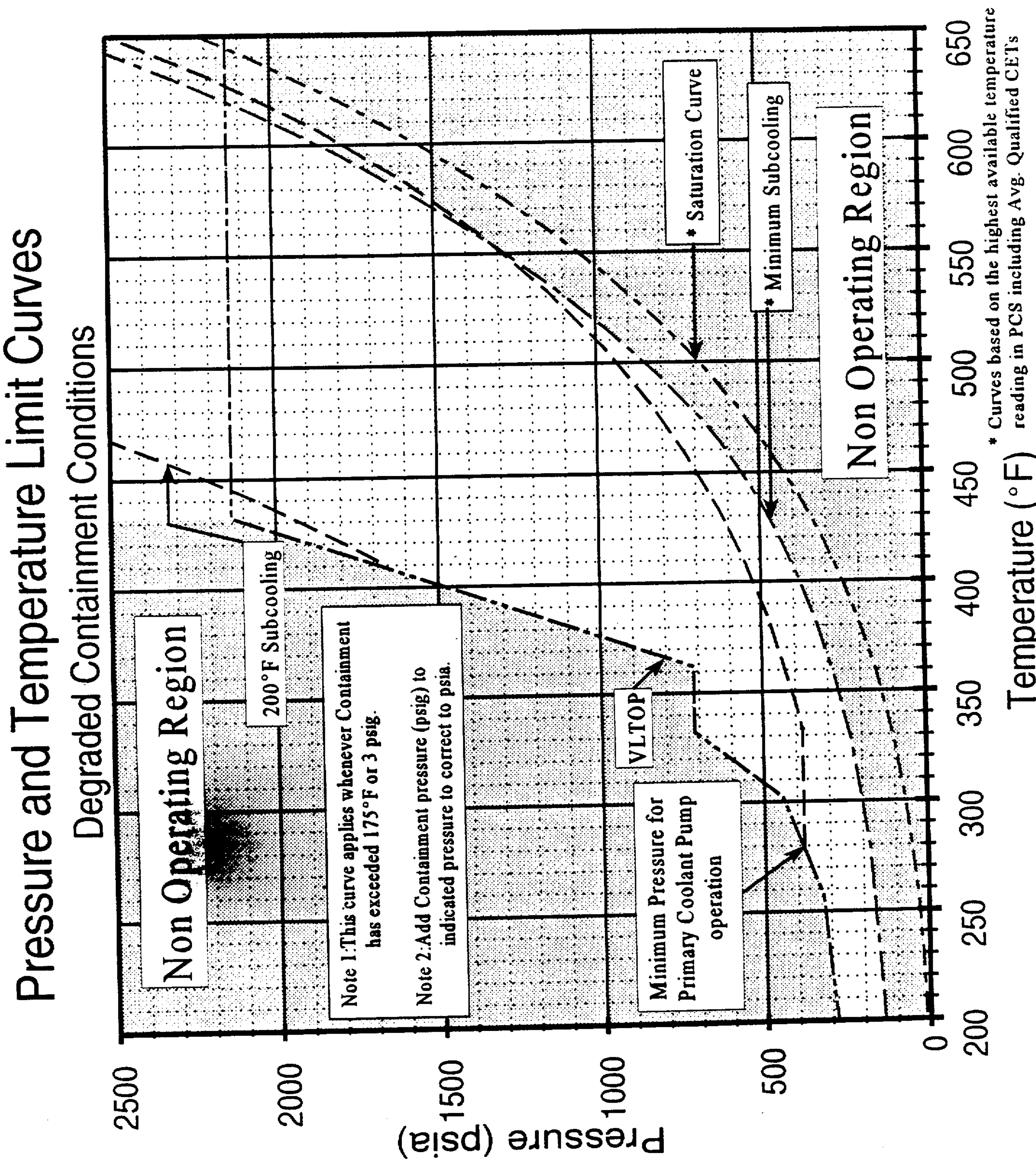
TITLE: Pressure Temperature Limit Curves



Pressure and Temperature Limit Curves

Degraded Containment Conditions

Note 1: This curve applies whenever Containment has exceeded 175°F or 3 psig.

Note 2: Add Containment pressure (psig) to indicated pressure to correct to psia.

* Curves based on the highest available temperature reading in PCS including Avg. Qualified CETs

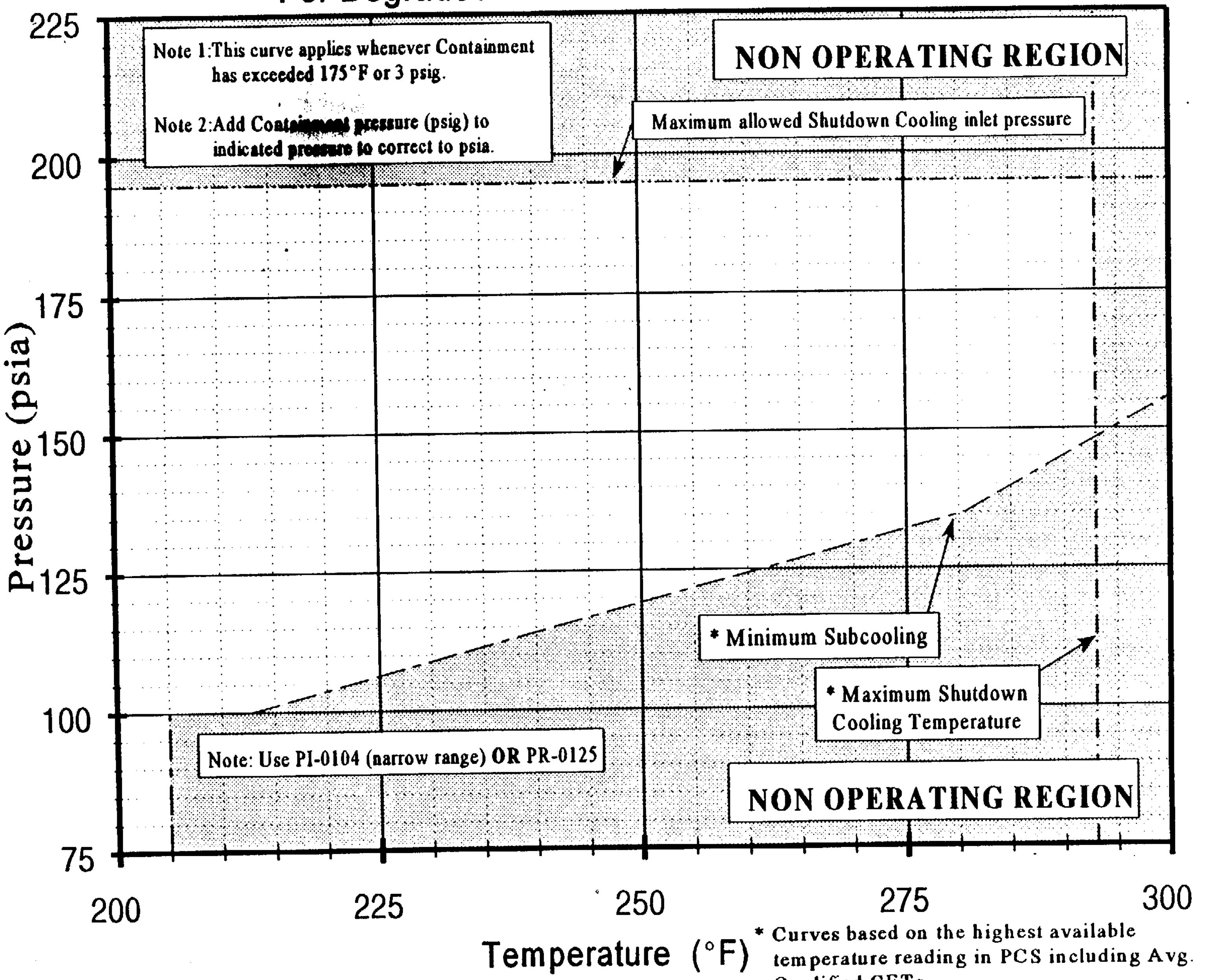
PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

TITLE: Pressure Temperature Limit Curves

Proc No	EOP Supplement 1
Supplement	1
Revision	5
Page	5 of 5

Shutdown Cooling Entry Window

For Degraded Containment Conditions



Note 1: This curve applies whenever Containment has exceeded 175°F or 3 psig.

Note 2: Add Containment pressure (psig) to indicated pressure to correct to psia.

Note: Use PI-0104 (narrow range) OR PR-0125

* Curves based on the highest available temperature reading in PCS including Avg. Qualified CETs

PALISADES
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PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP Supplement
Supplement	6
Revision	6
Page	1 of 2

TITLE: Checksheet For Containment Isolation And CCW Restoration

1. Ensure closed ALL valves unless otherwise specified by the notes.

Valve	Note	Description	L	R	C
PANEL C 13					
CV-1101		Containment Vent Header	☐		
CV-1806		Containment Purge Exhaust	☐		
CV-1814		Air Room Supply	☐		
CV-1808		Containment Purge Exhaust	☐		
CV-1807		Containment Purge Exhaust		☐	
CV-1813		Air Room Supply		☐	
CV-1805		Containment Purge Exhaust		☐	
CV-1102		Containment Vent Header		☐	
CV-1064		CWRTs Vent	☐		
CV-1044		CWRTs Outlet	☐		
CV-1036		CWRTs Recirc	☐		
CV-1002		PSDT Outlet	☐		
CV-0911	1, 4	CCW Return	☐		
CV-1103	5	Containment Sump Drain	☐		
CV-1104	5	Containment Sump Drain		☐	
CV-0940	1, 4	CCW Return		☐	
CV-1007		PSDT Outlet		☐	
CV-1038		CWRTs Recirc		☐	
CV-1045		CWRTs Outlet		☐	
CV-1065		CWRTs Vent		☐	
CV-0770		S/G 'B' Bottom Blowdown	☐		
CV-0771		S/G 'A' Bottom Blowdown	☐		
CV-0767		S/G 'A' Bottom Blowdown		☐	
CV-0768		S/G 'B' Bottom Blowdown		☐	
CV-0738		S/G 'B' Surface Blowdown			☐
CV-0739		S/G 'A' Surface Blowdown			☐
CV-0910	1, 4	CCW to Containment			☐
CV-0939		Shield Cooling Surge Tank Fill			☐
CV-1004		CWRTs Inlet Isol			☐
CV-1037		CWRTs Recirc Isol			☐
CV-1358		Nitrogen to Containment			☐
CV-1001		PSDT Recirc Isol			☐
CV-1910	2	Primary System Sample Isol	☐		
CV-1911	2	Primary System Sample Isol		☐	

Valve	Note	Description	L	R	C
PANEL C 02					
CV-2009		Letdown Containment Isol			☐
CV-2083		Controlled Bleed-off Containment Isol	☐		
CV-2099		Controlled Bleed-off Containment Isol		☐	
CV-0155		Quench Tank Spray Valve			☐
PANEL C 01					
CV-0510	4	S/G 'A' MSIV			☐
CV-0501	4	S/G 'B' MSIV			☐
CV-0701	4	S/G 'A' Main Feed Reg Valve	☐		
CV-0703	4	S/G 'B' Main Feed Reg Valve		☐	
CV-0735	4	S/G 'A' Bypass Feed Reg Valve	☐		
CV-0734	4	S/G 'B' Bypass Feed Reg Valve		☐	
PANEL C 11A (BACK)					
SV-2412A	3	Hydrogen Mon. Right Channel			☐
SV-2412B	3	Hydrogen Mon. Right Channel			☐
SV-2414A	3	Hydrogen Mon. Right Channel			☐
SV-2414B	3	Hydrogen Mon. Right Channel			☐
SV-2413A	3	Hydrogen Mon. Left Channel			☐
SV-2413B	3	Hydrogen Mon. Left Channel			☐
SV-2415A	3	Hydrogen Mon. Left Channel			☐
SV-2415B	3	Hydrogen Mon. Left Channel			☐

NOTES: L = Left Channel R = Right Channel C = Common

1. Refer to reverse side (Page 2) to open valves post CHP
2. Refer to EI-7.0 to bypass CHP and CHR
3. Refer to in-use EOP AND SOP-38 to bypass CHP and CHR
4. CHP only; equipment required in specific position ONLY if Containment pressure is greater than or equal to 4.0 psig.
5. CHR only

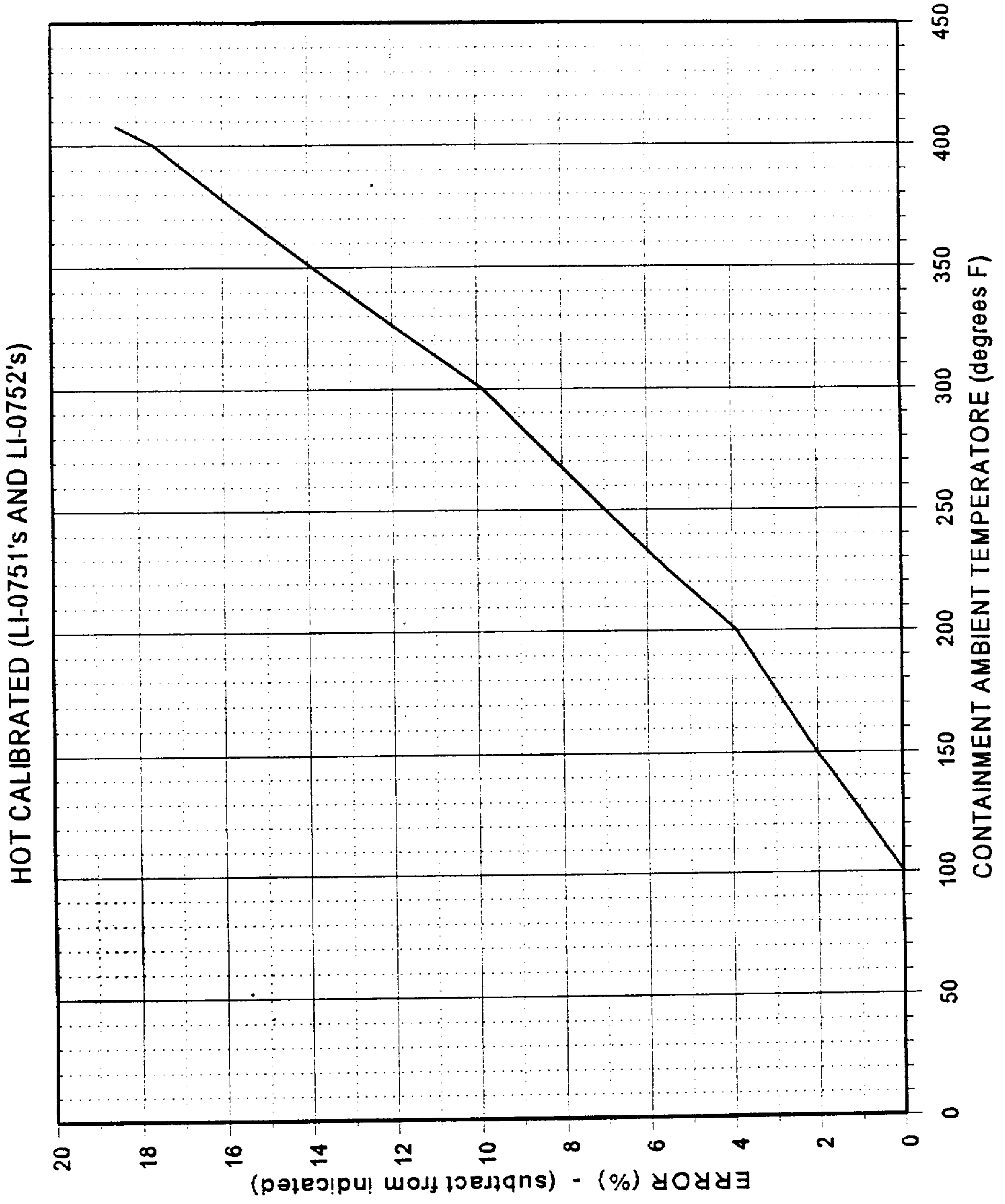
2. Additional actions required.

DESCRIPTION	(X)
HS-2003 to CLOSE (Letdown Orifice on panel C-02)	☐
HS-2004 to CLOSE (Letdown Orifice on panel C-02)	☐
HS-2005 to CLOSE (Letdown Orifice on panel C-02)	☐
WITH CHP Position CV-0910 keyswitch CLOSED (C-13)	☐
WITH CHP Position CV-0911 keyswitch CLOSED (C-13)	☐
WITH CHP Position CV-0940 keyswitch CLOSED (C-13)	☐

PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP Supplement
Supplement	11
Revision	5
Page	1 of 2

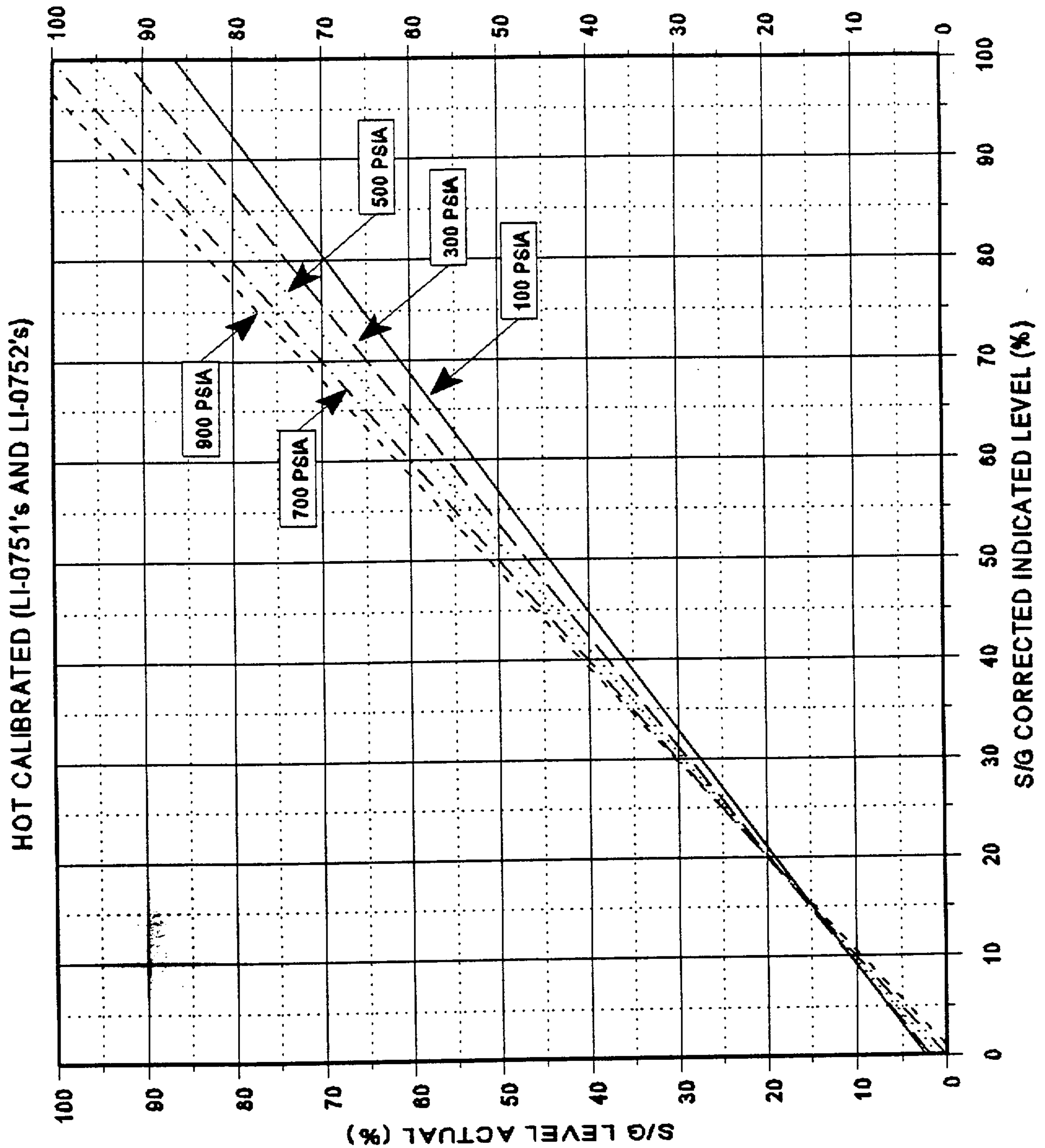
TITLE: S/G Level Correction



PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP Supplement
Supplement	11
Revision	5
Page	2 of 2

TITLE: S/G Level Correction



NOTE: Page 1 of this supplement should be used to obtain the corrected indicated level prior to using this figure.

PALISADES
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PALISADES NUCLEAR PLANT EMERGENCY OPERATING PROCEDURE

Proc No	EOP Supplement
Supplement	35
Revision	5
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TITLE: Determination of Emergency Boration Requirements

1.0 Determination of Hot Shutdown Boration Requirements

1. Multiply the number of full length Control Rods beyond one, not fully inserted, by 225 ppm.

   _________ x 225 ppm = _________ ppm
   (Number of
   stuck rods >1)

2. Determine the required Hot Shutdown boron concentration for current plant condition.

   a. **IF** plant conditions allow,
   THEN use Forced Outage book.

   b. **IF** plant conditions do not allow use of the Forced Outage book,
   THEN use Technical Data Book Figure 1.2.

   c. Hot Shutdown Boron Concentration = _________ ppm

3. Determine Refueling Boron concentration from Technical Data Book Figure 1.1

   Refueling Boron Concentration = __________ ppm.

4. Add boron requirements for stuck control rods and Hot Shutdown Boron Concentration.

   a. Stuck control rod boron requirement (Step 1.1): _____ ppm

   b. Hot Shutdown Boron Concentration (Step 1.2.c): +_____ ppm

   c. Final required boron concentration: =_____ ppm

NOTE: If the final required boron concentration is greater than Refueling Boron Concentration from Technical Data Book Figure 1.1, then use the Refueling Boron Concentration value.

5. Subtract latest PCS boron concentration from final required boron concentration sample results.

   a. Final required boron concentration: ______ ppm

   b. Latest PCS boron concentration: - ______ ppm

   c. PCS boron change required: = ______ ppm

6. Determine the amount of CBAT addition required to increase PCS boron concentration.

   a. Required boron change (Step 1.5.c): ______ ppm

   b. Amount of CBAT level change (%) per 100 ppm (from Table A): _____ %/100 ppm

   c. Required change in CBAT level (%):

   ___________ X ___________ X 0.01 = __________%
   (Step 1.6.a) (Step 1.6.b)

7. Request Reactor Engineering perform an EM-04-08 calculation as time permits.

2.0 PCS Boration Calculation for Cooldown

1. Multiply the number of full length Control Rods **beyond one, NOT** fully inserted, by 225 ppm.

   _________ x 225 ppm = _________ ppm
   (Number of
   stuck rods > 1)

2. Determine the required Cold Shutdown boron concentration for current plant conditions.

    a. **IF** plant conditions allow,
    THEN use the Forced Outage book.

    b. **IF** plant conditions do not allow use of the Forced Outage book,
    THEN use the Technical Data Book, Figure 1.2.

    c. Cold Shutdown Boron Concentration = ________ ppm

3. Determine Refueling Boron concentration from Technical Data Book Figure 1.1

    Refueling Boron Concentration = __________ ppm.

4. Add boron requirements for stuck control rods and Cold Shutdown Boron Concentration.

    a. Stuck control rod boron requirement (Step 2.1): ____ ppm

    b. Cold Shutdown Boron Concentration (Step 2.2.c): +____ ppm

    c. Required boron concentration: =____ ppm

NOTE: If the required boron concentration is greater than Refueling Boron Concentration from Technical Data Book Figure 1.1, then use Refueling Boron Concentration value for the final value.

5. Subtract latest PCS boron concentration from final required boron concentration sample results.

    a. Final required boron concentration: _____ ppm

    b. Latest PCS boron concentration: - _____ ppm

    c. PCS boron change required: = _____ ppm

6. Determine the amount of CBAT addition required to increase PCS boron concentration.

   a. Required boron change (Step 2.5.c): ______ ppm

   b. Amount of CBAT level change (%) per 100 ppm (from Table A): ______ %/100 ppm

   c. Required change in CBAT level (%):

   __________ X __________ X 0.01 = __________%
   (Step 2.6.a) (Step 2.6.b)

7. Request Reactor Engineering perform an EM-04-08 calculation as time permits.

Completed By: ____________________

Date/Time: __________/__________

Reviewed By: ____________________

TITLE: Determination of Emergency Boration Requirements

TABLE A

CBAT BORON CONCENTRATION (Note 2)	GALLONS FOR 100 ppm PCS INCREASE	% CHANGE IN SINGLE CBAT LEVEL FOR 100 ppm PCS INCREASE (Note 1)
17480	384	7.0
17000	397	7.2
16000	426	7.7
15000	460	8.4
14000	500	9.1
13000	547	9.9
12000	604	11.0
11000	675	12.3
10925	681	12.4
10000	764	13.9

Note 1: If BOTH boric acid tanks are utilized, then the value obtained from the table above is the total reduction of the combined tank level changes.

Note 2: **If CBAT** Boron Concentration is between two numbers, then use the lower **number**.

INSTRUCTIONS

CONTINGENCY ACTIONS

61. **WHEN** ALL of the following Shutdown Cooling System entry conditions are met:

- PCS parameters are acceptable for existing Containment conditions:

Parameter	Containment Less Than 175°F AND Less Than 3 psig at all times during the event	Containment Greater Than Or Equal To 175°F OR Greater Than Or Equal To 3 psig at any time during the event
PCS Pressure	Less Than 270 psia	<u>REFER TO</u> EOP Supplement 1
PZR Level (corrected)	Greater than 36% and controlled	Greater than 40% and controlled
Avg of Qualified CETs Subcooling	Greater than 25°F	<u>REFER TO</u> EOP Supplement 1
Avg of Qualified CETs and Loop T_Hs Temperature	Less than 300°F	<u>REFER TO</u> EOP Supplement 1

- **TSC has** determined that PCS **activity** is acceptable for circulation outside Containment.

- Containment Spray Pumps are not in use for Containment Atmosphere safety function.

(Continue)

APPROXIMATE TIME TO 200°F CURVES

1. Determine PCS level using all available indications.

2. Use initial PCS temperature from Step 4.1 or determine PCS temperature using an operable CET (preferred; refer to GOP-14 working copy) or select any other indication considered valid.

3. IF the following conditions exist, THEN the PCS is considered "**FILLED AND INTACT**":

   a. PCS was NOT drained below 623' 0" and current level is above 0% on LI-0103A/LIA-0102A.

   AND

   b. PCS is capable of being pressurized.

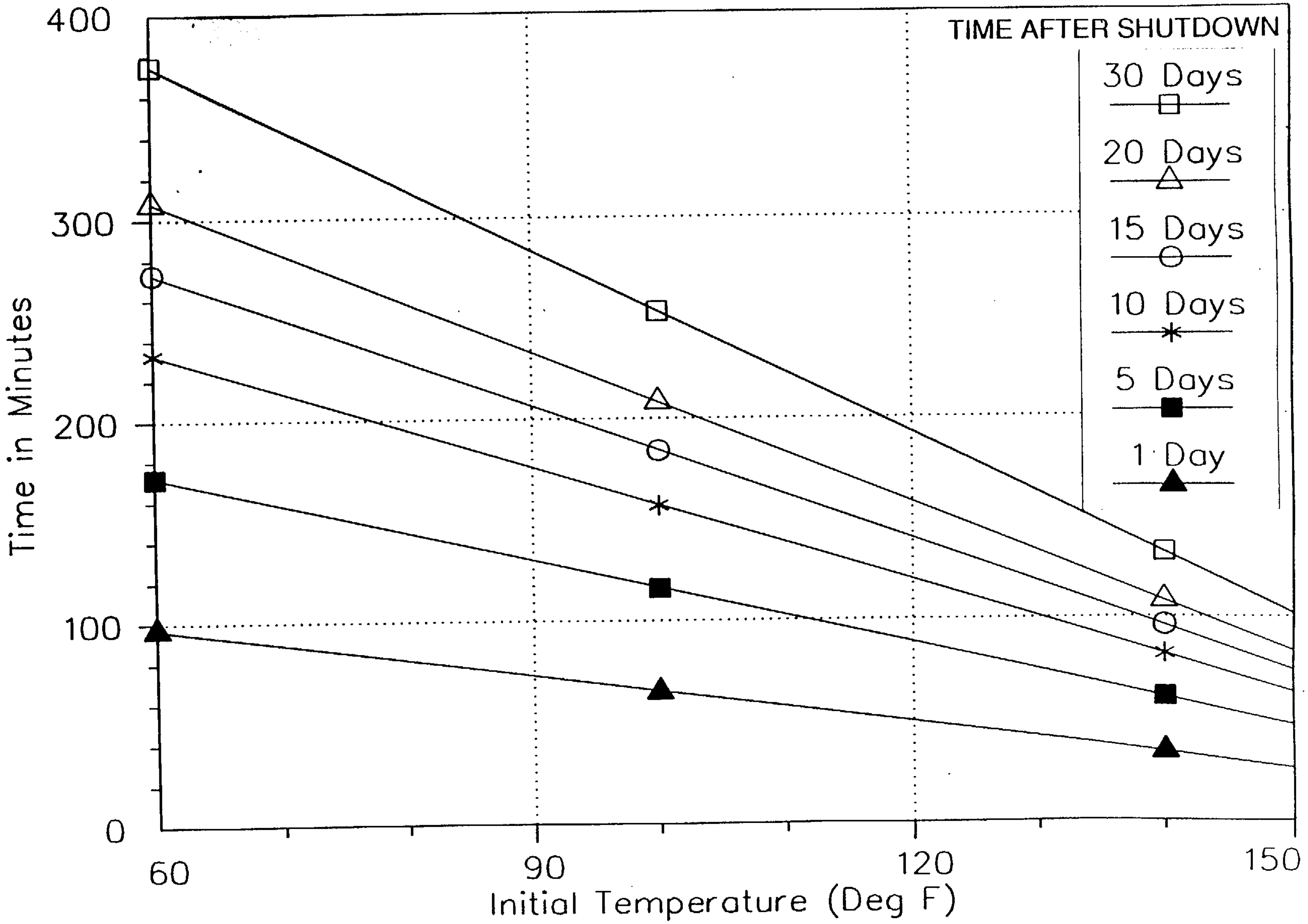
4. IF criteria of Step 3 are NOT met, THEN PCS is considered "**NOT FILLED/INTACT.**"

5. Refer to appropriate page in this attachment for PCS conditions. Time after shutdown curves may be interpolated.

CURVE TITLE	ATTACHMENT 1 PAGE NUMBER
PCS Filled/Intact, One or Both S/G's With Tubes Covered	2
NOTE: Assumes S/G tubes have not been drained. PCS NOT Filled/Intact, PCS Level at 639'	3
PCS NOT Filled/Intact, PCS Level at 628'5"	4
PCS NOT Filled/Intact, PCS Level at 623 (0 - 9 days)	5
PCS NOT Filled/Intact, PCS Level at 623 (≥ 10 days)	6
PCS NOT Filled/Intact, PCS Level at 618'2.5"	7
PCS NOT Filled/Intact, PCS Level at 617'6"	8
Refueling Cavity Flooded to 647'	9
Refueling Cavity Flooded to 632'	10
Refueling Cavity Flooded to 629'6"	11

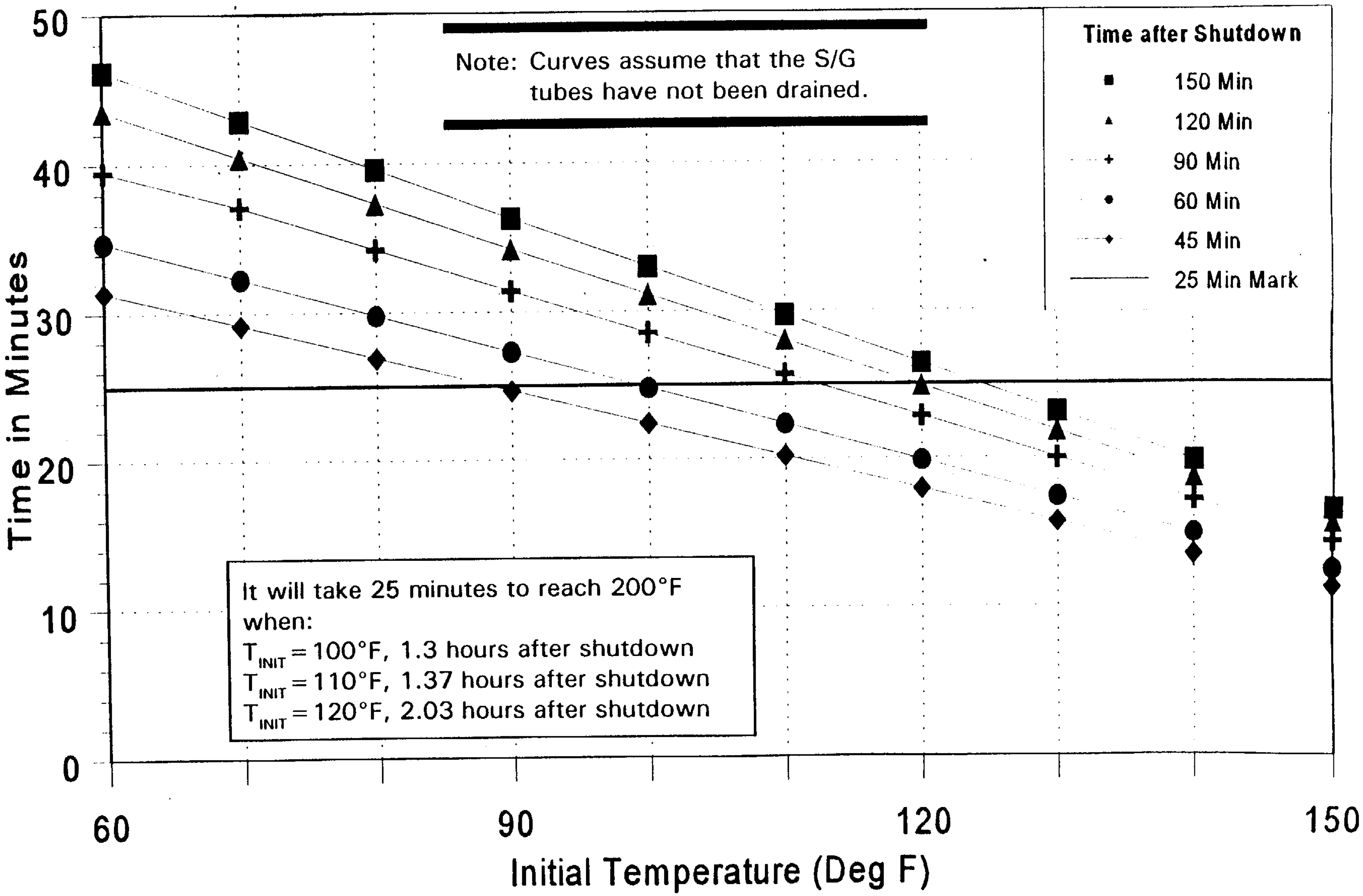
APPROXIMATE TIME TO 200°F CURVES

PCS FILLED AND INTACT, ONE OR BOTH S/G'S WITH TUBES COVERED



APPROXIMATE TIME TO 200°F CURVES

PCS NOT FILLED/INTACT, PCS LEVEL AT 639'0'

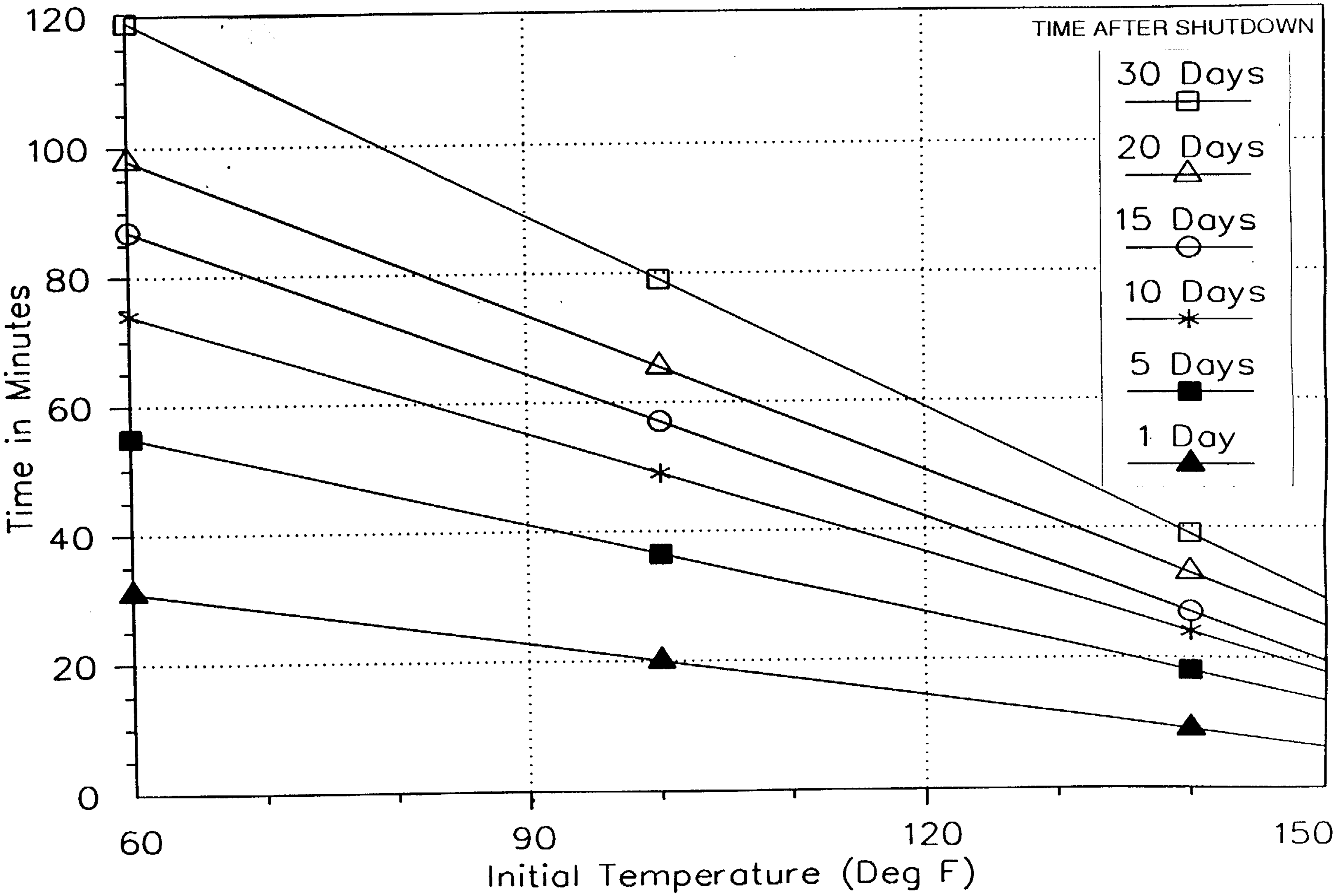


Note: Curves assume that the S/G tubes have not been drained.

It will take 25 minutes to reach 200°F when:
T_{INIT} = 100°F, 1.3 hours after shutdown
T_{INIT} = 110°F, 1.37 hours after shutdown
T_{INIT} = 120°F, 2.03 hours after shutdown

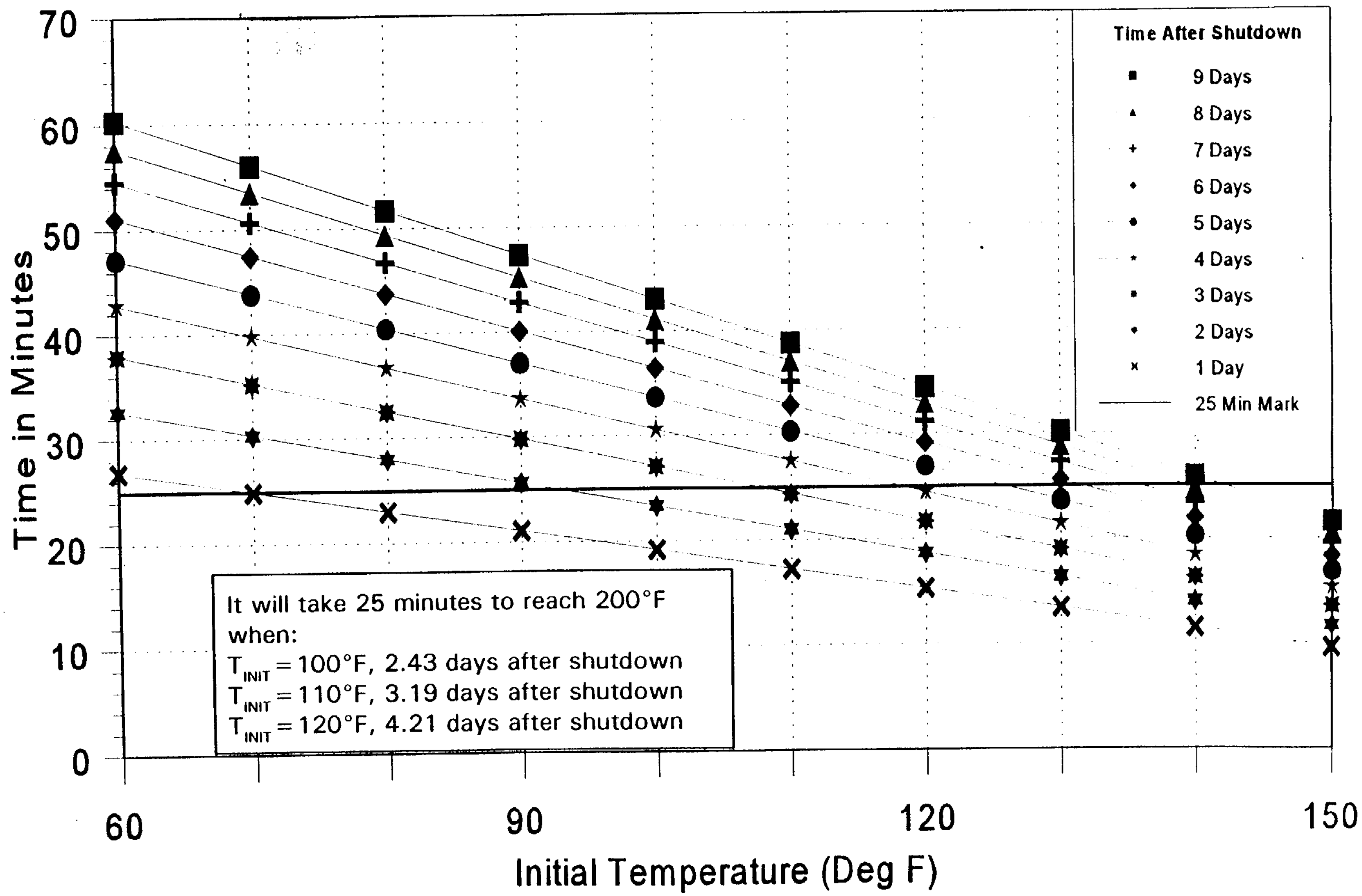
APPROXIMATE TIME TO 200°F CURVES

PCS NOT FILLED/INTACT, PCS LEVEL AT 628'5"



APPROXIMATE TIME TO 200°F CURVES

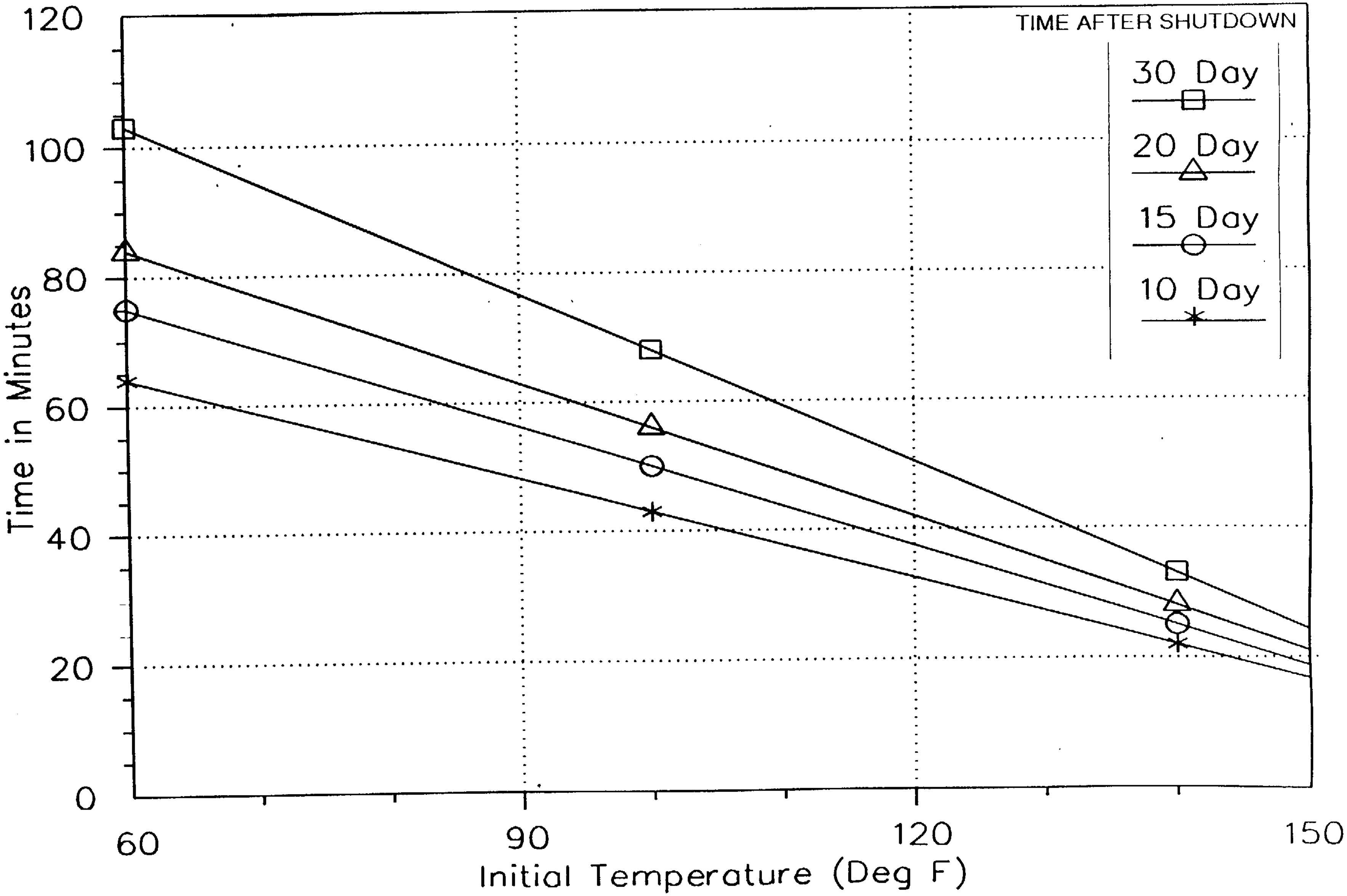
PCS NOT FILLED/INTACT, PCS LEVEL AT 623'



It will take 25 minutes to reach 200°F when:
T_{INIT} = 100°F, 2.43 days after shutdown
T_{INIT} = 110°F, 3.19 days after shutdown
T_{INIT} = 120°F, 4.21 days after shutdown

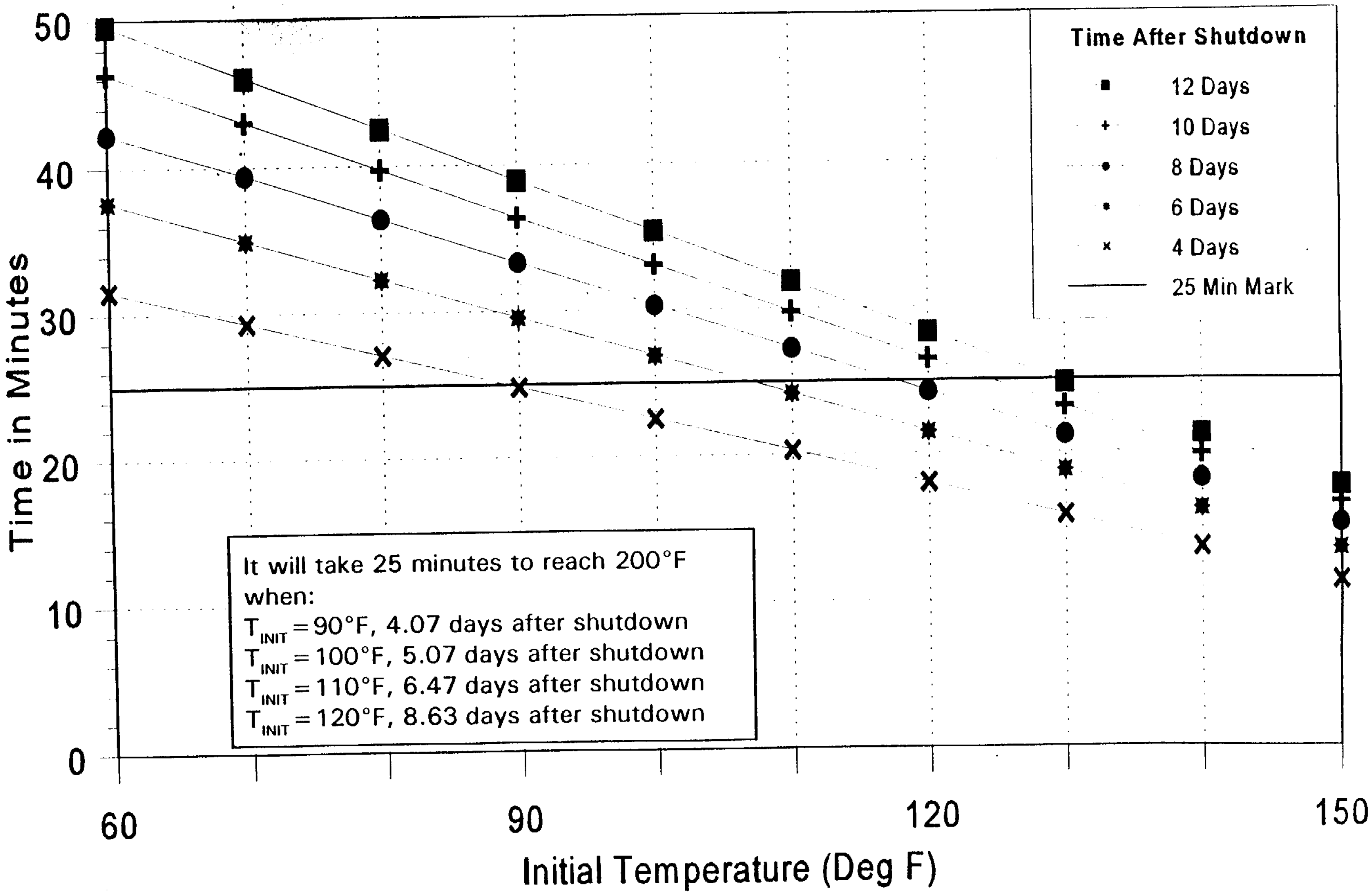
APPROXIMATE TIME TO 200°F CURVES

PCS NOT FILLED/INTACT, PCS LEVEL AT 623'



APPROXIMATE TIME TO 200°F CURVES

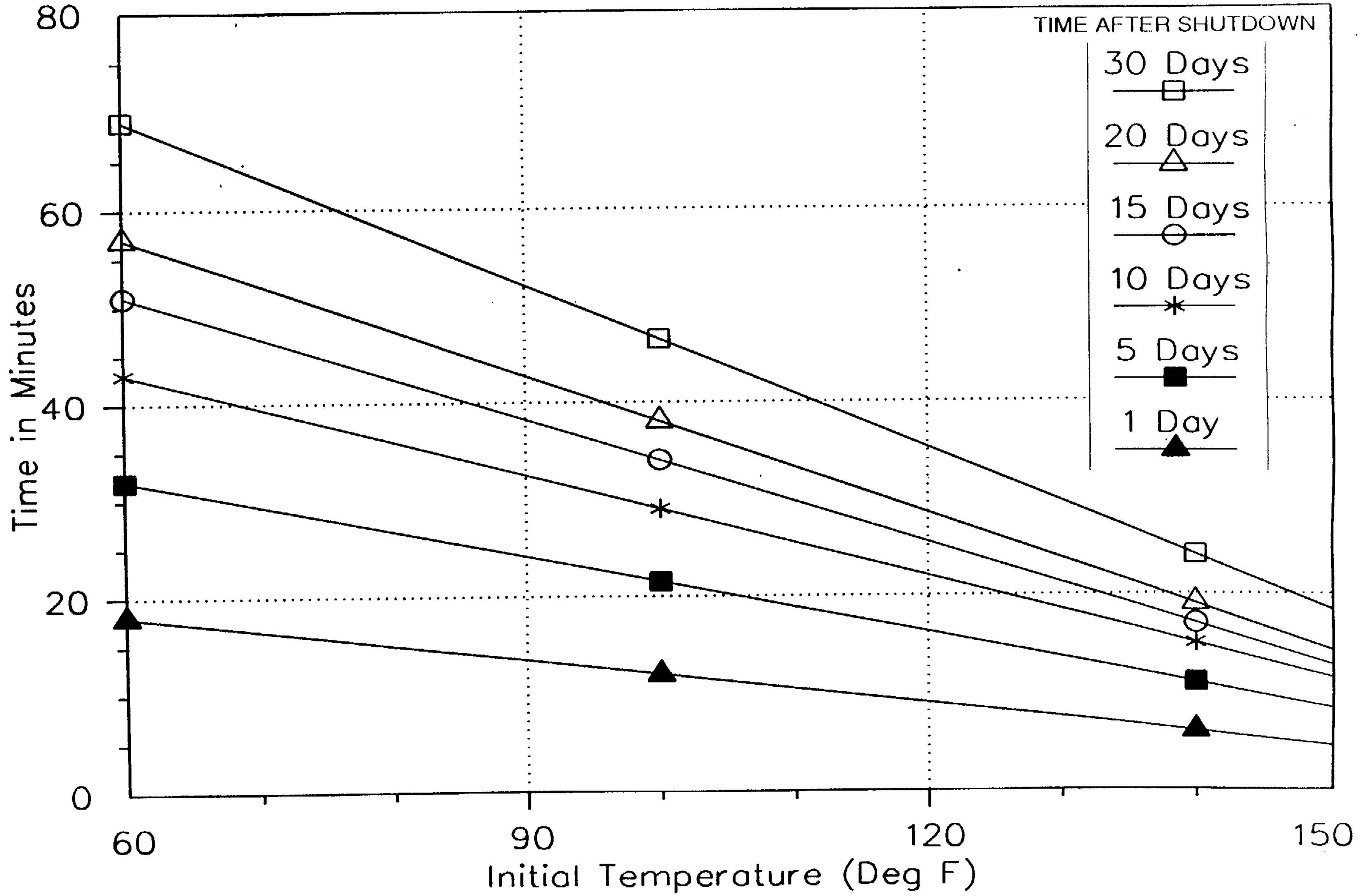
PCS NOT FILLED/INTACT, PCS LEVEL AT 618'2.5"



It will take 25 minutes to reach 200°F when:
T_{INIT} = 90°F, 4.07 days after shutdown
T_{INIT} = 100°F, 5.07 days after shutdown
T_{INIT} = 110°F, 6.47 days after shutdown
T_{INIT} = 120°F, 8.63 days after shutdown

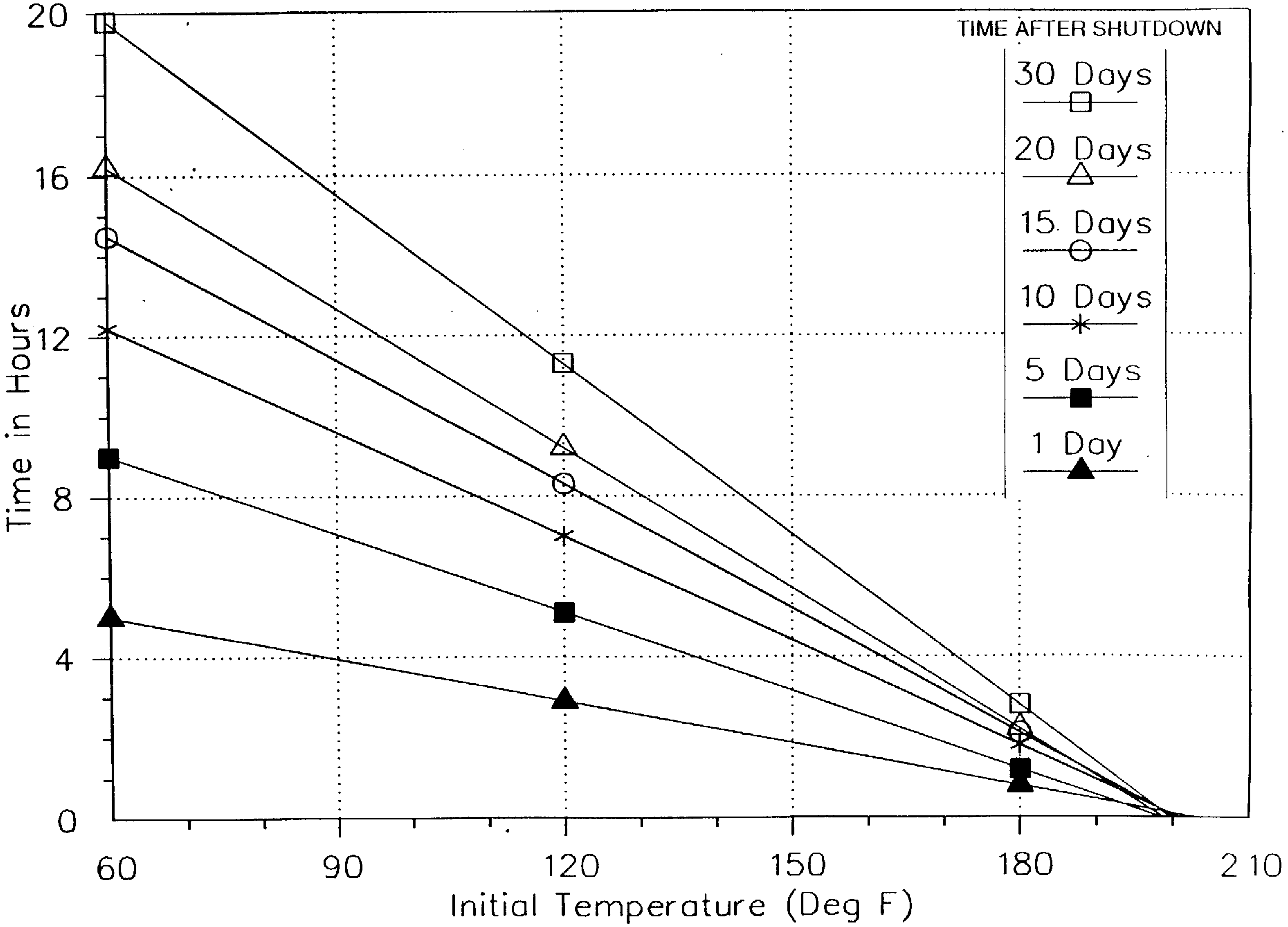
APPROXIMATE TIME TO 200°F CURVES

PCS NOT FILLED/INTACT, PCS LEVEL AT 617'6"



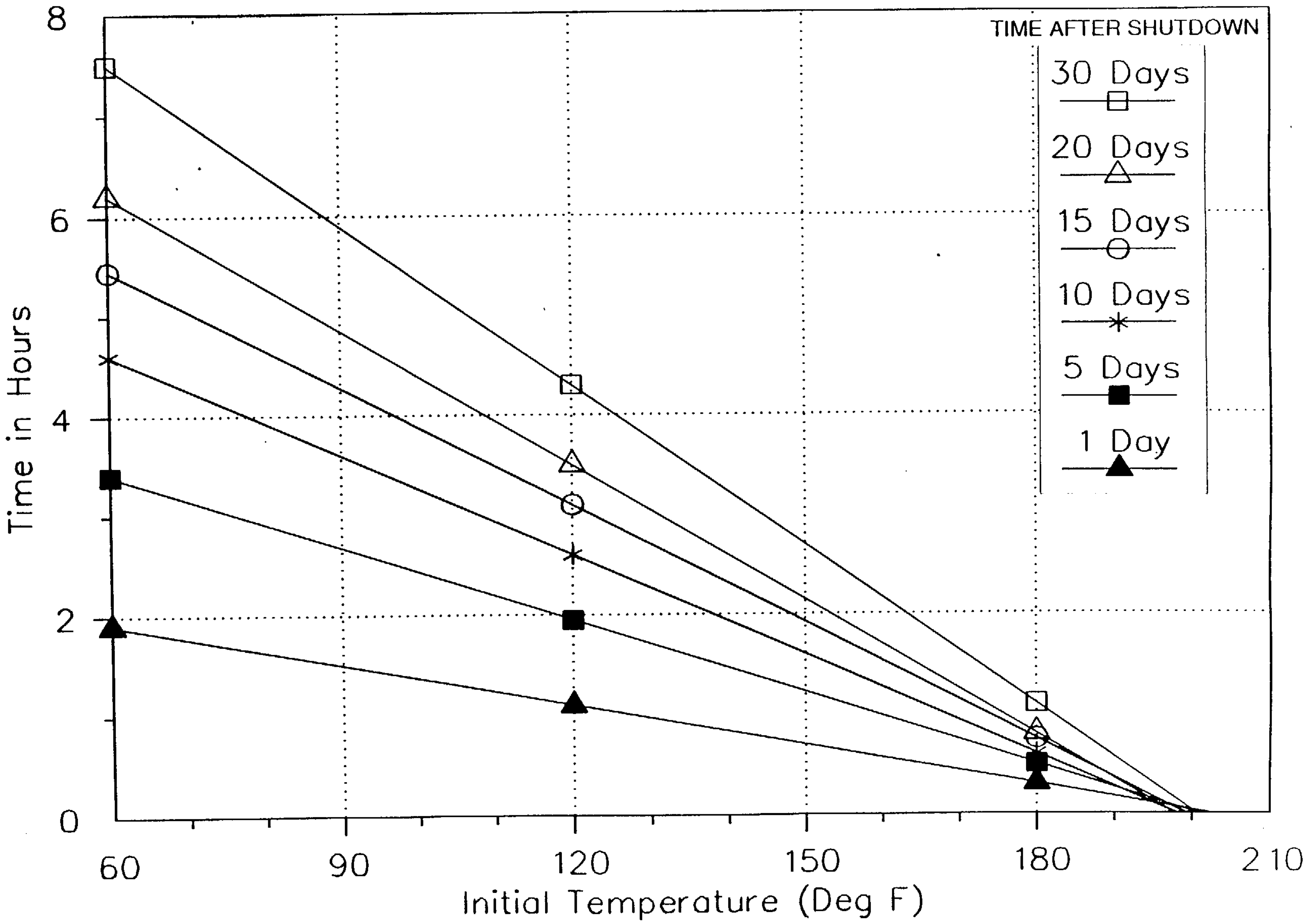
APPROXIMATE TIME TO 200°F CURVES

REFUELING CAVITY FLOODED TO 647'



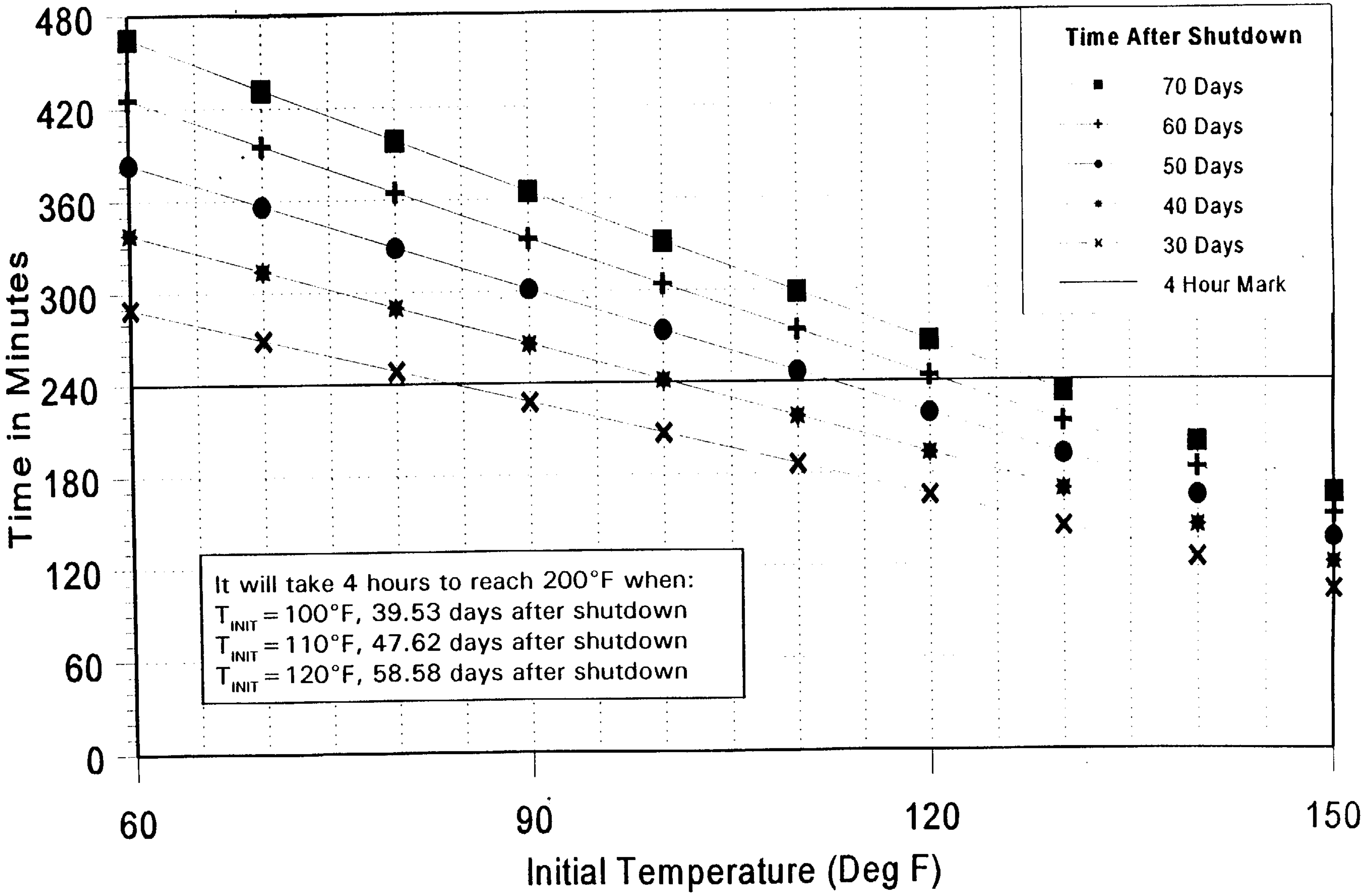
APPROXIMATE TIME TO 200°F CURVES

REFUELING CAVITY FLOODED TO 632'



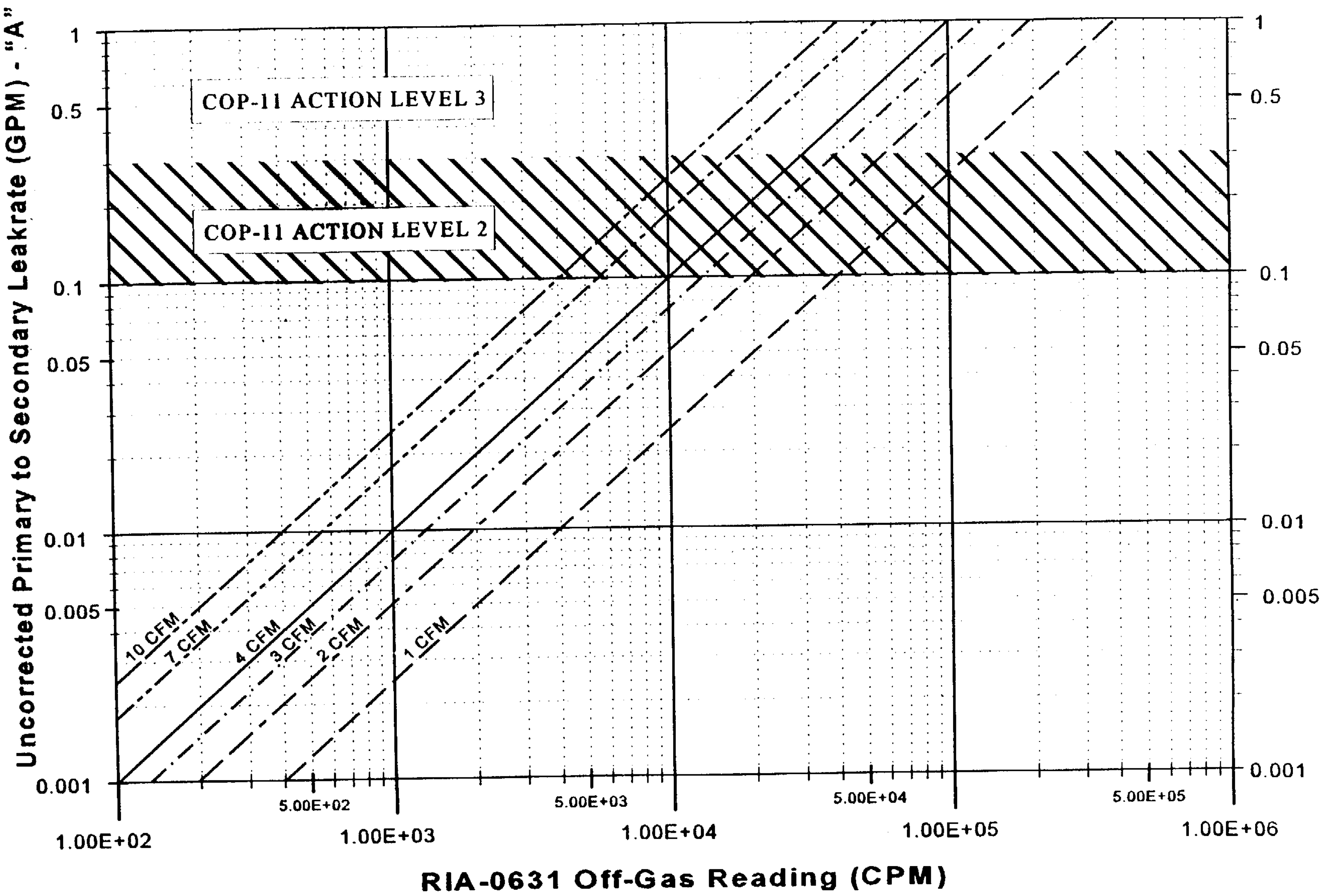
APPROXIMATE TIME TO 200°F CURVES

REFUELING CAVITY FLOODED TO 629'6"



It will take 4 hours to reach 200°F when:
T_{INIT} = 100°F, 39.53 days after shutdown
T_{INIT} = 110°F, 47.62 days after shutdown
T_{INIT} = 120°F, 58.58 days after shutdown

PRIMARY TO SECONDARY LEAKRATE
At Various Off-Gas Flow Rates

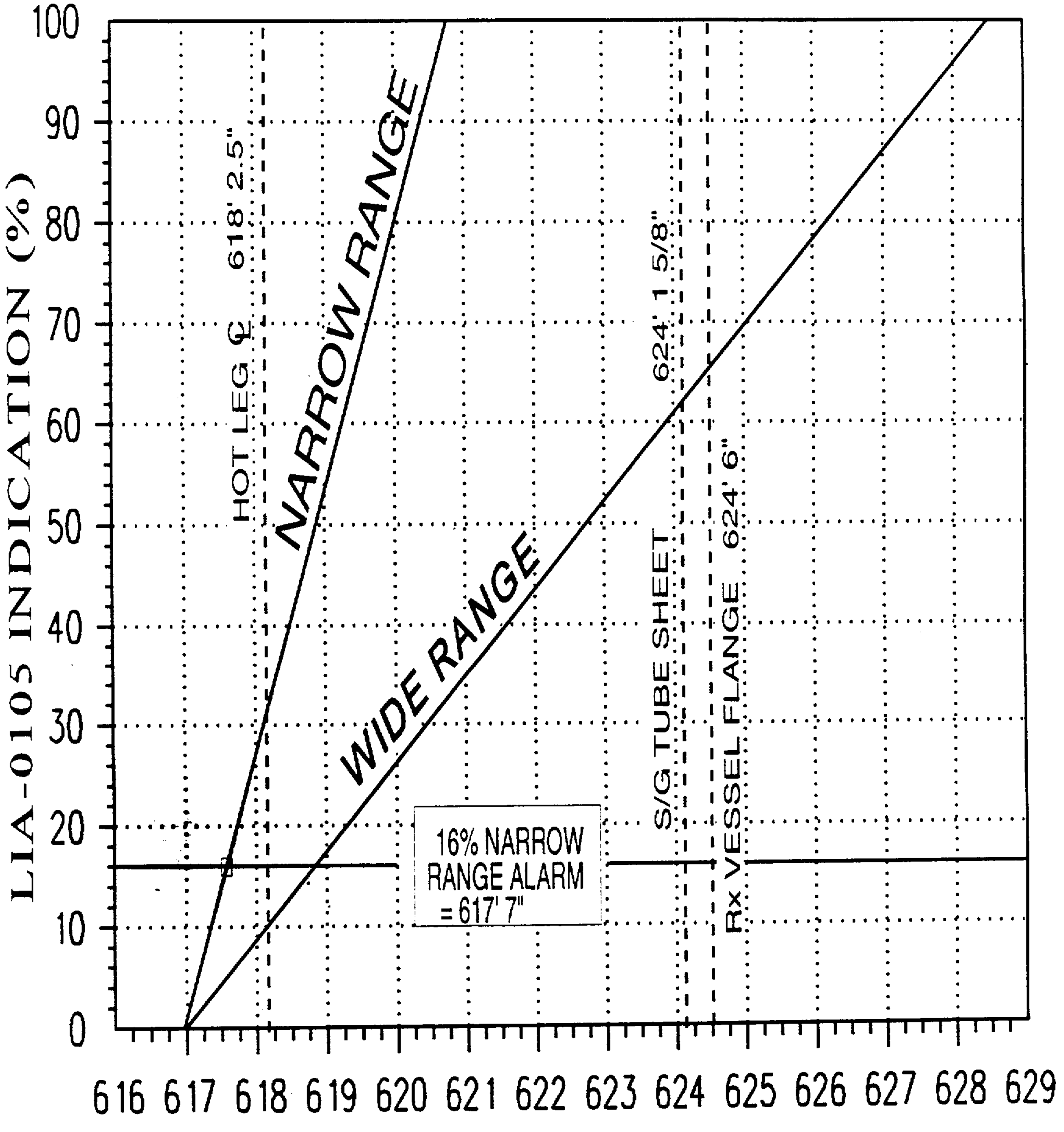


1) Using RIA-0631, determine uncorrected primary to secondary leakrate: "A".
2) Correct with the following equation.

$$\text{Corrected Primary to Secondary Leakrate} = A * \left(\frac{100}{\text{Total PCS Xenon 133 } (\mu\text{Ci/kg})} \right)$$

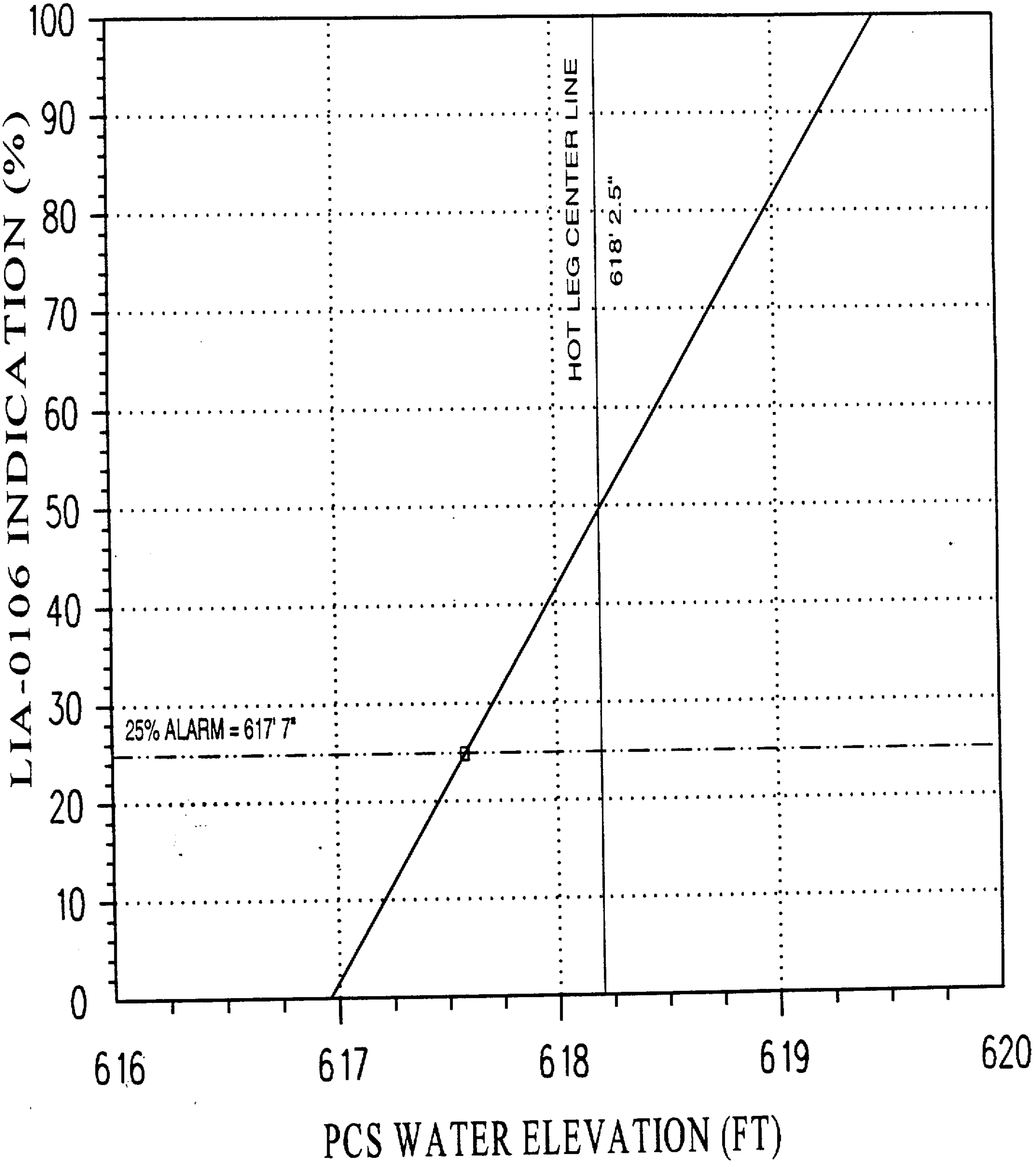
PCS WATER ELEVATION VS LIA-0105/LIA-0106 INDICATION

LIA-0105 INDICATION VS PCS WATER ELEVATION

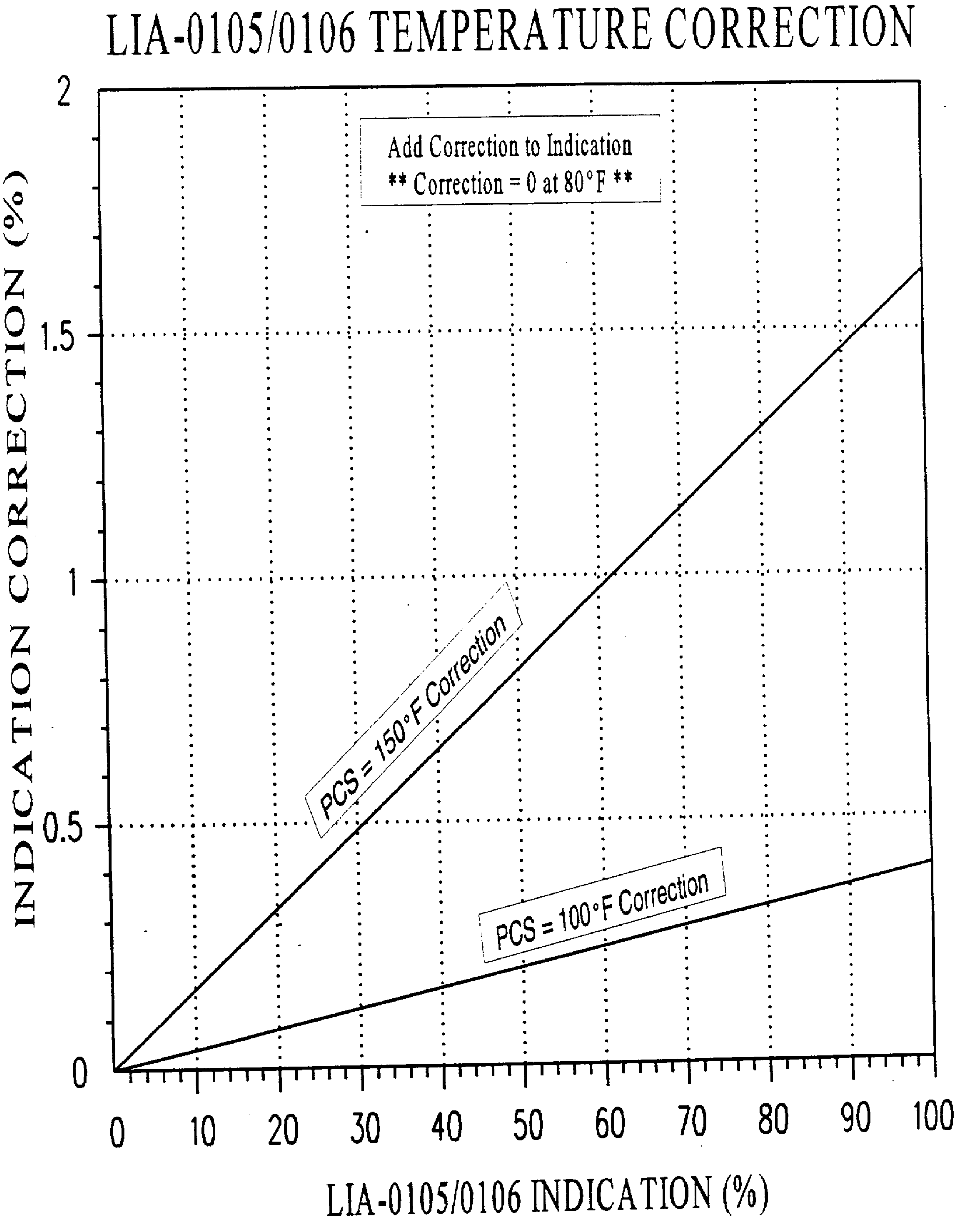


PCS WATER ELEVATION VS LIA-0105/LIA-0106 INDICATION

LIA-0106 INDICATION VS. PCS WATER ELEVATION



PCS WATER ELEVATION VS LIA-0105/LIA-0106 INDICATION



REGULATING ROD SEQUENCING PROGRAM AND MATRIX INDICATION

1.0 NORMAL REGULATING ROD WITHDRAWAL SEQUENCE

a. Group '1' moves alone from 3 to 83 inches withdrawal.

b. Group '2' moves from 3 to 51 inches withdrawal as Group '1' moves from 83 inches to fully withdrawn.

c. Group '2' moves alone from 51 to 83 inches withdrawal.

d. Group '3' moves from 3 to 51 inches withdrawal as Group '2' moves from 83 inches to fully withdrawn.

e. Group '3' moves alone from 51 to 83 inches withdrawal.

f. Group '4' moves from 3 to 51 inches withdrawal as Group '3' moves from 83 inches to fully withdrawn.

g. Group '4' moves alone from 51 inches to fully withdrawn.

2.0 NORMAL REGULATING ROD INSERTION SEQUENCE

a. Group '4' moves from fully withdrawn to 51 inches withdrawal alone.

b. Group '3' moves from fully withdrawn to 83 inches as Group '4' moves from 51 inches to fully inserted.

c. Group '3' moves from 83 to 51 inches withdrawal alone.

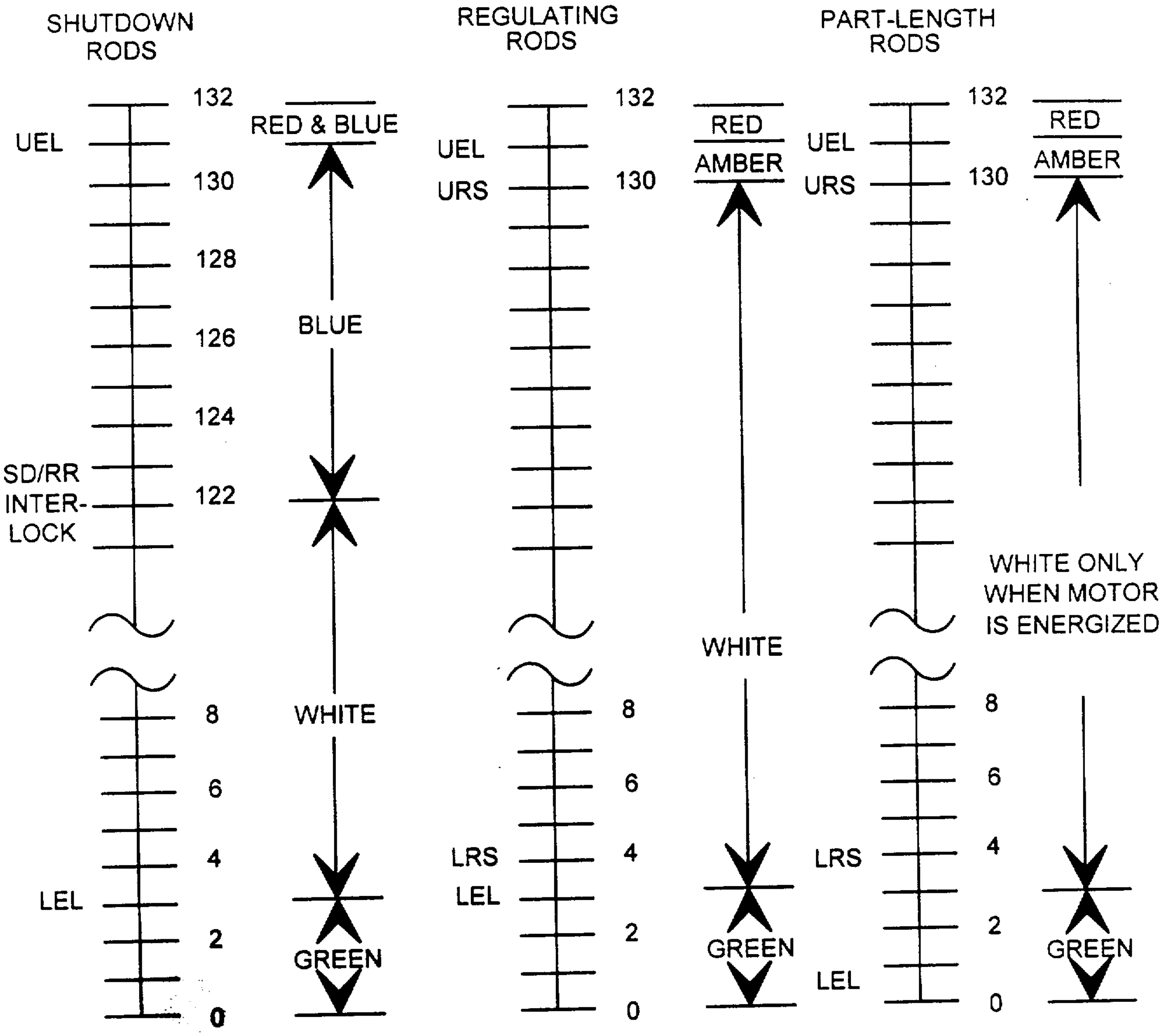
d. Group '2' moves from fully withdrawn to 83 inches as Group '3' moves from 51 inches to fully inserted.

e. Group '2' moves alone from 83 to 51 inches withdrawal.

f. Group '1' moves from fully withdrawn to 83 inches as Group '2' moves from 51 inches to fully inserted.

g. Group '1' moves from 83 inches to fully inserted alone.

REGULATING ROD SEQUENCING PROGRAM AND MATRIX INDICATION



UEL:	Upper Electrical Limit
LEL:	Lower Electrical Limit
URS:	Upper Rod Stop
LRS:	Lower Rod Stop
SD/RR:	Shutdown/Regulating Rod Interlock

Figure 1.1

SHUTDOWN MARGIN PARAMETERS

ROD WORTH	$\%\Delta\rho$, HFP
100 MWd/MTU	6.76
13810 MWd/MTU	7.52

STUCK ROD WORTH	$\%\Delta\rho$, HFP
100 MWd/MTU	0.87
13810 MWd/MTU	1.47

RECIPROCAL BORON WORTH	ppm/$\%\Delta\rho$, HFP
100 MWd/MTU	138.5
6500 MWd/MTU	128.7
13810 MWd/MTU	110.6

REFUELING BORON CONCENTRATION	ppm
	2339

Approved By: RSHaun 11-18-99
Reactor Engineering Supervisor

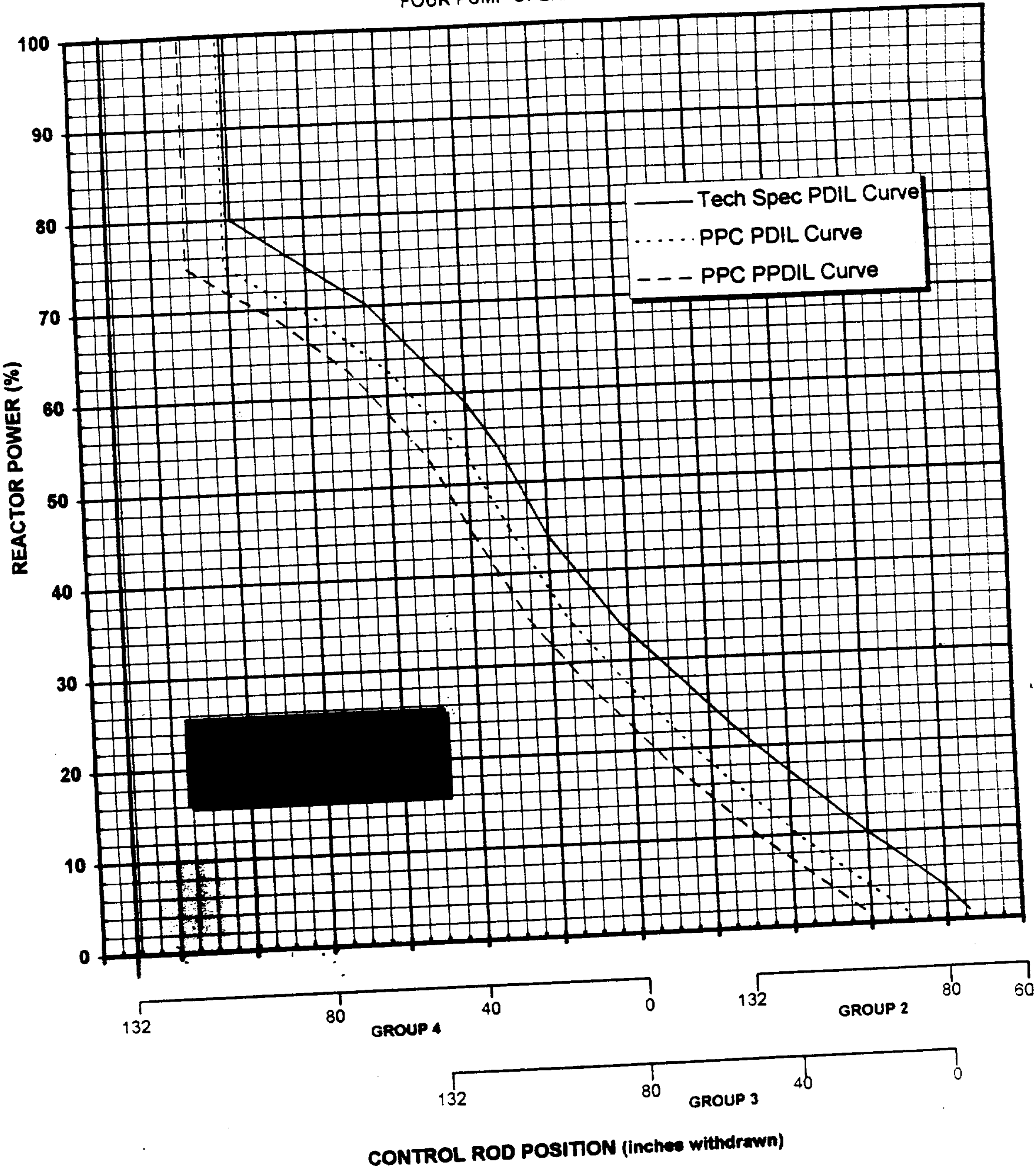
Reference: EMF-2309(P)
EMF-2259

Revision 2

Palisades Technical Data Book
Figure 1.9

POWER DEPENDENT INSERTION LIMITS

FOUR PUMP OPERATION



[redacted]

Reference: COLR 2.2
TDB 11.1

Approved By: RSHaun
Reactor Engineering Supervisor

FORMULA SHEET

NOTE: Hot equations should be used for a PCS temperature greater than or equal to 350 °F and cold equations should be used for a PCS temperature less than 350 °F.

1. BORON ADDITION

A. $$V_{HOT}\ (\text{Gal B.A.}) = 5.77 \times 10^4 \ln\left[\frac{\text{BAST (ppm)} - \text{PCS}_{\text{INITIAL}}\ \text{(ppm)}}{\text{BAST (ppm)} - \text{PCS}_{\text{FINAL}}\ \text{(ppm)}}\right]$$

B. $$V_{COLD}\ (\text{Gal B.A.}) = 8.48 \times 10^4 \ln\left[\frac{\text{BAST (ppm)} - \text{PCS}_{\text{INITIAL}}\ \text{(ppm)}}{\text{BAST (ppm)} - \text{PCS}_{\text{FINAL}}\ \text{(ppm)}}\right]$$

C. $$V\ (\text{Gal B.A. for desired ppm increase}) = \frac{[\text{Gal of } H_2O \text{ to borate}] \times [\text{Desired ppm increase}]}{\text{BAST (ppm)}}$$

2. DILUTION

A. $$V_{HOT}\ (\text{Gal PMW}) = 5.77 \times 10^4 \ln\left[\frac{\text{PCS}_{\text{INITIAL}}\ \text{(ppm)}}{\text{PCS}_{\text{FINAL}}\ \text{(ppm)}}\right]$$

B. $$V_{COLD}\ (\text{Gal PMW}) = 8.48 \times 10^4 \ln\left[\frac{\text{PCS}_{\text{INITIAL}}\ \text{(ppm)}}{\text{PCS}_{\text{FINAL}}\ \text{(ppm)}}\right]$$

3. BLEND RATIO

$$\frac{\text{\# of Gal PMW}}{\text{Gal of B.A.}} = \frac{\text{BAST (ppm)}}{\text{PCS (ppm)}} - 1$$

Approved By: ______________________
Reactor Engineering Supervisor

FORMULA SHEET

4. MIXING WATER AND CONCENTRATED BORIC ACID

A. $$\text{Final Concentration} = \frac{(\text{Initial Gal x Initial Conc})}{(\text{Initial Gal} + \text{Gal } H_2O \text{ Added})}$$

B. $$\begin{array}{c}\text{Gal of } H_2O\\ \text{Needed for}\\ \text{Desired Conc}\end{array} = \frac{(\text{Initial Gal x Initial Conc})}{\text{Final Conc}} - \text{Initial Gal}$$

5. MIXING 2 TANKS OF DIFFERENT CONCENTRATIONS

A. $$\text{Final Concentration} = \frac{(\text{Conc}_A \text{ x Vol}_A) + (\text{Conc}_B \text{ x Vol}_B)}{(\text{Vol}_A + \text{Vol}_B)}$$

B. $$\text{Vol}_A = \frac{(\text{Final Concentration} - \text{Conc}_B) \text{ x Vol}_B}{\text{Conc}_A \text{ x} \left(1 - \dfrac{\text{Final Concentration}}{\text{Conc}_A}\right)}$$

OR

$$\begin{array}{c}\text{Gal of Conc}\\ \text{B.A. for Desired}\\ \text{PPM Increase}\end{array} = \frac{(\text{Gal of Water to Borate x Desired PPM Increase})}{\text{PPM of Conc B.A. x} \left(1 - \dfrac{\text{Final Concentration}}{\text{PPM of Conc B.A.}}\right)}$$

Approved By: ______________________
Reactor Engineering Supervisor

FORMULA SHEET

6. TO PREDICT OR DETERMINE EVAPORATOR BOTTOMS CONCENTRATION

A.
$$\text{Gal of Feed to Evap} = \frac{\text{Increase in Bottom Conc}}{\text{Conc of Feed to Evap}} \times \text{Evap Concentrate Volume}$$

7. GAS PRESSURE, TEMPERATURE, VOLUME RELATIONSHIP

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

P = Absolute Pressure

V = Volume

T = Temperature (°Rankine) [°F + 460]

Approved By: Reactor Engineering Supervisor

3.7 ELECTRICAL POWER SYSTEMS

3.7.9 Distribution Systems - Operating

Specifications

The left and right trains of AC, DC, and Preferred AC power distribution subsystems listed in Table 3.7.9-1 shall be OPERABLE.

Applicability

Specification 3.7.9 applies when the PCS is above COLD SHUTDOWN.

Action

3.7.9.A With one or more subsystems of one AC electrical power distribution train inoperable:

1. Comply with 3.7.9.E, if applicable, and
2. Restore the electrical power distribution train to OPERABLE status; within 8 hours.

3.7.9.B With one Preferred AC bus inoperable:

1. Comply with 3.7.9.E, if applicable, and
2. Restore the Preferred AC bus to OPERABLE status; within 8 hours.

3.7.9.C With one or more subsystems of one DC electrical power distribution train inoperable:

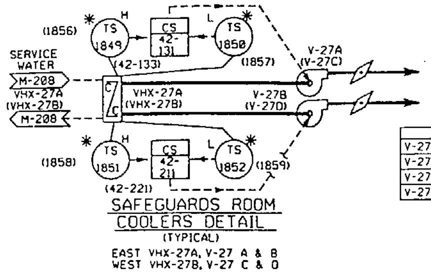
1. Comply with 3.7.9.E, if applicable, and
2. Restore the DC electrical power distribution train to OPERABLE status; within 8 hours.

3.7.9.D If the action required by 3.7.9.A, through 3.7.9.C is not met and the associated completion time has expired:

1. The reactor shall be placed in HOT SHUTDOWN; within 12 hours, and
2. The reactor shall be placed in COLD SHUTDOWN: within 48 hours.

3.7.9.E With any inoperable distribution subsystem that results in a loss of a safety function:

1. Enter Specification 3.0.3; immediately.

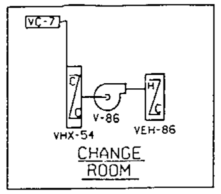


SAFEGUARDS ROOM COOLERS DETAIL

(TYPICAL)

EAST VHX-27A, V-27 A & B
WEST VHX-27B, V-27 C & D

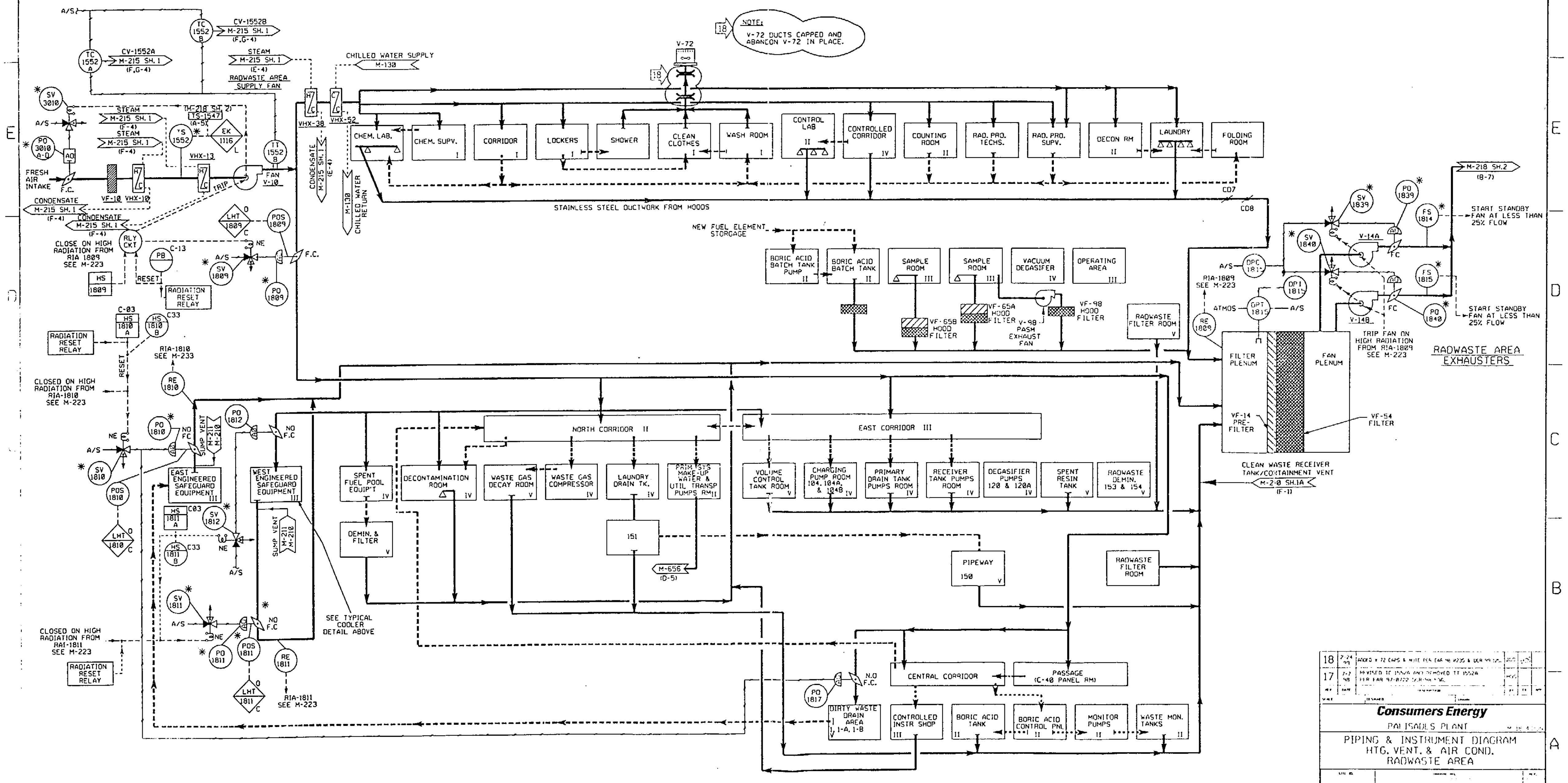
	HIGH TEMP	LOW TEMP			ROOM
V-27A	TS-1849	TS-1850	CS-42-131	VHX-27A	EAST
V-27B	TS-1851	TS-1852	CS-42-211	VHX-27A	EAST
V-27C	TS-1856	TS-1857	CS-42-133	VHX-27B	WEST
V-27D	TS-1858	TS-1859	CS-24-221	VHX-27B	WEST



CHANGE ROOM

NOTE:
PS-1802, 1802A, 1804 & 1804A ARE LOCATED IN PENETRATION #17 WITH FOUR ½" LINES.

NOTE:
←----- AIR CIRCULATION, NO DUCT WORK PROVIDED



18	7-24-99	ADDED V-72 CAPS & NOTE PER EAR 98-0235 & DCR 99-[illegible]	[illegible]	[illegible]	
17	7-7-98	REVISED TC 1552A AND REMOVED TT 1552A PER EAR 97-0722 DCR-98-[illegible]	MOS		

Consumers Energy

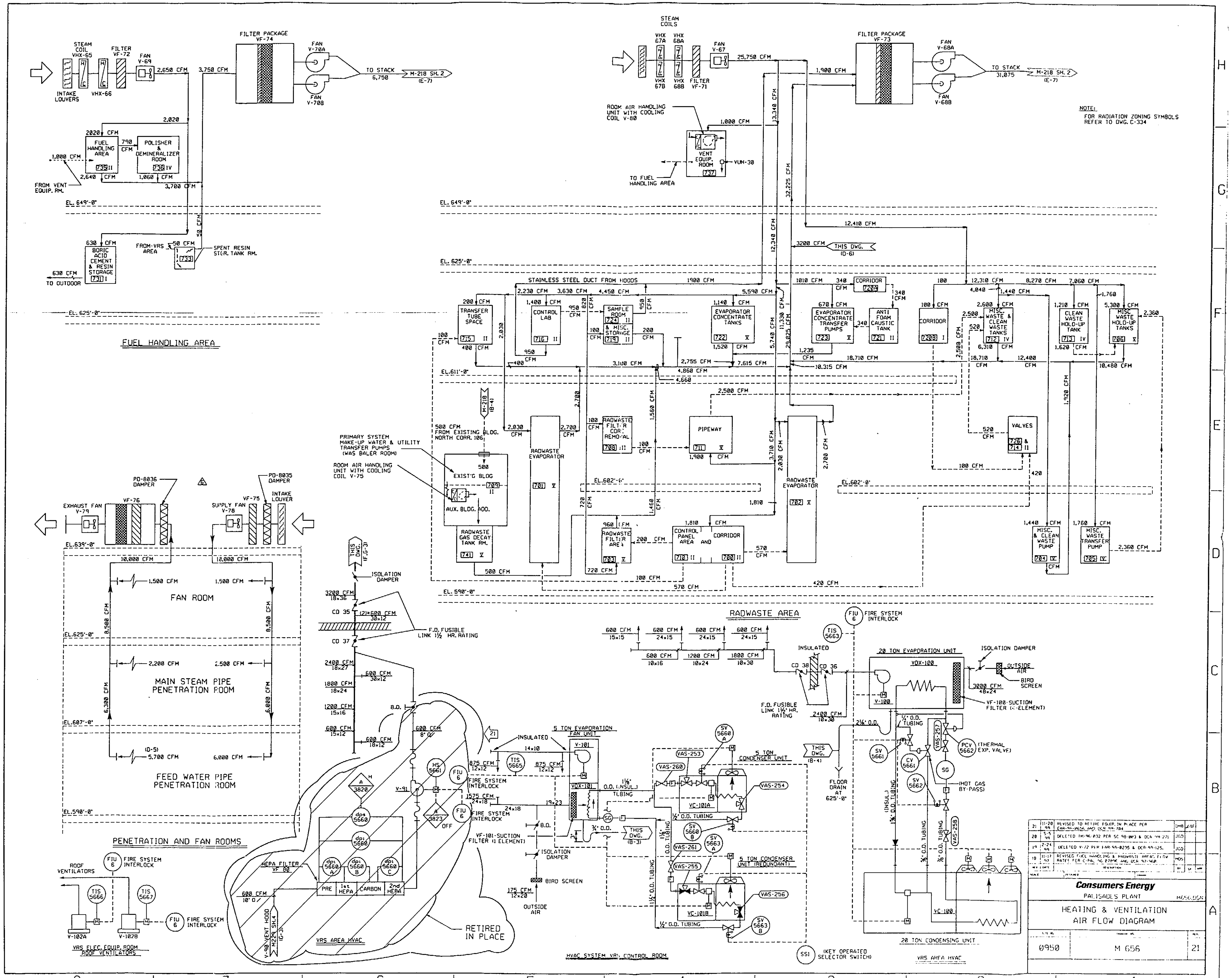
PALISADES PLANT

PIPING & INSTRUMENT DIAGRAM
HTG. VENT. & AIR COND.
RADWASTE AREA

0950

M218 SH.4

18



21	11-20 99	REVISED TO RETIRE EQUIP. IN PLACE PER EAR-96-M656 AND DCR 99-784	DMB		
20	5-5 99	DELETED TH-96-032 PER SC 98-003 & DCR 99-271	JGD		
19	2-24 99	DELETED V-72 PER EAR-98-0235 & DCR-99-125.	JGD		
18	11-17 97	REVISED FUEL HANDLING & RADWASTE AREAS FLOW RATES PER C-PAL 96 0709E AND DCR 97-068	HDS		
REV	DATE	DESCRIPTION	BY		APP

Consumers Energy

PALISADES PLANT

M656.DGN

HEATING & VENTILATION
AIR FLOW DIAGRAM

0950

M 656

21

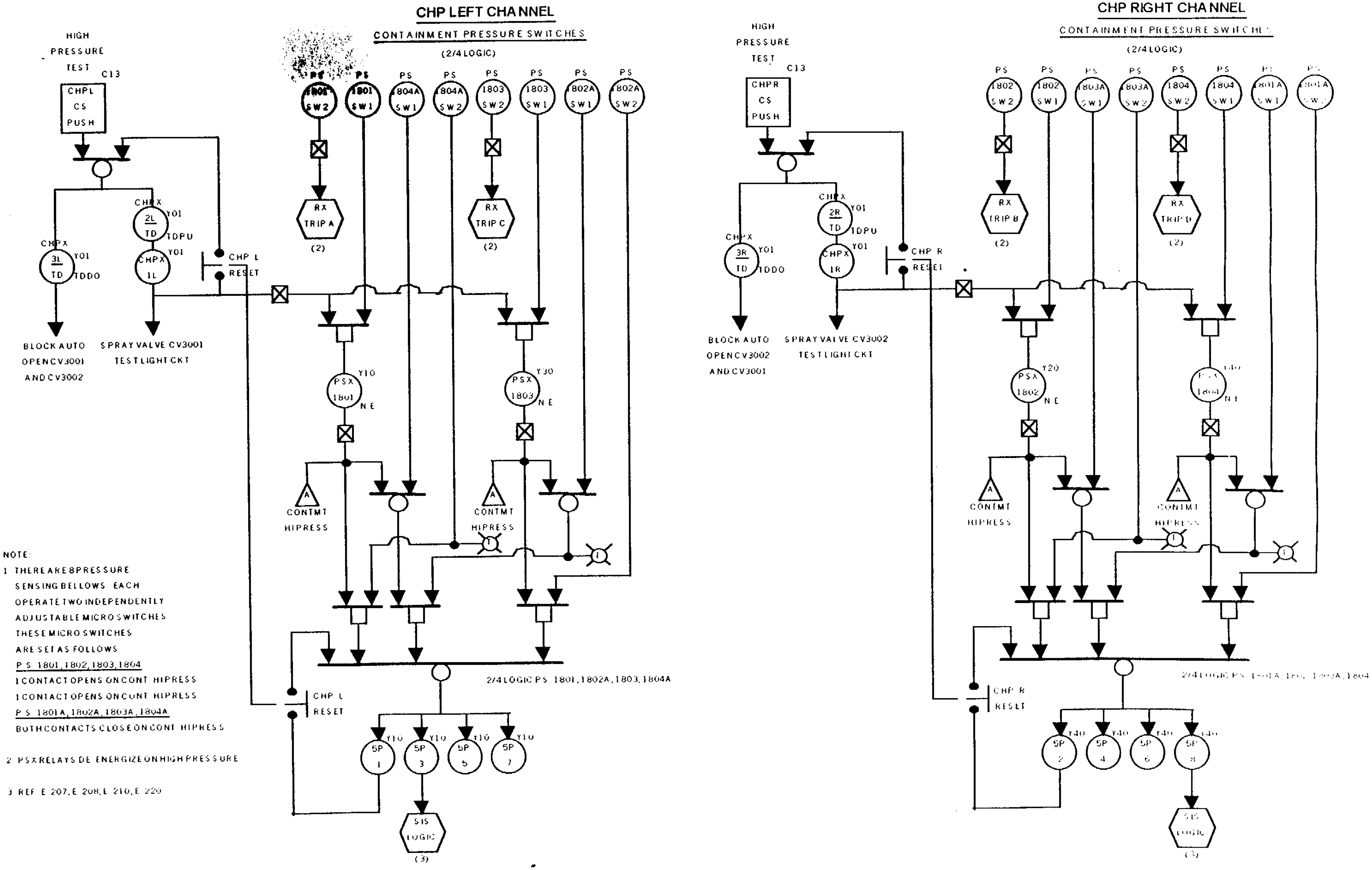
PALISADES NRC WRITTEN EXAMINATION

SENIOR REACTOR OPERATOR

QUESTION ATTACHMENTS

1. Question #37 Attachment
2. Question #42 Attachment
3. Question #67 Attachment
4. Question #75 Attachment

QUESTION #37 ATTACHMENT



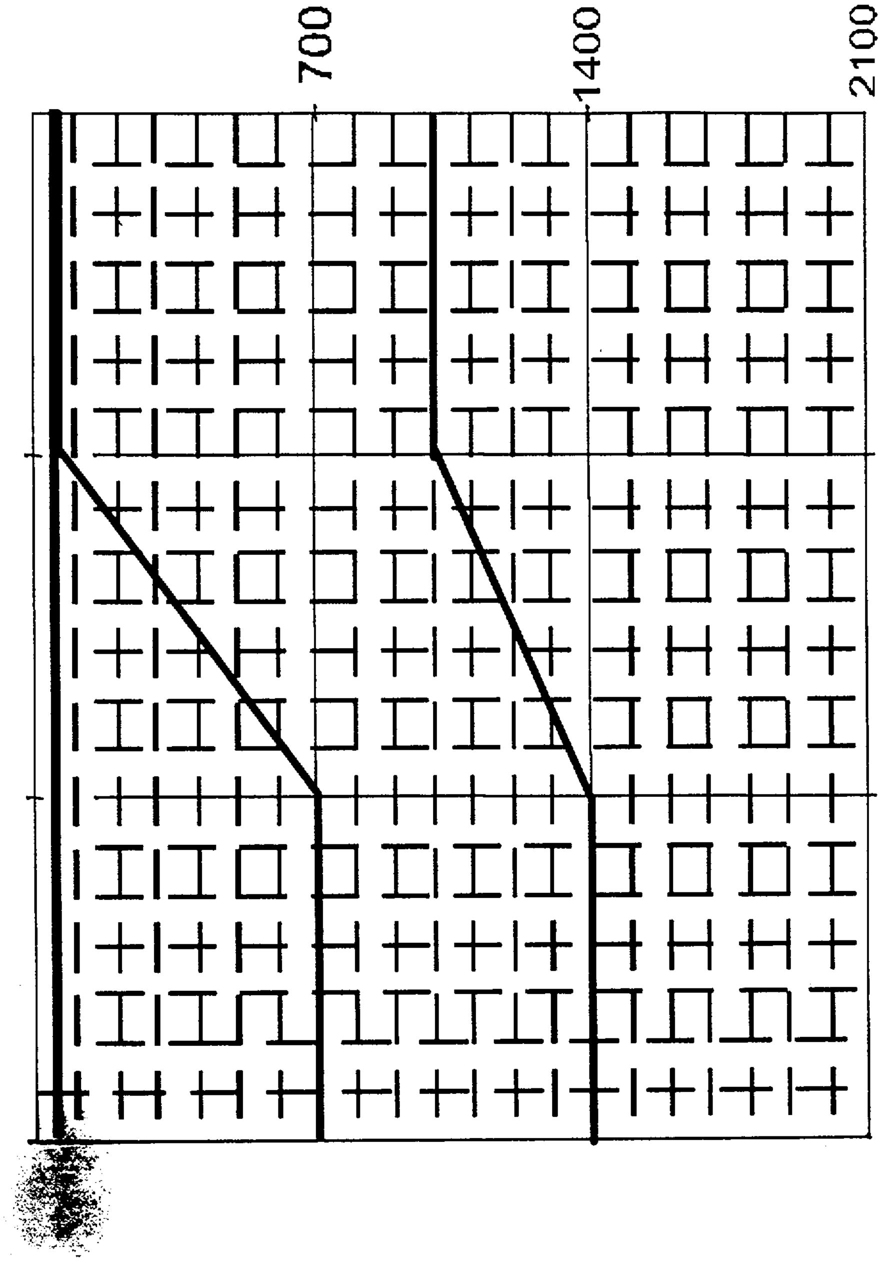
NOTE:

1 THERE ARE 8 PRESSURE
SENSING BELLOWS EACH
OPERATE TWO INDEPENDENTLY
ADJUSTABLE MICRO SWITCHES
THESE MICRO SWITCHES
ARE SET AS FOLLOWS
P S 1801,1802,1803,1804
1 CONTACT OPENS ON CONT HIPRESS
1 CONTACT OPENS ON CONT HIPRESS
P S 1801A,1802A,1803A,1804A
BOTH CONTACTS CLOSE ON CONT HIPRESS

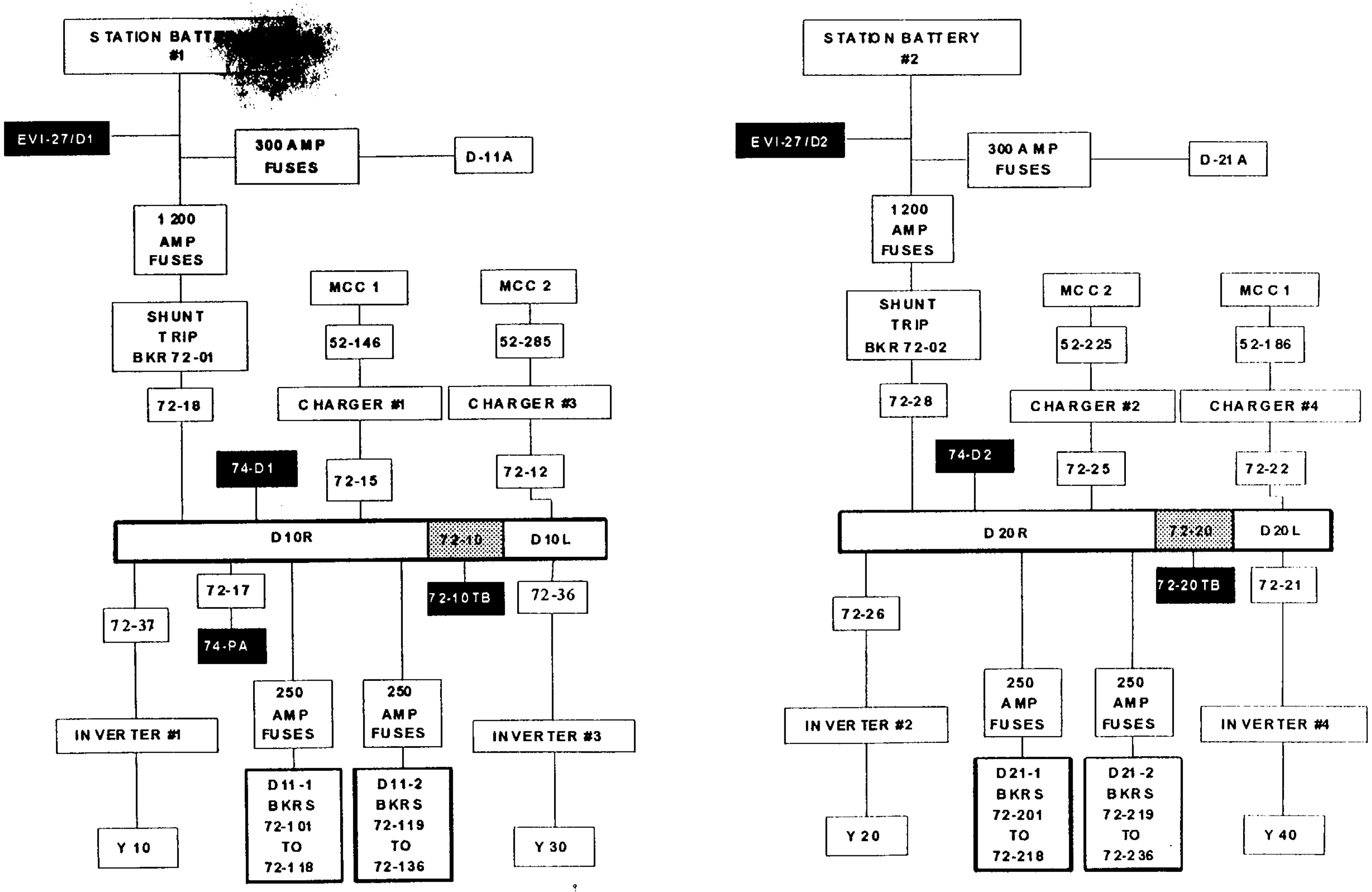
2 PSX RELAYS DE ENERGIZE ON HIGH PRESSURE

3 REF E 207,E 208,E 210,E 220

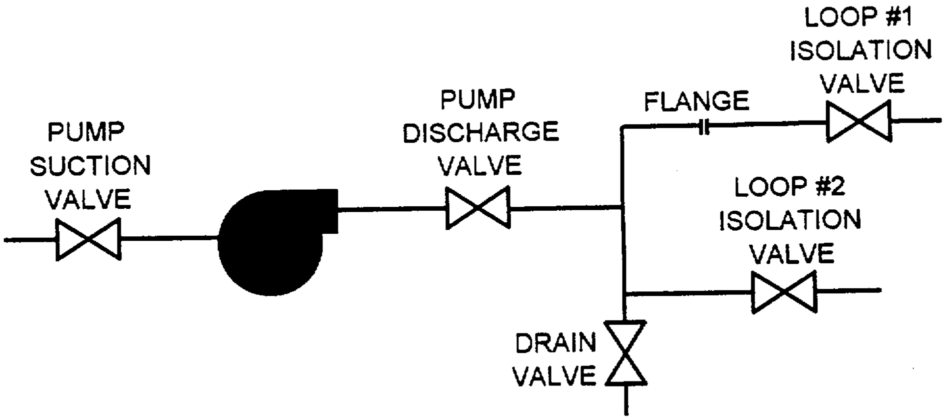
QUESTION #42 ATTACHMENT



QUESTION #67 ATTACHMENT



QUESTION #75 ATTACHMENT



FINAL-AS ADMINISTERED OPERATING TEST

FOR THE PALISADES INITIAL EXAMINATION THE WEEK OF MAY 22, 2000

FINAL-AS ADMINISTERED ADMINISTRATIVE JPMS

FOR THE PALISADES INITIAL EXAMINATION THE WEEK OF MAY 22, 2000

AS ADMINISTERED

Facility: PALISADES
Examination Level (circle one): SRO
Date of Examination: MAY 22-26, 2000
Operating Test Number: ________

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	CONDUCT OF OPERATIONS	Verification of the Compensation Required for a Withdrawn, Inoperable Control Rod (001A2.03)
		Reset the Ultrasonic Flow Meter Correction Factors (2.1.19)
A.2	EQUIPMENT CONTROL	Complete Operability Determination for a Failed Technical Specification Surveillance (2.2.21)
A.3	RADIATION CONTROL	Two questions concerning radiation control practices. (2.3.2; 2.3.10)
A.4	EMERGENCY PLAN	Classify an Emergency Event and Determine Protective Action Recommendations (2.4.44)

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-A.1-1

Verification of the Compensation Required for a Withdrawn, Inoperable Control Rod

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Verification of the Compensation Required for a Withdrawn, Inoperable Control Rod

Alternate Path: NONE

Facility JPM #: RTB 02N

K/A Rating: 001A2.03 Importance: SRO 4.2 RO 3.5

K/A Statement: Ability to (a) predict the impacts of the following malfunction or operations on the CRDS- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effect of stuck rod or Misaligned rod

Task Standard: EM-04-08, Attachment 1, reviewed and calculation determined to be performed improperly.

Preferred Evaluation Location: Simulator X In Plant ____

Preferred Evaluation Method: Perform X Simulate ____

References: EM-04-08, Shutdown Margin Requirements
Technical Data Book

Validation Time: 20 minutes Time Critical: NO

Candidate: ____________________

Time Start: ________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ____________________

____

Examiner: ____________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

EM-04-08, Attachment 1 (Attachment to this JPM)
Calculator

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Rod #6 is inoperable and fully withdrawn. It is believed that the rod is untrippable. Burnup is 6955 MWD/MTU. Rx power is 40%, PCS Boron is 836 ppm. All rods are out, and equilibrium Xenon conditions are established. Reactor Engineering is NOT available.

INITIATING CUES:

You have directed the Reactor Operator to determine the compensation for shutdown margin required for Control Rod #6 utilizing EM-04-08. Review the calculation using the given Attachment 1 of EM-04-08

START TIME: ________

STEP 1: Locates proper procedure and required information.

STANDARD: Locates EM-04-08, references Section 7.2.3 and Attachment 1, and locates Technical Data Book.

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 2: Verifies data in Section 1 for Inoperable Control Rod Identification

STANDARD: Verifies data entered as Group "1", Number "6", Core Location "I-12", and Condition "Inoperable" in Section 1

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 3: Verifies data in Section 2 for Worth of Inoperable Rod

STANDARD: Verifies worth as "1.17 (1.10 to 1.24)" (TDB Figure 1.1)

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 4: Verifies data in Section 3 for Source of Inoperable Control Rod Worth STANDARD: Verifies "Technical Data Book (Figure 1.1)" NOTES: ***NOTE: Not required to enter figure number.*** COMMENTS:	_____ SAT _____ UNSAT
STEP 20: Verifies data in Section 4.A for Current Cycle Burnup STANDARD: Verifies "6955" NOTES: ***NOTE: Data given in initial conditions.*** COMMENTS:	_____ SAT _____ UNSAT
STEP 6: Verifies data in Section 4.B for Current Reactor Power Level STANDARD: Verifies "40" NOTES: ***NOTE: Data given in initial conditions.*** COMMENTS:	_____ SAT _____ UNSAT

STEP 7: Verifies data in Section 4.C for Control Rod Worth Inserted into Core

STANDARD: Verifies worth as "0", group as "4", and inches as "131" (TDB Figure 1.3)

NOTES: ***NOTE: Data given as "rods full out" in initial conditions.***

____ SAT

COMMENTS:

____ UNSAT

STEP 20: Verifies data in Section 4.D for PCS Boron Concentration

STANDARD: Verifies "836"

NOTES: ***NOTE: Data given in initial conditions.***

____ SAT

COMMENTS:

____ UNSAT

STEP 9: Verifies data in Section 5.E for Worth of All Control Rods

STANDARD: Verifies "7.14 (7.07 to 7.21)" (TDB Figure 1.1)

NOTES:

____ SAT

COMMENTS:

____ UNSAT

STEP 10: Verifies data in Section 5.F for Maximum Worth of Stuck Rod STANDARD: Verifies worth as "1.17 (1.10 to 1.24)" (TDB Figure 1.1) NOTES: COMMENTS:	_____ SAT _____ UNSAT
STEP 11: Verifies data in Section 5.G for PCS Boron at 100% Power STANDARD: Verifies "700 (690 to 710)" (TDB Figure 6.1) NOTES: COMMENTS:	_____ SAT _____ UNSAT
STEP 12: Verifies data in Section 5.H for Power Defect at 100% Power STANDARD: Verifies "1.59 (1.58 to 1.60)" (TDB Figure 3.2) NOTES: COMMENTS:	_____ SAT _____ UNSAT

STEP 13:	Verifies data in Section 5.I for Power Defect	
STANDARD:	Verifies calculated value of "0.636 (0.632 to 0.640)"	
NOTES:	***NOTE: Tolerance based on previously allowed tolerances.***	
COMMENTS:		_____ SAT _____ UNSAT
STEP 14:	Verifies data in Section 6.K for Net Amount of Shutdown Margin	
STANDARD:	Verifies calculated value of"2.79 (2.66 to 2.92)"	
NOTES:	***NOTE: Tolerance based on previously allowed tolerances.***	
COMMENTS:		_____ SAT _____ UNSAT
STEP 15:	Verifies data in Section 6.L for Worth of Inoperable Control Rod	
STANDARD:	Verifies "1.17 (1.10 to 1.24)"	
NOTES:	***NOTE: Previously determined data (Step 2).***	
COMMENTS:		_____ SAT _____ UNSAT

STEP 16:	Verifies data in Section 6.M for Excess Shutdown Margin	***CRITICAL STEP***
STANDARD:	Calculates and determines entered value should be "1.62 (1.42 to 1.82)" instead of 0.62	
NOTES:	***Critical to identify improperly calculated value CUE: If candidate returns the calculation to you at this point, provide CUE: "Continue the review to identify any additional errors."*** ***NOTE: Tolerance based on previously allowed tolerances.*** ***NOTE: Incorrect value obtained due to math error.***	____ SAT
COMMENTS:		____ UNSAT
STEP 17:	Verifies data in Section 8.R for PPC PDIL	***CRITICAL STEP***
STANDARD:	Verifies Group as "4" and Inches as "23 (20 to 25)" (TDB Figure 1.9)	
NOTES:	***Critical to correctly interpret curve since this will be PDIL for conditions.*** ***NOTE: Section 7 is NOT required.***	____ SAT
COMMENTS:		____ UNSAT

STEP 18:	Verifies data in Section 8.S for Control Rod Position Corresponding to Excess SDM	***CRITICAL STEP***
STANDARD:	Determines actual value should be Group as "3" and inches as "10" (Group 2 at 70" to Group 3 at 30") (TDB Figure 1.3), not as entered on attachment.	
NOTES:	***Critical step to determine incorrect value entered.*** ***NOTE: Tolerance based on previously allowed tolerances. Error based on previous error.***	
COMMENTS:		_____ SAT _____ UNSAT
STEP 19:	Verifies data in Section 8.T for PDIL for Inoperable Control Rod Condition	***CRITICAL STEP***
STANDARD:	Determines entered value should be Group as "4" and Inches as "23 (20 to 25)" (TDB Figure 1.9), not as entered on attachment.	
NOTES:	***Critical step to identify required PDIL.*** ***NOTE: Previously determined values.***	
COMMENTS:		_____ SAT _____ UNSAT

STEP 20:	Returns attachment to Reactor Operator for corrections.	
STANDARD:	Returns attachment to Reactor Operator for corrections.	
NOTES:	***NOTE: Attach completed attachment to JPM.***	
		_____ SAT
COMMENTS:		_____ UNSAT
	END OF TASK	

STOP TIME: __________

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Rod #6 is inoperable and fully withdrawn. It is believed that the rod is untrippable. Burnup is 6955 MWD/MTU. Rx power is 40%, PCS Boron is 836 ppm. All rods are out, and equilibrium Xenon conditions are established. Reactor Engineering is NOT available.

INITIATING CUES:

You have directed the Reactor Operator to determine the compensation for shutdown margin required for Control Rod #6 utilizing EM-04-08. Review the calculation using the given Attachment 1 of EM-04-08

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

1. **INOPERABLE OR DROPPED CONTROL ROD IDENTIFICATION:**

GROUP *A* NUMBER *6* CORE LOCATION *I-12*

CONDITION ***INOPERABLE*** *(Inoperable or Dropped)*

2. **WORTH OF INOPERABLE OR DROPPED CONTROL ROD** *1.17* %Δρ
(TDB Figure 1.1 or Reactor Engineering)

3. **SOURCE OF INOPERABLE OR DROPPED CONTROL ROD WORTH DATA:**

TDB Figure 1.1

4. **REFERENCE DATA**

A. CURRENT CYCLE BURNUP (TDB Fig 1.10) *6955* MWd/MTU

B. CURRENT REACTOR POWER LEVEL (Percent of Rated Power) *40* %

C. CONTROL ROD WORTH INSERTED INTO CORE (TDB Fig 1.3) *0* %Δρ

GROUP ***ARO*** INCHES ***ARO***

This Control Rod worth does not include the worth of a dropped Control Rod.

D. PCS BORON CONCENTRATION (Chemistry Log or Reactor Logbook) *836* ppm

TDB = Technical Data Book

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

5. GENERAL DATA

E. WORTH OF ALL CONTROL RODS AT **A** (TDB Fig 1.1) *7.14* %Δρ

F. MAXIMUM WORTH OF STUCK CONTROL ROD AT **A** (TDB Fig 1.1) *1.17* %Δρ

G. PCS BORON AT 100% POWER AT **A** **OR** ACTUAL PCS BORON IF AT 100% POWER (TDB Fig 6.1, Reactor Log, or Chemistry Log) *700* ppm

H. POWER DEFECT AT 100% POWER (TDB Fig 3.2 and **G**) *1.59* %Δρ

I. POWER DEFECT AT POWER **B** *0.636* %Δρ

$$\frac{H \times B}{100} = \frac{(1.59) \times (40)}{100} =$$

J. REQUIRED SHUTDOWN MARGIN (4 PCPs Operating) 2.0 %Δρ

6. CALCULATION

K. NET AMOUNT OF SHUTDOWN MARGIN *2.79* %Δρ

$$\frac{(E - C - F)}{1.1} - I - J$$

$$= \frac{((7.14) - (0) - (1.17))}{1.1} - (0.636) - (2.0) =$$

TDB = Technical Data Book

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

L. WORTH OF INOPERABLE OR DROPPED CONTROL ROD ___1.17___ %Δρ

Step 2

M. EXCESS SHUTDOWN MARGIN WITH ONE INOPERABLE OR DROPPED CONTROL ROD ___0.62___ %Δρ

$$K - L = (2.79) - (1.17) =$$

NOTE: Step 7 only refers to Shutdown Margin. Off Normal Procedure ONP-5.1, "Control Rod Drop," requires a reduction in reactor power by boration to less than 75% within two hours of a dropped rod event due to hot channel factor concerns.

7. IF excess Shutdown Margin **(M)** is **NEGATIVE**, THEN borate the PCS to reduce reactor power until **M** is **POSITIVE** performing Steps **N** through **Q** to calculate the minimum reduced reactor power level.

N. POWER DEFECT AT REDUCED POWER

$$I + M = (\quad) + (\quad) =$$ ___NA___ %Δρ

O. MAXIMUM REDUCED POWER LEVEL

$$\frac{N \times B}{I} = \frac{(\quad) \times (\quad)}{(\quad)} =$$ ___NA___ %

P. Caution Tag the Control Rod joy-stick on panel C-02 that the new PDIL is Control Rod position at **C**.

Q. IF power reduction is required, THEN after power reduction re-perform Attachment 1 to verify Shutdown Margin requirements are satisfied.

TDB = Technical Data Book

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

NOTE: Step 8 only refers to Shutdown Margin. Off Normal Procedure ONP-5.1, "Control Rod Drop," requires a reduction in reactor power by boration to less than 75% within two hours of a dropped rod event due to hot channel factor concerns.

8. **IF M** is **POSITIVE, THEN** sufficient Shutdown Margin is available and no power reduction is necessary to ensure required Shutdown Margin. Perform Steps **R** though **U** to determine maximum allowable Control Rod insertion limit corresponding to excess Shutdown Margin available **(M)**.

R. PPC PDIL FOR CURRENT POWER LEVEL (TDB Fig 1.9)

Group *4*

Inches *23*

S. CONTROL ROD POSITION CORRESPONDING TO EXCESS SHUTDOWN MARGIN IN **M** (TDB Fig 1.3 or 5.1 and **M**)

Group *4*

Inches *36*

T. PDIL FOR INOPERABLE OR DROPPED CONTROL ROD CONDITION (**R** or **S**, whichever is farthest withdrawn)

Group *4*

Inches *36*

U. **IF** the Control Rod position in **S** is farther withdrawn than the Control Rod position in **R**, **THEN** Caution Tag the Control Rod joy-stick on panel C-02, identifying that the new PPC PDIL as the Control Rod position in **S**.

TDB = Technical Data Book

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

9. REVIEWS

N. C. Operator / Today
Performed By Date

/
Reviewed By Date

Forward Completed Form to Reactor Engineering Supervisor

/
Reactor Engineering Supervisor Date

TDB = Technical Data Book

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-A.1-2

Reset the Ultrasonic Flow Meter Correction Factors

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Reset the Ultrasonic Flow Meter Correction Factors

Alternate Path: NONE

Facility JPM #: ASHH 01

K/A Rating: 2.1.19 Importance: SRO 3.0 RO 3.0

K/A Statement: Ability to use plant computer to obtain and evaluate parametric information on system or component status.

Task Standard: UFM Correction Factors have been reset to a value of 1.0.

Preferred Evaluation Location: Simulator X In Plant ________

Preferred Evaluation Method: Perform X Simulate ________

References: GOP-12, Heat Balance Calculation
Technical Data Book Figure 14.1

Validation Time: 5 minutes Time Critical: NO

Candidate: ______________________________

Time Start: __________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ______________________________

____

____

Examiner: ______________________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- IC-10 (75%)
- Set UFM Correction Factors on PPC 551 to 0.9890 (UFM Correction Factor A) and 0.9690 (UFM Correction Factor B)
- Ensure completed copy of TDB Figure 14.1 is included with UFM Correction Factor A at 0.9890, UFM Correction Factor B at 0.9690, and Maximum Corrected Power for Resetting to 1.0 at 97.51% (place in correct location in Tech Data Book in Simulator).

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

The Plant is at 75% power, steady state during a shutdown.

INITIATING CUES:

During a planned power reduction to 50%, power has been stabilized for an indeterminate period prior to continuing the shutdown, and the Shift Supervisor directs you to check the UFM correction factor in accordance with GOP-8 and GOP-12.

START TIME: ______

STEP 1: Locates proper procedure and required information.

STANDARD: Locates GOP-12, references Sections 5.5 and 6.1.1, and locates Technical Data Book (TDB), Figure 14.1.

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 2: Ensures HB_PWR_STEADY is lowered to a value less than the "Maximum UFM Corrected Power for Resetting Correction Factors to 1.0"

STANDARD: Refers to TDB and determines maximum UFM Corrected Power for Resetting Correction Factors to 1.0 is 97.51% and compares to HB_PWR_STEADY value of 75%.

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 3: Obtain PPC display 521

CRITICAL STEP

STANDARD: Accesses PPC display 521 via the "NSSS APPLICATIONS" item on the main menu followed by the "UFM PLANT CALORIMETRIC" submenu.

NOTES: ***Critical step to select display to allow update.***

COMMENTS:

____ SAT

____ UNSAT

STEP 4:	Reset UFM Correction Factor A to 1.0.	***CRITICAL STEP***
STANDARD:	Selects UFM Correction Factor A, types in "1.0", and depresses UPDATE hardkey.	
NOTES:	***Critical step to reset UFM correction factors.***	________ SAT
COMMENTS:		________ UNSAT
STEP 5:	Reset UFM Correction Factor B to 1.0.	***CRITICAL STEP***
STANDARD:	Selects UFM Correction Factor B, types in "1.0", and depresses UPDATE hardkey.	
NOTES:	***Critical step to reset UFM correction factors.***	________ SAT
COMMENTS:		________ UNSAT
	END OF TASK	

STOP TIME: ________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The Plant is at 75% power, steady state during a shutdown.

INITIATING CUES:

During a planned power reduction to 50%, power has been stabilized for an indeterminate period prior to continuing the shutdown, and the Shift Supervisor directs you to check the UFM correction factor in accordance with GOP-8 and GOP-12.

JPM RO-A.1-2 Attach.

PALISADES TECHNICAL DATA BOOK FIGURE 14.1, REVISION 0

Date	UFM Correction Factor A	UFM Correction Factor B	Maximum UFM Corrected Power for Resetting Correction Factors to 1.0	Initials
3/18/00	0.9890	0.9690	97.51%	B

9-3-97

APPROVED BY / DATE

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-A.2

Complete Operability Determination for a Failed Technical Specification Surveillance

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Complete Operability Determination for a Failed Technical Specification Surveillance

Alternate Path: NONE

Facility JPM #: NEW

K/A Rating: 2.2.21 Importance: SRO 3.5 RO 2.3

K/A Statement: Knowledge of pre- and post-maintenance operability requirements.

Task Standard: Admin 3.03, Attachments 1 and 2, Condition Report Operability Determination, have been properly completed.

Preferred Evaluation Location: Simulator X In Plant ________

Preferred Evaluation Method: Perform X Simulate ________

References: Admin 3.03, Corrective Action Process
Standing Order 54

Validation Time: 20 minutes Time Critical: NO

Candidate: ______________________________

Time Start: __________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ______________________________

____

____

Examiner: ______________________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

Provide candidate with ATTACHED copy of QO-17, Attachment 1.
Have BLANK copy of AP 3.0.3, Attachment 1, available.
Have BLANK copy of AP 3.0.3, Attachment 2, available.

NOTE: COMPLETED AP 3.0.3, ATTACHMENTS 1 AND 2, ARE PROVIDED AS KEY FOR EXAMINER.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

The plant is operating at 99.9% power. PCS Temperature is 560 °F. PCS Pressure is 2060 psia.

Charging Pump P-55B is inoperable.

Charging Pump P-55C has excessive vibration on the pump inboard bearing. QO-17, Inservice Test Procedure - Charging Pumps, has just been completed.

INITIATING CUES:

Acting as the Shift Supervisor, you are to review the given QO-17 surveillance and complete any required paperwork.

START TIME: ________

STEP 1: Determines P-55C vibration required action range exceeded STANDARD: Reviews given QO-17 and determines Pump Inboard Bearing P1Z has exceeded Required Action Range NOTES: ***Critical to determine pump has excessive vibration.*** COMMENTS:	***CRITICAL STEP*** _____ SAT _____ UNSAT
STEP 2: Locates procedure to perform operability determination STANDARD: Locates Admin 3.03 and refers to Attachments 1 and 2 NOTES: ***NOTE: Attachments 1 and 2 may be completed in any order.*** COMMENTS:	_____ SAT _____ UNSAT
STEP 3: Enters Title information in Attachment 1 STANDARD: Enters "Charging Pump P-55C Failed QO-17" (or similar) in TITLE on Attachment 1 NOTES: ***Critical to enter correct information.*** COMMENTS:	***CRITICAL STEP*** _____ SAT _____ UNSAT

STEP 4:	Enters Discovery Date and Time information in Attachment 1	***CRITICAL STEP***
STANDARD:	Enters current date and time in DISCOVERY DATE AND TIME on Attachment 1	
NOTES:	***Critical to enter correct information.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 5:	Enters Condition Discovered By information in Attachment 1	***CRITICAL STEP***
STANDARD:	Enters name or operations in CONDITION DISCOVERED BY on Attachment 1	
NOTES:		_____ SAT
COMMENTS:		_____ UNSAT
STEP 6:	Enters System information in Attachment 1	***CRITICAL STEP***
STANDARD:	Enters "CVC" (or similar) in SYSTEM on Attachment 1	
NOTES:	***Critical to enter correct information.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 7:	Enters Component ID information in Attachment 1	***CRITICAL STEP***
STANDARD:	Enters "P-55C" in COMPONENT ID on Attachment 1	
NOTES:	***Critical to enter correct information.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 8:	Enters Description of Occurrence or Condition information in Attachment 1	***CRITICAL STEP***
STANDARD:	Enters "P-55C failed QO-17 due to vibration exceeding Required Action Range per Step 6.2.3" (or similar) in DESCRIPTION OF OCCURRENCE OR CONDITION on	
NOTES:	***Critical to enter correct information.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 9:	Enters Immediate Action Taken information in Attachment 1	***CRITICAL STEP***
STANDARD:	Enters "Initiated C-PAL and Notified IST Coordinator" (or similar) in IMMEDIATE ACTION TAKEN on Attachment 1	
NOTES:	***Critical to enter correct information.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 10:	Enters Recommendations information in Attachment 1	***CRITICAL STEP***
STANDARD:	Enters "P-55C inoperable; Make repairs per WR # XXXX" (or similar) in RECOMMENDATIONS on Attachment 1	
NOTES:	***Critical to enter correct information.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 11:	Enters References information in Attachment 1	***CRITICAL STEP***
STANDARD:	Enters "QO-17, WR # XXXX" (or similar) in REFERENCES on Attachment 1	
NOTES:	***Critical to enter correct information.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 12:	Determines whether initiator feedback requested in Attachment 1	
STANDARD:	Checks either "YES" box or "NO" box	
NOTES:	***NOTE: May enter either choice depending on whether feedback is desired or not.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 13:	Signs and dates Initiator information in Attachment 1	
STANDARD:	Signs name, enters current date and time, on Attachment 1	
NOTES:		_____ SAT
COMMENTS:		_____ UNSAT
STEP 14:	Determines operability for Attachment 1 entry	***CRITICAL STEP***
STANDARD:	Checks NO block in response to question "Equipment Currently Operable as a result of this condition?"	
NOTES:	***Critical to enter correct information for operability determination.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 15:	Determines transfer of operability for Attachment 1 entry	
STANDARD:	Enters "NA" in response to "Control of Operability transferred	
NOTES:	***NOTE: NA due to no work order being issued at this point, only a work request.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 16: Determines Immediate Reportability

STANDARD: Checks NO block in response to question "Immediately Reportable?"

NOTES:

COMMENTS:

_____ SAT

_____ UNSAT

STEP 17: Determines whether identified for future shifts

STANDARD: Checks YES or NO block

NOTES: ***NOTE:* Either response is acceptable here. This would be marked YES if a caution tag were hung or some other method of identifying the problem were implemented.**

COMMENTS:

_____ SAT

_____ UNSAT

STEP 18: Determines Maintenance Rule Requirements

STANDARD: Checks YES or NO block

NOTES: ***NOTE:* Either response is acceptable here. This could be marked YES if the candidate determined a Safety Assessment were required.**

COMMENTS:

_____ SAT

_____ UNSAT

STEP 19:	Enters Plant Status at Time of Condition Identification	***CRITICAL STEP***
STANDARD:	Enters POWER OPERATIONS for Plant Mode, 99.9% for Power Level, 560 °F for RCS Temperature, and 2060 psia for PCS Pressure	
NOTES:	***Critical to identify plant conditions to determine Standing Order LCO entry.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 20:	Identifies Degraded Equipment/System	***CRITICAL STEP***
STANDARD:	Enters CVCS and/or P-55C (Charging Pump C) in Item #1	
NOTES:	***Critical to identify equipment system to determine LCO conditions.*** ***NOTE: May also add Boron Addition as system.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 21: Identifies Safety Function

CRITICAL STEP

STANDARD: Identifies Reactivity Control, Inventory Control, and/or Pressure Control as safety functions affected in Item #2

NOTES: ***Critical step to identify correct safety function(s) for operability determination***

NOTE: Acceptable to identify any or all of these functions.

_____ SAT

_____ UNSAT

COMMENTS:

STEP 22: Identifies Current Equipment/System Status

~~**CRITICAL STEP**~~

STANDARD: Checks "Equipment is Inoperable" and "System Remains Operable" boxes in Item #3

NOTES: ***Critical step to identify operability status of equipment and system.***

_____ SAT

_____ UNSAT

COMMENTS: consideration of critical step was removed - the step in this box confusing and unclear in the procedure - as long as ~~one of four~~ equipment checked box as inoperable - SAT. [System condition not supported in procedure; however, it appears to be logical that the system condition should also be considered. Licensee's comments noted.

STEP 23:	Determines past operability status of equipment	***CRITICAL STEP***
STANDARD:	Checks "NO" box for past inoperability in Item #3	
NOTES:	***Critical step to identify previous operability of pump.*** ***NOTE: Pump is considered operable since last surveillance until this surveillance failure.***	______ SAT
COMMENTS:		______ UNSAT
STEP 24:	Identifies NO Existing Work Order to Transfer Operability	***CRITICAL STEP***
STANDARD:	Checks "NO" box indicating that operability control is NOT transferred to an existing work order in ITEM #4	
NOTES:	***Critical step to identify control of operability.*** ***NOTE: A work request exists, but no work order has yet been generated.***	______ SAT
COMMENTS:		______ UNSAT

STEP 25:	Identify entry into an LCO Action Statement	***CRITICAL STEP***
STANDARD:	Checks YES block for LCO Action entry in Item #5	
NOTES:	***Critical step to identify that a Standing Order LCO Action has been entered.***	______ SAT
COMMENTS:		______ UNSAT

STEP 26:	Identifies Technical Specification LCO Action Statements entered	***CRITICAL STEP***
STANDARD:	Enters Standing Order 54, Item 3.2.~~2~~3.a in Item #5	
NOTES:	***Critical step to identify affected Standing Order.***	______ SAT
COMMENTS:		______ UNSAT

STEP 27: Identifies Technical Specification LCO Action Statements STANDARD: Enters "Standing Order 54, 3.2.3.a" <u>OR</u> "At least two charging pumps shall be operable. One charging pump is OPERABLE on each bus. One of the operable charging pumps may be removed from service provided that two charging pumps are restored to operable status within 24 hours. Two charging pumps may be inoperable provided that one charging pump on each bus is restored to OPERABLE status within 24 hours." NOTES: ***Critical step to identify actions.*** COMMENTS:	***CRITICAL STEP*** _______ SAT _______ UNSAT
STEP 28: Signs, dates, and enters time STANDARD: Signs, enters, and enters time on attachment NOTES: COMMENTS: ***END OF TASK***	_______ SAT _______ UNSAT

STOP TIME: _______

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The plant is operating at 99.9% power. PCS Temperature is 560 °F. PCS Pressure is 2060 psia.

Charging Pump P-55B is inoperable.

Charging Pump P-55C has excessive vibration on the pump inboard bearing. QO-17, Inservice Test Procedure - Charging Pumps, has just been completed.

INITIATING CUES:

Acting as the Shift Supervisor, you are to review the given QO-17 surveillance and complete any required paperwork.

PIF/CR OPERABILITY DETERMINATION

PALISADES
NUCLEAR PLANT

OPERABILITY DETERMINATION C-PAL-00-00XXX

Plant STATUS AT TIME OF CONDITION IDENTIFICATION:

Plant Mode: POWER OPS Power Level: 99.9%
PCS Temperature: 560 PCS Pressure: 2060

OPERABILITY ASSESSMENT

1. What Equipment/System is Degraded or Potentially Nonconforming? CVCS, P-55C

2. What Safety Function is Performed by the Equipment/System? RC/IC/PC

3. Current Equipment/System Status as a result of this CR:

☐ Equipment Remains Operable X System Remains Operable
X Equipment is Inoperable ☐ System is Inoperable

Did or might the deficiency identified in the CR cause this equipment to be inoperable during past operation? ☐ Yes X No If yes, consider contacting Licensing for reportability implications.
Basis for Determination: (Page 2 May Be Used) TECH SPEC TEST DISCOVERED VIBRATION PROBLEM; P-55C PERFORMING DESIGN FUNCTION

4. Will condition described be resolved by an existing WO? ☐ Yes X No WO # N/A
(By answering yes, the control of Operability is transferred to the WO. Enter WO # on CR and CR# on WO also.)

5. Did this condition Cause the entry into a LCO Action Statement? X Yes ☐ No

Tech Spec Reference: SO 54 (3.2.2.a)
LCO Action Statement: SO 54 (3.2.3.a)

Shift Supervisor: SRO CANDIDATE Date: CURRENT Time: CURRENT

CONDITION REPORT INITIATION

PALISADES NUCLEAR PLANT

CONDITION REPORT
(INITIATION)
C - PAL - 00 - 00XXX

INITIATOR

TITLE: CHARGING PUMP P-55C FAILED QO-17 (IST PROCEDURE)
Discovery Date and Time: CURRENT DATE/TIME Condition Discovered By: SRO CANDIDATE
System: CVC (CHEMICAL VOLUME CONTROL) Component ID: P-55C

DESCRIPTION OF OCCURRENCE OR CONDITION:
P-55C FAILED QO-17 DUE TO VIBRATION EXCEEDING REQUIRED ACTION RANGE PER STEP 6.2.3

IMMEDIATE ACTION TAKEN: INITIATED C-PAL AND NOTIFIED IST COORDINATOR

RECOMMENDATIONS (Operability and Corrective Action): P-55C INOPERABLE, MAKE REPAIRS PER WR # XXXX

REFERENCES: QO-17, WR # XXXX

Evaluator Feedback to Initiator after Evaluation Requested ☐ Yes **X** No
Initiator: SRO CANDIDATE Date: CURRENT Time: CURRENT

SHIFT SUP

Equipment Currently Operable as a result of this condition? ☐ Yes X No ☐ N/A If applicable, Do Att 2
Control of Operability transferred to WO # N/A
Immediately Reportable? ☐ Yes X No If Yes, Complete Attachment 4
Affected Equipment Identified for Future Shifts? **X** Yes ☐ No
Safety Assessment per Maintenance Rule Policy Required? **X** Yes ☐ No

LIC

Reportable ☐ No ☐ Yes 10CFR Part # ______ PRC ☐ No ☐ Yes Licensing ______ /

CRG

Maintenance Rule Applicable? ☐ Yes ☐ No Significance Level 1 2 3 4 (circle one)
Industry Experience? ☐ Yes ☐ No
Does past operability need assessment? ☐ Yes ☐ No If yes, CARB required.
Comments:
CRG Chair: Date:

MRB Chairperson: ☐ GM-Plt Ops ☐ Dept Mgr/Dir
Others:
APPROVAL: ______ ______
CRG Chair Date

Assigned To:
Due Date:

EVAL

Eval: ______ / ______ Condition Review Team Leader: ______ /

MRB

MRB Chair
Approval: Date:

CLOSEOUT

Condition Review Team Leader: Date:

CHARGING PUMP TEST EVALUATION

1.0 VIBRATION TEST EVALUATION

Compare **P-55A PUMP VIBRATIONS** (Step 5.2.7) to the ranges below; circle the range in which each falls.

POINT ID	CHANNEL ID	MEASURED VIBRATIONS (IPS-PK)	REFERENCE VIBRATIONS (IPS-PK)	ACCEPTABLE RANGE (IPS-PK)	ALERT RANGE (IPS-PK)	REQUIRED ACTION RANGE (IPS-PK)
Pump Inboard Bearing	P1X	N/A	.112	VIBES ≤ .280	.280 < VIBES ≤ .670	VIBES > .670
	P1Y	N/A	.136	VIBES ≤ .339	.339 < VIBES ≤ .814	VIBES > .814
	P1Z	N/A	.086	VIBES ≤ .215	.215 < VIBES ≤ .518	VIBES > .518
Pump Outboard Bearing	P2X	N/A	.110	VIBES ≤ .276	.276 < VIBES ≤ .662	VIBES > .662
	P2Y	N/A	.110	VIBES ≤ .276	.276 < VIBES ≤ .662	VIBES > .662
	P2Z	N/A	.107	VIBES ≤ .269	.269 < VIBES ≤ .645	VIBES > .645

Compare **P-55B PUMP VIBRATIONS** (Step 5.3.10) to the ranges below; circle the range in which each falls.

POINT ID	CHANNEL ID	MEASURED VIBRATIONS (IPS-PK)	REFERENCE VIBRATIONS (IPS-PK)	ACCEPTABLE RANGE (IPS-PK)	ALERT RANGE (IPS-PK)	REQUIRED ACTION RANGE (IPS-PK)
Pump Inboard Bearing	P1X	N/A	.209	VIBES ≤ .523	.523 < VIBES ≤ 1.256	VIBES > 1.256
	P1Y	N/A	.157	VIBES ≤ .393	.393 < VIBES ≤ .942	VIBES > .942
	P1Z	N/A	.178	VIBES ≤ .445	.445 < VIBES ≤ 1.069	VIBES > 1.069
Pump Outboard Bearing	P2X	N/A	.211	VIBES ≤ .526	.526 < VIBES ≤ 1.264	VIBES > 1.264
	P2Y	N/A	.147	VIBES ≤ .368	.368 < VIBES ≤ .882	VIBES > .882
	P2Z	N/A	.180	VIBES ≤ .450	.450 < VIBES ≤ 1.077	VIBES > 1.077

Compare **P-55C PUMP VIBRATIONS** (Step 5.4.8) to the ranges below; circle the range in which each falls.

POINT ID	CHANNEL ID	MEASURED VIBRATIONS (IPS-PK)	REFERENCE VIBRATIONS (IPS-PK)	ACCEPTABLE RANGE (IPS-PK)	ALERT RANGE (IPS-PK)	REQUIRED ACTION RANGE (IPS-PK)
Pump Inboard Bearing	P1X	**0.806**	.137	VIBES ≤ .342	.342 < VIBES ≤ .823	VIBES > .823
	P1Y	**0.511**	.095	VIBES ≤ .238	.238 < VIBES ≤ .568	VIBES > .568
	P1Z	**0.751**	.124	VIBES ≤ .311	.311 < VIBES ≤ .747	VIBES > .747
Pump Outboard Bearing	P2X	**0.753**	.129	VIBES ≤ .322	.322 < VIBES ≤ .772	VIBES > .772
	P2Y	**0.591**	.100	VIBES ≤ .252	.252 < VIBES ≤ .602	VIBES > .602
	P2Z	**0.647**	.117	VIBES ≤ .294	.294 < VIBES ≤ .704	VIBES > .704

CHARGING PUMP TEST EVALUATION

2.0 FLOW TEST EVALUATION

Compare **FIA-0212 READINGS** to the ranges below. Circle the range in which each falls.

PUMP ID	MEASURED FLOWRATE (gpm)	REFERENCE FLOWRATE (gpm)	ACCEPTABLE RANGE (gpm)	ALERT RANGE (gpm)	REQUIRED ACTION RANGE (gpm)
P-55A	N/A Step 5.2.6 / FIA-0212	52.0	49.4 ≤ Flow ≤ 57.2	48.4 ≤ Flow < 49.4	Flow < 48.4 OR Flow > 57.2
P-55B	N/A Step 5.3.9 / FIA-0212	39.0	37.0 ≤ Flow ≤ 42.9	36.3 ≤ Flow < 37.0	Flow < 36.3 OR Flow > 42.9
P-55C	40.0 Step 5.4.7 / FIA-0212	39.0	37.0 ≤ Flow ≤ 42.9	36.3 ≤ Flow < 37.0	Flow < 36.3 OR Flow > 42.9

3.0 PUMP DISCHARGE PRESSURE EVALUATION

Compare **PI-0212 READINGS** to the ranges below. Circle the range in which each falls.
This acceptance criteria is based on 2045 ≤ PZR PRES ≤ 2075 psia as indicated on PI-0104.

PUMP ID	MEASURED PRESSURE (psig)	REFERENCE PRESSURE (psig)	ACCEPTABLE RANGE (psig)	ALERT RANGE (psig)	REQUIRED ACTION RANGE (psig)
P-55A	N/A Step 5.2.6 / PI-0212	2161	2010 ≤ PRES ≤ 2377	1945 ≤ PRES < 2010	PRES < 1945 OR PRES > 2377
P-55B	N/A Step 5.3.9 / PI-0212	2172	2020 ≤ PRES ≤ 2389	1955 ≤ PRES < 2020	PRES < 1955 OR PRES > 2389
P-55C	2070 Step 5.4.7 / PI-0212	2177	2025 ≤ PRES ≤ 2395	1959 ≤ PRES < 2025	PRES < 1959 OR PRES > 2395

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-A.3

Radiation Control

CANDIDATE: ______________________

EXAMINER: ______________________

PALISADES
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Radiation Control - Questions Only

Alternate Path: NONE

Facility JPM #: NEW

Preferred Evaluation Location: Simulator ______ In Plant X

Preferred Evaluation Method: Perform X Simulate ______

References: 10CFR20
Radiation Safety Plan, Section VI, Part 4, 2.1, Prerequisites for Respiratory Use
HP 2.6, Containment Entry With the Reactor Critical

Validation Time: 15 minutes Time Critical: NO

Candidate: ______________________

Time Start: ______ Time Finish: ______

Performance Time: ______ minutes

Performance Rating: SAT ______ UNSAT ______

Comments: ______________________

Examiner: ______________________ Date: ______
Signature

Tools/Equipment/Procedures Needed:

NOTE TO EXAMINER: Candidate Question Sheets are attached to the back of this JPM in reverse order. The last page of this JPM should be given to the candidate as Question #1 and the next to last page should be given as Question #2.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will provide you with two (2) questions. Using any available references, answer each question completely. If you require clarification for either question, ask me only. To indicate that you have completed your assigned question(s), return the handout sheet I provided you.

EXAMINER ANSWER SHEET #1

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF ANSWER)

QUESTION:

You are conducting a pre-job briefing for a specific job in a Radiological Control Area. It has been determined that the airborne activity in the area is 5 DAC/hour. The job is expected to take 4 hours to complete.

1) If the decision is made to NOT don respirators while working in this area, what is the internal exposure rate that you would be expected to receive?

2) If the decision is made to don respirators and the work begins at exactly 0200, what is the LATEST time that you will be required to take a break from wearing the respirator?

ANSWER:

1) Exposed to an internal dose rate of 12.5 mRem/hr (5 DAC/hr x 2.5 mRem/DAC = 12.5 mRem/hr)

2) The maximum continuous time that respirators can be worn is 3 hours. 0200 + 3 hours = 0500.

CANDIDATE RESPONSE:

K/A Rating: 2.3.10 Importance: SRO 3.3 RO 2.9

K/A Statement: Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.

References: 10CFR20
Radiation Safety Plan, Section VI, Part 4, 2.1, Prerequisites for Respiratory Use

EXAMINER ANSWER SHEET #2

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF ANSWER)

QUESTION:

The plant is being shutdown at a rate of 20% per hour to Hot Shutdown due to a small PCS leak.

The following conditions are noted:

- Reactor power is 42% and lowering.
- Containment Temperature is 115 °F and stable.
- RIA-1805, Containment Area Monitor indicates 0.9 R/hr and stable.
- RIA-1806, Containment Area Monitor indicates 1.2 R/hr and stable.
- RIA-1807, Containment Area Monitor indicates 0.8 R/hr and stable.
- RIA-1808, Containment Area Monitor indicates 1.3 R/hr and stable.
- RIA-1817, Containment Air Monitor is out-of-service

The Duty Radiation Protection Technician reports that a maintenance crew is standing by to enter Containment to investigate the leak in preparation for making repairs after the plant shutdown is completed.

1) Should you authorize the entry?

2) Justify your answer.

ANSWER:

1) Entry should NOT be authorized.

2) (Either answer required for full credit)

1. Reactor power is changing

2. With RIA-1817 out-of-service, RIA-1805 through RIA-1808 must be below 1 R/hr and stable. Two of the monitors are indicating radiation levels above 1 R/hr. *(Specific authorization to enter under these conditions must be obtained from the Radiation Services Supervisor - not required for credit)*

CANDIDATE RESPONSE:

K/A Rating: 2.3.2 Importance: SRO 2.9 RO 2.5

K/A Statement: Knowledge of facility ALARA program.

References: HP 2.6, Containment Entry With the Reactor Critical

CANDIDATE QUESTION SHEET #2

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF ANSWER)

QUESTION:

The plant is being shutdown at a rate of 20% per hour to Hot Shutdown due to a small PCS leak.

The following conditions are noted:

- Reactor power is 42% and lowering.
- Containment Temperature is 115 °F and stable.
- RIA-1805, Containment Area Monitor indicates 0.9 R/hr and stable.
- RIA-1806, Containment Area Monitor indicates 1.2 R/hr and stable.
- RIA-1807, Containment Area Monitor indicates 0.8 R/hr and stable.
- RIA-1808, Containment Area Monitor indicates 1.3 R/hr and stable.
- RIA-1817, Containment Air Monitor is out-of-service

The Duty Radiation Protection Technician reports that a maintenance crew is standing by to enter Containment to investigate the leak in preparation for making repairs after the plant shutdown is completed.

1) Should you authorize the entry?

2) Justify your answer.

CANDIDATE QUESTION SHEET #1

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF ANSWER)

QUESTION:

You are conducting a pre-job briefing for a specific job in a Radiological Control Area. It has been determined that the airborne activity in the area is 5 DAC/hour. The job is expected to take 4 hours to complete.

1) If the decision is made to NOT don respirators while working in this area, what is the internal exposure rate that you would be expected to receive?

2) If the decision is made to don respirators and the work begins at exactly 0200, what is the LATEST time that you will be required to take a break from wearing the respirator?

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-A.4

Classify an Emergency Event AND Determine Protective Action Recommendations

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Classify an Emergency Event AND Determine Protective Action Recommendations

Alternate Path: NONE Facility JPM #: NEW

K/A Rating:		Importance:	SRO		RO	
	2.4.41			4.1		2.3
	2.4.44			4.0		2.1

K/A Statement:

(2.4.41) Knowledge of the emergency action level thresholds and classifications.
(2.4.44) Knowledge of emergency plan protective action recommendations.

Task Standard: EI-3, Attachment 1, Section 7, Protective Action Recommendations, is satisfactorily completed in less than 15 minutes.

Preferred Evaluation Location: Simulator X In Plant ________

Preferred Evaluation Method: Perform X Simulate ________

References:
EI-1, Emergency Classifications and Actions
EI-3, Communications and Notifications
EI-6.13, Protective Action Recommendations for Offsite Populations
EOP Supplement 4

Validation Time: 20 minutes Time Critical: YES

NOTE: Time critical element is notification within 15 minutes of event declaration.

Candidate: ________________________________

Time Start: ________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ________________________________

Examiner: ________________________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS: No simulator setup required. Ensure the offsite dose program on the computer in the simulator is functioning.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

1) A LOCA is in progress.
2) PRZR level is offscale low.
3) PCS pressure is 100 psia.
4) PCS indicates superheated conditions.
5) Total LPSI flow is 1800 gpm.
6) Total HPSI flow is 460 gpm.
7) SIRWT level is 38% and lowering slowly.
8) Failed fuel monitor RIA-0202 is off scale high.
9) Containment High Range Monitors are indicating 3E3 R/hr.
10) Failed fuel analysis is in progress with no results to report.
11) An actual release is NOT occurring through the plant stack or steam dumps.
12) Weather outside is clear with no precipitation.
13) Obtained Meterological Data is as follows:
    - QN = 0.0
    - QI = 0.0
    - Wind Speed = 1.1
    - Stability Class = G
    - Wind Direction = 235 (from)

INITIATING CUES:

During activation of the Site Emergency Plan, you are the Shift Supervisor (acting as the SED).

You are to classify the event given the above information AND determine the Protective Action Recommendations required for this event.

This recommendation is required to be passed to Van Buren County within 15 minutes of event declaration [for purposes of this JPM this means handing recommendation to the evaluator].

START TIME: ________

STEP 1: Locates procedure to determine Emergency Classification STANDARD: Locates EI-1 and refers to Attachment 1 NOTES: COMMENTS:	_____ SAT _____ UNSAT
STEP 2: Refers to "Primary Coolant System Integrity" to determine Emergency Classification STANDARD: Locates correct table and refers to required conditions NOTES: COMMENTS:	_____ SAT _____ UNSAT
STEP 3: Determines Safety Injection flow is inadequate STANDARD: Refers to EOP Supplement 4 and determines BOTH HPSI and LPSI flow are below required values NOTES: COMMENTS:	_____ SAT _____ UNSAT

STEP 4: Declares correct Emergency Classification

CRITICAL STEP

STANDARD: Determines Emergency Classification is GENERAL EMERGENCY based on indications of LOCA, SI flow inadequate, and failed fuel monitor off-scale high

NOTES: ***Critical to determine correct classification to permit determining correct Protective Action Recommendations.***

_____ SAT

_____ UNSAT

COMMENTS:

STEP 5: Prepares Notification Form by entering meterological data in offsite dose program

CRITICAL STEP

STANDARD: Enters following meterological data in offsite dose program

- QN = 0.0
- QI = 0.0
- Wind Speed = 1.1
- Stability Class = G
- Wind Direction = 235 (from)

and verifies 0.7 Mev/dis, 0.0 m release height, and 2 hour release duration default information in program.

NOTES: ***Critical to ensure correct information is relayed to offsite agencies.***

NOTE: With no release in progress, may elect to manually enter data in EI-6.13. This is acceptable.

_____ SAT

_____ UNSAT

COMMENTS:

STEP 6: Enters required information in Notification Form

STANDARD: Checks boxes labeled "This is a drill" and "From CR"

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 7: Enters required information in Notification Form, Section 1

STANDARD: Checks boxes labeled "To County", "To State", and "To NRC"

NOTES: ***Critical to ensure correct offsite agencies are notified.***

COMMENTS:

~~***CRITICAL STEP***~~ HP

not necessarily CRITICAL - This item checked when filling out EI-1 ATT. 2. HP

____ SAT

____ UNSAT

STEP 8: Enters required information in Notification Form, Section 2A

STANDARD: Enters "1" in "Plant Message Number"

NOTES: ***Critical to ensure correct information is relayed to offsite agencies.***

COMMENTS:

CRITICAL STEP

____ SAT

____ UNSAT

STEP 9: Enters required information in Notification Form, Section 3

STANDARD: Checks box labeled "General Emergency" in 3A, enters "(CURRENT TIME and CURRENT DATE)" in 3E, and enters "PCS Leakage Into Containment" (or similar) in 3F

NOTES: ***Critical to ensure correct information is relayed to offsite agencies.***

COMMENTS:

CRITICAL STEP

_____ SAT

_____ UNSAT

STEP 10: Enters required information in Notification Form, Section 4

STANDARD: Checks box labeled "Stable" in 4A OR checks box labeled "Degrading" in 4B and enters "Attempts are being made to restore cooling flow to the reactor core" (or similar) in 4D

NOTES:

Critical to ensure correct offsite agencies are notified.

NOTE: This section is a judgement call. Either box 4A or 4B is acceptable to check and 4D should contain information pertinent to event conditions.

COMMENTS:

CRITICAL STEP

_____ SAT

_____ UNSAT

STEP 11: Enters required information in Notification Form, Section 5 STANDARD: Checks box labeled "NO" due to no release in progress NOTES: ***Critical to ensure correct information is relayed to offsite agencies.*** COMMENTS:	***CRITICAL STEP*** _____ SAT _____ UNSAT
STEP 12: Enters required information in Notification Form, Section 6 STANDARD: Checks box labeled "NO" in 6E and verify dose projection program has completed items 6A through 6D NOTES: ***Critical to ensure correct information is relayed to offsite agencies.*** COMMENTS:	***CRITICAL STEP*** _____ SAT _____ UNSAT
STEP 13: Locates procedure to perform Protective Action Recommendation STANDARD: Locates EI-6.13 and refers to Attachment 1 NOTES: COMMENTS:	_____ SAT _____ UNSAT

STEP 14:	Enters required information in Notification Form, Section 7	***CRITICAL STEP***
STANDARD:	Checks box labeled "YES" for 7A due to PARs required, checks box labeled "Plant Status" for 7B, enters "NA" (or leaves blank) item 7C, and enters "2 mile radius and 5 miles in areas 1 and 2" in item 7D	
NOTES:	***Critical to ensure correct information is relayed to offsite agencies.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 15:	Hands Notification Form to communicator for transmission	
STANDARD:	Give Notification Form to communicator	
NOTES:		_____ SAT
COMMENTS:		_____ UNSAT
	END OF TASK	

STOP TIME: __________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

1) A LOCA is in progress.
2) PRZR level is offscale low.
3) PCS pressure is 100 psia.
4) PCS indicates superheated conditions.
5) Total LPSI flow is 1800 gpm.
6) Total HPSI flow is 460 gpm.
7) SIRWT level is 38% and lowering slowly.
8) Failed fuel monitor RIA-0202 is off scale high.
9) Containment High Range Monitors are indicating 3E3 R/hr.
10) Failed fuel analysis is in progress with no results to report.
11) An actual release is NOT occurring through the plant stack or steam dumps.
12) Weather outside is clear with no precipitation.
13) Obtained Meterological Data is as follows:
    - QN = 0.0
    - QI = 0.0
    - Wind Speed = 1.1
    - Stability Class = G
    - Wind Direction = 235 (from)

INITIATING CUES:

During activation of the Site Emergency Plan, you are the Shift Supervisor (acting as the SED).

You are to classify the event given the above information AND determine the Protective Action Recommendations required for this event.

This recommendation is required to be passed to Van Buren County within 15 minutes of event declaration [for purposes of this JPM this means handing recommendation to the evaluator].

JPM SRO-A.4 Key

REQUIRED INFORMATION

Approval: ____________________ Date: ________ Time: ________

☒ This is a drill. ☐ This is not a drill.
From: ☒ CR ☐ TSC ☐ EOF

KEY

1. To: ☒ County Name: ________ Time: ________
   ☒ State Name: ________ Time: ________
   ☒ NRC Name: ________ Time: ________
2. PALISADES 2A. PLANT MESSAGE NUMBER 1
3. CLASS OF EMERGENCY
   A. ☐ Unusual Event B. ☐ Alert C. ☐ Site Area Emergency D. ☒ General Emergency
   E. This classification declared by Plant at: Time: 5 min ago Date: Today
   F. Initiating Conditions/Description of Event:
   PCS leakage into Containment

4. PLANT STATUS
   A. ☒ Stable B. ☐ Degrading C. ☐ Improving
   D. Additional Information:
   Attempts are being made to restore cooling flow to the reactor core

5. RADIOLOGICAL RELEASE IN PROGRESS: ☐ YES ☒ NO

6. METEOROLOGICAL DATA
   A. Wind Dir., Degrees From: 235. To: 55. B. Wind Speed, MPH: 1.1 C. Stability Class: G
   D. Three Downwind Sectors: C B D E. Precipitation: ☐ YES ☒ NO

7. PROTECTIVE ACTION RECOMMENDATIONS
   A. ☒ YES ☐ NO
   Note: If YES fill in following information.
   B. PAR based on: ☐ Dose Calculations ☒ Plant Status ☐ Other: ________
   C. In-place Shelter (Areas): NA
   D. Evacuation (Areas): 2 mile radius and 5 miles in areas 1 & 2

Req'd

AS AVAILABLE

8. RADIOLOGICAL RELEASE DATA
   A. Time release started: ________ Projected duration of release, hours: 2.00
   B. ☐ Airborne ☐ Waterborne ☐ Waterborne Analysis Attached
   C. Effluent Points:
   D. Noble gas release rate, Ci/sec 0.000E+00 Sample___ Monitor___ Estimate___
   E. Average energy per disintegration, MeV .700 Sample___ Monitor___ Estimate___
   F. Equivalent I-131 release rate, Ci/sec 0.000E+00 Sample___ Monitor___ Estimate___
   G. Particulate release rate Ci/sec ________ Sample___ Estimate___

9. CALCULATED OFFSITE DOSES
   A. ☐ Actual ☐ Potential
   B. Based on: ☐ Monitor (in Plant) ☐ Sample (in Plant)
   ☐ Back Calculation from Field Data ☐ Other Plant Conditions
   C. Calculated Dose Rate (mrem/hr)
   Time of Calculation: ________

Distance	TEDE (mrem/hr)	Adult Thyroid CDE (mrem/hr)
Site Boundary		
2 Miles		
5 Miles		
10 Miles		

KEY

   D. Calculated Accumulated Dose (mrem)
   Calculated Duration, Hours: 2.00

Distance	TEDE (mrem)	Adult Thyroid CDE (mrem)
Site Boundary		
2 Miles		
5 Miles		
10 Miles		

   E. Sectors Affected: ________

10. MEASURED OFFSITE DOSE RATES

A. Distance	Time	Reading (mR/hr)	Affected Sector
Site Boundary			
____ miles			
____ miles			
____ miles			

   B. Additional Information

FINAL-AS ADMINISTERED WALKTHROUGH JPMS

FOR THE PALISADES INITIAL EXAMINATION THE WEEK OF MAY 22, 2000

AS ADMINISTERED

ES-301 Control Room Systems and Facility Walk-Through Test Outline Form ES-301-2

Facility: PALISADES
Date of Examination: MAY 22-26, 2000
Exam Level (circle one): SRO(I)
Operating Test No.: _______

B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function (K/A#)
a. Test Cycle CV-3025 (IPE)	NS	2 (006A4.02)
b. Respond to a Primary Coolant Pump High Vibration on Startup (IPE)	MSL	4P (003A4.06)
c. Respond to a Pressure Control Malfunction While Manually Exercising PRZR Spray Valve (Alternate Path)	NAS	3 (010A2.02)
d. Emergency Borate (Alternate Path)	MAS	1 (004A4.18)
e. Align Service Water to ESS Pumps	NSL	4S (076A4.04)
f. Sample Containment for Hydrogen (Alternate Path)	MASL	5 (028A4.03)
g. Adjust the Power Range Instrumentation	DS	7 (015A4.02)

B.2 Facility Walk-Through

a. Perform CCW Thermal/Hydraulic Shock Prevention Actions	DLR	8 (008A4.04)
b. Operate P-55C from Bus 13	M	2 (022AA1.01)
c. Locally Start and Load 1-1 Diesel Generator (PRA/IPE) (Alternate Path)	MAL	6 (064A4.06)

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

AS ADMINISTERED

ES-301 Control Room Systems and Facility Walk-Through Test Outline Form ES-301-2

Facility: PALISADES
Exam Level (circle one): SRO(U)
Date of Examination: MAY 22-26, 2000
Operating Test No.: ________

B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. Test Cycle CV-3025 (IPE)	NS	2 (006A4.02)
b. NOT REQUIRED - SRO UPGRADE		
c. Respond to a Pressure Control Malfunction While Manually Exercising PRZR Spray Valve (Alternate Path)	NAS	3 (010A2.02)
d. NOT REQUIRED - SRO UPGRADE		
e. NOT REQUIRED - SRO UPGRADE		
f. NOT REQUIRED - SRO UPGRADE		
g. Adjust the Power Range Instrumentation	DS	7 (015A4.02)

B.2 Facility Walk-Through

a. Perform CCW Thermal/Hydraulic Shock Prevention Actions	DLR	8 (008A4.04)
b. NOT REQUIRED - SRO UPGRADE		
c. Locally Start and Load 1-1 Diesel Generator (PRA/IPE) (Alternate Path)	MAL	6 (064A4.06)

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-B.1-01

Test Cycle CV-3025

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Test Cycle CV-3025

Alternate Path: NONE

Facility JPM #: NEW

K/A Rating: 006A4.02 Importance: SRO 3.8 RO 4.0

K/A Statement: Ability to manually operate and/or monitor in the control room: Valves

Task Standard: Test cycling of CV-3025 has been completed per SOP-3.

Preferred Evaluation Location: Simulator X In Plant ____

Preferred Evaluation Method: Perform X Simulate ____

References: SOP-3, Safety Injection and Shutdown Cooling System

Validation Time: 5 minutes Time Critical: NO

Candidate: ____

Time Start: ____ Time Finish: ____

Performance Time: ____ minutes

Performance Rating: SAT ____ UNSAT ____

Comments: ____

Examiner: ____ Date: ____
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- IC-11

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Shutdown Cooling HX Discharge CV-3025 has had maintenance performed on its operator.

INITIATING CUES:

You have been directed to cycle CV-3025 for post-maintenance testing in accordance with SOP-3, Section 7.9.2.

START TIME: ________

STEP 1:	Obtains current procedure	
STANDARD:	Obtains copy of SOP-3 and refers to Section 7.9.2	
NOTES:	***Candidate will require keys to perform this JPM. May obtain them at beginning of performance or as required during performance.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 2:	Close CV-3224, E-60A Outlet	***CRITICAL STEP***
STANDARD:	Using Key 137, places CV-3224, in CLOSE on C-03 and observes RED light OFF and GREEN light ON	
NOTES:	***Critical step to perform proper valve alignment.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 3:	Close CV-3213, E-60B Outlet	***CRITICAL STEP***
STANDARD:	Using Key 135, places CV-3213, in CLOSE on C-03 and observes RED light OFF and GREEN light ON	
NOTES:	***Critical step to perform proper valve alignment.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 4:	Open CV-3025, Shutdown Cooling Outlet Valve from the SDCHX	***CRITICAL STEP***
STANDARD:	Using Key 97, places CV-3025, in MANUAL on C-02 and raises HIC-3025A output to 100%	
NOTES:	***Critical step to stroke valve open.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 5:	Close CV-3025, Shutdown Cooling Outlet Valve from the SDCHX	***CRITICAL STEP***
STANDARD:	Lowers HIC-3025A output to 0%, and using Key 97, places CV-3025, in CLOSE	
NOTES:	***Critical step to stroke valve closed.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 6:	Open CV-3224, E-60A Outlet	***CRITICAL STEP***
STANDARD:	Using Key 137, places CV-3224, in OPEN on C-03 and observes RED light ON and GREEN light OFF	
NOTES:	***Critical step to perform proper valve alignment.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 7: Open CV-3213, E-60B Outlet STANDARD: Using Key 135, places CV-3213, in OPEN on C-03 and observes RED light ON and GREEN light OFF NOTES: ***Critical step to perform proper valve alignment.*** COMMENTS:	***CRITICAL STEP*** ______ SAT ______ UNSAT
STEP 7: Informs Shift Supervisor of completion STANDARD: Informs Shift Supervisor that CV-3025 has been cycled in accordance with SOP-3 NOTES: COMMENTS: ***END OF TASK***	______ SAT ______ UNSAT

STOP TIME: __________

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Shutdown Cooling HX Discharge CV-3025 has had maintenance performed on its operator.

INITIATING CUES:

You have been directed to cycle CV-3025 for post-maintenance testing in accordance with SOP-3, Section 7.9.2.

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-B.1-02

Respond to a Primary Coolant Pump High Vibration on Startup

CANDIDATE: ________________________________

EXAMINER: ________________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Respond to a Primary Coolant Pump High Vibration on Startup

NOT CREDITED AS ALTERNATE PATH JPM

Alternate Path: PCP has high vibration on start, requiring pump trip.

Facility JPM #: ASED 01 (Modified)

K/A Rating: 003A4.06 Importance: SRO 2.9 RO 2.9

K/A Statement: Ability to manually operate and/or monitor in the control room: RCP parameters

Task Standard: PCP P-50A has been stopped.

Preferred Evaluation Location: Simulator X In Plant ________

Preferred Evaluation Method: Perform X Simulate ________

References: SOP-1, Primary Coolant System
ARP-5, Primary Coolant Pump Steam Generator and Rod Drives Scheme EK-09

Validation Time: 15 minutes Time Critical: NO

Candidate: ______________________________

Time Start: __________ Time Finish: __________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ______________________________
____
____

Examiner: ______________________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- IC-12
- Insert MALF RC16A, High Vibration on PCP P-50A
- Run P-50A until high vibration condition alarms
- Trip the reactor and stop P-50A
- Acknowledge and reset all alarms, including vibration monitor alarms
- Place oil pump hand switches for P-50A in OFF position
- Insert OVRD AO TIA-0133A, Severity = 70%, Ramp = 20 sec, Trigger ZDI2P(126).GT.0
- Insert OVRD AO TIA-0138A, Severity = 70%, Ramp = 20 sec, Trigger ZDI2P(126).GT.0
- Insert OVRD AO TIA-0139A, Severity = 70%, Ramp = 20 sec, Trigger ZDI2P(126).GT.0
- Insert OVRD AO LIA-0137A, Severity = 10%, Ramp = 15 sec, Trigger ZDI2P(126).GT.0

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Primary Coolant Pumps P-50B, 50C and 50D are in service. The plant is in Hot Shutdown. Proper Shutdown margin has been verified. RPS Breakers 42-1 and 42-2 have been opened.

INITIATING CUES:

During a plant hot shutdown outage, oil was added to P-50A oil reservior. The Shift Supervisor directs you to start PCP P-50A in accordance with SOP-1, Section 7.2.3.

Testing of the lift system is NOT required.

START TIME: ________

STEP 1:	Obtains current procedure	
STANDARD:	Obtains copy of SOP-1 and refers to Section 7.2.3	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 2:	Ensures EK09-31, PRI COOLANT PUMP P-50A CLG WTR LO FLOW, not in alarm	
STANDARD:	Notes annunciator window EK09-31 is NOT lit	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 3:	Verify OPEN PCP Controlled Bleed Off Relief Stop Valve CV-2191	
STANDARD:	Verifies hand switch in OPEN and verifies red light LIT and green light OFF	
NOTES:		____ SAT
COMMENTS:		____ UNSAT

STEP 4: Verifies PCP Controlled Bleed Off Isolation Valve CV-2083 OPEN STANDARD: Verifies red light LIT and green light OFF NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 5: Verifies PCP Controlled Bleed Off Isolation Valve CV-2099 OPEN STANDARD: Verifies red light LIT and green light OFF NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 6: PCP Controlled Bleed Off Header Pressure Indicator PIA-0215, on C-02, reading between 25 to 100 psi STANDARD: Dispatches an AO to adjust pressure as needed by throttling PCP Controlled Bleed Off Valve MV-2194 NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 7: Verifies positive indication of PCP Controlled Bleed Off Flow for P-50A (located on recorders FR-0133 A/B and FR-0143 A/B on C-11 or Pressure Breakdown across stages)

STANDARD: Monitors indication located on recorders FR-0133 A/B and FR-0143 A/B on C-11 or Pressure Breakdown across stages

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 8: Ensures PCS pressure maintained within the limits of Attachment 2, "Pressure and Temperature Limits," and above the "Minimum Pressure for PCP Operation" curve

STANDARD: Refers to Attachment 2 and determines pressure conditions satisfied

NOTES: ***NOTE:* *May not reference due to other pumps already operating. This is acceptable.***

COMMENTS:

____ SAT

____ UNSAT

STEP 9: Verifes Section 4.2 requirements are met

STANDARD: Refers to Section 4.2 and verifies requirements met

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 10: Verifies the restrictions of Technical Specification 3.1.1.h are met STANDARD: Refers to Technical Specificaion 3.1.1.h and determines restrictions met NOTES: ***NOTE: May not reference since other pumps are already operating. This is acceptable.*** COMMENTS:	____ SAT ____ UNSAT
STEP 11: Verifies PRI COOLANT PUMP P-50A REVERSE ROTATION alarm clear STANDARD: Verifies alarm window EK-0919 is clear. NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 12: Verifies the conditions of Section 5.2.4 are met STANDARD: Refers to Section 5.2.4 and determines conditions met NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 13:	Start the AC or DC Oil Lift Pump for PCP P-50A	***CRITICAL STEP***
STANDARD:	Places either P-80A (AC) or P-81A (DC) hand switch to HAND and verifies red light LIT and green light OFF	
NOTES:	***Critical step to develop pressure to meet interlock.***	____ SAT
COMMENTS:		____ UNSAT
STEP 14:	If lift oil pressure interlock is NOT satisfied with one lift pump operating, start the second Oil Lift Pump for P-50A	
STANDARD:	Verifies white light above P-50A hand switch is LIT and determines no need to start additional lift pump	
NOTES:		____ SAT
COMMENTS:		____ UNSAT

STEP 15:	Verifies PRI COOLANT PUMP P-50A BACKSTOP OIL LOW FLOW alarm clear	
STANDARD:	Verifes alarm window EK-0937 is clear	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 16:	Verifies P-50A oil permissive met	
STANDARD:	Verifes white PUMP START OIL PERMISSIVE light LIT for P-50A	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 17:	When oil lift pump(s) have been operating for at least two minutes, then start P-50A	***CRITICAL STEP***
STANDARD:	After 2 or more minutes, places P-50A hand switch in START and verify red light LIT and green light OFF	
NOTES:	***Critical step to start PCP.*** ***Cue: Two minutes have elapsed.***	____ SAT
COMMENTS:		____ UNSAT

STEP 18: Place AC and DC Oil Lift Pump handswitches to AUTO

STANDARD: After P-50A amps return to normal following the starting amp surge and after two minutes have elapsed from the start of the PCP, places P-80A and P-81A hand switches in AUTO and verifies red light OFF and green light LIT

NOTES: ***NOTE: Depending on timing of vibration condition, this may not be completed.***

COMMENTS:

____ SAT

____ UNSAT

STEP 19: Acknowledge high vibration alarm and refer to ARP-5

STANDARD: Acknowledges alarm and refers to ARP-5, EK09-13, Pri Coolant Pump Vibration Alert

NOTES: ***SIMULATOR OPERATOR: Insert OVRDs for bearing temperatures and controlled bleedoff.***

COMMENTS:

____ SAT

____ UNSAT

STEP 20: Confirm increased PCP vibration by observing both vertical and horizontal probes

STANDARD: Monitors vibration and determines vibration rising at a rapid rate

NOTES: ***NOTE: If Shift Supervisor notified, inform candidate to follow actions of ARP.***

COMMENTS:

____ SAT

____ UNSAT

STEP 21:	Remove PCP from service as soon as plant conditions permit per SOP-1, Section 7.2.5	
STANDARD:	Refers to SOP-1, Section 7.2.5	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 22:	Verifies the reactor is tripped	
STANDARD:	Verifies all rods on bottom of core	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 23:	Push reactor trip pushbutton on C-06 within 12 hours of event	
STANDARD:	Notes that trip pushbutton must be depressed within 12 hours	
NOTES:		____ SAT
COMMENTS:		____ UNSAT

STEP 24:	If previously stopped and if time allows, start the AC or DC Oil Lift Pump for P-50A and allow to operate for approximately two minutes	
STANDARD:	Places either P-80A (AC) or P-81A (DC) hand switch to HAND and verifies red light LIT and green light OFF	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 25:	Stop PCP P-50A	***CRITICAL STEP***
STANDARD:	Places hand switch on C-02 in TRIP and verifies red light OFF and green light LIT	
NOTES:	***Critical step to stop PCP to prevent further damage.***	____ SAT
COMMENTS:		____ UNSAT
STEP 26:	When at least five minutes have elapsed since stopping P 50A, then stop oil lift pumps	~~***CRITICAL STEP***~~ not critical
STANDARD:	Places AC (P-80A) and DC (P-81A) Oil Lift Pump hand switches to OFF and verifies green light LIT and red light OFF	
NOTES:	***Critical step to establish conditions required for secured PCP.*** ***Cue: Five minutes have elapsed.***	____ SAT
COMMENTS:		____ UNSAT

STEP 27: Verify proper shutdown margin STANDARD: Refers to EM-04-08, Shutdown Margin Requirements, or determines adequate shutdown margin based on initial conditions NOTES: ***NOTE: Proper shutdown margin was identified in INITIAL CONDITIONS.*** COMMENTS:	____ SAT ____ UNSAT
STEP 28: Inform Shift Supervisor of status STANDARD: Notifies Shift Supervisor that P-50A is stopped due to high vibration NOTES: COMMENTS: ***END OF TASK***	____ SAT ____ UNSAT

STOP TIME: __________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Primary Coolant Pumps P-50B, 50C and 50D are in service. The plant is in Hot Shutdown. Proper Shutdown margin has been verified. RPS Breakers 42-1 and 42-2 have been opened.

INITIATING CUES:

During a plant hot shutdown outage, oil was added to P-50A oil reservior. The Shift Supervisor directs you to start PCP P-50A in accordance with SOP-1, Section 7.2.3.

Testing of the lift system is NOT required.

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-B.1-03

Respond to a Pressure Control Malfunction While Manually Exercising PRZR Spray Valve

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Respond to a Pressure Control Malfunction While Manually Exercising

Alternate Path: Spray valve sticks open while lowering pressure

Facility JPM #: NEW

K/A Rating: 010A2.02 Importance: SRO 3.9 RO 3.9

K/A Statement: Ability to (a) predict the impacts of the following malfunctions or operations on the PZR PCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Spray valve failures

Task Standard: Reactor Trip is initiated due to lowering PCS pressure.

Preferred Evaluation Location: Simulator X In Plant ________

Preferred Evaluation Method: Perform X Simulate ________

References:
SOP-1, Primary Coolant System
ONP-18, Pressurizer Pressure Control Malfunctions

Validation Time: 5 minutes Time Critical: NO

Candidate: ________________________________

Time Start: __________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ________________________________

____

____

Examiner: ________________________________ Date: ________

Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:
- IC-11; place Spray Valve CV-1057 hand switch in CLOSE
- Override CV-1057 Hand Switch to CLOSE
- Insert MALF RC17 at a severity of 100% using Trigger ZDI2P(161)<1 (when CV-1059 is placed in CLOSE position).

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Pressurizer Spray Valve CV-1057 has just had repairs performed on its control circuit.

INITIATING CUES:

The Shift Supervisor has directed you to Manually Exercise CV-1057 in accordance with SOP-1, Section 7.3.2.

START TIME: ________

STEP 1:	Obtains current procedure	
STANDARD:	Obtains copy of SOP-1, Section 7.3.2.b.4.	
NOTES:		_____ SAT
COMMENTS:		_____ UNSAT
STEP 2:	Ensure PCS at normal operating pressure.	
STANDARD:	Verifies PCS at approximately 2060 psia	
NOTES:		_____ SAT
COMMENTS:		_____ UNSAT
STEP 3:	Verify Pressurizer Spray Valves CV-1057 and CV-1059 in AUTO	***CRITICAL STEP***
STANDARD:	Verifies or places hand switches in AUTO	
NOTES:	***Critical step to place CV-1057 in AUTO to permit valve stroke.*** ***NOTE: Red and green light indication will be determined by controller output at this time.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 4:	Determine which PZR Spray Valve is NOT fully closed	
STANDARD:	Determines CV-1057 is closed and CV-1059 is NOT fully closed by observing RED and GREEN position indicating lights	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 5:	Place open spray valve hand switch in CLOSE	***CRITICAL STEP***
STANDARD:	Places CV-1059 hand switch in CLOSE	
NOTES:	***Critical step to allow control signal to drive CV-1057 open.*** ***NOTE: MALF RC17 is entered at severity of 100% by trigger.***	____ SAT
COMMENTS:		____ UNSAT
STEP 6:	Monitors Pressurizer Pressure and CV-1057 position	
STANDARD:	Determines pressurizer pressure is lowering and CV-1057 has fully opened by red light LIT and green light OFF	
NOTES:		____ SAT
COMMENTS:		____ UNSAT

STEP 7: Monitors Pressurizer Pressure and CV-1057 position STANDARD: Determines pressurizer pressure is lowering and CV-1057 has fully opened by red light LIT and green light OFF NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 8: Attempts to close CV-1057 STANDARD: Lowers output on controller below 50% and/or places hand switch for CV-1057 in CLOSE NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 9: Notifies Shift Supervisor of problems with CV-1057 STANDARD: Notifies Shift Supervisor NOTES: ***Cue: If SS notified, direct candidate to respond per applicable ONP.*** COMMENTS:	____ SAT ____ UNSAT

STEP 10:	Refers to ONP-18	
STANDARD:	Refers to ONP-18, Section 4.2.1	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 11:	Initiates reactor trip	***CRITICAL STEP***
STANDARD:	Depresses reactor trip push button on C-02	
NOTES:	***Critical step to trip reactor in anticipation of automatic trip.***	____ SAT
COMMENTS:		____ UNSAT
	END OF TASK	

STOP TIME: __________

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Pressurizer Spray Valve CV-1057 has just had repairs performed on its control circuit.

INITIATING CUES:

The Shift Supervisor has directed you to Manually Exercise CV-1057 in accordance with SOP-1, Section 7.3.2.

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-B.1-04

Emergency Borate

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Emergency Borate

Alternate Path: Operable Boric Acid Pump trips when started, requiring Gravity Feed flow path.

Facility JPM #: ASFA 01A (Modified)

K/A Rating: 004A4.18 Importance: SRO 4.1 RO 4.3

K/A Statement: Ability to manually operate and/or monitor in the control room: Emergency borate valve

Task Standard: Emergency boration is established using Gravity Feed.

Preferred Evaluation Location: Simulator X In Plant ______

Preferred Evaluation Method: Perform X Simulate ______

References: SOP-2A, Chemical and Volume Control System

Validation Time: 5 minutes Time Critical: NO

Candidate: ______________________

Time Start: ______ Time Finish: ______

Performance Time: ______ minutes

Performance Rating: SAT ______ UNSAT ______

Comments: ______________________

____

____

Examiner: ______________________ Date: ______
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:
- IC-12; manually trip the reactor
- Perform actions for EOP-1.0 (close FRVs, FRBVs, etc.)
- Rack out breaker for Boric Acid Pump P-56A using REMOTE CV35 RACKOUT and hang caution tag on hand switch
- Override hand switch for Boric Acid Pump P-56B to prevent starting using OVRD DI P-56B-1 TRIP ON and OVRD DI P-56B-4 CLOSE OFF

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

A reactor trip has occurred.

INITIATING CUES:

The Shift Supervisor has directed you to Emergency Borate, using the Pumped Feed method.

START TIME: ________

STEP 1: Obtains current procedure or references control board STANDARD: Obtains copy of SOP-2A, refering to Section 7.5.2, or refers to placard on control board NOTES: COMMENTS:	_____ SAT _____ UNSAT
STEP 2: Ensure charging flow greater than 33 gpm STANDARD: Determines charging flow indicates greater than 33 gpm on C-02 NOTES: COMMENTS:	_____ SAT _____ UNSAT
STEP 3: OPEN MO-2140, Boric Acid Pump Feed Isol STANDARD: Places hand switch in OPEN and verifies red light LIT and green light OFF NOTES: ***NOTE: May perform Step 3 or Step 4 in either order. If Step 4 performed first, this step will NOT likely be performed.*** COMMENTS:	_____ SAT _____ UNSAT

STEP 4: Start P-56B, Boric Acid Pump

STANDARD: Places hand switch in START and determines that pump failed to start

NOTES: ***NOTE: May perform Step 3 or Step 4 in either order. If Step 4 performed first, Step 3 will NOT likely be performed.***

COMMENTS:

_____ SAT

_____ UNSAT

STEP 5: Notifies Shift Supervisor of failure of pump

STANDARD: Notifies Shift Supervisor

NOTES: ***Cue: If notified, Shift Supervisor directs candidate to establish emergency boration using gravity feed.***

COMMENTS:

_____ SAT

_____ UNSAT

STEP 6: CLOSE MO-2140, Boric Acid Pump Feed Isol

STANDARD: If opened previously, places hand switch for valve in CLOSE and verifies red light OFF and green light LIT

NOTES: ***NOTE: No effect on system operation if left open.***

COMMENTS:

_____ SAT

_____ UNSAT

STEP 7:	OPEN MO-2169, Boric Acid Tank Gravity Feed Isol Valve	***CRITICAL STEP***
STANDARD:	Places hand switch for valve in OPEN and verifies red light LIT and green light OFF	
NOTES:	***Critical step to establish flow path.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 8:	OPEN MO-2170, Boric Acid Tank Gravity Feed Isol Valve	***CRITICAL STEP***
STANDARD:	Places hand switch for valve in OPEN and verifies red light LIT and green light OFF	
NOTES:	***Critical step to establish flow path.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 9:	Verify CLOSED CV-2155, Boric Acid Blender Outlet Control Valve	
STANDARD:	Verifies hand switch for valve in CLOSE and verifies red light OFF and green light LIT	
NOTES:		_____ SAT
COMMENTS:		_____ UNSAT

STEP 10:	CLOSE MO-2087, VCT Outlet Isol Valve	***CRITICAL STEP***
STANDARD:	Places hand switch for valve in CLOSE and verifies red light OFF and green light LIT	
NOTES:	***Critical step to establish flow path.***	____ SAT
COMMENTS:		____ UNSAT
STEP 11:	Ensure CLOSED MO-2160, SIRW Tank to Charging Pumps Isol	
STANDARD:	Verifies closed by observing red light OFF and green light LIT.	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 12:	Notify Shift Supervisor that Emergency Boration has been started using Gravity Feed	
STANDARD:	Notifies Shift Supervisor	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
	END OF TASK	

STOP TIME: ________

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

A reactor trip has occurred.

INITIATING CUES:

The Shift Supervisor has directed you to Emergency Borate, using the Pumped Feed method.

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-B.1-05

Align Service Water to ESS Pumps

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Align Service Water to ESS Pumps

Alternate Path: NONE

Facility JPM #: NEW

K/A Rating: 076A4.04 Importance: SRO 3.5 RO 3.5

K/A Statement: Ability to manually operate and/or monitor in the Control Room: Emergency Heat Loads

Task Standard: SW flow is aligned to the ESS Pumps.

Preferred Evaluation Location: Simulator X In Plant ______

Preferred Evaluation Method: Perform X Simulate ______

References: SOP-16, Component Cooling Water

Validation Time: 10 minutes Time Critical: NO

Candidate: ______________________

Time Start: ______ Time Finish: ______

Performance Time: ______ minutes

Performance Rating: SAT ______ UNSAT ______

Comments: ______________________

____

____

Examiner: ______________________ Date: ______

Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- IC-11
- Initiate a manual reactor trip and safety injection.
- Ensure all actions of EOP-1 are completed.
- Reset SI and CHP per EOPs, as necessary.
- When directed, use REMOTE FUNCTIONS SW21, SW22, and CC07 to establish IA to valves locally.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

The plant is in a post-LOCA condition. SIAS has been reset.

Service Water is to be aligned to ESS Pump cooling.

INITIATING CUES:

The Shift Supervisor has directed you to align Service Water cooling to the ESS Pumps in accordance with SOP-16, Section 7.6.1.

START TIME: ________

STEP 1: Obtains current procedure STANDARD: Obtains copy of SOP-16, Section 7.6.1 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 2: Ensure SW Supplies and Return to ESS Pumps closed STANDARD: Verifies hand switches for CV-0879, CV-0880, and CV-0951 on C-03 in CLOSED position NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 3:	Open air supply to SW Supplies and Return to ESS Pumps	
STANDARD:	Directs AO to OPEN the air supply valves for CV-0879, CV-0880, and CV-0951	
NOTES:	***Simulator Operator: Open air supplies for valves using following remote functions:*** ***• CV-0879 REM SW21*** ***• CV-0880 REM SW22*** ***• CV-0951 REM CC07*** ***Cue: (After inserting remotes above) AO reports air supplies for CV-0879, CV-0880, and CV-0951 are open.***	____ SAT
COMMENTS:		____ UNSAT
STEP 4:	Close ESS Pumps CCW Supply	***CRITICAL STEP***
STANDARD:	Places hand switch for CV-0913 in CLOSE and verifies red light OFF and green light LIT	
NOTES:	***Critical step due to interlock between CCW and SW valves.***	____ SAT
COMMENTS:		____ UNSAT

STEP 5:	Close ESS Pumps CCW Return	***CRITICAL STEP***
STANDARD:	Places hand switch for CV-0950 in CLOSE and verifies red light OFF and green light LIT	
NOTES:	***Critical step due to interlock between CCW and SW valves.***	____ SAT
COMMENTS:		____ UNSAT

STEP 6:	Open ESS Pumps SW Supply	***CRITICAL STEP***
STANDARD:	Places hand switch for either CV-0879 or CV-0880 in OPEN and verifies red light LIT and green light OFF	
NOTES:	***Critical step to establish SW flow to pumps.*** ***NOTE: Opening either valve is acceptable.*** ***NOTE: Alarm windows EK-1155, WEST RM ENG SAFEGUARD PPS CLG WTR LO FLOW, and EK-1156, EAST RM ENG SAFEGUARD PPS CLG WTR LO FLOW, are expected to alarm.***	____ SAT
COMMENTS:		____ UNSAT

STEP 7: Open ESS Pumps SW Return STANDARD: Places hand switch for CV-0951 in OPEN and verifies red light LIT and green light OFF NOTES: ***Critical step to align SW Return from pumps.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT
STEP 8: Notify Chemistry to sample mixing basin for sodium nitrate STANDARD: Notifies Chemistry Department NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 9: Informs Shift Supervisor that SW is aligned to ESS Pumps STANDARD: Informs Shift Supervisor NOTES: COMMENTS: ***END OF TASK***	____ SAT ____ UNSAT

STOP TIME: __________

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The plant is in a post-LOCA condition. SIAS has been reset.

Service Water is to be aligned to ESS Pump cooling.

INITIATING CUES:

The Shift Supervisor has directed you to align Service Water cooling to the ESS Pumps in accordance with SOP-16, Section 7.6.1.

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-B.1-06

Sample Containment for Hydrogen

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Sample Containment for Hydrogen

Alternate Path: Sample light does not energize when required.

Facility JPM #: ASHE 02A (Modified)

K/A Rating: 028A4.03 Importance: SRO 3.3 RO 3.1

K/A Statement: Ability to manually operate and/or monitor in the control room: Location and operation of hydrogen sampling and analysis of containment atmosphere, including alarms and indications

Task Standard: Containment Hydrogen determined to be approximately 8%.

Preferred Evaluation Location: Simulator X In Plant ____

Preferred Evaluation Method: Perform X Simulate ____

References: SOP-38, Gaseous Process Monitoring System

Validation Time: 15 minutes Time Critical: NO

Candidate: ____________________

Time Start: ________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ____________________

____

____

Examiner: ____________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- IC-11
- Enter Malfunction RC04.
- Carry out EOP 1.0 Immediate Actions.
- Enter Malfunction CH07 at a Severity of 40%.
- Acknowledge alarms.
- Insert override DI C161-MODE-1 to OFF
- Insert override DI C161-MODE-2 to OFF (These overrides place HS-2427L in the standby position for the left channel)
- Ensure recorder AIR-2401 and chart recorder power is off per SOP 38.
- Ensure any keys are removed.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

The Hydrogen sampling system has been in "STANDBY" for greater than 6 hours. A CHR signal is present.

INITIATING CUES:

During performance of EOP 4.0, "Loss of Coolant Accident Recovery", the Shift Supervisor directs you to place the Left Channel Hydrogen Monitor in operation and to determine containment hydrogen concentration, referring to SOP 38, Section 7.5.2.

START TIME: ________

STEP 1: Obtains current procedure STANDARD: Obtains copy of SOP-38, Section 7.5.2 NOTES: COMMENTS:	_____ SAT _____ UNSAT
STEP 2: Ensure sampling system has been in STANDBY at least six hours STANDARD: Refers to initial conditions and determines system in standby for at least six hours NOTES: COMMENTS:	_____ SAT _____ UNSAT
STEP 3: Check left channel handswitch in NORMAL position STANDARD: Verifies left channel hand switch HS-2419 in NORM NOTES: COMMENTS:	_____ SAT _____ UNSAT

STEP 4: Check Range selector switch to the "0-10% range." STANDARD: Verifies H-2 Dual Range Switch in left (0-10%) position NOTES: COMMENTS:	_____ SAT _____ UNSAT
STEP 5: Enable the sample valves to be opened STANDARD: Using Key 364, turns Key Switch HS-2419 to the ACC position. NOTES: ***Critical step to allow valves to be opened.*** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 6: Open (enable) sample valves to open STANDARD: Places hand switch HS-2417 to the OPEN position and then releases NOTES: ***Critical step to allow valves to be opened.*** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 7:	Open solenoid valve SV-2413A	**CRITICAL STEP**
STANDARD:	Places HS-2413A to OPEN position and verifies red light LIT and green light OFF	
NOTES:	***Critical step to establish flow path.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 8:	Open solenoid valve SV-2413B	**CRITICAL STEP**
STANDARD:	Places HS-2413B to OPEN position and verifies red light LIT and green light OFF	
NOTES:	***Critical step to establish flow path.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 9:	Open solenoid valve SV-2415A	**CRITICAL STEP**
STANDARD:	Places HS-2415A to OPEN position and verifies red light LIT and green light OFF	
NOTES:	***Critical step to establish flow path.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 10:	Open solenoid valve SV-2415B	**CRITICAL STEP**
STANDARD:	Places HS-2415B to OPEN position and verifies red light LIT and green light OFF	
NOTES:	***Critical step to establish flow path.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 11:	Energize Containment Hydrogen Recorder	
STANDARD:	Places Power Switch to ON (Left Side of Recorder) on AR-2401	
NOTES:		_____ SAT
COMMENTS:		_____ UNSAT

STEP 12:	Energize Containment Hydrogen Recorder Chart Drive	
STANDARD:	Places Chart Drive Switch to ON (Top of Recorder)	
NOTES:		_____ SAT
COMMENTS:		_____ UNSAT

STEP 13:	Begin sampling/analyzing with left channel	**CRITICAL STEP**
STANDARD:	Places HS-2427L to the ANALYZE position	
NOTES:	***Critical step to obtain sample analysis.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 14:	Verify amber Sample Light LIT	
STANDARD:	Determines Sample Light OFF	
NOTES:	***SIMULATOR OPERATOR: When REMOTE SELECTOR P/B depressed in NEXT STEP, remove overrides on HS-2427L.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 15:	Ensure Sample Pump enabled	**CRITICAL STEP**
STANDARD:	Depresses Remote Selector Push Button and ensures Function Selector Switch in the SAMPLE position and note amber Sample Light comes ON	
NOTES:	***Critical step to enable sample pump.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 16: Determine hydrogen concentration

CRITICAL STEP

STANDARD: When H2 Monitor has been in ANALYZE for at least 15 minutes, read % H2 as approximately 8% using AI-2401L on the panel or using the blue pen on AR-2401

NOTES: ***Critical step to correctly interpret indication.***

Cue: Hydrogen monitor has been in ANALYZE for 16 minutes.

COMMENTS:

_____ SAT

_____ UNSAT

STEP 17: Notify Shift Supervisor of hydrogen reading

STANDARD: Notifies Shift Supervisor

NOTES:

COMMENTS:

_____ SAT

_____ UNSAT

END OF TASK

STOP TIME: __________

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The Hydrogen sampling system has been in "STANDBY" for greater than 6 hours. A CHR signal is present.

INITIATING CUES:

During performance of EOP 4.0, "Loss of Coolant Accident Recovery", the Shift Supervisor directs you to place the Left Channel Hydrogen Monitor in operation and to determine containment hydrogen concentration, referring to SOP 38, Section 7.5.2.

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-B.1-07

Adjust the Power Range Instrumentation

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Adjust the Power Range Instrumentation

Alternate Path: NONE

Facility JPM #: RHAA 01

K/A Rating: 015A4.02 Importance: SRO 3.9 RO 3.9

K/A Statement: Ability to manually operate and/or monitor in the control room: NIS indicators

Task Standard: NI-07 is properly adjusted for the Heat Balance calculation.

Preferred Evaluation Location: Simulator X In Plant ________

Preferred Evaluation Method: Perform X Simulate ________

References: GOP-12, Heat Balance Calculation
SOP-35, Neutron Monitoring System

Validation Time: 15 minutes Time Critical: NO

Candidate: ______________________________

Time Start: __________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ______________________________

____

____

Examiner: ______________________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- IC-11
- Adjust NI Channels A, B, and D to indicate 99.9 ± 0.2% by adjusting pot settings for A to 12.30, B to 5.02, and D to 9.32.
- Adjust Channel C to indicate 98.5 ± 0.2% by adjusting pot setting to 3.16.
- Provide candidate with attached copy of PPPC Page 521, UFM Plant Calorimetric, when directed and GOP 12 Attachment 2, when directed.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

The plant is at approximately 100% power on "A" Shift.

INITIATING CUES:

You are directed to perform DWO-1, Tech Spec Surveillance, required Heat Balance per GOP-12.

START TIME: ________

STEP 1: Selects proper computer display for Heat Balance STANDARD: Selects PPC display page 521 NOTES: COMMENTS:	_____ SAT _____ UNSAT
STEP 2: Prints heat balance off PPC display page 521 STANDARD: Prints heat balance NOTES: ***CUE: Hand candidate attached heat balance for use during this JPM.*** COMMENTS:	_____ SAT _____ UNSAT
STEP 3: Obtains current procedure STANDARD: Obtains copy of GOP-12, refering to Section 6.2.4, and SOP-35, refering to Section 7.2.3 NOTES: COMMENTS:	_____ SAT _____ UNSAT

STEP 4: Compares heat balance to indicated ΔT power

STANDARD: Determines heat balance and ΔT power within required range

NOTES:

COMMENTS:

_____ SAT

_____ UNSAT

STEP 5: Compares heat balance to indicated NI power

STANDARD: Heat balance reviewed and 99.9% is determined to be the correct power level, requiring NI-07 to be adjusted.

NOTES: ***CUE: Provide candidate with attached GOP-12 showing ΔT Power and BIAS "before adjustments".***

COMMENTS:

_____ SAT

_____ UNSAT

STEP 6: Records the "Before Adjustment" readings

STANDARD: Records "Before Adjustment" reading for NI-05 as 12.30 (± 0.05), NI-06 as 5.02 (± 0.05), NI-07 as 3.16 (± 0.05), and NI-08 as 9.32 (± 0.05).

NOTES:

COMMENTS:

_____ SAT

_____ UNSAT

STEP 7: Unlock the ‘C' Channel NI gain pot.

STANDARD: Lever on side of potentiometer moved clockwise

NOTES:

COMMENTS:

_____ SAT

_____ UNSAT

STEP 8: Adjust ‘C' Channel NI power to match calculated power

CRITICAL STEP

STANDARD: Nuclear Power LED readout adjusted to read
99.9 % (± 0.5%)

NOTES: ***Critical step to properly adjust reading.***

COMMENTS:

_____ SAT

_____ UNSAT

STEP 9: Lock the ‘C' Channel NI gain pot

STANDARD: Lever on side of potentiometer moved counterclockwise

NOTES:

COMMENTS:

_____ SAT

_____ UNSAT

STEP 10:	Read 'C' Channel NI power and gain pot setting and record on GOP 12	***CRITICAL STEP***
STANDARD:	NI-07 Power and Pot reading properly read and recorded on GOP 12 Attachment 2 'After Adjustments' section (99.9 ± 0.3% and 3.34 ± 0.05)	
NOTES:	***Critical step to properly record reading.*** ***NOTE: It is acceptable to record all NI pot settings or just NI-07.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 11:	Notify the Shift Supervisor that 'C' Channel N-07 adjustment is completed	
STANDARD:	Notifies Shift Supervisor	
NOTES:		_____ SAT
COMMENTS:		_____ UNSAT
	END OF TASK	

STOP TIME: __________

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The plant is at approximately 100% power on "A" Shift.

INITIATING CUES:

You are directed to perform DWO-1, Tech Spec Surveillance, required Heat Balance per GOP-12.

JPM SRO-B1.07 ATTACHMENT

Proc No GOP-12
Attachment 2
Revision 22
Page 1 of 1

POWER INSTRUMENTATION CALIBRATION FORM

C-27	Before Adjustments				After Adjustments (If required)			
	ΔT Pwr	BIAS	Nuc Pwr	Pot	ΔT Pwr	BIAS	Nuc Pwr	Pot
Channel "A"	100	5.31e-2						
Channel "B"	100	-1.12e-2						
Channel "C"	100	5.65e-2						
Channel "D"	100	-2.42e-2						

BIAS CHANGE

For any TMM ΔT power channel requiring adjustment, **CALCULATE** the required bias change as follows:

[% Power Heat Balance - ΔT Power Indicated] (0.01) = Δ BIAS   NEW BIAS VALUE

[______ - ______] (0.01) = ______ (A)   ______ (A)
[______ - ______] (0.01) = ______ (B)   ______ (B)
[______ - ______] (0.01) = ______ (C)   ______ (C)
[______ - ______] (0.01) = ______ (D)   ______ (D)

A POSITIVE result indicates that the BIAS term needs to be RAISED by the calculated value.

A NEGATIVE result indicates that the BIAS term needs to be LOWERED by the calculated value.

Calculated By: ______ / ______ / ______
Signature Date Time
Verified By: ______ / ______ / ______
Signature Date Time

TMM ΔT POWER CHANNEL INOPERABILITY TIME

For any TMM ΔT power channel requiring adjustment, **RECORD** the date and time that the channel is made inoperable (TMM keyswitch placed in "Data Modify," VHP and TMLP RPS Trips bypassed, etc) and the date and time that the channel is returned to operable status (TMM keyswitch returned to "Normal," VHP and TMLP RPS Trips bypasses removed, etc) below:

Inoperable: ______ / ______ Operable: ______ / ______ (A)
Date Time Date Time
Inoperable: ______ / ______ Operable: ______ / ______ (B)
Date Time Date Time
Inoperable: ______ / ______ Operable: ______ / ______ (C)
Date Time Date Time
Inoperable: ______ / ______ Operable: ______ / ______ (D)
Date Time Date Time

Data Recorded By: ______ / ______ / ______ Verified By: ______ / ______ / ______
Initials Date Time Initials Date Time

JPM SRO-B1.07 KEY

Proc No GOP-12
Attachment 2
Revision 22
Page 1 of 1

POWER INSTRUMENTATION CALIBRATION FORM

C-27	Before Adjustments				After Adjustments (If required)			
	ΔT Pwr	BIAS	Nuc Pwr	Pot	ΔT Pwr	BIAS	Nuc Pwr	Pot
Channel "A"	100	5.31e-2	99.8	12.30*				
Channel "B"	100	-1.12e-2	99.9	5.03*				
Channel "C"	100	5.65e-2	98.1	3.16*			99.9	3.34*
Channel "D"	100	-2.42e-2	99.9	9.32*				

**** SEE JPM BODY FOR PERMITTED TOLERANCES.***

BIAS CHANGE

For any TMM ΔT power channel requiring adjustment, **CALCULATE** the required bias change as follows:

[% Power Heat Balance - ΔT Power Indicated] (0.01) = Δ BIAS

NEW BIAS VALUE

[______ - ______] (0.01) = ______ (A) ______ (A)

[______ - ______] (0.01) = ______ (B) ______ (B)

[______ - ______] (0.01) = ______ (C) ______ (C)

[______ - ______] (0.01) = ______ (D) ______ (D)

A POSITIVE result indicates that the BIAS term needs to be RAISED by the calculated value.

A NEGATIVE result indicates that the BIAS term needs to be LOWERED by the calculated value.

Calculated By: ______________ / ______ / ______
Signature Date Time

Verified By: ______________ / ______ / ______
Signature Date Time

TMM ΔT POWER CHANNEL INOPERABILITY TIME

For any TMM ΔT power channel requiring adjustment, **RECORD** the date and time that the channel is made inoperable (TMM keyswitch placed in "Data Modify," VHP and TMLP RPS Trips bypassed, etc) and the date and time that the channel is returned to operable status (TMM keyswitch returned to "Normal," VHP and TMLP RPS Trips bypasses removed, etc) below:

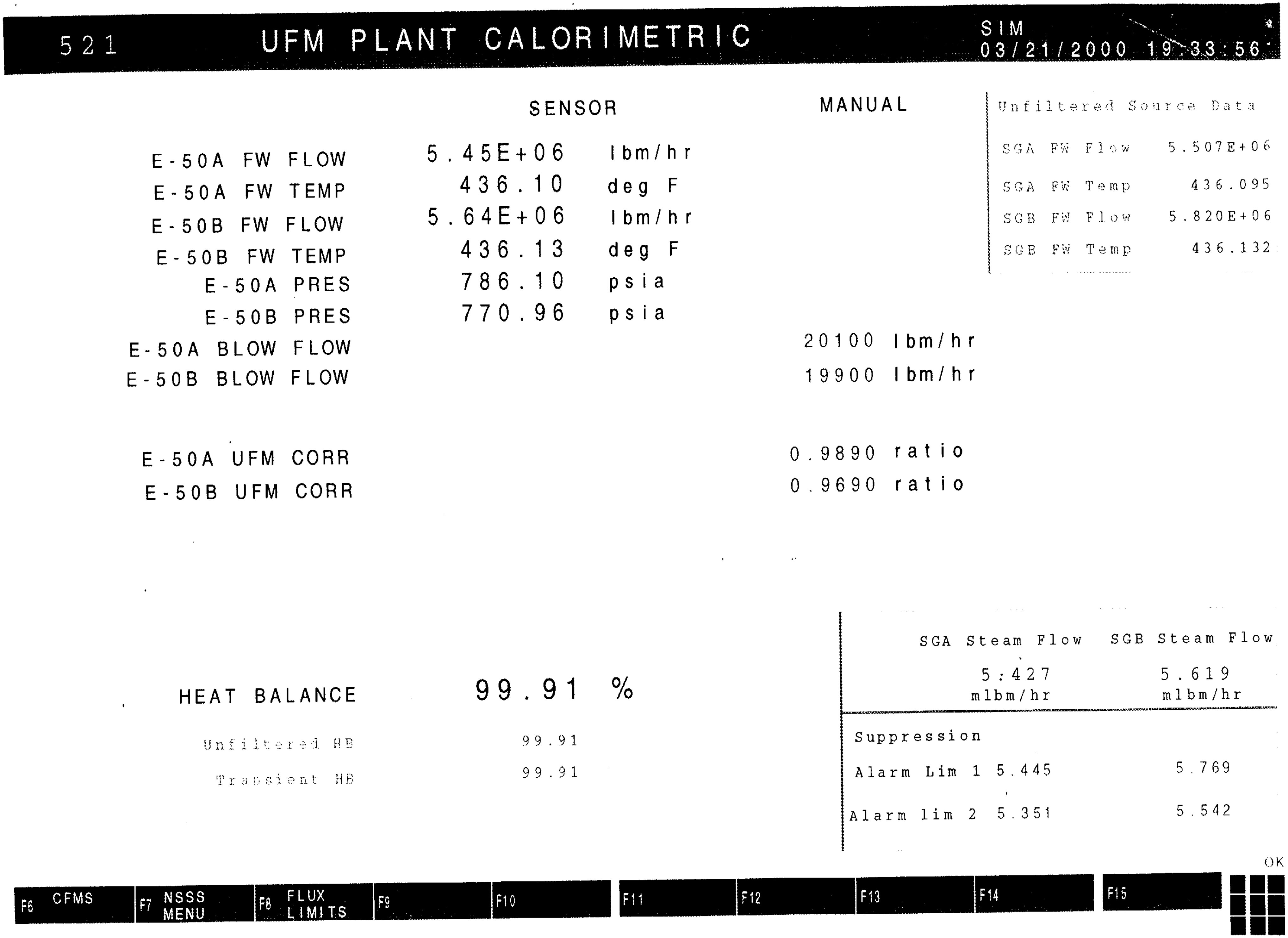
Inoperable: ______ / ______ (Date / Time) Operable: ______ / ______ (Date / Time) (A)

Inoperable: ______ / ______ (Date / Time) Operable: ______ / ______ (Date / Time) (B)

Inoperable: ______ / ______ (Date / Time) Operable: ______ / ______ (Date / Time) (C)

Inoperable: ______ / ______ (Date / Time) Operable: ______ / ______ (Date / Time) (D)

Data Recorded By: ______ / ______ / ______ (Initials Date Time) Verified By: ______ / ______ / ______ (Initials Date Time)



```
521          UFM PLANT CALORIMETRIC                                SIM
                                                                   03/21/2000 19:33:56

                              SENSOR                MANUAL      | Unfiltered Source Data
                                                                |
   E-50A FW FLOW        5.45E+06    lbm/hr                      | SGA FW Flow    5.507E+06
   E-50A FW TEMP          436.10    deg F                       | SGA FW Temp      436.095
   E-50B FW FLOW        5.64E+06    lbm/hr                      | SGB FW Flow    5.820E+06
   E-50B FW TEMP          436.13    deg F                       | SGB FW Temp      436.132
       E-50A PRES         786.10    psia
       E-50B PRES         770.96    psia
  E-50A BLOW FLOW                                20100 lbm/hr
  E-50B BLOW FLOW                                19900 lbm/hr


   E-50A UFM CORR                               0.9890 ratio
   E-50B UFM CORR                               0.9690 ratio



                                           | SGA Steam Flow   SGB Steam Flow
                                           |     5.427            5.619
     HEAT BALANCE       99.91 %            |   mlbm/hr          mlbm/hr
                                           |-------------------------------
       Unfiltered HB     99.91             | Suppression
                                           | Alarm Lim 1 5.445      5.769
        Transient HB     99.91             | Alarm lim 2  5.351     5.542
                                                                            OK
F6 CFMS | F7 NSSS MENU | F8 FLUX LIMITS | F9 | F10 | F11 | F12 | F13 | F14 | F15
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REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-B.2-08

Perform CCW Thermal/Hydraulic Shock Prevention Actions

CANDIDATE: ______________________

EXAMINER: ______________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Perform CCW Thermal/Hydraulic Shock Prevention Actions

Alternate Path: NONE

Facility JPM #: TBAR 03

K/A Rating: 008A4.04 Importance: SRO 2.6 RO 2.6

K/A Statement: Ability to manually operate and/or monitor in the control room: Startup of a CCW pump when the system is shut down.

Task Standard: P-52B discharge valve has been fully opened.

Preferred Evaluation Location: Simulator ____ In Plant X

Preferred Evaluation Method: Perform ____ Simulate X

References: EOP Supplement 24, SW and CCW Hydraulic Shock Prevention

Validation Time: 15 minutes Time Critical: NO

Candidate: ________________

Time Start: ____ Time Finish: ____

Performance Time: ____ minutes

Performance Rating: SAT ____ UNSAT ____

Comments: ________________

Examiner: ________________ Date: ____
Signature

Tools/Equipment/Procedures Needed:

EOP Supplement 24; locked valve key.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

A reactor trip has occurred as a result of a Loss of all AC power. 2400 Volt Bus 1D has had power restored. EOP Supplement 24 Preliminary Actions have been completed.

INITIATING CUES:

The Shift Supervisor instructs you to perform EOP Supplement 24, SW and CCW Hydraulic Shock Prevention, Subsequent Actions for P-52B ONLY.

P-52B is the FIRST CCW pump to be started.

You are issued a locked valve key at this time.

Another operator has been dispatched to install the Trip and Close fuses for the pump. Notify the Control Room when ready to have fuses installed.

START TIME: __________

STEP 1: Obtains current procedure STANDARD: Obtains copy of EOP Supplement 24 NOTES: COMMENTS:	_____ SAT _____ UNSAT
STEP 2: Unlock and close the discharge valve for CCW Pump P-52B STANDARD: P-52B Discharge, MV-CC942, unlocked and turned clockwise until closed NOTES: ***Critical step to establish proper valve position.*** ***Cue: Valve has been unlocked and is closed.*** COMMENTS:	***CRITICAL STEP*** _____ SAT _____ UNSAT
STEP 3: Throttle open two turns the discharge valve for CCW Pump P-52B STANDARD: P-52B Discharge, MV-CC942, turned two turns in counterclockwise direction NOTES: ***Critical step to establish proper valve position.*** ***Cue: Valve has been positioned two turns in open direction.*** COMMENTS:	***CRITICAL STEP*** _____ SAT _____ UNSAT

STEP 4: Notify Control Room that valve is throttled

STANDARD: Notifies Control Room

NOTES: ***CUE: Control Room informs you that P-52B is running.***

NOTE: To meet this condition, other operator has installed fuses and Control Room started pump.

COMMENTS:

_____ SAT

_____ UNSAT

STEP 5: Slowly open the CCW Pump Discharge Valve

CRITICAL STEP

STANDARD: P-52B Discharge, MV-CC942, turned slowly in a counterclockwise direction until fully open

NOTES: ***Critical step to establish design flow from pump.***

Cue: Valve is fully open.

COMMENTS:

_____ SAT

_____ UNSAT

STEP 6: Ensure open the discharge valves for the CCW pumps which have not been started

STANDARD: Verifies P-52A Discharge, MV-CC940, and P-52C Discharge, MV-CC945, are open

NOTES: ***Cue: Valves are fully open.***

COMMENTS:

_____ SAT

_____ UNSAT

STEP 7:	Notify Shift Supervisor that EOP Supplement 24 is complete for P-52B	
STANDARD:	Notifies Shift Supervisor	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
	END OF TASK	

STOP TIME: __________

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

A reactor trip has occurred as a result of a Loss of all AC power. 2400 Volt Bus 1D has had power restored. EOP Supplement 24 Preliminary Actions have been completed.

INITIATING CUES:

The Shift Supervisor instructs you to perform EOP Supplement 24, SW and CCW Hydraulic Shock Prevention, Subsequent Actions for P-52B ONLY.

P-52B is the FIRST CCW pump to be started.

You are issued a locked valve key at this time.

Another operator has been dispatched to install the Trip and Close fuses for the pump. Notify the Control Room when ready to have fuses installed.

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-B.2-09

Operate P-55C from Bus 13

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Operate P-55C from Bus 13

Alternate Path: NONE

Facility JPM #: TBAM 03 (Modified)

K/A Rating: 022AA1.01 Importance: SRO 3.3 RO 3.4

K/A Statement: Ability to operate and / or monitor the following as they apply to the Loss of Reactor Coolant Pump Makeup: CVCS letdown and charging

Task Standard: Charging Pump P-55C is aligned to LCC-13.

Preferred Evaluation Location: Simulator ______ In Plant X

Preferred Evaluation Method: Perform ______ Simulate X

References: SOP-2A, Chemical and Volume Control System

Validation Time: 25 minutes Time Critical: NO

Candidate: ______

Time Start: ______ Time Finish: ______

Performance Time: ______ minutes

Performance Rating: SAT ______ UNSAT ______

Comments: ______

Examiner: ______ Date: ______
Signature

Tools/Equipment/Procedures Needed:

SOP-2A, Section 7.1.3. After candidate describes where and which procedure would be obtained, provide a copy to candidate.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

The Control Room is NOT habitable. Load Center 11 is NOT available. P-55A and P-55B are NOT available. P-55C was powered from LCC 11 and is NOT operating.

INITIATING CUES:

During the performance of ONP 25.2, "Alternate Safe Shutdown Procedure", the Shift Supervisor directs you to operate P-55C from Bus 13, referring to SOP-2A, "Chemical and Volume Control System," Section 7.1.3.

START TIME: ________

STEP 1: Obtains current procedure STANDARD: Obtains copy of SOP-2A, Section 7.1.3 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 2: Ensure P-55C not operating STANDARD: Determines P-55C not operating by observing green OPEN flag is showing on breaker 52-1105 NOTES: ***Cue: Green OPEN flag is showing.*** ***NOTE: This was also provided in INITIAL CONDITIONS, so candidate may not check this.*** COMMENTS:	____ SAT ____ UNSAT
STEP 3: Rack out breaker 52-1105 to disconnect position STANDARD: Attaches racking tool and racks out breaker 52-1105 NOTES: ***Critical step to allow power to be aligned to alternate source.*** ***Cue: Breaker 52-1105 is racked out to disconnect.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT

STEP 4:	Ensure open and rack breaker 52-1308 into connect position and leave open	***CRITICAL STEP***
STANDARD:	Observes green OPEN flag showing on breaker 52-1308, attaches racking tool, and racks into connect position	
NOTES:	***Critical step to allow power to be aligned to alternate source.*** ***Cue: Breaker 52-1308 has the green OPEN flag showing and is racked into connect position.***	____ SAT
COMMENTS:		____ UNSAT
STEP 5:	Ensure OFF breaker 52-1308B	
STANDARD:	At JL255 in charging pump room, verifies 52-1308B is OFF	
NOTES:	***Cue: Breaker 52-1308B is OFF.***	____ SAT
COMMENTS:		____ UNSAT

STEP 6:	Place to ON breaker 52-1308A	***CRITICAL STEP***
STANDARD:	At JL255 in charging pump room, places breaker 52-1308A to ON position	
NOTES:	***Critical step to allow power to be aligned to alternate source.*** ***Cue: Breaker 52-1308A is ON.***	____ SAT ____ UNSAT
COMMENTS:		
STEP 7:	Place to OFF breaker 52-1105A	***CRITICAL STEP***
STANDARD:	At JL257 in charging pump room, places breaker 52-1105A to OFF position	
NOTES:	***Critical step to allow power to be aligned to alternate source.*** ***Cue: Breaker 52-1105A is OFF.***	____ SAT ____ UNSAT
COMMENTS:		

STEP 8: Place to ON breaker 52-1105B

CRITICAL STEP

STANDARD: At JL257 in charging pump room, places breaker 52-1105B to ON position

NOTES: ***Critical step to allow power to be aligned to alternate source.***

Cue: Breaker 52-1105B is ON.

____ SAT

____ UNSAT

COMMENTS:

STEP 9: Place Seal Coolant Pump Control Switch for P-55C in HAND

STANDARD: Places switch in HAND position

NOTES: ***Cue: The seal coolant pump is running.***

If discharge pressure checked, provide cue that it is approximately 20 psi.

____ SAT

____ UNSAT

COMMENTS:

STEP 10:	Test operate breaker 52-1308 to start and stop P-55C to ensure proper breaker operation	
STANDARD:	Closes breaker 52-1308, verifying red CLOSED flag showing, then opens breaker 52-1308, verifying green OPEN flag showing	
NOTES:	***Cue: When closing 52-1308, the red CLOSED flag is showing.*** ***When opening 52-1308, the green OPEN flag is showing.*** ***NOTE: Candidate may verify actual pump operation by calling Control Room or observing system operation during cycling of breaker. This is not required.***	____ SAT
COMMENTS:		____ UNSAT
STEP 11:	Notify Shift Supervisor that P-55C is aligned to LCC-13	
STANDARD:	Notifies Shift Supervisor	
NOTES:	***CUE: If asked, tell candidate to leave P-55C OFF.***	____ SAT
COMMENTS:		____ UNSAT
	END OF TASK	

STOP TIME: __________

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The Control Room is NOT habitable. Load Center 11 is NOT available. P-55A and P-55B are NOT available. P-55C was powered from LCC 11 and is NOT operating.

INITIATING CUES:

During the performance of ONP 25.2, "Alternate Safe Shutdown Procedure", the Shift Supervisor directs you to operate P-55C from Bus 13, referring to SOP-2A, "Chemical and Volume Control System," Section 7.1.3.

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-B.2-10

Locally Start and Load 1-1 Diesel Generator

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Locally Start and Load 1-1 Diesel Generator

Alternate Path: Engine Control Switch fails to start Diesel Generator, requiring operation of Air Start Motor Solenoid Override

Facility JPM #: TBAS 01 (Modified)

K/A Rating: 064A4.06 Importance: SRO 3.9 RO 3.9

K/A Statement: Ability to manually operate and/or monitor in the control room: Manual start, loading, and stopping of the ED/G

Task Standard:

1-1 Diesel Generator is operating with SW Pump P-7B and Bus 13 energized.

Preferred Evaluation Location: Simulator ________ In Plant X

Preferred Evaluation Method: Perform ________ Simulate X

References: ONP-25.2, Alternate Safe Shutdown Procedure
ONP-20, Diesel Generator Manual Control

Validation Time: 30 minutes Time Critical: NO

Candidate: ________________________________

Time Start: __________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ____

____

____

Examiner: ________________________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

ONP-20, Section 4.3.2

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Start-up Transformer 1-2 and Safeguards 1-1 Transformer are NOT available. A fire in the Control Room damaged Bus 1C load shed circuits. The fire in the Control Room also damaged 1-1 Diesel Generator control circuits. The Control Room is NOT habitable. 1-1 DG is NOT operating.

INITIATING CUES:

During performance of ONP 25.2, "Alternate Safe Shutdown Procedure", the Shift Supervisor directs you to start 1-1 Diesel Generator, energize 1C Bus then close breakers 152-103 (Starting P-7B) and 152-108 (Bus 13) per ONP-20 Section 4.3.2. After the DG is started, monitor for proper operation.

START TIME: ________

STEP 1:	Obtains current procedure	
STANDARD:	Obtains copy of ONP-20 and refers to Section 4.3.2	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 2:	Trip all breakers on Bus 1C	***CRITICAL STEP***
STANDARD:	Trips all breakers on 1C Bus electrically, by using the hand switch, or mechanically, using the mechanical trip plunger located bottom center of the breaker inside the cubicle.	
NOTES:	***Critical step to load shed bus.*** ***Cue: As each breaker is opened electrically, the green and, if applicable, white breaker status lights are LIT and the red breaker status light is OFF.*** ***As each breaker is opened mechanically, the breaker status flag reads OPEN.***	____ SAT
COMMENTS:		____ UNSAT

STEP 3:	Remove control power fuses for all breakers on Bus 1C except 152-103, 152-107 and 152-108.	***CRITICAL STEP***
STANDARD:	Removes BRK CLOSING COIL FRN-R-2.5 and BRK CLOSE AND TRIP CIRCUIT 30A fuses for all breakers except 152-103, 152-107 and 152-108.	
NOTES:	***Critical step to apply control power to only desired breakers.*** ***Cue: The required breaker's fuses are removed (as each breaker fuse is removed).***	____ SAT
COMMENTS:		____ UNSAT

STEP 4:	Obtain Remote-Local-Transfer switch handles	
STANDARD:	Obtains RLTS handles from cubicle above breaker 152-102	
NOTES:	***Cue: RLTS handles have been obtained.***	____ SAT
COMMENTS:		____ UNSAT

STEP 5:	Reviews Attachment 2 of ONP 20	
STANDARD:	Reviews Attachment 2 for the effects of placing 1-1 Diesel Generator RLTS in the LOCAL position	
NOTES:	***NO cue required.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 6:	Isolate the 1-1 DG Control Circuits	***CRITICAL STEP***
STANDARD:	Places HS-C22-RLTS and HS-G20-RLTS to the LOCAL position	
NOTES:	***Critical step to provide control of DG.*** ***Cue: HS-C22-RLTS and HS-G20-RLTS are in LOCAL position.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 7:	Place RLTS to LOCAL position on breakers 152-107, 152-103, and 152-108	***CRITICAL STEP***
STANDARD:	Places HS-152-107 RLTS (Brkr. 152-107), HS-152-103 RLTS (Brkr. 152-103), HS-152-108 RLTS (Brkr. 152-108) to the LOCAL position	
NOTES:	***Critical step to obtain control of breakers.*** ***Cue: Hand switch is in the LOCAL position (as each hand switch is place in the LOCAL position) .***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 8:	Remove 30 AMP BREAKER CLOSE AND TRIP CIRCUIT fuses from 152-107, 152-103 and 152-108	***CRITICAL STEP***
STANDARD:	Removes the 30 AMP BREAKER CLOSE AND TRIP CIRCUIT fuses from breakers 152-107, 152-103, and 152-110	
NOTES:	***Critical step to prevent spurious operation.*** ***Cue: 30 AMP BREAKER CLOSE AND TRIP CIRCUIT fuse is removed (as each fuse is removed).***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 9:	Verify breaker status lights are LIT	
STANDARD:	Verifies that the breaker status lights are LIT for 152-107, 152-103, 152-108	
NOTES:	***Cue: The breaker status lights are LIT.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 10:	Attempt to start 1-1 DG	
STANDARD:	Places local 1-1 DG Engine Control Switch to START	
NOTES:	***Cue: 1-1 DG control switch is in START, engine is NOT running and did NOT attempt to start.*** ***Conditional Cue: If candidate asks for any readings on the diesel generator to verify that is operating, cue the operator that the reading indicates engine is not running. (Speed: 0 RPM, Frequency: 0 Hz, Voltage: 0 kilovolts)***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 11: Starts 1-1 DG using Air Start Motor Solenoid Override pushbutton

CRITICAL STEP

STANDARD: Depresses AND holds for at least five seconds the Air Start Motor Solenoid Override pushbutton

NOTES: ***Critical step to start DG.***

Cue: 1-1 DG Air Start Motor Solenoid Override pushbutton has been depressed for more than 5 seconds, and diesel engine is running.

Conditional Cue: If candidate asks for any readings on the diesel generator to verify that is operating, cue the operator that the reading indicated is correct for normal unloaded conditions. (Speed: 900 RPM, Frequency: 60 Hz, Voltage: 2.4 kilovolts)

Alarms on local panel are ENGINE TROUBLE and LOW RAW WATER PRESSURE. Alarms reset if reset button depressed.

COMMENTS:

_____ SAT

_____ UNSAT

STEP 12: Energize Bus 1C by locally closing 1-1 DG Output Breaker 152-107

CRITICAL STEP

STANDARD: Closes breaker 152-107

NOTES: ***Critical step to energize bus.***

Cue: The red and white breaker status lights are LIT and the green breaker status light is OFF.

COMMENTS:

_____ SAT

_____ UNSAT

STEP 13: Locally close breaker 152-103 (P-7B) STANDARD: Closes breaker 152-103 NOTES: ***Critical step to provide cooling to DG.*** ***Cue: The red breaker status light is LIT and the green breaker status light is OFF.*** COMMENTS:	***CRITICAL STEP*** _____ SAT _____ UNSAT
STEP 14: Notifes Shift Supervisor that DG 1-1 is operating and supplying SW P-7B and Bus 13 STANDARD: Notifes Shift Supervisor NOTES: COMMENTS:	_____ SAT _____ UNSAT
STEP 15: Verifies proper cooling water flow to DG STANDARD: Verifies Raw Water Pressure on DG Local Control Panel > 25 psig NOTES: ***CUE: Raw Water Pressure indicates 28 psig.*** ***NOTE: Control Room is not available to obtain SW pressure.*** COMMENTS: ***END OF TASK***	_____ SAT _____ UNSAT

STOP TIME: __________

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Start-up Transformer 1-2 and Safeguards 1-1 Transformer are NOT available. A fire in the Control Room damaged Bus 1C load shed circuits. The fire in the Control Room also damaged 1-1 Diesel Generator control circuits. The Control Room is NOT habitable. 1-1 DG is NOT operating.

INITIATING CUES:

During performance of ONP 25.2, "Alternate Safe Shutdown Procedure", the Shift Supervisor directs you to start 1-1 Diesel Generator, energize 1C Bus then close breakers 152-103 (Starting P-7B) and 152-108 (Bus 13) per ONP-20 Section 4.3.2. After the DG is started, monitor for proper operation.

FINAL-AS ADMINISTERED SCENARIOS

FOR THE PALISADES INITIAL EXAMINATION THE WEEK OF MAY 22, 2000

PALISADES OPERATING EXAM - MAY 23, 2000
APPLICANT ASSIGNMENT

ADAMS, Paul E. - No operating examination - waived. Only re-took the written exam.

CREW 1 (MORNING) - Simulator scenarios No. 2 and 3.

	(Crew Positions)	
	Scenario No.2	Scenario No.3
MULFORD, Todd D.	SRO	RO
SNUGGERUD, Ross D.	RO	SRO
Surrogate	BOP	BOP

CREW 2 (AFTERNOON) - Simulator scenarios No. 2 and 3.

	(Crew Positions)	
	Scenario No.2	Scenario No.3
LEWIS, Kenneth L.	SRO	RO
MAY, Robert L.	RO	SRO
Surrogate	BOP	BOP

Facility: **PALISADES** Scenario Number: **1** Op-Test Number: ________

Examiners

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Operators

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Objectives: To evaluate the candidates' ability to execute a power reduction, respond to a hot leg RTD failure, a loss of a safeguards 2400VAC bus, and a malfunction of the charging pump speed controller. To evaluate the candidate's implementation of emergency operating procedures in response to a large break loss of coolant accident. Post-trip evaluation will determine the candidates' ability to respond to a Low Pressure Safety Injection pump failure.

Initial Conditions: 100% power, BOL. AFW Pump P-8C is out-of-service, with caution tag on pump hand switch, for oil replacement and is expected to be returned to service between 4 and 6 hours following turnover.

Turnover: 100% power, BOL.

AFW Pump P-8C has been out-of-service 11 hours for oil replacement and is expected to be returned to service between 4 and 6 hours following turnover. Technical Specification 3.5.2.a has been entered and has 61 hours remaining before a shutdown to Hot Shutdown conditions is required.

Boron concentration is 1257 ppm. ASI is 0.0.

Shift orders are to lower power at 20% per hour to Hot Shutdown to allow for SG contaminant cleanup.

Event Number	Malfunction Number (1)	Event Type*	Event Description
1	NA	RO(R) TURB(N) SRO(N)	Power Reduction
2	RP23B	RO(I) SRO(I)	Hot Leg #2 RTD TE-0122HB Failure Low
3	CV04	RO(C) SRO(C)	Charging Pump P-55A Fluid Drive Failure High (IPE)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Event Number	Malfunction Number	Event Type*	Event Description
4	ED04B	TURB(C) SRO(C)	Loss of 2400 V Bus 1-D
5	RC02	RO(M) TURB(M) SRO(M)	PCS Cold Leg Rupture
6	SEE SETUP	RO(C) SRO(C)	Low Pressure Safety Injection Pump P67B Failure

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Simulator Setup & Actions Required for Scenario # 1

Event Number	Simulator Operator Actions
INITIAL CONDITIONS	IC-11. 100% power, BOL. AFW Pump P-8C is out-of-service, with caution tag on pump hand switch. • OVRD LO P-8C-G, P-8C GREEN light OFF • OVRD LO P-8C-R, P-8C RED light OFF • OVRD DI P-8C-1, P-8C C/S TRIP Malfunction for Event 6 ACTIVE AT SETUP. • OVRD DI P-67B-1 TRIP to ON • TRIGGER EVENT to DELETE P-67B-1 TRIP when operator starts pump as follows: 1) Select an unused event number and place in upper left hand corner of event trigger screen EVENT # 2) Type ZDI1P(272) in EVENT ACTION 3) Type DOR P-67B-1 in COMMAND 4) Click the ACCEPT NEW EVENT button 5) Click the FINISH button
1	NONE
2	MALF RP23B, Severity = 0%
3	MALF CV04, Severity = 100%
4	MALF ED04B ANN-K-02-59 EXCITER COOLER HIGH TEMP to ON with delay = 60 seconds ***NOTE: Both MALF and ANN should be on Event Trigger #4.***
5	MALF RC02 ***NOTE: Activate event after crew has determined Condensate Pump and Cooling Tower Pump operating.***
6	ACTIVE AT SETUP • OVRD DI P-67B-1 TRIP to ON • TRIGGER EVENT to DELETE P-67B-1 TRIP when operator starts pump as follows: 1) Select an unused event number and place in upper left hand corner of event trigger screen EVENT # 2) Type ZDI1P(272) in EVENT ACTION 3) Type DOR P-67B-1 in COMMAND 4) Click the ACCEPT NEW EVENT button 5) Click the FINISH button

SHIFT TURNOVER SCENARIO # 1

100% power, BOL.

AFW Pump P-8C has been out-of-service 11 hours for oil replacement and is expected to be returned to service between 4 and 6 hours following turnover. Technical Specification 3.5.2.a has been entered and has 61 hours remaining before a shutdown to Hot Shutdown conditions is required.

Boron concentration is 1257 ppm. ASI is 0.0.

Shift orders are to lower power at 20% per hour to Hot Shutdown to allow for SG contaminant cleanup.

Op-Test Number: ________ Scenario Number: 1 Event Number: 1

Event Description: ***Power Reduction***

Time	Position	Applicant's Actions or Behaviors
	SRO	Enters and directs the actions of GOP-8
	SRO	Reviews Precautions and Limitations with crew
	SRO	Notifies Area Power Control and Chemistry of impending shutdown ***NOTE: Chemistry reports that they will establish degas operations after Hot Shutdown is achieved.***
	SRO	Evaluate PCS leak rate surveillance interval
	SRO	Establish "Power Operation Degas Lineup" (SOP-2A, Section 7.13, "Degas Of PCS") ***NOTE: If not previously reported, Chemistry reports that they will establish degas operations after Hot Shutdown is achieved.***

Op-Test Number: ________ Scenario Number: 1 Event Number: 1

Event Description: ***Power Reduction***

Time	Position	Applicant's Actions or Behaviors
	SRO	Evaluate ASI guidelines (EM-04-17, "Axial Shape Index (ASI) Control") - For an unplanned rapid power reduction, the operator need not worry about maintaining ASI within Target ASI ± 0.05 during the power reduction - Initiate trending of ASI - Power reduction should be initiated by boration
	RO	Commence boration of PCS (SOP-2A, Section 7.5.1, "Boration") - Determine required amount of boron - Establish boration flow - Maintain boron concentration to ensure regulating rods above the PPDIL
	SRO	If Reactor power changes by 15% or more in one hour or less, then notify Chemistry to perform an isotopic analysis for iodine
	TURB	Commence load reduction at 20%/hour (SOP-8, Section 7.1, "Turbine Generator K-1") - Lower turbine load at 20%/hour - Before Governor Valve #4 closes below 10%, transfer valve control from SEQUENTIAL to SINGLE valve control - Adjust Valve Position Limiter to maintain Limiter just above valve control signal
		NOTE: Next event should be entered once power has been lowered by approximately 3-5%.

Op-Test Number: ________	Scenario Number: 1	Event Number: 2
Event Description: ***Hot Leg #2 RTD TE-0122HB Failure Low***		

Time	Position	Applicant's Actions or Behaviors
	RO	Diagnoses low failure of Loop #2 Thot signal - EK-0967, LOOP 1 LOOP 2 Tave DEVIATION, alarms - EK-0969, LOOP 2 Tave/Tref GROSS DEVIATION, alarms - EK-0924, GROUP 1 POWER DEPENDENT INSERTION LIMIT, alarms - EK-06 Rack D 04, NUCLEAR - DT POWER DEVIATION T-INLET OFF - NORMAL/CALCULATOR TROUBLE CHANNEL B Lowering of calculated ΔT and calculated TM/LP trip setpoint for channel 'A' TI-0122HB, Loop 2 Hot Leg Temperature, indicates low ***NOTE: If crew checks TYT-0200 behind C-12 (not modeled on simulator), inform them YELLOW alarm light is LIT.***
	SRO	Enters and directs the actions of various ARPs and ONP-13, Tave/Tref Controller Failure
	RO	Places Avg Temp Display Select Switch to LOOP 1 position to swap in-service Tave/Tref Controllers
	RO	Checks ΔT Power for the PIP Node and the SPI Node/Host Computer on a workstation and compares to actual Reactor Power

Op-Test Number: ________ Scenario Number: 1 Event Number: 2

Event Description: ***Hot Leg #2 RTD TE-0122HB Failure Low***

Time	Position	Applicant's Actions or Behaviors
	SRO	Refers to Tech Spec 3.17 (Tables 3.17.1, Item 2, and 3.17.6, Items 12 and 18)
	TURB	Bypass the Variable High Power Trip and the TM/LP Trip per SOP-36 1. Insert bypass key above affected RPS Trip Unit. 2. Turn key 90° clockwise. 3. Verify lit yellow light above bypass keyswitch. 4. Log evolution in the Reactor Logbook
	SRO	Initiates troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 1 Event Number: 3

Event Description: ***Charging Pump P-55A Fluid Drive Failure High (IPE)***

Time	Position	Applicant's Actions or Behaviors
	SRO RO	Daignoses high failure of P-55A Speed - Charging/Letdown mismatch - Pressurizer Level rising - VCT Level lowering - EK-0704, Letdown Ht Ex Tube Inlet Hi-Lo Pressure, alarm
	SRO	Enters and directs the actions of EK-0704 ***NOTE: Actions directed by EK-0704 do NOT address this condition.***
	SRO	Directs RO to take manual control of P-55A speed or place Charging Pump P-55B or P-55C in service and secure Charging Pump P-55A per SOP-2A
	RO	Takes manual control of P-55A speed to restore charging flow to normal (33-44 gpm) ***NOTE: Remainder of this event applies ONLY if crew takes actions to place P-55B or P-55C in manual and secures P-55A. It is acceptable for either set of actions to be taken.***
	RO	If directed, place in MANUAL either P-55B (preferred) or P-55C Charging Pumps Control Select Switch

Op-Test Number: ________ Scenario Number: 1 Event Number: 3

Event Description: ***Charging Pump P-55A Fluid Drive Failure High (IPE)***

Time	Position	Applicant's Actions or Behaviors
	RO	Direct AO to ensure throttled OPEN P-55B Seal Coolant Flow Control Valve
	RO	Ensure in AUTO charging pump control select switch for the second fixed capacity charging pump
	RO	Start pump selected for manual operation
	SRO RO	Refer to Attachment 2 and check that the charging pump selected for AUTO (P-55C preferred), and possibly additional Letdown Orifice Stop Valves cycle according to controller output to maintain PZR level setpoint
	RO	IF desired to minimize Letdown Orifice Valve cycling, THEN CLOSE CV-2004, Orifice Stop Valve

Op-Test Number: ________ Scenario Number: 1 Event Number: 3

Event Description: ***Charging Pump P-55A Fluid Drive Failure High (IPE)***

Time	Position	Applicant's Actions or Behaviors
	RO	When charging flow increases, stop P-55A
	SRO	Initiate troubleshooting and repair of P-55A drive

Op-Test Number: ________ Scenario Number: 1 Event Number: 4

Event Description: ***Loss of 2400 V Bus 1-D***

Time	Position	Applicant's Actions or Behaviors
	TURB	Diagnose loss of 2400 V Bus 1-D - EK-05-04, 2400V BUS 1D BKR 152-203 TRIP, alarm - EK-05-15, 2400V BUS 1C AND/OR 1D UNDERVOLTAGE, alarm - EK-05-22, BUS FAIL TO TRANSFER, alarm - Breaker 152-203 trips - Voltages and load indications for Bus 1-D indicate zero - EDG 1-2 starts, but does not energize Bus 1-D - Service Water Pump P-7C trips - Component Cooling Water P-52B trips, if running
	SRO	Enters and directs the actions of ARP-3 (EK-05) and ONP-2.1
	TURB	Stops EDG 1-2 if temperature limits are reached
	SRO	Refers to and directs the actions of ONP-6.1
	TURB	Monitor Exciter air temperature

Op-Test Number: ________ Scenario Number: 1 Event Number: 4

Event Description: ***Loss of 2400 V Bus 1-D***

Time	Position	Applicant's Actions or Behaviors
	RO	Ensure Service Water Pump operating with Critical SW Header pressure > 42 psig ***NOTE: Critical SW Header pressure is approximately 30 psig. A reactor trip is required when EK-0259, EXCITER COOLER HIGH TEMP, alarms. Crew may make decision to trip before alarm is received due to low SW pressure with only one SW pump available. This is NOT required, but is acceptable.***
	SRO	Orders Reactor Trip due to inadequate cooling to exciter air cooler with power above 15%, enters and directs the actions of EOP-1.0 ***NOTE: Crew should continue with ONP-2.1 as time and personnel permit. Focus of crew should be on EOPs, however.***
	RO	Trips the reactor
	RO	Determine that Reactivity Control acceptance criteria is met
	TURB	Control the Feedwater System - Ensure closed ALL Main Feed Regulating Valves and ALL Bypass Feed Regulating Valves for BOTH S/Gs - IF Tave is less than 525^{0}F AND lowering uncontrolled, THEN trip the operating Main Feed Pumps

Op-Test Number: ________ Scenario Number: 1 Event Number: 4

Event Description: ***Loss of 2400 V Bus 1-D***

Time	Position	Applicant's Actions or Behaviors
	RO	Determine that Control Room Gaseous radiation environment acceptable
	TURB	Determine that Vital Auxiliaries-Electric acceptance criteria are NOT met due to previous loss of 2400 V Bus 1D
	RO	Determine that PCS Inventory Control acceptance criteria are met
	RO	Determine that PCS Pressure Control acceptance criteria are met
	TURB	Determine that PCS Heat Removal acceptance criteria are met

Op-Test Number: ________ Scenario Number: 1 Event Number: 4

Event Description: ***Loss of 2400 V Bus 1-D***

Time	Position	Applicant's Actions or Behaviors
	RO	Determine that Core Heat Removal acceptance criteria are met
	RO	Determine that Containment Isolation acceptance criteria are met
	RO	Determine that Containment Atmosphere acceptance criteria are met
	RO	Determine that Vital Auxiliaries-Water acceptance criteria NOT met due to inadequate Critical SW Header pressure - Closes High Capacity Valves as necessary to establish > 42 psig
	RO	Determine that Vital Auxiliaries-Air acceptance criteria met

Op-Test Number:		Scenario Number:	1	Event Number:	4
Event Description:	***Loss of 2400 V Bus 1-D***				

Time	Position	Applicant's Actions or Behaviors
	TURB	Verify at least one Condensate Pump and at least one Cooling Tower Pump operating
		SIMULATOR OPERATOR: Event # 5 (PCS COLD LEG RUPTURE) should be entered after crew determines at least one Condensate Pump and at least one Cooling Tower Pump operating.
		NOTE: Remaining items in this event are part of response to Loss of Bus 1D and are to be performed only as time and manpower permits.
	TURB	Ensure CRHVAC Train 'B' in service
	TURB	Ensure Main Exhaust Fan V-6B in service

Op-Test Number:	________	Scenario Number:	1	Event Number:	4

Event Description: ***Loss of 2400 V Bus 1-D***

Time	Position	Applicant's Actions or Behaviors
	TURB	Feed Bus 12 from Bus 11 as allowed to regain necessary equipment per SOP-30
	TURB	Start IA Compressors as available and required
	SRO	Reference TS 3.7 and Standing Orders 54 and 62
	SRO	Contact maintenance to initiate troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 1 Event Number: 5

Event Description: ***PCS Cold Leg Rupture***

Time	Position	Applicant's Actions or Behaviors
	SRO RO TURB	Diagnose large break LOCA - SIAS actuated - PCS pressure lowering rapidly - Containment pressure rising rapidly - Containment humidity and temperature rising - Numerous related alarms
	RO	Identifies that LPSI Pump P-67B failed to start - Green light lit, red light dark on HS - No flow indicated ***NOTE: This is actually Event 6.***
	RO	Notifies SRO of pump failure to start
	SRO	Directs RO to start pump.
	RO	Starts LPSI Pump P-67B **NOTE: CRITICAL STEP TO PROVIDE LPSI FLOW DURING LARGE BREAK LOCA SINCE OPPOSITE TRAIN PUMP HAS NO POWER.**
	RO	Verifies LPSI Pump P-67B injecting

Op-Test Number: ________ Scenario Number: 1 Event Number: 5

Event Description: ***PCS Cold Leg Rupture***

Time	Position	Applicant's Actions or Behaviors
	RO	Determines that PCP operating criteria are NOT met and stops all PCPs **NOTE: CRITICAL STEP TO MINIMIZE PCP DAMAGE DUE TO LOCA.**
	TURB	Commence Emergency Shutdown Checklist (GOP-10)
	SRO	Transitions to and directs the actions of EOP-4.0, Loss of Coolant Accident Recovery
	TURB	Ensure available safeguards equipment operated or operating per EOP Supplement 5
	RO	Verify at least minimum SI flow per EOP Supplement 4
	RO	Stops all PCPs - Pressurizer pressure less than 1300 psia - PCS subcooling less than 25 ^{0}F ***NOTE: PCPs may have been stopped earlier in scenario.***

Op-Test Number: ________ Scenario Number: 1 Event Number: 5

Event Description: ***PCS Cold Leg Rupture***

Time	Position	Applicant's Actions or Behaviors
	RO	Attempt to isolate the LOCA - Verify BOTH PORVs are closed - Close the PORV block valves - Ensure closed Letdown Stop Valves - Ensure closed PCS Sample Isolation Valves - Ensure closed Reactor Vessel and PZR Vent Valves - Verify no leak to CCW - Verify Pressurizer relief valves not leaking by ***NOTE: May identify as LBLOCA and not attempt to isolate leakage paths. This is acceptable.***
	TURB	Place at least one Hydrogen Monitor in operation per SOP-38
	RO	Verifies Containment Spray operating as required
	TURB	Verify Containment Isolation for CHP per EOP Supplement 6
		TERMINATE THE SCENARIO WHEN CONTAINMENT ISOLATION FOR CHP HAS BEEN VERIFIED.

Op-Test Number: ________ Scenario Number: 1 Event Number: 6

Event Description: ***Low Pressure Safety Injection Pump P67B Failure***

Time	Position	Applicant's Actions or Behaviors
	RO	Identifies that HPSI Pump P-67B failed to start - Green light lit, red light dark on HS - No flow indicated ***NOTE: There are no alarms associated with this condition. It should be noted during the immediate actions of EOP-1.0. This is actually performed as part of EVENT 5.***
	RO	Notifies SRO of pump failure to start
	SRO	Directs RO to start pump.
	RO	Starts LPSI Pump P-67B **NOTE: CRITICAL STEP TO PROVIDE LPSI FLOW DURING LARGE BREAK LOCA SINCE OPPOSITE TRAIN PUMP HAS NO POWER.**
	RO	Verifies LPSI Pump P-67B injecting

Facility: **PALISADES** Scenario Number: 2 Op-Test Number: ______

Examiners Operators

Objectives: To evaluate the candidates' ability to raise power at EOL, respond to a malfunction of the letdown pressure controller, a power range nuclear instrument failure, and a pressurizer pressure control malfunction. To evaluate the response to a main turbine high vibration requiring a plant trip, with a subsequent failure of the main turbine to trip. EOP implementation will be evaluated based upon the candidates' ability to respond and mitigate the consequences of a steam generator tube rupture. Post-trip response will be required to lower PCS pressure using the PORVs due to a failure of normal and auxiliary spray. EOP-9 entry will be required due to a failed open code safety valve on the ruptured SG.

Initial Conditions: IC-18. Approximately 25% power EOL; Equipment OOS is HPSI Pump P-66B and Aux Spray Valve CV-2117, with a caution tag hung on both hand switches; 'A' MFW Pump is in service.

Turnover: Approximately 25% power EOL.

Equipment out-of-service is HPSI Pump P-66B for pump alignment; P-66B should be returned to service in approximately 3 hours. Technical Specification 3.3.2.c was entered 6 hours ago and P-66B must be restored within the next 18 hours. Aux Spray Valve CV-2117 is also inoperable due to a wiring problem with the hand switch.

'A' MFW Pump is in service. Boron concentration is 333 ppm. ASI is -0.03.

GOP-5 has been completed through Section 2.0. Shift orders are to continue raising power at a rate between 6% and 10% per hour.

Event Number	Malfunction Number (1)	Event Type*	Event Description
1	NA	RO(R) TURB(N) SRO(N)	Up Power Ramp
2	CV05	RO(C) SRO(C)	Loss of Letdown Pressure Control High

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Event Number	Malfunction Number	Event Type*	Event Description
3	RP11D	TURB(I) SRO(I)	Power Range Safety Channel Detector (8) High Voltage Power Failure
4	RX05B	RO(I) SRO(I)	Pressurizer Pressure Control Fails In The High Direction (Channel B)
5	TU01	TURB(C) SRO(C)	Main Turbine High Vibration (Requires Trip) **(IPE)**
6	TC02	TURB(C) SRO(C)	Failure of Turbine Trip Actuation (**PRA**)
7	SG01A	RO(M) TURB(M) SRO(M)	Steam Generator 'A' Tube Rupture at 700 gpm
8	SEE SETUP	RO(C) SRO(C)	Failure of Pressurizer Pressure Output to Normal Spray Valves
9	MS06A	RO(C) TURB(C) SRO(C)	Steam Generator 'A' Failed Open Code Safety Valve

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Simulator Setup & Actions Required for Scenario # 2

Event Number	Simulator Operator Actions
INITIAL CONDITIONS	IC-18. Approximately 25% power EOL. 'A' MFW Pump is in service. HPSI Pump P-66B is OOS, with a caution tag hung on the hand switch • REMOTE SI24 RACKOUT Aux Spray is OOS, with a caution tag hung on the hand switch • OVRD DI CV-2117 H/S OFF • OVRD LO CV-2117-G, CV-2117 GREEN light OFF • OVRD LO CV-2117-R, CV-2117 RED light OFF Override CST Levels to prevent alarms from actuating • OVRD LA-2021 to 95% value • OVRD LA-2022 to 95% value Malfunction for Event 6 is ACTIVE. • TC02
1	NONE
2	MALF CV05
3	MALF RP11D
4	MALF RX05B
5	MALF TU01, Severity =100%, Ramp = 15 min (Ramps to 15 mils at 1 mil/minute)
6	MALF TC02, ACTIVE AT SETUP
7*	MALF SG01A, Severity = 70% (700 gpm), Ramp = 5 minutes, ACTIVE UPON COMPLETION OF EOP-1.0 ACTIONS IN RESPONSE TO TURBINE VIBRATION ACTIVE AT SAME TIME AS EVENT 8 (Spray Valve Failure).
8*	OVRD CV-1057 and CV-1059 to CLOSE to simulate failure of output signal from pressure controller to valves. ACTIVE AT SAME TIME AS EVENT 7 (SGTR).
9	MALF MS06A, Severity = 100%, ACTIVE UPON LOWERING OF PCS PRESSURE TO BELOW 940 PSIA NOTE: Severity should be determined to ensure Containment Pressure exceeds 4 psig.

* Note Events 7 and 8 are activated at same time.

SHIFT TURNOVER SCENARIO # 2

Approximately 25% power EOL.

Equipment out-of-service is HPSI Pump P-66B for pump alignment; P-66B should be returned to service in approximately 3 hours. Technical Specification 3.3.2.c was entered 6 hours ago and P-66B must be restored within the next 18 hours. Aux Spray Valve CV-2117 is also inoperable due to a wiring problem with the hand switch.

'A' MFW Pump is in service. Boron concentration is 333 ppm. ASI is -0.03.

GOP-5 has been completed through Section 2.0. Shift orders are to continue raising power at a rate between 6% and 10% per hour.

Op-Test Number: ________ Scenario Number: 2 Event Number: 1

Event Description: ***Up Power Ramp***

Time	Position	Applicant's Actions or Behaviors
	SRO	Enters and directs the actions of GOP-5
	RO	Dilutes per Operator Aid 182 or SOP-2A and/or withdraws rods as necessary for power ramp
	TURB	Continue power level increase as specified by the Shift Supervisor
	TURB	At approximately 30% power, coordinate with an AO to start second feedwater pump, leaving at 3250 RPM with pump recirculating valve open until pump is needed for SG feed per SOP-12
	TURB	At approximately 30% power, coordinate with AO to place the Moisture Separator Reheaters in service per SOP-8

Op-Test Number: ________ Scenario Number: 2 Event Number: 2

Event Description: ***Loss of Letdown Pressure Control High***

Time	Position	Applicant's Actions or Behaviors
	RO	Diagnoses failure of the intermediate letdown pressure controller - Selected intermediate letdown pressure control valve opens - Flashing in the regenerative heat exchangers, resulting in pressure and flow oscillations on the letdown line - EK-0704, LETDOWN HT EX TUBE INLET HI-LO PRESS, alarms
	SRO	Enters and directs the actions of EK-0704
	RO	Determines charging and letdown flows NOT matched
	RO	Determines Low Pressure Letdown Pressure controller PIC-0202 NOT controlling at approximately 460 psig
	RO	Selects manual on the pressure indicator controller

Op-Test Number: ________ Scenario Number: 2 Event Number: 2

Event Description: ***Loss of Letdown Pressure Control High***

Time	Position	Applicant's Actions or Behaviors
	RO	Manually repositions selected valve to control pressure at approximately 460 psig
	SRO	Initiates troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 2 Event Number: 3

Event Description: ***Power Range Safety Channel Detector (8) High Voltage Power Failure***

Time	Position	Applicant's Actions or Behaviors
	SRO RO TURB	Diagnose failure of NI-08 - NI-008 detector voltage indicates 0 VDC - EK-0948, DROPPED ROD - EK-06 C03, CHANNEL DEVIATION LEVEL 1 5% C04, CHANNEL DEVIATION LEVEL 2 10% C07, DROPPED ROD C08, NI CHANNEL TROUBLE - TMM Channel D NI indicates 0 - NI-008 Upper and Lower indicate 0% power
	SRO	Enter and direct the actions of various ARPs
	TURB	Bypass the Variable High Power Trip, the TM/LP Trip, the High Power Rate Trip and Loss of Load Trips per SOP-36 1. Insert bypass key above affected RPS Trip Unit. 2. Turn key 90° clockwise. 3. Verify lit yellow light above bypass keyswitch. 4. Log evolution in the Reactor Logbook
	SRO	Refer to Technical Specification 3.17.1.2

Op-Test Number: ________ Scenario Number: 2 Event Number: 3

Event Description: ***Power Range Safety Channel Detector (8) High Voltage Power Failure***

Time	Position	Applicant's Actions or Behaviors
	SRO	Refer to EM-04-02 to monitor Quadrant Power Tilt
	SRO	Declare the ASI Alarm Function (Technical Specification Table 3.17.6) of TMM 'D' inoperable (Items 12, 15, and 16)
	RO TURB	Monitor and log the "Power Density" status of the remaining operable TMMs hourly
	SRO	Intiate troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 2 Event Number: 4

Event Description: ***Pressurizer Pressure Control Fails In The High Direction (Channel B)***

Time	Position	Applicant's Actions or Behaviors
	RO	Diagnoses high failure of pressurizer pressure controlling channel - EK-0753, PRESSURIZER PRESSURE OFF NORMAL HI-LO, alarms - Spray valves open - Proportional heaters off - Pressurizer pressure lowers - PIA-0101B indicating high
	SRO	Enters and directs the actions of ARP-4 and ONP-18
	RO	Takes manual control of PPCS controller 'A' or alternates Pressurizer pressure controllers per SOP-1 **NOTE: CRITICAL STEP TO PREVENT TM/LP TRIP AND SIAS ON LOW PRESSURE.**
	SRO	Initiates troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 2 Event Number: 5

Event Description: ***Main Turbine High Vibration (Requires Trip) (IPE)***

Time	Position	Applicant's Actions or Behaviors
	SRO TURB	Diagnose high vibration on turbine - EK-0105, TURBINE HIGH VIBRATION - Indications on Control Room vibration recorders
		NOTE: If AO is sent to verify vibration, report that Control Board vibration readings are correct.
	SRO	Enter and direct the action of EK-0105
	TURB	Checks normal indications on: - Bearing oil temperature - Eccentricity - Differential expansion - Generator frequency - Feedwater heater levels
	SRO	Determine plant trip required due to vibration level and orders reactor trip ***NOTE: May first determine that level is between 10-14 mils and commence a plant shutdown per GOP-8. This is acceptable if a trip is directed when vibration exceeds 14 mils with reactor power above 15%.***
	RO TURB	Trips the reactor as directed

Op-Test Number: ________ Scenario Number: 2 Event Number: 5

Event Description: ***Main Turbine High Vibration (Requires Trip) (IPE)***

Time	Position	Applicant's Actions or Behaviors
	SRO	Enters and directs the actions of EOP-1.0
	RO	Determine that Reactivity Control acceptance criteria is met
	TURB	Control the Feedwater System - Ensure closed ALL Main Feed Regulating Valves and ALL Bypass Feed Regulating Valves for BOTH S/Gs - IF Tave is less than 525°F AND lowering uncontrolled, THEN trip the operating Main Feed Pumps
	TURB	Determine that Control Room Gaseous radiation environment acceptable

Op-Test Number: ________ Scenario Number: 2 Event Number: 5

Event Description: ***Main Turbine High Vibration (Requires Trip) (IPE)***

Time	Position	Applicant's Actions or Behaviors
	TURB	Determine that Vital Auxiliaries-Electric acceptance criteria are NOT met - Main Turbine does NOT trip - Closes MSIVs **NOTE: CRITICAL STEP TO CLOSE MSIVs TO PREVENT CONTINUED COOLDOWN.** ***NOTE: Attempts to trip the turbine from C-01 will not be successful. MSIVs must be closed.***
	RO	Determine that PCS Inventory Control acceptance criteria are met
	RO	Determine that PCS Pressure Control acceptance criteria are met
	RO	Determine that Core Heat Removal acceptance criteria are met
	TURB	Determine that PCS Heat Removal acceptance criteria are met
	RO TURB	Determine that Containment Isolation acceptance criteria are met

Op-Test Number: ________ Scenario Number: 2 Event Number: 5

Event Description: ***Main Turbine High Vibration (Requires Trip) (IPE)***

Time	Position	Applicant's Actions or Behaviors
	RO	Determine that Containment Atmosphere acceptance criteria are met
	RO	Determine that Vital Auxiliaries-Water acceptance criteria met
	RO	Determine that Vital Auxiliaries-Air acceptance criteria met
	TURB	Verify at least one Condensate Pump and at least one Cooling Tower Pump operating
	TURB	Commence Emergency Shutdown Checklist (GOP-10)
		NOTE: Initiate next event once Emergency Shutdown Checklist is addressed.

Op-Test Number: ________ Scenario Number: 2 Event Number: 6

Event Description: ***Failure of Turbine Trip Actuation (PRA)***

Time	Position	Applicant's Actions or Behaviors
	TURB	Diagnose failure of turbine to trip - Position indication - Steam pressure lowering - PCS cooldown and depressurization ***NOTE: This is actually performed as part of Event 5.*** **NOTE: CRITICAL STEP TO CLOSE MSIVs TO PREVENT CONTINUED COOLDOWN.**
	TURB	Closes both MSIVs as Contingency Action for failure of turbine to trip and notifies CRS.

Op-Test Number: ________ Scenario Number: 2 Event Number: 7

Event Description: ***Steam Generator 'A' Tube Rupture at 700 gpm***

Time	Position	Applicant's Actions or Behaviors
	SRO RO TURB	Diagnoses SGTR on SG 'A' - Rising radiation levels in secondary - Lowering PCS level - Lowering PCS pressure - Rising SG level - Lowering SG feed flow - EK-1364, GASEOUS WASTE MONITORING HI RADIATION, alarms
	SRO	Enters and directs the actions of EOP-5.0 ***NOTE: May return to EOP-1.0, but acceptable to enter EOP-5.0 directly. If EOP-1.0 re-entered, it will be to perform re-diagnosis.***
	RO	Stop PCPs, as required - If pressure less than 1300 psia, stop 2 PCPs - If subcooling less than 25 °F, stop remaining 2 PCPS

Op-Test Number: ______ Scenario Number: 2 Event Number: 7	
Event Description: ***Steam Generator 'A' Tube Rupture at 700 gpm***	

Time	Position	Applicant's Actions or Behaviors
	SRO	Verifes acceptance criteria met at intervals of approximately every 15 minutes
	SRO	Notify Heath Physics to perform preliminary radiation surveys per EOP Supplement 14
	TURB	Ensure available safeguards equipment operated or operating per EOP Supplement 5
	RO TURB	Verify at least minimum SI flow per EOP Supplement 4

Op-Test Number: ________ Scenario Number: 2 Event Number: 7

Event Description: ***Steam Generator 'A' Tube Rupture at 700 gpm***

Time	Position	Applicant's Actions or Behaviors
	RO	Commence emergency boration to establish PCS boron concentration greater than or equal to hot shutdown boron concentration
	RO TURB	Ensure SG blowdown valves are closed
	RO TURB	Cooldown the PCS to highest narrow range Thot less than 524 °F (preferably 500 °F to 515 °F) using the Atmospheric Dump Valves or Turbine Bypass Valve (must open MSIV Bypass)
	RO	Record each occurrence of PZR Spray operation with a ΔT (PZR vapor phase temp minus spray temp) greater than 200 °F in the Reactor Logbook ***NOTE: Spray will not be available without PCPs operating.***

Op-Test Number: ________ Scenario Number: 2 Event Number: 7

Event Description: ***Steam Generator 'A' Tube Rupture at 700 gpm***

Time	Position	Applicant's Actions or Behaviors
	RO SRO	Verify SI Pump throttling criteria are satisfied - PCS subcooling, based on the Average of Qualified CETs, is least 25 oF subcooled - Corrected PZR level is greater than 20% and controlled per EOP Supplements 9 and 10 - At least one S/G is available for PCS heat removal with corrected level being maintained or being restored to between 60% and 70% per Supplement 11 - Operable RVLMS channels indicate greater than 102 inches above the bottom of fuel alignment plate
	RO	Attempt to depressurize the PCS - Maintain PZR pressure within ALL of the following criteria: • Less than 940 psia • Within the limits of EOP Supplement 1 • Preferably within 50 psid of the isolated S/G pressure

Op-Test Number: ______ Scenario Number: 2 Event Number: 7

Event Description: ***Steam Generator 'A' Tube Rupture at 700 gpm***

Time	Position	Applicant's Actions or Behaviors
	RO	Determines Normal and Aux Spray are NOT available - Aux Spray Valve CV-2117 tagged - Normal Spray Valves CV-1057 and CV-1059 fail to open ***NOTE: This is actually Event 8.***
	RO	Informs SRO of problems with spray
	SRO	Directs RO to lower pressure using PORV ***NOTE: Crew may elect to continue with depressurizing by cooling down rather than using PORVs. This is acceptable provided PCS pressure is maintained below 940 psia.***
	RO	Lowers pressure using PORV - Opens PORV isolation valves - Enables LTOP - Cycles one PORV to lower pressure below 940 psia and, preferably, within 50 psid of ruptured SG pressure **NOTE: CRITICAL STEP TO LOWER PRESSURE BELOW 940 PSIA TO MINIMIZE RELEASE.**
		EVENT 9, FAILED OPEN SG CODE SAFETY, SHOULD BE ACTIVATED AFTER CREW LOWERS PCS PRESSURE BELOW 940 PSIA.

Op-Test Number: ________ Scenario Number: 2 Event Number: 8

Event Description: ***Failure of Pressurizer Pressure Output to Normal Spray Valves***

Time	Position	Applicant's Actions or Behaviors
	RO	Determines Normal and Aux Spray are NOT available - Aux Spray Valve CV-2117 tagged - Normal Spray Valves CV-1057 and CV-1059 fail to open ***NOTE: This is actually performed as part of Event 7.***
	RO	Informs SRO of problems with spray
	SRO	Directs RO to lower pressure using PORV
	RO	Lowers pressure using PORV - Opens PORV isolation valves - Enables LTOP - Cycles one PORV to lower pressure below 940 psia and, preferably, within 50 psid of ruptured SG pressure **NOTE: CRITICAL STEP TO LOWER PRESSURE BELOW 940 PSIA TO MINIMIZE RELEASE.**

Op-Test Number: ________ Scenario Number: 2 Event Number: 9

Event Description: ***Steam Generator 'A' Failed Open Code Safety Valve***

Time	Position	Applicant's Actions or Behaviors
	RO TURB	Diagnoses SG 'A' Failed Open Code Safety Valve - SG pressure lowering - SG steam flow rising - PCS temperature lowering - SG level lowering - PCS subcooling rising
		NOTE: Cue Shift Engineer to inform SRO that CONTAINMENT ISOLATION Safety Function is NOT satisfied if Turbine Operator does not determine failure.
	SRO	Determines entry into EOP-9 is required due to Containment Isolation Safety Function NOT satisfied. ***NOTE: May also enter EOP-9 due to multiple failures. May also return to diagnostics of EOP-1 to determine EOP-9 entry required. Either of these are also acceptable.***
	SRO	Enters and directs the actions of EOP-9
	RO	Ensures PCPs operating in proper configuration for plant conditions - PCS pressure < 1300 psia, secure 2 PCPs - Subcooling < 25 ^{0}F, secure all PCPs - PCS Tcold < 450 ^{0}F, secure 1 PCP - PCPs within operating limits of EOP Supplement 1

Op-Test Number: ________ Scenario Number: 2 Event Number: 9

Event Description: ***Steam Generator 'A' Failed Open Code Safety Valve***

Time	Position	Applicant's Actions or Behaviors
	RO	Emergency borate as necessary to establish Hot Shutdown boron concentration
	SRO	Identify plant resources or success paths which can be used to fulfill each safety function, referring to Resource Assessment Trees A through I. - Reactivity Control met by Success Path RC-3 - Maintenance of Vital Auxiliaries Electric met by Success Path MVAE-DC-1 and MVAE-AC-1 - PCS Inventory Control met by Success Path IC-2 - PCS Pressure Control met by Success Path PC-1 - PCS and Core Heat Removal met by Success Path HR-2 - Containment Isolation NOT met due to Containment not isolated (CI-1) - Containment Atmosphere Control met by Success Path CA-2 - Maintenance of Vital Auxiliaries Water met by Success Path MVAW-1 - Maintenance of Vital Auxiliaries Air met by Success Path MVAA-1 ***NOTE: Safety Functions may be met by other Success Paths also. Only one Success Path is required to be met to satisfy each Safety Function.***
	SRO	Enters and directs the actions of EOP-9, Success Path CI-1
	TURB	Verifies Containment Isolation complete per EOP Supplement 6

Op-Test Number:	____	Scenario Number:	2	Event Number:	9

Event Description: ***Steam Generator 'A' Failed Open Code Safety Valve***

Time	Position	Applicant's Actions or Behaviors
	RO TURB	If Containment Pressure > 4 psig, places keyswitches for CCW containment isolation valves in CLOSE
	RO	Determines no leakage from PCS to CCW by monitoring CCW Surge Tank level
	TURB	Determines no leakage from PCS to SW or CCW by monitoring SW and CCW radiation monitors
	SRO	Verifies ruptured SG has been previously isolated
	SRO	Determines CI-1 met due to Containment Isolation valves being closed and no release path from ruptured SG to environment
		TERMINATE THE SCENARIO WHEN THE ACTIONS OF CI-1 HAVE BEEN COMPLETED.

Facility: **PALISADES** Scenario Number: 3 Op-Test Number: ____________

Examiners ____________ ____________ ____________

Operators ____________ ____________ ____________

Objectives: To evaluate the candidates' ability to respond to a pressurizer level control malfunction resulting in a loss of a backup heater group and to lower plant power. During the power reduction, the candidates will be evaluated on their ability to control SG levels in manual following a failure of a feedwater flow transmitter. To evaluate the candidates' response to a failed closed main turbine governor valve which will require a plant trip. The reactor will not trip automatically, nor manually from the primary trip switch, and must be tripped using secondary means. Following the plant trip, the candidates will be evaluated on their ability to diagnose and respond to a steamline break inside containment. Post-trip complications will include a failure of both trains of CHP to actuate, requiring the candidates to respond to this ESF failure by manually aligning Containment Isolation, manually initiating SIAS, and manually aligning Containment Spray.

Initial Conditions: IC-21; Approximately 100% power EOL; Equipment OOS is Charging Pump P-55A with Caution Tag hung on hand switch; Charging System is aligned for Mode 1 operation with P 55B in MANUAL and P-55C in AUTO.

Turnover: Power is 100% at EOL.

Charging Pump P-55A is out of service for repairs with the Charging System aligned for Mode 1 operations and CV-2004 closed. Standing Order 54, Section 3.2.2, is satisfied.

Boron concentration is 46 ppm. ASI is + 0.03.

Shift orders are to lower power to 60% load at 20% per hour to allow taking P-1B out-of-service due to elevated seal leakage conditions.

Event Number	Malfunction Number (1)	Event Type*	Event Description
1	RX07B	RO(I) SRO(I)	Pressurizer Level Control Channel B Upscale Demand
2	RX12C		Pressurizer Heater Groups Fail Off (Backup Group #1) **(IPE)**
3	NA	RO(R) TURB(N) SRO(N)	Down Power Ramp

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Event Number	Malfunction Number	Event Type*	Event Description
4	RX14A	TURB(I) SRO(I)	Feedwater Flow Transmitter FT-0701 Failure High
5	TC04C	TURB(C) SRO(C)	Turbine Governor Valve GV 3 Fails Shut
6	RP19	RO(C) SRO(C)	Failure of the Reactor to Automatically Trip
7	MS03A	RO(M) TURB(M) SRO(M)	Main Steamline Rupture Inside of the Containment
8	CH05A/B	RO(C) TURB(C) SRO(C)	Initiation Failure Of Containment Isolation, Safety Injection, and Containment Spray

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Simulator Setup & Actions Required for Scenario # 3

Event Number	Simulator Operator Actions
INITIAL CONDITIONS	IC-21; Approximately 100% power EOL Equipment OOS is Charging Pump P-55A with Caution Tag hung on hand switch; Charging System is aligned for Mode 1 operation with P-55B in MANUAL and P-55C in AUTO. • P-55B Control Select to Manual • P-55C Control Select to Auto • Start P-55B with Control Switch • Stop P-55A with Control Switch • Place CV-2004 in Close • Remote CV32, P-55A, Rackout Malfunction for Event 6 ACTIVE AT SETUP • MALF RP19 • OVRD DI REACTOR_TRIP to OFF Malfunction for Event 8 ACTIVE AT SETUP. • MALF CHO5A and CHO5B
*1**	MALF RX07B ***Activate Event #1 and Event #2 simultaneously.***
*2**	MALF RX12C ***Activate Event #1 and Event #2 simultaneously.***
3	NONE
4	MALF RX14A, Severity = 100%
5	MALF TC04C
6	Malfunction for Event 6 ACTIVE AT SETUP • MALF RP19 • OVRD DI REACTOR_TRIP to OFF
7	MALF MS03A, Severity = 20%, Ramp = 2 minutes
8	Malfunction for Event 8 ACTIVE AT SETUP. • MALF CHO5A and CHO5B

* ***Events #1 and #2 should be activated at same time.***

SHIFT TURNOVER SCENARIO # 3

Power is 100% at EOL.

Charging Pump P-55A is out of service for repairs with the Charging System aligned for Mode 1 operations and CV-2004 closed. Standing Order 54, Section 3.2.2, is satisfied.

Boron concentration is 46 ppm. ASI is + 0.03.

Shift orders are to lower power to 60% load at 20% per hour to allow taking P-1B out-of-service due to elevated seal leakage conditions.

Op-Test Number: ________ Scenario Number: 3 Event Number: 1

Event Description: ***Pressurizer Level Control Channel B Upscale Demand***

Time	Position	Applicant's Actions or Behaviors
	RO	Diagnose low failure of Pressurizer Level Transmitter LT-0101B - Pressurizer Level Control 'B' output demand high - Pressurizer Level Indication LI-0101B failed low - EK-07-61, PRESSURIZER LEVEL HI-LO, alarm - EK-07-63, PRESSURIZER LEVEL CH "A" LO-LO, alarm - Letdown Orifice Stop Valves closed - Charging Pumps P-55B and P-55C running - Charging Pump P-55A at maximum speed - Pressurizer Heaters off - Actual Pressurizer level rising
	SRO	Enters and directs the actions of ARP-4 (EK-07)
	RO	Takes manual control of Pressurizer Level controller <u>OR</u> selects Channel 'A' as controlling channel **CRITICAL STEP TO OBTAIN CONTROL OF PRESSURIZER LEVEL PRIOR TO VCT LOW-LOW LEVEL CAUSING A CHARGING PUMP SUCTION SWAPOVER TO THE SIRW TANK.**
	RO	Restores Pressurizer level to program value and regains heater control by selecting 'Channel A' on LIC-0101, Heater Control Select
	SRO	Contact maintenance to initiate troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 3 Event Number: 2

Event Description: ***Pressurizer Heater Groups Fail Off (Backup Group #1) (IPE)***

Time	Position	Applicant's Actions or Behaviors
		NOTE: This malfunction should be activated at the same time that EVENT 1 is activated.
	RO	Diagnoses tripped supply breaker for Backup heater Group #1 - Indication on Group #1 heaters - Lower than normal current on heater current indication - Slower pressure recovery following depressurization on previous event
	SRO	Consults TS 3.1.1.j to determine required current = 91 amps (375 KW)
	SRO	Initiates troubleshooting and repair

Op-Test Number: ________ Scenario Number: 3 Event Number: 3

Event Description: ***Down Power Ramp***

Time	Position	Applicant's Actions or Behaviors
	SRO	Enters and directs the actions of GOP-8
	SRO	Reviews Precautions and Limitations with crew
	SRO	Notifies Area Power Control and Chemistry of impending shutdown
	SRO	Evaluate PCS leak rate surveillance interval
	SRO	Establish "Power Operation Degas Lineup" (SOP-2A, Section 7.13, "Degas Of PCS") ***NOTE: Not required since plant is not being taken off line.***

Op-Test Number: ______ Scenario Number: 3 Event Number: 3

Event Description: ***Down Power Ramp***

Time	Position	Applicant's Actions or Behaviors
	SRO	Evaluate ASI guidelines (EM-04-17, "Axial Shape Index (ASI) Control") - For an unplanned rapid power reduction, the operator need not worry about maintaining ASI within Target ASI ± 0.05 during the power reduction - Initiate trending of ASI - Power reduction should be initiated by boration
	RO	Commence boration of PCS (SOP-2A, Section 7.5.1, "Boration") - Determine required amount of boron - Establish boration flow - Maintain boron concentration to ensure regulating rods above the PPDIL
	SRO	If Reactor power changes by 15% or more in one hour or less, then notify Chemistry to perform an isotopic analysis for iodine
	TURB	Commence load reduction at 20% ~~15~~%/hour (SOP-8, Section 7.1, "Turbine Generator K-1") - Lower turbine load at 20% ~~15~~%/hour - Before Governor Valve #4 closes below 10%, transfer valve control from SEQUENTIAL to SINGLE valve control - Adjust Valve Position Limiter to maintain Limiter just above valve control signal
		NOTE: Next event should be entered once power has been lowered by approximately 3-5%.

Op-Test Number: ________ Scenario Number: 3 Event Number: 4

Event Description: ***Feedwater Flow Transmitter FT-0701 Failure High***

Time	Position	Applicant's Actions or Behaviors
	TURB	Diagnose high failure of Feedwater Flow Transmitter FT-0701 - LIC-0701 demand goes low - CV-0701 indication goes to zero - Recorder FI-0701 feed flow goes high - SG 'A' level lowers - EK-09-62, STEAM GEN E-50A LO LEVEL, alarm
	SRO	Enters and directs the actions of ARP-5 (EK-09) and ONP-3.0
	TURB	Takes manual control of FRV-0701 using LIC-0701 **NOTE: CRITICAL STEP TO TAKE MANUAL CONTROL OF FRV AND GAIN CONTROL OF SG LEVEL BEFORE LOW SG LEVEL REACTOR TRIP.**
	TURB	Slowly raise SG level using manual control of FRV-0701 to restore level
	SRO	Contact maintenance to initiate troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	TURB	Diagnoses turbine control valve GV-3 failing shut - EK-0318, TURBINE PANEL TROUBLE, alarms - Indication on DEH panel - Load lowering - Steam pressure rising - PCS temperature rising - Reactor power lowering
	TURB	Calls up the alarm subscreen and pushes Silence Key to enable reflash of alarm window
	SRO TURB	Refers to Attachment 1 of ARP-2 - Possible SRVOOUT 1(2) alarm due to valve position - Possible VPLL 1(2) alarm due to valve position
	SRO	If time permits, enter and direct the actions of ONP-1, Loss of Load
	RO	Insert control rods to match Tave to Tref as time permits (Immediate Action of ONP-1)

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	TURB	Ensures Turbine Controls in MANUAL
	TURB	Ensures at least one EHC pump running
	SRO	Orders reactor trip due to being above 15% power
	RO	Trips the reactor as directed

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	SRO	Enters and directs the actions of EOP-1.0
	RO	Determine that Reactivity Control acceptance criteria NOT met
	RO	Determines that Reactor has failed to trip from C-02 and trips reactor from C-06. **NOTE: CRITICAL TO TRIP REACTOR USING ALTERNATE METHODS.** ***NOTE: This is actually EVENT 6.***

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	TURB	Control the Feedwater System - Ensure closed ALL Main Feed Regulating Valves and ALL Bypass Feed Regulating Valves for BOTH S/Gs - IF Tave is less than 525°F AND lowering uncontrolled, THEN trip the operating Main Feed Pumps
	TURB	Determine that Control Room Gaseous radiation environment acceptable
	TURB	Determine that Vital Auxiliaries-Electric acceptance criteria are met
	RO	Determine that PCS Inventory Control acceptance criteria are met
	RO	Determine that PCS Pressure Control acceptance criteria are met
	RO	Determine that Core Heat Removal acceptance criteria are met

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	TURB	Determine that PCS Heat Removal acceptance criteria are met
	RO	Determine that Containment Isolation acceptance criteria are met
	RO	Determine that Containment Atmosphere acceptance criteria are met
	RO	Determine that Vital Auxiliaries-Water acceptance criteria met
	RO	Determine that Vital Auxiliaries-Air acceptance criteria met

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	TURB	Verify at least one Condensate Pump and at least one Cooling Tower Pump operating
	TURB	Commence Emergency Shutdown Checklist (GOP-10)
	SRO	Transition to EOP-2.0, Reactor Trip Recovery - All safety function acceptance criteria met - Control Room is habitable
	SRO	Directs the actions of EOP-2.0
	SRO	Verifies acceptance criteria met at intervals of approximately every 15 minutes

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	RO	Verifies all PCPs operating
	RO	Verifies Pressurizer level within limits - Level between 20% and 85% - Level trending to between 42% and 57%
	RO	Verify Pressurizer pressure within limits - Pressure between 1650 and 2185 psia - Pressure trending to between 2010 and 2100 psia
		SIMULATOR OPERATOR: Initiate next event once Pressurizer level and pressure bands have been given by SRO to RO.

Op-Test Number: ______ Scenario Number: 3 Event Number: 6

Event Description: ***Failure of the Reactor to Automatically Trip***

Time	Position	Applicant's Actions or Behaviors
	RO	Determines that Reactor has failed to trip when Reactor Trip push button depressed on C-02. ***NOTE: This is actually performed as part of EVENT 5.***
	RO	Trips Reactor from C-06. **NOTE: CRITICAL TO CAUSE REACTOR TRIP FOLLOWING ATWS CONDITION.**
	RO	Informs SRO of failure of reactor to trip from C-02

Op-Test Number: ________ Scenario Number: 3 Event Number: 7

Event Description: ***Main Steamline Rupture Inside of the Containment***

Time	Position	Applicant's Actions or Behaviors
	RO TURB SRO	Diagnose ruptured SG inside containment - Excessive steam flow to the containment from SG '~~B~~' A - Reactor trip/Safety Injection signals - SG isolation actuation - SG pressures and PCS temperatures and pressures lowering - Containment humidity, temperature, pressure rising - PCS subcooling rising - Numerous control room alarms
	SRO	Diagnoses steam break and enters and directs the actions of EOP-6.0 ***NOTE: May return to EOP-1.0, but acceptable to enter EOP-6.0 directly. If EOP-1.0 re-entered, it will be to perform re-diagnosis.***
	RO TURB	Determine that Containment Isolation acceptance criteria NOT met
	RO TURB	Determines Containment Isolation did NOT occur - EK-1126, CIS INITIATED, NOT in alarm - Valves NOT properly aligned ***NOTE: This is actually EVENT 8.***
	RO TURB	Initiates CHR signal to isolate containment - Depresses CHRL-CS, HIGH RADIATION INITIATE, and/or - Depresses CHRR-CS, HIGH RADIATION INITIATE **NOTE: CRITICAL TO ENSURE CONTAINMENT IS ISOLATED WHEN REQUIRED.**
		NOTE: Crew may opt to secure PCPs at this time due to no CCW to Containment. Depending on timing of crew, conditions will probably NOT be met to restore CCW to Containment.

Op-Test Number: ________ Scenario Number: 3 Event Number: 7

Event Description: ***Main Steamline Rupture Inside of the Containment***

Time	Position	Applicant's Actions or Behaviors
	TURB	Perform EOP Supplement 6, "Checklist for Containment Isolation." ***NOTE: This is actually Event 8.***
	RO TURB	Closes both MSIVs and CCW Containment Isolation Valves **NOTE: CRITICAL TO CLOSE MSIVs SINCE THEY ARE REQUIRED TO BE CLOSED ON CHP.** ***NOTE: SRO may direct leaving CCW valves open to maintain cooling to PCPs.*** ***NOTE: This is actually Event 8.***
	RO TURB	Initiates SIAS **NOTE: CRITICAL TO INITIATE SAFETY INJECTION WHEN REQUIRED.** ***NOTE: This is actually Event 8.***
	RO	Manually aligns for Containment Spray **NOTE: CRITICAL TO ENSURE CONTAINMENT SPRAY ACTUATED WHEN REQUIRED.** ***NOTE: This is actually Event 8.***
	SRO	Verify Attachment 1, "Safety Function Status Check Sheet" acceptance criteria are satisfied at intervals of approximately fifteen minutes

Op-Test Number: ________ Scenario Number: 3 Event Number: 7

Event Description: ***Main Steamline Rupture Inside of the Containment***

Time	Position	Applicant's Actions or Behaviors
	RO	Verifies "SAFETY INJ INITIATED" (EK-1342) is alarmed due to PZR pressure less than or equal to 1605 psia OR Containment pressure is greater than or equal to 4.0 psig,
	TURB	Ensure available safeguards equipment operated or operating per EOP Supplement 5
	RO TURB	Verify at least minimum SI flow per EOP Supplement 4
	TURB	Ensure MSIVs and MSIV Bypass Valves are closed
	RO	Stop one PCP in each loop if pressure drops below 1300 psia ***NOTE: May have already stopped PCPs due to lack of CCW flow to Containment.*** **CRITICAL STEP TO SECURE PCPs WHEN DETERMINED THAT CCW FLOW CANNOT BE RESTORED TO CONTAINMENT.**
	RO	Commence emergency boration to establish PCS boron concentration greater than or equal to hotshutdown boron concentration as verified by sample or hand calculation per EOP Supplement 35.

Op-Test Number: ________ Scenario Number: 3 Event Number: 7

Event Description: ***Main Steamline Rupture Inside of the Containment***

Time	Position	Applicant's Actions or Behaviors
	RO	Verify PCP operating limits are satisfied per EOP Supplement 1 ***NOTE: May have already stopped PCPs due to lack of CCW flow to Containment.*** **CRITICAL STEP TO SECURE PCPs WHEN DETERMINED THAT CCW FLOW CANNOT BE RESTORED TO CONTAINMENT.**
	TURB	Place LTOP in service
	SRO RO TURB	Determine the most affected S/G by considering ALL of the following: • High steam flow from S/G • Lowering S/G pressure • Lowering S/G level • Lowering Loop T_C temperature
	TURB	Isolate Steam Generator 'A' per EOP Supplement 17
	RO TURB	Stabilize PCS temperature
	RO	Verify SI Pump throttling criteria are satisfied
		Terminate the scenario when PCS temperature has been stabilized and SI Pump Throttling criteria are determined to be satisfied.

Op-Test Number: ________ Scenario Number: 3 Event Number: 8

Event Description: ***Initiation Failure Of Containment Isolation, Safety Injection, and Containment Spray***

Time	Position	Applicant's Actions or Behaviors
	RO TURB	Determines Containment Isolation did NOT occur - EK-1126, CIS INITIATED, NOT in alarm - Valves NOT properly aligned ***NOTE: This is actually performed as part of EVENT 7.***
	RO TURB	Initiates CHR signal to isolate containment and determines CIS does NOT occur - Depresses CHRL-CS, HIGH RADIATION INITIATE, and/or - Depresses CHRR-CS, HIGH RADIATION INITIATE
	TURB	Manually aligns for Containment Isolation per EOP Supplement 6 **NOTE: CRITICAL TO ENSURE CONTAINMENT IS ISOLATED WHEN REQUIRED.**
	RO TURB	Manually closes both MSIVs - CV-0510 (SG 'A') - CV-0501 (SG 'B') **NOTE: CRITICAL TO CLOSE MSIVs SINCE THEY ARE REQUIRED TO BE CLOSED ON CHP.**
	RO TURB	Manually closes CCW Isolation Valves - CV-0910, (KEY: 337) - CV-0911, (KEY: 338) - CV-0940, (KEY: 336) ***NOTE: SRO may direct leaving CCW valves open to maintain cooling to PCPs.***

Op-Test Number: ________ Scenario Number: 3 Event Number: 8

Event Description: ***Initiation Failure Of Containment Isolation, Safety Injection, and Containment Spray***

Time	Position	Applicant's Actions or Behaviors
	RO TURB	Determines SIAS did NOT occur - EK-1342, SAFETY INJ INITIATED, NOT in alarm - Valves NOT properly aligned
	RO TURB	Initiates SIAS - Depresses PB-1, INJECTION INITIATE - Depresses PB-2, INJECTION INITIATE **NOTE: CRITICAL TO INITIATE SAFETY INJECTION WHEN REQUIRED.**
	RO	Manually aligns for Containment Spray - Opens all Containment Spray Valves - Starts all Containment Spray Pumps **NOTE: CRITICAL TO ENSURE CONTAINMENT SPRAY ACTUATED WHEN REQUIRED.**

ORIGINAL EXAM SECURITY AGREEMENT

1. Pre-Examination

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of May 22 and 29, 2000 as of the date of my signature. I agree that I will not knowingly divulge any information about these examinations to any persons who have not been authorized by the NRC chief examiner. I understand that I am not to instruct, evaluate, or provide performance feedback to those applicants scheduled to be administered these licensing examinations from this date until completion of examination administration, except as specifically noted below and authorized by the NRC.Furthermore, I am aware of the physical security measures and requirements (as documented in the facility licensee's procedures) and understand that violation of the conditions of this agreement may result in cancellation of the examinations and/or an enforcement action against me or the facility licensee. I will immediately report to facility management or the NRC chief examiner any indications or suggestions that examination security may have been compromised.

2. Post-Examination

To the best of my knowledge, I did not divulge to any unauthorized persons any information concerning the NRC licensing examinations administered during the week(s) of May 22 and 29, 2000. From the date that I entered into this security agreement until the completion of examination administration, I did not instruct, evaluate, or provide performance feedback to those applicants who were administered these licensing examinations, except as specifically noted below and authorized by the NRC.

	PRINTED NAME	JOB TITLE / RESPONSIBILITY	SIGNATURE (1)	DATE	SIGNATURE (2)	DATE	NOTE
1.	William Gross	Author		1/20/00	DDH for WGross per phoncon	6/1/00	
2.	Darrell Hensley	Exam Lead	Darrell Hensley	2/16/00	Darrell Hensley	6/1/00	
3.	RICHARD MASSA	FACILITY REVIEWER		2.22.00		6.1.00	
4.	Robert Sailor	Exam Team Member		2/29/00		6/1/00	
5.	JAMES V. WICKS	VALIDATION TEAM MEMBER		3.20.00		6/1/00	
6.	VIRGINIA L. MOCERI	VALIDATION TEAM MEMBER	Virginia L. Moceri	3/20/00	Virginia L. Moceri	6/1/00	
7.	John T Leblanc	Validation Team Member		3/20/00		6/1/00	
8.	STEPHEN M COGSWELL	VALIDATION TEAM MEMBER	Stephen M Cogswell	3-20-00	Stephen M Cogswell	6-1-00	
9.	RALPH C STARLAND JR	Simulator Support	Ralph C Starland Jr	3-21-00		6/1/00	
10.	Chris Niffenegger	Senior Tech / Simulator Support		5-2-2000		6/1/2000	
11.	David W. Rogers	Training Director		5/3/00		6/1/00	
*12.	Gregory A Baustian	Nuclear Engineering Mgr		5/8/00			* +
13.	Patrick J. Pitcher	HLC Training Supervisor		5/22/00		6/1/00	
14.	Terry Davis	SR. Nuc Instr. NT		5/22/00			* +
15.							

NOTES:

* For Common 5 ONLY.

\+ - see attached page. DH 6/12/00

* - Forthcoming - individual is offsite (vacation).

PALISADES EXAMINATION - MAY 2000

1. Pre-Examination

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of May 22 and 29, 2000 as of the date of my signature. I agree that I will not knowingly divulge any infomation about these examinations to any persons who have not been authorized by the NRC chief examiner. I understand that I am not to instruct, evaluate, or provide performance feedback to those applicants scheduled to be administered these licensing examinations from this date until completion of examination administration, except as specifically noted below and authorized by the NRC.Furthermore, I am aware of the physical security measures and requirements (as documented in the facility licensee's procedures) and understand that violation of the conditions of this agreement may result in cancellation of the examinations and/or an enforcement action against me or the facility licensee. I will immediately report to facility management or the NRC chief examiner any indications or suggestions that examination security may have been compromised.

2. Post-Examination

To the best of my knowledge, I did not divulge to any unauthorized persons any information concerning the NRC licensing examinations administered during the week(s) of May 22 and 29, 2000. From the date that I entered into this security agreement until the completion of examination administration, I did not instruct, evaluate, or provide performance feedback to those applicants who were administered these licensing examinations, except as specifically noted below and authorized by the NRC.

	PRINTED NAME	JOB TITLE / RESPONSIBILITY	SIGNATURE (1)	DATE	SIGNATURE (2)	DATE	NOTE
1.	William Gross	Author		1/20/00	DLH for WGross per phoncon	6/1/00	
2.	Darrell Hensley	Exam Lead	Darrell Hensley	2/16/00	Darrell Hensley	6/1/00	
3.	RICHARD MASSA	FACILITY REVIEWER		2-22-00		6-1-00	
4.	Robert Sailor	Exam Team Member		2/29/00		6/1/00	
5.	JAMES V. WICKS	VALIDATION TEAM MEMBER		3-20-00		6/1/00	
6.	VIRGINIA L. MOCERI	VALIDATION TEAM MEMBER	Virginia L. Moceri	3/20/00	Virginia L. Moceri	6/1/00	
7.	John T Leblang	Validation Team Member		3/20/00		6/1/00	
8.	STEPHEN M COGSWELL	VALIDATION TEAM MEMBER	Stephen M Cogswell	3-20-00	Stephen M Cogswell	6-1-00	
9.	RALPH C STARLAND JR	Simulator Support		3-21-00		6/1/00	
10.	Chris Niffenegger	Senior Tech / Simulator Support		5-2-2000		6/1/2000	
11.	David W. Rogers	Training Director		5/3/00		6/1/00	
*12.	GREGORY A BAUSTIAN	Nuclear Engineering Mgr		5/8/00		6/12/00	*
13.	Patrick J. Pitcher	HLC Training Supervisor		5/22/00		6/1/00	
14.	Terry Davis	SR Nuc Instr. NT		5/22/00		6/9/00	*
15.							

NOTES:

* For Common 5 ONLY.

* - Forthcoming - individual is offsite (vacation).

ES-301 Operating Test Quality Checklist Form ES-301-3

Facility: **PALISADES** Date of Examination: **22-MAY-00** Operating Test Number:

	1. GENERAL CRITERIA	Initials a	b	c
a.	The operating test conforms with the previously approved outline; changes are consistent with sampling requirements (e.g., 10 CFR 55.45, operational importance, safety function distribution).	WJG	RM	HP
b.	There is no day-to-day repetition between this and other operating tests to be administered during this examination.	WJG	RM	HP
c.	The operating test shall not duplicate items from the applicants' audit test(s)(see Section D.1.a).	WJG	RM	HP
d.	Overlap with the written examination and between operating test categories is within acceptable limits.	WJG	RM	HP
e.	It appears that the operating test will differentiate between competent and less-than-competent applicants at the designated license level.	WJG	RM	HP
	2. WALK-THROUGH (CATEGORY A & B) CRITERIA	--	--	--
a.	Each JPM includes the following, as applicable: · initial conditions · initiating cues · references and tools, including associated procedures · validated time limits (average time allowed for completion) and specific designation if deemed to be time critical by the facility licensee · specific performance criteria that include: - detailed expected actions with exact criteria and nomenclature - system response and other examiner cues - statements describing important observations to be made by the applicant - criteria for successful completion of the task - identification of critical steps and their associated performance standards - restrictions on the sequence of steps, if applicable	WJG	RM	HP
b.	The prescripted questions in Category A are predominantly open reference and meet the criteria in Attachment 1 of ES-301.	N/A	N/A	N/A
c.	Repetition from operating tests used during the previous licensing examination is within acceptable limits (30% for the walk-through) and do not compromise test integrity.	WJG	RM	HP
d.	At least 20 percent of the JPMs on each test are new or significantly modified.	WJG	RM	HP
	3. SIMULATOR (CATEGORY C) CRITERIA	--	--	--
a.	The associated simulator operating tests (scenario sets) have been reviewed in accordance with Form ES-301-4 and a copy is attached.	WJG	RM	HP

* done 5/18 HP

Post-prep week

	Printed Name / Signature	Date	
a. Author	William J. Gross /	3/31/00	
b. Facility Reviewer(*)	RICHARD MASSA /	4.6.00	
c. NRC Chief Examiner (*)	Hironori Peterson /	4-24-2000	HP 5/18/00
d. NRC Supervisor (*)	David E. Hills / David E. Hills	4-24-00	DEH 5/18/00

(*) The facility signature is not applicable for NRC-developed tests; two independent NRC reviews are required.

* NOTE! ADDITIONAL concerns on discriminatory validity + adequacy of expected actions for an Alt path JPM.

ES-301 Simulator Scenario Quality Checklist Form ES-301-4

Facility: **PALISADES** Date of Exam: **22-May-00** Scenario Numbers: **1 / 2 / 3** Operating Test No.: **1** (1)

	QUALITATIVE ATTRIBUTES	Initials a	Initials b	Initials c
1.	The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the operators into expected events.	wjg	RM	
2.	The scenarios consist mostly of related events.	wjg	RM	
3.	Each event description consists of · the point in the scenario when it is to be initiated · the malfunction(s) that are entered to initiate the event · the symptoms/cues that will be visible to the crew · the expected operator actions (by shift position) · the event termination point (if applicable)	wjg	RM	
4.	No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.	wjg	RM	
5.	The events are valid with regard to physics and thermodynamics.	wjg	RM	
6.	Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.	wjg	RM	
7.	If time compression techniques are used, the scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.	wjg	RM	
8.	The simulator modeling is not altered.	wjg	RM	
9.	The scenarios have been validated. Any open simulator performance deficiencies have been evaluated to ensure that functional fidelity is maintained while running the planned scenarios.	wjg	RM	
10.	Every operator will be evaluated using at least one new or significantly modified scenario. All other scenarios have been altered in accordance with Section D.4 of ES-301.	wjg	RM	
11.	All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).	wjg	RM	
12.	Each applicant will be significantly involved in the minimum number of transients and events specified on Form ES-301-5 (submit the form with the simulator scenarios).	wjg	RM	
13.	The level of difficulty is appropriate to support licensing decisions for each crew position.	wjg	RM	

	TARGET QUANTITATIVE ATTRIBUTES (PER SCENARIO; SEE SECTION D.4.D)	Actual Attributes	--	--	--
1.	Total malfunctions (5-8)	6 / 7 / 7	wjg	RM	
2.	Malfunctions after EOP entry (1-2)	1 / 2 / 2	wjg	RM	
3.	Abnormal events (2-4)	4 / 4 / 4	wjg	RM	
4.	Major transients (1-2)	1 / 2 / 1	wjg	RM	
5.	EOPs entered/requiring substantive actions (1-2)	2 / 2 / 3	wjg	RM	
6.	EOP contingencies requiring substantive actions (0-2)	0 / 0 / 0	wjg	RM	*
7.	Critical tasks (2-3)	2 / 3 / 4	wjg	RM	

NOTE (1): Candidates for Operating Test No. 1 are three (3) SRO-I candidates, each filling the BOP, RO, and SRO positions within the scenario set.

Author: William J. Gross / William J. Gross 3/31/00

Chief Examiner: Hironori Peterson / Hironori Peterson 4/24/2000

* need to clarify EOP contingency entry with licensee.

OPERATING TEST NO.: Scenario Set 1, SRO-I (1) Candidate

Applicant Type	Evolution Type	Minimum Number	Scenario Number		
			1 SRO	2 BOP	3 RO
RO	Reactivity	1			
	Normal	1			
	Instrument	2			
	Component	2			
	Major	1			

SRO-I	As RO	Reactivity	1			3
		Normal	0		1	
		Instrument	1		3	1
		Component	1		5-6	2-7-8
		Major	1		7	6
	As SRO	Reactivity	0			
		Normal	1	1		
		Instrument	1	2-4		
		Component	1	3-5-7		
		Major	1	6		

SRO-U	Reactivity	0			
	Normal	1			
	Instrument	1			
	Component	1			
	Major	1			

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: William J. Gross / 3/31/00

Chief Examiner: Hironori Peterson / 4/24/2000

OPERATING TEST NO.: Scenario Set 1, SRO-I (2) Candidate

Applicant Type		Evolution Type	Minimum Number	Scenario Number 1 RO	Scenario Number 2 SRO	Scenario Number 3 BOP
RO		Reactivity	1			
		Normal	1			
		Instrument	2			
		Component	2			
		Major	1			
SRO-I	As RO	Reactivity	1	1		
		Normal	0			3
		Instrument	1	2		4
		Component	1	3-7		5
		Major	1	6		6
	As SRO	Reactivity	0			
		Normal	1		1	
		Instrument	1		3-4	
		Component	1		2-5-6-8	
		Major	1		7	
SRO-U		Reactivity	0			
		Normal	1			
		Instrument	1			
		Component	1			
		Major	1			

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: William J. Gross / William J. Gross 3/31/00

Chief Examiner: Hironori Peterson / 4/24/2000

OPERATING TEST NO.: Scenario Set 1, SRO-I (3) Candidate

Applicant Type	Evolution Type	Minimum Number	Scenario Number		
			1 BOP	2 RO	3 SRO
RO	Reactivity	1			
	Normal	1			
	Instrument	2			
	Component	2			
	Major	1			

Applicant Type	Evolution Type	Minimum Number	1 BOP	2 RO	3 SRO
As RO	Reactivity	1		1	
	Normal	0	1		
	Instrument	1	4	4	
	Component	1	5	2-8	
	Major	1	6	7	
SRO-I					
As SRO	Reactivity	0			
	Normal	1			3
	Instrument	1			1-4
	Component	1			2-5-7-8
	Major	1			6

Applicant Type	Evolution Type	Minimum Number	1 BOP	2 RO	3 SRO
SRO-U	Reactivity	0			
	Normal	1			
	Instrument	1			
	Component	1			
	Major	1			

Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.

(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: William J. Gross / 3/31/00

Chief Examiner: Hironori Peterson / 4/24/2000

Competencies	Applicant #1 SRO-I			Applicant #2 SRO-I			Applicant #3 SRO-I		
	SCENARIO			SCENARIO			SCENARIO		
	1	2	3	1	2	3	1	2	3
Understand and Interpret Annunciators and Alarms	2-3-4-5-6-7	3-5-6-7	1-2-6-7-8	2-3-6-7	2-3-4-5-6-7-8	4-5-6	4-5-6	2-4-7-8	1-2-4-5-6-7-8
Diagnose Events and Conditions	2-3-4-5-6-7	3-5-6-7	1-2-6-7-8	2-3-6-7	2-3-4-5-6-7-8	4-5-6	4-5-6	2-4-7-8	1-2-4-5-6-7-8
Understand Plant and System Response	1-2-3-4-5-6	1-3-5-6-7	1-2-3-6-7-8	1-2-3-6	1-2-3-4-5-6-7-8	3-4-5-6	1-4-5-6	1-2-4-7-8	1-2-3-4-5-6-7-8
Comply With and Use Procedures (1)	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
Operate Control Boards (2)		1-3-5-6-7	1-2-3-6-7-8	1-2-3-6-7		3-4-5-6	1-4-5-6	1-2-4-7-8	
Communicate and Interact With the Crew	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
Demonstrate Supervisory Ability (3)	ALL				ALL				ALL
Comply With and Use Tech. Specs. (3)	2				3				2

Notes:
(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: William J. Gross / 3/31/00
Chief Examiner: Hironori Peterson / 4/24/2000

Facility: **PALISADES** Date of Exam: **22-May-00** Scenario Numbers: **1 / 2 /** Operating Test No.: **2** (1)

	QUALITATIVE ATTRIBUTES	Initials a	Initials b	Initials c
1.	The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the operators into expected events.	wjg	RM	HP
2.	The scenarios consist mostly of related events.	wjg	RM	HP
3.	Each event description consists of · the point in the scenario when it is to be initiated · the malfunction(s) that are entered to initiate the event · the symptoms/cues that will be visible to the crew · the expected operator actions (by shift position) · the event termination point (if applicable)	wjg	RM	HP
4.	No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.	wjg	RM	HP
5.	The events are valid with regard to physics and thermodynamics.	wjg	RM	HP
6.	Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.	wjg	RM	HP
7.	If time compression techniques are used, the scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.	wjg	RM	HP
8.	The simulator modeling is not altered.	wjg	RM	HP
9.	The scenarios have been validated. Any open simulator performance deficiencies have been evaluated to ensure that functional fidelity is maintained while running the planned scenarios.	wjg	RM	HP
10.	Every operator will be evaluated using at least one new or significantly modified scenario. All other scenarios have been altered in accordance with Section D.4 of ES-301.	wjg	RM	HP
11.	All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).	wjg	RM	HP
12.	Each applicant will be significantly involved in the minimum number of transients and events specified on Form ES-301-5 (submit the form with the simulator scenarios).	wjg	RM	HP
13.	The level of difficulty is appropriate to support licensing decisions for each crew position.	wjg	RM	HP

	TARGET QUANTITATIVE ATTRIBUTES (PER SCENARIO; SEE SECTION D.4.D)	Actual Attributes	--	--	--	
1.	Total malfunctions (5-8)	6 / 7 /	wjg	RM	HP	
2.	Malfunctions after EOP entry (1-2)	1 / 2 /	wjg	RM	HP	
3.	Abnormal events (2-4)	4 / 4 /	wjg	RM	HP	
4.	Major transients (1-2)	1 / 2 /	wjg	RM	HP	
5.	EOPs entered/requiring substantive actions (1-2)	2 / 2 /	wjg	RM	HP	
6.	EOP contingencies requiring substantive actions (0-2)	0 / 0 /	wjg	RM	HP	*
7.	Critical tasks (2-3)	2 / 3 /	wjg	RM	HP	

NOTE (1): Candidates for Operating Test No. 2 are one (1) SRO-I candidate, filling the RO position and the SRO position within the scenario set, one (1) SRO-U candidate, filling the SRO position and the BOP position within the scenario set, and one (1) RO candidate, filling the BOP and RO positions within the scenario set.

Author: William J. Gross / William J. Gross 3/31/00

Chief Examiner: Hironori Peterson / Hironori Peterson 4/24/2000

* need to clarify contingency EOPs - Functional restoration procedure entry

OPERATING TEST NO.: Scenario Set 2, SRO-U Candidate

Applicant Type	Evolution Type	Minimum Number	Scenario Number		
			1 SRO	2 BOP	3
RO	Reactivity	1			
	Normal	1			
	Instrument	2			
	Component	2			
	Major	1			

SRO-I	As RO	Reactivity	1			
		Normal	0			
		Instrument	1			
		Component	1			
		Major	1			
	As SRO	Reactivity	0			
		Normal	1			
		Instrument	1			
		Component	1			
		Major	1			

SRO-U	Reactivity	0			
	Normal	1	1	1	
	Instrument	1	2-4	3	
	Component	1	3-5-7	5-6	
	Major	1	6	7	

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: William J. Gross / 3/31/00

Chief Examiner: Hironori Peterson / 4/24/2000

ES-301 Transient and Event Checklist Form ES-301-5

OPERATING TEST NO.: Scenario Set 2, SRO-I Candidate

Applicant Type	Evolution Type	Minimum Number	Scenario Number		
			1 RO	2 SRO	3
RO	Reactivity	1			
	Normal	1			
	Instrument	2			
	Component	2			
	Major	1			

SRO-I	As RO	Reactivity	1	1		
		Normal	0			
		Instrument	1	2		
		Component	1	3-7		
		Major	1	6		
	As SRO	Reactivity	0			
		Normal	1		1	
		Instrument	1		3-4	
		Component	1		2-5-6-8	
		Major	1		7	

SRO-U	Reactivity	0			
	Normal	1			
	Instrument	1			
	Component	1			
	Major	1			

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: William J. Gross / William J Gross 3/31/00

Chief Examiner: Hironori Peterson / 4/24/2000

ES-301 Transient and Event Checklist Form ES-301-5

OPERATING TEST NO.: Scenario Set 2, RO Candidate

Applicant Type	Evolution Type	Minimum Number	Scenario Number		
			1 BOP	2 RO	3
RO	Reactivity	1		1	
	Normal	1	1		
	Instrument	2	4	4	
	Component	2	5	2-8	
	Major	1	6	7	

Applicant Type		Evolution Type	Minimum Number	1	2	3
SRO-I	As RO	Reactivity	1			
		Normal	0			
		Instrument	1			
		Component	1			
		Major	1			
	As SRO	Reactivity	0			
		Normal	1			
		Instrument	1			
		Component	1			
		Major	1			

Applicant Type	Evolution Type	Minimum Number	1	2	3
SRO-U	Reactivity	0			
	Normal	1			
	Instrument	1			
	Component	1			
	Major	1			

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: William J. Gross / William J. Gross 3/31/00

Chief Examiner: Hironori Peterson / Hironori Peterson 4/24/2000

Competencies	Applicant #1 SRO-U			Applicant #2 SRO-I			Applicant #3 RO		
	SCENARIO			SCENARIO			SCENARIO		
	1	2	3	1	2	3	1	2	3
Understand and Interpret Annunciators and Alarms	2-3-4-5-6-7	3-5-6-7		2-3-6-7	2-3-4-5-6-7-8		4-5-6	2-4-7-8	
Diagnose Events and Conditions	2-3-4-5-6-7	3-5-6-7		2-3-6-7	2-3-4-5-6-7-8		4-5-6	2-4-7-8	
Understand Plant and System Response	1-2-3-4-5-6	1-3-5-6-7		1-2-3-6	1-2-3-4-5-6-7-8		1-4-5-6	1-2-4-7-8	
Comply With and Use Procedures (1)	ALL	ALL		ALL	ALL		ALL	ALL	
Operate Control Boards (2)		1-3-5-6-7		1-2-3-6-7			1-4-5-6	1-2-4-7-8	
Communicate and Interact With the Crew	ALL	ALL		ALL	ALL		ALL	ALL	
Demonstrate Supervisory Ability (3)	ALL				ALL				
Comply With and Use Tech. Specs. (3)	2				3				

Notes:
(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: William J. Gross / 3/31/00
Chief Examiner: Hironori Peterson 4/24/2000

Facility: **PALISADES** Date of Exam: **22-MAY-00** Exam Level: **SRO**

	Item Description				Initial a	Initial b*	Initial c#	
1.	Questions and answers technically accurate and applicable to facility				wjg	RM	HP	
2.	a. NRC K/As referenced for all questions b. Facility learning objectives referenced as available				wjg	RM	HP	
3.	RO/SRO overlap is no more than 75 percent, and SRO questions are appropriate per Section D.2.d of ES-401				wjg	RM	HP	* done HP 5/18
4.	No more than 25 questions are duplicated from [practice exams, quizzes, and] the last two NRC licensing exams; enter the actual number of duplicated questions at right		NRC	Other	wjg	RM	HP	
			0	0				
6.	Bank use meets limits (no more than 50 percent from the bank, at least 10 percent new, and the rest modified); enter the actual question distribution at right	Bank	Modified	New	wjg	RM	HP	* Done HP 5/18
		~~49~~ 46 HP	~~40~~ 41 HP	~~11~~ 13 HP 5/18				
5.	[No (Less than 5 percent) question duplication from the license screening/audit exam (if independently written)]				wjg	RM	HP	
7.	Between 50 and 60 percent of the questions on the exam (including 10 new questions) are written at the comprehension/analysis level; enter the actual question distribution at right	Memory		C/A	wjg	RM	HP	* done HP 5/18
		~~45~~ 48 HP 5/18		~~57~~ 52 HP 5/18				
8.	References/handouts provided do not give away answers				wjg	RM	HP	* done 5/18 HP
9.	Question distribution meets previously approved examination outline; deviations are justified				wjg	RM	HP	
10.	Question psychometric quality and format meet ES, Appendix B, guidelines				wjg	RM	HP	* done 5/18 HP
11.	The exam contains 100, one-point, multiple choice items; the total is correct and agrees with value on cover sheet				wjg	RM	HP	

	Printed Name / Signature	Date	Post Prep-week
a. Author	William J. Gross / William J. Gross	3/31/00	
b. Facility Reviewer(*)	RICHARD MASSA / R Massa	4.6.00	
c. NRC Chief Examiner(*)	Hironori Peterson / Hironori Peterson	4-24-2000	HP 5/18/00
d. NRC Regional Supervisor(*)	David E. Hills / David E. Hills	4-24-2000	DEH 5/18/00

Note: * The facility reviewer's signature is not applicable for NRC-developed examinations; two independent NRC reviews are required.
See special instructions (Section E.2.c) for Items 1, 4, 5, and 6.
[ ] The items in brackets do not apply to NRC-prepared examinations.

* See specifics in ES-401-9: NOTED concerns on several questions pertaining to
  - psychometric quality
  - possibly direct look up questions, given references for certain questions
  - questionable categorization of question hierarchy (Fundamental / Comph/Anlysis)
  - questionable categorization of Bank & Modified
  - SRO only questions - some may be too basic

[will require some effort to resolve examiner questions/concerns with licensee pre-prepweek & during prepwk

Written Examination
Quality Checklist

Facility: **PALISADES** Date of Exam: **22-MAY-00** Exam Level: **RO**

	Item Description				Initial a	Initial b*	Initial c#	
1.	Questions and answers technically accurate and applicable to facility				wjg	RM	HP	
2.	a. NRC K/As referenced for all questions b. Facility learning objectives referenced as available				wjg	RM	HP	
3.	RO/SRO overlap is no more than 75 percent, and SRO questions are appropriate per Section D.2.d of ES-401				wjg	RM	HP	* HP done 5/18
4.	No more than 25 questions are duplicated from [practice exams, quizzes, and] the last two NRC licensing exams; enter the actual number of duplicated questions at right	NRC 0	Other 0		wjg	RM	HP	
5.	[No (Less than 5 percent) question duplication from the license screening/audit exam (if independently written)]				wjg	RM	HP	
6.	Bank use meets limits (no more than 50 percent from the bank, at least 10 percent new, and the rest modified); enter the actual question distribution at right	Bank ~~48~~ 46 HP	Modified ~~41~~ 42 HP	New ~~11~~ 12 5/18 HP	wjg	RM	HP	* Done 5/18 HP
7.	Between 50 and 60 percent of the questions on the exam (including 10 new questions) are written at the comprehension/analysis level; enter the actual question distribution at right	Memory ~~44~~ 48 HP 5/18	C/A ~~56~~ 52 HP 5/18		wjg	RM	HP	* done HP 5/18
8.	References/handouts provided do not give away answers				wjg	RM	HP	* done HP 5/18
9.	Question distribution meets previously approved examination outline; deviations are justified				wjg	RM	HP	
10.	Question psychometric quality and format meet ES, Appendix B, guidelines				wjg	RM	HP	* done 5/18 HP
11.	The exam contains 100, one-point, multiple choice items; the total is correct and agrees with value on cover sheet				wjg	RM	HP	

	Printed Name / Signature	Date	Post-prep week
a. Author	William J. Gross / William J. Gross	3/31/00	
b. Facility Reviewer(*)	RICHARD MASSA / RM	4.6.00	
c. NRC Chief Examiner(*)	Hironori Peterson / Hironori Peterson	4-24-2000	5/18/0
d. NRC Regional Supervisor(*)	David E. Hills / David E. Hills	4-24-2000	5/18/00

Note: * The facility reviewer's signature is not applicable for NRC-developed examinations; two independent NRC reviews are required.
See special instructions (Section E.2.c) for Items 1, 4, 5, and 6.
[ ] The items in brackets do not apply to NRC-prepared examinations.

* note: see info on SRO QA checklist.

Instructions

[Refer to Appendix B for additional information regarding each of the following concepts.]

1. Enter the level of knowledge (LOK) of each question as either (F)undamental or (H)igher cognitive level.

2. Enter the level of difficulty (LOD) of each question using a 1 - 5 (easy - difficult) rating scale (questions in the 2 - 4 range are acceptable).

3. Check the appropriate box if a psychometric flaw is identified:
   - The stem lacks sufficient focus to elicit the correct answer (e.g., unclear intent, more information is needed, or too much needless information).
   - The stem or distractors contain cues (i.e., clues, specific determiners, phrasing, length, etc).
   - The answer choices are a collection of unrelated true/false statements.
   - More than one distractor is not credible.
   - One or more distractors is (are) partially correct (e.g., if the applicant can make unstated assumptions that are not contradicted by stem).

4. Check the appropriate box if a job content error is identified:
   - The question is not linked to the job requirements (i.e., the question has a valid K/A but, as written, is not operational in content).
   - The question requires the recall of knowledge that is too specific for the closed reference test mode (i.e., it is not required to be known from memory).
   - The question contains data with an unrealistic level of accuracy or inconsistent units (e.g., panel meter in percent with question in gallons).
   - The question requires reverse logic or application compared to the job requirements.

5. Based on the reviewer's judgment, is the question as written (U)nacceptable (requiring repair or replacement), in need of (E)ditorial enhancement, or (S)atisfactory?

6. For any "U" ratings, at a minimum, explain how the Appendix B psychometric attributes are not being met.

(NOTE: Question #'s 1-20, 31-50, and 61-95 are COMMON to both RO and SRO exams. Question #'s 21-30, 51-60, and 96-100 are noted as specific RO and SRO only questions.)

ES-401 Written Examination Form ES-401-9
FACILITY: PALISADES Exam Date: May 26, 2000 Review Worksheet
COMMON QUESTIONS (RO&SRO) 1-10

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. U/E/S	6. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward		
1	H	2										S	
2	F	2										S	
3	H	3										S	
4	H	3		x		x						E	Need distractor balance per Appd. B.c.2.f. Stem asks for an effect, 3 dist have no effect only 1 has an effect. Potentially cues to the correct answer.
5	F	3				x						E	Initially thought to be Unsat. The reference did not support the answer. Also noted grammar help, and potential specific determiners, per Appd. B.C.2.m. The licensee was able to obtain appropriate reference to support answer.
6	F	2										S	
7	F	2										S	
8	F	1		x			x					U	Answer too obvious. A hole in containment is always a loss in cont. integrity. Suggested better dists, i.e., modify question to solicit I/A for breech of cont integrity. Question rewritten with better dists.
9	H	3	x	x								E	Don't add info that is not part of stem conditions as a conditional item in the dists. Add the conditions for clarification in the stem, i.e., SIAS and RAS conditions.
10	H	3										S	

LEGEND: acronyms

Appd	appendix
cont	containment
dist(s)	distractor(s)
I/A	immediate action
SIAS	safety injection actuation signal
RAS	recirculation actuation signal

Note: Highlighted LOK - H, determined to be more of fundamental level of knowledge.

FACILITY: PALISADES Exam Date: May 26, 2000

COMMON QUESTIONS (RO&SRO) 11-20

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. U/E/S	6. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward		
11	F	3							x			U	Don't ask specific sequence step of an action from subsequent action. What about I/A steps? Or ask what is the consequences of improper action for hyd/thermal shock. Question rewritten to ask reasons why.
12	F	3										S	Initially thought to be unsat, that there was too many items required from memory, i.e. memorize a table of data for valve lineup. Focus on a specific system condition, I/A, auto plant response, or limit to one or two items. Licensee noted a change in reference, was part of I/A step 10 of the reference procedure.
13	H	4										E	Try using whole numbers for dists. Is the question a test in use of a graph? There is less accuracy in reading a graph vice the use of the correct graphs.
14	H	3	x			x						E	Watch out for words such as "may occur". Need to be specific, otherwise unwanted assumptions may confuse.
15	F	3										S	(Note: post exam comment by applicants during exam, licensee found that the question stem needed a NOT to get the correct answer. Original question and ref supported the answer incorrectly.)
16	F	3										S	
17	H	2										S	
18	F	3				x	x					E	Initially thought to be unsat, for the reference was unclear. Not necessarily at TAF, so possibly dists C and D may be correct (possible three correct answers). Licensee clarified reference, noted only one correct answer. Question sat, suggested to capitalize the word "ALL" in the stem.
19	F	3										S	
20	F	2										S	

ACRONYMS:

TAF	top of active fuel
hyd	hydraulic

FACILITY: PALISADES Exam Date: May 26, 2000

COMMON QUESTIONS (RO&SRO) 31-40

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5.	6.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	U/E/S	Explanation
31	F	2		x		x						U	The answer is the only dist that has the cue "monitoring" as implied in the question stem "monitoring system". Reword dists. Also, dist C not credible, it implies an auto function to shutdown on high rad.
32	H	3							x			U	Not an I/A step, appears to require memorization of procedural steps. Better to ask systems concept question on what is use to isolate the Battery due to a fire.
33	H	4										S	Initially thought to be unsat, requires memorization of specific steps in EOP that are not I/A. Need to verify in learning objectives that this info is required from memory. Licensee noted it was required memory info. Accepted.
34	F	1				x						U	Not discriminating. Under any refuel problem, answer b will always be correct. Dists a &c not plausible, and question does not meet selected K/A. The question concerns T/S, but the K/A refers to EOP action. Question replaced to fit K/A.
35	H	1		x								U	Easy lookup question, no analysis for which NI power to use (50 or 49%), the results are the same. Learning objection uncertain, refers to T/S item? Not discriminating. Rewrote question to include understanding of NI power influence on graphs.
36	H	3										E	Instead of 5% level, what if it is at 15% level, would condensate pump still trip? (<35% causes cavitation)
37	H	3										S	
38	H	2										S	
39	H	2				x						E	Dist A may not be credible, no auto trip <15%. Appears dist B is always a true/correct statement no matter what the condition. Its I/A step, but order required?
40	F	3				x						E	Dist C, use one temperature, not a range of temperatures. Rather than memorization of setpoints, could make it more of a Why question.

FACILITY: PALISADES Exam Date: May 26, 2000

COMMON QUESTIONS (RO&SRO) 41-50

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. U/E/S	6. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward		
41	H	2				x						E	Dist must be positively stated statement, not a “should” - which implies that it may not do what it intends to do.
42	H	2										S	
43	H	3										S	
44	F	3										S	
45	F	2										S	
46	F	3	x				x					U	Each dist that could be used to isolate the discharge can be construed as correct, for the stem does not specify auto or manual action. Multiple answers. Clarified stem to read “automatically”.
47	H	3										S	
48	H	3										S	
49	H	3	x				x					U	Answer has added condition that is not in the stem - an assumption made in addition that is not taken into account for other dists. Need to better fit K/A. Rewrote to ask the effects to pressurizer level control.
50	H	3										U	The reference submitted does not answer the question. K/A fit? Technically placing a panel in service is not the same as loss or malfunction of controllers and positioners. Rewrote question to focus on malfunction condition will have on AFW pump P-8.

ACRONYMS:

AFW	auxiliary feedwater pump

FACILITY: PALISADES Exam Date: May 26, 2000
COMMON QUESTIONS (RO&SRO) 61-70

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. U/E/S	6. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward		
61	H	2										U	K/A not associated with temperature, but with steam pressure and power. Supplied reference has no bearing on answer. Changed K/A, and found better reference.
62	F	3										S	
63	H	3	x			x						E	Initially thought to be unsat, stem wording must be positive soliciting a required answer. Not something that may occur, "... if the transfer operation occurs too slowly." Dist C wording should be changed to reflect plant accepted wording, "runback".
64	H	1										U	Not discriminating. Direct lookup in graph - no calculations required. Better to calculated required boron addition to meet plant condition requirements. Question rewritten.
65	H	2	x			x						U	Dists C &D not credible - has no effect on A S/G pressure control. Need to clarify stem on status of A S/G being isolated.
66	H	2										S	
67	H	3										S	
68	F	2										S	
69	H	2										E	Dist A, positive wording, avoid "should". Either the action does or does not occur.
70	H	2	x									E	Clarify stem for grammar; use "projected", and delete the extra word "a".

NUREG-1021, Revision 8

Acronyms:

S/G	Steam Generator

FACILITY: PALISADES Exam Date: May 26, 2000

COMMON QUESTIONS (RO&SRO) 71-80

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5.	6.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	U/E/S	Explanation
71	H	2		x					x			E	Initially thought to be unsat. Memorize actions of subsequent action not I/A. Licensee assured that the information is required memory knowledge, and expected per learning objectives. Specific determiners, the answer is the only one specifically referring to actions and a procedure. Change rest of dists to balance with the answer, add appropriate procedure references to each dist.
72	H	3		x					x			U	Specific determiner, the correct answer stands out as being the only one with specific info, an alarm condition. Balance rest of dists. Question if this is I/A step? Not I/A step, but the learning objective notes I/A steps. Procedure changed, no longer I/A. Changed to why condition for annunciators.
73	F	3										S	
74	F	3										S	
75	H	2							x			U	Initially thought to be unsat. Looks like memorization of procedure steps in order. However, it is required knowledge for lineup sequence for tagging, and a portion of prints are given as reference to answer the question. Question accepted, but need to correct the answer for sequence, item 3 &4 is before item 2.
76	H	3										E	Initially thought to be unsat, cannot get answer from graph. But, identified that the labeling on the given graph was offset, whereby the potential to use the wrong curve. Graph corrected.
77	H	2										E	Initially thought to be unsat, for not an I/A but a subsequent action. Note learning objective states I/A, but procedures were changed to remove I/A. However, licensee assured the actions are expected from memory per lesson objectives. Need to clarify and balance out the dists.
78	H	2										E	Dist A not credible. Stem needs to be positive worded, not use "should". Not I/A step, should be more conceptual. Licensee noted it is required knowledge from memory per learning objectives. Accepted with proposed changes.
79	H	2										U	This is subsequent action, not I/A step. Not meet K/A, K/A asks for reasons why. Also, default answer type question, i.e., any condition given in stem - answer trip the reactor. Rewrote question to focus on reasons why the reactor must be tripped.
80	H	2										S	

FACILITY: PALISADES Exam Date: May 26, 2000

COMMON QUESTIONS (RO&SRO) 81-95

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. U/E/S	6. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward		
81	H	2										E	Originally thought to be unsat, not discriminating. Reviewed with licensee, enhance by changing dist D. Question acceptable.
82	F	2	x	x		x	x					U	Make the answer similar in style as other dists, remove additional position name. Not too discriminating. Dist A potentially also correct. The reference does not support the correct answer. Stem needs clarification to solicit the correct answer per supporting reference.
83	H	2										E	Dists B & D adds qualifying conditions, i.e., makes assumptions that is not part of the stem. Balance the answer with reasons why.
84	H	1										U	Another question asking procedure step that is not an I/A step. Also, this is another default type answer, i.e., anything wrong - then trip the reactor. Not discriminating. Does not fit the K/A. The K/A asks for reasons why an action or response. Rewrote question.
85	F	2										S	
86	H	2										S	Originally thought to be unsat, the reference did not support the answer. Licensee later was able to validate the question and answer.
87	F	2										E	Originally thought to be unsat, the question did not meet the selected K/A. Changed to a K/A that fit the question.
88	H	3										S	
89	H	3										S	
90	H	3										S	
91	H	2										S	
92	H	2										S	
93	F	3										S	
94	F	2										S	
95	F	3										S	

FACILITY: PALISADES Exam Date: May 26, 2000

SRO ONLY QUESTIONS 21-30

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5.	6.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	U/E/S	Explanation
21	F	2										S	
22	H	3										S	
23	F	2										S	
24	F	2		x				x				U	Per Appd B.C.1.g, the answer should not be direct wording from the reference text. Question does not fit selected K/A, no analysis need, straight memory. Need to give a situation an SRO would encounter.
25	F	2				x						E	Dist D, "NRC Resident Inspector" as a choice for plant authorization, not credible. Recommend changing dist D.
26	F	3		x								E	Specific determiner, the answer is the only choice that notes a specific accident. Balance the other dist to similarly note an accident type.
27	F	3	x									E	Recommend not to have a negatively stated question, i.e., "Except". Appd B.2.e. (NOTE: this question had a post exam comment, licensee proposed that there was no correct answer due to assumption of the meaning of "late" in the answer. NRC did not accept post exam comment, the answer was adequately clear to solicit the correct choice.
28	F	2										S	Originally thought to be unsat, question does not fit the selected K/A. The K/A related to T/S, but question concerned with Standing Orders. Licensee clarified that the Standing Order 54 issue was originally a T/S item, but was taken out of the T/S. However, the issue is still treated similarly as any other T/S item, LCO, etc., but maintained as a Standing Order. Question accepted.
29	F	2										S	
30	H	2										E	Not too discriminating, but acceptable.

FACILITY: PALISADES Exam Date: May 26, 2000

SRO ONLY QUESTIONS 51-60

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5.	6.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	U/E/S	Explanation
51	H	3										S	
52	F	2										S	
53	**H**	3	x			x	x	x				U	Answer not technically correct per supplied reference. Stem appears to have incorrect condition for the answer being sought. Should avoid negatively stated question, i.e., "NOT". Also, does not appear to be an SRO only type question, K/A does not include 10 CFR 55.43 item number. Licensee reverified technical accuracy, had to change dist and clarify stem. Licensee noted that diagnoses is expected of SRO for the EOP implementation. Adequate, question accepted for SRO only.
54	F	2										S	Low discriminating value for an SRO, but adequate.
55	H	3										U	Potential multiple correct answer. Dist D per given reference is also correct, unless specifically noted as "temporary". Also, dist A needed to be modified to be incorrect. Appeared not to be an SRO only type question. Needed to note it as more of a supervisory role. Licensee noted that the task in the question is a supervisor responsibility.
56	H	3										S	
57	H	3		x								E	Potential cues, the answer and one other dist notes "temporary", when the question asks about Temporary Modifications. Balance the other two dists, or remove the word temporary.
58	H	2										S	Originally thought dist B was also a correct answer. Licensee noted the specific requirement for EOP use at the facility prohibited dist B as a correct choice.
59	F	2						x				U	The question as originally written is not an SRO only function. Need to focus on SRO only responsibility. Licensee noted that it is facility expectation that the SRO make the decision. Question stem rewritten to focus on supervisor direction. Question adequate, accepted.
60	F	2						x				U	The question as originally written is not an SRO only function. Need to focus on SRO only responsibility. Question rewritten to focus on SRO required actions, i.e., make SRO signature requirement as it is specified in the plant documents.

FACILITY: PALISADES Exam Date: May 26, 2000

SRO ONLY QUESTIONS 96-100

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. U/E/S	6. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward		
96	H	3										S	
97	F	3										S	
98	H	2										S	
99	F	2										S	
100	H	2										S	

FACILITY: PALISADES Exam Date: May 26, 2000

RO ONLY QUESTIONS 21-30

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. U/E/S	6. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward		
21	F	2										S	
22	H	2		x								E	Based on attachments provided in the exam, if answer left as is (6 %/hr) the it is possibly a direct lookup. Minor change in stem requires calculation and new answer (5%/hr).
23	F	2										S	
24	F	1						x				U	Not discriminating in respect to reactor safety. Rewrote question to focus more on what is checked as important, rather than who checks the instruments.
25	F	3		x								E	Balance the dists. The answer and one dist notes a cue word, "VCT", as is in the stem.
26	F	2										S	Initially had question on basis for the time delay. Licensee clarified, question acceptable. Also, level of difficulty is not a "4".
27	F	2										S	Initially found sat as submitted by licensee. However, at prep week, licensee found potentially multiple answers. Licensee rewrote question. Found acceptable.
28	F	3										S	
29	F	2										E	Should try to avoid words such as "ONLY" in dists. Tendency for such words to focus on correct answer, similarly as noted in Appd B.2.m.(8) for suggesting a wrong option..
30	H	2	x	x		x						U	Answer had specific determiner, "immediately", unlike other dists. Clarify stem, last bullet not needed. Initially dists C & D thought to be not credible, but licensee noted these were based on actual event. Add to dist A so as not to be similar to dist C.

FACILITY: PALISADES Exam Date: May 26, 2000

RO ONLY QUESTIONS 51-60

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. U/E/S	6. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward		
51	F	3										S	
52	H	3	x			x	x					U	The justification of answer notes "using the override bypasses the extreme travel end limit switch." But the reference caution states, "All limit switches ... with the exception of extreme travel limit switches, are bypassed when the override key switch is activated." Appears to contradict answer justification. Reword dist A and answer C to note interlock removed. Stem clarified to solicit correct answer.
53	F	3	x									E	Recommend clarify stem and remove the word "Best" in best describes. It potentially implies that manual operation of the valve is alright. "Best" by who's standards?
54	F	2										S	
55	F	2										S	
56	H	3										S	
57	H	3				x						E	Dist. B & C, TBV closed, not credible for a turbine trip TBV always opens. At very low condenser vacuum TBV will not open (5" Hg). Recommend adjusting the condenser vacuum to 10" vice 14" Hg for better use and credibility for dists.
58	H	2		x		x						U	Another default (fail safe) type answer, if anything wrong - just trip the reactor, always potentially a correct choice. Enhance all the dists and answer, include other dists with reactor trips.
59	H	2										S	
60	F(H)	2										U	Initially thought that the question did not meet the selected K/A, conduct and verify valve lineup. Licensee noted the question is about requirements for locked valves, which is part of actions related to valve lineups. Adequate, question accepted for K/A. However, it is of low operational and discriminatory value. Rewrite to calculate the needed percent flow limitation and determine if valves are to be locked or not. Enhanced question from fundamental to higher level.

Acronyms:

TBV	turbine bypass valve

FACILITY: PALISADES Exam Date: May 26, 2000
RO ONLY QUESTIONS 96-100

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. U/E/S	6. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward		
96	H	3	x			x						E	Clarify stem, status of 5A, 5B, 6B heaters, questions may arise during exam. Also, add the word "WHY" at the end of the question. All the dists includes a why. Could improve dist C, to note, "to prevent exceeding the maximum extraction steam velocity." Which is true if 2 stages of feedwater heaters are bypassed, but the stem only notes bypassing one heater.
97	F	2										S	
98	F	3		x		x						U	The answer is too generic, not discriminating. Any refuel problems would require stopping fuel movement, the answer. Need to rewrite question.
99	H	3										S	Initially thought to be unsat, another fail safe "trip the reactor" question. Licensee noted the required analysis of data table, also dist B notes a reactor trip as with the answer. Adequate, acceptable question.
100	H	2										S	

NUREG-1021 FORM ES-403-1

ES-403 | Written Examination Grading Quality Checklist | Form ES-403-1

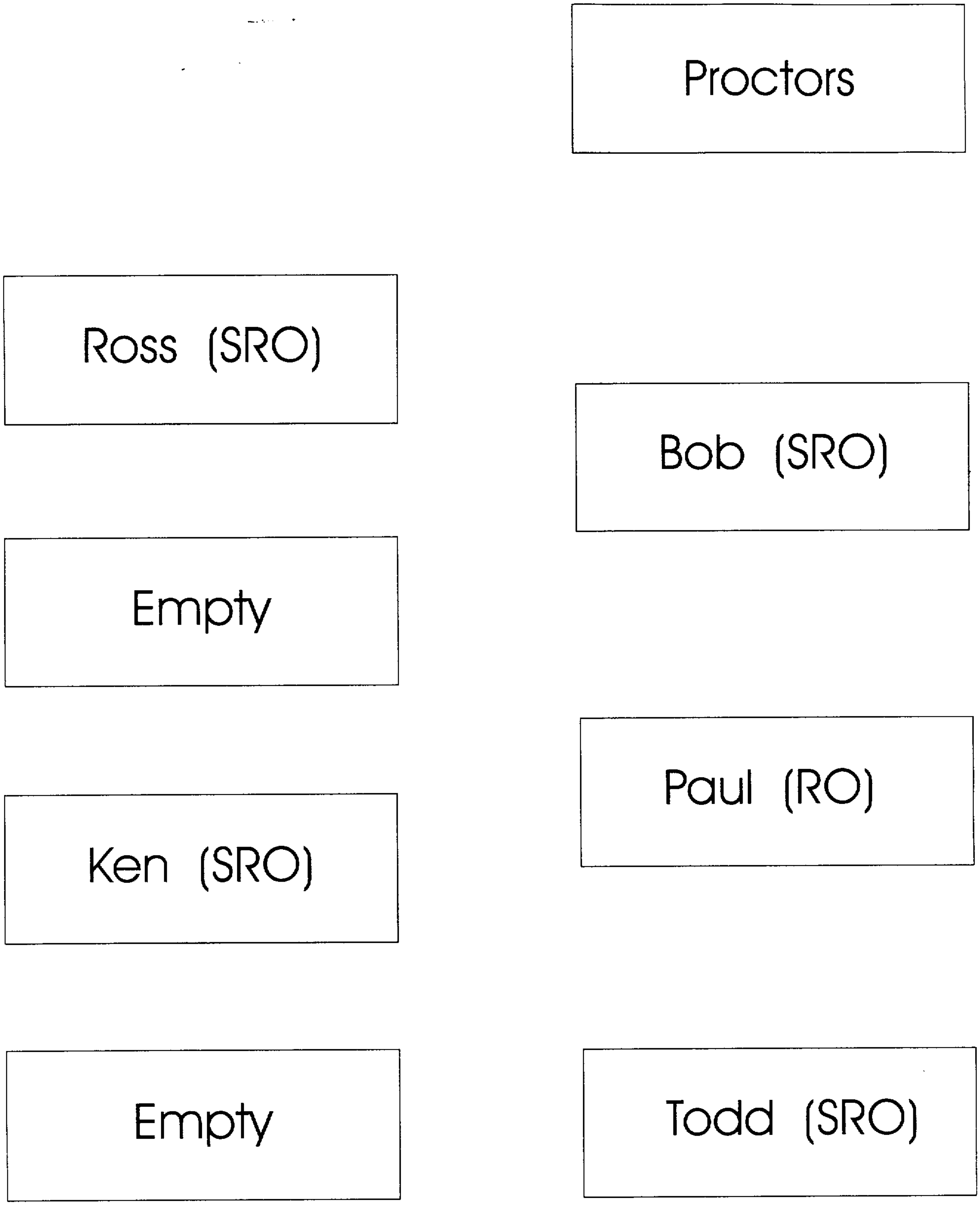
Facility:
Date of Exam:
Exam Level: RO/SRO

	Item Description	Initials a	Initials b	Initials c
1.	Answer key changes and question deletions justified and documented	DH	GB	HP
2.	Applicants' scores checked for addition errors (reviewers spot check > 25% of examinations)	DH	GB	HP
3.	Grading for all borderline cases (80% +/- 2%) reviewed in detail	N/A	N/A	NA
4.	All other failing examinations checked to ensure that grades are justified	N/A	N/A	NA
5.	Performance on missed questions checked for training deficiencies and wording problems; evaluate validity of questions missed by half or more of the applicants	DH	GB	HP

	Printed Name / Signature	Date
a. Grader	Darrell Hensley / Darrell Hensley	6/1/00
b. Facility Reviewer(*)	GERALD R BOSS / Gerald R Boss	6/1/00
c. NRC Chief Examiner (*)	Hironori Peterson / Hironori Peterson	6/12/00
d. NRC Supervisor (*)	David E. Hills /	6/25/00

(*) The facility reviewer's signature is not applicable for examinations graded by the NRC; two independent NRC reviews are required.

NRC 2000 Palisades Initial License Exam
Seating Chart



RO/SRO WRITTEN EXAM CANDIDATE COMMENTS

Palisades Post-Written Examination Candidate Comments

Common 1
"There is probably not enough heat generated from only one foot of core uncovery to achieve superheated conditions."

SRO 27
"There is no correct answer."

Common 37
"Question could be enhanced and made more clear by adding: 'to only the conditions above.'"

Common 44
"Needed more information on plant condtions and crew response. I had assumed that letdown had been isolated by the crew."

SRO 51
"Could clarify the stem to be 'per stated conditions' instead of a design basis function of the system."

End of Comments

RO/SRO WRITTEN EXAM ADMINISTRATION QUESTIONS

AND PROCTOR RESPONSES

Candidate Questions During Examination with Proctor Responses

Common 4
Based on the comments made at the exam brief, I can make the assumption that an alarm would be in with air pressure at 75 psig?

Proctor Response:
If it is your expectation that an alarm would be in at that value, then you could make the assumption.

Common 15
There is more than one correct answer. Three of these valves can be operated from C-33.

Proctor Response:
If you believe there is more than one correct answer, make a notation and select the most correct answer.

Are we sure that this question shouldn't have "NOT" located at C-33 in the question?

Proctor Response:
Did not know at the time the question was asked; will get back at earliest opportunity.

(Followup: It was determined that the wording of this question was incorrect and should have read as follows: "Which of the following valves associated with Reactivity Control can NOT be operated from Control Panel C-33?" Proctor reviewed the correction with each student on an individual basis to ensure they understood the change to the question.)

Common 36
When they say LIC-0701 failing high, are they talking about the input TO it, or the output FROM it?

Proctor Response:
Per the question wording, the output FROM it.

Also the same question from another candidate with the same response from the proctor.

Candidate Questions During Examination with Proctor Responses

Common 37
Is it asking what would happen if plant conditions were normal, or if SIS conditions existed?

Proctor Response:
If SIS conditions exist (conditions that would warrant an SIS).

Common 38
Is the intent of the question for the sequence of events to be as written?

Proctor Response:
Yes.

Common 44
What is the plant status?

Proctor Response:
No further information available.

Further clarification: Can I assume there was no operator action?

Proctor Response:
Assume crew responded per plant procedures.

Common 63
It appears that "A" and "B" are both correct, since loss of Y-01 will cause main feed pps. to ramp to minimum speed, which could cause a reactor trip on high pressurizer pressure.

Proctor Response:
Intent of question is for the conditions stated in the stem - i.e., does that cause the conditions given in the distractors?

Common 77
Does distractor "C" contradict conditions in the stem? (i.e., vacuum continues lowering). Does it mean that even if I do "C" actions that vacuum will continue lowering?

Proctor Response:
Intent of question is what are actions to be taken with conditions as stated in the stem.

Candidate Questions During Examination with Proctor Responses

RO 22
Is this question based on the old rates (per our attachment/reference), or on the actual current rates in the plant?

Proctor Response:
Answer the question based on your provided reference.

Is this a new core, or is it older than 5 days?

Proctor Response:
Assume we have been operating much longer than 5 days.

SRO 21
(Comment only) What they are really asking here is for the boron requirements, not really the margin requirements.

Proctor Response:
None required and none given.

SRO 22
What times are the shifts designed to start? Candidate offered A Shift , 2300-0700, B Shift from 0700-1500, etc.

Proctor Response:
Asked candidate if it makes a difference in how you would answer the question. Candidate then said he would answer, then ask a further question if necessary. No further questions were asked by the candidate for this question.

Am I to consider travel time?

Proctor Response:
No.

SRO 27
Does 1.5 hours late mean from turnover time, or from turnover time plus the 2 hour limit plus 1.5 hours.

Proctor Response:
Late means 1.5 hours beyond any required limit imposed.
(NOTE: A recommendation is being made to delete this question from the exam. Please see facility comments for additional description and justification.)

Candidate Questions During Examination with Proctor Responses

SRO 51
Conditions in the distractors - are they given based on the given plant conditions, or on the design basis function of the system?

Proctor Response:
Based on the design basis function of the system.

SRO 55
Distractor "C" - Does losing this 1 member make us drop below the minimum shift complement of Fire Brigade members?

Proctor Response:
Assume you started with a normal full shift complement of brigade members, and per conditions in "C", one goes home sick.

SRO 60
A candidate noted differences between parts of the stem: "CANNOT be moved" and "requirement to be moved". He thought they were contradictory statements.

Proctor Response:
Asked candidate to re-read the question. Candidate then stated he then understood the question.

SRO 91
Candidate wanted to know if this question had any correct answer, and asked if he was required to memorize procedure values for operating RHR.

Proctor Response:
Knowledge of system operating conditions may be required to answer the question.

SRO 100
Is this the only reference provided (T.S. 3.7.9)? Don't I get the associated Tech Spec Table? Otherwise, I would have to know what is meant by a subsystem.
(Note: This question was asked by two candidates.)

Proctor Response:
During validation, no need for an additional reference was identified.

Consumers Energy

A CMS Energy Company

Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

Tel: 616 764 2276
Fax: 616 764 3265

Nathan L. Haskell
Director, Licensing and
Performance Assessment

June 2, 2000

U.S. Nuclear Regulatory Commission
Region III
801 Warrenville Road
Lisle, IL 60532-4351

ATTN: David E. Hills - Chief, Operator Licensing Branch

PALISADES PLANT - POST EXAMINATION SUBMITTAL

Enclosed please find our post examination submittal regarding our Senior Reactor Operator (SRO) and Reactor Operator (RO) initial license written examinations that were administered on May 26, 2000. This submittal is being provided in accordance with NUREG-1021, ES-501, Section C1a, Revision 8, dated April, 1999.

If you have any questions, please contact the Palisades Plant Training Director, David Rogers, at 616-764-2906.

Sincerely,

Nathan L Haskell

Nathan L. Haskell
Director, Licensing and Performance Assessment

Enclosure

cc D. Rogers, Palisades Plant
P. Pitcher, Palisades Plant
H. Peterson, Region III, USNRC
Distribution File

Consumers Energy

A CMS Energy Company

Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

Patrick J. Pitcher - ILT Supervisor
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI. 49043

May 26, 2000

Hironari Peterson - Chief Examiner
U.S. Nuclear Regulatory Commission
Region III
801 Warrenville Road
Lisle, IL 60532-4351

Subject: Palisades Initial License Exam JPM SRO-A.2 & SRO-A.4 Critical Steps

Dear ~~Mr.~~ Pete Peterson,

Per our conversation regarding justification for not designating the steps in the subject JPMs as critical please review the following:

Admin JPM SRO-A.2 Step 22 was determined by Palisades Operations, Licensing and Training management to not be a critical step. AP 3.03 states at Section 7.2.2.b (enclosed) that the responsibility to make an Operability Determination does not reside solely with the Shift Supervisor. It is the expectation of plant management that the Shift Supervisor will solicit input from many diverse resources in order to make a correct determination. As such the JPM step should not be considered critical in the absence of extensive additional cues.

Admin JPM SRO-A.4 Step 7 was determined by Operations and Emergency Planning management to not be a critical step. Although it was agreed that it is critical to ensure the correct offsite agencies are notified by identifying those agencies to the communicator, EI-3 Attachment 1 (enclosed) is not where this identification is made. This activity takes place when the Shift Supervisor fills out EI-1 Attachment 2 (enclosed) and circles Mandatory (M) in Item 3, 4 and 7. EI-3 Attachment 1 Item 1 blocks are intended to be used by the communicator and are checked off as the notifications are made. The JPM step should not be considered critical as the critical activity (i.e. identifying which offsite agencies to notify) occurs in a separate procedure.

If you have any further questions please don't hesitate to contact me at (616) 764-2153.

Sincerely,

Patrick J. Pitcher

7.2 OPERABILITY/REPORTABILITY DETERMINATIONS AND OTHER SHIFT SUPERVISOR ACTIONS

7.2.1 Immediate Action

Upon notification of a condition requiring immediate action, the Shift Supervisor shall take the necessary corrective action(s) to ensure the safety and security of the Plant personnel.

7.2.2 Operability Determinations

Administrative issues involving currently or previously installed Plant equipment shall receive an operability determination. Conversely, administrative issues NOT involving Plant equipment may be checked N/A by the WCC/SS. Work Control Center staff may assist in these determinations.

a. An operability determination shall be made when a PIF/CR involves installed Plant equipment or equipment relied upon by the license in the FSAR, Technical Specifications, any plan or their implementing procedures (Emergency Plan, Security Plan, Emergency Implementing Procedures, Safeguard Procedures). Once a degraded or nonconforming condition of installed Plant equipment is identified, an operability determination shall be made as soon as possible, consistent with the safety importance of the affected equipment. Attachment 2, Page 1, shall be used to document this decision.

   - For equipment contained in the Technical Specifications, the Allowed Outage Time contained in the Technical Specification generally provides reasonable guidelines for safety significance.
   - For equipment not contained in the Technical Specifications, engineering judgement shall be used to determine safety significance.

The operability determination should address the effects of the described condition or event on the component and system now (currently) and in the past (previously). The need for past operability assessment is prompted by and documented on PIF/CR (Attachment 1). If the assessment has not been previously done and is needed to determine reportability, then past operability is considered and assigned in CRG. When a component or system may have been determined inoperable in past but has been determined operable now, an operability recommendation should be provided to justify how the factors effecting past operability have been corrected to meet its operability requirements. Considerations should demonstrate questioning attitude and may require engineering support. Attachment 2, "PIF/CR Operability Determination," should be used to describe and document these considerations.

The operability determination should be based on the best information available and must be predicated on the reasonable expectation that the equipment is operable and that the prompt determination process will support that expectation. When reasonable expectation does not exist, the equipment shall be declared inoperable and the safe course of action shall be taken.

If it is not clear that the operability determination can be promptly rendered (target 24 hours), the Initiator of the PIF/CR will discuss the issue with management for determination of safety significance and the assignment of an appropriate schedule for the completion of the operability determination. This review duration may be documented on Attachment 2, Page 2, "Engineering Operability Recommendation."

b. In all cases, the Shift Supervisor makes the initial operability determination and documents this determination. The Shift Supervisor may transfer control of operability to a WO, provided the WO specifies testing sufficient to demonstrate operability and he references the WO number. (Reference of a Work Request is not sufficient, see Palisades Administrative Procedure 5.01, "Processing Work Requests/WOs.")

This statement must not be construed to place the entire responsibility for the information needed to make the decision on the Shift Supervisor. It is expected that the SS will solicit information from knowledgeable sources. In particular, advice should be obtained from the Duty and Call Superintendent, other levels of Operations Management, Engineering, and Licensing. Site personnel are expected to support the operability decision-making process by providing information to the SS.

c. If the basis of operability requires significant engineering input even though it can be made promptly, then Page 2 of Attachment 2, "Engineering Operability Recommendation" should be used to describe and document the basis. It is expected that Systems Engineering would normally complete or support the completion of the basis.

d. CRs that include an Operability Determination which declared equipment inoperable and did not transfer control of operability to a WO, shall be returned to the SS for an Operability Reassessment. This determination shall be documented on Attachment 2, Page 3, "Operability Reassessment."

The original "Operability Reassessment" goes with the original CR. A copy of the "Operability Reassessment" shall be forwarded to the CAC or placed in the CR basket in the WCC.

7.2.3 Reportability Determinations

a. The Shift Supervisor shall determine prompt reportability and notification requirements in accordance with Attachment 3.

b. Notifications for nonemergency events determined to be reportable within one, four, and twenty-four hours shall be made via the Emergency Notification System (ENS) using the Event Notification Worksheet (Palisades Administrative Procedure 3.03, Attachment 4).

EMERGENCY NOTIFICATION FORM

REQUIRED INFORMATION

Approval:______________________ Date:__________ Time:__________

☐ This is a drill. ☐ This is not a drill.

From: ☐ CR ☐ TSC ☐ EOF

1. To: ☐ County Name: ______________________ Time: __________
☐ State Name: ______________________ Time: __________
☐ NRC Name: ______________________ Time: __________

2. PALISADES 2A. PLANT MESSAGE NUMBER__________

3. CLASS OF EMERGENCY
A. ☐ Unusual Event B. ☐ Alert C. ☐ Site Area Emergency D. ☐ General Emergency
E. This classification declared by Plant at: Time: __________ Date: __________
F. Initiating Conditions/Description of Event:

4. PLANT STATUS
A. ☐ Stable B. ☐ Degrading C. ☐ Improving
D. Additional Information:

5. RADIOLOGICAL RELEASE IN PROGRESS: ☐ YES ☐ NO

6. METEOROLOGICAL DATA
A. Wind Direction, Degrees From: ______ To: ______ B. Wind Speed, MPH: ______ C. Stability Class: ______
D. Three Downwind Sectors: __________ E. Precipitation: ☐ YES ☐ NO

7. PROTECTIVE ACTION RECOMMENDATIONS
A. ☐ YES ☐ NO
Note: If YES fill in following information.
B. PAR based on: ☐ Dose Calculations ☐ Plant Status ☐ Other__________
C. In-place Shelter (Areas) __________
D. Evacuation (Areas) __________

AS AVAILABLE

8. RADIOLOGICAL RELEASE DATA
A. Time release started__________ Projected duration of release__________
B. ☐ Airborne ☐ Waterborne ☐ Waterborne Analysis Attached
C. Effluent Points__________

D. Noble gas release rate, Ci/sec______	Sample______	Monitor______	Estimate______
E. Average energy per disintegration, MeV______	Sample______	Monitor______	Estimate______
F. Equivalent I-131 release rate, Ci/sec______	Sample______	Monitor______	Estimate______
G. Particulate release rate Ci/sec______	Sample______	Estimate______	

9. CALCULATED OFFSITE DOSES
A. ☐ Actual ☐ Potential
B. Based on: ☐ Monitor (in Plant) ☐ Sample (in Plant) ☐ Back Calculation from field data ☐ Other Plant Conditions
C. Calculated Dose Rate (mrem/hr)
Time of Calculation__________

Distance	TEDE (mrem/hr)	Adult Thyroid CDE (mrem/hr)
Site Boundary	______	______
2 Miles	______	______
5 Miles	______	______
10 Miles	______	______

D. Calculated Accumulated Dose (mrem)
Calculated Duration, Hours__________

Distance	TEDE (mrem)	Adult Thyroid CDE (mrem)
Site Boundary	______	______
2 Miles	______	______
5 Miles	______	______
10 Miles	______	______

E. Sectors Affected__________

10. MEASURED OFFSITE DOSE RATES

A. Distance	Time	Reading (mR/hr)	Affected Sector
Site Boundary	______	______	______
______miles	______	______	______
______miles	______	______	______
______miles	______	______	______

B. Additional Information

Proc No EI-1
Attachment 2
Revision 33
Page 1 of 1

EMERGENCY ACTIONS/NOTIFICATIONS

VENT TYPE (Circle one): UE / ALERT / SAE / GENERAL Date: _________

ITEM	ACTION (circle)	DESCRIPTION OF ACTION	REF	DONE?
1	M S I	Announce Emergency on PA	EI-3	
2	M S I	Sound Emergency Siren	EI-3	
3	M S I	Notify Van Buren County (within 15 min of declaration) See Notes 2 and 3 below	EI-3	
4	M S I	Notify State of Michigan (within 15 min of declaration) See Notes 2 and 3 below	EI-3	
5	M S I	Provide Protective Action Recommendation	EI-6.13	
6	M S I	Call Duty and Call Superintendent	N/A	
7	M S I	Notify NRC See Note 1 below	EI-3	
8	M S I	Perform Personnel Accountability - Notify Security at Ext 2278	EI-12.1	
9	M S I	Initiate Staff Augmentation - Notify Security at Ext 2278 See Note 4 below	EI-2.2	
10	M S I	Activate ERDS	SOP-34	
11	M S I	Initiate Onsite Monitoring	EI-8	
12	M S I	Activate Safeguards Contingency Procedures	N/A	
13	M S I	Perform Offsite Dose Assessment	EI-6.0	
14	M S I	Initiate Offsite Monitoring	EI-9	
15	M S I	Notify Public Affairs - Day @ 764-8931 Night @ 637-5170	EI-3	
16	M S I	Activate Fire Protection Plan	FPIPs	
17	M S I	Evacuate Nonessential Personnel	EI-13	
18	M S I	Notify Covert Fire Dept and Call Security @ 2278	EI-3	
19	M S I	Perform Core Damage Calculation	EI-11	
20	M S I	Perform Environmental Assessment	EI-10	
21	M S I	Perform Post Accident Sampling/Analysis	EI-7.0	
22	M S I	Initiate Re-entry/Recovery	EI-5	
23	M S I	Initiate Condition Report	Admin 3.03	
24	M S I	Monitor Severe Accident Management Guideline for Implementation	SAMGs	

LEGEND AND NOTES: M=MANDATORY S=SUBSEQUENT I=IF NEEDED

NOTES:
1. = 10CFR50.72(c) REQUIRES THAT CONSUMERS ENERGY "MAINTAIN AN OPEN, CONTINUOUS COMMUNICATION CHANNEL WITH THE NRC OPERATIONS UPON REQUEST OF THE NRC"
2. = 15 MINUTE UPDATES REQUIRED WHEN ABOVE UE
3. = REFER TO EI-3 ATTACHMENT 2, FOR BACKUP PHONE NUMBERS (IF NEEDED)
4. = FOR DAYSHIFT ON WEEKDAYS, SOUND THE EMERGENCY SIREN AND PERFORM PERSONNEL ACCOUNTABILITY ALL OTHER SHIFTS INCLUDING WEEKENDS AND HOLIDAYS, AUGMENT THE TELECOMPUTERS BY NOTIFYING THE SECURITY SHIFT LEADER WHO INITIATES (EXT 2278)

IOTE: Completed forms shall be transmitted to Plant Licensing within 24 hours.

Question Clarification Affecting the Initial Exam Grading

Mr. Peterson:

During the administration of the written exams, several comments were raised concerning question # 15. The student concern was that there were three correct answers and one incorrect and should there be a "NOT" included in the question stem.

The question and references were quickly researched and it was found that the question needed a "NOT" qualifier in the stem to have the intended correct answer.

The questions ("common" #15) were pen and ink changed and the following statement was written on the board:

> "...Reactivity Control can NOT be operated from Control Panel C-33."

The students were individually alerted to the change by the proctor to avoid a group distraction.

This attachment is not intended to replace the post exam comment package we will prepare for submittal but is rather intended to appraise you of a significant change made to the exams during their administration.

Bob Sailor

RO/SRO WRITTEN EXAM COMMENTS

WITH PROPOSED RESOLUTIONS

Plus NRC Resolution

LICENSEE POST EXAM COMMENTS
(WRITTEN EXAMINATION)

FACILITY: PALISADES
EXAMINATION DATE: MAY 26, 2000
RO AND SRO WRITTEN EXAMINATIONS

The licensee submitted two post examination comments that may affect the final grading of the written examination. Questions 15, common for both SRO and RO, and question 27, SRO only.

The licensee also submitted two other post examination comments that does not affect the grading of the written examination. These two questions (questions 1 and 44, common to both SRO and RO) were submitted only for future enhancement prior to inclusion into the NRC question bank.

QUESTIONS AFFECTING EXAM GRADING

Question No. 15 (RO/SRO Common)

Comment:
"This question was modified during the exam administration. It became apparent that there may be more than one correct answer due to the nature of the questions raised by the students. The simulator C-33 panel was observed and it became apparent that all valves except CV-2130 were located there. The question and answer were changed during the exam to preclude subsequent deletion of the question due to three correct answers. The word "NOT" was inserted in the question stem as follows:

> Which of the following valves associated with Reactivity Control can NOT be operated from Control Panel C-33?

The answer for the modified question now becomes "a"."

NRC Resolution:
Recommendation accepted.

During the NRC review and pre-verification of the examination material with the licensee, no comments were made on Question 15. The licensee's reference and verification assured that the original selected answer "c" was the correct answer. It was initially verified by the licensee that only the valve MO-2169, choice "c", was controlled from Control Panel C-33, and that the other three distractors were not controlled from the same panel. Based on recent licensee recommendation, verification of panel C-33, the original question was technically incorrect. An example of poor verification by the licensee prior to submitting the examination material to the NRC. Based on review of the licensee's recent justification for question No. 15, changes to the question was accepted. As administered examination was updated to include "NOT" in the question stem, and associated correct answer now becomes choice "a".

Question No. 27 (SRO Only)

Comment:
"Answer 'b' is not correct if a plausible assumption is made concerning the key word 'late'. If the candidate reasons that late is defined as *that time beyond the 2 hour limit*, then this condition becomes a non-emergency, 30 day reportable event and would require notification to the Duty and Call Superintendent. If the candidate assumes that late is defined as *that time beginning when the ill crew member relinquishes their control room duties*, then the condition does not violate Technical Specifications and therefore would not be in violation and would not require notification.

We request that question be deleted from the examination due to having no clearly correct answer.

It is also recommended that the question be modified to be clearly correct in the future by modifying answer 'b' to read as follows:

> if shift staffing is less than permitted by Technical Specifications due to an ill crew member being sent home and the replacement operator reports 1.5 hours after the person's departure."

NRC Resolution:
Recommendation to delete the question NOT accepted.

During NRC review of the examination material, the examiner's editorial comment recommended to avoid negatively stated questions, i.e., avoid "EXCEPT", but to query a positive response soliciting when you must make a notification. Also, during the NRC pre-examination verification the licensee assured the examiner and noted that the assumption of the 1.5 hours was within the technical specification time limit, therefore NO notification was warranted. The assumption made by the applicants and subsequently supported by the licensee was contrary to the answer and was not considered plausible. The answer was written in present tense, which noted that staffing was less than technical specifications for the crew member being sent home and that the replacement operator WILL BE 1.5 hours late. The answer implies that the replacement operator will not arrive for 1.5 hours, which was agreed upon with the licensee prior to the examination, which made choice 'b' correct. The assumptions made by the applicants during the exam administration was contrary to Appendix E, "Policies and Guidelines for Taking NRC Examinations," Part B, "Written Examination Guidelines," Item No. 7. The question and answer was considered appropriate and will not be deleted.

QUESTIONS NOT AFFECTING EXAM GRADING (Only Recommendation for Future Enhancement)

Question No. 1 (RO/SRO Common)

Comment:
"The determination of whether or not the CETs will indicate either superheated or saturated conditions is subject to further analysis based on the assumption of how much power was being produced at the top one foot of the core. It is debatable that enough decay heat is present in this area to cause superheated indication on the CETs. Answer modification is not suggested; however, the question would test with better reliability if the stem were modified as follows:

> When the top *two (2)* feet of the Reactor Core becomes uncovered..."

NRC Resolution:
Recommendation accepted.

The added clarification of two feet appears to reinforce the question and answer.

Question No. 44 (RO/SRO Common)

Comment:
"A candidate assumed that operator action would have occurred - including isolating letdown to enhance emergency boration. We recommend an enhancement to the question as follows:

> *Assuming no subsequent operator action occurs*, which of the following results in the greatest heat load on the Component Cooling Water System?"

NRC Resolution:
Recommendation accepted.

The added enhancement of no subsequent operator actions appears to reinforce the question and answer.

PALISADES POST EXAMINATION COMMENTS

RO/SRO WRITTEN EXAMS

The following comments address proposed changes to the RO and SRO written examinations administered May 26, 2000 at Palisades Nuclear Plant. Two questions (# 15 and #27) affect the final grading of the exam. The other questions included are for enhancement prior to inclusion into the NRC question bank.

Submitted: Darrell Hensley
Examination Author

Reviewed: Gerald R Boss
Operations Manager

Question: 15 (RO/SRO Common)

While implementing ONP-25.2, Alternate Safe Shutdown Procedure, the crew is taking actions for Reactivity Control.

Which of the following valves associated with Reactivity Control can be operated from Control Panel C-33?

a. Boric Acid Pump Recirc Valve, CV-2130

b. Charging Pumps Suction From SIRWT, MO-2160

c. Boric Acid Gravity Feed Valve, MO-2169

d. VCT Outlet Valve, MO-2087

Answer:

c. Boric Acid Gravity Feed Valve, MO-2169

Reference: ONP-25.2

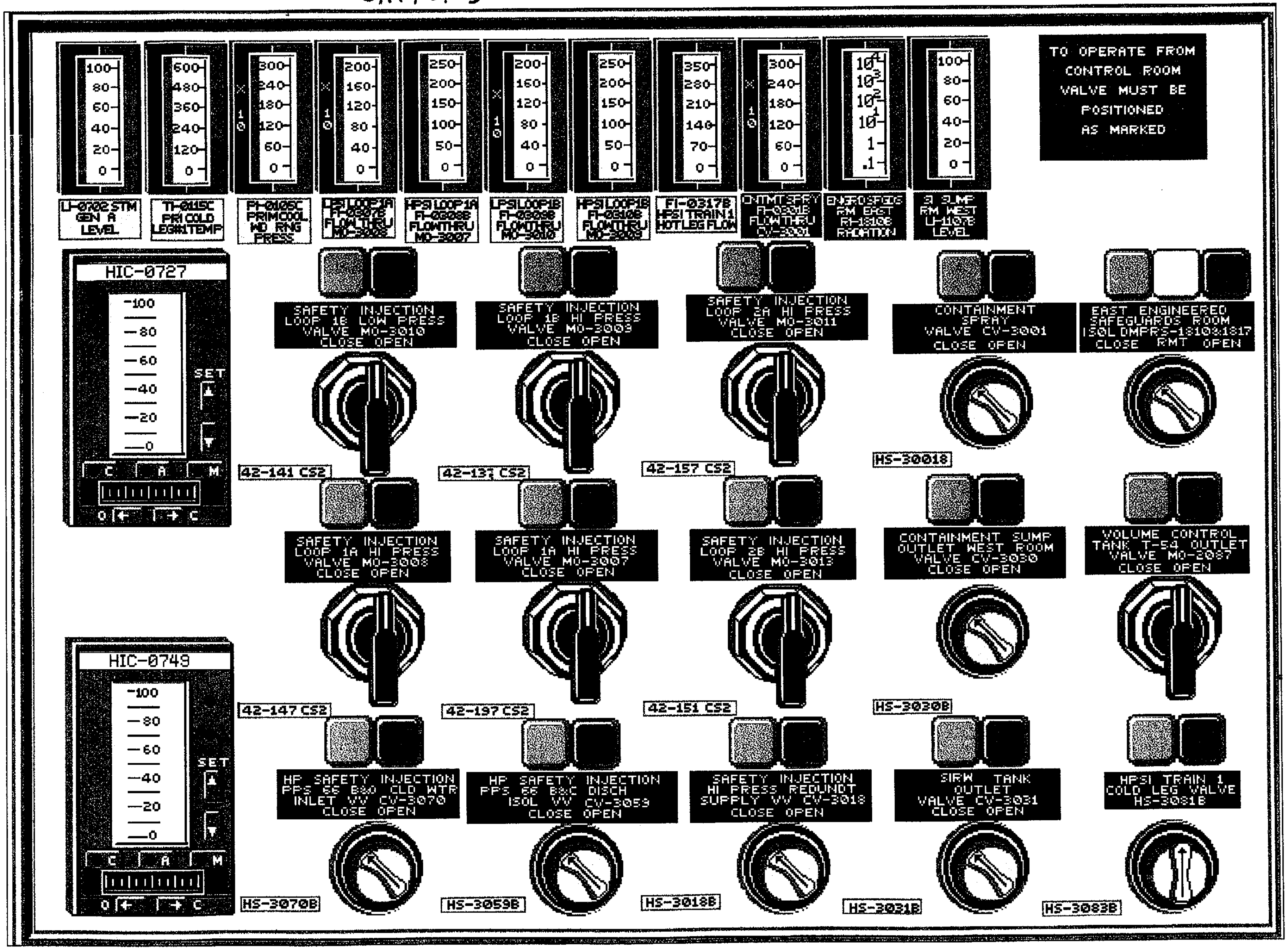
Comment: This question was modified during the exam administration. It became apparent that there may be more than one correct answer due to the nature of the questions raised by the students. The simulator C-33 panel was observed and it became apparent that all valves except CV-2130 were located there. The question and answer were changed during the exam to preclude subsequent deletion of the question due to three correct answers. The word "**NOT**" was inserted in the question stem as follows:

Which of the following valves associated with Reactivity Control can ***NOT*** be operated from Control Panel C-33?

The answer for the modified question now becomes "a".

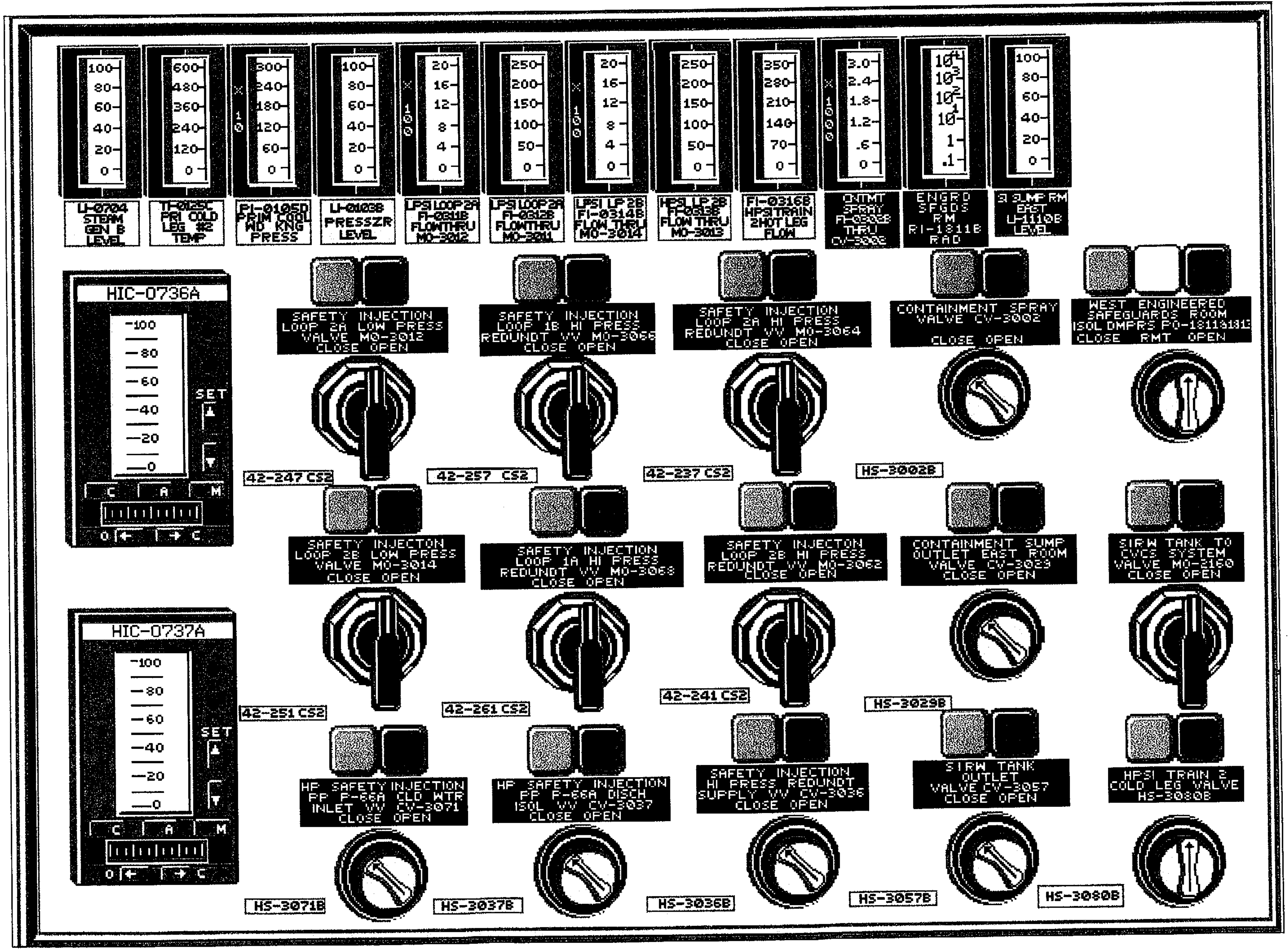
Reference: Attached drawings of Panel C-33

Question #15 (C-33 Drawings)
sh. 1 of 3



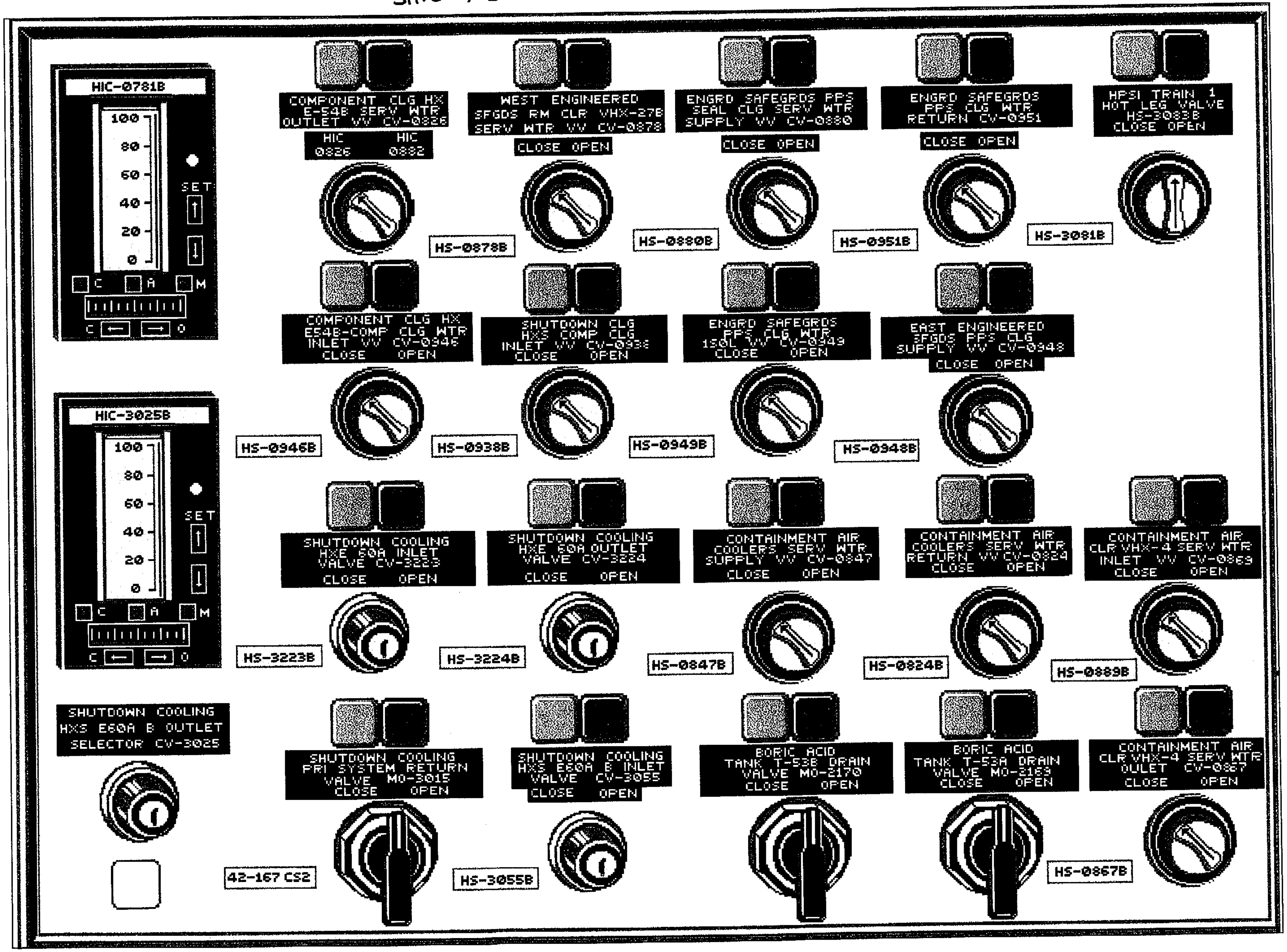
Simulator Graphics 267.pcx (pal17t1_)

Question # 15 (C-33)
sh. 2 of 3



Simulator Graphics 268.pcx (pal17t2_)

Question #15 (C-33)
sh.3 of 3



Simulator Graphics 269.pcx (pal17b1_)

Question: 27 (SRO Only)

The Duty and Call Superintendent is required to be notified for ALL of the following conditions **EXCEPT** ...

a. entry into ONP-5.1, Control Rod Drop, to recover a dropped rod at power.

b. if shift staffing is less than permitted by Technical Specifications due to an ill crew member being sent home and the replacement operator will be 1.5 hours late.

c. if work being performed by an outside contractor is progressing too slowly to be considered satisfactory as a result of poor interfacing.

d. for a 24-hour report to the NRC due to an unplanned contamination event that requires access to the contaminated area by workers be restricted by imposing additional radiological controls.

Answer:

b. if shift staffing is less than permitted by Technical Specifications due to an ill crew member being sent home and the replacement operator will be 1.5 hours late.

Reference: AP-4.00

Comment: Answer "b" is not correct if a plausible assumption is made concerning the key word "late". If the candidate reasons that late is defined as *that time beyond the 2 hour limit*, then this condition becomes a non-emergency, 30 day reportable event and would require notification to the Duty and Call Superintendent. If the candidate assumes that late is defined as *that time beginning when the ill crew member relinquishes their control room duties*, then the condition does not violate Technical Specifications and therefore would not be in violation and would not require notification.

We request that question be deleted from the examination due to having no clearly correct answer.

It is also recommended that the question be modified to be clearly correct in the future by modifying answer "b" to read as follows:

> "if shift staffing is less than permitted by Technical Specifications due to an ill crew member being sent home and the replacement operator *reports 1.5 hours after the person's departure."*

References: AP-4.00, 5.5.1.a.1 on page 66 of 78. (Attached)
AP-3.03, Attachment 3, 50.73(a)(2)(i)(B) on page 8 of 11. (Attached)

Question # 27

5.5 NOTIFICATION REQUIREMENTS

NOTE: Many Plant conditions and operating situations are of such nature that it may be necessary or prudent for the Shift Supervisor to promptly advise the Duty and Call Superintendent of the circumstances. The Shift Supervisor must utilize his or her judgement and experience in assessing the need for such notification, which implicitly includes obtaining advice, assistance, and direction from the Duty and Call Superintendent. The Duty and Call Superintendent may direct the Shift Supervisor to call the General Manager Plant Operations, or another Department representative.

5.5.1 Duty and Call Notification

a. The Shift Supervisor provides verbal notification to the Duty and Call Superintendent who provides counsel and follow up action for the following items:

1. Any reportable occurrences identified by Palisades Administrative Procedure 3.03, "Corrective Action Process," or Emergency Implementing Procedures.
2. Intended deviation from approved procedures related to nuclear safety under emergency conditions.
3. Conditions that require the use of Emergency Operating Procedures or Off Normal Procedures.
4. Abnormal status of Technical Specifications equipment or equipment that could jeopardize the facility's capacity to produce electrical power.
5. Inspections by regulatory agencies, such as the NRC (other than resident inspector), OSHA, State Inspectors, etc.
6. Problems related to other departments when attempts to contact the appropriate supervisor have failed.
7. Problems with contractors. The Duty and Call Superintendent acts as liaison between Consumers Energy and contractors if jobs are not progressing satisfactorily. The D&C may expedite the work activities by utilizing Plant personnel in the solution of problems.

PIF/CR REPORTABILITY DETERMINATION CHECKLIST

PALISADES NUCLEAR PLANT

REPORTABILITY DETERMINATION CHECKLIST
ONLY COMPLETE PAGES 1-7 FOR ONE, FOUR, AND TWENTY-FOUR HOUR REPORTS; PAGES 8-11 ARE FOR 30 DAY REPORTS

C-PAL- -

DESCRIPTION	YES	NO
§50.73 Licensee Event Report System	---	---
§50.73(a)(1) The holder of an operating license for a nuclear power Plant (licensee) shall submit a Licensee Event Report (LER) for any event of the type described in this paragraph within 30 days after the discovery of the event. Unless otherwise specified in this section, the licensee shall report an event regardless of the Plant mode or power level, and regardless of the significance of the structure, system, or component that initiated the event.	---	---
§50.73(a)(2)(i) The licensee shall report:		
(A) The completion of any nuclear Plant shutdown required by the Plant's Technical Specifications; or		
(B) Any operation or condition prohibited by the Plant's Technical Specifications; or		
(C) Any deviation from the Plant's Technical Specifications authorized pursuant to §50.54(x) of this part.		
§50.73(a)(2)(ii) Any event or condition that resulted in the condition of the nuclear power Plant, including its principal safety barriers, being seriously degraded, or that resulted in the nuclear power Plant being:		
(A) In an unanalyzed condition that significantly compromised Plant safety;		
(B) In a condition that was outside the design basis of the Plant; or		
(C) In a condition not covered by the Plant's operating and emergency procedures.		
§50.73(a)(2)(iii) Any natural phenomenon or other external condition that posed an actual threat to the safety of the nuclear power Plant or significantly hampered site personnel in the performance of duties necessary for the safe operation of the nuclear power Plant.		

Question: 1 (RO/SRO Common)

When the top one (1) foot of the Reactor Core becomes uncovered ...

a. CETs will indicate that saturated conditions exist.

b. CETs will indicate that superheated conditions exist.

c. incore NI readings will indicate abnormally low.

d. excore NI readings will indicate abnormally low.

Answer:

b. CETs will indicate that superheated conditions exist.

Reference: EOP-4.0
EOP-9.0
LP-ASGA

Comment: The determination of whether or not the CETs will indicate either superheated or saturated conditions is subject to further analysis based on the assumption of how much power was being produced at the top one foot of the core. It is debatable that enough decay heat is present in this area to cause superheated indication on the CETs. Answer modification is not suggested, however the question would test with better reliability if the stem were modified as follows:

"When the top *two (2) feet* of the Reactor Core becomes uncovered..."

Reference: Not Applicable

Question: 44 (RO/SRO Common)

Ten (10) minutes have elapsed since an inadvertent SIAS.

Which of the following results in the greatest heat load on the Component Cooling Water System?

a. Letdown Heat Exchanger

b. Primary Coolant Pumps

c. Shutdown Cooling Heat Exchangers

d. Spent Fuel Pool Heat Exchanger

Answer:

a. Letdown Heat Exchanger

Reference: FSAR Table 9-4

Comment: A candidate assumed that operator action would have occurred – including isolating letdown to enhance emergency boration. We recommend an enhancement to the question as follows:

"*Assuming no subsequent operator action occurs,* which of the following results in the greatest heat load on the Component Cooling Water System?"

Reference: Not Applicable

Consumers Energy

A CMS Energy Company

Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

April 6, 2000

Mr. Hironari Peterson
United States Nuclear Regulatory Commission
Region III
801 Warrenville Road
Lisle IL 60532-4351

Dear Mr. Peterson:

Per your request, this is the cover letter for the Palisades Nuclear Plant 2000 Initial Licensing Exam submittal. Accompanying this letter are the following items for the submittal:

- Operating Test Quality Checklist Form ES-301-3
- Two sets of the following (one for each group of candidates): Simulator Scenario Quality Checklist, Form ES-301-4 with accompanying Transient and Event Checklists, Form ES-301-5 and Competencies Checklist, Form ES-301-6
- Written Exam Quality Checklist, Form ES-401-7 (1 for SRO, 1 for RO)
- Updated Control Room Systems and Facility Walk-Through Test Outline, Form ES-301-2 for RO, SRO-1, SRO-U
- "Changes to Palisades Examination Outlines" to document which changes were made since outline submittal
- CD-ROM titled "Palisades Procedures - Information Copy, January 2000"
- Folder containing "Supplied Materials for Palisades Senior Reactor Operator Examination" and "Supplied Materials for Palisades Reactor Operator Examination"
- 125 Written Examination questions, including Data Sheets, required references, and Significantly Modified documentation (as appropriate)
- 4 Simulator Scenarios (Scenario 1, Scenario 2, Scenario 3, Spare Scenario)
- 30 JPMs (20 System, 10 Administrative)

Also, per NUREG 1021, rev. 8, ES-201, Attachment 1 these examination materials are to be withheld from public disclosure until after the examinations are complete.

Respectfully,

Mr. Richard Massa
Facility Reviewer

APR 10 2000

WALK-THROUGH JPMs

JPM # RO-B.1-04

- Replaced "Respond to a Control Rod Out-Of-Sequence Alarm" with "Perform Control Rod Drop Times Measurement" due to procedural ambiguity which may result in candidate taking an extremely long period of time to perform JPM (Validation time was nearly 1 hour) – No change to Safety Function

JPM # RO-B.1-05/SRO-B.1-05

- Replaced "Supply CCW to SFP Cooling with SIS Present" with "Supply SW Cooling to Engineered Safeguards Pumps" due to only having 1 critical step in original JPM – Change to Safety Function from Safety Function 8 to Safety Function 4S (same procedure used as original JPM, however) – Still meets necessary requirements for Safety Functions per ES-301.D.3.a

JPM # SRO-B.1-07

- Replaced "Adjust the Thermal Margin Monitors ΔT Power" with RO JPM #RO-B.1-07, "Adjust the Power Range Instrumentation," due to simulator not being modeled to determine/adjust required biasing for Thermal Margin Monitors – No change to Safety Function

JPM # RO-B.2-09/SRO-B.2-09

- Included RCA identifier "R" in Type Code since it was identified during validation that entry was required into the RCA for the performance of this JPM.

CHANGES TO PALISADES EXAMINATION OUTLINES

SCENARIOS

Scenario #1

- Changed order of several events due to requirement for crew to trip plant based on conditions during loss of Bus 1D
- Replaced PR Channel Failure in Scenario #1 with Steam Flow Transmitter Failure in Scenario #2 due to no Tech Spec requirements being addressed in Scenario #2 and a large number being addressed in Scenario #1

Scenario #2

- Replaced Steam Flow Transmitter Failure in Scenario #2 with PR Channel Failure in Scenario #1 due to no Tech Spec requirements being addressed in Scenario #2 and a large number being addressed in Scenario #1

Scenario #3

- Replaced Failure of Two Rods to Fully Insert with Failure of Reactor to Automatically or Manually Trip (from primary location) due to similarity between original malfunction in scenario and JPM for emergency boration (SRO JPM)

Scenario #SPARE

- Replaced Control Rod Exercising with Failed Closed MSR Valves due to Control Rod Exercising not meeting requirements for significant reactivity manipulations due to insufficient plant response

- Replaced VCT Level Control High Failure with Letdown Temperature Controller Failure due to no verifiable required responses by candidate to VCT level channel failure

- Deleted Cooling Tower Basin Low Level due to limitations of being able to simulate plant response

- Reordered several events to allow candidates opportunity to properly diagnose and respond to events

Proposal for Non-Transient Initiated (Planned) Power Changes in Evaluated Scenarios

Approximately a half hour prior to the students entering the simulator, inform the students that they will be given approximately 30 minutes to prepare for a plant power change. Inform them that the purpose for providing this time is to ensure that the evaluation time is spent measuring their ability to operate (and supervise the operation of) the controls the plant.

Provide them with the following information:

Plant Power Level

Target Power Increase/Decrease

PCS Boron Concentration

Cycle Age/EFPH

Xenon/Iodine Concentration (As Appropriate)

Target ASI (and whether Rx Engineering has increased the limit to ± .05, as applicable)

Inform them that they are expected to take this time to perform calculations as appropriate, perform procedure reviews (approved references will be available), and have any applicable discussions concerning task responsibilities or other important pre-job evolution information. This discussion is not meant to delete any appropriate <u>short</u> crew brief prior to the power change.

PALISADES INITIAL EXAM OUTLINE REVIEW (2/28-3/2/2000)
(NRC COMMENTS)

EXAM IN GENERAL

- NO PRA/IPE insights indicated in the overall exam outline (written, JPM, simulator scenario) **[updated submittal of the outline by the licensee per the Chief Examiner's request, now included PRA/IPE info]**

WRITTEN EXAM

(NOTE: Written exam for K/A outline review is satisfactory.)

- SRO & RO exam comparison:
  26 different questions for RO and SRO only [OK]
  74 common questions

- SRO exam - 9 K/As duplicated from last NRC exam - < 10% [OK]
  RO exam - 8 K/As duplicated from last NRC exam - < 10% [OK]

WALKTHROUGH EXAM

GENERAL COMMENT

- NO K/As on either the Admin or Systems JPMs **[updated submittal includes the K/As]**

- NO info of new, modified, or bank on the Admin JPMs

- Lack of details for JPM descriptions

ADMIN JPMs

• A.1 (RO/SRO) -	What is UFM correction factor?
• A.2 (RO) -	Develop tagout on a pump - I believe the licensee has a book practically detailing the tagout requirements (components,etc.) that is required to develop a tagout (not discriminating, if this is the case). No description, what kind of pump? Safety or Non-safety related equipment? ALSO, SIMILAR TO LAST NRC EXAM, i.e., tagout a pump.
• A.2 (SRO) -	Operability determination on T/S surveillance failure - no description, depends on what it is !?
• A.4 (SRO) -	Recommend adding classify the emergency along with PARs; due to time constraints will not classify scenario exam.

SYSTEMS JPMs

- B.1.a (RO/SRO) - What is CV-3025? No description.
- B.1.b (RO/SRO) - Start a primary coolant pump - no detail description, caution that it is not just start a lube oil lift pump and start the primary coolant pump - if it is, then not discriminating. What is the Alternate Path?
- B.1.c (RO/SRO) - Manually lower pzr press - Similar to scenario malfunction for pzr press control failure fails high and requires manual control. **(NUREG 1021, Section D.4.c, not to duplicate operations that will be tested during the W/T portion of the test.)**
- B.1.d (SRO) - Emergency Borate - Note: if add ATWS to simulator scenario, must ensure the mitigating action does not duplicate the JPM.
- B.1.f (SRO) - Manually initiate Cont. Spray - similar to scenario malfunction for failure of auto initiation of Cont. Spray. Better be more than just pushing a button. **(NUREG 1021, Section D.4.c, not to duplicate operations that will be tested during the W/T portion of the test.)**
- B.2.b (RO/SRO) - What is P-55C? No description. Is it a primary coolant pump, if so similar system as B.1.b.
- B.2.c (RO/SRO) - Local start of EDG - is this JPM part of a normal surveillance run of the diesel? Or is it an emergency/abnormal event start of the EDG? What is the alternate path? Just to start the diesel from the local panel is not an alternate path, it must have a failure that requires an alternate action to complete the given task.

DYNAMIC SIMULATOR EXAM

(NOTE: due to only having two examiners, exam scheduling will require change in crew makeup from three applicants per crew to two applicants and an surrogate operator. This change will require new ES-301-5's.)

GENERAL COMMENT

- Each scenario noted the SRO to classify the event, but due to time constraints, we will not require event classification after the scenarios. This will be covered in the Admin JPM. Remove classification requirements from scenarios.
- The scenario sets does not incorporate the use of at least one ECA or functional restoration procedure. **(NUREG 1021, Appendix D, Section C.2.g, "EOP Contingency Procedures Used.")**
- Two of the four scenarios submitted (three scenarios and a spare) does not incorporate a malfunction after the major transient (after EOP entry). **(NUREG 1021, Appendix D, Section C.2.c, Malfunctions After EOP Entry.)**

- Many of the single malfunction events are repeated from the last NRC exam. For example: Thot (hot leg #1 RTD) failure low, charging pump failure (trip), failure of letdown pressure control, S/G steam flow transmitter failure low, Pzr pressure control failure high, Pzr level control failure, feedwater flow transmitter failure, action (test vice failure) for turbine governor valve GV-3, and VCT level control failure high (was on last NRC W/T exam). Nine (9) out of 19 total malfunction events; 47% of single malfunction events were seen during the last NRC exam. [Although there is no specific requirement in the standards for the amount of duplication of scenario events from past exams, excessive duplication would lead to questions on appropriate discriminating value.]

- Based on review of the proposed Certification exam outline, it was identified that a large number of the similar and identical individual event malfunctions would be duplicated between the Certification exam and the NRC license exam. Approximately, 16 events out of 19 total events (only counting instrument and component failures) would be duplicated. See attached Cert exam ouline. The Chief Examiner requested this info from the licensee noting the anticiapted operating exams, both JPM and scenarios. **(NUREG 1021, ES-301, Section D.1.a; also, Quality Checklist ES-301-3, item 1.c, "General Criteria.")**

- Minimal Tech Spec compliance for scenarios 2, 3, and spare. [appears to be only one each]

- Lack of details in the scenario Turnover. For example, no indications of Tech Spec LCO status for given equipment failures in the initial conditions.

- The scenarios appear to be combinations of unrelated malfunctions of little or no actions required for mitigation. For example, scenario #1 Large break LOCA with loss of HPSI pump, the failure of a HPSI pump has no mitigation strategy due to the event will require mitigation in the use of the LPSI (RHR). **(NUREG 1021, Appendix D, Section C.2.c.)** [If there are some interrelations within the events, need to verify the extent.]

SCENARIO #1

- Two similar event malfunctions from last NRC exam: Thot failure, charging pump failure.

- Large Break LOCA with HPSI pump failure: no mitigation strategy to count the HPSI failure as a malfunction after EOP entry.

SCENARIO #2

- Three similar event malfunctions from last NRC exam: loss of letdown press control, main steam flow transmitter low failure on S/G, PZR pressure control failure.

- Depending on the details of the malfunction, the two events for the turbine system, high vibs on turbine requires turbine trip with failure of turbine to trip, should count as only one related system component malfunction with required mitigating actions. Fault on turbine which requires manual shutdown of turbine.

- NO malfunctions after entry into EOPs following the major transient. Recommend adding a malfunction that adds to the level of response to the SGTR, i.e., SGTR with loss of reactor coolant-subcooled recovery, SGTR without PZR pressure control (i.e, no spray, no PORVs).

- Also, this scenario starts with a HPSI pump inop, which helps in the mitigation of SGTR. One of the main actions for SGTR is to control the press and level of the ruptured SG, whereby securing of the HPSI pumps are mitigating actions.

SCENARIO #3

- Three similar event malfunctions from last NRC exam: PZR level control failure, feedwater flow transmitter failure, turbine governor valve GV 3 fails shut (last NRC exam had to perform a test on same valve).

SCENARIO # SPARE

- One similar event malfunction from last NRC exam: VCT level control failure.
- Reactivity event, control rod exercising - how much of a reactivity change and level of operator response to reactivity change is required or anticipated in performing this test?
- NO malfunctions after entry into EOPs following the major transient.
- Calculate PCS leak rate due to a PCS leak is a malfunction in one of the scenarios. This is duplicated in the Admin JPM task, A.1.a, "Determine Primary System Leakage Rate." **(NUREG 1021, Section D.4.c, not to duplicate operations that will be tested during the W/T portion of the test.)**

Summary of Palisades Facility Reviewer's Final Comments for Initial License Exam

Exam Item	Facility Reviewer's Comment	Comment Disposition
Common 64	Maximum rod worths can also be provided by Reactor Engineering.	Added bullet to stem: "Reactor Engineering support not available."
Common 82	Immediate overexposure problems are also identified through the Corrective Action Process, which also involves the Control Room Supervisor.	Clarified stem by inserting: "not an immediate overexposure problem."
RO 24	For certain surveillances and instruments the maximum and minimum range is also checked.	Clarified stem by adding the word: "ALWAYS".
RO 27	Use of term "core" for refueling is not accurate. Should be "reactor".	Changed "core" to "reactor" in stem.
Scenario 2, Event 5, p. 13	Either the RO or the TURB operator can perform the PCS Heat Removal check.	Changed position specified to RO/TURB
JPM SRO A.1-1	It is reasonable to return the document (EM-04-08, Att.1) to the originator to re-perform at the time the first error is identified.	Added cue: "Continue the review to identify any additional mistakes."
JPM SRO A.1-2	Resetting the UFM Correction Factors is optional if the Plant is to be taken offline. (GOP-8, Att.1, 2.2 NOTE)	Added clarification to Initiating Cues that this is a planned power reduction to 50%.

Summary of Palisades NRC Written Examination Changes

QUESTION NUMBER	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
Common 4	*RECOMMENDED CHANGE* Consider balancing of distracters to eliminate correct answer appearing different from others	*NO CHANGE*
Common 5	*REQUIRED CHANGE* Additional reference required to be identified and included	Reference identified and included.
Common 8	*REQUIRED CHANGE* Revise to address failure of Containment Isolation	Revised several distracters, including correct answer to increase discriminatory value.
		REVALIDATION COMMENT Change distracter 'a' to indicate 3.7 psig vice 4.0 psig since breech of integrity might be considered to exist until isolation verified and minor word clarification in distracter 'b'
Common 9	*RECOMMENDED CHANGE* Revise stem to indicate that RAS has also occurred	Revised stem to indicate that RAS has already occurred. Clarified confusion regarding surge tank level in stem.
Common 11	*REQUIRED CHANGE* Revise to address reasons rather that actual performance	Revised question to reflect reasons for SW alignment prior to starting pump rather than performance of alignment
		REVALIDATION COMMENT Change condition in stem to clarify that a complete loss of power has occurred
Common 12	*REQUIRED CHANGE* Include EOP-1 as an additional reference	Incorporated EOP-1 as additional reference.
Common 14	*RECOMMENDED CHANGE* Consider changing "may" to "will" in stem	*NO CHANGE*
Common 18	*REQUIRED CHANGE* Revise stem to identify words "all" in BOLD/CAPS	Capitalized and bolded ALL in two locations in stem.

Summary of Palisades NRC Written Examination Changes

QUESTION NUMBER	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
Common 31	*REQUIRED CHANGE* Move portion of distracter "d" to stem for better discrimination	Moved information from distracter "d" to stem.
Common 32	*REQUIRED CHANGE* Revise to address reasons rather that actual performance	Developed new question to address reasons for operating shunt trip instead of when shunt trip is operated.
		REVALIDATION COMMENT Change wording in distracter 'a' from "trip" to "isolate" to indicate an intentional action and clarify distracter 'c' to indicate ALL loads disconnected
Common 33	*REQUIRED CHANGE* Add LP-TBAC as reference to identify requirement for operators to know natural circulation parameters	Included lesson plan TBAC as additional reference.
Common 34	*REQUIRED CHANGE* Either replace question to better match KA or replace KA and question	Replaced question with newly developed question to raise discriminating value and replaced KA with 0322.1.11 (sample plan requirements still met).
Common 35	*REQUIRED CHANGE* Revise question to make more discriminating	Revised question to make more discriminating.
Common 37		*NOTE: IDENTIFIED BY PALISADES EXAM TEAM* Moved attached drawing to reference package and identified reference package in stem.
Common 39	*RECOMMENDED CHANGE* Consider changing distracter "a" from automatically trip reactor to manually trip reactor	*NO CHANGE*
Common 41	*RECOMMENDED CHANGE* Consider rewording of distracter "d" to better match other distracters	Reworded distracter "d" to better match other distracters.
Common 46	*REQUIRED CHANGE* Add "automatically" to stem and replace distracter "d"	Added "automatically" to stem and replaced distracter "d" with another valve.

Summary of Palisades NRC Written Examination Changes

QUESTION NUMBER	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
Common 49	*REQUIRED CHANGE* Revise to address result of alignment rather than alignment	Revised question to give correct distracter in stem and ask response of plant to conditions rather than cause of given plant conditions.
Common 50	*REQUIRED CHANGE* Revise to address reasons rather that actual performance	Revised question to address results of placing aux shutdown panel in service.
Common 61	*REQUIRED CHANGE* Replace KA with 045K5.17 and determine additional references to justify answer	Replaced KA. Included LP-ASEA as reference to identify change in temperatures when lowering power.
Common 63	*REQUIRED CHANGE* Make stem more positive and clarify distracter "c"	Revised stem and distracter "c" to make statements more positive.
Common 64	*REQUIRED CHANGE* Revise question to make more discriminating	Revised question to ask different area of same concept.
Common 65	*RECOMMENDED CHANGE* Consider adding condition to stem to identify prior isolation of ruptured SG	Added bullet in stem to clarify that SG has been isolated.
Common 67	*REQUIRED CHANGE* Move question attachment to reference package	Moved attached drawing to reference package and identified reference package in stem.
Common 70	*RECOMMENDED CHANGE* Typographical error in stem	Corrected typographical error.
Common 71	*REQUIRED CHANGE* Add procedure references to distracters "a", "c", and "d"	Added procedure references to distracters.
Common 72	*REQUIRED CHANGE* Add alarm conditions to all distracters to make them similar	Added alarms to all distracters to make them similar.
Common 73	*RECOMMENDED CHANGE* Consider capitalizing two words in stem	Capitalized CLOSE and OPEN in stem.
Common 75	*REQUIRED CHANGE* Correct sequence in distracter "a" and move question attachment to reference package	Corrected typographical error in distracter "a", moved attached drawing to reference package and identified reference package in stem.

Summary of Palisades NRC Written Examination Changes

QUESTION NUMBER	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
Common 77	*REQUIRED CHANGE* Revise distracters "a" and "b" to provide better discrimination	Revised wording in distracters "a" and "b" to make more discriminating and revised wording in stem to make more positive statement. *REVALIDATION COMMENT* Clarify wording in next to last bullet in stem
Common 78	*REQUIRED CHANGE* Replace distracter "a" to provide better discrimination since this is the only non-action	Replaced distracter "a" with an action to make more discriminating
Common 79	*REQUIRED CHANGE* Revise to address reasons rather that actual performance	Revised question to address reasons for tripping the plant.
Common 81	*REQUIRED CHANGE* Revise distracter "d" to provide better discrimination	Revised distracter "d" to make question more discriminating.
Common 82	*REQUIRED CHANGE* Revise distracter "c" to provide better discrimination	Revised distracter "c" to make more discriminating. Verify with validation that "a" is NOT correct.
Common 83	*REQUIRED CHANGE* Add information to distracters "a" and "c" to provide more consistency with other distracters	Added conditions to distracters "a" and "c" to make more consistent.
Common 84	*REQUIRED CHANGE* Revise to address reasons rather that actual performance	Revised question to address reasons for tripping the plant.
Common 86	*REQUIRED CHANGE* Change difficulty rating to "3"	Changed difficulty rating to "3" and replaced reference.
Common 87	*REQUIRED CHANGE* Replace KA with 015K4.05	Replaced KA.
Common 92	*RECOMMENDED CHANGE* Consider capitalizing word in stem	Capitalized PRIOR in stem.

Summary of Palisades NRC Written Examination Changes

QUESTION NUMBER	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
RO 22	*RECOMMENDED CHANGE* Consider changing stem slightly to provide different answer	Changed power level at time=90 minutes to cause ramp rate to be different than ramp limit. Capitalized and bolded "rate" in stem for clarification.
RO 24	*REQUIRED CHANGE* Revise to provide requirements for issuing test equipment	Revised question to address responsibilities of operator issuing equipment rather than who is responsible.
		REVALIDATION COMMENT Replace instrument name in stem with correct instrument due to recent change in operations use
RO 27		*NOTE: IDENTIFIED BY PALISADES EXAM TEAM* Revised to ensure only one correct answer is possible.
		REVALIDATION COMMENT Corrected typo in first bullet in stem
RO 30	*REQUIRED CHANGE* Revise distracters to provide additional actions for each	Deleted last bullet in stem and added response to actions in distracters "a" and "b".
RO 52	*REQUIRED CHANGE* Revise wording of correct answer to make more discriminating	Revised wording of distracters "a" and "c" to make question more discriminating.
		REVALIDATION COMMENT Change wording in stem question to reflect results rather than consequences since this is an intentional action taken
RO 53	*RECOMMENDED CHANGE* Delete "best" from stem to remove implication of subjectivity	Deleted "best" from stem.
RO 57	*REQUIRED CHANGE* Change final condenser vacuum condition to 10"Hg vice 14"Hg	Changed final value of condenser vacuum.

Summary of Palisades NRC Written Examination Changes

QUESTION NUMBER	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
RO 58	*REQUIRED CHANGE* Include procedure references in each distracter	Included procedure references in all incorrect distracters to make similar to correct answer.
RO 60	*REQUIRED CHANGE* Revise to provide a condition which would require a judgement	Revised question to make comprehensive level question requiring candidate to make judgment.
RO 98	*REQUIRED CHANGE* Replace question with a control room manning situation	Replaced with a control room manning requirement question and replaced objective.
RO 99	*REQUIRED CHANGE* Typographical error in distracter "b"	Corrected typographical error in distracter "b".

Summary of Palisades NRC Written Examination Changes

QUESTION NUMBER	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
SRO 24	*REQUIRED CHANGE* Revise to include tables/times to make higher order	Developed new question to incorporate same concept while requiring candidates to calculate times.
SRO 25	*RECOMMENDED CHANGE* Consider replacing distracter "d" to make more credible	Replaced distracter "d" to make distracter more plausible
SRO 26	*RECOMMENDED CHANGE* Add clarifier to distracters "a", "b", and "c" for consistency	Added clarifiers to distracters to make consistent with correct answer
SRO 53	*REQUIRED CHANGE* Determine if any correct answer exists and revise if necessary	Replaced distracter "d" and made "d" the correct selection to ensure only one correct answer.
SRO 55	*REQUIRED CHANGE* Include explanation of supervisory role of SRO in implementing FPIPs	Included information in stem to identify as an SRO requirement and added clarifying information in distracters "a" and "d"
SRO 57	*RECOMMENDED CHANGE* Add "temporarily" to distracters "a" and "b" for consistency	Added "temporarily" to two distracters to make more consistent with other distracters
SRO 59	*REQUIRED CHANGE* Include explanation of supervisory role of SRO in implementing contamination control	Included information in stem to identify as an SRO requirement
SRO 60	*REQUIRED CHANGE* Revise to give condition where SRO must make determination to sign permit	Revised question to provide situation where judgement of SRO is required to determine whether permit should be signed

Summary of Palisades NRC Simulator Examination Changes

SCENARIO EVENT NUMBER	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
1/4 (SPARE)	Delete Event 4 since not required due to Surrogate filling position	Deleted Event 4 and renumbered Events 5, 6, and 7 as Events 4, 5, and 6, respectively
1/2 (SPARE)	Identify specific TS items to be addressed	Identified Item 2 for TS 3.17.1 and Items 12 and 18 for TS 3.17.6
1/4 (SPARE)	Add action for RO to close High Capacity SW valves to Containment due to inadequate Critical Header pressure	Added action for RO to close High Capacity SW valves to Containment due to inadequate Critical Header pressure
1/3 (SPARE)		*REVALIDATION COMMENTS* Reflect potential that charging flow may not be restored to full 44 gpm due to high level existing
1/4-5 (SPARE)		*REVALIDATION COMMENTS* Identify most likely position to perform identified actions – has no effect on requirements for minimum performance criteria for individual operators

Summary of Palisades NRC Simulator Examination Changes

SCENARIO EVENT NUMBER	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
2/1	Add step to identify RO requirement to dilute/withdraw rods	Added step to Event 1 to identify requirement for RO to dilute/withdraw rods
2/3	Identify specific TS items to be addressed	Identified Item 2 for TS 3.17.1 and Items 12, 15, and 16 for TS 3.17.6
2/5	Add note which cues AO report if contacted to verify turbine vibration due to Condition Report on Turbine Vibration Recorder	Added cue that, if addressed, AO reports that Control Board Recorder readings are correct.
2/7	Add allowance to cooldown PCS by opening MSIV bypass to use Turbine Bypass Valve	Added information to identify possibility of opening MSIV bypass to use Turbine Bypass Valve
2/9	Add new event to require entry into EOP-9	Added stuck open code safety valve on ruptured SG as Event 9 to require entry into EOP-9
2/3		*REVALIDATION COMMENTS* Change Tech Spec reference from TS Table 3.17.1 (Item 2) to 3.17.1.2
2/7		*REVALIDATION COMMENTS* Change note to reflect reason for potentially re-entering EOP-1 would be for re-diagnosis
2/3-5-7		*REVALIDATION COMMENTS* Identify most likely position to perform identified actions – has no effect on requirements for minimum performance criteria for individual operators

Summary of Palisades NRC Simulator Examination Changes

SCENARIO EVENT NUMBER	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
3/Turnover	Change conditions to provide sense of urgency to perfom power reduction	Changed shift orders to reflect requirement to lower load due to concerns with FW Pump problems
3/Turnover	*IDENTIFIED BY EXAM TEAM.* Change TS reference due to recent TS change.	Deleted reference to TS 3.2.2 due to recently being deleted from plant TS program
3/2	Delete credit for RO component failure	Deleted credit for SRO and RO component failure due to being continuation of SRO and RO instrument failure. SRO and RO requirements still met for component failures.
3/Events	Re-order event numbers for clarification	Re-ordered Event 8 as Event 6 and Events 6 and 7 as Events 7 and 8.
3/Setup	*IDENTIFIED BY EXAM TEAM.* Revise setup conditions for Event 8	Revised Setup conditions for Event 8 based on changes to Event.
3/5	Add step to identify RO requirement to insert rods	Added step to Event 5 to identify requirement for RO to insert rods as immediate action to restore Tave to Tref
3/8	Modify event to provide failure of CHP to actuate, resulting in failure of CIS, SIAS, and Containment Spray	Modified Event 8 to require manual actuation of CHR and SIAS by TURB operator and alignment of Containment Spray by RO
3/5		*REVALIDATION COMMENTS* Correct typo and insert additional comment "as time permits" regarding rod insertion in the event crew makes decision to trip reactor before actions can be taken to insert rods
3/7		*REVALIDATION COMMENTS* Change note to reflect reason for potentially re-entering EOP-1 would be for re-diagnosis

Summary of Palisades NRC Simulator Examination Changes

SCENARIO EVENT NUMBER	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
3/8		*REVALIDATION COMMENTS* Indicate that it is acceptable to initiate CHR isolation by depressing either one or both push buttons
3/5-7-8		*REVALIDATION COMMENTS* Identify most likely position to perform identified actions – has no effect on requirements for minimum performance criteria for individual operators

Summary of Palisades NRC JPM Examination Changes

JPM	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
Admin A1-1	Remove portion of cue which describes actions to be taken following review of attachment	Removed portion of cue.
Admin A1-2	Add initiating cue and steps to require candidate to determine UFM is to be removed from service.	Revised one word in cue from "remove" to "check" *REVALIDATION COMMENT* Include GOP-8 in initiating cue as this is the driving document for GOP-12
Admin A2	Include surveillance as part of initiating cue and require candidate to determine operability requirement and associated paperwork.	Included surveillance and changed candidates requirements. *REVALIDATION COMMENT* Include note in Step 2 that attachments 1 and 2 can be performed in any order
Admin A3	Replace JPM with another Radiological Control JPM or two questions.	Replaced JPM with 2 Radiation Protection related questions. Original validated JPM replaced as not being a task of sufficient discriminatory value.
Admin A4	Include requirement to classify event as well as determining PAR for event.	Included requirement to classify event as well as determine PAR. *REVALIDATION COMMENT* Correct attachment numbers in Steps 1 and 13. Delete Step 6 as being a Critical Step since for purposes of JPM it is not critical whether candidate identifies whether it is a drill or not

Summary of Palisades NRC JPM Examination Changes

JPM	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
JPM B1-1	Add note to first step that candidate can either determine which keys are required prior to starting JPM or as candidate works through JPM.	Minor revision which adds note to Step 1 for examiner clarification
JPM B1-2	1) Change title of JPM to reflect outcome of JPM rather than original intent. 2) Add information to initial conditions. 3) Add two alarms to body of JPM.	Changed title, added initial conditions, and added alarms.
JPM B1-3	JPM is considered faulted, but not Alternate Path. Revise/replace.	Deleted references to being Alternate Path JPM and revised JPM to reflect normal exercising of equipment.
JPM B1-4	Add "if opened previously" to step requiring closure of valve	Added suggested wording.
JPM B1-5	Add two alarms to body of JPM.	Added two alarms as suggested. *REVALIDATION COMMENT* Add simulator operator instructions to reset CHP, as necessary during setup
JPM B1-6	*IDENTIFIED BY EXAM TEAM.*	Replaced original JPM B.1-6 with this JPM.

Summary of Palisades NRC JPM Examination Changes

JPM	NRC VALIDATION COMMENTS	DISPOSITION OF NRC VALIDATION COMMENTS
JPM B1-7	Add steps to determine if post-calibration adjustment is required to be performed rather than telling candidate to perform adjustment.	Added steps to require candidate to determine which NIs require adjustment and to record "before adjustment" data.
		REVALIDATION COMMENT Correct typo in Steps 1 and 2
JPM B2-8	Add note explaining that fuses are installed and pump started by other operators	Added note to clarify this condition.
JPM B2-9	Add step/note/cue to verification of breaker operation that candidate should also verify operation of pump.	Included note that candidate should also be expected to verify pump operation by contacting Control Room or observing pump.
JPM B2-10	1) Change cue in 3rd from last step that if candidate contacts SS for guidance, to require candidate to make judgment call. 2) Add expected alarms as cues for examiners. 3) Add additional step to verify raw water pressure. 4) Change cue to add requirement to monitor DG after being started.	1) Changed failure and alternate path step to allow alternate success path to start DG. 2) Added alarms as cue. 3) Added additional non-critical step to verify raw water pressure. 4) Changed cue to requirement to monitor DG.

cc: H. Peterson

January 20, 2000

Mr. Thomas J. Palmisano
Site Vice President and General Manager
Palisades Nuclear Generating Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

Dear Mr. Palmisano:

In a telephone conversation on January 20, 2000, between Mrs. A. M. Stone and Mr. P. Pitcher, arrangements were made for the administration of licensing examinations at the Palisades Nuclear Power Plant the week of May 22, 2000. In addition, the NRC will make an examination validation visit to your facility the week of May 1, 2000.

As agreed during the telephone conversation, your staff will prepare the examinations based on the guidelines in Revision 8 of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors." The NRC regional office will discuss with your staff any changes that might be necessary before the examinations are administered.

To meet the above schedule, it will be necessary for your staff to furnish the examination outlines by February 28, 2000. The written examinations, operating tests, and the supporting reference materials identified in Attachment 2 of ES-201 will be due by April 3, 2000. Pursuant to 10 CFR 55.40(b)(3), an authorized representative of the facility licensee shall approve the outlines, examinations, and tests before they are submitted to the NRC for review and approval. All materials shall be complete and ready to use. Any delay in receiving the required examination and reference materials, or the submittal of inadequate or incomplete materials, may cause the examinations to be rescheduled.

In order to conduct the requested written examinations and operating tests, it will be necessary for your staff to provide adequate space and accommodations in accordance with ES-402, and to make the simulation facility available on the dates noted above. In accordance with ES-302, your staff should retain the original simulator performance data (e.g., system pressures, temperatures, and levels) generated during the dynamic operating tests until the examination results are final.

Appendix E of NUREG-1021 contains a number of NRC policies and guidelines that will be in effect while the written examinations and operating tests are being administered.

To permit timely NRC review and evaluation, your staff should submit preliminary reactor operator and senior reactor operator license applications (Office of Management and Budget (OMB) approval number 3150-0090), medical certifications (OMB approval number 3150-0024), and waiver requests (if any) (OMB approval number 3150-0090) at least 30 days before the first examination date. If the applications are not received at least 30 days before the examination date, a postponement may be necessary. Signed applications certifying that all training has been completed should be submitted at least 14 days before the first examination date.

This letter contains information collections that are subject to the *Paperwork Reduction Act of 1995* (44 U.S.C. 3501 et seq.). These information collections were approved by the Office of Management and Budget, approval number 3150-0101, which expires on September 30, 2000.

The public reporting burden for this collection is estimated to average 500 hours per response, including the time for reviewing instructions, gathering and maintaining the data needed, writing the examinations, and completing and reviewing the collection of information. Send comments on any aspect of this collection of information, including suggestions for reducing the burden, to the Information and Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, or by Internet electronic mail at BJS1@NRC.GOV; and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0101), Office of Management and Budget, Washington, D.C. 20503.

The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

Thank you for your cooperation in this matter. Mr. P. Pitcher has been advised of the policies and guidelines referenced in this letter. If you have any questions regarding the NRC's examination procedures and guidelines, please contact H. Peterson at 630-829-9707, or me at 630-829-9733.

Sincerely,

David E Hills

David E. Hills, Chief
Operations Branch

Docket No. 50-255
License No. DPR-20

cc: R. Fenech, Senior Vice President, Nuclear
Fossil and Hydro Operations
N. Haskell, Director, Licensing
R. Whale, Michigan Public Service Commission
Michigan Department of Environmental Quality
Department of Attorney General (MI)
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ES-201 Examination Preparation Checklist Form ES-201-1

Facility: PALISADES Date of Examination: May 23-26, 2000

Examinations Developed by: [✓ Facility] / NRC (circle one)

Target Date*	Task Description / Reference	Chief Examiner's Initials
-180	1. Examination administration date confirmed (C.1.a; C.2.a & b)	
-120	2. NRC examiners and facility contact assigned (C.1.d; C.2.e)	
-120	3. Facility contact briefed on security & other requirements (C.2.c)	
-120	4. Corporate notification letter sent (C.2.d)	
[-90]	[5. Reference material due (C.1.e; C.3.c)]	
-75	6. Integrated examination outline(s) due (C.1.e & f; C.3.d)	
-70	7. Examination outline(s) reviewed by NRC and feedback provided to facility licensee (C.2.h; C.3.e)	
-45	8. Proposed examinations, supporting documentation, and reference materials due (C.1.e, f, g & h; C.3.d)	
-30	9. Preliminary license applications due (C.1.l; C.2.g; ES-202)	
-14	10. Final license applications due and assignment sheet prepared (C.1.l; C.2.g; ES-202)	
-14	11. Examination approved by NRC supervisor for facility licensee review (C.2.h; C.3.f)	
-14	12. Examinations reviewed with facility licensee (C.1.j; C.2.f & h; C.3.g)	
-7	13. Written examinations and operating tests approved by NRC supervisor (C.2.i; C.3.h)	
-7	14. Final applications reviewed; assignment sheet updated; waiver letters sent (C.2.g, ES-204)	
-7	15. Proctoring/written exam administration guidelines reviewed with facility licensee and authorization granted to give written exams (if applicable) (C.3.k)	
-7	16. Approved scenarios, job performance measures, and questions distributed to NRC examiners (C.3.i)	

* Target dates are keyed to the examination date identified in the corporate notification letter. They are for planning purposes and may be adjusted on a case-by-case basis in coordination with the facility licensee.

[ ] Applies only to examinations prepared by the NRC.

Examination Outline
Quality Checklist

Facility: **PALISADES** Date of Examination: **22-May-00**

Item	Task Description	Initials a	Initials b*	Initials c	
1. WRITTEN	a. Verify that the outline(s) fit(s) the appropriate model per ES-401.	WJG	RM	HP	
	b. Assess whether the outline was systematically prepared and whether all knowledge and ability categories are appropriately sampled.	WJG	RM	HP	
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	WJG	RM	HP	
	d. Assess whether the repetition from previous examination outlines is excessive.	WJG	RM	HP	
2. SIM	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, and major transients.	WJG	RM	HP	
	b. Assess whether there are enough scenario sets (and spares) to test the projected number and mix of applicants in accordance with the expected crew composition and rotation schedule without compromising exam integrity; ensure each applicant can be tested using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s)*, and scenarios will not be repeated over successive days.	WJG	RM	HP	
	c. To the extent possible, assess whether the outline(s) conform(s) with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D.	WJG	RM	HP	**
3. W/T	a. Verify that: (1) the outline(s) contain(s) the required number of control room and in-plant tasks, ✓ (2) no more than 30% of the test material is repeated from the last NRC examination, ✓ (3)* no tasks are duplicated from the applicants' audit test(s), and ✓ (VIA licensee info) (4) no more than 80% of any operating test is taken directly from the licensee's exam banks. ✓	WJG	RM	HP	
	b. Verify that: (1) the tasks are distributed among the safety function groupings as specified in ES-301, (2) one task is conducted in a low-power or shutdown condition, ✓ (3) 40% of the tasks require the applicant to implement an alternate path procedure, ✓ (4) one in-plant task tests the applicant's response to an emergency or abnormal condition, and ✓ (5) the in-plant walk-through requires the applicant to enter the RCA. ✓	WJG	RM	HP	
	c. Verify that the required administrative topics are covered, with emphasis on performance-based activities.	WJG	RM	HP	
	d. Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on successive days.	WJG	RM	HP	
4. GENERAL	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam section.	WJG	RM	HP	★
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	WJG	RM	HP	
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	WJG	RM	HP	★
	d. Check for duplication and overlap among exam sections.	WJG	RM	HP	+
	e. Check the entire exam for balance of coverage.	WJG	RM	HP	
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	WJG	RM	HP	

	Printed Name / Signature	Date
a. Author	William Gross	2/11/00
b. Facility Reviewer(*)	RICHARD MASSA	2.25.00
c. Chief Examiner	Hironori Peterson	2/29/00
d. NRC Supervisor	David Hills / David Hills	3-1-00

(*) Not applicable for NRC-developed examinations.

** NOT All scenarios have malfunctions following EOP entry, Major Malf/Transient NOT require entry into ECA's or Functional Restoration Procedures.

+ Appears to be two tasks duplicated for W/T to SIM

★ verbal confirmation via telecon with licensee - will verify once licensee Fedex info by 3/2/00.

SUBMITTAL OF THE OUTLINE FOR THE

PALISADES EXAMINATION THE WEEK OF MAY 22, 2000

Facility: **PALISADES** Date of Examination: **22-May-00**

Examination Level: **RO** Operating Test Number: ____

	Administrative Topic/Subject Description	Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	CONDUCT OF OPERATIONS	Determine Primary Coolant System Leakage Rate
		Reset the UFM Correction Factor
A.2	EQUIPMENT CONTROL	Develop Caution Tags for an Inoperable Pump
A.3	RADIATION CONTROL	Monitor Equipment Removal from the RCA
A.4	EMERGENCY PLAN	Obtain Meterological Data for Emergency Notification Form

Facility: **PALISADES** Date of Examination: **22-May-00**

Examination Level: **SRO-I/U** Operating Test Number: ______

	Administrative Topic/Subject Description	Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	CONDUCT OF OPERATIONS	Verification of the Compensation Required for a Withdrawn, Inoperable Control Rod
		Reset the UFM Correction Factor
A.2	EQUIPMENT CONTROL	Complete Operability Determination for a Failed Technical Specification Surveillance
A.3	RADIATION CONTROL	Monitor Equipment Removal from the RCA
A.4	EMERGENCY PLAN	Determine Protective Action Recommendations

Facility:	**PALISADES**	Date of Examination:	**22-May-00**
Examination Level:	**RO**	Operating Test Number:	

B.1 Control Room Systems

	System/JPM Title	Type Code*	Safety Function
a.	Test Cycle CV-3025	NS	2
b.	Start a Primary Coolant Pump	MASL	4P
c.	Manually Lower Pressurizer Pressure	NAS	3
d.	Respond to a "Control Rod Out-of-Sequence" Alarm	DS	1
e.	Supply CCW to SFP Cooling with SIS Present	NSL	8
f.	Sample Containment for Hydrogen	MASL	5
g.	Adjust the Power Range Instrumentation	DS	7

B.2 Facility Walk-Through

	System/JPM Title	Type Code*	Safety Function
a.	Perform CCW Thermal/Hydraulic Shock Prevention Actions	DLR	8
b.	Operate P-55C from Bus 13	M	2
c.	Locally Start and Load 1-1 Diesel Generator	MAL	6

*Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol Room, (S)imulator, (L)ow-Power, (R)CA

Facility: **PALISADES** Date of Examination: **22-May-00**

Examination Level: **SRO-I** Operating Test Number: ______

B.1 Control Room Systems

System/JPM Title	Type Code*	Safety Function
a. Test Cycle CV-3025	NS	2
b. Start a Primary Coolant Pump	MASL	4P
c. Manually Lower Pressurizer Pressure	NAS	3
d. Emergency Borate	MAS	1
e. Supply CCW to SFP Cooling with SIS Present	NSL	8
f. Manually Initiate Containment Spray	DS	5
g. Adjust the Thermal Margin Monitors ΔT Power	DS	7

B.2 Facility Walk-Through

a. Perform CCW Thermal/Hydraulic Shock Prevention Actions	DLR	8
b. Operate P-55C from Bus 13	M	2
c. Locally Start and Load 1-1 Diesel Generator	MAL	6

*Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol Room, (S)imulator, (L)ow-Power, (R)CA

Facility: **PALISADES**	Date of Examination: **22-May-00**
Examination Level: **SRO-U**	Operating Test Number:

B.1 Control Room Systems

System/JPM Title	Type Code*	Safety Function
a. Test Cycle CV-3025	NS	2
b. *NOT REQUIRED - SRO UPGRADE*		
c. Manually Lower Pressurizer Pressure	NAS	3
d. *NOT REQUIRED - SRO UPGRADE*		
e. *NOT REQUIRED - SRO UPGRADE*		
f. Manually Initiate Containment Spray	DS	5
g. *NOT REQUIRED - SRO UPGRADE*		

B.2 Facility Walk-Through

a. Perform CCW Thermal/Hydraulic Shock Prevention Actions	DLR	8
b. *NOT REQUIRED - SRO UPGRADE*		
c. Locally Start and Load 1-1 Diesel Generator	MAL	6

*Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol Room, (S)imulator, (L)ow-Power, (R)CA

SUBMITTAL OF THE OUTLINE FOR THE

PALISADES EXAMINATION THE WEEK OF MAY 22, 2000

Facility:	**PALISADES**	Date of Exam:	**22-May-00**	Exam Level:	**RO**

Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	
1 Emergency & Abnormal Plant Evolutions	1	2	2	3	▨	▨	▨	3	4	▨	▨	2	16
	2	2	2	4	▨	▨	▨	3	4	▨	▨	2	17
	3	1	0	1	▨	▨	▨	1	0	▨	▨	0	3
	Tier Totals	5	4	8	▨	▨	▨	7	8	▨	▨	4	36
2 Plant Systems	1	3	2	1	2	2	2	2	3	2	2	2	23
	2	2	2	2	2	1	2	2	2	1	2	2	20
	3	1	1	1	2	0	0	0	0	1	1	1	8
	Tier Totals	6	5	4	6	3	4	4	5	4	5	5	51

3 Generic Knowledge and Abilities	Cat 1	Cat 2	Cat 3	Cat 4	
	4	3	3	3	13

Notes:

1 Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).

2 Actual point totals must match those specified in the table.

3 Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.

4 Systems/evolutions within each group are identified on the associated outline.

5 The shaded areas are not applicable to the category/tier.

6* The generic K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.

7 On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.

ES-401	PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1	Form ES-401-4

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000005 Inoperable/Stuck Control Rod / 1						2.1.25	Obtain/interpret station reference materials (Inoperable/Stuck Rod)	2.8	1
000015/17 RCP Malfunctions / 4			3				RCP Malfunctions: Tripping reactor and RCP	3.7	1
CE/A13 Natural Circ. / 4		2					Natural Circulation Operations: Heat removal systems and proper operation	3.4	1
000024 Emergency Boration / 1			1				Emergency Boration: When emergency boration is required	4.1	1
000026 Loss of Component Cooling Water / 8					2		Loss of Component Cooling Water: Cause of loss	2.9	1
000027 Pressurizer Pressure Control System Malfunction / 3				1			Pressurizer Pressure Control Malfunctions: PZR heaters, sprays, PORVs	4.0	1
000040 (CE/E05) Steam Line Rupture - Excessive				12			Steam Line Rupture: RCS pressure and temperature	4.2	1
CE/A11 RCS Overcooling - PTS / 4			2				RCS Overcooling: Procedures associated with RCS Overcooling	2.9	1
000051 Loss of Condenser Vacuum / 4					2		Loss of Condenser Vacuum: Reactor and/or turbine trip	3.9	1
000055 Station Blackout / 6	2						Station Blackout: Natural circulation cooling	4.1	1
000057 Loss of Vital AC Elec. Inst. Bus / 6				1			Loss of Vital AC Instrument Bus: Manual inverter swapping	3.7	1
000062 Loss of Nuclear Service Water / 4						2.4.24	Loss of cooling water procedures (Loss of SW)	3.3	1
000067 Plant Fire On-site / 9					16		Plant Fire on Site: Equipment/control systems maintained/operated during fire	3.3	1
000068 Control Room Evac. / 8		1					Interrelations between Control Room Evacuation and Auxiliary shutdown panel	3.9	1
000069 Loss of CTMT Integrity / 5					1		Determine/interpret a Loss of Containment Integrity	3.7	1
000074 Inad. Core Cooling / 4	3						Inadequate Core Cooling: Processes for removing decay heat	4.5	1
K/A Category Totals:	2	2	3	3	4	2	Group Point Total:		16

ES-401	PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2	Form ES-401-4

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000003 Dropped Control Rod / 1			4				Dropped Control Rod: Actions contained in EOP for dropped control rod	3.8	1
000007 (CE/E02) Reactor Trip - Stabilization - Recovery / 1						2.4.1	EOP entry conditions and immediate action steps (Reactor Trip)	4.3	1
000008 Pressurizer Vapor Space Accident / 3					20		Pressurizer Vapor Space Accident: Open PORV or code safety	3.4	1
000009 Small Break LOCA / 3	2						Small break LOCA: Use of steam tables	3.5	1
000011 Large Break LOCA / 3				16			Large Break LOCA: Balancing of HPI loop flows	3.5	1
000022 Loss of Reactor Coolant Makeup / 2				9			Loss of Reactor Coolant Pump Makeup: RCP seal flows, temperatures, pressures, and vibrations	3.2	1
000025 Loss of RHR System / 4	1						Loss of Residual Heat Removal System during all modes of operation	3.9	1
000029 Anticipated Transient w/o Scram / 1		6					Interrelations between ATWS and breakers and relays	2.9	1
000032 Loss of Source Range NI / 7			2				Loss of Source Range NIS: Guidance in EOP	3.7	1
000033 Loss of Intermediate Range NI / 7					7		Loss of Intermediate Range NIS: Reactor trip	3.9	1
000037 Steam Generator Tube Leak / 3					12		Steam Generator Tube Leak: Flow rate of leak	3.3	1
000038 Steam Generator Tube Rupture / 3						2.4.7	EOP mitigation strategies (SGTR)	3.1	1
000054 (CE/E06) Loss of Main Feedwater / 4			1				Loss of Main Feedwater (MFW): Reactor and/or turbine trip	4.1	1
000058 Loss of DC Power / 6			2				Loss of DC Power: Actions contained in EOP	4.0	1
000059 Accidental Liquid RadWaste Rel. / 9					5		Accidental Liquid Radwaste Release: Automatic safety actions	3.6	1
000060 Accidental Gaseous RadWaste Rel. / 9		2					Interrelations between Accidental Gaseous Radwaste Release and Auxiliary building ventilation	2.7	1
000061 ARM System Alarms / 7				1			Area Radiation Monitoring (ARM) System Alarms: Automatic actuation	3.6	1
K/A Category Totals:	2	2	4	3	4	2	Group Point Total:		17

ES-401 PWR RO Examination Outline Form ES-401-4

Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
✓ 000056 Loss of Off-site Power / 6				7			Loss of Offsite Power: Service water pump operations	3.2	1
✓ 000065 Loss of Instrument Air / 8			3				Loss of Instrument Air: Effects of isolating equipment	2.9	1
✓ CE/A16 Excess RCS Leakage / 2	3						Excess RCS Leakage: Conditions and remedial action	3.2	1
K/A Category Totals:	1	0	1	1	0	0	Group Point Total:		3

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PWR RO Examination Outline
Plant Systems - Tier 2/Group 1

Form ES-401-4

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
001 Control Rod Drive					1							CRDS: Understanding/application of rod bank curves	3.3	2
											2.1.25	Interpret reference materials which contain performance data (Control Rods)	2.8	
003 Reactor Coolant Pump										4		Operate/monitor: RCP seal differential pressure	3.1	3
								2				RCPS: Conditions for abnormal RCP shutdown	3.7	
						4						RCPS: Containment isolation valves affecting RCP operation	2.8	
004 Chemical and Volume Control			5									Loss/malfunction of CVCS on PZR LCS	3.8	3
		3										Power supplies to the Charging pumps	3.3	
				12								CVCS design/interlock(s) which provide for minimum level of VCT	3.1	
013 Engineered Safety Features Actuation									1			Monitor ESFAS input channels and logic	3.7	3
							7					Monitor changes in Containment radiation	3.6	
	17											Relationship between ESFAS and Liquid Radwaste	2.6	
015 Nuclear Instrumentation					12							NIS: Quadrant power tilt	3.2	2
		1										Power supplies to NIS channels and	3.3	
017 In-core Temperature Monitor	1											Relationships between ITM and the plant computer	3.2	1
022 Containment Cooling									1			Monitor CCS, including: Initiation of safeguards mode of operation	4.1	1
056 Condensate											2.1.32	System limits and precautions (Condensate)	3.4	2
								4				Condensate System: Loss of condensate pumps	2.6	
059 Main Feedwater				18								MFW design/interlock(s): Automatic feedwater reduction on plant trip	2.8	2
								3				MFW malfunctions: Overfeeding event	2.7	
061 Auxiliary/Emergency Feedwater						1						Loss/malfunction of AFW: Controllers and positioners	2.5	3
	3											Relationship between AFW and Main steam system	3.5	
							5					AFW controls: AFW flow/motor amps	3.6	
072 Area Radiation Monitoring										1		Operate/monitor ARM: Alarm/interlock setpoint checks/adjustments	3.0	1
K/A Category Totals:	3	2	1	2	2	2	2	3	2	2	2	Group Point Total:		23

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PWR RO Examination Outline
Plant Systems - Tier 2/Group 2

Form ES-401-4

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
002 Reactor Coolant					11							Effects of primary coolant system and secondary coolant system	4.0	2
						15						Loss/malfunction of RCS on post-accident sampling	TBD	
006 Emergency Core Cooling											2.1.25	Interpret reference materials which contain performance data (ECCS)	2.8	2
				17								ECCS design/interlock(s): Safety Injection Valve Interlocks	3.8	
010 Pressurizer Pressure Control		1										Power supplies to the PZR heaters	3.0	1
011 Pressurizer Level Control						5						Loss/malfunction of PZR level gauges as post-accident monitors	3.1	1
012 Reactor Protection		1										Power supplies to RPS channels and components	3.3	1
014 Rod Position Indication							2					RPIS controls, including rod position	3.2	1
016 Non-nuclear Instrumentation			9									Loss/malfunction of NNIS on ESFAS	3.5	1
026 Containment Spray								4				CSS malfunctions or operations: Failure of spray pump	3.9	2
										1		Operate/monitor: CSS controls	4.5	
029 Containment Purge											2.1.33	Entry-level conditions for technical specifications (Containment Purge)	3.4	1
033 Spent Fuel Pool Cooling								3				Spent Fuel Pool Cooling System: Abnormal water level or loss of level	3.1	1
035 Steam Generator				2								S/GS design/interlock(s): S/G level indication	3.2	1
039 Main and Reheat Steam							6					MRSS controls, including main steam pressure	3.0	1
062 AC Electrical Distribution	4											Relationship between AC distribution system and off-site power sources	3.7	2
										1		Operate/monitor breakers (including available switchyard)	3.3	
063 DC Electrical Distribution			2									Loss/malfunction of DC electrical system on components using DC control power	3.5	1
064 Emergency Diesel Generator									5			Monitor ED/G, including: Operation in parallel	2.8	1
073 Process Radiation Monitoring	1											Relationship between PRM system and systems served by PRMs	3.6	1
K/A Category Totals:	2	2	2	2	1	2	2	2	1	2	2	Group Point Total:		20

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PWR RO Examination Outline
Plant Systems - Tier 2/Group 3

Form ES-401-4

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
005 Residual Heat Removal										1		Operate/monitor: Controls and indication for RHR pumps	3.6	1
008 Component Cooling Water			1									Loss/malfunction of CCWS on loads cooled by CCWS	3.4	1
028 Hydrogen Recombiner and Purge Control											2.1.32	System limits and precautions (H-2 Recombiner and Purge Control)	3.4	1
034 Fuel Handling Equipment									1			Fuel Handling System: Travel limits	2.5	1
041 Steam Dump/Turbine Bypass				18								SDS design/interlock(s): Turbine trip	3.4	1
045 Main Turbine Generator				1								MT/G design/inter-lock(s): Steam pressure at T/G inlet and plant power level	2.7	1
076 Service Water	8											Relationship between SWS and RHR system	3.5	1
078 Instrument Air		1										Power supplies to Instrument air compressor	2.7	1
K/A Category Totals:	1	1	1	2	0	0	0	0	1	1	1	Group Point Total:		8

Plant-Specific Priorities

System/Topic	Recommended Replacement for ...	Reason	Points
Plant-Specific Priority Total: (limit 10)			

✓

PALISADES Date of Exam: **22-May-00** Exam Level: **RO**

Category	K/A #	Topic	Imp.	Points
Conduct of Operations	2.1.1	Conduct of operations requirements	3.7	1
	2.1.2	Operator responsibilities during all modes of plant operation	3.0	1
	2.1.22	Determine Mode of Operation	2.8	1
	2.1.29	Conduct and verify valve lineups	3.4	1
	Total			4
Equipment Control	2.2.12	Surveillance procedures	3.0	1
	2.2.13	Tagging and clearance procedures	3.6	1
	2.2.26	Refueling administrative requirements	2.5	1
	Total			3
Radiation Control	2.3.2	Facility ALARA program	2.5	1
	2.3.4	Radiation exposure limits and contamination control	2.5	1
	2.3.10	Reduce levels of radiation and guard against personnel exposure	2.9	1
	Total			3
Emergency Procedures/Plan	2.4.16	EOP implementation hierarchy/coordination with procedures	3.0	1
	2.4.20	Operational implications of EOP warnings, cautions, and notes	3.3	1
	2.4.25	Fire protection procedures	2.9	1
	Total			3
Tier 3 Point Total				13

Facility: **PALISADES** Date of Exam: **22-May-00** Exam Level: **SRO**

Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	
1 Emergency & Abnormal Plant Evolutions	1	3	3	6	▨	▨	▨	3	5	▨	▨	4	24
	2	3	1	4	▨	▨	▨	3	3	▨	▨	2	16
	3	1	0	0	▨	▨	▨	1	0	▨	▨	1	3
	Tier Totals	7	4	10	▨	▨	▨	7	8	▨	▨	7	43
2 Plant Systems	1	1	1	2	2	2	1	2	2	2	2	2	19
	2	2	2	1	2	1	1	1	1	1	1	4	17
	3	0	1	1	1	0	0	0	0	0	1	0	4
	Tier Totals	3	4	4	5	3	2	3	3	3	4	6	40

3 Generic Knowledge and Abilities	Cat 1	Cat 2	Cat 3	Cat 4	
	5	4	4	4	17

Notes:

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2 Actual point totals must match those specified in the table.

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4 Systems/evolutions within each group are identified on the associated outline.

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7 On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the SRO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.

ES-401 PWR SRO Examination Outline Form ES-401-3

Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000003 Dropped Control Rod / 1			4				Dropped Control Rod: Actions contained in EOP for dropped control rod	4.1	1
000005 Inoperable/Stuck Control Rod / 1						2.1.25	Obtain/interpret station reference materials (Inoperable/Stuck Rod)	3.1	1
000011 Large Break LOCA / 3				16			Large Break LOCA: Balancing of HPI loop flows	3.5	2
						2.1.12	Technical specifications (LOCA)	4.0	
000015/17 RCP Malfunctions / 4			3				RCP Malfunctions: Tripping reactor and RCP	4.0	1
CE/A13 Natural Circ. / 4		2					Natural Circulation Operations: Heat removal systems and proper operation	3.6	2
						2.4.4	Entry-level conditions for emergency and abnormal procedures (Natural Circulation)	4.3	
000024 Emergency Boration / 1	3						Emergency Boration: Calculation of boration time from volumetric boron addition	2.9	2
			1				Emergency Boration: When emergency boration is required	4.4	
000026 Loss of Component Cooling Water / 8					2		Loss of Component Cooling Water: Cause of loss	3.6	1
000029 Anticipated Transient w/o Scram / 1		6					Interrelations between ATWS and breakers and relays	3.1	1
000040 (CE/E05) Steam Line Rupture - Excessive Heat Transfer / 4			2				Operating procedures associated with Excess Steam Demand	3.8	2
				12			Steam Line Rupture: RCS pressure and temperature	4.2	
CE/A11 RCS Overcooling - PTS / 4			2				RCS Overcooling: Procedures associated with RCS Overcooling	3.4	1
000051 Loss of Condenser Vacuum / 4					2		Loss of Condenser Vacuum: Reactor and/or turbine trip	4.1	1
000055 Station Blackout / 6	2						Station Blackout: Natural circulation cooling	4.4	1
000057 Loss of Vital AC Elec. Inst. Bus / 6				1			Loss of Vital AC Instrument Bus: Manual inverter swapping	3.7	1
000059 Accidental Liquid RadWaste Rel. / 9					5		Accidental Liquid Radwaste Release: Automatic safety actions	3.9	1
000062 Loss of Nuclear Service Water / 4						2.4.24	Loss of cooling water procedures (Loss of SW)	3.7	1
000067 Plant Fire On-site / 9					16		Plant Fire on Site: Equipment/control systems maintained/operated during fire	4.0	1
000068 Control Room Evac. / 8		1					Interrelations between Control Room Evacuation and Auxiliary shutdown panel	4.0	1
000069 Loss of CTMT Integrity / 5					1		Determine/interpret a Loss of Containment Integrity	4.3	1
000074 Inad. Core Cooling / 4	3						Inadequate Core Cooling: Processes for removing decay heat	4.9	1
000076 High Reactor Coolant Activity / 9			6				High Reactor Coolant Activity: Actions contained in EOP	3.8	1
K/A Category Totals:	3	3	6	3	5	4	Group Point Total:		24

ES-401 PWR SRO Examination Outline Form ES-401-3

Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
000007 (CE/E02) Reactor Trip - Stabilization -						2.4.1	EOP entry conditions and immediate action steps (Reactor	4.6	1
000008 Pressurizer Vapor Space Accident / 3					20		Pressurizer Vapor Space Accident: Open PORV or code safety	3.6	1
000009 Small Break LOCA / 3	2						Small break LOCA: Use of steam tables	4.2	1
000022 Loss of Reactor Coolant Makeup / 2				9			Loss of Reactor Coolant Pump Makeup: RCP seal flows, temperatures, pressures, and vibrations	3.3	1
000025 Loss of RHR System / 4	1						Loss of Residual Heat Removal System during all modes of operation	4.3	1
000027 Pressurizer Pressure Control System Malfunction / 3				1			Pressurizer Pressure Control Malfunctions: PZR heaters, sprays, PORVs	3.9	1
000032 Loss of Source Range NI / 7			2				Loss of Source Range NIS: Guidance in EOP	4.1	1
000033 Loss of Intermediate Range NI / 7					7		Loss of Intermediate Range NIS: Reactor trip	4.2	1
000037 Steam Generator Tube Leak / 3					12		Steam Generator Tube Leak: Flow rate of leak	4.1	1
000038 Steam Generator Tube Rupture / 3						2.4.7	EOP mitigation strategies (SGTR)	3.8	1
000054 (CE/E06) Loss of Main Feedwater / 4			1				Loss of Main Feedwater (MFW): Reactor and/or turbine trip	4.4	1
000058 Loss of DC Power / 6			2				Loss of DC Power: Actions contained in EOP	4.2	1
000060 Accidental Gaseous Radwaste Rel. / 9		2					Interrelations between Accidental Gaseous Radwaste Release and Auxiliary building ventilation	3.1	1
000061 ARM System Alarms / 7				1			Area Radiation Monitoring (ARM) System Alarms: Automatic actuation	3.6	1
000065 Loss of Instrument Air / 8			3				Loss of Instrument Air: Effects of isolating equipment	3.4	1
CE/E09 Functional Recovery	2						Functional Recovery: Procedures associated with Functional Recovery	4.0	1
K/A Category Totals:	3	1	4	3	3	2	Group Point Total:		16

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PWR SRO Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
✓ 000036 Fuel Handling Accident / 8						2.1.12	Technical specifications (Fuel Handling Accident)	4.0	1
✓ 000056 Loss of Off-site Power / 6				7			Loss of Offsite Power: Service water pump operations	3.2	1
✓ CE/A16 Excess RCS Leakage / 2	3						Excess RCS Leakage: Conditions and remedial action	3.5	1
K/A Category Totals:	1	0	0	1	0	1	Group Point Total:		3

PWR SRO Examination Outline
Plant Systems - Tier 2/Group 1

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
001 Control Rod Drive											2.1.25	Interpret reference materials which contain performance data (Control Rods)	3.1	1
003 Reactor Coolant Pump										4		Operate/monitor: RCP seal differential pressure	3.0	2
					9							RCPS: Effects of RCP operation on deltaP at lower temperatures	2.6	
004 Chemical and Volume Control				2								CVCS design/interlock(s): Control of pH, and range of acceptability	2.6	2
			5									Loss/malfunction of CVCS on PZR LCS	4.2	
013 Engineered Safety Features Actuation									1			Monitor ESFAS input channels and logic	3.9	2
							7					Monitor changes in Containment radiation	3.9	
014 Rod Position Indication							2					RPIS controls, including rod position	3.6	1
015 Nuclear Instrumentation					12							NIS: Quadrant power tilt	3.6	2
		1										Power supplies to NIS channels and	3.7	
017 In-core Temperature Monitor	1											Relationships between ITM and the plant computer	3.2	1
022 Containment Cooling									1			Monitor CCS, including: Initiation of safeguards mode of operation	4.3	1
026 Containment Spray								4				CSS malfunctions or operations: Failure of spray pump	4.2	1
056 Condensate								4				Condensate System: Loss of condensate pumps	2.8	1
059 Main Feedwater				18								MFW design/interlock(s): Automatic feedwater reduction on plant trip	3.0	1
061 Auxiliary/Emergency Feedwater						1						Loss/malfunction of AFW: Controllers and positioners	2.8	1
063 DC Electrical Distribution			2									Loss/malfunction of DC electrical system on components using DC control power	3.7	2
											2.1.12	Technical specifications (DC Electrical)	4.0	
072 Area Radiation Monitoring										1		Operate/monitor ARM: Alarm/interlock setpoint checks/adjustments	3.3	1
K/A Category Totals:	1	1	2	2	2	1	2	2	2	2	2	Group Point Total:		19

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PWR SRO Examination Outline
Plant Systems - Tier 2/Group 2

Form ES-401-3

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
002 Reactor Coolant					11							Effects of primary coolant system and secondary coolant system	4.2	1
006 Emergency Core Cooling											2.1.25	Interpret reference materials which contain performance data (ECCS)	3.1	2
				17								ECCS design/interlock(s): Safety Injection Valve Interlocks	4.1	
010 Pressurizer Pressure Control		1										Power supplies to the PZR heaters	3.4	1
011 Pressurizer Level Control						5						Loss/malfunction of PZR level gauges as post-accident monitors	3.7	1
012 Reactor Protection		1										Power supplies to RPS channels and components	3.7	1
016 Non-nuclear Instrumentation			9									Loss/malfunction of NNIS on ESFAS	3.7	1
028 Hydrogen Recombiner and Purge Control											2.1.32	System limits and precautions (H-2 Recombiner and Purge Control)	3.8	1
029 Containment Purge											2.1.33	Entry-level conditions for technical specifications (Containment Purge)	4.0	1
033 Spent Fuel Pool Cooling								3				Spent Fuel Pool Cooling System: Abnormal water level or loss of level	3.5	1
034 Fuel Handling Equipment											2.2.25	Bases in Tech Specs (Fuel Handling)	3.7	1
035 Steam Generator				2								S/GS design/interlock(s): S/G level indication	3.5	1
039 Main and Reheat Steam							6					MRSS controls, including main steam pressure	3.1	1
062 AC Electrical Distribution	4											Relationship between AC distribution system and off-site power sources	4.2	2
										1		Operate/monitor breakers (including available switchyard)	3.1	
064 Emergency Diesel Generator									5			Monitor ED/G, including: Operation in parallel	2.9	1
073 Process Radiation Monitoring	1											Relationship between PRM system and systems served by PRMs	3.9	1
K/A Category Totals:	2	2	1	2	1	1	1	1	1	1	4	Group Point Total:		17

ES-401 PWR SRO Examination Outline Form ES-401-3

Plant Systems - Tier 2/Group 3

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
✓ 005 Residual Heat Removal										1		Operate/monitor: Controls and indication for RHR pumps	3.4	1
✓ 008 Component Cooling Water			1									Loss/malfunction of CCWS on loads cooled by CCWS	3.5	1
✓ 045 Main Turbine Generator				1								MT/G design/inter-lock(s): Steam pressure at T/G inlet and plant power level	2.9	1
✓ 078 Instrument Air		1										Power supplies to Instrument air compressor	2.9	1
K/A Category Totals:	0	1	1	1	0	0	0	0	0	1	0	Group Point Total:		4

Plant-Specific Priorities

System/Topic	Recommended Replacement for ...	Reason	Points
Plant-Specific Priority Total: (limit 10)			

PALISADES Date of Exam: **22-May-00** Exam Level: **SRO**

Category	K/A #	Topic	Imp.	Points
Conduct of Operations	2.1.4	Shift staffing requirements	3.4	1
	2.1.14	System status criteria which require notification of personnel	3.3	1
	2.1.15	Short-term information such as night and standing orders	3.0	1
	2.1.26	Non-nuclear safety procedures	2.6	1
	2.1.33	Entry-level conditions for technical specifications	4.0	1
	Total			5
Equipment Control	2.2.24	Effect of maintenance activities on LCO status	3.8	1
	2.2.11	Process for controlling temporary changes	3.4	1
	2.2.13	Tagging and clearance procedures	3.8	1
	2.2.18	Maintenance activities during shutdown operations	3.6	1
	Total			4
Radiation Control	2.3.1	10CFR20 and facility radiation control requirements	3.0	1
	2.3.2	Facility ALARA program	2.9	1
	2.3.4	Radiation exposure limits and contamination control	3.1	1
	2.3.10	Reduce levels of radiation and guard against personnel exposure	3.3	1
	Total			4
Emergency Procedures/Plan	2.4.4	Entry-level conditions for emergency and abnormal procedures	4.3	1
	2.4.17	EOP terms and definitions	3.8	1
	2.4.25	Fire protection procedures	3.4	1
	2.4.30	Operations/status reported to outside agencies	3.6	1
	Total			4
Tier 3 Point Total				17

OPERATING TEST NO.: Scenario Set 1, SRO-I (1) Candidate

Applicant Type	Evolution Type	Minimum Number	Scenario Number		
			1 SRO	2 BOP	3 RO
RO	Reactivity	1			
	Normal	1			
	Instrument	2			
	Component	2			
	Major	1			
SRO-I As RO	Reactivity	1			3
	Normal	0		1	
	Instrument	1		3	1
	Component	1		5-6	2-7
	Major	1		7	6
SRO-I As SRO	Reactivity	0			
	Normal	1	1		
	Instrument	1	2-5		
	Component	1	3-4-7		
	Major	1	6		
SRO-U	Reactivity	0			
	Normal	1			
	Instrument	1			
	Component	1			
	Major	1			

Instructions:

(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.

(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: William Gross

Chief Examiner: Hironori Peterson

ES-301 Transient and Event Checklist Form ES-301-5

OPERATING TEST NO.: Scenario Set 1, SRO-I (2) Candidate

Applicant Type		Evolution Type	Minimum Number	Scenario Number		
				1 RO	2 SRO	3 BOP
RO		Reactivity	1			
		Normal	1			
		Instrument	2			
		Component	2			
		Major	1			
SRO-I	As RO	Reactivity	1	1		
		Normal	0			3
		Instrument	1	2		4
		Component	1	4-7		5
		Major	1	6		6
	As SRO	Reactivity	0			
		Normal	1		1	
		Instrument	1		3-4	
		Component	1		2-5-6	
		Major	1		7	
SRO-U		Reactivity	0			
		Normal	1			
		Instrument	1			
		Component	1			
		Major	1			

Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.

(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: William Gross

Chief Examiner: Hironori Peterson

ES-301 Transient and Event Checklist Form ES-301-5

OPERATING TEST NO.: Scenario Set 1, SRO-I (3) Candidate

Applicant Type		Evolution Type	Minimum Number	Scenario Number		
				1 BOP	2 RO	3 SRO
RO		Reactivity	1			
		Normal	1			
		Instrument	2			
		Component	2			
		Major	1			
SRO-I	As RO	Reactivity	1		1	
		Normal	0	1		
		Instrument	1	5	4	
		Component	1	3	2	
		Major	1	6	7	
	As SRO	Reactivity	0			
		Normal	1			3
		Instrument	1			1-4
		Component	1			2-5-7
		Major	1			6
SRO-U		Reactivity	0			
		Normal	1			
		Instrument	1			
		Component	1			
		Major	1			

Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.

(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: William Gross

Chief Examiner: Hironori Peterson

Competencies	Applicant #1 SRO-I			Applicant #2 SRO-I			Applicant #3 SRO-I		
	SCENARIO			SCENARIO			SCENARIO		
	1	2	3	1	2	3	1	2	3
Understand and Interpret Annunciators and Alarms	2-3-4-5-6	3-5-6-7	1-2-6-7	2-4-7	2-3-4-5-6-7	4-5-6-7	3-5-6	2-4-7	1-2-3-5-6-7
Diagnose Events and Conditions	2-3-4-5-6	3-5-6-7	1-2-6-7	2-4-6-7	2-3-4-5-6-7	4-5-6-7	3-5-6	2-4-7	1-2-4-5-6-7
Understand Plant and System Response	1-2-3-6	3-5-7	1-2-3-6-7	1-2-4	1-2-3-4-7	3-4-5-6-7	1-3-5-6	2-4-7	1-3-4-5-6
Comply With and Use Procedures (1)	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
Operate Control Boards (2)		1-3-5-6-7	1-2-3-6-7	1-2-4-6-7		3-4-5-6-7	1-3-5-6	1-2-4-7	
Communicate and Interact With the Crew	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
Demonstrate Supervisory Ability (3)	ALL				ALL				ALL
Comply With and Use Tech. Specs. (3)	3-4-5				4				2

Notes:
(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: William Gross
Chief Examiner: Hironori Peterson

OPERATING TEST NO.: Scenario Set 2, RO Candidate

Applicant Type	Evolution Type	Minimum Number	Scenario Number		
			1 BOP	2 RO	3
RO	Reactivity	1		1	
	Normal	1	1		
	Instrument	2	5	4	
	Component	2	3	2	
	Major	1	6	7	

SRO-I As RO	Reactivity	1			
	Normal	0			
	Instrument	1			
	Component	1			
	Major	1			
SRO-I As SRO	Reactivity	0			
	Normal	1			
	Instrument	1			
	Component	1			
	Major	1			

SRO-U	Reactivity	0			
	Normal	1			
	Instrument	1			
	Component	1			
	Major	1			

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: William Gross

Chief Examiner: Hironori Peterson

OPERATING TEST NO.: Scenario Set 2, SRO-I Candidate

Applicant Type		Evolution Type	Minimum Number	Scenario Number		
				1 RO	2 SRO	3
RO		Reactivity	1			
		Normal	1			
		Instrument	2			
		Component	2			
		Major	1			
SRO-I	As RO	Reactivity	1	1		
		Normal	0			
		Instrument	1	2		
		Component	1	4-7		
		Major	1	6		
	As SRO	Reactivity	0			
		Normal	1		1	
		Instrument	1		3-4	
		Component	1		2-5-6	
		Major	1		7	
SRO-U		Reactivity	0			
		Normal	1			
		Instrument	1			
		Component	1			
		Major	1			

Instructions:
(1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.
(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: William Gross

Chief Examiner: Hironori Peterson

OPERATING TEST NO.: Scenario Set 2, SRO-U Candidate

Applicant Type	Evolution Type	Minimum Number	Scenario Number		
			1 SRO	2 BOP	3
RO	Reactivity	1			
	Normal	1			
	Instrument	2			
	Component	2			
	Major	1			

SRO-I As RO	Reactivity	1			
	Normal	0			
	Instrument	1			
	Component	1			
	Major	1			
SRO-I As SRO	Reactivity	0			
	Normal	1			
	Instrument	1			
	Component	1			
	Major	1			

SRO-U	Reactivity	0			
	Normal	1	1	1	
	Instrument	1	2-5	3	
	Component	1	3-4-7	5-6	
	Major	1	6	7	

Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.

(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: William Gross

Chief Examiner: Hironori Peterson

Competencies	Applicant #1 SRO-U			Applicant #2 SRO-I			Applicant #3 RO		
	SCENARIO			SCENARIO			SCENARIO		
	1	2	3	1	2	3	1	2	3
Understand and Interpret Annunciators and Alarms	2-3-4-5-6	3-5-6-7		2-4-7	2-3-4-5-6-7		3-5-6	2-4-7	
Diagnose Events and Conditions	2-3-4-5-6	3-5-6-7		2-4-6-7	2-3-4-5-6-7		3-5-6	2-4-7	
Understand Plant and System Response	1-2-3-6	3-5-7		1-2-4	1-2-3-4-7		1-3-5-6	2-4-7	
Comply With and Use Procedures (1)	ALL	ALL		ALL	ALL		ALL	ALL	
Operate Control Boards (2)		1-3-5-6-7		1-2-4-6-7			1-3-5-6	1-2-4-7	
Communicate and Interact With the Crew	ALL	ALL		ALL	ALL		ALL	ALL	
Demonstrate Supervisory Ability (3)	ALL				ALL				
Comply With and Use Tech. Specs. (3)	3-4-5				4				

Notes:
(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: William Gross
Chief Examiner: Hironori Peterson

Facility:	**PALISADES**	Scenario Number:	**1**	Op-Test Number:	

Examiners

Operators

Objectives: To evaluate the candidates' ability to execute a power reduction, respond to a hot leg RTD failure, a loss of a safeguards 2400VAC bus, a malfunction of the charging pump speed controller, and a power range nuclear instrument. To evaluate the candidate's implementation of emergency operating procedures in response to a large break loss of coolant accident. Post-trip evaluation will determine the candidates' ability to respond to a High Pressure Safety Injection pump failure.

Initial Conditions: 100% power, BOL. AFW Pump P-8C is out-of-service, with caution tag on pump hand switch, for oil replacement and is expected to be returned to service between 4 and 6 hours following turnover.

Turnover: 100% power, BOL. AFW Pump P-8C is out-of-service for oil replacement and is expected to be returned to service between 4 and 6 hours following turnover. Boron concentration is 1257 ppm. ASI is 0.0. Shift orders are to lower power at 20% per hour to allow for SG contaminant cleanup.

Event Number	Malfunction Number (1)	Event Type*	Event Description
1	NA	RO(R) TURB(N) SRO(N)	Power Reduction
2	RP22B	RO(I) SRO(I)	Hot Leg #1 RTD TE-0112HB Failure Low
3	ED04B	TURB(C) SRO(C)	Loss of 2400 V Bus 1-D

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Event Number	Malfunction Number	Event Type*	Event Description
4	CV04	RO(C) SRO(C)	Charging Pump P-55A Fluid Drive Failure High
5	RP11D	TURB(I) SRO(I)	Power Range Safety Channel Detector (8) High Voltage Power Failure
6	RC02	RO(M) TURB(M) SRO(M)	PCS Cold Leg Rupture
7	SI01A	RO(C) SRO(C)	High Pressure Safety Injection Pump P66A Failure
8	NA	SRO	Classify the Event

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Facility: **PALISADES** Scenario Number: 2 Op-Test Number: ________

Examiners

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____

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Operators

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____

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Objectives: To evaluate the candidates' ability to raise power at EOL, respond to a malfunction of the letdown pressure controller, a failure of a steam flow transmitter, and a pressurizer pressure control malfunction. To evaluate the response to a main turbine high vibration requiring a plant trip, with a subsequent failure of the main turbine to trip. EOP implementation will be evaluated based upon the candidates' ability to respond and mitigate the consequences of a steam generator tube rupture.

Initial Conditions: IC-18. Approximately 25% power EOL; Equipment OOS is HPSI Pump P-66B, with a caution tag hung on the hand switch; 'A' MFW Pump is in service.

Turnover: Approximately 25% power EOL; Equipment out-of-service is HPSI Pump P-66B for pump alignment; P-66B should be returned to service in approximately 3 hours. 'A' MFW Pump is in service. Boron concentration is 333 ppm. ASI is -0.03. Shift orders are to continue raising power.

Event Number	Malfunction Number (1)	Event Type*	Event Description
1	NA	RO(R) TURB(N) SRO(N)	Up Power Ramp
2	CV05	RO(C) SRO(C)	Loss of Letdown Pressure Control High
3	RX15A	TURB(I) SRO(I)	Main Steam Flow Transmitter FT-0702 Low Failure on Steam Generator 'A'

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Event Number	Malfunction Number	Event Type*	Event Description
4	RX05B	RO(I) SRO(I)	Pressurizer Pressure Control Fails In The High Direction (Channel B)
5	TU01	TURB(C) SRO(C)	Main Turbine High Vibration (Requires Trip)
6	TC02	TURB(C) SRO(C)	Failure of Turbine Trip Actuation
7	SG01A	RO(M) TURB(M) SRO(M)	Steam Generator 'A' Tube Rupture at 700 gpm
8	NA	SRO	Classify the Event

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
(1) See Attachment, “Simulator Setup & Actions Required for Scenario,” for details on setup.

Facility: **PALISADES** Scenario Number: 3 Op-Test Number: ______

Examiners
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______

Operators
______
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______

Objectives: To evaluate the candidates' ability to respond to a pressurizer level control malfunction resulting in a loss of a backup heater group and to lower plant power. During the power reduction, the candidates will be evaluated on their ability to control SG levels in manual following a failure of a feedwater flow transmitter. To evaluate the candidates' response to a failed closed main turbine governor valve which will require a plant trip. Following the plant trip, the candidates will be evaluated on their ability to diagnose and respond to a steamline break inside containment. Post-trip complications will include a failure of one train of containment spray to automatically actuate, requiring the candidates to respond to this ESF failure.

Initial Conditions: IC-21; Approximately 100% power EOL; Equipment OOS is Charging Pump P-55A with Caution Tag hung on hand switch; Charging System is aligned for Mode 1 operation with P-55B in MANUAL and P-55C in AUTO.

Turnover: Power is 100% at EOL. Charging Pump P-55A is out of service for repairs with the Charging System aligned for Mode 1 operations. Boron concentration is 46 ppm. ASI is 0.0. Shift orders are to lower power to 40% load at 15% per hour for maintenance on P-1B.

Event Number	Malfunction Number (1)	Event Type*	Event Description
1	RX07B	RO(I) SRO(I)	Pressurizer Level Control Channel B Upscale Demand
2	RX12C	RO(C) SRO(C)	Pressurizer Heater Groups Fail Off (Backup Group #1)
3	NA	RO(R) TURB(N) SRO(N)	Down Power Ramp

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Event Number	Malfunction Number	Event Type*	Event Description
4	RX14A	TURB(I) SRO(I)	Feedwater Flow Transmitter FT-0701 Failure High
5	TC04C	TURB(C) SRO(C)	Turbine Governor Valve GV 3 Fails Shut
6	MS03A	RO(M) TURB(M) SRO(M)	Main Steamline Rupture Inside of the Containment
7	CH05B	RO(C) SRO(C)	Train "B" Automatic Initiation Failure Of Containment Spray
8	NA	SRO	Classify the Event

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Facility: **PALISADES** Scenario Number: **Spare** Op-Test Number: ____

Examiners

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Operators

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Objectives: To evaluate the candidates' ability to perform Technical Specification surveillance testing of the Control Room Ventilation System and Control Rod Exercising. To evaluate the candidates' response to a malfunction of the VCT level control system, a source/wide range nuclear instrument failure, and a low cooling tower basin level condition. EOP implementation will be evaluated in response to a small PCS leak which increases in size as plant power is reduced, eventually requiring a reactor trip and response to safety injection.

Initial Conditions: IC-9. Approximately 50% power BOL; Equipment OOS is AFW Pump P-8B; Caution tag hand switches for CV-0522A and CV-0522B

Turnover: Power is approximately 50% at BOL. ASI is -0.01. Boron concentration is 1451 ppm. AFW Pump P-8B is out of service for maintenance and will not be available for approximately 24 hours. Shift orders are to maintain power until AFW Pump P-8B is returned to service and perform MO-33, Control Room Ventilation Emergency Operation, for Train 'A', and QO-34, Control Rod Exercising, for Regulating Rods.

Event Number	Malfunction Number (1)	Event Type*	Event Description
1	NA	TURB(N) SRO(N)	Perform MO-33, Control Room Ventilation Emergency Operation, Test
2	NA	RO(R) SRO(R)	Perform QO-34, Control Rod Exercising, Test
3	CV13	RO(I) SRO(I)	Volume Control Tank Level Control Failure High

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Event Number	Malfunction Number	Event Type*	Event Description
4	RP06B	TURB(I) SRO(I)	Source/Wide Range Channel NI-02/04 High Voltage Power Supply Failure
5	Later	TURB(C) SRO(C)	Cooling Water Tower E-30A Basin Low Level
6	RC03	RO(C) TURB(C) SRO(C)	Primary Coolant System Leak into the Containment at 5 gpm
7	RC04	RO(M) TURB(M) SRO(M)	Primary Coolant System Leak into the Containment at 400 gpm
8	NA	SRO	Classify the Event

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

INITIAL SUBMITTAL OF THE EXAMINATION

FOR THE PALISADES INITIAL EXAMINATION THE WEEK OF MAY 22, 2000

INITIAL SUBMITTAL OF THE OPERATING TEST

FOR THE PALISADES INITIAL EXAMINATION THE WEEK OF MAY 22, 2000

INITIAL SUBMITTAL OF THE ADMINISTRATIVE JPMS

FOR THE PALISADES INITIAL EXAMINATION THE WEEK OF MAY 22, 2000

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-A.1-1

Determine Primary Coolant System Leakage Rate

CANDIDATE: ______________________

EXAMINER: ______________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Determine Primary Coolant System Leakage Rate

Alternate Path: NONE

Facility JPM #: NEW

K/A Rating: 009EA2.33 Importance: SRO 3.8 RO 3.3

K/A Statement: Ability to determine or interpret the following as they apply to a small break LOCA: RCS water inventory balance and Tech-Spec limits

Task Standard: GOP-13, Attachment 1, properly completed

Preferred Evaluation Location: Simulator ______ In Plant X

Preferred Evaluation Method: Perform X Simulate ______

References: GOP-13, Primary System Leakage Calculation

Validation Time: 15 minutes Time Critical: NO

Candidate: ______________________

Time Start: ________ Time Finish: ______

Performance Time: ______ minutes

Performance Rating: SAT ______ UNSAT ______

Comments: ______________________

Examiner: ______________________ Date: ______
Signature

Tools/Equipment/Procedures Needed:

GOP-13
Attached Data for Leakage Calculation
Calculator

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

The plant is operating at 100% power. The attached data has been obtained for performing a PCS leakage calculation.

At 0215, a 10 gallon dilution was performed for PCS temperature control. NO other additions were made, NO sampling occurred, and NO diversions occurred.

The Zinc Addition System was secured during the data collection.

CRDM Seal Leakage is known to be 455 ml/min and Charging Pump Seal Leakage is known to be 75 ml/min. There are NO other known leakage sources.

Controlled Bleedoff is aligned to the VCT.

INITIATING CUES:

The Shift Supervisor directs you to calculate the Tech Spec required PCS leakage in accordance with GOP-13.

START TIME: ________

STEP 1: Locates proper procedure STANDARD: Locates GOP-13, Attachment 1, and Section 6.1 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 2: RECORD data time STANDARD: Enters Initial Reading of 0100 and Final Reading of 0400 NOTES: ***Critical to correctly enter data for calculation.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT
STEP 3: RECORD Pressurizer level STANDARD: Enters Initial Reading of 57% and Final Reading of 56.5% NOTES: ***Critical to correctly enter data for calculation.***	***CRITICAL STEP*** ____ SAT

STEP 4: RECORD Volume Control Tank level STANDARD: Enters Initial Reading of 73% and Final Reading of 74% NOTES: ***Critical to correctly enter data for calculation.*** COMMENTS:	____ SAT ____ UNSAT
STEP 5: RECORD PCS TAVE to the nearest 0.1 °F STANDARD: Enters Initial Reading of 559.5 °F and Final Reading of 560.0 °F NOTES: ***Critical to correctly enter data for calculation.*** COMMENTS:	____ SAT ____ UNSAT
STEP 6: RECORD the total amount of Primary Makeup Water and/or Boric Acid added STANDARD: Enters 10 gallons of PMW and 0 gals of Boric Acid NOTES: ***Critical to correctly enter data for calculation.*** COMMENTS:	____ SAT ____ UNSAT

STEP 7: RECORD any other known PCS or CVCS additions STANDARD: Enters 0 gallons of additions NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 8: CALCULATE PCS leakage STANDARD: Calculates PCS leakage to be 0.255 (0.205 to 0.305) gpm NOTES: ***Critical to correctly perform calculation.*** COMMENTS:	____ SAT ____ UNSAT
STEP 9: RECORD Zinc Addition System injection rate STANDARD: Enters 0 gpm for addition rate NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 10: CALCULATE Total PCS Leakage

CRITICAL STEP

STANDARD: Calculates Total PCS leakage to be 0.255 (0.205 to 0.305) gpm

NOTES: ***Critical to correctly perform calculation.***

____ SAT

____ UNSAT

COMMENTS:

STEP 11: RECORD the most recent CRDM seal leakage measurement

CRITICAL STEP

STANDARD: Enters 455 ml/min CRDM leakage and converts to 0.12 (0.10 to 0.14) gpm

NOTES: ***Critical to correctly enter data and convert for calculation.***

____ SAT

____ UNSAT

COMMENTS:

STEP 12: RECORD the most recent Charging Pump seal leakage measurement

CRITICAL STEP

STANDARD: Enters 75 ml/min Charging Pump seal leakage and converts to 0.02 (0.00 to 0.04) gpm

NOTES: ***Critical to correctly enter data and convert for calculation.***

____ SAT

____ UNSAT

COMMENTS:

STEP 13: RECORD source and leak rate, in gpm, for any other leakage sources that have been positively identified and quantified STANDARD: Enters 0 gpm for other leakage sources NOTES:	____ SAT
STEP 14: CALCULATE total identified PCS leakage STANDARD: Calculates and enters 0.14 (0.10 to 0.18) gpm total identified PCS leakage NOTES: ***Critical to properly calculate value.*** ***NOTE: Tolerance based on previously allowed tolerances.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT
STEP 15: CALCULATE Unidentified PCS leakage STANDARD: Calculates and enters 0.115 (0.025 to 0.205) gpm Unidentified PCS leakage NOTES: ***Critical to properly calculate value.*** ***NOTE: Tolerance based on previously allowed tolerances.*** COMMENTS:	____ SAT ____ UNSAT

STEP 16: Notifies Shift Supervisor of PCS Leakage Rates STANDARD: Notifies Shift Supervisor NOTES: COMMENTS: ***END OF TASK***	____ SAT ____ UNSAT

STOP TIME: ________

JPM RO-A.1-1 ATTACHMENT

	INITIAL VALUE	FINAL VALUE
TIME	0100	0400
PRZR LEVEL (PPC PT LPRCZ)	57%	56.5%
VCT LEVEL (PPC)	73%	74%
PCS TAVE (PPC PT TAVG)	559.5 °F	560.0 °F

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The plant is operating at 100% power. The attached data has been obtained for performing a PCS leakage calculation.

At 0215, a 10 gallon dilution was performed for PCS temperature control. NO other additions were made, NO sampling occurred, and NO diversions occurred.

The Zinc Addition System was secured during the data collection.

CRDM Seal Leakage is known to be 455 ml/min and Charging Pump Seal Leakage is known to be 75 ml/min. There are NO other known leakage sources.

Controlled Bleedoff is aligned to the VCT.

INITIATING CUES:

The Shift Supervisor directs you to calculate the Tech Spec required PCS leakage in accordance with GOP-13.

PCS INVENTORY FORM

KEY

____
DATE

☒ TECHNICAL SPECIFICATION REQUIRED ☐ INFORMATION ONLY

A. TOTAL PCS LEAKAGE

1. Verify the prerequisites, precautions, and limitations of GOP-13 are met for Technical Specification required PCS leak rates.

	PARAMETER	INITIAL READING	FINAL READING	CHANGE
2.	Duration of Test; Step 6.1.1	- 0100	+ 0400	= + 180 Min
3.	Pressurizer Level; Step 6.1.2 ([✓ PPC PT LPRZD], LT_0101A_D, LIC-0101A or B)	+ 57.0 %	- 56.5 %	= ± [✓ +] 0.5 %
4.	VCT Level; Step 6.1.3 ([✓ PPC] or LIC-0205)	+ 73.0 %	- 74.0 %	= ± [✓ −] 1.0 %
5.	PCS T_{AVE}; Step 6.1.4; ([✓ PPC PT TAVG], TYT_0100, TYT_0200A or Reactor Reg # ___) ±1°F limit (Note 1)	+ 559.5 °F	- 560.0 °F	= ± [✓ −] 0.5 °F
6.	PMW Additions: Step 6.1.6			= + 10 gal
7.	BA Additions; Step 6.1.6			= + 0 gal
8.	Other PCS or CVCS additions (+) or samples (-), if applicable; Step 6.1.7 (0 ml x 0.0002642 gal/ml)			= ± 0 gal

9. Calculation of $= \dfrac{(A.3) \times 66.16 \text{ gal/\%} + (A.4) \times 34.415 \text{ gal/\%} - (A.5) \times 74.43 \text{ gal/°F} + (A.6) + (A.7) + (A.8)}{(A.2)}$

Step 6.1.8 (Use numbers in last column for calculation)

$$\frac{(0.5) \times 66.16 + (-1.0) \times 34.415 - (-0.5) \times 74.43 + (10) + (0) + (0)}{(180)} = 0.255 \text{ gpm}$$

10. Zinc Injection Rate; Steps 6.1.9 and 6.1.10
(0 liters/day x 0.000183) [conversion units are gal day/liter min] = 0 gpm

11. Total PCS Leakage in gpm; Step 6.1.11 (refer to Step 6.4 for limits)
= (A.9) 0.255 + (A.10) 0 = 0.255 gpm (Total)

B. UNIDENTIFIED PCS LEAKAGE

1. CRDM Seal Leakage; Step 6.2.1
(455 ml/min x 0.0002642 gal/ml) = 0.120 gpm
2. Charging Pump Seal Leakage; Step 6.2.2
(75 ml/min x 0.0002642 gal/ml) = 0.020 gpm
3. Other known leakage source, (if applicable), list source and rate; Step 6.2.3
Source: **Rate:**
(0 ml/min x 0.0002642 gal/ml) = 0 gpm
4. Total Identified Leakage (B.1 + B.2 + B.3) = 0.140 gpm (Identified)
5. Unidentified PCS Leakage = Total PCS Leakage - Total Identified Leakage
(A.11) 0.255 - (B.4) 0.140 = 0.115 gpm (Unidentified)
(If >1.0 gpm - refer to Step 6.3)

KEY

KEY /
Calculated By Date

__________ /
Reviewed By Date

NOTE 1: IF reactor power was changed by more than 5% in the hour immediately prior to taking initial data AND PPC data is used, THEN wait at least 20 minutes prior to data acquisition.

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-A.1-2

Reset the Ultrasonic Flow Meter Correction Factors

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Reset the Ultrasonic Flow Meter Correction Factors

Alternate Path: NONE

Facility JPM #: ASHH 01

K/A Rating: 2.1.19 Importance: SRO 3.0 RO 3.0

K/A Statement: Ability to use plant computer to obtain and evaluate parametric information on system or component status.

Task Standard: UFM Correction Factors have been reset to a value of 1.0.

Preferred Evaluation Location: Simulator X In Plant ________

Preferred Evaluation Method: Perform X Simulate ________

References: GOP-12, Heat Balance Calculation
Technical Data Book Figure 14.1

Validation Time: 5 minutes Time Critical: NO

Candidate: ____________________________________

Time Start: __________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ____

____

____

Examiner: ____________________________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- IC-10 (75%)
- Set UFM Correction Factors on PPC 551 to 0.9890 (UFM Correction Factor A) and 0.9690 (UFM Correction Factor B)
- Ensure completed copy of TDB Figure 14.1 is included with UFM Correction Factor A at 0.9890, UFM Correction Factor B at 0.9690, and Maximum Corrected Power for Resetting to 1.0 at 97.51%

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

The Plant is at 75% power, steady state during a shutdown.

INITIATING CUES:

During a plant power reduction, power has been stabilized for an indeterminate period prior to continuing the shutdown, and the Shift Supervisor directs you to remove the UFM correction factor from service in accordance with GOP-12.

START TIME: ________

STEP 1:	Locates proper procedure and required information.	
STANDARD:	Locates GOP-12, references Sections 5.5 and 6.1.1, and locates Technical Data Book (TDB), Figure 14.1.	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 2:	Ensures HB_PWR_STEADY is lowered to a value less than the "Maximum UFM Corrected Power for Resetting Correction Factors to 1.0"	
STANDARD:	Refers to TDB and determines maximum UFM Corrected Power for Resetting Correction Factors to 1.0 is 97.51% and compares to HB_PWR_STEADY value of 75%.	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 3:	Obtain PPC display 521	***CRITICAL STEP***
STANDARD:	Accesses PPC display 521 via the "NSSS APPLICATIONS" item on the main menu followed by the "UFM PLANT CALORIMETRIC" submenu.	
NOTES:	***Critical step to select display to allow update.***	____ SAT
COMMENTS:		____ UNSAT

STEP 4:	Reset UFM Correction Factor A to 1.0.	***CRITICAL STEP***
STANDARD:	Selects UFM Correction Factor A, types in "1.0", and depresses UPDATE hardkey.	
NOTES:	***Critical step to reset UFM correction factors.***	________ SAT
COMMENTS:		________ UNSAT
STEP 5:	Reset UFM Correction Factor B to 1.0.	***CRITICAL STEP***
STANDARD:	Selects UFM Correction Factor B, types in "1.0", and depresses UPDATE hardkey.	
NOTES:	***Critical step to reset UFM correction factors.***	________ SAT
COMMENTS:		________ UNSAT
	END OF TASK	

STOP TIME: ________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The Plant is at 75% power, steady state during a shutdown.

INITIATING CUES:

During a plant power reduction, power has been stabilized for an indeterminate period prior to continuing the shutdown, and the Shift Supervisor directs you to remove the UFM correction factor from service in accordance with GOP-12.

JPM RO-A,1-2 Attach.

PALISADES TECHNICAL DATA BOOK FIGURE 14.1, REVISION 0

Date	UFM Correction Factor A	UFM Correction Factor B	Maximum UFM Corrected Power for Resetting Correction Factors to 1.0	Initials
3/18/00	0.9890	0.9690	97.51%	B

9-3-97

APPROVED BY / DATE

JPM SRO-A.1-2
IS THE SAME AS
JPM RO-A.1-2

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-A.2

Develop Caution Tags for an Inoperable Pump

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Develop Caution Tags for an Inoperable Pump

Alternate Path: NONE

Facility JPM #: NEW

K/A Rating: 2.2.13 Importance: SRO 3.8 RO 3.6

K/A Statement: Knowledge of tagging and clearance procedures.

Task Standard: Caution Tag Log and Caution Tag Form 350 and Form 3188 have been completed with required information.

Preferred Evaluation Location: Simulator X In Plant ________

Preferred Evaluation Method: Perform X Simulate ________

References: Admin Procedure 4.02, Control of Equipment

Validation Time: 15 minutes Time Critical: NO

Candidate: ______________________________

Time Start: __________ Time Finish: _______

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ______________________________

____

____

Examiner: ______________________________ Date: _______
Signature

Tools/Equipment/Procedures Needed:

EVALUATOR INSTRUCTIONS:

- Provide candidate with a partially filled out Caution Tag Log per Admin Procedure 4.02 listing one other CR related series of Caution Tags previously hung and still installed.
- Ensure required blank Caution Tags are available to be completed by the candidate.
- Properly completed tags and index are included with JPM.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Charging Pump P-55C breaker 52-1105 has been racked to the DISCONNECT position due to an Auxiliary Operator's report of excessive pump vibration.

INITIATING CUES:

The Shift Supervisor has directed you to develop the necessary Caution Tags to place on hand switch 52-1105CS on C-02 for P-55C and on breaker 52-1105 on LCC-11.

P-55C is only to be used with Shift Supervisor permission for emergency conditions if P-55A and P-55B are both unavailable.

Work Request Number 279868 has been initiated to troubleshoot and repair the pump.

START TIME: ________

STEP 1: Locates procedure to caution tag P-55C STANDARD: Locates Admin 4.02 and refers to Sections 10.2.1 and 10.2.2 and Attachment 4 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 2: Obtain proper type of Caution Tag for P-55C on C-02 STANDARD: Obtains Caution Tag Form 3188 NOTES: ***NOTE: When candidate explains how to obtain proper type Caution Tag, if none available, give candidate Caution Tag Form 3188.*** COMMENTS:	____ SAT ____ UNSAT
STEP 3: Obtain proper type of Caution Tag for breaker 52-1105 on LCC-11 STANDARD: Obtains Caution Tag Form 350 NOTES: ***NOTE: When candidate explains how to obtain proper type Caution Tag, if none available, give candidate Caution Tag Form 350.*** COMMENTS:	____ SAT ____ UNSAT

STEP 4:	Obtain next available Serial Number from Caution Tag Log	***CRITICAL STEP***
STANDARD:	Obtains Serial Number 00-CR-002-2 from Caution Tag Log, records in Caution Tag Log and on both Caution Tags to be installed, except that one of the tags is listed as 00-CR-002-1 and the other is listed as 00-CR-002-2	
NOTES:	***Critical step to obtain and record proper serial number.*** ***NOTE: Serial number indicates year-group designator-next sequential number-total number of tags.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 5:	Enters equipment designator	***CRITICAL STEP***
STANDARD:	Enters "P-55C C/S," "P-55C H/S," or "52-1105 C/S" AND "52-1105" in Block 3 of Caution Tag Log, enters "52-1105" on the front of Form 350, and enters "P-55C C/S," "P-55C H/S," or "52-1105 C/S"on the front of Form 3188	
NOTES:	***Critical step to properly enter data.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 6: Enters AMMS designator for system in Caution Tag Log

STANDARD: Enters "CVC" in lower left corner of Block 3 of Caution Tag Log

NOTES: ***NOTE: May obtain from computer or any other available source.***

COMMENTS:

_____ SAT

_____ UNSAT

STEP 7: Enters special instructions and/or reason for tagging equipment

CRITICAL STEP

STANDARD: Enters "Only operate with SS permission in emergency" (or similar) in Caution Tag Log Block 4, on front of Form 350 and Form 3188 and "excessive vibration" (or similar) in Caution Tag Log Block 4, on front of Form 350 and on back of Form 3188

NOTES: ***Critical step to include special instructions and/or reason for not operating pump on tags.***

COMMENTS:

_____ SAT

_____ UNSAT

STEP 8: Enters Work Request number in Caution Tag Log STANDARD: Enters Work Request number "279868" in Block 5 of Caution Tag Log NOTES: ***Critical step to identify associated work to repair pump.*** ***NOTE: Work Request number given in initial conditions.*** ***CUE: If candidate indicates that Caution Tag number is to be included on Work Request, inform candidate that it will be performed by another crew member.*** COMMENTS:	***CRITICAL STEP*** ________ SAT ________ UNSAT
STEP 9: Informs Shift Supervisor that Caution Tags are ready to be installed STANDARD: Informs Shift Supervisor that Caution Tags are ready to be installed NOTES: COMMENTS: ***END OF TASK***	________ SAT ________ UNSAT

STOP TIME: ________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Charging Pump P-55C breaker 52-1105 has been racked to the DISCONNECT position due to an Auxiliary Operator's report of excessive pump vibration.

INITIATING CUES:

The Shift Supervisor has directed you to develop the necessary Caution Tags to place on hand switch 52-1105CS on C-02 for P-55C and on breaker 52-1105 on LCC-11.

P-55C is only to be used with Shift Supervisor permission for emergency conditions if P-55A and P-55B are both unavailable.

Work Request Number 279868 has been initiated to troubleshoot and repair the pump.

JPM RO-A.2
Attachment

Proc No 4.02
Attachment 7
Revision 17
Page 1 of 1

PALISADES NUCLEAR PLANT
CAUTION TAG LOG

Date And Time Printed: January 13, 2000 11:05

1 Serial Number	2 Tag Placed		3 Tagged Equipment or Components		4 Reason for Tag and/or Special Instructions	5 Controlling Document Number (WO/WR/CR/etc)	6 Tag Removed		7 Comments
	Date	By		System			Date	By	
00-CR-001-1	3/18/00	B	P-66B	SI	Operate in emergency only - Pump has small oil leak Do not operate w/o SS permission	WR206531			

REASON TAGGED

EXCESSIVE VIBRATION

Date/Time ________________

Removed ________________

FORM 3188 4-89

CAUTION

OVER FOR REASON TAGGED

00-CR-002-1

Equip. Tagged P-55C C/S

Tagged by KEY

Date / Time ________________

Special Instr. DO NOT OPERATE W/O SS PERMISSION

COPY OF TAGS FOR KEY

Form 350 1-97

00-CR-002-2 KEY

CONSUMERS ENERGY

CAUTION TAG

Equipment Tagged

52-1105 (P-55C)

Reason Tag Placed

EXCESS VIBRATION

Authorized By

SS

Special Instructions

EMERGENCY USE ONLY
DO NOT OPERATE W/O
SS PERMISSION

Placed By: KEY

Date:

Time:

Removed By:

Date:

Time:

Station:

JPM RO-A.2
KEY

Proc No 4.02
Attachment 7
Revision 17
Page 1 of 1

PALISADES NUCLEAR PLANT
CAUTION TAG LOG

Date And Time Printed: January 13, 2000 11:05

Serial Number 1	Tag Placed 2		Tagged Equipment or Components 3	Reason for Tag and/or Special Instructions 4	Controlling Document Number (WO/WR/CR/etc) 5	Tag Removed 6		Comments 7
	Date	By	System			Date	By	
00-CR-001-1	3/18/00		P-66B SI	Operate in emergency only - Pump has small oil leak Do not operate w/o SS permission	WR 206531			
00-CR-002-2			52-1105 P-55C C/S (52-1105 C/S) CVCS	Excessive Vibration Emergency Use Only Do not operate w/o SS Permission	WR 279868			
				KEY				

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-A.3

Monitor Equipment Removal from the RCA

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Monitor Equipment Removal from the RCA

Alternate Path: NONE

Facility JPM #: NEW

K/A Rating: 2.3.4 Importance: SRO 3.1 RO 2.5

K/A Statement: Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.

Task Standard: Demonstrates proper use of SAM-9 for monitoring hand carried items.

Preferred Evaluation Location: Simulator ____ In Plant X

Preferred Evaluation Method: Perform X Simulate ____

References: Instructions for SAM-9 Use

Validation Time: 5 minutes Time Critical: NO

Candidate: ____________________

Time Start: ________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ____________________

____

____

Examiner: ____________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

EVALUATOR NOTE: Present candidate with hand-held item upon exiting RCA, e.g., clipboard, flashlight, etc.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

You are exiting the RCA with hand-held items.

INITIATING CUES:

Demonstrate proper usage of the SAM-9 to monitor hand-held items when exiting the RCA.

START TIME: ________

STEP 1: Insert hand-held item into SAM-9 chamber STANDARD: Inserts hand-held item into chamber, ensuring item is placed on plastic tray NOTES: ***Critical step to allow monitoring of item.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT
STEP 2: Close SAM-9 door STANDARD: Closes door to SAM-9 NOTES: ***Critical step to enable monitor interlock.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT
STEP 3: Start monitoring of hand-held item STANDARD: Depresses large red button on front of SAM-9 NOTES: ***Critical step to perform counting.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT

STEP 4:	Ensure any personal contamination does not interfere with counting	
STANDARD:	Stands outside blue line while SAM-9 is operating	
NOTES:		________ SAT
COMMENTS:		________ UNSAT
STEP 5:	Verify hand-held item not contaminated	***CRITICAL STEP***
STANDARD:	Identifies CLEAR display on SAM-9	
NOTES:	***Critical step to determine item not contaminated prior to removal.***	________ SAT
COMMENTS:		________ UNSAT
STEP 6:	Remove item from SAM-9	
STANDARD:	Opens SAM-9 chamber door, removes item, and closes door	
NOTES:		________ SAT
COMMENTS:		________ UNSAT
	END OF TASK	

STOP TIME: ________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

You are exiting the RCA with hand-held items.

INITIATING CUES:

Demonstrate proper usage of the SAM-9 to monitor hand-held items when exiting the RCA.

JPM SRO-A.3
IS THE SAME AS
JPM RO-A.3

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-A.4

Obtain Meterological Data for Emergency Notification Form

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Obtain Meterological Data for Emergency Notification Form

Alternate Path: NONE

Facility JPM #: NEW

K/A Rating: 2.4.39 Importance: SRO 3.1 RO 3.3

K/A Statement: Knowledge of the RO's responsibilities in emergency plan implementation.

Task Standard: EI-3.0, Attachment 1, Section 6, Items A, B, and C are completed.

Preferred Evaluation Location: Simulator X In Plant ____

Preferred Evaluation Method: Perform X Simulate ____

References: EI-3.0, Communications and Notifications
EI-6.0, Offsite Dose Calculation and Recommendations fro Protective Actions

Validation Time: 5 minutes Time Critical: NO

Candidate: ____________________

Time Start: ________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ____________________

Examiner: ____________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS: IC-11; ensure EI-1, Attachment 1, Initial Notification Form, is available

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

The Shift Supervisor, acting as the Site Emergency Director, has declared an Alert condition.

INITIATING CUES:

The Shift Supervisor has directed you to obtain the necessary Meterological Data required to be entered on EI-1, Attachment 1, Initial Notification Form, Section 6, Items A, B, and C.

START TIME: ________

STEP 1:	Obtains copy of EI-3, Attachment 1, Initial Notification Form	
STANDARD:	Obtains current copy of attachment	
NOTES:	***NOTE: May consult EI-6.7, Section 5.1, for instructions on how to operate Met Data Display on PPC, but this is NOT required.***	____ SAT
COMMENTS:		____ UNSAT
STEP 2:	Locates PPC Display containing Meterological Data	***CRITICAL STEP***
STANDARD:	Goes to PPC Page 351 to obtain data	
NOTES:	***Critical step to allow obtaining data.***	____ SAT
COMMENTS:		____ UNSAT
STEP 3:	Records proper Wind Direction	***CRITICAL STEP***
STANDARD:	Records proper Wind Direction as from 330° to 150°	
NOTES:	***Critical step to determine proper direction.***	____ SAT
COMMENTS:		____ UNSAT

STEP 4: Records proper Wind Speed STANDARD: Records Wind Speed as 10 mph NOTES: ***Critical step to determine correct speed.*** COMMENTS:	***CRITICAL STEP*** _______ SAT _______ UNSAT
STEP 5: Completes entering data in Attachment 1 STANDARD: Completes entering data in Attachment 1, Section 6, Items A, B, and C and returns to Shift Supervisor NOTES: COMMENTS: ***END OF TASK***	_______ SAT _______ UNSAT

STOP TIME: _______

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The Shift Supervisor, acting as the Site Emergency Director, has declared an Alert condition.

INITIATING CUES:

The Shift Supervisor has directed you to obtain the necessary Meterological Data required to be entered on EI-1, Attachment 1, Initial Notification Form, Section 6, Items A, B, and C.

JPM RO-A.4

KEY

Proc No EI-3
Attachment 1
Revision 18
Page 1 of 1

EMERGENCY NOTIFICATION FORM

REQUIRED INFORMATION

Approval:______________________ Date:__________ Time:__________

☐ This is a drill. ☐ This is not a drill.

From: ☐ CR ☐ TSC ☐ EOF

1. To: ☐ County Name: ______________ Time: ________
☐ State Name: ______________ Time: ________
☐ NRC Name: ______________ Time: ________

2. PALISADES 2A. PLANT MESSAGE NUMBER__________

3. CLASS OF EMERGENCY
A. ☐ Unusual Event B. ☐ Alert C. ☐ Site Area Emergency D. ☐ General Emergency
E. This classification declared by Plant at: Time: __________ Date: __________
F. Initiating Conditions/Description of Event:

KEY

4. PLANT STATUS
A. ☐ Stable B. ☐ Degrading C. ☐ Improving
D. Additional Information:

5. RADIOLOGICAL RELEASE IN PROGRESS: ☐ YES ☐ NO

6. METEOROLOGICAL DATA (10 meter)
A. Wind Direction, Degrees From: 330 To: 150 B. Wind Speed, MPH: 10 C. Stability Class: D
D. Three Downwind Sectors: __________ E. Precipitation: ☐ YES ☐ NO

Req'd Data

7. PROTECTIVE ACTION RECOMMENDATIONS
A. ☐ YES ☐ NO
Note: If YES fill in following information.
B. PAR based on: ☐ Dose Calculations ☐ Plant Status ☐ Other__________
C. In-place Shelter (Areas) __________
D. Evacuation (Areas) __________

AS AVAILABLE

8. RADIOLOGICAL RELEASE DATA
A. Time release started__________ Projected duration of release__________
B. ☐ Airborne ☐ Waterborne ☐ Waterborne Analysis Attached
C. Effluent Points__________
D. Noble gas release rate, Ci/sec______ Sample______ Monitor______ Estimate______
E. Average energy per disintegration, MeV______ Sample______ Monitor______ Estimate______
F. Equivalent I-131 release rate, Ci/sec______ Sample______ Monitor______ Estimate______
G. Particulate release rate Ci/sec______ Sample______ Estimate______

9. CALCULATED OFFSITE DOSES
A. ☐ Actual ☐ Potential
B. Based on: ☐ Monitor (in Plant) ☐ Sample (in Plant) ☐ Back Calculation from field data ☐ Other Plant Conditions
C. Calculated Dose Rate (mrem/hr)
Time of Calculation__________

Distance	TEDE (mrem/hr)	Adult Thyroid CDE (mrem/hr)
Site Boundary		
2 Miles		
5 Miles		
10 Miles		

D. Calculated Accumulated Dose (mrem)
Calculated Duration, Hours__________

Distance	TEDE (mrem)	Adult Thyroid CDE (mrem)
Site Boundary		
2 Miles		
5 Miles		
10 Miles		

KEY

E. Sectors Affected__________

10. MEASURED OFFSITE DOSE RATES

A. Distance	Time	Reading (mR/hr)	Affected Sector
Site Boundary			
______miles			
______miles			
______miles			

B. Additional Information

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-A.1-1

Verification of the Compensation Required for a Withdrawn, Inoperable Control Rod

CANDIDATE: ______________________

EXAMINER: ______________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Verification of the Compensation Required for a Withdrawn, Inoperable Control Rod

Alternate Path: NONE

Facility JPM #: RTB 02N

K/A Rating: 001A2.03 Importance: SRO 4.2 RO 3.5

K/A Statement: Ability to (a) predict the impacts of the following malfunction or operations on the CRDS- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effect of stuck rod or Misaligned rod

Task Standard: EM-04-08, Attachment 1, reviewed and calculation determined to be performed improperly.

Preferred Evaluation Location: Simulator X In Plant ____

Preferred Evaluation Method: Perform X Simulate ____

References: EM-04-08, Shutdown Margin Requirements
Technical Data Book

Validation Time: 20 minutes Time Critical: NO

Candidate: ____________________

Time Start: ________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ____________________

____

____

Examiner: ____________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

EM-04-08, Attachment 1 (Attachment to this JPM)
Technical Data Book, Figure 14.1 (Attachment to this JPM)
Calculator

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Rod #6 is inoperable and fully withdrawn. It is believed that the rod is untrippable. Burnup is 6955 MWD/MTU. Rx power is 40%, PCS Boron is 836 ppm. All rods are out, and equilibrium Xenon conditions are established. Reactor Engineering is NOT available.

INITIATING CUES:

You have directed the Reactor Operator to determine the compensation for shutdown margin required for Control Rod #6 utilizing EM-04-08. Review the calculation using the given Attachment 1 of EM-04-08

If the attachment is completed correctly, sign the attachment when complete.

If any errors are noted, you are to make corrections to attachment and return the attachment to the Reactor Operator.

START TIME: ________

STEP 1: Locates proper procedure and required information. STANDARD: Locates EM-04-08, references Section 7.2.3 and Attachment 1, and locates Technical Data Book. NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 2: Verifies data in Section 1 for Inoperable Control Rod Identification STANDARD: Verifies data entered as Group "1", Number "6", Core Location "I-12", and Condition "Inoperable" in Section 1 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 3: Verifies data in Section 2 for Worth of Inoperable Rod STANDARD: Verifies worth as "1.17 (1.10 to 1.24)" (TDB Figure 1.1) NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 4: Verifies data in Section 3 for Source of Inoperable Control Rod Worth

STANDARD: Verifies "Technical Data Book (Figure 1.1)"

NOTES: ***NOTE: Not required to enter figure number.***

____ SAT

COMMENTS:

____ UNSAT

STEP 20: Verifies data in Section 4.A for Current Cycle Burnup

STANDARD: Verifies "6955"

NOTES: ***NOTE: Data given in initial conditions.***

____ SAT

COMMENTS:

____ UNSAT

STEP 6: Verifies data in Section 4.B for Current Reactor Power Level

STANDARD: Verifies "40"

NOTES: ***NOTE: Data given in initial conditions.***

____ SAT

COMMENTS:

____ UNSAT

STEP 7: Verifies data in Section 4.C for Control Rod Worth Inserted into Core

STANDARD: Verifies worth as "0", group as "4", and inches as "131" (TDB Figure 1.3)

NOTES: ***NOTE: Data given as "rods full out" in initial conditions.***

COMMENTS:

_____ SAT

_____ UNSAT

STEP 20: Verifies data in Section 4.D for PCS Boron Concentration

STANDARD: Verifies "836"

NOTES: ***NOTE: Data given in initial conditions.***

COMMENTS:

_____ SAT

_____ UNSAT

STEP 9: Verifies data in Section 5.E for Worth of All Control Rods

STANDARD: Verifies "7.14 (7.07 to 7.21)" (TDB Figure 1.1)

NOTES:

COMMENTS:

_____ SAT

_____ UNSAT

STEP 10: Verifies data in Section 5.F for Maximum Worth of Stuck Rod STANDARD: Verifies worth as "1.17 (1.10 to 1.24)" (TDB Figure 1.1) NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 11: Verifies data in Section 5.G for PCS Boron at 100% Power STANDARD: Verifies "700 (690 to 710)" (TDB Figure 6.1) NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 12: Verifies data in Section 5.H for Power Defect at 100% Power STANDARD: Verifies "1.59 (1.58 to 1.60)" (TDB Figure 3.2) NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 13: Verifies data in Section 5.I for Power Defect STANDARD: Verifies calculated value of "0.636 (0.632 to 0.640)" NOTES: ***NOTE: Tolerance based on previously allowed tolerances.*** COMMENTS:	____ SAT ____ UNSAT
STEP 14: Verifies data in Section 6.K for Net Amount of Shutdown Margin STANDARD: Verifies calculated value of"2.79 (2.66 to 2.92)" NOTES: ***NOTE: Tolerance based on previously allowed tolerances.*** COMMENTS:	____ SAT ____ UNSAT
STEP 15: Verifies data in Section 6.L for Worth of Inoperable Control Rod STANDARD: Verifies "1.17 (1.10 to 1.24)" NOTES: ***NOTE: Previously determined data (Step 2).*** COMMENTS:	____ SAT ____ UNSAT

STEP 16:	Verifies data in Section 6.M for Excess Shutdown Margin	***CRITICAL STEP***
STANDARD:	Calculates and determines entered value should be "1.62 (1.42 to 1.82)" instead of 0.62	
NOTES:	***Critical to identify improperly calculated value*** ***NOTE: Tolerance based on previously allowed tolerances.*** ***NOTE: Incorrect value obtained due to math error.***	____ SAT
COMMENTS:		____ UNSAT
STEP 17:	Verifies data in Section 8.R for PPC PDIL	***CRITICAL STEP***
STANDARD:	Verifies Group as "4" and Inches as "23 (20 to 25)" (TDB Figure 1.9)	
NOTES:	***Critical to correctly interpret curve since this will be PDIL for conditions.*** ***NOTE: Section 7 is NOT required.***	____ SAT
COMMENTS:		____ UNSAT

STEP 18:	Verifies data in Section 8.S for Control Rod Position Corresponding to Excess SDM	***CRITICAL STEP***
STANDARD:	Determines actual value should be Group as "3" and inches as "10" (Group 2 at 70" to Group 3 at 30") (TDB Figure 1.3), not as entered on attachment.	
NOTES:	***Critical step to determine incorrect value entered.*** ***NOTE: Tolerance based on previously allowed tolerances. Error based on previous error.***	____ SAT
COMMENTS:		____ UNSAT
STEP 19:	Verifies data in Section 8.T for PDIL for Inoperable Control Rod Condition	***CRITICAL STEP***
STANDARD:	Determines entered value should be Group as "4" and Inches as "23 (20 to 25)" (TDB Figure 1.9), not as entered on attachment.	
NOTES:	***Critical step to identify required PDIL.*** ***NOTE: Previously determined values.***	____ SAT
COMMENTS:		____ UNSAT

STEP 20: Returns attachment to Reactor Operator for corrections. STANDARD: Returns attachment to Reactor Operator for corrections. NOTES: ***NOTE: Attach completed attachment to JPM.*** COMMENTS: ***END OF TASK***	____ SAT ____ UNSAT

STOP TIME: ________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Rod #6 is inoperable and fully withdrawn. It is believed that the rod is untrippable. Burnup is 6955 MWD/MTU. Rx power is 40%, PCS Boron is 836 ppm. All rods are out, and equilibrium Xenon conditions are established. Reactor Engineering is NOT available.

INITIATING CUES:

You have directed the Reactor Operator to determine the compensation for shutdown margin required for Control Rod #6 utilizing EM-04-08. Review the calculation using the given Attachment 1 of EM-04-08

If the attachment is completed correctly, sign the attachment when complete.

If any errors are noted, you are to make corrections to attachment and return the attachment to the Reactor Operator.

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

1. **INOPERABLE OR DROPPED CONTROL ROD IDENTIFICATION:**

GROUP *A* NUMBER *6* CORE LOCATION *I-12*

CONDITION *INOPERABLE* *(Inoperable or Dropped)*

2. **WORTH OF INOPERABLE OR DROPPED CONTROL ROD** *1.17* %Δρ
(TDB Figure 1.1 or Reactor Engineering)

3. **SOURCE OF INOPERABLE OR DROPPED CONTROL ROD WORTH DATA:**

TDB Figure 1.1

4. **REFERENCE DATA**

A. CURRENT CYCLE BURNUP *6955* MWd/MTU
(TDB Fig 1.10)

B. CURRENT REACTOR POWER LEVEL *40* %
(Percent of Rated Power)

C. CONTROL ROD WORTH INSERTED INTO CORE *0* %Δρ
(TDB Fig 1.3)

GROUP *ARO* INCHES *ARO*

This Control Rod worth does not include the worth of a dropped Control Rod.

D. PCS BORON CONCENTRATION *836* ppm
(Chemistry Log or Reactor Logbook)

TDB = Technical Data Book

5. GENERAL DATA

E. WORTH OF ALL CONTROL RODS AT **A** (TDB Fig 1.1) *7.14* %Δρ

F. MAXIMUM WORTH OF STUCK CONTROL ROD AT **A** (TDB Fig 1.1) *1.17* %Δρ

G. PCS BORON AT 100% POWER AT **A** **OR** ACTUAL PCS BORON IF AT 100% POWER (TDB Fig 6.1, Reactor Log, or Chemistry Log) *700* ppm

H. POWER DEFECT AT 100% POWER (TDB Fig 3.2 and **G**) *1.59* %Δρ

I. POWER DEFECT AT POWER **B** *0.636* %Δρ

$$\frac{H \times B}{100} = \frac{(1.59) \times (40)}{100} =$$

J. REQUIRED SHUTDOWN MARGIN (4 PCPs Operating) 2.0 %Δρ

6. CALCULATION

K. NET AMOUNT OF SHUTDOWN MARGIN *2.79* %Δρ

$$\frac{(\mathbf{E} - \mathbf{C} - \mathbf{F})}{1.1} - \mathbf{I} - \mathbf{J}$$

$$= \frac{((7.14) - (0) - (1.17))}{1.1} - (0.636) - (2.0) =$$

TDB = Technical Data Book

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

L. WORTH OF INOPERABLE OR DROPPED CONTROL ROD ___1.17___ %Δρ

Step 2

M. EXCESS SHUTDOWN MARGIN WITH ONE INOPERABLE OR DROPPED CONTROL ROD ___0.62___ %Δρ

K - L = (2.79) - (1.17) =

NOTE: Step 7 only refers to Shutdown Margin. Off Normal Procedure ONP-5.1, "Control Rod Drop," requires a reduction in reactor power by boration to less than 75% within two hours of a dropped rod event due to hot channel factor concerns.

7. IF excess Shutdown Margin **(M)** is **NEGATIVE**, **THEN** borate the PCS to reduce reactor power until **M** is **POSITIVE** performing Steps **N** through **Q** to calculate the minimum reduced reactor power level.

N. POWER DEFECT AT REDUCED POWER

I + **M** = (   ) + (   ) = ___NA___ %Δρ

O. MAXIMUM REDUCED POWER LEVEL

$$\frac{\mathbf{N} \times \mathbf{B}}{\mathbf{I}} = \frac{(\quad) \times (\quad)}{(\quad)} =$$ ___NA___ %

P. Caution Tag the Control Rod joy-stick on panel C-02 that the new PDIL is Control Rod position at **C.**

Q. IF power reduction is required, **THEN** after power reduction re-perform Attachment 1 to verify Shutdown Margin requirements are satisfied.

TDB = Technical Data Book

NOTE: Step 8 only refers to Shutdown Margin. Off Normal Procedure ONP-5.1, "Control Rod Drop," requires a reduction in reactor power by boration to less than 75% within two hours of a dropped rod event due to hot channel factor concerns.

8. **IF M** is **POSITIVE, THEN** sufficient Shutdown Margin is available and no power reduction is necessary to ensure required Shutdown Margin. Perform Steps **R** though **U** to determine maximum allowable Control Rod insertion limit corresponding to excess Shutdown Margin available **(M)**.

R. PPC PDIL FOR CURRENT POWER LEVEL (TDB Fig 1.9)

Group 4

Inches 23

S. CONTROL ROD POSITION CORRESPONDING TO EXCESS SHUTDOWN MARGIN IN **M** (TDB Fig 1.3 or 5.1 and **M**)

Group 4

Inches 36

T. PDIL FOR INOPERABLE OR DROPPED CONTROL ROD CONDITION (**R** or **S**, whichever is farthest withdrawn)

Group 4

Inches 36

U. **IF** the Control Rod position in **S** is farther withdrawn than the Control Rod position in **R**, **THEN** Caution Tag the Control Rod joy-stick on panel C-02, identifying that the new PPC PDIL as the Control Rod position in **S**.

TDB = Technical Data Book

INOPERABLE OR DROPPED CONTROL ROD SHUTDOWN MARGIN CALCULATION

9. REVIEWS

N. C. Operator / Today
Performed By Date

/
Reviewed By Date

Forward Completed Form to Reactor Engineering Supervisor

/
Reactor Engineering Supervisor Date

TDB = Technical Data Book

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-A.2

Complete Operability Determination for a Failed Technical Specification Surveillance

CANDIDATE: ______________________

EXAMINER: ______________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Complete Operability Determination for a Failed Technical Specification Surveillance

Alternate Path: NONE

Facility JPM #: NEW

K/A Rating: 2.2.21 Importance: SRO 3.5 RO 2.3

K/A Statement: Knowledge of pre- and post-maintenance operability requirements.

Task Standard: Admin 3.03, Attachment 2, Condition Report Operability Determination, page 1 has been properly completed.

Preferred Evaluation Location: Simulator X In Plant ________

Preferred Evaluation Method: Perform X Simulate ________

References: Admin 3.03, Corrective Action Process
Technical Specifications

Validation Time: 20 minutes Time Critical: NO

Candidate: ______________________________

Time Start: ________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ______________________________

____

____

Examiner: ______________________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

Provide candidate with attached copy of Admin 3.03, Attachment 1.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

The plant is operating at 99.9% power. PCS Temperature is 560 °F. PCS Pressure is 2060 psia.

Charging Pump P-55B is inoperable.

Charging Pump P-55C has excessive vibration on the pump inboard bearing. QO-17, Inservice Test Procedure - Charging Pumps, has just been completed and it has been determined that P-55C is inoperable due to the vibration exceeding the Required Action Range.

System Engineering reports that vibration readings taken yesterday on Charging Pump P-55C were satisfactory.

INITIATING CUES:

Acting as the Shift Supervisor, you are to complete the given Admin 3.03, Attachment 1, SHIFT SUP Section AND Admin 3.03, Attachment 2, PIF/CR Operability Determination.

START TIME: _________

STEP 1: Locates procedure to perform operability determination STANDARD: Locates Admin 3.03 and refers to Sections 7.3.2 and Attachment 2 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 2: Determines operability for Attachment 1 entry STANDARD: Checks NO block in response to question "Equipment Currently Operable as a result of this condition?" NOTES: ***Critical to enter correct information for operability determination.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT
STEP 3: Determines transfer of operability for Attachment 1 entry STANDARD: Enters "NA" in response to "Control of Operability NOTES: ***NOTE: NA due to no work order being issued at this point, only a work request.*** COMMENTS:	____ SAT ____ UNSAT

STEP 4: Determines Immediate Reportability

STANDARD: Checks NO block in response to question "Immediately Reportable?"

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 5: Determines whether identified for future shifts

STANDARD: Checks YES or NO block

NOTES: ***NOTE: Either response is acceptable here. This would be marked YES if a caution tag were hung or some other method of identifying the problem were implemented.***

COMMENTS:

____ SAT

____ UNSAT

STEP 6: Determines Maintenance Rule Requirements

STANDARD: Checks YES or NO block

NOTES: ***NOTE: Either response is acceptable here. This could be marked YES if the candidate determined a Safety Assessment were required.***

COMMENTS:

____ SAT

____ UNSAT

STEP 7:	Enters Plant Status at Time of Condition Identification	***CRITICAL STEP***
STANDARD:	Enters POWER OPERATIONS for Plant Mode, 99.9% for Power Level, 560 °F for RCS Temperature, and 2060 psia for PCS Pressure	
NOTES:	***Critical to identify plant conditions to determine LCO entry.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 8:	Identifies Degraded Equipment/System	***CRITICAL STEP***
STANDARD:	Enters CVCS and/or P-55C (Charging Pump C) in Item #1	
NOTES:	***Critical to identify equipment system to determine LCO conditions.*** ***NOTE: May also add Boron Addition as system.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 9:	Identifies Safety Function	***CRITICAL STEP***
STANDARD:	Identifies both Reactivity Control, Inventory Control, and/or Pressure Control as safety functions affected in Item #2	
NOTES:	***Critical step to identify correct safety function(s) for operability determination*** ***NOTE: Acceptable to identify any or all of these functions.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 10:	Identifies Current Equipment/System Status	***CRITICAL STEP***
STANDARD:	Checks "Equipment is Inoperable" and "System Remains Operable" boxes in Item #3	
NOTES:	***Critical step to identify operability status of equipment and system.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 11: Determines past operability status of equipment

CRITICAL STEP

STANDARD: Checks "NO" box for past inoperability in Item #3

NOTES: ***Critical step to identify previous operability of pump.***

NOTE: Pump is considered operable since last surveillance until this surveillance failure.

Also, INITIAL CONDITIONS indicate System Engineering supplied information that vibration was satisfactory when performed yesterday.

_____ SAT

_____ UNSAT

COMMENTS:

STEP 12: Identifies NO Existing Work Order to Transfer Operability

CRITICAL STEP

STANDARD: Checks "NO" box indicating that operability control is NOT transferred to an existing work order in ITEM #4

NOTES: ***Critical step to identify control of operability.***

NOTE: A work request exists, but no work order has yet been generated.

_____ SAT

_____ UNSAT

COMMENTS:

STEP 13: Identify entry into an LCO Action Statement STANDARD: Checks YES block for LCO Action entry in Item #5 NOTES: ***Critical step to identify that a Technical Specifications LCO Action has been entered.*** COMMENTS:	***CRITICAL STEP*** _____ SAT _____ UNSAT
STEP 14: Identifies Technical Specification LCO Action Statements entered STANDARD: Enters minimum of TS 3.2.2 and TS 3.2.3 in Item #5 NOTES: ***Critical step to identify affected Technical Specifications.*** ***NOTE: May also include Standing Order 54, but not required.*** COMMENTS:	***CRITICAL STEP*** _____ SAT _____ UNSAT

STEP 15: Identifies Technical Specification LCO Action Statements

CRITICAL STEP

STANDARD: Enters "TS 3.2.3.a" OR "At least two charging pumps shall be operable. One charging pump is OPERABLE on each bus. One of the operable charging pumps may be removed from service provided that two charging pumps are restored to operable status within 24 hours. Two charging pumps may be inoperable provided that one charging pump on each bus is restored to OPERABLE status within 24 hours."

NOTES: ***Critical step to identify actions.***

COMMENTS:

_______ SAT

_______ UNSAT

STEP 16: Signs, dates, and enters time

STANDARD: Signs, enters, and enters time on attachment

NOTES:

COMMENTS:

_______ SAT

_______ UNSAT

END OF TASK

STOP TIME: _______

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The plant is operating at 99.9% power. PCS Temperature is 560 °F. PCS Pressure is 2060 psia.

Charging Pump P-55B is inoperable.

Charging Pump P-55C has excessive vibration on the pump inboard bearing. QO-17, Inservice Test Procedure - Charging Pumps, has just been completed and it has been determined that P-55C is inoperable due to the vibration exceeding the Required Action Range.

System Engineering reports that vibration readings taken yesterday on Charging Pump P-55C were satisfactory.

INITIATING CUES:

Acting as the Shift Supervisor, you are to complete the given Admin 3.03, Attachment 1, SHIFT SUP Section AND Admin 3.03, Attachment 2, PIF/CR Operability Determination.

CONDITION REPORT INITIATION

PALISADES NUCLEAR PLANT

CONDITION REPORT
(INITIATION)

C - PAL - 00 - 00XXXX

INITIATOR

TITLE: CHARGING PUMP P-55C FAILED QO-17 (INSERVICE TEST PROCEDURE)
Discovery Date and Time: TODAY, 1 HR AGO Condition Discovered By: OPERATIONS
System: CVC (CHEMICAL AND VOLUME CONT) Component ID: P-55C

DESCRIPTION OF OCCURRENCE OR CONDITION:
P-55C FAILED QO-17 DUE TO VIBRATION EXCEEDING REQUIRED ACTION RANGE PER STEP 6.2.3

IMMEDIATE ACTION TAKEN: INITIATED C-PAL AND NOTIFIED THE SS

RECOMMENDATIONS (Operability and Corrective Action): MAKE REPAIRS PER WR# XXXXX

REFERENCES: QO-17, WR # XXXXX

Evaluator Feedback to Initiator after Evaluation Requested ☐ Yes ☒ No
Initiator: CONTROL ROOM SUPERVISOR Date: TODAY Time: NOW

SHIFT SUP

Equipment Currently Operable as a result of this condition? ☐ Yes ☐ No ☐ N/A If applicable, Do Att 2
Control of Operability transferred to WO # ____________
Immediately Reportable? ☐ Yes ☐ No If Yes, Complete Attachment 4
Affected Equipment Identified for Future Shifts? ☐ Yes ☐ No
Safety Assessment per Maintenance Rule Policy Required? ☐ Yes ☐ No

LIC

Reportable: ☐ No ☐ Yes 10CFR Part # ____________
PRC: ☐ No ☐ Yes Licensing ____________

CRG

Maintenance Rule Applicable? ☐ Yes ☐ No Significance Level 1 2 3 4 (circle one)
Industry Experience? ☐ Yes ☐ No
Does past operability need assessment? ☐ Yes ☐ No If yes, CARB required.
Comments: ____________
CRG Chair: ____________ Date: ____________

MRB Chairperson: ☐ GM-Plt Ops ☐ Dept Mgr/Dir
Others:
APPROVAL: ____________ ____________
CRG Chair Date

Assigned To: ____________
Due Date: ____________

EVAL

Eval: ____________/______ Condition Review Team Leader: ____________

MRB

MRB Chair
Approval: ____________ Date: ____________

CLOSEOUT

Condition Review Team Leader: ____________ Date: ____________

PIF/CR OPERABILITY DETERMINATION

PALISADES
NUCLEAR PLANT

OPERABILITY DETERMINATION C-PAL-_____-______

Plant STATUS AT TIME OF CONDITION IDENTIFICATION:

Plant Mode: ____________________ Power Level: ______________________________
PCS Temperature: ______________ PCS Pressure: ______________________________

OPERABILITY ASSESSMENT

1. What Equipment/System is Degraded or Potentially Nonconforming? ____________________
____
____

2. What Safety Function is Performed by the Equipment/System? ____________________
____
____

3. Current Equipment/System Status as a result of this CR:

   ☐ Equipment Remains Operable ☐ System Remains Operable
   ☐ Equipment is Inoperable ☐ System is Inoperable

   Did or might the deficiency identified in the CR cause this equipment to be inoperable during past operation? ☐ Yes ☐ No If yes, consider contacting Licensing for reportability implications.
   Basis for Determination: (Page 2 May Be Used) ______________________________
   ____
   ____
   ____
   ____
   ____

4. Will condition described be resolved by an existing WO? ☐ Yes ☐ No WO #__________
   (By answering yes, the control of Operability is transferred to the WO. Enter WO # on CR and CR# on WO also.)

5. Did this condition Cause the entry into a LCO Action Statement? ☐ Yes ☐ No

   Tech Spec Reference: ______________________________
   LCO Action Statement: ______________________________
   ____

Shift Supervisor: ____________________ Date: ______________ Time: ______________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-A.4

Determine Protective Action Recommendations

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Determine Protective Action Recommendations

Alternate Path: NONE

Facility JPM #: SEP 04

K/A Rating: 2.4.44 Importance: SRO 4.0 RO 2.1

K/A Statement: Knowledge of emergency plan protective action recommendations.

Task Standard: EI-3, Attachment 1, Section 7, Protective Action Recommendations, is satisfactorily completed in less than 15 minutes.

Preferred Evaluation Location: Simulator X In Plant ________

Preferred Evaluation Method: Perform X Simulate ________

References: EI-3, Communications and Notifications
EI-6.13, Protective Action Recommendations for Offsite Populations

Validation Time: 10 minutes Time Critical: YES

Candidate: ____________________

Time Start: ________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ____________________

____

____

Examiner: ____________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS: No simulator setup required. Prepare an Attachment 1 (ATTACHED TO JPM) to EI-3 by using the offsite dose program on the computer in the simulator and enter following Met data:

QN = 0.0
QI = 0.0
Wind Speed = 1.1
Stability Class = G
Wind Direction = 235 (from)
Verify 0.7 Mev/dis, 0.0 m release height, 2 hour release duration

Fill out items 1 through 6 of Attachment 1 as follows and hand to candidate as part of cue:

CHECK "This is a drill." box
CHECK "From CR" box
CHECK "To County, State, NRC" boxes in ITEM 1
ENTER "1" in ITEM 2a
CHECK "General" box in ITEM 3d
ENTER "5 minutes ago" it TIME and "Today" in DATE in ITEM 3e
ENTER "PCS leakage to Containment" in ITEM 3f
CHECK "Stable" box in ITEM 4a
ENTER "Attempts are being made to restore cooling flow to the reactor core" in ITEM 4d
CHECK "NO" box in ITEM 5
ENTER "235 to 55" in ITEM 6a
ENTER "1.1" in ITEM 6b
ENTER "G" in ITEM 6c
ENTER "B, C, D" in ITEM 6d
CHECK "NO" box in ITEM 6e

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

1) A LOCA is in progress.
2) Safety Injection flow is inadequate.
3) Failed fuel monitor RIA-0202 is off scale high.
4) Failed fuel analysis is in progress with no results to report.
5) An actual release is NOT occurring through the plant stack or steam dumps.
6) General Emergency condition has been declared at this time.
7) Weather outside is clear with no precipitation.

INITIATING CUES:

During activation of the Site Emergency Plan, the Shift Supervisor (who is now the SED) directs you to determine the Minimum Initial Protective Action Recommendations required for this event and refers you to EI-6.13.

This recommendation is required to be passed to Van Buren County within 15 minutes of General Emergency declaration [for purposes of this JPM this means handing recommendation to the evaluator who will role play the SED].

START TIME: ________

STEP 1: Locates procedure to perform Protective Action Recommendation STANDARD: Locates EI-6.13 and refers to Attachment 2 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 2: Determine actions and enter data in Item 7A STANDARD: Checks "YES" box in Item 7A NOTES: ***Critical step to determine recommendations apply.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT
STEP 3: Determines recommendations based on plant status STANDARD: Checks "Plant Status" box in Item 7B NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 4: Determines no in-place sheltering is recommended STANDARD: Enters "NA" or leaves space blank in Item 7C NOTES: COMMENTS:	_______ SAT _______ UNSAT
STEP 5: Determines evacuation recommendations. STANDARD: Enters "Evacuate 2 mile radius and 5 miles in areas 1 & 2". NOTES: ***Critical step to determine evacuation recommendations.*** COMMENTS: ***END OF TASK***	***CRITICAL STEP*** _______ SAT _______ UNSAT

STOP TIME: _______

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

1) A LOCA is in progress.
2) Safety Injection flow is inadequate.
3) Failed fuel monitor RIA-0202 is off scale high.
4) Failed fuel analysis is in progress with no results to report.
5) An actual release is NOT occurring through the plant stack or steam dumps.
6) General Emergency condition has been declared at this time.
7) Weather outside is clear with no precipitation.

INITIATING CUES:

During activation of the Site Emergency Plan, the Shift Supervisor (who is now the SED) directs you to determine the Minimum Initial Protective Action Recommendations required for this event and refers you to EI-6.13.

This recommendation is required to be passed to Van Buren County within 15 minutes of General Emergency declaration [for purposes of this JPM this means handing recommendation to the evaluator who will role play the SED].

JPM SRO-A.4 Attachmen

REQUIRED INFORMATION

Approval: ______________________ Date: __________ Time: __________

☒ This is a drill. ☐ This is not a drill.
From: ☒ CR ☐ TSC ☐ EOF

1. To: ☒ County Name: ______________________ Time: __________
☒ State Name: ______________________ Time: __________
☒ NRC Name: ______________________ Time: __________
2. PALISADES 2A. PLANT MESSAGE NUMBER 1
3. CLASS OF EMERGENCY
A. ☐ Unusual Event B. ☐ Alert C. ☐ Site Area Emergency D. ☒ General Emergency
E. This classification declared by Plant at: Time: 5 min ago Date: Today
F. Initiating Conditions/Description of Event:
PCS Leakage into Containment

4. PLANT STATUS
A. ☒ Stable B. ☐ Degrading C. ☐ Improving
D. Additional Information:
Attempts are being made to restore cooling flow to the reactor core

5. RADIOLOGICAL RELEASE IN PROGRESS: ☐ YES ☒ NO

6. METEOROLOGICAL DATA
A. Wind Dir., Degrees From: 235. To: 55. B. Wind Speed, MPH: 1.1 C. Stability Class: G
D. Three Downwind Sectors: C B D E. Precipitation: ☐ YES ☒ NO

7. PROTECTIVE ACTION RECOMMENDATIONS
A. ☐ YES ☐ NO
Note: If YES fill in following information.
B. PAR based on: ☐ Dose Calculations ☐ Plant Status ☐ Other: __________
C. In-place Shelter (Areas): __________
D. Evacuation (Areas): __________

AS AVAILABLE

8. RADIOLOGICAL RELEASE DATA
A. Time release started: __________ Projected duration of release, hours: 2.00
B. ☐ Airborne ☐ Waterborne ☐ Waterborne Analysis Attached
C. Effluent Points: __________
D. Noble gas release rate, Ci/sec 0.000E+00 Sample___ Monitor___ Estimate___
E. Average energy per disintegration, MeV .700 Sample___ Monitor___ Estimate___
F. Equivalent I-131 release rate, Ci/sec 0.000E+00 Sample___ Monitor___ Estimate___
G. Particulate release rate Ci/sec__________ Sample___ Estimate___

9. CALCULATED OFFSITE DOSES
A. ☐ Actual ☐ Potential
B. Based on: ☐ Monitor (in Plant) ☐ Sample (in Plant)
☐ Back Calculation from Field Data ☐ Other Plant Conditions
C. Calculated Dose Rate (mrem/hr)
Time of Calculation: __________

Distance	TEDE (mrem/hr)	Adult Thyroid CDE (mrem/hr)
Site Boundary		
2 Miles		
5 Miles		
10 Miles		

D. Calculated Accumulated Dose (mrem)
Calculated Duration, Hours: 2.00

Distance	TEDE (mrem)	Adult Thyroid CDE (mrem)
Site Boundary		
2 Miles		
5 Miles		
10 Miles		

E. Sectors Affected: __________

10. MEASURED OFFSITE DOSE RATES
A.

Distance	Time	Reading (mR/hr)	Affected Sector
Site Boundary			
______ miles			
______ miles			
______ miles			

B. Additional Information

JPM SRO-A.4 Key

REQUIRED INFORMATION

Approval: ____________________ Date: __________ Time: __________

☒ This is a drill. ☐ This is not a drill.
From: ☒ CR ☐ TSC ☐ EOF

KEY

1. To: ☒ County Name: ____________ Time: __________
☒ State Name: ____________ Time: __________
☒ NRC Name: ____________ Time: __________

2. PALISADES 2A. PLANT MESSAGE NUMBER 1

3. CLASS OF EMERGENCY
A. ☐ Unusual Event B. ☐ Alert C. ☐ Site Area Emergency D. ☒ General Emergency
E. This classification declared by Plant at: Time: 5 min ago Date: Today
F. Initiating Conditions/Description of Event:
PCS leakage into Containment

4. PLANT STATUS
A. ☒ Stable B. ☐ Degrading C. ☐ Improving
D. Additional Information:
Attempts are being made to restore cooling flow to the reactor core

5. RADIOLOGICAL RELEASE IN PROGRESS: ☐ YES ☒ NO

6. METEOROLOGICAL DATA
A. Wind Dir., Degrees From: 235. To: 55. B. Wind Speed, MPH: 1.1 C. Stability Class: G
D. Three Downwind Sectors: C B D E. Precipitation: ☐ YES ☒ NO

7. PROTECTIVE ACTION RECOMMENDATIONS
A. ☒ YES ☐ NO
Note: If YES fill in following information.
B. PAR based on: ☐ Dose Calculations ☒ Plant Status ☐ Other: __________
C. In-place Shelter (Areas): NA
D. Evacuation (Areas): 2 mile radius and 5 miles in areas 1 & 2

Req'd

AS AVAILABLE

8. RADIOLOGICAL RELEASE DATA
A. Time release started: __________ Projected duration of release, hours: 2.00
B. ☐ Airborne ☐ Waterborne ☐ Waterborne Analysis Attached
C. Effluent Points:
D. Noble gas release rate, Ci/sec 0.000E+00 Sample___ Monitor___ Estimate___
E. Average energy per disintegration, MeV .700 Sample___ Monitor___ Estimate___
F. Equivalent I-131 release rate, Ci/sec 0.000E+00 Sample___ Monitor___ Estimate___
G. Particulate release rate Ci/sec __________ Sample___ Estimate___

9. CALCULATED OFFSITE DOSES
A. ☐ Actual ☐ Potential
B. Based on: ☐ Monitor (in Plant) ☐ Sample (in Plant)
☐ Back Calculation from Field Data ☐ Other Plant Conditions
C. Calculated Dose Rate (mrem/hr)
Time of Calculation: __________

Distance	TEDE (mrem/hr)	Adult Thyroid CDE (mrem/hr)
Site Boundary		
2 Miles		
5 Miles		
10 Miles		

KEY

D. Calculated Accumulated Dose (mrem)
Calculated Duration, Hours: 2.00

Distance	TEDE (mrem)	Adult Thyroid CDE (mrem)
Site Boundary		
2 Miles		
5 Miles		
10 Miles		

E. Sectors Affected: __________

10. MEASURED OFFSITE DOSE RATES

A. Distance	Time	Reading (mR/hr)	Affected Sector
Site Boundary			
____ miles			
____ miles			
____ miles			

B. Additional Information

INITIAL SUBMITTAL OF THE WALKTHROUGH JPMS

FOR THE PALISADES INITIAL EXAMINATION THE WEEK OF MAY 22, 2000

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-B.1-01

Test Cycle CV-3025

CANDIDATE: ______________________

EXAMINER: ______________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Test Cycle CV-3025

Alternate Path: NONE

Facility JPM #: NEW

K/A Rating: 006A4.02 Importance: SRO 3.8 RO 4.0

K/A Statement: Ability to manually operate and/or monitor in the control room: Valves

Task Standard: Test cycling of CV-3025 has been completed per SOP-3.

Preferred Evaluation Location: Simulator X In Plant ____

Preferred Evaluation Method: Perform X Simulate ____

References: SOP-3, Safety Injection and Shutdown Cooling System

Validation Time: 5 minutes Time Critical: NO

Candidate: ____________________

Time Start: ________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ____________________

____

____

Examiner: ____________________ Date: ________

Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- IC-11

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Shutdown Cooling HX Discharge CV-3025 has had maintenance performed on its operator.

INITIATING CUES:

You have been directed to cycle CV-3025 for post-maintenance testing in accordance with SOP-3, Section 7.9.2.

START TIME: ________

STEP 1:	Obtains current procedure	
STANDARD:	Obtains copy of SOP-3 and refers to Section 7.9.2	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 2:	Close CV-3224, E-60A Outlet	***CRITICAL STEP***
STANDARD:	Using Key 137, places CV-3224, in CLOSE on C-03 and observes RED light OFF and GREEN light ON	
NOTES:	***Critical step to perform proper valve alignment.***	____ SAT
COMMENTS:		____ UNSAT
STEP 3:	Close CV-3213, E-60B Outlet	***CRITICAL STEP***
STANDARD:	Using Key 135, places CV-3213, in CLOSE on C-03 and observes RED light OFF and GREEN light ON	
NOTES:	***Critical step to perform proper valve alignment.***	____ SAT
COMMENTS:		____ UNSAT

STEP 4:	Open CV-3025, Shutdown Cooling Outlet Valve from the SDCHX	***CRITICAL STEP***
STANDARD:	Using Key 97, places CV-3025, in MANUAL on C-02 and raises HIC-3025A output to 100%	
NOTES:	***Critical step to stroke valve open.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 5:	Close CV-3025, Shutdown Cooling Outlet Valve from the SDCHX	***CRITICAL STEP***
STANDARD:	Lowers HIC-3025A output to 0%, and using Key 97, places CV-3025, in CLOSE	
NOTES:	***Critical step to stroke valve closed.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 6:	Open CV-3224, E-60A Outlet	***CRITICAL STEP***
STANDARD:	Using Key 137, places CV-3224, in OPEN on C-03 and observes RED light ON and GREEN light OFF	
NOTES:	***Critical step to perform proper valve alignment.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 7: Open CV-3213, E-60B Outlet STANDARD: Using Key 135, places CV-3213, in OPEN on C-03 and observes RED light ON and GREEN light OFF NOTES: ***Critical step to perform proper valve alignment.*** COMMENTS:	***CRITICAL STEP*** _____ SAT _____ UNSAT
STEP 7: Informs Shift Supervisor of completion STANDARD: Informs Shift Supervisor that CV-3025 has been cycled in accordance with SOP-3 NOTES: COMMENTS: ***END OF TASK***	_____ SAT _____ UNSAT

STOP TIME: __________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Shutdown Cooling HX Discharge CV-3025 has had maintenance performed on its operator.

INITIATING CUES:

You have been directed to cycle CV-3025 for post-maintenance testing in accordance with SOP-3, Section 7.9.2.

JPM SRO-B.1-01
IS THE SAME AS
JPM RO-B.1-01

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-B.1-02

Start a Primary Coolant Pump

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Start a Primary Coolant Pump

Alternate Path: PCP has high vibration on start, requiring pump trip.

Facility JPM #: ASED 01 (Modified)

K/A Rating: 003A4.06 Importance: SRO 2.9 RO 2.9

K/A Statement: Ability to manually operate and/or monitor in the control room: RCP parameters

Task Standard: PCP P-50A has been stopped.

Preferred Evaluation Location: Simulator X In Plant ____

Preferred Evaluation Method: Perform X Simulate ____

References: SOP-1, Primary Coolant System
ARP-5, Primary Coolant Pump Steam Generator and Rod Drives Scheme EK-09

Validation Time: 15 minutes Time Critical: NO

Candidate: ____

Time Start: ____ Time Finish: ____

Performance Time: ____ minutes

Performance Rating: SAT ____ UNSAT ____

Comments: ____

Examiner: ____ Date: ____
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- IC-12
- Insert MALF RC16A, High Vibration on PCP P-50A
- Run P-50A until high vibration condition alarms
- Trip the reactor and stop P-50A
- Acknowledge and reset all alarms, including vibration monitor alarms
- Place oil pump hand switches for P-50A in OFF position
- Insert OVRD AO TIA-0133A, Severity = 70%, Ramp = 20 sec, Trigger ZDI2P(126).GT.0
- Insert OVRD AO TIA-0138A, Severity = 70%, Ramp = 20 sec, Trigger ZDI2P(126).GT.0
- Insert OVRD AO TIA-0139A, Severity = 70%, Ramp = 20 sec, Trigger ZDI2P(126).GT.0
- Insert OVRD AO LIA-0137A, Severity = 10%, Ramp = 15 sec, Trigger ZDI2P(126).GT.0

READ TO OPERATOR

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INITIAL CONDITIONS:

Primary Coolant Pumps P-50B, 50C and 50D are in service. The plant is in Hot Shutdown. Proper Shutdown margin has been verified.

INITIATING CUES:

During a plant hot shutdown outage, oil was added to P-50A oil reservior. The Shift Supervisor directs you to start PCP P-50A in accordance with SOP-1, Section 7.2.3.

Testing of the lift system is NOT required.

START TIME: ________

STEP 1: Obtains current procedure STANDARD: Obtains copy of SOP-1 and refers to Section 7.2.3 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 2: Ensures EK09-31, PRI COOLANT PUMP P-50A CLG WTR LO FLOW, not in alarm STANDARD: Notes annunciator window EK09-31 is NOT lit NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 3: Verify OPEN PCP Controlled Bleed Off Relief Stop Valve CV-2191 STANDARD: Verifies hand switch in OPEN and verifies red light LIT and green light OFF NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 4: Verifies PCP Controlled Bleed Off Isolation Valve CV-2083 OPEN STANDARD: Verifies red light LIT and green light OFF NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 5: Verifies PCP Controlled Bleed Off Isolation Valve CV-2099 OPEN STANDARD: Verifies red light LIT and green light OFF NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 6: PCP Controlled Bleed Off Header Pressure Indicator PIA-0215, on C-02, reading between 25 to 100 psi STANDARD: Dispatches an AO to adjust pressure as needed by throttling PCP Controlled Bleed Off Valve MV-2194 NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 7: Verifies positive indication of PCP Controlled Bleed Off Flow for P-50A (located on recorders FR-0133 A/B and FR-0143 A/B on C-11 or Pressure Breakdown across stages) STANDARD: Monitors indication located on recorders FR-0133 A/B and FR-0143 A/B on C-11 or Pressure Breakdown across stages NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 8: Ensures PCS pressure maintained within the limits of Attachment 2, "Pressure and Temperature Limits," and above the "Minimum Pressure for PCP Operation" curve STANDARD: Refers to Attachment 2 and determines pressure conditions satisfied NOTES: ***NOTE: May not reference due to other pumps already operating. This is acceptable.*** COMMENTS:	____ SAT ____ UNSAT
STEP 9: Verifes Section 4.2 requirements are met STANDARD: Refers to Section 4.2 and verifies requirements met NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 10:	Verifies the restrictions of Technical Specification 3.1.1.h are met	
STANDARD:	Refers to Technical Specificaion 3.1.1.h and determines restrictions met	
NOTES:	***NOTE: May not reference since other pumps are already operating. This is acceptable.***	____ SAT
COMMENTS:		____ UNSAT
STEP 11:	Verifies the conditions of Section 5.2.4 are met	
STANDARD:	Refers to Section 5.2.4 and determines conditions met	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 12:	Start the AC or DC Oil Lift Pump for PCP P-50A	***CRITICAL STEP***
STANDARD:	Places either P-80A (AC) or P-81A (DC) hand switch to HAND and verifies red light LIT and green light OFF	
NOTES:	***Critical step to develop pressure to meet interlock.***	____ SAT
COMMENTS:		____ UNSAT

STEP 13: If lift oil pressure interlock is NOT satisfied with one lift pump operating, start the second Oil Lift Pump for P-50A

STANDARD: Verifies white light above P-50A hand switch is LIT and determines no need to start additional lift pump

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 14: Verifies P-50A oil permissive met

STANDARD: Verifes white PUMP START OIL PERMISSIVE light LIT for P-50A

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 15: When oil lift pump(s) have been operating for at least two minutes, then start P-50A

CRITICAL STEP

STANDARD: After 2 or more minutes, places P-50A hand switch in START and verify red light LIT and green light OFF

NOTES: ***Critical step to start PCP.***

Cue: Two minutes have elapsed.

COMMENTS:

____ SAT

____ UNSAT

STEP 16: Place AC and DC Oil Lift Pump handswitches to AUTO

STANDARD: After P-50A amps return to normal following the starting amp surge and after two minutes have elapsed from the start of the PCP, places P-80A and P-81A hand switches in AUTO and verifies red light OFF and green light LIT

NOTES: ***NOTE: Depending on timing of vibration condition, this may not be completed.***

COMMENTS:

___ SAT

___ UNSAT

STEP 17: Acknowledge high vibration alarm and refer to ARP-5

STANDARD: Acknowledges alarm and refers to ARP-5, EK09-13, Pri Coolant Pump Vibration Alert

NOTES: ***SIMULATOR OPERATOR: Insert OVRDs for bearing temperatures and controlled bleedoff.***

COMMENTS:

___ SAT

___ UNSAT

STEP 18: Confirm increased PCP vibration by observing both vertical and horizontal probes

STANDARD: Monitors vibration and determines vibration rising at a rapid rate

NOTES: ***NOTE: If Shift Supervisor notified, inform candidate to follow actions of ARP.***

COMMENTS:

___ SAT

___ UNSAT

STEP 19: Remove PCP from service as soon as plant conditions permit per SOP-1, Section 7.2.5

STANDARD: Refers to SOP-1, Section 7.2.5

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 20: Verifies the reactor is tripped

STANDARD: Verifies all rods on bottom of core

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 21: Push reactor trip pushbutton on C-06 within 12 hours of event

STANDARD: Notes that trip pushbutton must be depressed within 12 hours

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 22:	If previously stopped and if time allows, start the AC or DC Oil Lift Pump for P-50A and allow to operate for approximately two minutes	
STANDARD:	Places either P-80A (AC) or P-81A (DC) hand switch to HAND and verifies red light LIT and green light OFF	
NOTES:		___ SAT
COMMENTS:		___ UNSAT
STEP 23:	Stop PCP P-50A	***CRITICAL STEP***
STANDARD:	Places hand switch on C-02 in TRIP and verifies red light OFF and green light LIT	
NOTES:	***Critical step to stop PCP to prevent further damage.***	___ SAT
COMMENTS:		___ UNSAT
STEP 24:	When at least five minutes have elapsed since stopping P-50A, then stop oil lift pumps	***CRITICAL STEP***
STANDARD:	Places AC (P-80A) and DC (P-81A) Oil Lift Pump hand switches to OFF and verifies green light LIT and red light OFF	
NOTES:	***Critical step to establish conditions required for secured PCP.***	
	Cue: Five minutes have elapsed.	___ SAT
COMMENTS:		___ UNSAT

STEP 25: Verify proper shutdown margin

STANDARD: Refers to EM-04-08, Shutdown Margin Requirements, or determines adequate shutdown margin based on initial conditions

NOTES: ***NOTE: Proper shutdown margin was identified in INITIAL CONDITIONS.***

COMMENTS:

____ SAT

____ UNSAT

STEP 26: Inform Shift Supervisor of status

STANDARD: Notifies Shift Supervisor that P-50A is stopped due to high vibration

NOTES:

COMMENTS:

____ SAT

____ UNSAT

END OF TASK

STOP TIME: ________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Primary Coolant Pumps P-50B, 50C and 50D are in service. The plant is in Hot Shutdown. Proper Shutdown margin has been verified.

INITIATING CUES:

During a plant hot shutdown outage, oil was added to P-50A oil reservior. The Shift Supervisor directs you to start PCP P-50A in accordance with SOP-1, Section 7.2.3.

Testing of the lift system is NOT required.

JPM SRO-B.1-02
IS THE SAME AS
JPM RO-B.1-02

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-B.1-03

Manually Lower Pressurizer Pressure

CANDIDATE: ______________________

EXAMINER: ______________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Manually Lower Pressurizer Pressure

Alternate Path: Spray valve sticks open while lowering pressure

Facility JPM #: NEW

K/A Rating: 010A2.02 Importance: SRO 3.9 RO 3.9

K/A Statement: Ability to (a) predict the impacts of the following malfunctions or operations on the PZR PCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Spray valve failures

Task Standard: Reactor Trip is initiated due to lowering PCS pressure.

Preferred Evaluation Location: Simulator X In Plant ____

Preferred Evaluation Method: Perform X Simulate ____

References: SOP-1, Primary Coolant System
ONP-18, Pressurizer Pressure Control Malfunctions

Validation Time: 5 minutes Time Critical: NO

Candidate: ____________________

Time Start: ________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ____________________

Examiner: ____________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- IC-11; place Spray Valve CV-1057 hand switch in CLOSE
- Insert MALF RC17 at a severity of 100% using Trigger ZDIZP(160).GT.0 (when the valve begins to open).

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Pressurizer Spray Valve CV-1057 has just had repairs performed on its control circuit.

INITIATING CUES:

The Shift Supervisor has directed you to MANUALLY stroke CV-1057 full open and closed in accordance with SOP-1, Section 7.3.2, for post-maintenance testing.

Pressurizer pressure is to be maintained above 2000 psia at all times during the valve stroke.

START TIME: ________

STEP 1: Obtains current procedure STANDARD: Obtains copy of SOP-1, Section 7.3.2 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 2: Verify all Backup Heater Group Switches in MANUAL and all Proportional Heater Group Switches in ON. STANDARD: Verifies hand switches for Backup Heaters in MAN with red lights LIT and green lights OFF and verifies hand switches for Proportional Heaters in ON with red lights LIT and green lights OFF NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 3: Verify Pressurizer Spray Valves CV-1057 and CV-1059 in AUTO STANDARD: Verifies or places hand switches in AUTO NOTES: ***Critical step to place CV-1057 in AUTO to permit valve stroke.*** ***NOTE: Red and green light indication will be determined by controller output at this time.*** ***May place CV-1059 in CLOSE to prevent pressure from lowering too rapidly while stroking CV-1057.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT

STEP 4:	Ensure Pressurizer Heater Control Channel Selector Switch in CHAN A & B	
STANDARD:	Verifies switch in mid (CHAN A & B) position	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 5:	Depress the "M" pushbutton on selected controller	***CRITICAL STEP***
STANDARD:	Depresses the "M" pushbutton on Channel B controller	
NOTES:	***Critical step to allow stroking valve.***	____ SAT
COMMENTS:		____ UNSAT
STEP 6:	Adjust output to cause PZR Spray Valve CV-1057 to ramp open	***CRITICAL STEP***
STANDARD:	Raises output above 50% on Channel B controller.	
NOTES:	***Critical step to cause valve to stroke open.***	
	NOTE: Enter MALF RC17 at severity of 100%.	____ SAT
COMMENTS:		____ UNSAT

STEP 7: Monitors Pressurizer Pressure and CV-1057 position STANDARD: Determines pressurizer pressure is lowering and CV-1057 has fully opened by red light LIT and green light OFF NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 8: Attempts to close CV-1057 STANDARD: Lowers output on controller below 50% and/or places hand switch for CV-1057 in CLOSE NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 9: Notifies Shift Supervisor of problems with CV-1057 STANDARD: Notifies Shift Supervisor NOTES: ***Cue: If SS notified, direct candidate to respond per applicable ONP.*** COMMENTS:	____ SAT ____ UNSAT

STEP 10: Refers to ONP-18 STANDARD: Refers to ONP-18, Section 4.2.1 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 11: Initiates reactor trip STANDARD: Depresses reactor trip push button on C-02 NOTES: ***Critical step to trip reactor in anticipation of automatic trip.*** COMMENTS: ***END OF TASK***	***CRITICAL STEP*** ____ SAT ____ UNSAT

STOP TIME: __________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Pressurizer Spray Valve CV-1057 has just had repairs performed on its control circuit.

INITIATING CUES:

The Shift Supervisor has directed you to MANUALLY stroke CV-1057 full open and closed in accordance with SOP-1, Section 7.3.2, for post-maintenance testing.

Pressurizer pressure is to be maintained above 2000 psia at all times during the valve stroke.

JPM SRO-B.1-03
IS THE SAME AS
JPM RO-B.1-03

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-B.1-04

Perform a Dropped Rod Test

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Perform a Dropped Rod Test

Alternate Path: NONE

Facility JPM #: NEW

K/A Rating: 001A4.06 Importance: SRO 3.2 RO 2.9

K/A Statement: Ability to manually operate and/or monitor in the control room: Control rod drive disconnect/connect

Task Standard: Control Rod drop test timing is completed for Rod 31.

Preferred Evaluation Location: Simulator X In Plant ____

Preferred Evaluation Method: Perform X Simulate ____

References: RO-22, Control Rod Drop Times

Validation Time: 20 minutes Time Critical: NO

Candidate: ____

Time Start: ____ Time Finish: ____

Performance Time: ____ minutes

Performance Rating: SAT ____ UNSAT ____

Comments: ____

____

____

Examiner: ____ Date: ____

Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- Any Hot Shutdown IC
- Insert all rods, including part lengths, to bottom of core
- Perform Sections 5.2 and 5.3 of RO-22
- Provide candidate with attached RO-22, Attachment 1

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Control Rod Drop Time Testing is being performed using the Plant Computer. Rod Drop Timing is NOT required to be measured using a recorder.

INITIATING CUES:

The Shift Supervisor has directed you to perform Sections 5.4 and 5.5 of RO-22, "Control Rod Drop Times", for Control Rod 31.

START TIME: ________

STEP 1: Obtains current procedures STANDARD: Obtains copy of RO-22, Sections 5.4 and 5.5, and Attachment 1 NOTES: ***NOTE: Provide candidate with partially completed Attachment 2.*** COMMENTS:	____ SAT ____ UNSAT
STEP 2: Set start and stop position for dropped rod timing on PPC STANDARD: On PPC workstation display 420, enters the start position as "130" and stop position as "13" NOTES: ***Critical step to allow timing of dropped rod.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT
STEP 3: Obtains copy of SOP-6 to withdraw Rod 31 STANDARD: Obtains current copy of SOP-6 and refers to Section 7.4 NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 4:	Selects Rod 31 for withdrawal	***CRITICAL STEP***
STANDARD:	Rotates Group 2 Rod Selector Switch to Rod 31 position	
NOTES:	***Critical step to allow movement of Rod 31***	____ SAT
COMMENTS:		____ UNSAT
STEP 5:	Selects Rod Group containing Rod 31	***CRITICAL***
STANDARD:	Rotates Rod Control Group Select Switch to Group 2 position	
NOTES:	***Critical step to allow movement of Rod 31***	____ SAT
COMMENTS:		____ UNSAT
STEP 6:	Aligns rod control to allow individual rod movement	***CRITICAL STEP***
STANDARD:	Rotates Rod Control Mode Select switch to Manual Individual (MI) position	
NOTES:	***Critical step to allow movement of only Rod 31.***	____ SAT
COMMENTS:		____ UNSAT

STEP 7:	Withdraws Rod 31 to Upper Electrical Limit (UEL)	***CRITICAL STEP***
STANDARD:	Places Raise-Lower Switch to Raise position	
NOTES:	***Critical step to allow outward movement of Rod***	____ SAT
COMMENTS:		____ UNSAT

STEP 8:	Record position when red matrix light illuminated	***CRITICAL STEP***
STANDARD:	Records position on Attachment 1 as 131 ± 0.5	
NOTES:	***Critical step to record correct data for test.***	____ SAT
COMMENTS:		____ UNSAT

STEP 9:	Record full out rod position for Rod 31	***CRITICAL STEP***
STANDARD:	Refers to PPC display 412 and records full out position on Attachment 1 for Rod 31 as 131 ± 0.5	
NOTES:	***Critical step to record correct data for test.***	____ SAT
COMMENTS:		____ UNSAT

STEP 10:	Enters rod number for rod to be tested	***CRITICAL STEP***
STANDARD:	On PPC display 420, enters Rod 31	
NOTES:	***Critical step to enter rod number to ensure PPC monitors correct rod.***	____ SAT
COMMENTS:		____ UNSAT
STEP 11:	Start testing sequence on PPC	***CRITICAL STEP***
STANDARD:	On PPC display 420, sets START NEW TEST to YES	
NOTES:	***Critical step to allow PPC to monitor testing.***	____ SAT
COMMENTS:		____ UNSAT
STEP 12:	Trip the selected rod	***TIME CRITICAL STEP***
STANDARD:	After TEST STATUS changes to TESTING on PPC display 420, trips Rod 31 at the Rod Drop Test Panel by placing Rod 31 toggle to CLUTCH OFF	
NOTES:	***Time critical step to place Rod 31 in CLUTCH OFF position within 30 seconds of entering starting test in previous step.***	____ SAT
COMMENTS:		____ UNSAT

STEP 13: Verify test completion status on PPC STANDARD: On PPC display 420, verifies TEST STATUS indicates COMPLETE NOTES: ***NOTE: If test failure due to rod being dropped from below 130 inches or due to not placing toggle in CLUTCH OFF within 30 seconds, it is acceptable to repeat test for Rod 31.*** COMMENTS:	____ SAT ____ UNSAT
STEP 14: Reset trip toggle for rod STANDARD: Places toggle for Rod 31 at Rod Drop Test Panel to CLUTCH ON position NOTES: ***Critical step to allow withdrawing Rod 31 to complete testing.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT
STEP 15: Records Rod Drop Clutch Time for Rod 31 STANDARD: Records Rod 31 Rod Drop Clutch Time per PPC display on Attachment 1 NOTES: ***Critical step to record correct data for test.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT

STEP 16: Withdraw dropped rod to clear rod drop alarm

CRITICAL STEP

STANDARD: Withdraws Rod 31 by placing Raise-Lower Lever to Raise position and withdraws Rod 31 to between 4 and 5 inches and records alarm clear and position on Attachment 1

NOTES: ***Critical step to clear rod drop alarm for data collection.***

COMMENTS:

____ SAT

____ UNSAT

STEP 17: Insert rod to Lower Electrical Limit (LEL) position

CRITICAL STEP

STANDARD: Inserts Rod 31 to LEL by placing Raise-Lower Lever to Lower position until rod motion stops

NOTES: ***Critical step to determine LEL position for data.***

COMMENTS:

____ SAT

____ UNSAT

STEP 18: Record LEL position

CRITICAL STEP

STANDARD: Records LEL position for Rod 31 as 2.9 ± 0.2 inches on Attachment 1

NOTES: ***Critical step to record correct data for test.***

COMMENTS:

____ SAT

____ UNSAT

STEP 19: Record time and date of rod test completion STANDARD: Records current date and time on Attachment 1 and initials NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 20: Prints rod drop position display profile and rod drop times STANDARD: Prints PPC displays 421 and 422 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 21: Notify Shift Supervisor that rod drop testing for Rod 31 is complete STANDARD: Notifies Shift Supervisor NOTES: COMMENTS: ***END OF TASK***	____ SAT ____ UNSAT

STOP TIME: __________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Control Rod Drop Time Testing is being performed using the Plant Computer. Rod Drop Timing is NOT required to be measured using a recorder.

INITIATING CUES:

The Shift Supervisor has directed you to perform Sections 5.4 and 5.5 of RO-22, "Control Rod Drop Times", for Control Rod 31.

CRDM DATA SHEET
TIMED TESTING

Proc RO-22
Attachment 1
Revision 16
Page 1 of 4

Step 5.2.5 Primary Coolant Temp 533 F° (T$_{AV}$ TI-0110) Primary Coolant Pressure 2060 psi (PI-0104) Recorded By: AC / Date

Step 5.3.8 Dropped Rod Alarm (EK-0948) is Clear -- Verified By: AE / Date

Step	5.3.2	5.3.3	5.5.2	5.5.3	5.5.10	5.5.11	5.5.12	5.5.13	5.5.14	Initial	
Rod No	Rod Position at LEL	Green Matrix Light (√)	Red Matrix Light Position	UEL Full Out Position	Rod Drop Clutch Time From Full Out	Alarm EK-0948 (√)	Alarm Reset Position	Rod Position At LEL	Test Completed (Time)	Performed By	Verified By
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											

Comments

CRDM D A SHEET
TIMED ESTING

Proc RO-22
Attachment 1
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Page 2 of 4

Step	5.3.2	5.3.3	5.5.2	5.5.3	5.5.10	5.5.11	5.5.12	5.5.13	5.5.14	Initial	
Rod No	Rod Position at LEL	Green Matrix Light (√)	Red Matrix Light Position	UEL Full Out Position	Rod Drop Clutch Time From Full Out	Alarm EK-0948 (√)	Alarm Reset Position	Rod Position At LEL	Test Completed (Time)	Performed By	Verified By
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											

Comments ____

____

____

CRDM I 'A SHEET
TIMED TESTING

Step	5.3.2	5.3.3	5.5.2	5.5.3	5.5.10	5.5.11	5.5.12	5.5.13	5.5.14	Initial	
Rod No	Rod Position at LEL	Green Matrix Light (√)	Red Matrix Light Position	UEL Full Out Position	Rod Drop Clutch Time From Full Out	Alarm EK-0948 (√)	Alarm Reset Position	Rod Position At LEL	Test Completed (Time)	Performed By	Verified By
24											
25											
26											
27											
28											
29											
30											
31	2.9	✓									
32											
33											
34											
35											

Comments ______________________________

CRDM DATA SHEET
TIMED TESTING

Step	5.3.2	5.3.3/ 5.3.5	5.5.2	5.5.3	5.5.10	5.5.11	5.5.12	5.5.13	5.5.14	Initial	
Rod No	Rod Position at LEL	Green Matrix Light (√)	Red Matrix Light Position	UEL Full Out Position	Rod Drop Clutch Time From Full Out	Alarm EK-0948 (√)	Alarm Reset Position	Rod Position At LEL	Test Completed (Time)	Performed By	Verified By
36											
37											
38											
39											
40											
41											
42	▨		▨	▨	▨	▨	▨	▨	▨		
43	▨		▨	▨	▨	▨	▨	▨	▨		
44	▨		▨	▨	▨	▨	▨	▨	▨		
45	▨		▨	▨	▨	▨	▨	▨	▨		

Comments ____

Procedure No RO-22
Revision 16
Issued Date 4/13/99

PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATION SURVEILLANCE PROCEDURE

TITLE: CONTROL ROD DROP TIMES

For NRC Review for Reference Use

	4/12/99
Procedure Sponsor	Date
JDSlinkard	2/4/98
Technical Reviewer	Date
TRSteffler	2/7/98
User Reviewer	Date

Proc No RO-22
Revision 16

PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATION SURVEILLANCE AND SPECIAL TEST PROCEDURE
ISSUE AND ROUTING SHEET

TITLE: CONTROL ROD DROP TIMES

ISSUED TO Operations Supervisor FREQUENCY Refueling COLD SHUTDOWN REQUIRED (Y/N) No

SPECIAL REQUIREMENTS Hot shutdown with reactor reset

EQUIPMENT	EQUIPMENT	EQUIPMENT	EQUIPMENT	ASSOCIATED EQUIPMENT
Control Rods 1-41	CRD-1 through CRD-41			

SPECIAL INST

ROUTE AFTER COMPLETION (ORDER NO IN BOX)

1	1st LINE SUPV						
*2	SS/SE						
3	SURV PROG SCHED						
4	SYSTEM ENG						
5	SYS ENG SEC HD						
6	OPS SUPPORT SUPV						
7	SURV PROG SCHED						
8	ERC						

* Required only if inoperable equipment.

PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATION SURVEILLANCE PROCEDURE
ACCEPTANCE CRITERIA AND OPERABILITY SHEET

Proc No RO-22
Revision 16
Page 1 of 2

TITLE: CONTROL ROD DROP TIMES

---

1. Is Section 6.0 acceptance criteria met? ☐ YES ☐ NO

   If "NO" box checked, then provide explanation on page 2. (Include justification for equipment operability if applicable.)

   ______________________ / ________
   First Line Supervisor Date

2. Is all tested equipment operable? ☐ YES ☐ NO
   If "NO" box checked, then provide explanation on page 2.

   ______________________ / ________ / ________
   First Line Supervisor Date Time

3. Are the Limiting Safety System Settings, applicable LCO Action Statements, or Surveillance Requirements required by Technical Specifications met?

   Chapter 2 Section(s) None
   Chapter 3 Section(s) 3.1.1b, 3.1.3d, 3.10.1e, 3.10.4b, 3.10.5, 3.10.6, 3.10.7 and Tables 3.17.1 and 3.17.6 Items 1, 2, and 13
   Chapter 4 Section(s) 4.2, Table 4.2.2 Item 1

   ☐ YES ☐ NO

   If "NO" box is checked, provide explanation and justification for continued Plant operation on page 2.

   ______________________ / ________
   First Line Supervisor Date

4. If "NO" box was checked in Item 1, 2, or 3 above, identify corrective action document.

   CR: ☐ YES ☐ NO # ____________
   WR/WO: ☐ YES ☐ NO # ____________

5. If **"NO"** box was checked in Item 1, 2, or 3 above, notify SS/SE.

   SS/SE Review: ______________________ / ________ / ________
   Signature Date Time

6. Technical Review Acceptable: ☐ YES ☐ NO

   Retest Required: ☐ YES ☐ NO Change Frequency To: ____________

   If Technical Review not acceptable, then identify corrective action document(s):

   CR: # ____________ WR/WO: # ____________

   ______________________ / ________
   Signature Date

PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATION SURVEILLANCE PROCEDURE
ACCEPTANCE CRITERIA AND OPERABILITY SHEET

Proc No RO-22
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Page 2 of 2

TITLE: CONTROL ROD DROP TIMES

---

1. Acceptance Criteria

2. Equipment Operability

3. Technical Specification Requirements

TITLE: CONTROL ROD DROP TIMES

Table of Contents

Table of Contents

ATTACHMENTS

Attachment 1, "CRDM Data Sheet Timed Testing"
Attachment 2, "CRDM Data Sheet (Optional Test) Timed Testing"

PALISADES NUCLEAR PLANT
TECHNICAL SPECIFICATION SURVEILLANCE PROCEDURE

Proc No RO-22
Revision 16
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TITLE: CONTROL ROD DROP TIMES

USER ALERT
CONTINUOUS USE PROCEDURE

Read each step of the procedure prior to performing that step. When sign-offs are required, sign off each step as complete before proceeding to the next step.

1.0 PURPOSE

Technical Specification Table 4.2.2 Item 1 requires testing of control rod drop times every refueling outage. This requirement applies to all full length control rods (1-41). Technical Specification 3.10.1.e specifies the drop time of each control rod shall be no greater than 2.5 seconds from the beginning of rod motion to 90% insertion. Performance of this test fulfills this test requirement and verifies acceptable control rod drop times.

Additional information is recorded that is not Technical Specifications required. This data includes the Lower Electrical Limit (LEL), Dropped Rod Alarm (EK-0948) annunciation along with its reset function and the Upper Electrical Limit (UEL). Testing of the clutch toggle switches is performed even though it is not a Technical Specification requirement. e

2.0 REFERENCE

2.1 SOURCE DOCUMENTS

2.1.1 Technical Specifications Chapter 4 - Section 4.2, Table 4.2.2 Item 1

2.1.2 Technical Specifications Chapter 3 - Sections 3.1.1b, 3.1.3d, 3.3.4 3.10.1e, 3.10.4b, 3.10.5, 3.10.6, 3.10.7, Tables 3.17.1 and 3.17.6 Items 1, 2 and 13

2.1.3 Technical Specifications Chapter 2 - None

2.1.4 FSAR - Sections 3.3.4.2, 7.5.2.1, 7.6.1.3, 7.6.2.3, 14.1.3 and Figure 14.1-3

2.1.5 Vendor file M1-P-A Palisades Plant Computer

2.1.6 Vendor File M1-C-B, "Control Rod Drive Mechanism (CRDM)"

2.1.7 Vendor File M1-C-D, "CRDM Control"

2.1.8 Drawing E-615 Sh 4 "SPI Cabinet C06-3 Chassis 1 Connection Diagram Reed Switch Input"

2.1.9 Engineering Manual Procedure EM-04-08, "Shutdown Margin Requirements"

2.1.10 Palisades Administrative Procedure 9.20, "Technical Specification Surveillance and Special Test Program"

2.1.11 Palisades Administrative Procedure 4.02, "Control of Equipment"

2.1.12 Consumers Energy Accident Prevention Manual for Generating Plants

2.2 REFERENCE DOCUMENTS

2.2.1 System Operating Procedure SOP-6, "Reactor Control System"

2.2.2 Palisades Administrative Procedure 10.46, "Plant Records"

2.2.3 Palisades Administrative Procedure 3.03, "Corrective Action Process"

3.0 PREREQUISITES

3.1 AUTHORIZATION

Shift Supervisor's permission shall be obtained to perform this test. The Shift Supervisor shall read and understand Sections 1.0 through 4.0 of this procedure prior to granting permission.

_______________________________ / __________
Shift Supervisor Date

3.2 SPECIAL NOTIFICATIONS

None

3.3 PLANT CONDITIONS

3.3.1 The plant is in Hot Shutdown

3.3.2 During the performance of this test, plant status will change to Hot Standby.

3.4 SYSTEM CONDITIONS

3.4.1 Both HPSI pumps shall be operable to satisfy Technical Specification 3.3.4.

3.4.2 All prerequisites listed in SOP-6, Attachment 4, "Resetting Reactor Protection System," must be met before ANY rod movement above the Lower Electrical Limit (LEL).

3.4.3 The Primary Rod Position - Sychros - and the Palisades Plant Computer (PPC) or the Secondary Rod Position - Reed Stacks are operable for this test.

3.4.4 Reactor Protective System reset.

3.4.5 Instrumentation listed in Technical Specifications Tables 3.17.1 and 3.17.6 Items 1, 2 and 13 shall be operable to satisfy "Minimum Operable Channels" requirements.

3.4.6 All four Primary Coolant Pumps shall be in service to satisfy Technical Specification 3.1.1.b.

3.4.7 Steam bubble and normal water level established in pressurizer to satisfy Technical Specification 3.1.3.d.

3.5 MINIMUM PERSONNEL SKILL LEVELS

3.5.1 Performance

a. Control Operator

b. I&C Technician qualified per I&C OJT program

3.5.2 Verification

a. Control Operator

b. I&C Technician qualified per I&C OJT program

Verification is required on all steps of this procedure involving equipment manipulation.

Steps containing both "Performed By" and "Verified By" shall not be signed by the same person.

3.6 SPECIAL TOOLS/EQUIPMENT

Except for use of test instruments justified in the appropriate Technical Specification Test Basis Document, only calibrated Measuring and Test Equipment (M&TE) and Installed Plant Instrumentation (IPI) shall be used to measure parameters which are compared to acceptance criteria.

3.6.1 Calibrated Equipment

BBC Model SE561 or equivalent (Required only for optional test)

______________	______________	______________
Serial Number	Calibration Date	Calibration Due Date

3.7 SPECIAL RADIATION PROTECTION REQUIREMENTS

None

4.0 PRECAUTIONS AND LIMITATIONS

4.1 OUT OF TOLERANCE DATA

All out of tolerance data shall meet the following conditions:

a. Circled in red by person recording data.

b. Reported immediately to supervisor in charge of test.

c. Evaluated by the supervisor before proceeding to next step.

4.2 PERSONNEL SAFETY

Standard Plant safety practices shall be observed.

4.3 EQUIPMENT/PLANT SAFETY OR LIMITS

4.3.1 Only one Control Rod shall be withdrawn at a time for testing.

4.3.2 At no time should Control Rod Groups be withdrawn above the Lower Electrical Limit (LEL).

4.3.3 Adequate shutdown margin shall be maintained at $\geq 2\%$ plus the highest worth rod being tested.

4.3.4 Source range neutron channels are to be monitored during Control Rod motion. **IF** a sustained count of twice the base count is observed, **THEN** stop testing and trip the Reactor. | e

4.3.5 This procedure is safety-related.

4.4 LIMITING CONDITIONS OF OPERATION ENTERED DURING PERFORMANCE OF THIS TEST

None

5.0 PROCEDURE

USER ALERT
CONTINUOUS USE PROCEDURE

Read each step of the procedure prior to performing that step. When sign-offs are required, sign off each step as complete before proceeding to the next step.

NOTE: The preferred timing test uses the Palisades Plant Computer (PPC). At the System Engineer's discretion a timing test using a chart recorder may be performed instead of, or in addition to, the PPC based test.

5.1 PREREQUISITES AND EQUIPMENT/PLANT SAFETY LIMITS

5.1.1 Ensure the following prerequisites have been met:

a. The Reactor in hot shutdown with four Reactor Coolant pumps operating

b. The Primary Rod Position - Synchros - and the Palisades Plant Computer (PPC) **OR** the Secondary Rod Position-Reed Stacks are operable for this test.

c. Reactor Protective System reset per System Operating Procedure SOP-6, Attachment 4.

Performed By: ______________________ / ________
Control Operator Date

Verified By: ______________________ / ________
Control Operator Date

5.1.2 IF a recorder is being used to time the Control Rods, THEN calibrate the recorder per step 5.6.1.

5.1.3 IF at any time during the performance of this test, a sustained count of twice the base count is observed, THEN stop testing and trip the Reactor.

TITLE: CONTROL ROD DROP TIMES

5.2 CONTROL ROD DROP TIMING TEST SETUP

5.2.1 Ensure all Control Rod Matrix lights illuminate using the matrix lamp test button. Replace as necessary.

Performed By: ______________________ / ________
Control Operator Date

5.2.2 Ensure that all fuses for the Control Rod Drive Mechanism (CRDM) motors are installed inside the C-15 Panel.

Performed By: ______________________ / ________
Control Operator Date

5.2.3 Energize all clutches at the Rod Drop Test Panel located inside C-06 Panel by placing toggle switches to "CLUTCH ON" position.

Performed By: ______________________ / ________
Control Operator Date

5.2.4 Ensure computer timing is "ON" by placing the "Rod Drop Test Panel Switch" location inside C-06, in the "In Circuit" position.

Performed By: ______________________ / ________
Control Operator Date

5.2.5 Record Primary Coolant Temperature from the digital T_{AV} display of TI-0110 (°F) located on C-02 **AND** Primary Coolant Pressure PI-0104 on Page 1 of Attachment 1, "CRDM Data Sheet Timed Testing."

Recorded By: ______________________ / ________
Control Operator Date

5.3 VERIFICATION OF LOWER ELECTRICAL LIMITS (LEL)

5.3.1 Withdraw any trippable Control rod (1-41) to about four (4) inches from "FULL IN" position, then reinsert Control Rod to Lower Electrical Limit (LEL).

5.3.2 Record position of rod when LEL is reached on Attachment 1, "CRDM Data Sheet Timed Testing."

5.3.3 Verify green matrix light is illuminated **AND** record (√) on Attachment 1, "CRDM Data Sheet Timed Testing."

5.3.4 Repeat Steps 5.3.1 through 5.3.3 for all remaining trippable Control Rods.

5.3.5 Withdraw any one part length Control Rod (42-45) to about four (4) inches from "FULL IN" position, **THEN** reinsert Control Rod until the green matrix light (Lower Electrical Limit - LEL) just illuminates (approximately 3.5") **AND** document on Attachment 1.

5.3.6 Repeat Step 5.3.5 for all remaining part length Control Rods.

5.3.7 IF EK-0948, "Dropped Rod Alarm," did not clear, **THEN** withdraw any one control rod until its green matrix light extinguishes, **AND** reinsert rod until the green matrix light just illuminates. Document below which rod movement clears alarm.

Rod that cleared alarm ______________________

5.3.8 Verify Dropped Rod Alarm (EK-0948) is clear. Record on page 1 of Attachment 1, "CRDM Data Sheet Timed Testing."

5.4 COMPUTER CONSTANTS

e On PPC workstation display 420, set the start position to 130 and the stop position to 13. Re-enter the start and stop positions even if they appear to be correct.

Performed By: ______________________ / ________
Control Operator Date

Verified By: ______________________ / ________
Control Operator Date

5.5 CONTROL ROD DROP TIMING ALARM TEST

5.5.1 Withdraw selected rod (1-41) to the Upper Electrical Limit (UEL) per System Operating Procedure SOP-6, "Reactor Control System."

5.5.2 Record position red matrix light illuminates on Attachment 1, "CRDM Data Sheet Timed Testing."

5.5.3 Record "synchro" full out rod position from the PPC on Attachment 1, "CRDM Data Sheet Timed Testing" as follows:

a. Shutdown Rods from PPC workstation display 411.

b. Regulating Rods from PPC workstation display 412.

5.5.4 **IF** timing will also be measured by a recorder, **THEN** go to Section 5.6 for initial setup. Subsequent rod tests go to Step 5.6.3.

NOTE: **IF** BBC recorder is being used, **THEN** ensure recorder is reset.

5.5.5 On PPC workstation display 420,

a. Enter the rod number for the next rod to test.

b. Verify the start position is set to 130.

c. Verify the stop position is set to 13.

NOTES: 1. After "YES" is selected in the following step, "Test Status" will automatically change to "Acknowledged" then to "Testing" and "Start New Test" will change back to "No."

2. Step 5.5.7 must be performed within 30 seconds of Step 5.5.6 or the rod drop test will fail.

5.5.6 On PPC workstation display 420, set "START NEW TEST" to "YES".

NOTE: If the selected rod is a selected group target rod, the digital (old nixie tube) display for that rod will be disabled during the test.

5.5.7 After "Test Status" changes to "Testing," trip the selected rod at the Rod Drop Test Panel.

5.5.8 After the test is complete, verify on PPC workstation display 420 that the "TEST STATUS" reads "COMPLETE." If the "TEST STATUS" reads failure, then:

a. The rod was started from a rod position less than 130 inches, or

b. The rod was not tripped within 30 seconds after initiation of the test, or

c. The rod did not reach the end point within 15 seconds after the selected rod was tripped.

Repeat test if "FAILURE" was due to a or b. Stop test and initiate a Condition Report if "FAILURE" was due to c.

5.5.9 Reset the trip toggle switch for the selected rod at the Rod Drop Test Panel.

NOTE: There will be two drop times displayed. The first time is designated as the rod drop time. This is the time it took the rod to drop from the test start position to the test end position. The second time is designated the rod drop clutch time. This is the time it took the rod to drop from the moment the toggle switch was put to the trip position to the test end position. It includes the clutch release time. This is the time that should be recorded in the next step.

5.5.10 Record the rod drop clutch time on Attachment 1, "CRDM Data Sheet Timed Testing."

5.5.11 Verify Dropped rod Alarm (EK-0948), and record on Attachment 1, "CRDM Data Sheet Timed Testing."

5.5.12 Withdraw dropped rod until rod drop alarm (EK-0948) clears **AND** record reset position on Attachment 1, "CRDM Data Sheet Timed Testing."

e | a. Withdraw Control Rod to 4" - 5".

5.5.13 Insert Control Rod to LEL, record Rod position on Attachment 1, "CRDM Data Sheet Timed Testing."

5.5.14 Record time of day, when test for each rod is completed, on Attachment 1, "CRDM Data Sheet Timed Testing."

5.5.15 Print the rod drop position display 3 seconds profile and the drop times from PPC workstation displays 421 and 422.

5.5.16 Ensure legible printout is received from the PPC printer.

5.5.17 Repeat Steps 5.5.1 through 5.5.16 for each rod to be tested (Rods 1-41).

5.5.18 <u>If optional recorder timed test is NOT being performed, go to Section 5.7</u>.

NOTE: A Control Operator and I&C Technician are required for performance of Section 5.5.

5.6 CONTROL ROD DROP TIMING TEST SETUP (RECORDER TIMED - OPTIONAL)

5.6.1 I&C to calibrate and install BBC Model SE561 recorder or equivalent as follows:

a. Calibrate recorder Channel 2 for 0-5VDC. Attach copy of strip chart with calibration information.

b. Set strip chart paper speed to at least 125mm/sec. Calibrate paper speed to within ±10%.

c. Setup recorder:

1. Set AUT/REC/SCOPE switch on rear of SE561 to REC.

2. Turn on power.

3. Set recorder Control Unit as follows:

OUTPUT - LENGTH = 1.0
OUTPUT - START = 0.0
ZOOM = 0.05
TRIG POS = 0.1
SAMPLE TIME = 200 microsec

4. Set recorder Printer as follows:

   GRID = ON
   ANNOTATION = ON
   SETUP = ON
   PRINT = ON

5. Set recorder Storage Units as follows (to ensure acceptance criteria data is recorded):

NOTE: Variations in setup are permitted provided acceptance criteria are recorded.

CHANNEL	1	2
TRIG LEVEL	3	0
ZERO SHIFT	0	0
TRIG MODE	SLOPE +	OFF
OUTPUT	1.0	1.0
VOLTS/DIV	5.0	0.5
ZOOM	AUT	AUT
INPUT	DC	DC

d. Install recorder as follows:

1. Connect Channel 1 to the clutch release signal (C06-2 TB56 terminals 4+ and 4-).

2. Connect Channel 2 to the designated secondary rod position (C06-2 terminal strips).

TB-1	RODS 1-6	TB-5	RODS 25-30
TB-2	RODS 7-12	TB-6	RODS 31-36
TB-3	RODS 13-18	TB-7	RODS 37-42
TB-4	RODS 19-24	TB-8	RODS 43-45

NOTES:

1. Recorder Channel 1 should offset when rod drop switch is thrown.
2. Rod displacement is on recorder Channel 2.

5.6.2 Ensure equipment necessary to perform test is properly set up.

Performed By: ______________________ / ________
I&C Technician Date

Verified By: ______________________ / ________
I&C Technician Date

5.6.3 Just prior to each rod drop test I&C will activate the recorder by:

a. On Control Unit, hold RESET/START switch to RESET (up) for at least 2 seconds. Control Unit LED bar will flash red and green at 0.1 position.

b. Ensure "Live Zeros" on both Recorder Channels.

c. On Control Unit, depress RESET/START to START position to begin data storage as indicated by red LED lights from -3 to 0.1. Ensure 0.1 position is flashing red and yellow.

5.6.4 Operator will Drop Test the control rod per Steps 5.5.4 through 5.5.7 of this procedure. Steps 5.6.5 through 5.6.7 may be performed following performance of Step 5.5.11.

5.6.5 Verify proper data collection on the recorder by:

a. Ensure all Storage Units display green zebra pattern.

b. Ensure Control Unit displays all red lights with 0.1 position flashing red and yellow.

c. Obtain time response printout by depressing RESET/START to START.

d. **IF** other ranges of printouts are required, **THEN** adjust only the following:

   1. Control Unit OUTPUT-LENGTH
   2. Control Unit ZOOM
   3. Each Storage Unit ZERO SHIFT
   4. Each Storage Unit OUTPUT

5.6.6 After performance of the test, mark Recorder output with following items:

a. Control Rod number

b. Date and Time

c. Rod Drop Time. The time between loss of clutch voltage (Channel 1 voltage drop) and the control rod reaches 95% insertion.

5.6.7 Repeat Steps 5.6.3 to 5.6.6 for the remaining rods. The AUT/REC/SCOPE switch on rear of recorder may be placed in Auto and Steps 5.6.3 and 5.6.5 will occur automatically.

5.6.8 Turn recorder "OFF" and determine recorder rod drop time.

5.6.9 Record drop time on Attachment 2, "CRDM Data Sheet (Optional Test) Timed Testing."

5.6.10 Record time of day when test for each rod is completed on Attachment 2, "CRDM Data Sheet (Optional Test) Timed Testing."

5.6.11 Drive the selected rod down to its Lower Electrical Limit (LEL). Record Rod position on Attachment 2, "CRDM Data Sheet (Optional Test) Timed Testing."

5.6.12 Repeat Steps 5.5.1, 5.5.2b.2 and 5.6.3 through 5.6.11 for each rod to be tested (Rods 1-41).

5.7 POST TEST REQUIREMENTS

5.7.1 Ensure computer timing is "OFF" by placing the "Rod Drop Test Panel Switch" located inside the C-06 panel to the "Out Of Circuit" position.

5.7.2 Trip Reactor from C-02 or C-06 unless directed otherwise by Shift Supervisor.

Performed By: ______________________ / ________
Control Operator Date

Verified By: ______________________ / ________
Control Operator Date

5.7.3 Remove recorder (if used) and signal cables.

Performed By: ______________________ / ________
Control Operator or I&C Technician Date

Verified By: ______________________ / ________
Control Operator or I&C Technician Date

5.7.4 If recorder was used, I&C to perform post test calibration of BBC Model SE561 recorder or equivalent as follows:

a. Calibrate recorder Channel 2 for 0-5VDC. Attach copy of strip chart with calibration information.

b. Set strip chart paper speed to at least 125mm/sec. Calibrate paper speed to within ±10%.

c. Setup recorder:

1. Set AUT/REC/SCOPE switch on rear of SE561 to REC.
2. Turn on power.

3. Set recorder Control Unit as follows:

   OUTPUT - LENGTH = 1.0
   OUTPUT - START = 0.0
   ZOOM = 0.05
   TRIG POS = 0.1
   SAMPLE TIME = 200 microsec

4. Set recorder Printer as follows:

   GRID = ON
   ANNOTATION = ON
   SETUP = ON
   PRINT = ON

5. Set recorder Storage Units as follows (to ensure acceptance criteria data is recorded):

NOTE: Variations in setup are permitted provided acceptance criteria are recorded.

CHANNEL	1	2
TRIG LEVEL	3	0
ZERO SHIFT	0	0
TRIG MODE	SLOPE +	OFF
OUTPUT	1.0	1.0
VOLTS/DIV	5.0	0.5
ZOOM	AUT	AUT
INPUT	DC	DC

5.7.5 Return equipment to status as directed by Shift Supervisor and record the information below (Circle One).

CRDM Motor Fuses:	Installed	Removed
CRDM Clutches:	Energized	Deenergized

Performed By: ______________________ / ________
Control Operator Date

Verified By: ______________________ / ________
Control Operator Date

5.7.6 Notify Shift Supervisor when test is completed.

______________________ / ________
Shift Supervisor Date

5.7.7 Transfer all data onto working copy number one, if multiple copies were used, **AND** verify correctness. Destroy all other working copies used during the test. Otherwise N/A the signature lines.

Performed By: ______________________ / ________
Control Operator Date

Verified By: ______________________ / ________
Control Operator Date

5.7.8 Shift Supervisor shall perform the following:

a. Review the completed procedure and Attachment 1, "CRDM Data Sheet Timed Testing," and Attachment 2, "CRDM Data Sheet (Optional Test) Timed Testing," (if performed).

b. Initiate a Condition Report for any equipment which has not operated satisfactorily and document on the Acceptance Criteria and Operability Sheet.

c. Complete the Acceptance Criteria and Operability Sheet.

Performed By: ______________________ / ________
Shift Supervisor Date

6.0 ACCEPTANCE CRITERIA

6.1 IF a **PPC** rod drop "clutch time" is greater than 2.49 seconds, THEN the control rod is considered inoperable and corrective action shall be taken. (This is the Technical Specification requirement of less than or equal to 2.5 seconds minus the 0.01 second error introduced by the synchros.)

6.2 IF a **STRIP CHART RECORDER** rod drop time is greater than 2.25 seconds, THEN the control rod is considered inoperable and corrective action shall be taken. (This is the Technical Specification requirement of less than or equal to 2.5 seconds minus the 0.25 second error introduced by the strip chart recorder.)

6.3 All out of tolerance data (including alarms/lights not operating properly) shall be circled in red.

7.0 RECORDS AND ATTACHMENTS

7.1 ATTACHMENTS

7.1.1 Attachment 1, "CRDM Data Sheet Timed Testing"

7.1.2 Attachment 2, "CRDM Data Sheet (Optional Test) Timed Testing"

7.2 RECORDS

The printouts from the workstation displays 421 and 422, recorder traces and completed procedure with attachments are the records of this test and shall be forwarded to the ERC for entry into the Uniform File Index (UFI) in the Engineering Records Center (ERC) per Palisades Administrative Procedure 10.46, "Plant Records."

CRDM DATA SHEET
TIMED TESTING

Step 5.2.5 Primary Coolant Temp ________ F° Primary Coolant Pressure ______psi Recorded By: ________________/______
(T$_{AV}$ TI-0110) (PI-0104) Date

Step 5.3.8 Dropped Rod Alarm (EK-0948) is Clear -- Verified By: ________________/______
Date

Step	5.3.2	5.3.3	5.5.2	5.5.3	5.5.10	5.5.11	5.5.12	5.5.13	5.5.14	Initial	
Rod No	Rod Position at LEL	Green Matrix Light (√)	Red Matrix Light Position	UEL Full Out Position	Rod Drop Clutch Time From Full Out	Alarm EK-0948 (√)	Alarm Reset Position	Rod Position At LEL	Test Completed (Time)	Performed By	Verified By
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											

Comments ____

CRDM D A SHEET
TIMED ESTING

Step	5.3.2	5.3.3	5.5.2	5.5.3	5.5.10	5.5.11	5.5.12	5.5.13	5.5.14	Initial	
Rod No	Rod Position at LEL	Green Matrix Light (√)	Red Matrix Light Position	UEL Full Out Position	Rod Drop Clutch Time From Full Out	Alarm EK-0948 (√)	Alarm Reset Position	Rod Position At LEL	Test Completed (Time)	Performed By	Verified By
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											

Comments ____

____

____

CRDM DATA SHEET
TIMED TESTING

Step	5.3.2	5.3.3	5.5.2	5.5.3	5.5.10	5.5.11	5.5.12	5.5.13	5.5.14	Initial	
Rod No	Rod Position at LEL	Green Matrix Light (√)	Red Matrix Light Position	UEL Full Out Position	Rod Drop Clutch Time From Full Out	Alarm EK-0948 (√)	Alarm Reset Position	Rod Position At LEL	Test Completed (Time)	Performed By	Verified By
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											

Comments ____

CRDM DATA SHEET
TIMED TESTING

Step	5.3.2	5.3.3/ 5.3.5	5.5.2	5.5.3	5.5.10	5.5.11	5.5.12	5.5.13	5.5.14	Initial	
Rod No	Rod Position at LEL	Green Matrix Light (√)	Red Matrix Light Position	UEL Full Out Position	Rod Drop Clutch Time From Full Out	Alarm EK-0948 (√)	Alarm Reset Position	Rod Position At LEL	Test Completed (Time)	Performed By	Verified By
36											
37											
38											
39											
40											
41											
42	▨		▨	▨	▨	▨	▨	▨	▨		
43	▨		▨	▨	▨	▨	▨	▨	▨		
44	▨		▨	▨	▨	▨	▨	▨	▨		
45	▨		▨	▨	▨	▨	▨	▨	▨		

Comments ____

CRDM DATA SH (OPTIONAL TEST)
TIMED TESTING

		5.6.9	5.6.10	5.6.11	INITIAL	
ROD NO	ALARM EK-0948 (√)	ROD DROP CLUTCH TIME FROM FULL OUT	TEST COMPLETED (TIME)	ROD POSITION AT LEL	PERFORMED BY	VERIFIED BY
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Comments ____

____

____

CRDM DATA SH (OPTIONAL TEST)
TIMED TESTING

		5.6.9	5.6.10	5.6.11	INITIAL	
ROD NO	ALARM EK-0948 (√)	ROD DROP CLUTCH TIME FROM FULL OUT	TEST COMPLETED (TIME)	ROD POSITION AT LEL	PERFORMED BY	VERIFIED BY
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						

Comments ____

CRDM DATA SH. (OPTIONAL TEST)
TIMED TESTING

		5.6.9	5.6.10	5.6.11	INITIAL	
ROD NO	ALARM EK-0948 (√)	ROD DROP CLUTCH TIME FROM FULL OUT	TEST COMPLETED (TIME)	ROD POSITION AT LEL	PERFORMED BY	VERIFIED BY
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						

Comments ______________________________

CRDM DATA SH (OPTIONAL TEST)
TIMED TESTING

		5.6.9	5.6.10	5.6.11	INITIAL	
ROD NO	ALARM EK-0948 (√)	ROD DROP CLUTCH TIME FROM FULL OUT	TEST COMPLETED (TIME)	ROD POSITION AT LEL	PERFORMED BY	VERIFIED BY
37						
38						
39						
40						
41						
42	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
43	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
44	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
45	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Comments ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-B.1-05

Align Service Water to ESS Pumps

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Align Service Water to ESS Pumps

Alternate Path: NONE

Facility JPM #: NEW

K/A Rating: 076A4.04 Importance: SRO 3.5 RO 3.5

K/A Statement: Ability to manually operate and/or monitor in the Control Room: Emergency Heat Loads

Task Standard: SW flow is aligned to the ESS Pumps.

Preferred Evaluation Location: Simulator X In Plant ________

Preferred Evaluation Method: Perform X Simulate ________

References: SOP-16, Component Cooling Water

Validation Time: 10 minutes Time Critical: NO

Candidate: ______________________________

Time Start: __________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ______________________________

____

____

Examiner: ______________________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- IC-11
- Initiate a manual reactor trip and safety injection.
- Ensure all actions of EOP-1 are completed.
- When directed, use REMOTE FUNCTIONS SW21, SW22, and CC07 to establish IA to valves locally.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Service Water is to be aligned to ESS Pump cooling.

INITIATING CUES:

The Shift Supervisor has directed you to align Service Water cooling to the ESS Pumps in accordance with SOP-16, Section 7.6.1.

START TIME: ________

STEP 1: Obtains current procedure STANDARD: Obtains copy of SOP-16, Section 7.6.1 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 2: Ensure SW Supplies and Return to ESS Pumps closed STANDARD: Verifies hand switches for CV-0879, CV-0880, and CV-0951 on C-03 in CLOSED position NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 3:	Open air supply to SW Supplies and Return to ESS Pumps	
STANDARD:	Directs AO to OPEN the air supply valves for CV-0879, CV-0880, and CV-0951	
NOTES:	***Simulator Operator: Open air supplies for valves using following remote functions:*** ***• CV-0879 REM SW21*** ***• CV-0880 REM SW22*** ***• CV-0951 REM CC07*** ***Cue: (After inserting remotes above) AO reports air supplies for CV-0879, CV-0880, and CV-0951 are open.***	____ SAT
COMMENTS:		____ UNSAT
STEP 4:	Close ESS Pumps CCW Supply	***CRITICAL STEP***
STANDARD:	Places hand switch for CV-0913 in CLOSE and verifies red light OFF and green light LIT	
NOTES:	***Critical step due to interlock between CCW and SW valves.***	____ SAT
COMMENTS:		____ UNSAT

STEP 5: Close ESS Pumps CCW Return STANDARD: Places hand switch for CV-0950 in CLOSE and verifies red light OFF and green light LIT NOTES: ***Critical step due to interlock between CCW and SW valves.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT
STEP 6: Open ESS Pumps SW Supply STANDARD: Places hand switch for either CV-0879 or CV-0880 in OPEN and verifies red light LIT and green light OFF NOTES: ***Critical step to establish SW flow to pumps.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT

STEP 7:	Open ESS Pumps SW Return	***CRITICAL STEP***
STANDARD:	Places hand switch for CV-0951 in OPEN and verifies red light LIT and green light OFF	
NOTES:	***Critical step to align SW Return from pumps.***	____ SAT
COMMENTS:		____ UNSAT
STEP 8:	Notify Chemistry to sample mixing basin for sodium nitrate	
STANDARD:	Notifies Chemistry Department	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 9:	Informs Shift Supervisor that SW is aligned to ESS Pumps	
STANDARD:	Informs Shift Supervisor	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
	END OF TASK	

STOP TIME: __________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Service Water is to be aligned to ESS Pump cooling.

INITIATING CUES:

The Shift Supervisor has directed you to align Service Water cooling to the ESS Pumps in accordance with SOP-16, Section 7.6.1.

JPM SRO-B.1-05
IS THE SAME AS
JPM RO-B.1-05

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-B.1-06

Sample Containment for Hydrogen

CANDIDATE: ______________________

EXAMINER: ______________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Sample Containment for Hydrogen

Alternate Path: Sample light does not energize when required.

Facility JPM #: ASHE 02A (Modified)

K/A Rating: 028A4.03 Importance: SRO 3.3 RO 3.1

K/A Statement: Ability to manually operate and/or monitor in the control room: Location and operation of hydrogen sampling and analysis of containment atmosphere, including alarms and indications

Task Standard: Containment Hydrogen determined to be approximately 8%.

Preferred Evaluation Location: Simulator X In Plant ____

Preferred Evaluation Method: Perform X Simulate ____

References: SOP-38, Gaseous Process Monitoring System

Validation Time: 15 minutes Time Critical: NO

Candidate: ____

Time Start: ____ Time Finish: ____

Performance Time: ____ minutes

Performance Rating: SAT ____ UNSAT ____

Comments: ____

Examiner: ____ Date: ____
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- IC-11
- Enter Malfunction RC04.
- Carry out EOP 1.0 Immediate Actions.
- Enter Malfunction CH07 at a Severity of 40%.
- Acknowledge alarms.
- Insert override DI C161-MODE-1 to OFF
- Insert override DI C161-MODE-2 to OFF (These overrides place HS-2427L in the standby position for the left channel)
- Ensure recorder AIR-2401 and chart recorder power is off per SOP 38.
- Ensure any keys are removed.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

The Hydrogen sampling system has been in "STANDBY" for greater than 6 hours. A CHR signal is present.

INITIATING CUES:

During performance of EOP 4.0, "Loss of Coolant Accident Recovery", the Shift Supervisor directs you to place the Left Channel Hydrogen Monitor in operation and to determine containment hydrogen concentration, referring to SOP 38, Section 7.5.2.

START TIME: ________

STEP 1: Obtains current procedure STANDARD: Obtains copy of SOP-38, Section 7.5.2 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 2: Ensure sampling system has been in STANDBY at least six hours STANDARD: Refers to initial conditions and determines system in standby for at least six hours NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 3: Check left channel handswitch in NORMAL position STANDARD: Verifies left channel hand switch HS-2419 in NORM NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 4:	Check Range selector switch to the "0-10% range."	
STANDARD:	Verifies H-2 Dual Range Switch in left (0-10%) position	
NOTES:		_____ SAT
COMMENTS:		_____ UNSAT
STEP 5:	Enable the sample valves to be opened	**CRITICAL STEP**
STANDARD:	Using Key 364, turns Key Switch HS-2419 to the ACC position.	
NOTES:	***Critical step to allow valves to be opened.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 6:	Open (enable) sample valves to open	**CRITICAL STEP**
STANDARD:	Places hand switch HS-2417 to the OPEN position and then releases	
NOTES:	***Critical step to allow valves to be opened.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 7:	Open solenoid valve SV-2413A	**CRITICAL STEP**
STANDARD:	Places HS-2413A to OPEN position and verifies red light LIT and green light OFF	
NOTES:	***Critical step to establish flow path.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 8:	Open solenoid valve SV-2413B	**CRITICAL STEP**
STANDARD:	Places HS-2413B to OPEN position and verifies red light LIT and green light OFF	
NOTES:	***Critical step to establish flow path.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 9:	Open solenoid valve SV-2415A	**CRITICAL STEP**
STANDARD:	Places HS-2415A to OPEN position and verifies red light LIT and green light OFF	
NOTES:	***Critical step to establish flow path.***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 10:	Open solenoid valve SV-2415B	**CRITICAL STEP**
STANDARD:	Places HS-2415B to OPEN position and verifies red light LIT and green light OFF	
NOTES:	***Critical step to establish flow path.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 11:	Energize Containment Hydrogen Recorder	
STANDARD:	Places Power Switch to ON (Left Side of Recorder) on AR-2401	
NOTES:		_____ SAT
COMMENTS:		_____ UNSAT
STEP 12:	Energize Containment Hydrogen Recorder Chart Drive	
STANDARD:	Places Chart Drive Switch to ON (Top of Recorder)	
NOTES:		_____ SAT
COMMENTS:		_____ UNSAT

STEP 13: Begin sampling/analyzing with left channel STANDARD: Places HS-2427L to the ANALYZE position NOTES: ***Critical step to obtain sample analysis.*** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 14: Verify amber Sample Light LIT STANDARD: Determines Sample Light OFF NOTES: ***SIMULATOR OPERATOR: When REMOTE SELECTOR P/B depressed in NEXT STEP, remove overrides on HS-2427L.*** COMMENTS:	_____ SAT _____ UNSAT
STEP 15: Ensure Sample Pump enabled STANDARD: Depresses Remote Selector Push Button and ensures Function Selector Switch in the SAMPLE position and note amber Sample Light comes ON NOTES: ***Critical step to enable sample pump.*** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT

STEP 16: Determine hydrogen concentration STANDARD: When H2 Monitor has been in ANALYZE for at least 15 minutes, read % H2 as approximately 8% using AI 2401L on the panel or using the blue pen on AR-2401 NOTES: ***Critical step to correctly interpret indication.*** ***Cue: Hydrogen monitor has been in ANALYZE for 16 minutes.*** COMMENTS:	**CRITICAL STEP** _____ SAT _____ UNSAT
STEP 17: Notify Shift Supervisor of hydrogen reading STANDARD: Notifies Shift Supervisor NOTES: COMMENTS: ***END OF TASK***	_____ SAT _____ UNSAT

STOP TIME: ________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The Hydrogen sampling system has been in "STANDBY" for greater than 6 hours. A CHR signal is present.

INITIATING CUES:

During performance of EOP 4.0, "Loss of Coolant Accident Recovery", the Shift Supervisor directs you to place the Left Channel Hydrogen Monitor in operation and to determine containment hydrogen concentration, referring to SOP 38, Section 7.5.2.

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-B.1-07

Adjust the Power Range Instrumentation

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Adjust the Power Range Instrumentation

Alternate Path: NONE

Facility JPM #: RHAA 01

K/A Rating: 015A4.02 Importance: SRO 3.9 RO 3.9

K/A Statement: Ability to manually operate and/or monitor in the control room: NIS indicators

Task Standard: NI-07 is properly adjusted for the Heat Balance calculation.

Preferred Evaluation Location: Simulator X In Plant ____

Preferred Evaluation Method: Perform X Simulate ____

References: GOP-12, Heat Balance Calculation
SOP-35, Neutron Monitoring System

Validation Time: 15 minutes Time Critical: NO

Candidate: ____________________

Time Start: ________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ____________________

____

____

Examiner: ____________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:
- IC-11
- Adjust NI Channels A, B, and D to indicate 99.9 ± 0.2% by adjusting pot settings for A to 13.45, B to 5.02, and D to 9.32.
- Adjust Channel C to indicate 98.5 ± 0.2% by adjusting pot setting to 3.16.
- Provide candidate with attached copy of GOP 12 Attachment 2.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

A Heat Balance Calculation has just been performed.

INITIATING CUES:

During performance of GOP 12, "Heat Balance Calculation", the Shift Supervisor directs you to adjust the 'C' Channel Power Range NI Indication (NI-07) using the enclosed heat balance per GOP-12, Section 6.2.4, and SOP-35, Section 7.2.3.

"Before Adjustments" Data has been recorded on Attachment 2 of GOP-12.

START TIME: ________

STEP 1: Obtains current procedure STANDARD: Obtains copy of GOP-12, refering to Section 6.2.4, and SOP-35, refering to Section 7.2.3 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 2: Review the Heat Balance and determine how much NI-07 should be adjusted. STANDARD: Heat balance reviewed and 99.9% is determined to be the correct power level. NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 3: Unlock the ‘C' Channel NI gain pot. STANDARD: Lever on side of potentiometer moved counterclockwise NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 4:	Adjust 'C' Channel NI power to match calculated power	***CRITICAL STEP***
STANDARD:	Nuclear Power LED readout adjusted to read 99.9 % (± 0.5%)	
NOTES:	***Critical step to properly adjust reading.***	____ SAT
COMMENTS:		____ UNSAT
STEP 5:	Lock the 'C' Channel NI gain pot	
STANDARD:	Lever on side of potentiometer moved clockwise	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 6:	Read 'C' Channel NI NI power and gain pot setting and record on GOP 12	***CRITICAL STEP***
STANDARD:	NI-07 Power and Pot reading properly read and recorded on GOP 12 Attachment 2 'After Adjustments' section	
NOTES:	***Critical step to properly record reading.*** ***NOTE: It is acceptable to record all NI pot settings or just NI-07.***	____ SAT
COMMENTS:		____ UNSAT

STEP 7: Notify the Shift Supervisor that 'C' Channel N-07 adjustment is completed STANDARD: Notifies Shift Supervisor NOTES: COMMENTS: ***END OF TASK***	____ SAT ____ UNSAT

STOP TIME: ________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

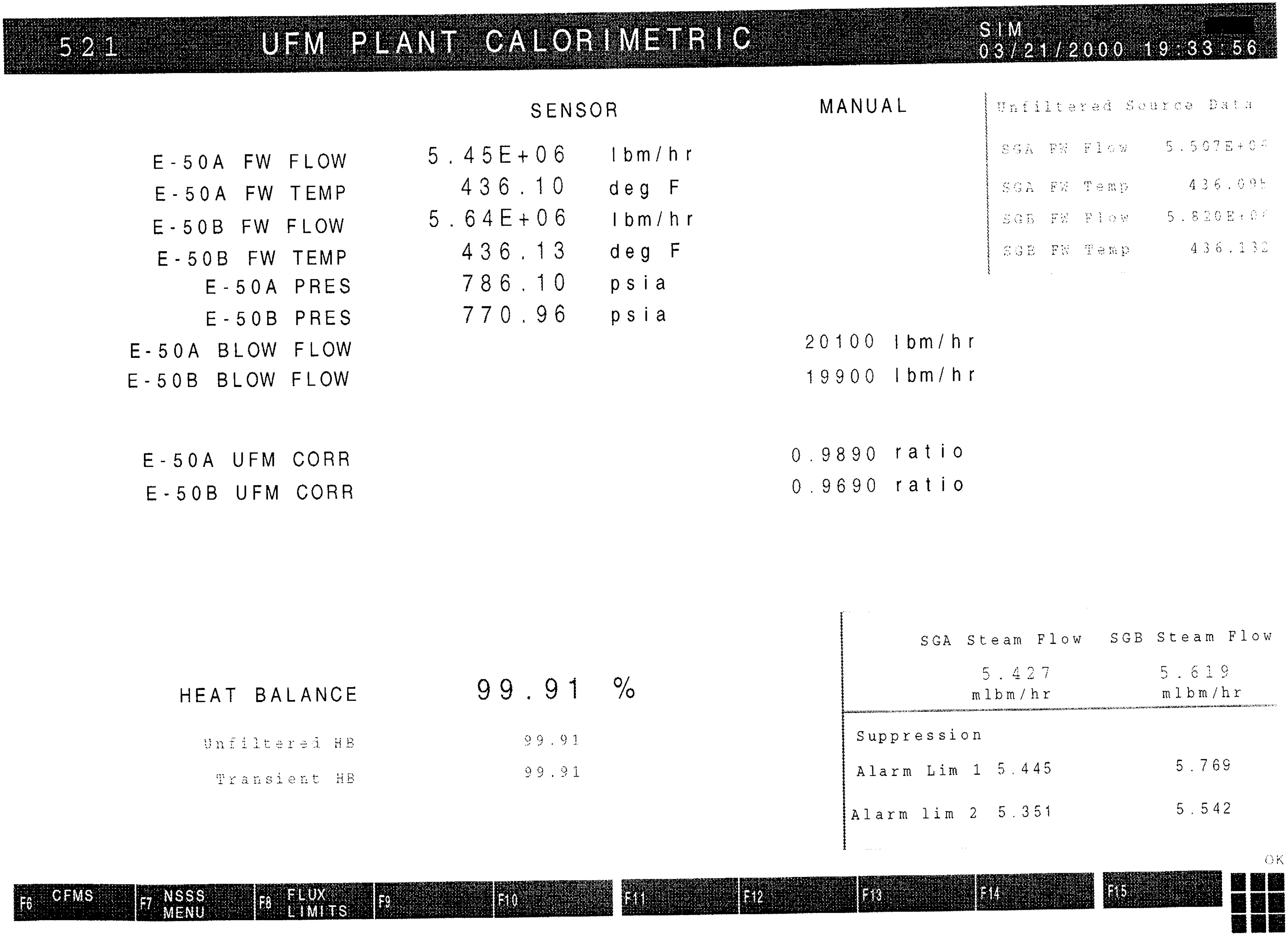
A Heat Balance Calculation has just been performed.

INITIATING CUES:

During performance of GOP 12, "Heat Balance Calculation", the Shift Supervisor directs you to adjust the 'C' Channel Power Range NI Indication (NI-07) using the enclosed heat balance per GOP-12, Section 6.2.4, and SOP-35, Section 7.2.3.

"Before Adjustments" Data has been recorded on Attachment 2 of GOP-12.

JPM SRO-B.1-07
IS THE SAME AS
JPM RO-B.1-07



521 UFM PLANT CALORIMETRIC

SIM [redacted]
03/21/2000 19:33:56

	SENSOR		MANUAL	
E-50A FW FLOW	5.45E+06	lbm/hr		
E-50A FW TEMP	436.10	deg F		
E-50B FW FLOW	5.64E+06	lbm/hr		
E-50B FW TEMP	436.13	deg F		
E-50A PRES	786.10	psia		
E-50B PRES	770.96	psia		
E-50A BLOW FLOW			20100	lbm/hr
E-50B BLOW FLOW			19900	lbm/hr
E-50A UFM CORR			0.9890	ratio
E-50B UFM CORR			0.9690	ratio

Unfiltered Source Data

SGA FW Flow	5.507E+06
SGA FW Temp	436.095
SGB FW Flow	5.820E+06
SGB FW Temp	436.132

HEAT BALANCE	**99.91 %**
Unfiltered HB	99.91
Transient HB	99.91

	SGA Steam Flow	SGB Steam Flow
	5.427 mlbm/hr	5.619 mlbm/hr
Suppression		
Alarm Lim 1	5.445	5.769
Alarm lim 2	5.351	5.542

OK

JPM B.1-07 Attachmen

Proc No GOP-12
Attachment 2
Revision 23
Page 1 of 1

POWER INSTRUMENTATION CALIBRATION FORM

C-27

	Before Adjustments				After Adjustments (if required)			
	ΔT Pwr	BIAS	Nuc Pwr	Pot	ΔT Pwr	BIAS	Nuc Pwr	Pot
Channel "A"	100	5.31E-2	99.9	13.45				
Channel "B"	100	-1.12E-2	99.9	5.02				
Channel "C"	100	5.65E-2	98.5	3.16				
Channel "D"	100	-2.42E-2	99.8	9.32				

BIAS CHANGE

For any TMM ΔT power channel requiring adjustment, **CALCULATE** the required bias change as follows:

[% Power Heat Balance - ΔT Power Indicated] (0.01) = Δ BIAS

NEW BIAS VALUE

[________ - ________] (0.01) = ______ (A) ______ (A)
[________ - ________] (0.01) = ______ (B) ______ (B)
[________ - ________] (0.01) = ______ (C) ______ (C)
[________ - ________] (0.01) = ______ (D) ______ (D)

A POSITIVE result indicates that the BIAS term needs to be RAISED by the calculated value.

A NEGATIVE result indicates that the BIAS term needs to be LOWERED by the calculated value.

Calculated By: ______________________ / ______ / ______
Signature Date Time

Verified By: ______________________ / ______ / ______
Signature Date Time

TMM ΔT POWER CHANNEL INOPERABILITY TIME

For any TMM ΔT power channel requiring adjustment, **RECORD** the date and time that the channel is made inoperable (TMM keyswitch placed in "Data Modify," VHP and TMLP RPS Trips bypassed, etc) and the date and time that the channel is returned to operable status (TMM keyswitch returned to "Normal," VHP and TMLP RPS Trips bypasses removed, etc) below:

Inoperable: ______ / ______ Date Time Operable: ______ / ______ Date Time (A)

Inoperable: ______ / ______ Date Time Operable: ______ / ______ Date Time (B)

Inoperable: ______ / ______ Date Time Operable: ______ / ______ Date Time (C)

Inoperable: ______ / ______ Date Time Operable: ______ / ______ Date Time (D)

Data Recorded By: ______ / ______ / ______ Initials Date Time

Verified By: ______ / ______ / ______ Initials Date Time

JPM B.1-07 KEY

KEY

Proc No GOP-12
Attachment 2
Revision 23
Page 1 of 1

POWER INSTRUMENTATION CALIBRATION FORM

C-27	Before Adjustments				After Adjustments (if required)			
	ΔT Pwr	BIAS	Nuc Pwr	Pot	ΔT Pwr	BIAS	Nuc Pwr	Pot
Channel "A"	100	5.31E-2	99.9	13.45				
Channel "B"	100	-1.12E-2	99.9	5.02				
Channel "C"	100	5.65E-2	98.5	3.16			99.9	3.30
Channel "D"	100	-2.42E-2	99.8	9.32			(99.4 to 100.4)	(3.20 to 3.40)

BIAS CHANGE

For any TMM ΔT power channel requiring adjustment, **CALCULATE** the required bias change as follows:

[% Power Heat Balance - ΔT Power Indicated] (0.01) = Δ BIAS — NEW BIAS VALUE

[________ - ________] (0.01) = ________ (A) ________ (A)
[________ - ________] (0.01) = ________ (B) ________ (B)
[________ - ________] (0.01) = ________ (C) ________ (C)
[________ - ________] (0.01) = ________ (D) ________ (D)

A POSITIVE result indicates that the BIAS term needs to be RAISED by the calculated value.

A NEGATIVE result indicates that the BIAS term needs to be LOWERED by the calculated value.

Calculated By: ____________________ / ________ / ________
Signature Date Time

Verified By: ____________________ / ________ / ________
Signature Date Time

TMM ΔT POWER CHANNEL INOPERABILITY TIME

For any TMM ΔT power channel requiring adjustment, **RECORD** the date and time that the channel is made inoperable (TMM keyswitch placed in "Data Modify," VHP and TMLP RPS Trips bypassed, etc) and the date and time that the channel is returned to operable status (TMM keyswitch returned to "Normal," VHP and TMLP RPS Trips bypasses removed, etc) below:

Inoperable: ________ / ________ Date Time Operable: ________ / ________ Date Time (A)

Inoperable: ________ / ________ Date Time Operable: ________ / ________ Date Time (B)

Inoperable: ________ / ________ Date Time Operable: ________ / ________ Date Time (C)

Inoperable: ________ / ________ Date Time Operable: ________ / ________ Date Time (D)

Data Recorded By: ________ / ________ / ________ Initials Date Time Verified By: ________ / ________ / ________ Initials Date Time

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-B.2-08

Perform CCW Thermal/Hydraulic Shock Prevention Actions

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Perform CCW Thermal/Hydraulic Shock Prevention Actions

Alternate Path: NONE

Facility JPM #: TBAR 03

K/A Rating: 008A4.04 Importance: SRO 2.6 RO 2.6

K/A Statement: Ability to manually operate and/or monitor in the control room: Startup of a CCW pump when the system is shut down.

Task Standard: P-52B discharge valve has been fully opened.

Preferred Evaluation Location: Simulator ______ In Plant X

Preferred Evaluation Method: Perform ______ Simulate X

References: EOP Supplement 24, SW and CCW Hydraulic Shock Prevention

Validation Time: 15 minutes Time Critical: NO

Candidate: ____________________

Time Start: ________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ____________________

____

____

Examiner: ____________________ Date: ________

Signature

Tools/Equipment/Procedures Needed:

EOP Supplement 24; locked valve key.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

A reactor trip has occurred as a result of a Loss of all AC power. 2400 Volt Bus 1D has had power restored. EOP Supplement 24 Preliminary Actions have been completed.

INITIATING CUES:

The Shift Supervisor instructs you to perform EOP Supplement 24, SW and CCW Hydraulic Shock Prevention, Subsequent Actions for P-52B ONLY.

P-52B is the FIRST CCW pump to be started.

You are issued a locked valve key at this time.

Another operator has been dispatched to install the Trip and Close fuses for the pump. Notify the Control Room when ready to have fuses installed.

START TIME: ________

STEP 1:	Obtains current procedure	
STANDARD:	Obtains copy of EOP Supplement 24	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 2:	Unlock and close the discharge valve for CCW Pump P-52B	***CRITICAL STEP***
STANDARD:	P-52B Discharge, MV-CC942, unlocked and turned clockwise until closed	
NOTES:	***Critical step to establish proper valve position.*** ***Cue: Valve has been unlocked and is closed.***	____ SAT
COMMENTS:		____ UNSAT
STEP 3:	Throttle open two turns the discharge valve for CCW Pump P-52B	***CRITICAL STEP***
STANDARD:	P-52B Discharge, MV-CC942, turned two turns in counterclockwise direction	
NOTES:	***Critical step to establish proper valve position.*** ***Cue: Valve has been positioned two turns in open direction.***	____ SAT
COMMENTS:		____ UNSAT

STEP 4: Notify Control Room that valve is throttled STANDARD: Notifies Control Room NOTES: ***CUE: Control Room informs you that P-52B is running.*** COMMENTS:	____ SAT ____ UNSAT
STEP 5: Slowly open the CCW Pump Discharge Valve STANDARD: P-52B Discharge, MV-CC942, turned slowly in a counterclockwise direction until fully open NOTES: ***Critical step to establish design flow from pump.*** ***Cue: Valve is fully open.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT
STEP 6: Ensure open the discharge valves for the CCW pumps which have not been started STANDARD: Verifies P-52A Discharge, MV-CC940, and P-52C Discharge, MV-CC945, are open NOTES: ***Cue: Valves are fully open.*** COMMENTS:	____ SAT ____ UNSAT

STEP 7: Notify Shift Supervisor that EOP Supplement 24 is complete for P-52B STANDARD: Notifies Shift Supervisor NOTES: COMMENTS:	____ SAT ____ UNSAT
END OF TASK	

STOP TIME: __________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

A reactor trip has occurred as a result of a Loss of all AC power. 2400 Volt Bus 1D has had power restored. EOP Supplement 24 Preliminary Actions have been completed.

INITIATING CUES:

The Shift Supervisor instructs you to perform EOP Supplement 24, SW and CCW Hydraulic Shock Prevention, Subsequent Actions for P-52B ONLY.

P-52B is the FIRST CCW pump to be started.

You are issued a locked valve key at this time.

Another operator has been dispatched to install the Trip and Close fuses for the pump. Notify the Control Room when ready to have fuses installed.

JPM SRO-B.2-08
IS THE SAME AS
JPM RO-B.2-08

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-B.2-09

Operate P-55C from Bus 13

CANDIDATE: ______________________

EXAMINER: ______________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Operate P-55C from Bus 13

Alternate Path: NONE

Facility JPM #: TBAM 03 (Modified)

K/A Rating: 022AA1.01 Importance: SRO 3.3 RO 3.4

K/A Statement: Ability to operate and / or monitor the following as they apply to the Loss of Reactor Coolant Pump Makeup: CVCS letdown and charging

Task Standard: Charging Pump P-55C is aligned to LCC-13.

Preferred Evaluation Location: Simulator _______ In Plant X

Preferred Evaluation Method: Perform _______ Simulate X

References: SOP-2A, Chemical and Volume Control System

Validation Time: 25 minutes Time Critical: NO

Candidate: ____________________________________

Time Start: _________ Time Finish: _______

Performance Time: _______ minutes

Performance Rating: SAT _______ UNSAT _______

Comments: ____

____

____

Examiner: ______________________________ Date: _______
Signature

Tools/Equipment/Procedures Needed:

SOP-2A, Section 7.1.3. After candidate describes where and which procedure would be obtained, provide a copy to candidate.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

The Control Room is NOT habitable. Load Center 11 is NOT available. P-55A and P-55B are NOT available. P-55C was powered from LCC 11 and is NOT operating.

INITIATING CUES:

During the performance of ONP 25.2, "Alternate Safe Shutdown Procedure", the Shift Supervisor directs you to operate P-55C from Bus 13, referring to SOP-2A, "Chemical and Volume Control System," Section 7.1.3.

START TIME: ________

STEP 1: Obtains current procedure STANDARD: Obtains copy of SOP-2A, Section 7.1.3 NOTES: COMMENTS:	____ SAT ____ UNSAT
STEP 2: Ensure P-55C not operating STANDARD: Determines P-55C not operating by observing green OPEN flag is showing on breaker 52-1105 NOTES: ***Cue: Green OPEN flag is showing.*** ***NOTE: This was also provided in INITIAL CONDITIONS, so candidate may not check this.*** COMMENTS:	____ SAT ____ UNSAT
STEP 3: Rack out breaker 52-1105 to disconnect position STANDARD: Attaches racking tool and racks out breaker 52-1105 NOTES: ***Critical step to allow power to be aligned to alternate source.*** ***Cue: Breaker 52-1105 is racked out to disconnect.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT

STEP 4:	Ensure open and rack breaker 52-1308 into connect position and leave open	***CRITICAL STEP***
STANDARD:	Observes green OPEN flag showing on breaker 52-1308, attaches racking tool, and racks into connect position	
NOTES:	***Critical step to allow power to be aligned to alternate source.*** ***Cue: Breaker 52-1308 has the green OPEN flag showing and is racked into connect position.***	____ SAT
COMMENTS:		____ UNSAT
STEP 5:	Ensure OFF breaker 52-1308B	
STANDARD:	At JL255 in charging pump room, verifies 52-1308B is OFF	
NOTES:	***Cue: Breaker 52-1308B is OFF.***	____ SAT
COMMENTS:		____ UNSAT

STEP 6:	Place to ON breaker 52-1308A	***CRITICAL STEP***
STANDARD:	At JL255 in charging pump room, places breaker 52-1308A to ON position	
NOTES:	***Critical step to allow power to be aligned to alternate source.*** ***Cue: Breaker 52-1308A is ON.***	____ SAT ____ UNSAT
COMMENTS:		
STEP 7:	Place to OFF breaker 52-1105A	***CRITICAL STEP***
STANDARD:	At JL257 in charging pump room, places breaker 52-1105A to OFF position	
NOTES:	***Critical step to allow power to be aligned to alternate source.*** ***Cue: Breaker 52-1105A is OFF.***	____ SAT ____ UNSAT
COMMENTS:		

STEP 8: Place to ON breaker 52-1105B

CRITICAL STEP

STANDARD: At JL257 in charging pump room, places breaker 52-1105B to ON position

NOTES: ***Critical step to allow power to be aligned to alternate source.***

Cue: Breaker 52-1105B is ON.

____ SAT

____ UNSAT

COMMENTS:

STEP 9: Place Seal Coolant Pump Control Switch for P-55C in HAND

STANDARD: Places switch in HAND position

NOTES: ***Cue: The seal coolant pump is running.***

If discharge pressure checked, provide cue that it is approximately 20 psi.

____ SAT

____ UNSAT

COMMENTS:

STEP 10:	Test operate breaker 52-1308 to start and stop P-55C to ensure proper breaker operation	
STANDARD:	Closes breaker 52-1308, verifying red CLOSED flag showing, then opens breaker 52-1308, verifying green OPEN flag showing	
NOTES:	***Cue: When closing 52-1308, the red CLOSED flag is showing.*** ***When opening 52-1308, the green OPEN flag is showing.***	___ SAT
COMMENTS:		___ UNSAT
STEP 11:	Notify Shift Supervisor that P-55C is aligned to LCC-13	
STANDARD:	Notifies Shift Supervisor	
NOTES:	***CUE: If asked, tell candidate to leave P-55C OFF.***	___ SAT
COMMENTS:		___ UNSAT
	END OF TASK	

STOP TIME: ________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The Control Room is NOT habitable. Load Center 11 is NOT available. P-55A and P-55B are NOT available. P-55C was powered from LCC 11 and is NOT operating.

INITIATING CUES:

During the performance of ONP 25.2, "Alternate Safe Shutdown Procedure", the Shift Supervisor directs you to operate P-55C from Bus 13, referring to SOP-2A, "Chemical and Volume Control System," Section 7.1.3.

JPM SRO-B.2-09
IS THE SAME AS
JPM RO-B.2-09

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM RO-B.2-10

Locally Start and Load 1-1 Diesel Generator

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Locally Start and Load 1-1 Diesel Generator

Alternate Path: Output breaker fails to close, requiring shutdown of Diesel Generator due to no cooling water.

Facility JPM #: TBAS 01 (Modified)

K/A Rating: 064A4.06 Importance: SRO 3.9 RO 3.9

K/A Statement: Ability to manually operate and/or monitor in the control room: Manual start, loading, and stopping of the ED/G

Task Standard: 1-1 Diesel Generator is secured.

Preferred Evaluation Location: Simulator ______ In Plant X

Preferred Evaluation Method: Perform ______ Simulate X

References: ONP-25.2, Alternate Safe Shutdown Procedure
ONP-20, Diesel Generator Manual Control

Validation Time: 30 minutes Time Critical: NO

Candidate: ______________________________

Time Start: __________ Time Finish: __________

Performance Time: ______ minutes

Performance Rating: SAT ______ UNSAT ______

Comments: ______________________________

____

____

Examiner: ______________________________ Date: ______
Signature

Tools/Equipment/Procedures Needed:

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Start-up Transformer 1-2 and Safeguards 1-1 Transformer are NOT available. A fire in the Control Room damaged Bus 1C load shed circuits. The fire in the Control Room also damaged 1-1 Diesel Generator control circuits. The Control Room is NOT habitable. 1-1 DG is NOT operating.

INITIATING CUES:

During performance of ONP 25.2, "Alternate Safe Shutdown Procedure", the Shift Supervisor directs you to start 1-1 Diesel Generator, energize 1C Bus then close breakers 152-103 (Starting P-7B) and 152-108 (Bus 13) per ONP-20 Section 4.3.2.

START TIME: ________

STEP 1: Obtains current procedure

STANDARD: Obtains copy of ONP-20 and refers to Section 4.3.2

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 2: Trip all breakers on Bus 1C

CRITICAL STEP

STANDARD: Trips all breakers on 1C Bus electrically, by using the hand switch, or mechanically, using the mechanical trip plunger located bottom center of the breaker inside the cubicle.

NOTES: ***Critical step to load shed bus.***

Cue:** **As each breaker is opened electrically, the green and, if applicable, white breaker status lights are LIT and the red breaker status light is OFF.

As each breaker is opened mechanically, the breaker status flag reads OPEN.

COMMENTS:

____ SAT

____ UNSAT

STEP 3: Remove control power fuses for all breakers on Bus 1C except 152-103, 152-107 and 152-108.

CRITICAL STEP

STANDARD: Removes BRK CLOSING COIL FRN-R-2.5 and BRK CLOSE AND TRIP CIRCUIT 30A fuses for all breakers except 152-103, 152-107 and 152-108.

NOTES: ***Critical step to apply control power to only desired breakers.***

Cue: The required breaker's fuses are removed (as each breaker fuse is removed).

COMMENTS:

_____ SAT

_____ UNSAT

STEP 4: Obtain Remote-Local-Transfer switch handles

STANDARD: Obtains RLTS handles from cubicle above breaker 152-102

NOTES: ***Cue: RLTS handles have been obtained.***

COMMENTS:

_____ SAT

_____ UNSAT

STEP 5:	Reviews Attachment 2 of ONP 20	
STANDARD:	Reviews Attachment 2 for the effects of placing 1-1 Diesel Generator RLTS in the LOCAL position	
NOTES:	***NO cue required.***	____ SAT
COMMENTS:		____ UNSAT
STEP 6:	Isolate the 1-1 DG Control Circuits	***CRITICAL STEP***
STANDARD:	Places HS-C22-RLTS and HS-G20-RLTS to the LOCAL position	
NOTES:	***Critical step to provide control of DG.*** ***Cue: HS-C22-RLTS and HS-G20-RLTS are in LOCAL position.***	____ SAT
COMMENTS:		____ UNSAT

STEP 7: Place RLTS to LOCAL position on breakers 152-107, 152-103, and 152-108

CRITICAL STEP

STANDARD: Places HS-152-107 RLTS (Brkr. 152-107), HS-152-103 RLTS (Brkr. 152-103), HS-152-108 RLTS (Brkr. 152-108) to the LOCAL position

NOTES: ***Critical step to obtain control of breakers.***

Cue: Hand switch is in the LOCAL position (as each hand switch is place in the LOCAL position)

.

____ SAT

____ UNSAT

COMMENTS:

STEP 8: Remove 30 AMP BREAKER CLOSE AND TRIP CIRCUIT fuses from 152-107, 152-103 and 152-108

CRITICAL STEP

STANDARD: Removes the 30 AMP BREAKER CLOSE AND TRIP CIRCUIT fuses from breakers 152-107, 152-103, and 152-110

NOTES: ***Critical step to prevent spurious operation.***

Cue: 30 AMP BREAKER CLOSE AND TRIP CIRCUIT fuse is removed (as each fuse is removed).

____ SAT

____ UNSAT

COMMENTS:

STEP 9:	Verify breaker status lights are LIT	
STANDARD:	Verifies that the breaker status lights are LIT for 152-107, 152-103, 152-108	
NOTES:	***Cue: The breaker status lights are LIT.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 10:	Start 1-1 DG	***CRITICAL STEP***
STANDARD:	Places local 1-1 DG Engine Control Switch to START	
NOTES:	***Critical step to start Diesel Generator.*** ***Cue: 1-1 DG control switch is in START, engine is running.*** ***Conditional Cue: If candidate asks for any readings on the diesel generator to verify that is operating, cue the operator that the reading indicated is correct for normal unloaded conditions. (Speed: 900 RPM, Frequency: 60 Hz, Voltage: 2.4 kilovolts)***	_____ SAT
COMMENTS:		_____ UNSAT

STEP 11:	Energize Bus 1C by locally closing 1-1 DG Output Breaker 152-107	***CRITICAL STEP***
STANDARD:	Closes breaker 152-107	
NOTES:	***Critical step to energize bus.*** ***Cue: The red and white breaker status lights are LIT and the green breaker status light is OFF.***	____ SAT
COMMENTS:		____ UNSAT

STEP 12:	Locally close breaker 152-103 (P-7B)	
STANDARD:	Attempts to close breaker 152-103	
NOTES:	***Cue: The red breaker status light is OFF and the green breaker status light is LIT.*** ***NOTE: Breaker fails to close.***	____ SAT
COMMENTS:		____ UNSAT

STEP 13:	Notifes Shift Supervisor that SW Pump P-7B breaker failed to close	
STANDARD:	Notifes Shift Supervisor	
NOTES:	***Cue: Shift Supervisor directs you to stop 1-1 DG.***	____ SAT
COMMENTS:		____ UNSAT
STEP 14:	Stop 1-1 DG	***CRITICAL STEP***
STANDARD:	Places local 1-1 DG Engine Control Switch to STOP	
NOTES:	***Critical step to stop Diesel Generator.*** ***Cue: 1-1 DG control switch is in STOP, engine is slowing down.*** ***Conditional Cue: If candidate asks, Breaker 152-107 GREEN light is LIT and RED light is OFF.***	____ SAT
COMMENTS:		____ UNSAT
STEP 15:	Notify Shift Supervisor that 1-1 DG is stopped	
STANDARD:	Notifies Shift Supervisor	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
	END OF TASK	

STOP TIME: __________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Start-up Transformer 1-2 and Safeguards 1-1 Transformer are NOT available. A fire in the Control Room damaged Bus 1C load shed circuits. The fire in the Control Room also damaged 1-1 Diesel Generator control circuits. The Control Room is NOT habitable. 1-1 DG is NOT operating.

INITIATING CUES:

During performance of ONP 25.2, "Alternate Safe Shutdown Procedure", the Shift Supervisor directs you to start 1-1 Diesel Generator, energize 1C Bus then close breakers 152-103 (Starting P-7B) and 152-108 (Bus 13) per ONP-20 Section 4.3.2.

JPM SRO-B.2-10
IS THE SAME AS
JPM RO-B.2-10

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-B.1-04

Emergency Borate

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Emergency Borate

Alternate Path: Operable Boric Acid Pump trips when started, requiring Gravity Feed flow path.

Facility JPM #: ASFA 01A (Modified)

K/A Rating: 004A4.18 Importance: SRO 4.1 RO 4.3

K/A Statement: Ability to manually operate and/or monitor in the control room: Emergency borate valve

Task Standard: Emergency boration is established using Gravity Feed.

Preferred Evaluation Location: Simulator X In Plant ________

Preferred Evaluation Method: Perform X Simulate ________

References: SOP-2A, Chemical and Volume Control System

Validation Time: 5 minutes Time Critical: NO

Candidate: ____________________

Time Start: ________ Time Finish: ________

Performance Time: ________ minutes

Performance Rating: SAT ________ UNSAT ________

Comments: ____________________

____

____

Examiner: ____________________ Date: ________
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS:

- IC-12; manually trip the reactor
- Perform actions for EOP-1.0 (close FRVs, FRBVs, etc.)
- Rack out breaker for Boric Acid Pump P-56A using REMOTE CV35 RACKOUT and hang caution tag on hand switch
- Override hand switch for Boric Acid Pump P-56B to prevent starting using OVRD DI P-56B-1 TRIP ON and OVRD DI P-56B-4 CLOSE OFF

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

A reactor trip has occurred.

INITIATING CUES:

The Shift Supervisor has directed you to Emergency Borate, using the Pumped Feed method.

START TIME: ________

STEP 1:	Obtains current procedure or references control board	
STANDARD:	Obtains copy of SOP-2A, refering to Section 7.5.2, or refers to placard on control board	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 2:	Ensure charging flow greater than 33 gpm	
STANDARD:	Determines charging flow indicates greater than 33 gpm on C-02	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 3:	OPEN MO-2140, Boric Acid Pump Feed Isol	
STANDARD:	Places hand switch in OPEN and verifies red light LIT and green light OFF	
NOTES:	***NOTE: May perform Step 3 or Step 4 in either order. If Step 4 performed first, this step will NOT likely be performed.***	____ SAT
COMMENTS:		____ UNSAT

STEP 4: Start P-56B, Boric Acid Pump

STANDARD: Places hand switch in START and determines that pump failed to start

NOTES: ***NOTE: May perform Step 3 or Step 4 in either order. If Step 4 performed first, Step 3 will NOT likely be performed.***

COMMENTS:

____ SAT

____ UNSAT

STEP 5: Notifies Shift Supervisor of failure of pump

STANDARD: Notifies Shift Supervisor

NOTES: ***Cue: If notified, Shift Supervisor directs candidate to establish emergency boration using gravity feed.***

COMMENTS:

____ SAT

____ UNSAT

STEP 6: CLOSE MO-2140, Boric Acid Pump Feed Isol

STANDARD: Places hand switch for valve in CLOSE and verifies red light OFF and green light LIT

NOTES:

COMMENTS:

____ SAT

____ UNSAT

STEP 7: OPEN MO-2169, Boric Acid Tank Gravity Feed Isol Valve STANDARD: Places hand switch for valve in OPEN and verifies red light LIT and green light OFF NOTES: ***Critical step to establish flow path.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT
STEP 8: OPEN MO-2170, Boric Acid Tank Gravity Feed Isol Valve STANDARD: Places hand switch for valve in OPEN and verifies red light LIT and green light OFF NOTES: ***Critical step to establish flow path.*** COMMENTS:	***CRITICAL STEP*** ____ SAT ____ UNSAT
STEP 9: Verify CLOSED CV-2155, Boric Acid Blender Outlet Control Valve STANDARD: Verifies hand switch for valve in CLOSE and verifies red light OFF and green light LIT NOTES: COMMENTS:	____ SAT ____ UNSAT

STEP 10:	CLOSE MO-2087, VCT Outlet Isol Valve	***CRITICAL STEP***
STANDARD:	Places hand switch for valve in CLOSE and verifies red light OFF and green light LIT	
NOTES:	***Critical step to establish flow path.***	____ SAT
COMMENTS:		____ UNSAT
STEP 11:	Ensure CLOSED MO-2160, SIRW Tank to Charging Pumps Isol	
STANDARD:	Verifies closed by observing red light OFF and green light LIT.	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 12:	Notify Shift Supervisor that Emergency Boration has been started using Gravity Feed	
STANDARD:	Notifies Shift Supervisor	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
	END OF TASK	

STOP TIME: __________

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

A reactor trip has occurred.

INITIATING CUES:

The Shift Supervisor has directed you to Emergency Borate, using the Pumped Feed method.

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM SRO-B.1-06

Manually Initiate Containment Spray

CANDIDATE: ______________________________

EXAMINER: ______________________________

REGION III
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Manually Initiate Containment Spray

Alternate Path: NONE

Facility JPM #: ASHC 01

K/A Rating: 026A4.01 Importance: SRO 4.3 RO 4.5

K/A Statement: Ability to manually operate and/or monitor in the control room: CSS controls

Task Standard: Containment spray is in service.

Preferred Evaluation Location: Simulator X In Plant ____

Preferred Evaluation Method: Perform X Simulate ____

References: EOP-1.0, Standard Post-Trip Actions

Validation Time: 5 minutes Time Critical: NO

Candidate: ____

Time Start: ____ Time Finish: ____

Performance Time: ____ minutes

Performance Rating: SAT ____ UNSAT ____

Comments: ____

Examiner: ____ Date: ____
Signature

Tools/Equipment/Procedures Needed:

SIMULATOR OPERATOR INSTRUCTIONS: IC-11; insert MALF CH05A and CH05B to prevent actuation of containment spray; insert MALF MS03A at a severity of 100%. Perform the actions of EOP-1.0 EXCEPT initiating containment spray.

READ TO OPERATOR

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

The plant has experienced an Excess Steam Demand Event. EOP-6.0 is being performed. Containment pressure is 4.0 psig and containment isolation has been verified. SIAS has been verified. Containment spray is NOT in service.

INITIATING CUES:

During performance of EOP-6.0, "Excess Steam Demand Event", the Shift Supervisor directs you to manually initiate containment spray per Step 26a.

START TIME: ________

STEP 1: Obtains current procedure STANDARD: Obtains copy of EOP-6.0, Step 26a NOTES: COMMENTS:	_____ SAT _____ UNSAT
STEP 2: Determine Containment Pressure STANDARD: Determines Containment Pressure to be greater than 4.0 psig NOTES: COMMENTS:	_____ SAT _____ UNSAT

STEP 3:	Ensure open all available Containment Spray Valves	
STANDARD:	Determines Containment Spray valves NOT open	
NOTES:		____ SAT
COMMENTS:		____ UNSAT
STEP 4:	Open containment spray valve CV- 3001	***CRITICAL STEP***
STANDARD:	Places hand switch in OPEN and verifies red light lit and green light OFF	
NOTES:	***Critical step to align spray system.***	____ SAT
COMMENTS:		____ UNSAT
STEP 5:	Open containment spray valve CV- 3002	***CRITICAL STEP***
STANDARD:	Places hand switch in OPEN and verifies red light lit and green light OFF	
NOTES:	***Critical step to align spray system.***	____ SAT
COMMENTS:		____ UNSAT

STEP 6: Ensure all available Containment Spray Pumps are operating

STANDARD: Determines all Containment Spray Pumps are OFF

NOTES:

COMMENTS:

_____ SAT

_____ UNSAT

CRITICAL STEP

STEP 7: Starts Containment Spray Pump P-54A

STANDARD: Places P-54A hand switch in START and verifies red light LIT and green light OFF

NOTES: ***Critical step to align spray system.***

COMMENTS:

_____ SAT

_____ UNSAT

CRITICAL STEP

STEP 8: Starts Containment Spray Pump P-54B

STANDARD: Places P-54B hand switch in START and verifies red light LIT and green light OFF

NOTES: ***Critical step to align spray system.***

COMMENTS:

_____ SAT

_____ UNSAT

STEP 9:	Starts Containment Spray Pump P-54C	***CRITICAL STEP***
STANDARD:	Places P-54C hand switch in START and verifies red light LIT and green light OFF	
NOTES:	***Critical step to align spray system.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 10:	Verify spray flow	
STANDARD:	Verifies flow indicated on both FI-0301A and FI-0302A	
NOTES:	***NOTE: This is NOT a required action, but is acceptable.***	_____ SAT
COMMENTS:		_____ UNSAT
STEP 11:	Notify Shift Supervisor that Containment Spray is operating	
STANDARD:	Notifies Shift Supervisor	
NOTES:		_____ SAT
COMMENTS:		_____ UNSAT
	END OF TASK	

STOP TIME: __________

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The plant has experienced an Excess Steam Demand Event. EOP-6.0 is being performed. Containment pressure is 4.0 psig and containment isolation has been verified. SIAS has been verified. Containment spray is NOT in service.

INITIATING CUES:

During performance of EOP-6.0, "Excess Steam Demand Event", the Shift Supervisor directs you to manually initiate containment spray per Step 26a.

INITIAL SUBMITTAL OF THE SCENARIOS

FOR THE PALISADES INITIAL EXAMINATION THE WEEK OF MAY 22, 2000

Facility:	**PALISADES**	Scenario Number:	1	Op-Test Number:	

Examiners	Operators

Objectives: To evaluate the candidates' ability to execute a power reduction, respond to a hot leg RTD failure, a loss of a safeguards 2400VAC bus, a malfunction of the charging pump speed controller, and a feedwater flow transmitter failure. To evaluate the candidate's implementation of emergency operating procedures in response to a large break loss of coolant accident. Post-trip evaluation will determine the candidates' ability to respond to a Low Pressure Safety Injection pump failure.

Initial Conditions: 100% power, BOL. AFW Pump P-8C is out-of-service, with caution tag on pump hand switch, for oil replacement and is expected to be returned to service between 4 and 6 hours following turnover.

Turnover: 100% power, BOL.

AFW Pump P-8C has been out-of-service 11 hours for oil replacement and is expected to be returned to service between 4 and 6 hours following turnover. Technical Specification 3.5.2.a has been entered and has 61 hours remaining before a shutdown to Hot Shutdown conditions is required.

Boron concentration is 1257 ppm. ASI is 0.0.

Shift orders are to lower power at 20% per hour to Hot Shutdown to allow for SG contaminant cleanup.

Event Number	Malfunction Number (1)	Event Type*	Event Description
1	NA	RO(R) TURB(N) SRO(N)	Power Reduction
2	RP23B	RO(I) SRO(I)	Hot Leg #2 RTD TE-0122HB Failure Low
3	CV04	RO(C) SRO(C)	Charging Pump P-55A Fluid Drive Failure High (IPE)

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Event Number	Malfunction Number	Event Type*	Event Description
4	RX15A	TURB(I) SRO(I)	Main Steam Flow Transmitter FT-0702 Low Failure on Steam Generator 'A'
5	ED04B	TURB(C) SRO(C)	Loss of 2400 V Bus 1-D
6	RC02	RO(M) TURB(M) SRO(M)	PCS Cold Leg Rupture
7	SEE SETUP	RO(C) SRO(C)	Low Pressure Safety Injection Pump P67B Failure

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Simulator Setup & Actions Required for Scenario # 1

Event Number	Simulator Operator Actions
INITIAL CONDITIONS	IC-11. 100% power, BOL. AFW Pump P-8C is out-of-service, with caution tag on pump hand switch. • OVRD LO P-8C-G, P-8C GREEN light OFF • OVRD LO P-8C-R, P-8C RED light OFF • OVRD DI P-8C-1, P-8C C/S TRIP Malfunction for Event 7 ACTIVE AT SETUP. • OVRD DI P-67B-1 TRIP to ON • TRIGGER EVENT to DELETE P-67B-1 TRIP when operator starts pump as follows: 1) Select an unused event number and place in upper left hand corner of event trigger screen EVENT # 2) Type ZDI1P(272) in EVENT ACTION 3) Type DOR P-67B-1 in COMMAND 4) Click the ACCEPT NEW EVENT button 5) Click the FINISH button
1	NONE
2	MALF RP23B, Severity = 0%
3	MALF CV04, Severity = 100%
4	MALF RX15A, Severity = 0%
5	MALF ED04B ANN-K-02-59 EXCITER COOLER HIGH TEMP to ON with delay = 60 seconds ***NOTE: Both MALF and ANN should be on Event Trigger #5.***
6	MALF RC02 ***NOTE: Activate event after crew has determined Condensate Pump and Cooling Tower Pump operating.***
7	ACTIVE AT SETUP • OVRD DI P-67B-1 TRIP to ON • TRIGGER EVENT to DELETE P-67B-1 TRIP when operator starts pump as follows: 1) Select an unused event number and place in upper left hand corner of event trigger screen EVENT # 2) Type ZDI1P(272) in EVENT ACTION 3) Type DOR P-67B-1 in COMMAND 4) Click the ACCEPT NEW EVENT button 5) Click the FINISH button

SHIFT TURNOVER SCENARIO # 1

100% power, BOL.

AFW Pump P-8C has been out-of-service 11 hours for oil replacement and is expected to be returned to service between 4 and 6 hours following turnover. Technical Specification 3.5.2.a has been entered and has 61 hours remaining before a shutdown to Hot Shutdown conditions is required.

Boron concentration is 1257 ppm. ASI is 0.0.

Shift orders are to lower power at 20% per hour to Hot Shutdown to allow for SG contaminant cleanup.

Op-Test Number: ________ Scenario Number: 1 Event Number: 1

Event Description: ***Power Reduction***

Time	Position	Applicant's Actions or Behaviors
	SRO	Enters and directs the actions of GOP-8
	SRO	Reviews Precautions and Limitations with crew
	SRO	Notifies Area Power Control and Chemistry of impending shutdown ***NOTE: Chemistry reports that they will establish degas operations after Hot Shutdown is achieved.***
	SRO	Evaluate PCS leak rate surveillance interval
	SRO	Establish "Power Operation Degas Lineup" (SOP-2A, Section 7.13, "Degas Of PCS") ***NOTE: If not previously reported, Chemistry reports that they will establish degas operations after Hot Shutdown is achieved.***

Op-Test Number: ________ Scenario Number: 1 Event Number: 1

Event Description: ***Power Reduction***

Time	Position	Applicant's Actions or Behaviors
	SRO	Evaluate ASI guidelines (EM-04-17, "Axial Shape Index (ASI) Control") - For an unplanned rapid power reduction, the operator need not worry about maintaining ASI within Target ASI ± 0.05 during the power reduction - Initiate trending of ASI - Power reduction should be initiated by boration
	RO	Commence boration of PCS (SOP-2A, Section 7.5.1, "Boration") - Determine required amount of boron - Establish boration flow - Maintain boron concentration to ensure regulating rods above the PPDIL
	SRO	If Reactor power changes by 15% or more in one hour or less, then notify Chemistry to perform an isotopic analysis for iodine
	TURB	Commence load reduction at 20%/hour (SOP-8, Section 7.1, "Turbine Generator K-1") - Lower turbine load at 20%/hour - Before Governor Valve #4 closes below 10%, transfer valve control from SEQUENTIAL to SINGLE valve control - Adjust Valve Position Limiter to maintain Limiter just above valve control signal
		NOTE: Next event should be entered once power has been lowered by approximately 3-5%.

Op-Test Number: ________ Scenario Number: 1 Event Number: 2

Event Description: ***Hot Leg #2 RTD TE-0122HB Failure Low***

Time	Position	Applicant's Actions or Behaviors
	RO	Diagnoses low failure of Loop #2 Thot signal - EK-0967, LOOP 1 LOOP 2 Tave DEVIATION, alarms - EK-0969, LOOP 2 Tave/Tref GROSS DEVIATION, alarms - EK-0924, GROUP 1 POWER DEPENDENT INSERTION LIMIT, alarms - EK-06 Rack D 04, NUCLEAR - DT POWER DEVIATION T-INLET OFF - NORMAL/CALCULATOR TROUBLE CHANNEL B Lowering of calculated ΔT and calculated TM/LP trip setpoint for channel 'A' TI-0122HB, Loop 2 Hot Leg Temperature, indicates low ***NOTE: If crew checks TYT-0200 behind C-12 (not modeled on simulator), inform them YELLOW alarm light is LIT.***
	SRO	Enters and directs the actions of various ARPs and ONP-13, Tave/Tref Controller Failure
	RO	Places Avg Temp Display Select Switch to LOOP 1 position to swap in-service Tave/Tref Controllers
	RO	Checks ΔT Power for the PIP Node and the SPI Node/Host Computer on a workstation and compares to actual Reactor Power

Op-Test Number: ________ Scenario Number: 1 Event Number: 2

Event Description: ***Hot Leg #2 RTD TE-0122HB Failure Low***

Time	Position	Applicant's Actions or Behaviors
	SRO	Refers to Tech Spec 3.17 (Tables 3.17.1 and 3.17.6)
	TURB	Bypass the Variable High Power Trip and the TM/LP Trip per SOP-36 1. Insert bypass key above affected RPS Trip Unit. 2. Turn key 90° clockwise. 3. Verify lit yellow light above bypass keyswitch. 4. Log evolution in the Reactor Logbook
	SRO	Initiates troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 1 Event Number: 3

Event Description: ***Charging Pump P-55A Fluid Drive Failure High (IPE)***

Time	Position	Applicant's Actions or Behaviors
	SRO RO	Daignoses high failure of P-55A Speed - Charging/Letdown mismatch - Pressurizer Level rising - VCT Level lowering - EK-0704, Letdown Ht Ex Tube Inlet Hi-Lo Pressure, alarm
	SRO	Enters and directs the actions of EK-0704 ***NOTE: Actions directed by EK-0704 do NOT address this condition.***
	SRO	Directs RO to take manual control of P-55A speed or place Charging Pump P-55B or P-55C in service and secure Charging Pump P-55A per SOP-2A
	RO	Takes manual control of P-55A speed to restore charging flow to normal (44 gpm) ***NOTE: Remainder of this event applies ONLY if crew takes actions to place P-55B or P-55C in manual and secures P-55A. It is acceptable for either set of actions to be taken.***
	RO	If directed, place in MANUAL either P-55B (preferred) or P-55C Charging Pumps Control Select Switch

Op-Test Number: ________ Scenario Number: 1 Event Number: 3

Event Description: ***Charging Pump P-55A Fluid Drive Failure High (IPE)***

Time	Position	Applicant's Actions or Behaviors
	RO	Direct AO to ensure throttled OPEN P-55B Seal Coolant Flow Control Valve
	RO	Ensure in AUTO charging pump control select switch for the second fixed capacity charging pump
	RO	Start pump selected for manual operation
	SRO RO	Refer to Attachment 2 and check that the charging pump selected for AUTO (P-55C preferred), and possibly additional Letdown Orifice Stop Valves cycle according to controller output to maintain PZR level setpoint
	RO	IF desired to minimize Letdown Orifice Valve cycling, THEN CLOSE CV-2004, Orifice Stop Valve

Op-Test Number: ________ Scenario Number: 1 Event Number: 3

Event Description: ***Charging Pump P-55A Fluid Drive Failure High (IPE)***

Time	Position	Applicant's Actions or Behaviors
	RO	When charging flow increases, stop P-55A
	SRO	Initiate troubleshooting and repair of P-55A drive

Op-Test Number: ________ Scenario Number: 1 Event Number: 4

Event Description: ***Main Steam Flow Transmitter FT-0702 Low Failure on Steam Generator 'A'***

Time	Position	Applicant's Actions or Behaviors
	TURB	Diagnoses failure of steam flow transmitter FT-0702 on SG 'A' - Steam flow lower than feed flow - CV-0701 closing to lower feed flow - Feed pump speed lowering - SG 'A' level lowering - SG 'B' level lowering, then restoring to normal as CV-0703 opens
	SRO	Enters and directs the actions of ONP-3, Loss of Feedwater
	TURB	Takes manual control of CV-0701 and feed pumps, if needed, to maintain SG levels at program **NOTE: CRITICAL STEP TO PREVENT REACTOR TRIP ON LOW SG LEVEL (IMMEDIATE ACTION).**
	SRO	Initiates troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 1 Event Number: 5

Event Description: ***Loss of 2400 V Bus 1-D***

Time	Position	Applicant's Actions or Behaviors
	TURB	Diagnose loss of 2400 V Bus 1-D - EK-05-04, 2400V BUS 1D BKR 152-203 TRIP, alarm - EK-05-15, 2400V BUS 1C AND/OR 1D UNDERVOLTAGE, alarm - EK-05-22, BUS FAIL TO TRANSFER, alarm - Breaker 152-203 trips - Voltages and load indications for Bus 1-D indicate zero - EDG 1-2 starts, but does not energize Bus 1-D - Service Water Pump P-7C trips - Component Cooling Water P-52B trips, if running
	SRO	Enters and directs the actions of ARP-3 (EK-05) and ONP-2.1
	TURB	Stops EDG 1-2 if temperature limits are reached
	SRO	Refers to and directs the actions of ONP-6.1
	TURB	Monitor Exciter air temperature

Op-Test Number:	________	Scenario Number:	1	Event Number:	5

Event Description: ***Loss of 2400 V Bus 1-D***

Time	Position	Applicant's Actions or Behaviors
	RO	Ensure Service Water Pump operating with Critical SW Header pressure > 42 psig ***NOTE: Critical SW Header pressure is approximately 30 psig. A reactor trip is required when EK-0259, EXCITER COOLER HIGH TEMP, alarms. Crew may make decision to trip before alarm is received due to low SW pressure with only one SW pump available. This is NOT required, but is acceptable.***
	SRO	Orders Reactor Trip due to inadequate cooling to exciter air cooler with power above 15%, enters and directs the actions of EOP-1.0 ***NOTE: Crew should continue with ONP-2.1 as time and personnel permit. Focus of crew should be on EOPs, however.***
	RO	Trips the reactor
	RO	Determine that Reactivity Control acceptance criteria is met
	TURB	Control the Feedwater System - Ensure closed ALL Main Feed Regulating Valves and ALL Bypass Feed Regulating Valves for BOTH S/Gs - IF Tave is less than 525°F AND lowering uncontrolled, THEN trip the operating Main Feed Pumps

Op-Test Number: ________ Scenario Number: 1 Event Number: 5

Event Description: ***Loss of 2400 V Bus 1-D***

Time	Position	Applicant's Actions or Behaviors
	RO	Determine that Control Room Gaseous radiation environment acceptable
	TURB	Determine that Vital Auxiliaries-Electric acceptance criteria are NOT met due to previous loss of 2400 V Bus 1D
	RO	Determine that PCS Inventory Control acceptance criteria are met
	RO	Determine that PCS Pressure Control acceptance criteria are met
	RO	Determine that PCS Heat Removal acceptance criteria are met

Op-Test Number: ________ Scenario Number: 1 Event Number: 5

Event Description: ***Loss of 2400 V Bus 1-D***

Time	Position	Applicant's Actions or Behaviors
	RO	Determine that Core Heat Removal acceptance criteria are met
	RO	Determine that Containment Isolation acceptance criteria are met
	RO	Determine that Containment Atmosphere acceptance criteria are met
	RO	Determine that Vital Auxiliaries-Water acceptance criteria met
	RO	Determine that Vital Auxiliaries-Air acceptance criteria met

Op-Test Number: ________ Scenario Number: 1 Event Number: 5

Event Description: ***Loss of 2400 V Bus 1-D***

Time	Position	Applicant's Actions or Behaviors
	TURB	Verify at least one Condensate Pump and at least one Cooling Tower Pump operating
		SIMULATOR OPERATOR: Event # 6 (PCS COLD LEG RUPTURE) should be entered after crew determines at least one Condensate Pump and at least one Cooling Tower Pump operating.
		NOTE: Remaining items in this event are part of response to Loss of Bus 1D and are to be performed only as time and manpower permits.
	TURB	Ensure CRHVAC Train 'B' in service
	TURB	Ensure Main Exhaust Fan V-6B in service

Op-Test Number: ________ Scenario Number: 1 Event Number: 5

Event Description: ***Loss of 2400 V Bus 1-D***

Time	Position	Applicant's Actions or Behaviors
	TURB	Feed Bus 12 from Bus 11 as allowed to regain necessary equipment per SOP 30
	TURB	Start IA Compressors as available and required
	SRO	Reference TS 3.7 and Standing Orders 54 and 62
	SRO	Contact maintenance to initiate troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 1 Event Number: 6

Event Description: ***PCS Cold Leg Rupture***

Time	Position	Applicant's Actions or Behaviors
	SRO RO TURB	Diagnose large break LOCA - SIAS actuated - PCS pressure lowering rapidly - Containment pressure rising rapidly - Containment humidity and temperature rising - Numerous related alarms
	RO	Identifies that HPSI Pump P-67B failed to start - Green light lit, red light dark on HS - No flow indicated
	RO	Notifies SRO of pump failure to start
	SRO	Directs RO to start pump.
	RO	Starts LPSI Pump P-67B **NOTE: CRITICAL STEP TO PROVIDE LPSI FLOW DURING LARGE BREAK LOCA SINCE OPPOSITE TRAIN PUMP HAS NO POWER.**
	RO	Verifies LPSI Pump P-67B injecting

Op-Test Number: ________ Scenario Number: 1 Event Number: 6

Event Description: ***PCS Cold Leg Rupture***

Time	Position	Applicant's Actions or Behaviors
	RO	Determines that PCP operating criteria are NOT met and stops all PCPs **NOTE: CRITICAL STEP TO MINIMIZE PCP DAMAGE DUE TO LOCA.**
	TURB	Commence Emergency Shutdown Checklist (GOP-10)
	SRO	Transitions to and directs the actions of EOP-4.0, Loss of Coolant Accident Recovery
	TURB	Ensure available safeguards equipment operated or operating per EOP Supplement 5
	RO	Verify at least minimum SI flow per EOP Supplement 4
	RO	Stops all PCPs - Pressurizer pressure less than 1300 psia - PCS subcooling less than 25 °F ***NOTE: PCPs may have been stopped earlier in scenario.***

Op-Test Number: ________ Scenario Number: 1 Event Number: 6

Event Description: ***PCS Cold Leg Rupture***

Time	Position	Applicant's Actions or Behaviors
	TURB	Attempt to isolate the LOCA - Verify BOTH PORVs are closed - Close the PORV block valves - Ensure closed Letdown Stop Valves - Ensure closed PCS Sample Isolation Valves - Ensure closed Reactor Vessel and PZR Vent Valves - Verify no leak to CCW - Verify Pressurizer relief valves not leaking by ***NOTE: May identify as LBLOCA and not attempt to isolate leakage paths. This is acceptable.***
	RO	Place at least one Hydrogen Monitor in operation per SOP-38
	RO	Verifies Containment Spray operating as required
	TURB	Verify Containment Isolation for CHP per EOP Supplement 6
		TERMINATE THE SCENARIO WHEN CONTAINMENT ISOLATION FOR CHP HAS BEEN VERIFIED.

Op-Test Number: ________ Scenario Number: 1 Event Number: 7

Event Description: ***Low Pressure Safety Injection Pump P67B Failure***

Time	Position	Applicant's Actions or Behaviors
	RO	Identifies that HPSI Pump P-67B failed to start - Green light lit, red light dark on HS - No flow indicated ***NOTE: There are no alarms associated with this condition. It should be noted during the immediate actions of EOP-1.0. This is actually performed as part of EVENT 6.***
	RO	Notifies SRO of pump failure to start
	SRO	Directs RO to start pump.
	RO	Starts LPSI Pump P-67B **NOTE: CRITICAL STEP TO PROVIDE LPSI FLOW DURING LARGE BREAK LOCA SINCE OPPOSITE TRAIN PUMP HAS NO POWER.**
	RO	Verifies LPSI Pump P-67B injecting

Facility: **PALISADES** Scenario Number: **2** Op-Test Number: ________

Examiners

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Operators

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Objectives:	To evaluate the candidates' ability to raise power at EOL, respond to a malfunction of the letdown pressure controller, a power range nuclear instrument failure, and a pressurizer pressure control malfunction. To evaluate the response to a main turbine high vibration requiring a plant trip, with a subsequent failure of the main turbine to trip. EOP implementation will be evaluated based upon the candidates' ability to respond and mitigate the consequences of a steam generator tube rupture. Post-trip response will be required to lower PCS pressure using the PORVs due to a failure of normal and auxiliary spray.
Initial Conditions:	IC-18. Approximately 25% power EOL; Equipment OOS is HPSI Pump P-66B and Aux Spray Valve CV-2117, with a caution tag hung on both hand switches; 'A' MFW Pump is in service.
Turnover:	Approximately 25% power EOL. Equipment out-of-service is HPSI Pump P-66B for pump alignment; P-66B should be returned to service in approximately 3 hours. Technical Specification 3.3.2.c was entered 6 hours ago and P-66B must be restored within the next 18 hours. Aux Spray Valve CV-2117 is also inoperable due to a wiring problem with the hand switch. 'A' MFW Pump is in service. Boron concentration is 333 ppm. ASI is -0.03. GOP-5 has been completed through Section 2.0. Shift orders are to continue raising power at a rate between 6% and 10% per hour.

Event Number	Malfunction Number (1)	Event Type*	Event Description
1	NA	RO(R) TURB(N) SRO(N)	Up Power Ramp
2	CV05	RO(C) SRO(C)	Loss of Letdown Pressure Control High
3	RP11D	TURB(I) SRO(I)	Power Range Safety Channel Detector (8) High Voltage Power Failure

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Event Number	Malfunction Number	Event Type*	Event Description
4	RX05B	RO(I) SRO(I)	Pressurizer Pressure Control Fails In The High Direction (Channel B)
5	TU01	TURB(C) SRO(C)	Main Turbine High Vibration (Requires Trip) **(IPE)**
6	TC02	TURB(C) SRO(C)	Failure of Turbine Trip Actuation **(PRA)**
7	SG01A	RO(M) TURB(M) SRO(M)	Steam Generator 'A' Tube Rupture at 700 gpm
8	SEE SETUP	RO(C) SRO(C)	Failure of Pressurizer Pressure Output to Normal Spray Valves

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

(1) See Attachment, “Simulator Setup & Actions Required for Scenario,” for details on setup.

Simulator Setup & Actions Required for Scenario # 2

Event Number	Simulator Operator Actions
INITIAL CONDITIONS	IC-18. Approximately 25% power EOL. 'A' MFW Pump is in service. HPSI Pump P-66B is OOS, with a caution tag hung on the hand switch • REMOTE SI24 RACKOUT Aux Spray is OOS, with a caution tag hung on the hand switch • OVRD DI CV-2117 H/S OFF • OVRD LO CV-2117-G, CV-2117 GREEN light OFF • OVRD LO CV-2117-R, CV-2117 RED light OFF Malfunction for Event 6 is ACTIVE. • TC02
1	NONE
2	MALF CV05
3	MALF RP11D
4	MALF RX05B
5	MALF TU01, Severity =100%, Ramp = 15 min (Ramps to 15 mils at 1 mil/minute)
6	MALF TC02, ACTIVE AT SETUP
7*	MALF SG01A, Severity = 70% (700 gpm), Ramp = 5 minutes, ACTIVE UPON COMPLETION OF EOP-1.0 ACTIONS IN RESPONSE TO TURBINE VIBRATION ACTIVE AT SAME TIME AS EVENT 8 (Spray Valve Failure).
8*	OVRD CV-1057 and CV-1059 to CLOSE to simulate failure of output signal from pressure controller to valves. ACTIVE AT SAME TIME AS EVENT 7 (SGTR).

* Note Events 7 and 8 are activated at same time.

SHIFT TURNOVER SCENARIO # 2

Approximately 25% power EOL.

Equipment out-of-service is HPSI Pump P-66B for pump alignment; P-66B should be returned to service in approximately 3 hours. Technical Specification 3.3.2.c was entered 6 hours ago and P-66B must be restored within the next 18 hours. Aux Spray Valve CV-2117 is also inoperable due to a wiring problem with the hand switch.

'A' MFW Pump is in service. Boron concentration is 333 ppm. ASI is -0.03.

GOP-5 has been completed through Section 2.0. Shift orders are to continue raising power at a rate between 6% and 10% per hour.

Op-Test Number: ________ Scenario Number: 2 Event Number: 1

Event Description: ***Up Power Ramp***

Time	Position	Applicant's Actions or Behaviors
	SRO	Enters and directs the actions of GOP-5
	SRO	Reviews Precautions and Limitations with crew
	TURB	Continue power level increase as specified by the Shift Supervisor
	TURB	At approximately 30% power, coordinate with an AO to start second feedwate pump, leaving at 3250 RPM with pump recirculating valve open until pump is needed for SG feed per SOP-12
	TURB	At approximately 30% power, coordinate with AO to place the Moisture Separator Reheaters in service per SOP-8

Op-Test Number: ________ Scenario Number: 2 Event Number: 2

Event Description: ***Loss of Letdown Pressure Control High***

Time	Position	Applicant's Actions or Behaviors
	RO	Diagnoses failure of the intermediate letdown pressure controller - Selected intermediate letdown pressure control valve opens - Flashing in the regenerative heat exchangers, resulting in pressure and flow oscillations on the letdown line - EK-0704, LETDOWN HT EX TUBE INLET HI-LO PRESS, alarms
	SRO	Enters and directs the actions of EK-0704
	RO	Determines charging and letdown flows NOT matched
	RO	Determines Low Pressure Letdown Pressure controller PIC-0202 NOT controlling at approximately 460 psig
	RO	Selects manual on the pressure indicator controller

Op-Test Number: ________ Scenario Number: 2 Event Number: 2

Event Description: ***Loss of Letdown Pressure Control High***

Time	Position	Applicant's Actions or Behaviors
	RO	Manually repositions selected valve to control pressure at approximately 460 psig
	SRO	Initiates troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 2 Event Number: 3

Event Description: ***Power Range Safety Channel Detector (8) High Voltage Power Failure***

Time	Position	Applicant's Actions or Behaviors
	SRO RO TURB	Diagnose failure of NI-08 - NI-008 detector voltage indicates 0 VDC - EK-0948, DROPPED ROD - EK-06 C03, CHANNEL DEVIATION LEVEL 1 5% C04, CHANNEL DEVIATION LEVEL 2 10% C07, DROPPED ROD C08, NI CHANNEL TROUBLE - TMM Channel D NI indicates 0 - NI-008 Upper and Lower indicate 0% power
	SRO	Enter and direct the actions of various ARPs
	TURB	Bypass the Variable High Power Trip, the TM/LP Trip, the High Power Rate Trip and Loss of Load Trips per SOP-36 1. Insert bypass key above affected RPS Trip Unit. 2. Turn key 90° clockwise. 3. Verify lit yellow light above bypass keyswitch. 4. Log evolution in the Reactor Logbook
	SRO	Refer to Technical Specification Table 3.17.1

Op-Test Number: ________ Scenario Number: 2 Event Number: 3

Event Description: ***Power Range Safety Channel Detector (8) High Voltage Power Failure***

Time	Position	Applicant's Actions or Behaviors
	SRO	Refer to EM-04-02 to monitor Quadrant Power Tilt
	SRO	Declare the ASI Alarm Function (Technical Specification Table 3.17.6) of TMM 'D' inoperable
	TURB	Monitor and log the "Power Density" status of the remaining operable TMMs hourly
	SRO	Intiate troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 2 Event Number: 4

Event Description: ***Pressurizer Pressure Control Fails In The High Direction (Channel B)***

Time	Position	Applicant's Actions or Behaviors
	RO	Diagnoses high failure of pressurizer pressure controlling channel - EK-0753, PRESSURIZER PRESSURE OFF NORMAL HI-LO, alarms - Spray valves open - Proportional heaters off - Pressurizer pressure lowers - PIA-0101B indicating high
	SRO	Enters and directs the actions of ARP-4 and ONP-18
	RO	Takes manual control of PPCS controller 'A' or alternates Pressurizer pressure controllers per SOP-1 **NOTE: CRITICAL STEP TO PREVENT TM/LP TRIP AND SIAS ON LOW PRESSURE.**
	SRO	Initiates troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 2 Event Number: 5

Event Description: ***Main Turbine High Vibration (Requires Trip) (IPE)***

Time	Position	Applicant's Actions or Behaviors
	SRO TURB	Diagnose high vibration on turbine - EK-0105, TURBINE HIGH VIBRATION - Indications on Control Room vibration recorders
	SRO	Enter and direct the action of EK-0105
	TURB	Checks normal indications on: - Bearing oil temperature - Eccentricity - Differential expansion - Generator frequency - Feedwater heater levels
	SRO	Determine plant trip required due to vibration level and orders reactor trip ***NOTE: May first determine that level is between 10-14 mils and commence a plant shutdown per GOP-8. This is acceptable if a trip is directed when vibration exceeds 14 mils with reactor power above 15%.***
	RO	Trips the reactor as directed

Op-Test Number: ________ Scenario Number: 2 Event Number: 5

Event Description: ***Main Turbine High Vibration (Requires Trip) (IPE)***

Time	Position	Applicant's Actions or Behaviors
	SRO	Enters and directs the actions of EOP-1.0
	RO	Determine that Reactivity Control acceptance criteria is met
	TURB	Control the Feedwater System - Ensure closed ALL Main Feed Regulating Valves and ALL Bypass Feed Regulating Valves for BOTH S/Gs - IF Tave is less than 525°F AND lowering uncontrolled, THEN trip the operating Main Feed Pumps
	RO	Determine that Control Room Gaseous radiation environment acceptable

Op-Test Number: ________ Scenario Number: 2 Event Number: 5

Event Description: ***Main Turbine High Vibration (Requires Trip) (IPE)***

Time	Position	Applicant's Actions or Behaviors
	TURB	Determine that Vital Auxiliaries-Electric acceptance criteria are NOT met - Main Turbine does NOT trip - Closes MSIVs **NOTE: CRITICAL STEP TO CLOSE MSIVs TO PREVENT CONTINUED COOLDOWN.** ***NOTE: Attempts to trip the turbine from C-01 will not be successful. MSIVs must be closed.***
	RO	Determine that PCS Inventory Control acceptance criteria are met
	RO	Determine that PCS Pressure Control acceptance criteria are met
	RO	Determine that Core Heat Removal acceptance criteria are met
	RO	Determine that PCS Heat Removal acceptance criteria are met
	RO	Determine that Containment Isolation acceptance criteria are met

Op-Test Number: ________ Scenario Number: 2 Event Number: 5

Event Description: ***Main Turbine High Vibration (Requires Trip) (IPE)***

Time	Position	Applicant's Actions or Behaviors
	RO	Determine that Containment Atmosphere acceptance criteria are met
	RO	Determine that Vital Auxiliaries-Water acceptance criteria met
	RO	Determine that Vital Auxiliaries-Air acceptance criteria met
	TURB	Verify at least one Condensate Pump and at least one Cooling Tower Pump operating
	TURB	Commence Emergency Shutdown Checklist (GOP-10)
		NOTE: Initiate next event once Emergency Shutdown Checklist is addressed.

Op-Test Number: ________ Scenario Number: 2 Event Number: 6

Event Description: ***Failure of Turbine Trip Actuation (PRA)***

Time	Position	Applicant's Actions or Behaviors
	TURB	Diagnose failure of turbine to trip - Position indication - Steam pressure lowering - PCS cooldown and depressurization ***NOTE: This is actually performed as part of Event 5.*** **NOTE: CRITICAL STEP TO CLOSE MSIVs TO PREVENT CONTINUED COOLDOWN.**
	TURB	Closes both MSIVs as Contingency Action for failure of turbine to trip and notifies CRS.

Op-Test Number: ________ Scenario Number: 2 Event Number: 7

Event Description: ***Steam Generator 'A' Tube Rupture at 700 gpm***

Time	Position	Applicant's Actions or Behaviors
	SRO RO TURB	Diagnoses SGTR on SG 'A' - Rising radiation levels in secondary - Lowering PCS level - Lowering PCS pressure - Rising SG level - Lowering SG feed flow - EK-1364, GASEOUS WASTE MONITORING HI RADIATION, alarms
	SRO	Enters and directs the actions of EOP-5.0 ***NOTE: May return to EOP-1.0, but acceptable to enter EOP-5.0 directly. If EOP-1.0 re-entered, operator actions will repeat those previously performed.***
	RO	Stop PCPs, as required - If pressure less than 1300 psia, stop 2 PCPs - If subcooling less than 25 °F, stop remaining 2 PCPS

Op-Test Number: ________ Scenario Number: 2 Event Number: 7

Event Description: ***Steam Generator 'A' Tube Rupture at 700 gpm***

Time	Position	Applicant's Actions or Behaviors
	SRO	Verifes acceptance criteria met at intervals of approximately every 15 minutes
	SRO	Notify Heath Physics to perform preliminary radiation surveys per EOP Supplement 14
	TURB	Ensure available safeguards equipment operated or operating per EOP Supplement 5
	RO	Verify at least minimum SI flow per EOP Supplement 4

Op-Test Number: ________ Scenario Number: 2 Event Number: 7

Event Description: ***Steam Generator 'A' Tube Rupture at 700 gpm***

Time	Position	Applicant's Actions or Behaviors
	RO	Commence emergency boration to establish PCS boron concentration greater than or equal to hot shutdown boron concentration
	TURB	Ensure SG blowdown valves are closed
	RO TURB	Cooldown the PCS to highest narrow range Thot less than 524 °F (preferably 500 °F to 515 °F) using the Atmospheric Dump Valves
	RO	Record each occurrence of PZR Spray operation with a ΔT (PZR vapor phase temp minus spray temp) greater than 200 °F in the Reactor Logbook ***NOTE: Spray will not be available without PCPs operating.***

Op-Test Number: ________ Scenario Number: 2 Event Number: 7

Event Description: ***Steam Generator 'A' Tube Rupture at 700 gpm***

Time	Position	Applicant's Actions or Behaviors
	RO SRO	Verify SI Pump throttling criteria are satisfied - PCS subcooling, based on the Average of Qualified CETs, is least 25 oF subcooled - Corrected PZR level is greater than 20% and controlled per EOP Supplements 9 and 10 - At least one S/G is available for PCS heat removal with corrected level being maintained or being restored to between 60% and 70% per Supplement 11 - Operable RVLMS channels indicate greater than 102 inches above the bottom of fuel alignment plate
	RO	Attempt to depressurize the PCS - Maintain PZR pressure within ALL of the following criteria: • Less than 940 psia • Within the limits of EOP Supplement 1 • Preferably within 50 psid of the isolated S/G pressure

Op-Test Number: ________	Scenario Number: 2	Event Number: 7		

Event Description: ***Steam Generator 'A' Tube Rupture at 700 gpm***

Time	Position	Applicant's Actions or Behaviors
	RO	Determines Normal and Aux Spray are NOT available - Aux Spray Valve CV-2117 tagged - Normal Spray Valves CV-1057 and CV-1059 fail to open ***NOTE: This is actually Event 8.***
	RO	Informs SRO of problems with spray
	SRO	Directs RO to lower pressure using PORV ***NOTE: Crew may elect to continue with depressurizing by cooling down rather than using PORVs. This is acceptable provided PCS pressure is maintained below 940 psia.***
	RO	Lowers pressure using PORV - Opens PORV isolation valves - Enables LTOP - Cycles one PORV to lower pressure below 940 psia and, preferably, within 50 psid of ruptured SG pressure **NOTE: CRITICAL STEP TO LOWER PRESSURE BELOW 940 PSIA TO MINIMIZE RELEASE.**
		TERMINATE THE SCENARIO WHEN THE CREW HAS DEPRESSURIZED THE PCS BELOW 940 PSIA.

Op-Test Number: ________ Scenario Number: 2 Event Number: 8

Event Description: ***Failure of Pressurizer Pressure Output to Normal Spray Valves***

Time	Position	Applicant's Actions or Behaviors
	RO	Determines Normal and Aux Spray are NOT available - Aux Spray Valve CV-2117 tagged - Normal Spray Valves CV-1057 and CV-1059 fail to open ***NOTE: This is actually performed as part of Event 7.***
	RO	Informs SRO of problems with spray
	SRO	Directs RO to lower pressure using PORV
	RO	Lowers pressure using PORV - Opens PORV isolation valves - Enables LTOP - Cycles one PORV to lower pressure below 940 psia and, preferably, within 50 psid of ruptured SG pressure **NOTE: CRITICAL STEP TO LOWER PRESSURE BELOW 940 PSIA TO MINIMIZE RELEASE.**

Facility: **PALISADES** Scenario Number: **3** Op-Test Number: ______

Examiners
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Operators
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Objectives: To evaluate the candidates' ability to respond to a pressurizer level control malfunction resulting in a loss of a backup heater group and to lower plant power. During the power reduction, the candidates will be evaluated on their ability to control SG levels in manual following a failure of a feedwater flow transmitter. To evaluate the candidates' response to a failed closed main turbine governor valve which will require a plant trip. The reactor will not trip automatically, nor manually from the primary trip switch, and must be tripped using secondary means. Following the plant trip, the candidates will be evaluated on their ability to diagnose and respond to a steamline break inside containment. Post-trip complications will include a failure of both trains of containment isolation to automatically actuate, requiring the candidates to respond to this ESF failure.

Initial Conditions: IC-21; Approximately 100% power EOL; Equipment OOS is Charging Pump P-55A with Caution Tag hung on hand switch; Charging System is aligned for Mode 1 operation with P-55B in MANUAL and P-55C in AUTO.

Turnover: Power is 100% at EOL.

Charging Pump P-55A is out of service for repairs with the Charging System aligned for Mode 1 operations and CV-2004 closed. Technical Specification 3.2.2 and Standing Order 54 are satisfied.

Boron concentration is 46 ppm. ASI is + 0.03.

Shift orders are to lower power to 60% load at 15% per hour for maintenance on P-1B.

Event Number	Malfunction Number (1)	Event Type*	Event Description
1	RX07B	RO(I) SRO(I)	Pressurizer Level Control Channel B Upscale Demand
2	RX12C	RO(C) SRO(C)	Pressurizer Heater Groups Fail Off (Backup Group #1) **(IPE)**
3	NA	RO(R) TURB(N) SRO(N)	Down Power Ramp

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Event Number	Malfunction Number	Event Type*	Event Description
4	RX14A	TURB(I) SRO(I)	Feedwater Flow Transmitter FT-0701 Failure High
5	TC04C	TURB(C) SRO(C)	Turbine Governor Valve GV 3 Fails Shut
6	MS03A	RO(M) TURB(M) SRO(M)	Main Steamline Rupture Inside of the Containment
7	CH05A/B	RO(C) SRO(C)	Automatic Initiation Failure Of Containment Isolation
8	RP19	RO(C) SRO(C)	Failure of the Reactor to Automatically Trip

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Simulator Setup & Actions Required for Scenario # 3

Event Number	Simulator Operator Actions
INITIAL CONDITIONS	IC-21; Approximately 100% power EOL Equipment OOS is Charging Pump P-55A with Caution Tag hung on hand switch; Charging System is aligned for Mode 1 operation with P-55B in MANUAL and P-55C in AUTO. • P-55B Control Select to Manual • P-55C Control Select to Auto • Start P-55B with Control Switch • Stop P-55A with Control Switch • Place CV-2004 in Close • Remote CV32, P-55A, Rackout Malfunction for Event 7 ACTIVE AT SETUP. • MALF CHO5A and CHO5B • TRIGGER EVENT to DELETE CHO5A when operator depresses CHR INITIATE as follows: 1) Select an unused event number and place in upper left hand corner of event trigger screen EVENT # 2) Type ZDI1P(689) in EVENT ACTION 3) Type DMF CH05A in COMMAND 4) Click the ACCEPT NEW EVENT button 5) Click the FINISH button • TRIGGER EVENT to DELETE CHO5B when operator depresses CHR INITIATE as follows: 1) Select an unused event number and place in upper left hand corner of event trigger screen EVENT # 2) Type ZDI1P(696) in EVENT ACTION 3) Type DMF CH05B in COMMAND 4) Click the ACCEPT NEW EVENT button 5) Click the FINISH button Malfunction for Event 8 ACTIVE AT SETUP • MALF RP19 • OVRD DI REACTOR_TRIP to OFF
1*	MALF RX07B ***Activate Event #1 and Event #2 simultaneously.***
2*	MALF RX12C ***Activate Event #1 and Event #2 simultaneously.***
3	NONE
4	MALF RX14A, Severity = 100%
5	MALF TC04C
6	MALF MS03A, Severity = 20%, Ramp = 2 minutes

Setup Continued on Next Page

Simulator Setup & Actions Required for Scenario # 3

(Continued)

7	Malfunction for Event 7 ACTIVE AT SETUP. • MALF CHO5A and CHO5B • TRIGGER EVENT to DELETE CHO5A when operator depresses CHR INITIATE as follows: 1) Select an unused event number and place in upper left hand corner of event trigger screen EVENT # 2) Type ZDI1P(689) in EVENT ACTION 3) Type DMF CH05A in COMMAND 4) Click the ACCEPT NEW EVENT button 5) Click the FINISH button • TRIGGER EVENT to DELETE CHO5B when operator depresses CHR INITIATE as follows: 1) Select an unused event number and place in upper left hand corner of event trigger screen EVENT # 2) Type ZDI1P(696) in EVENT ACTION 3) Type DMF CH05B in COMMAND 4) Click the ACCEPT NEW EVENT button 5) Click the FINISH button
8	Malfunction for Event 8 ACTIVE AT SETUP • MALF RP19 • OVRD DI REACTOR_TRIP to OFF

**** Events #1 and #2 should be activated at same time.***

SHIFT TURNOVER SCENARIO # 3

Power is 100% at EOL.

Charging Pump P-55A is out of service for repairs with the Charging System aligned for Mode 1 operations and CV-2004 closed. Technical Specification 3.2.2 and Standing Order 54 are satisfied.

Boron concentration is 46 ppm. ASI is + 0.03.

Shift orders are to lower power to 60% load at 15% per hour for maintenance on P-1B.

Op-Test Number: ________ Scenario Number: 3 Event Number: 1

Event Description: ***Pressurizer Level Control Channel B Upscale Demand***

Time	Position	Applicant's Actions or Behaviors
	RO	Diagnose low failure of Pressurizer Level Transmitter LT-0101B - Pressurizer Level Control 'B' output demand high - Pressurizer Level Indication LI-0101B failed low - EK-07-61, PRESSURIZER LEVEL HI-LO, alarm - EK-07-63, PRESSURIZER LEVEL CH "A" LO-LO, alarm - Letdown Orifice Stop Valves closed - Charging Pumps P-55B and P-55C running - Charging Pump P-55A at maximum speed - Pressurizer Heaters off - Actual Pressurizer level rising
	SRO	Enters and directs the actions of ARP-4 (EK-07)
	RO	Takes manual control of Pressurizer Level controller <u>OR</u> selects Channel 'A' as controlling channel **CRITICAL STEP TO OBTAIN CONTROL OF PRESSURIZER LEVEL PRIOR TO VCT LOW-LOW LEVEL CAUSING A CHARGING PUMP SUCTION SWAPOVER TO THE SIRW TANK.**
	RO	Restores Pressurizer level to program value and regains heater control by selecting 'Channel A' on LIC-0101, Heater Control Select
	SRO	Contact maintenance to initiate troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 3 Event Number: 2

Event Description: ***Pressurizer Heater Groups Fail Off (Backup Group #1) (IPE)***

Time	Position	Applicant's Actions or Behaviors
		NOTE: This malfunction should be activated at the same time that EVENT 1 is activated.
	RO	Diagnoses tripped supply breaker for Backup heater Group #1 - Indication on Group #1 heaters - Lower than normal current on heater current indication - Slower pressure recovery following depressurization on previous event
	SRO	Consults TS 3.1.1.j to determine required current = 91 amps (375 KW)
	SRO	Initiates troubleshooting and repair

Op-Test Number: ________ Scenario Number: 3 Event Number: 3

Event Description: ***Down Power Ramp***

Time	Position	Applicant's Actions or Behaviors
	SRO	Enters and directs the actions of GOP-8
	SRO	Reviews Precautions and Limitations with crew
	SRO	Notifies Area Power Control and Chemistry of impending shutdown
	SRO	Evaluate PCS leak rate surveillance interval
	SRO	Establish "Power Operation Degas Lineup" (SOP-2A, Section 7.13, "Degas Of PCS") ***NOTE: Not required since plant is not being taken off line.***

Op-Test Number: ________ Scenario Number: 3 Event Number: 3

Event Description: ***Down Power Ramp***

Time	Position	Applicant's Actions or Behaviors
	SRO	Evaluate ASI guidelines (EM-04-17, "Axial Shape Index (ASI) Control") - For an unplanned rapid power reduction, the operator need not worry about maintaining ASI within Target ASI ± 0.05 during the power reduction - Initiate trending of ASI - Power reduction should be initiated by boration
	RO	Commence boration of PCS (SOP-2A, Section 7.5.1, "Boration") - Determine required amount of boron - Establish boration flow - Maintain boron concentration to ensure regulating rods above the PPDIL
	SRO	If Reactor power changes by 15% or more in one hour or less, then notify Chemistry to perform an isotopic analysis for iodine
	TURB	Commence load reduction at 15%/hour (SOP-8, Section 7.1, "Turbine Generator K-1") - Lower turbine load at 15%/hour - Before Governor Valve #4 closes below 10%, transfer valve control from SEQUENTIAL to SINGLE valve control - Adjust Valve Position Limiter to maintain Limiter just above valve control signal
		NOTE: Next event should be entered once power has been lowered by approximately 3-5%.

Op-Test Number: ________ Scenario Number: 3 Event Number: 4

Event Description: ***Feedwater Flow Transmitter FT-0701 Failure High***

Time	Position	Applicant's Actions or Behaviors
	TURB	Diagnose high failure of Feedwater Flow Transmitter FT-0701 - LIC-0701 demand goes low - CV-0701 indication goes to zero - Recorder FI-0701 feed flow goes high - SG 'A' level lowers - EK-09-62, STEAM GEN E-50A LO LEVEL, alarm
	SRO	Enters and directs the actions of ARP-5 (EK-09) and ONP-3.0
	TURB	Takes manual control of FRV-0701 using LIC-0701 **NOTE: CRITICAL STEP TO TAKE MANUAL CONTROL OF FRV AND GAIN CONTROL OF SG LEVEL BEFORE LOW SG LEVEL REACTOR TRIP.**
	TURB	Slowly raise SG level using manual control of FRV-0701 to restore level
	SRO	Contact maintenance to initiate troubleshooting and repairs

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	TURB	Diagnoses turbine control valve CV-3 failing shut - EK-0318, TURBINE PANEL TROUBLE, alarms - Indication on DEH panel - Remaining CVs opening in attempt to maintain load - Load lowering - Steam pressure rising - PCS temperature rising - Reactor power lowering
	TURB	Calls up the alarm subscreen and pushes Silence Key to enable reflash of alarm window
	SRO	Refers to Attachment 1 of ARP-2 - Possible SRVOOUT 1(2) alarm due to valve position - Possible VPLL 1(2) alarm due to valve position
	SRO	If time permits, enter and direct the actions of ONP-1, Loss of Load

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	TURB	Ensures Turbine Controls in MANUAL
	TURB	Ensures at least one EHC pump running
	SRO	Orders reactor trip due to being above 15% power
	RO	Trips the reactor as directed

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	SRO	Enters and directs the actions of EOP-1.0
	RO	Determine that Reactivity Control acceptance criteria NOT met
	RO	Determines that Reactor has failed to trip from C-02 and trips reactor from C-06. **NOTE: CRITICAL TO TRIP REACTOR USING ALTERNATE METHODS.** ***NOTE: This is actually EVENT 8.***

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	TURB	Control the Feedwater System - Ensure closed ALL Main Feed Regulating Valves and ALL Bypass Feed Regulating Valves for BOTH S/Gs - IF Tave is less than 525°F AND lowering uncontrolled, THEN trip the operating Main Feed Pumps
	RO	Determine that Control Room Gaseous radiation environment acceptable
	RO	Determine that Vital Auxiliaries-Electric acceptance criteria are met
	RO	Determine that PCS Inventory Control acceptance criteria are met
	RO	Determine that PCS Pressure Control acceptance criteria are met
	RO	Determine that Core Heat Removal acceptance criteria are met

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	RO	Determine that PCS Heat Removal acceptance criteria are met
	RO	Determine that Containment Isolation acceptance criteria are met
	RO	Determine that Containment Atmosphere acceptance criteria are met
	RO	Determine that Vital Auxiliaries-Water acceptance criteria met
	RO	Determine that Vital Auxiliaries-Air acceptance criteria met

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	RO	Verify at least one Condensate Pump and at least one Cooling Tower Pump operating
	TURB	Commence Emergency Shutdown Checklist (GOP-10)
	SRO	Transition to EOP-2.0, Reactor Trip Recovery - All safety function acceptance criteria met - Control Room is habitable
	SRO	Directs the actions of EOP-2.0
	SRO	Verifies acceptance criteria met at intervals of approximately every 15 minutes

Op-Test Number: ________ Scenario Number: 3 Event Number: 5

Event Description: ***Turbine Governor Valve GV 3 Fails Shut***

Time	Position	Applicant's Actions or Behaviors
	RO	Verifies all PCPs operating
	RO	Verifies Pressurizer level within limits - Level between 20% and 85% - Level trending to between 42% and 57%
	RO	Verify Pressurizer pressure within limits - Pressure between 1650 and 2185 psia - Pressure trending to between 2010 and 2100 psia
		SIMULATOR OPERATOR: Initiate next event once Pressurizer level and pressure bands have been given by SRO to RO.

Op-Test Number: ________ Scenario Number: 3 Event Number: 6

Event Description: ***Main Steamline Rupture Inside of the Containment***

Time	Position	Applicant's Actions or Behaviors
	RO TURB SRO	Diagnose ruptured SG inside containment - Excessive steam flow to the containment from SG 'B' - Reactor trip/Safety Injection signals - SG isolation actuation - SG pressures and PCS temperatures and pressures lowering - Containment humidity, temperature, pressure rising - PCS subcooling rising - Numerous control room alarms
	SRO	Diagnoses steam break and enters and directs the actions of EOP-6.0 ***NOTE: May return to EOP-1.0, but acceptable to enter EOP-6.0 directly. If EOP-1.0 re-entered, operator actions will repeat those previously performed.***
	RO TURB	Determine that Containment Isolation acceptance criteria NOT met
	RO	Determines Containment Isolation did NOT occur - EK-1126, CIS INITIATED, NOT in alarm - Valves NOT properly aligned ***NOTE: This is actually EVENT 7.***
	RO	Initiates CHR signal to isolate containment - Depresses CHRL-CS, HIGH RADIATION INITIATE - Depresses CHRR-CS, HIGH RADIATION INITIATE **NOTE: CRITICAL TO ENSURE CONTAINMENT IS ISOLATED WHEN REQUIRED.**
		NOTE: Crew may opt to secure PCPs at this time due to no CCW to Containment. Depending on timing of crew, conditions will probably NOT be met to restore CCW to Containment.

Op-Test Number: ________	Scenario Number: 3	Event Number: 6

Event Description: ***Main Steamline Rupture Inside of the Containment***

Time	Position	Applicant's Actions or Behaviors
	SRO	Perform EOP Supplement 6, "Checklist for Containment Isolation."
	SRO	Verify Attachment 1, "Safety Function Status Check Sheet" acceptance criteria are satisfied at intervals of approximately fifteen minutes
	RO	Verifies "SAFETY INJ INITIATED" (EK-1342) is alarmed due to PZR pressure less than or equal to 1605 psia OR Containment pressure is greater than or equal to 4.0 psig,
	TURB	Ensure available safeguards equipment operated or operating per EOP Supplement 5

Op-Test Number:	________	Scenario Number: 3	Event Number: 6	

Event Description: ***Main Steamline Rupture Inside of the Containment***

Time	Position	Applicant's Actions or Behaviors
	RO	Verify at least minimum SI flow per EOP Supplement 4
	TURB	Ensure MSIVs and MSIV Bypass Valves are closed
	RO	Stop one PCP in each loop if pressure drops below 1300 psia ***NOTE: May have already stopped PCPs due to lack of CCW flow to Containment.*** **CRITICAL STEP TO SECURE PCPs WHEN DETERMINED THAT CCW FLOW CANNOT BE RESTORED TO CONTAINMENT.**
	RO	Commence emergency boration to establish PCS boron concentration greater than or equal to hotshutdown boron concentration as verified by sample or hand calculation per EOP Supplement 35.
	RO	Verify PCP operating limits are satisfied per EOP Supplement 1 ***NOTE: May have already stopped PCPs due to lack of CCW flow to Containment.*** **CRITICAL STEP TO SECURE PCPs WHEN DETERMINED THAT CCW FLOW CANNOT BE RESTORED TO CONTAINMENT.**

Op-Test Number: ________ Scenario Number: 3 Event Number: 6

Event Description: ***Main Steamline Rupture Inside of the Containment***

Time	Position	Applicant's Actions or Behaviors
	TURB	Place LTOP in service
	SRO RO TURB	Determine the most affected S/G by considering ALL of the following: • High steam flow from S/G • Lowering S/G pressure • Lowering S/G level • Lowering Loop T_C temperature
	TURB	Isolate Steam Generator 'A' per EOP Supplement 17
	RO TURB	Stabilize PCS temperature
	RO	Verify SI Pump throttling criteria are satisfied
		Terminate the scenario when PCS temperature has been stabilized and SI Pump Throttling criteria are determined to be satisfied.

Op-Test Number: ________ Scenario Number: 3 Event Number: 7

Event Description: ***Automatic Initiation Failure Of Containment Isolation***

Time	Position	Applicant's Actions or Behaviors
	RO	Determines Containment Isolation did NOT occur - EK-1126, CIS INITIATED, NOT in alarm - Valves NOT properly aligned ***NOTE: This is actually performed as part of EVENT 6.***
	RO	Initiates CHR signal to isolate containment - Depresses CHRL-CS, HIGH RADIATION INITIATE - Depresses CHRR-CS, HIGH RADIATION INITIATE **NOTE: CRITICAL TO ENSURE CONTAINMENT IS ISOLATED WHEN REQUIRED.**

Op-Test Number: ________ Scenario Number: 3 Event Number: 8

Event Description: ***Failure of the Reactor to Automatically Trip***

Time	Position	Applicant's Actions or Behaviors
	RO	Determines that Reactor has failed to trip when Reactor Trip push button depressed on C-02. ***NOTE: This is actually performed as part of EVENT 5.***
	RO	Trips Reactor from C-06 OR places CRDM lift coil disconnect switches for all rods in disconnect position. ***NOTE: Either method is acceptable.*** **NOTE: CRITICAL TO CAUSE REACTOR TRIP FOLLOWING ATWS CONDITION.**
	RO	Informs SRO of failure of reactor to trip from C-02

Facility: **PALISADES** Scenario Number: **Spare** Op-Test Number: ______

Examiners	Operators
______	______
______	______
______	______

Objectives: To evaluate the candidates' ability to perform Technical Specification surveillance testing of the Control Room Ventilation System. To evaluate the candidates' response to a source/wide range nuclear instrument failure, a closure of the MSR steam supply valves, and a malfunction of CVCS temperature control. EOP implementation will be evaluated in response to a small PCS leak which increases in size, eventually requiring a reactor trip and response to safety injection. Post-trip response will be evaluated by the operator's response to a failure of SIAS to actuate automatically.

Initial Conditions: IC-9. Approximately 50% power BOL; Equipment OOS is AFW Pump P-8B due to degradation of the alternate steam supply line **(IPE)** and troubleshooting on the normal steam supply valve; Caution tag hand switches for CV-0522A and CV-0522B

Turnover: Power is approximately 50% at BOL.

AFW Pump P-8B is out of service due to degradation of the alternate steam supply line and troubleshooting on the normal steam supply valve. Technical Specification 3.5.2 has been entered and has 61 hours remaining before a shutdown to Hot Shutdown conditions is required.

Boron concentration is 1451 ppm. ASI is -0.01.

Shift orders are to maintain power until AFW Pump P-8B is returned to service and perform MO-33, Control Room Ventilation Emergency Operation, for Train 'A'.

Event Number	Malfunction Number (1)	Event Type*	Event Description
1	NA	TURB(N) SRO(N)	Perform MO-33, Control Room Ventilation Emergency Operation, Test
2	RP06B	TURB(I) SRO(I)	Source/Wide Range Channel NI-02/04 High Voltage Power Supply Failure **(IPE)**
3	MS-16 MS-17	RO(R) TURB(C) SRO(C)	MSR Steam Supply Valves Failed Closed **(IPE)**

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Event Number	Malfunction Number	Event Type*	Event Description
4	OVRD TIC-0203	RO(I) SRO(I)	Letdown Temperature Control Valve Failed Closed in Auto
5	RC03	RO(C) TURB(C) SRO(C)	Primary Coolant System Leak into the Containment at 5 gpm
6	RC04	RO(M) TURB(M) SRO(M)	Primary Coolant System Leak into the Containment at 400 gpm
7	ED13A ED13B	RO(C) SRO(C)	Failure of Automatic SIAS

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
(1) See Attachment, "Simulator Setup & Actions Required for Scenario," for details on setup.

Simulator Setup & Actions Required for Scenario # Spare

Event Number	Simulator Operator Actions
INITIAL CONDITIONS	IC-9. Approximately 50% power BOL AFW Pump P-8B OOS with Caution tag on hand switches for CV-0522A and CV-0522B • OVRD DI CV-0522B-1, P-8B STM SPLY CLOSE, ON • Place hand switch for CV-0522B to CLOSE Event 7 is ACTIVE AT SETUP • MALF ED13A • MALF ED13B Ensure thermometer available in Control Room with Calibration Sticker attached for Event 1. Ensure DPIC picture installed on rear panel for Event 1.
1	NONE
2	MALF RP06B
3	REMOTE MS16 and MS17, CLOSE
4	OVRD DI TIC-0203-INC PB DEPRESSED to ON (Valve closes as setpoint is raised)
5	RC03, Severity = 5%
6	RC04, Severity = 40%
7	Event 7 is ACTIVE AT SETUP • MALF ED13A • MALF ED13B

SHIFT TURNOVER SCENARIO # Spare

Power is approximately 50% at BOL.

AFW Pump P-8B is out of service due to degradation of the alternate steam supply line and troubleshooting on the normal steam supply valve. Technical Specification 3.5.2 has been entered and has 61 hours remaining before a shutdown to Hot Shutdown conditions is required.

Boron concentration is 1451 ppm. ASI is -0.01.

Shift orders are to maintain power until AFW Pump P-8B is returned to service and perform MO-33, Control Room Ventilation Emergency Operation, for Train 'A'.

Op-Test Number: ________ Scenario Number: Spare Event Number: 1

Event Description: ***Perform MO-33, Control Room Ventilation Emergency Operation, Test***

Time	Position	Applicant's Actions or Behaviors
	SRO	Directs performance of MO-33 for Train 'A' only
	TURB	Obtains copy of MO-33, Section 5.1
	TURB	Check or place HS-1673A (V-95) to "ON" and HS-1674A (V-96) to "AUTO."
	TURB	Ensure HS-1745A (Damper D-7) is in "AUTO" position
	TURB	Ensure HS-1675 (VC-11) is in "AUTO" position.

Op-Test Number: ______ Scenario Number: Spare Event Number: 1

Event Description: ***Perform MO-33, Control Room Ventilation Emergency Operation, Test***

Time	Position	Applicant's Actions or Behaviors
	TURB	Place HS-1715A (V-26A) to "ON" position.
	TURB	Visually verify flow path through VF-26A (HEPA and charcoal filter unit) by observing open position switch lights at Panel EC-11A for Dampers D-5, D- 6, and D-7
	TURB	Ensure Turbine Building air pressure with respect to atmosphere is equal to or >0" H_2O ***NOTE: AO reports pressure is "positive."***
	TURB	Record start time of V-26A
	TURB	Record operating mode of VC-11

Op-Test Number: ________ Scenario Number: Spare Event Number: 1

Event Description: ***Perform MO-33, Control Room Ventilation Emergency Operation, Test***

Time	Position	Applicant's Actions or Behaviors
	TURB	Record Control Room temperature
	TURB	Circle DPIC used to record Control Room pressure ***NOTE: Not simulated. Picture attached to control board.***
	TURB	Direct AO to verify FIC-1711 is in the "Auto" position ***CUE: AO reports FIC-1711 is in AUTO.***
	TURB	Direct AO to record flow rate at FIC-1711 ***CUE: AO records flow as 3400 cfm.***
	TURB	Direct AO to record air flow from the idle train ***CUE: AO records flow as 100 cfm on FIC-1712 and 3000 cfm on FIS-1682.***

Op-Test Number: ________ Scenario Number: Spare Event Number: 1

Event Description: ***Perform MO-33, Control Room Ventilation Emergency Operation, Test***

Time	Position	Applicant's Actions or Behaviors
	TURB	Verify no bypass flow through idle train with Dampers D-11 and D-12 in close position. Dampers are closed with GREEN indicating lights ON.
	TURB	Visually verify NO low flow alarm EK-0237 indications at Panel EC-11A

Op-Test Number: ________ Scenario Number: Spare Event Number: 2

Event Description: ***Source/Wide Range Channel NI-02/04 High Voltage Power Supply Failure (IPE)***

Time	Position	Applicant's Actions or Behaviors
	SRO TURB	Diagnoses loss of High Voltage Power Supply for SR/WR Channel NI-02/04 - EK-06 Rack C08, NI CHANNEL TROUBLE, alarms - Voltage indicates zero - NI-02/04 indicates failed
	SRO	Enters and directs the actions of ARP-21
	SRO	Refer to Technical Specifications Section 3.17.1 and 3.17.4
	TURB	Place one inoperable Startup rate trip unit in the tripped condition within 1 hour ***NOTE: Acceptable to place either Channel B or D in tripped condition.***
	SRO	Initiate Work Request for troubleshooting/repairs

Op-Test Number: ________ Scenario Number: Spare Event Number: 3

Event Description: ***MSR Steam Supply Valves Failed Closed (IPE)***

Time	Position	Applicant's Actions or Behaviors
	RO TURB SRO	Diagnoses MSR Steam Supply Valves Closure - E9A/B/C/D Steam Supply Valves indicating mid-position/closed on C-01 - PCS Average Temperature rising - EK-0165, REHEATER DRAIN TANKS T4A & T4B HI LEVEL, alarms - EK-0704, LETDOWN HT. EX TUBE INLET HI-LO PRESS, alarms - EK-0703, LETDOWN HT. EX TUBE HI TEMP, alarms - EK-0968, LOOP 1 Tref/Tave GROSS DEVIATION, alarms - EK-0969, LOOP 2 Tref/Tave GROSS DEVIATION, alarms
	SRO	Enters and directs the actions of ONP-1
	RO	Inserts rods to restore Tave to Tref (IMMEDIATE ACTION)
	RO	Ensures pressurizer level control responding to change in steam demand/PCS temperature
	RO	Ensures pressurizer pressure control responding to change in steam demand/PCS temperature

Op-Test Number: ________ Scenario Number: Spare Event Number: 3

Event Description: ***MSR Steam Supply Valves Failed Closed (IPE)***

Time	Position	Applicant's Actions or Behaviors
	TURB	Ensures steam generator level control responding to change in steam demand/PCS temperature
	SRO	Initiates troubleshooting and repairs
		SIMULATOR OPERATOR: Initiate next event when Tave and Pressurizer level have been restored to normal values and have been stabilized.

Op-Test Number: ________ Scenario Number: Spare Event Number: 4

Event Description: ***Letdown Temperature Control Valve Failed Closed in Auto***

Time	Position	Applicant's Actions or Behaviors
	SRO RO	Diagnose failure of Letdown Temperature Controller - EK-0703, LETDOWN HT EX TUBE OUTLET HI TEMP, alarms - TIC-0203, Controller for CV-0909, indicates 100% output - CV-0909, Letdown Temperature Control Valve, CLOSED
	SRO	Enter and direct the actions of ARP-4
	RO	Places TIC-0203 in MANUAL control
	RO	Adjusts TIC-0203 in MANUAL for approximately 110 °F
	SRO	Initiates troubleshooting and repairs

Op-Test Number: ________ Scenario Number: Spare Event Number: 5

Event Description: ***Primary Coolant System Leak into the Containment at 5 gpm***

Time	Position	Applicant's Actions or Behaviors
	RO TURB SRO	Diagnoses leakage from PCS to containment - Containment humidity rising - Pressurizer level lowering until recovered by PLCS - Pressurizer pressure lowering until recovered by PPCS - Charging requirements rising - Charging/letdown mismatch greater than normal - VCT level lowering - Containment sump level rising - EK-1364, GASEOUS WASTE, alarms due to Containment Air alarm
	SRO	Refers to and directs the actions of ONP-23.1
	RO	Ensure additional Charging Pumps start (if necessary)
	RO	Ensure that the increase in average makeup rate has not been caused by a large generator load change or by a change in Tave

Op-Test Number: ________ Scenario Number: Spare Event Number: 5

Event Description: ***Primary Coolant System Leak into the Containment at 5 gpm***

Time	Position	Applicant's Actions or Behaviors
	RO SRO	At SRO discretion, close CV-2001 and CV-2009 to isolate letdown ***NOTE: May elect to NOT isolate letdown. This is acceptable.***
	RO TURB SRO	Determine PCS leakrate ***NOTE: Full leak rate calculation is not expected to be performed. Leak rate determination may be somewhat masked by previous events which may still have PCS temperature changing slightly.***
	RO TURB	Attempt to locate the leak - Containment Sump level recorders - Containment humidity indicators - Area radiation monitors
	SRO	Refers to and enters Technical Specification 3.1.5 for PCS Leakage Limits
	SRO	Enters GOP-8 to perform an orderly shutdown
		NOTE: Initiate next event when SRO has addressed plant conditions and Technical Specifications.

Op-Test Number: ________ Scenario Number: Spare Event Number: 6

Event Description: ***Primary Coolant System Leak into the Containment at 400 gpm***

Time	Position	Applicant's Actions or Behaviors
	RO TURB SRO	Diagnose large break LOCA - SIAS actuated - PCS pressure lowering rapidly - Containment pressure rising rapidly - Containment humidity and temperature rising - Numerous related alarms
	SRO	Orders Reactor Trip and enters and directs the actions of EOP-1.0
	RO	Determine that Reactivity Control acceptance criteria are met

Op-Test Number: ________ Scenario Number: Spare Event Number: 6

Event Description: ***Primary Coolant System Leak into the Containment at 400 gpm***

Time	Position	Applicant's Actions or Behaviors
	TURB	Control the Feedwater System - Ensure closed ALL Main Feed Regulating Valves and ALL Bypass Feed Regulating Valves for BOTH S/Gs - IF T_{ave} is less than 525°F AND lowering uncontrolled, THEN trip the operating Main Feed Pumps
	RO	Determine that Control Room Gaseous radiation environment acceptable
	RO	Determine that Vital Auxiliaries-Electric acceptance criteria are met
	RO	Determine that PCS Inventory Control acceptance criteria are NOT met due to low pressurizer level
	RO	Determine that PCS Pressure Control acceptance criteria are NOT met due to low pressurizer pressure
	RO	Determines SIAS has failed to initiate - EK-1342, SAFETY INJ INITIATED, NOT in alarm - SIAS components have failed to actuate ***NOTE: This is actually EVENT 8.***

Op-Test Number: ________ Scenario Number: Spare Event Number: 6

Event Description: ***Primary Coolant System Leak into the Containment at 400 gpm***

Time	Position	Applicant's Actions or Behaviors
	RO	Initiates SIAS - Depresses PB1-1, INJECTION INITIATE - Depresses PB1-2, INJECTION INITIATE **NOTE: CRITICAL TO ENSURE SIAS IS ACTUATED WHEN REQUIRED.**
	RO	Determine that Core Heat Removal acceptance criteria are met
	RO TURB	Determine that PCS Heat Removal acceptance criteria are met - Ensure Turbine Bypass Valve closed - Ensure Atmospheric Steam Dump Valves closed - Ensure both MSIVs closed - Ensure Main Feed Regulating Valves and Bypass Feed Regulating Valves closed
	RO TURB	Determine that Containment Isolation acceptance criteria are met
	RO TURB	Determine that Containment Atmosphere acceptance criteria are NOT met

Op-Test Number: ________ Scenario Number: Spare Event Number: 6

Event Description: ***Primary Coolant System Leak into the Containment at 400 gpm***

Time	Position	Applicant's Actions or Behaviors
	RO	Determine that Vital Auxiliaries-Water acceptance criteria met
	RO	Determine that Vital Auxiliaries-Air acceptance criteria met
	TURB	Perform EOP Supplement 5, "Checklist for Safeguards Equipment Following SIAS"
	TURB	Perform EOP Supplement 6, "Checklist for Containment Isolation."
	TURB	Commence Emergency Shutdown Checklist (GOP-10)

Op-Test Number: ________ Scenario Number: Spare Event Number: 6

Event Description: ***Primary Coolant System Leak into the Containment at 400 gpm***

Time	Position	Applicant's Actions or Behaviors
	SRO	Refers to Attachment 1, "Event Diagnostic Flow Chart" AND diagnoses the event
	SRO	Transitions to EOP-4.0 due to indications of a PCS LOCA
	SRO	Verify Attachment 1, "Safety Function Status Check Sheet" acceptance criteria are satisfied at intervals of approximately fifteen minutes
	RO	Verify "SAFETY INJ INITIATED" (EK-1342) is alarmed
	TURB	Ensure available safeguards equipment operated or operating per EOP Supplement 5

Op-Test Number: ________ Scenario Number: Spare Event Number: 6

Event Description: ***Primary Coolant System Leak into the Containment at 400 gpm***

Time	Position	Applicant's Actions or Behaviors
	RO	Verify at least minimum SI flow per EOP Supplement 4
	RO	Stop PCPs when conditions met - First 2 PCPs when below 1300 psia - Last 2 PCPs when less than minimum subcooling **NOTE: CRITICAL STEP TO LIMIT PCP MASS LOSS OUT OF BREAK.**
	RO TURB	Attempt to isolate the PCS break
	TURB	Place at least one Hydrogen Monitor in operation per SOP-38
	TURB	Verify "CIS INITIATED" (EK-1126) is alarmed and verify Containment Isolation per EOP Supplement 6

Op-Test Number: ________ Scenario Number: Spare Event Number: 6

Event Description: ***Primary Coolant System Leak into the Containment at 400 gpm***

Time	Position	Applicant's Actions or Behaviors
	RO	Verify proper Containment Spray alignment and flow
	TURB	Operate Control Room HVAC in Emergency Mode per SOP-24
	RO	Verify PCS boron concentration greater than or equal to coldshutdown boron concentration as verified by sample or hand calculation per EOP Supplement 35
	RO TURB	Commence a controlled PCS cooldown
		TERMINATE THE SCENARIO WHEN A CONTROLLED PCS COOLDOWN HAS COMMENCED.

Op-Test Number: ________ Scenario Number: Spare Event Number: 7

Event Description: ***Failure of Automatic SIAS***

Time	Position	Applicant's Actions or Behaviors
	RO	Determines SIAS has failed to initiate - EK-1342, SAFETY INJ INITIATED, NOT in alarm - SIAS components have failed to actuate ***NOTE: This is actually performed as part of EVENT 7.***
	RO	Initiates SIAS - Depresses PB1-1, INJECTION INITIATE - Depresses PB1-2, INJECTION INITIATE **NOTE: CRITICAL TO ENSURE SIAS IS ACTUATED WHEN REQUIRED.**
	RO	Informs SRO of SIAS failure to actuate and manual actuation

INITIAL SUBMITTAL OF THE WRITTEN EXAMINATION

FOR THE PALISADES INITIAL EXAMINATION THE WEEK OF MAY 22, 2000

Question: 1

When the top one (1) foot of the Reactor Core becomes uncovered ...

a. CETs will indicate that saturated conditions exist.

b. CETs will indicate that superheated conditions exist.

c. incore NI readings will indicate abnormally low.

d. excore NI readings will indicate abnormally low.

Answer:

b. CETs will indicate that superheated conditions exist.

QUESTION NUMBER:	SRO	1	RO	1
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 074EK1.03
Knowledge of the operational implications of the following concepts as they apply to the Inadequate Core Cooling: Processes for removing decay heat from the core

K/A IMPORTANCE: SRO 4.9 RO 4.5

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 7

OBJECTIVE: TBAH0A2.02
Describe the once-through method of core cooling and the conditions for use.

REFERENCES:
EOP-4.0
EOP-9.0
LP-ASGA

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 9888

JUSTIFICATION:

a. Plausible since saturated conditions will exist until core is uncovered. Conditions reach superheat.
b. ✓ As the core uncovers, heat is added to the steam flowing past the uncovered portion of the fuel. This results in superheated conditions.
c. Plausible since voiding affects incore NI indication. Indication goes up instead of lowering.
d. Plausible since leakage changes as core is uncovered. Indication rises instead of lowers.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Understands that adding heat to steam created in the core results in superheated conditions and the indications of superheated conditions.

REFERENCES SUPPLIED:

Question: 2

Following a loss of 120 VAC Preferred Bus Y-20, the Anticipated Transient Without Scram (ATWS) System trip logic is ...

a. 1-out-of-3.

b. 2-out-of-3.

c. 1-out-of-4.

d. 2-out-of-4.

Answer:

b. 2-out-of-3.

QUESTION NUMBER:	SRO	2	RO	2
TIER/GROUP:	SRO	1/1	RO	1/2

K/A: 029EK2.06
Knowledge of the interrelations between the ATWS and breakers, relays, and disconnects

K/A IMPORTANCE:	SRO	3.1	RO	2.9
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	6

OBJECTIVE: ASGC0A2.10
Describe the function and operation of the ATWS trip system.

REFERENCES: ONP-24.1
LP-ASGC

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 7710

JUSTIFICATION:

a. Plausible since RPS protection normally goes to 1-of-3 configuration upon loss of power to channel. ATWS is energize to actuate.
b. ✓ Loss of power to an inputting pressure transmitter will not cause the input to actuate since it is "energize to actuate." This leaves system in 2-of-3 logic.
c. Plausible since RPS protection normally causes channel to trip on loss of power. ATWS is energize to actuate.
d. Plausible if candidate believes Y-10 has no effect on ATWS. On loss of power, input is no longer available, so logic is now 2-of-3.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of power supplies to ATWS and the recognition that the ATWS is energized to actuate.

REFERENCES SUPPLIED:

Question: 3

Given the following conditions:

- A loss of all offsite power has occurred.
- A small break LOCA has occurred concurrently.
- Tave is 559 °F.
- Tcold is 548 °F.
- Thot is 570 °F.
- Average Qualified CETs is 565 °F.
- Pressurizer pressure is 1500 psia.

While performing EOP-1.0, Standard Post-Trip Actions, PCS subcooling should be determined to be ...

a. 26 °F.

b. 31 °F.

c. 37 °F.

d. 48 °F.

Answer:

b. 31 °F.

QUESTION NUMBER:	SRO	3	RO	3
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 009EK1.02
Knowledge of the operational implications of the following concepts as they apply to the small break LOCA: Use of steam tables

K/A IMPORTANCE: SRO 4.2 RO 3.5

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 5

OBJECTIVE: RHAA0A4.01
Given Natural Circulation plant conditions, explain why readings from the Subcooled Margin Monitor should not be used to determine PCS subcooling.

REFERENCES: Steam tables
EOP-1.0

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 11869

JUSTIFICATION:

a. Plausible since with no PCPs running, alternate indications must be used. CETs are to be used to determine subcooling with no PCPs operating.

b. ✓ Saturation temperature for 1500 psia is 596 °F. CETs are used due to no PCPs operating, so subcooling margin is saturation less CETs.

c. Plausible since with no PCPs running, alternate indications must be used. CETs are to be used to determine subcooling with no PCPs operating.

d. Plausible since with no PCPs running, alternate indications must be used. CETs are to be used to determine subcooling with no PCPs operating.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 4

Ability to apply information to steam table usage and recognize which temperatures should be used under different conditions.

REFERENCES SUPPLIED: Steam Tables

Question: 4

Given the following conditions:

- The plant is operating at 100% power.
- Instrument air pressure lowers to 75 psig and stabilizes.
- RED indicating lights are observed ON for Air Compressors C-2A, C-2B, and C-2C.

What is the effect of continuing to operate the plant with an instrument air pressure of 75 psig?

a. Service air is isolated. However, this has **NO** effect on continued plant operation at 100% power.

b. The standby air compressor starts. However, there will be **NO** effect on continued plant operation unless erratic valve operation occurs.

c. Instrument air to containment and service air are isolated. However, this has **NO** effect on continued plant operation at 100% power.

d. Service air is isolated. This will eventually result in a trip due to the loss of the cooling tower pumps.

Answer:

d. Service air is isolated. This will eventually result in a trip due to the loss of the cooling tower pumps.

QUESTION NUMBER: SRO 4 RO 4
TIER/GROUP: SRO 1/2 RO 1/3

K/A: 065AK3.03
Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air: Effects on plant operation of isolating certain equipment from instrument air

K/A IMPORTANCE: SRO 3.4 RO 2.9

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 4

OBJECTIVE: ASBC0A4.02
Given plant conditions involving the Plant Instrument and Service Air System, determine the operational status of the Plant Instrument Air Compressors.

REFERENCES: ONP-7.1

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 1175

JUSTIFICATION:

a. Plausible since SA is not normally considered a vital system. Will eventually lose cooling tower pumps.
b. Plausible since SA is not normally considered a vital system. Will eventually lose cooling tower pumps.
c. Plausible since SA is not normally considered a vital system. Will eventually lose cooling tower pumps.
d. ✓ IA to SA isolates at 85 psig. Continued operation with SA isolated will eventually cause cooling tower pumps to trip due to loss of air pressure to basin level transmitters.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Comprehends the effect of a loss of instrument air on other systems and the overall effect on the plant.

REFERENCES SUPPLIED:

Question: 5

The consequence of installing an incore detector in the wrong core location would be ...

a. an error introduced into the Estimated Critical Position (ECP).

b. the improper length may unknowingly result in data being gathered at improper core elevations.

c. excessive radiation upon removal of the incore during the next refueling.

d. the incore detector could become an unanalyzed source of neutrons.

Answer:

b. the improper length may unknowingly result in data being gathered at improper core elevations.

QUESTION NUMBER:	SRO	5	RO	5
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 017K1.01
Knowledge of the physical connections and/or cause-effect relationships between the ITM system and the following systems: Plant computer

K/A IMPORTANCE:	SRO	3.2	RO	3.2
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: IOTD0A1.01
Given appropriate refueling conditions and appropriate Control Room references: b. Determine the consequences of a failure to perform any given procedure step when required.

REFERENCES: LP-IOTD

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 9757

JUSTIFICATION:

a. Plausible since previous power history is included in ECP calculation. Elevation of data is affected.
b. ✓ Length of detector determines core elevation where data is identified.
c. Plausible since detectors are radiation hazard when removed. Location will not affect radiation levels appreciably.
d. Plausible since detectors use neutron source as method of detection. Strength is extremely minimal compared to strength of flux at power.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of reason for performing procedural steps during refueling.

REFERENCES SUPPLIED:

Question: 6

A fault on 2400 VAC Bus 1C has caused the bus to de-energize and isolate.

Assuming **NO** operator action has been taken, which of the following Pressurizer Heaters have power available?

a.
- All 4 groups of Backup Heaters
- Both groups of Proportional Heaters

b.
- 2 groups of Backup Heaters
- 1 group of Proportional Heaters

c.
- All 4 groups of Backup Heaters
- Neither group of Proportional Heaters

d.
- 2 groups of Backup Heaters
- Neither group of Proportional Heaters

Answer:

a.
- All 4 groups of Backup Heaters
- Both groups of Proportional Heaters

QUESTION NUMBER:	SRO	6	RO	6
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 010K2.01
Knowledge of bus power supplies to the following: PZR heaters

K/A IMPORTANCE:	SRO	3.4	RO	3.0
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	3

OBJECTIVE: ASFE0K2.01
Given Plant conditions, determine if the Pressurizer heaters still have power.

REFERENCES:
E-4, Sheet 1
LP-ASFE

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 9184

JUSTIFICATION:

a. ✓ Heaters are powered from LCC-15 and LCC-16, which are powered from Bus 1E and 1D, respectively.

b. Plausible since heaters are powered from equivalent level of voltage using different buses. Heaters are powered from LCC-15 and LCC-16, which are powered from Bus 1E and 1D, respectively.

c. Plausible since heaters are powered from equivalent level of voltage using different buses. Heaters are powered from LCC-15 and LCC-16, which are powered from Bus 1E and 1D, respectively.

d. Plausible since heaters are powered from equivalent level of voltage using different buses. Heaters are powered from LCC-15 and LCC-16, which are powered from Bus 1E and 1D, respectively.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of power supplies to the pressurizer heaters.

REFERENCES SUPPLIED:

Question: 7

The WHITE light associated with 4160 VAC Bus 1B Breaker 252-201, Station Power Transformer 1-1, being LIT indicates the breaker ...

a. closing springs are charged.

b. undervoltage relays are reset.

c. is racked to the TEST position.

d. has control power available.

Answer:

a. closing springs are charged.

QUESTION NUMBER:	SRO	7	RO	7
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 062A4.01
Ability to manually operate and/or monitor in the control room: All breakers (including available switchyard)

K/A IMPORTANCE: SRO 3.1 RO 3.3

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 7

OBJECTIVE: ASAA0G7.02
Given any manual or automatic operation of the Electrical Distribution equipment, predict the expected status of the following controls and indications: a. Indicator lights lighted 3. Breaker status indicating lights

REFERENCES: SOP-30

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8786

JUSTIFICATION:

a. ✓ White light indicates that closing springs are charged.

b. Plausible if thought that expected white lights are associated with individual breakers. White lights above undervoltage relays indicate status.

c. Plausible if thought that white light indicates test position. No indication in Control Room that breaker is in test position.

d. Plausible if thought that expected white lights are associated with individual breakers. White lights associated with buses indicate status of control power.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of indications associated with breakers.

REFERENCES SUPPLIED:

Question: 8

Which of the following is considered to be a breech of Containment Integrity in accordance with ONP-4.2, Loss of Containment Integrity?

a. It is determined that Penetration 15 (CCW Return) local leak rate test (LLRT) was improperly performed last Refueling Outage.

b. The Personnel Air Lock fails the door inner seal leak test.

c. Debris blown by a tornado penetrates the Containment Building.

d. CV-2009, Letdown Isolation, becomes mechanically bound in the open position.

Answer:

c. Debris blown by a tornado penetrates the Containment Building.

QUESTION NUMBER:	SRO	8	RO	8
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 069AA2.01
Ability to determine and interpret a Loss of Containment Integrity

K/A IMPORTANCE:	SRO	4.3	RO	3.7
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	9

OBJECTIVE: TBALT00.02
Given plant conditions involving symptoms of a breach or violation of containment integrity, respond IAW ONP 4.2.

REFERENCES: ONP-4.2

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 5315

JUSTIFICATION:

a. Plausible since affects containment leakage surveillance requirements. This would not be a breech of integrity, but would require entry into Tech Specs to address the improperly performed surveillance.

b. Plausible since affects containment leakage surveillance requirements. This would not be a breech of integrity, but would require entry into Tech Specs to address the failed surveillance.

c. ✓ Visual holes/failures of containment caused by nature or accidents are considered breech of containment integrity.

d. Plausible since affects containment leakage surveillance requirements. This would not be a breech of integrity, but would require entry into Tech Specs to address the failed isolation valve.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of symptoms requiring entry into procedures.

REFERENCES SUPPLIED:

Question: 9

Given the following conditions:

- A large break LOCA has occurred.
- Following the Safety Injection, pressurizer pressure has stabilized at approximately 50 psia.
- Containment pressure is approximately 14 psig.
- While responding to the LOCA in accordance with EOP-4.0, Loss of Coolant Accident Recovery, EK-1172, COMPONENT CLG SURGE TANK T-3 HI-LO LEVEL, alarms.
- Component Cooling Surge Tank level is 90% and rising slowly.
- Component Cooling Water to Containment has **NOT** been restored.

Assuming all systems are responding as expected, a potential cause of high low level is leakage from the ...

a. SFP Heat Exchanger following the SIAS.

b. SDC Heat Exchanger following the RAS.

c. CVCS Letdown Heat Exchanger following the SIAS.

d. PCP Mechanical Seal Coolers following the RAS.

Answer:

b. SDC Heat Exchanger following the RAS.

QUESTION NUMBER:	SRO	9	RO	9
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 026AA2.02
Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: The cause of possible CCW loss

K/A IMPORTANCE:	SRO	3.6	RO	2.9
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAI0K6.01
Given Plant conditions involving a loss of Service Water, CCW, or Instrument Air (including system leaks) and Control Room references, determine: a. The probable cause (including the location of the leak if applicable)

REFERENCES: FSAR Table 9-4
EOP-4.0

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible since this is a potential leakage path during normal operations. The SFP heat exchanger is isolated by the SIAS.
b. ✓ SDC is at a higher pressure than CCW when aligned under these conditions.
c. Plausible since this is a potential leakage path during normal operations. The letdown heat exchanger is isolated by CHP.
d. Plausible since this is a potential leakage path during normal operations. CCW is isolated to containment by the CHP.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of potential relative pressures of components cooled by CCW during different plant conditions.

REFERENCES SUPPLIED:

Question: 10

Given the following conditions:

- The plant is at 100% power.
- CVCS charging and letdown are secured for a short period of time to perform maintenance.
- PCS temperature is maintained constant.

Which of the following describes the trend of pressurizer and VCT levels?

	PRESSURIZER LEVEL	**VCT LEVEL**
a.	Lowers	Rises
b.	Constant	Constant
c.	Lowers	Constant
d.	Constant	Rises

Answer:

a.	Lowers	Rises

QUESTION NUMBER:	SRO	10	RO	10
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 022AA1.09
Ability to operate and/or monitor the following as they apply to the Loss of Reactor Coolant Pump Makeup: RCP seal flows, temperatures, pressures, and vibrations

K/A IMPORTANCE: SRO 3.3 RO 3.2

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 6

OBJECTIVE: ASFA0A2.01
Given Plant conditions and a failure, malfunction, or incorrect operation of any given CVCS System component, predict the impact on the operation of the CVCS System.

REFERENCES: SOP-2A

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 12129

JUSTIFICATION:

a. ✓ PCP bleedoff is still aligned to the VCT under these conditions.
b. Plausible since most sources to CVCS are isolated under these conditions. Pressurizer level lowers and VCT level rises.
c. Plausible since PCP bleedoff can be aligned to RDT. Pressurizer level lowers and VCT level rises.
d. Plausible since PCP bleedoff can be isolated during certain conditions. Pressurizer level lowers and VCT level rises.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Comprehension that controlled bleedoff is still aligned and the effect of bleedoff on CVCS and PCS.

REFERENCES SUPPLIED:

Question: 11

Given the following conditions:

- A loss of all offsite power occurred 25 minutes ago.
- The crew is performing the actions of EOP-3.0.

Which of the following actions are taken to minimize the hydraulic/thermal shock to the Service Water (SW) System while starting the FIRST pump?

a. Fully close the pump discharge valve, start the SW Pump, then throttle the valve

b. Fully open the pump discharge valve, start the SW Pump, then throttle the valve

c. Fully close the pump discharge valve, throttle the valve, then start the SW Pump

d. Slowly pressurize the SW System using a Diesel Fire Pump, then start the SW Pump

Answer:

c. Fully close the pump discharge valve, throttle the valve, then start the SW Pump

QUESTION NUMBER:	SRO	11	RO	11
TIER/GROUP:	SRO	1/3	RO	1/3

K/A: 056AA1.07
Ability to operate and/or monitor the following as they apply to the Loss of Offsite Power: Service water pump

K/A IMPORTANCE: SRO 3.2 RO 3.2

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAR0G7.01
Given plant conditions involving a loss of all AC power: b. Describe the consequences of failing to perform any given EOP 3.0 step.

REFERENCES: EOP Supplement 24

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 7938

JUSTIFICATION:

a. Plausible since many centrifigul pumps are started with discharge valve open. Pump discharge valve is throttled open 2 turns prior to starting first pump.
b. Plausible since this will prevent overpressurizing the system. Pump discharge valve is throttled open 2 turns prior to starting first pump.
c. ✓ Pump discharge valve is throttled open 2 turns prior to starting first pump.
d. Plausible since FW is a backup to SW and contains a diesel pump which could have been started. Pump discharge valve is throttled open 2 turns prior to starting first pump.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of procedural requirements during accident conditions.

REFERENCES SUPPLIED:

Question: 12

Which of the following describes the Containment Air Cooler and Fan configuration for a post-LOCA DBA condition?

	"A" FANS	**"B" FANS**	**SW HIGH CAPACITY OUTLET VALVES OPEN**	**SW INLET VALVES OPEN**
a.	Running	Tripped	VHX-1, VHX-2, VHX-3, VHX-4	VHX-1, VHX-2, VHX-3 **ONLY**
b.	Tripped	Running	VHX-1, VHX-2, VHX-3 **ONLY**	VHX-1, VHX-2, VHX-3, VHX-4
c.	Running	Tripped	VHX-1, VHX-2, VHX-3 **ONLY**	VHX-1, VHX-2, VHX-3 **ONLY**
d.	Tripped	Running	VHX-1, VHX-2, VHX-3, VHX-4	VHX-1, VHX-2, VHX-3, VHX-4

Answer:

a.	Running	Tripped	VHX-1, VHX-2, VHX-3, VHX-4	VHX-1, VHX-2, VHX-3 **ONLY**

QUESTION NUMBER:	SRO	12	RO	12
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 022A3.01
Ability to monitor automatic operation of the CCS, including: Initiation of safeguards mode of operation

K/A IMPORTANCE: SRO 4.3 RO 4.1

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 9

OBJECTIVE: ASHD0K3.01
Determine the effect on the Containment Air Coolers System for the following : c. Safety Injection Actuation Signal (SIAS).

REFERENCES: EOP Supplement 5

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8830

JUSTIFICATION:

a. ✓ A' fans are running, 'B' fans are tripped, all 4 coolers have SW outlet valves open, and coolers 1, 2, and 3 have inlet valve open.

b. Plausible if candidate determines that fan operation and SW valve operation. A' fans are running, 'B' fans are tripped, all 4 coolers have SW outlet valves open, and only coolers 1, 2, and 3 have inlet valves open.

c. Plausible since fan operation and inlet valves are correct. All 4 coolers have SW outlet valves open.

d. Plausible since outlet valves are correct. A' fans are running,'B' fans are tripped, and only coolers 1, 2, and 3 have inlet valves open.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of containment air cooling response to accident conditions.

REFERENCES SUPPLIED:

Question: 13

Given the following conditions:

- LIA-0105, Reactor Vessel Level, is indicating 63%.
- The indicator position switch for LIA-0105 is in WIDE RANGE.
- PCS temperature is 150 °F.

The PCS level, in feet and inches, is ...

a. 619' 0".

b. 619' 4".

c. 624' 0".

d. 624' 4".

Answer:

d. 624' 4".

QUESTION NUMBER:	SRO	13	RO	13
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 011K6.05
Knowledge of the effect of a loss or malfunction on the function of PZR level gauges as post-accident monitors

K/A IMPORTANCE: SRO 3.7 RO 3.1

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 2

OBJECTIVE: ASEC0A1.01
Given normally available control room references, the status of the PCS and readings from the following instruments, determine if the readings are normal. a. Reactor Vessel Level (LIA-0105)

REFERENCES: SOP-1

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 1056

JUSTIFICATION:

a. Plausible if candidate uses Narrow Range curve and subtracts level correction. Incorrect curve used and level correction applied incorrectly.
b. Plausible if candidate uses Narrow Range curve, although level correction is correctly added. Incorrect curve used.
c. Plausible if candidate subtracts level correction, although Wide Range level indication is correctly used. Level correction applied incorrectly.
d. ✓ Add 1% to indication due to temperature correction. Intersection of Wide Range curve and 64% is 624'3".

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Ability to apply given information to graphical data for PCS.

REFERENCES SUPPLIED: SOP-1, Attachment 6 (Pages 1-3)

Question: 14

Given the following conditions:

- Diesel Generator 1-1 is operating at full load, paralleled with the grid.
- The Main Generator voltage is adjusted from 60 MVARs overexcited to 75 MVARs underexcited.

Assuming **NO** operator actions, a change may occur in Diesel Generator 1-1 ...

a. current.

b. frequency.

c. voltage.

d. speed.

Answer:

a. current.

QUESTION NUMBER:	SRO	14	RO	14
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 064A3.05
Ability to monitor automatic operation of the ED/G system, including: Operation of the governor control of frequency and voltage control in parallel operation

K/A IMPORTANCE:	SRO	2.9	RO	2.8
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	8

OBJECTIVE: ASAC0K1.01
Explain the effect on diesel generator Reactive load for any specified change in bus/grid voltage when operating the D/G in the parallel mode.

REFERENCES: SOP-22
D-PAL-89-131

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 3858

JUSTIFICATION:

a. ✓ Lowering grid voltage (adjusting VARs) will result in a paralleled DG in picking up the lowered VARs, thus changing current since voltage is held constant.

b. Plausible since an unparalleled DG frequency will change. Frequency maintained constant by grid.

c. Plausible since voltage would change if not maintained constant by voltage regulator. Current changes to adjust VARs.

d. Plausible since an unparalleled DG speed will change. Speed and frequency maintained constant by grid.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Analysis of the effect of grid changes on the DG when in parallel operations.

REFERENCES SUPPLIED:

Question: 15

While implementing ONP-25.2, Alternate Safe Shutdown Procedure, the crew is taking actions for Reactivity Control.

Which of the following valves associated with Reactivity Control can be operated from Control Panel C-33?

a. Boric Acid Pump Recirc Valve, CV-2130

b. Charging Pumps Suction From SIRWT, MO-2160

c. Boric Acid Gravity Feed Valve, MO-2169

d. VCT Outlet Valve, MO-2087

Answer:

c. Boric Acid Gravity Feed Valve, MO-2169

QUESTION NUMBER:	SRO	15	RO	15
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 068AK2.01
Knowledge of the interrelations between the Control Room Evacuation and Auxiliary shutdown panel layout

K/A IMPORTANCE: SRO 4.0 RO 3.9

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 6

OBJECTIVE: ASFA0G6.01
List the CVCS components which can be operated from Panel C-33.

REFERENCES: ONP-25.2

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 529

JUSTIFICATION:

a. Plausible since this is a boric acid valve, several of which are controlled from C-33. Valve is not controlled from Panel C-33.
b. Plausible since this is a CVCS valve, several of which are controlled from C-33. Valve is not controlled from Panel C-33.
c. ✓ Valve can be operated from Panel C-33 or locally after removing power.
d. Plausible since this is a CVCS valve, several of which are controlled from C-33. Valve is not controlled from Panel C-33.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of equipment which can be controlled from shutdown panel.

REFERENCES SUPPLIED:

Question: 16

Emergency boration and a reactor trip are IMMEDIATE ACTIONS required during a(n) ...

a. steam line break caused by a failed weld.

b. breech of containment integrity caused by an earthquake.

c. excessive feedwater event caused by a failed controller.

d. uncontrolled 60 inch insertion of two (2) Group 4 regulating rods.

Answer:

b. breech of containment integrity caused by an earthquake.

QUESTION NUMBER:	SRO	16	RO	16
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 024AK3.01
Knowledge of the reasons for the following responses as they apply to the Emergency Boration: When emergency boration is required

K/A IMPORTANCE:	SRO	4.4	RO	4.1
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBALG11.01
State the immediate actions for the following: a. Loss of containment integrity

REFERENCES: ONP-4.2

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8879

JUSTIFICATION:

a. Plausible since boration and a trip add negative reactivity to counter the rise in power. Addressed by excessive load increase which requires lowering load as an immediate action.

b. ✓ Both actions are immediate actions in response to a loss of containment integrity.

c. Plausible since boration and a trip add negative reactivity to counter the rise in power. Addressed by excessive feedwater increase which requires taking manual control of the plant as an immediate action.

d. Plausible since two rods requires a trip in the subsequent actions. Addressed by control rod drop which has no immediate actions required.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of immediate operator actions.

REFERENCES SUPPLIED:

Question: 17

Given the following conditions:

- The PCS is being filled from Reduced Inventory 5 days following a forced outage to replace a PCP seal package.
- Current PCS level is 628' 5".
- Both SGs have level at approximately 50%.
- Current Average Qualified CET temperature is 140 °F.
- Shutdown Cooling has been lost.

The PCS will reach 200 °F in approximately ...

a. 11 to 15 minutes.

b. 16 to 20 minutes.

c. 21 to 25 minutes.

d. 26 to 30 minutes.

Answer:

b. 16 to 20 minutes.

QUESTION NUMBER:	SRO	17	RO	17
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 025AK1.01
Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System: Loss of RHRS during all modes of operation

K/A IMPORTANCE: SRO 4.3 RO 3.9

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAO0A2.01
Given plant conditions and ONP 17, determine the time to 200 °F.

REFERENCES: ONP-17

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible if candidate uses incorrect curves or data points. Incorrect curves or data points used.

b. ✓ Using ONP-17, Attachment 1, intersection of 5 day curve and 140 °F initial temperature is approximately 18 minutes.

c. Plausible if candidate uses incorrect curves or data points. Incorrect curves or data points used.

d. Plausible if candidate uses incorrect curves or data points. Incorrect curves or data points used.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of given information to graphical data to determine heatup rate.

REFERENCES SUPPLIED: ONP-17, Attachment 1 (all pages)

Question: 18

The Reactor Vessel Level Monitoring System (RVLMS) lights indicate all GREEN lights OFF and all RED lights LIT.

This indicates that the reactor vessel level is ...

a. completely full.

b. at or below the top of the fuel.

c. in the head region.

d. at or above the top of the hot legs.

Answer:

b. at or below the top of the fuel.

QUESTION NUMBER:	SRO	18	RO	18
TIER/GROUP:	SRO	1/3	RO	1/3

K/A: CA16AK1.3
Knowledge of the operational implications of the following concepts as they apply to the Excess RCS Leakage: Annunciators and conditions indicating signals, and remedial action associated with the Excess RCS Leakage

K/A IMPORTANCE: SRO 3.5 RO 3.2

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 2

OBJECTIVE: ASEC0K6.05
State the functions provided by the following Reactor Vessel and Internals instrumentation: c. Reactor Vessel Level Monitoring System (RVLMS)

REFERENCES:
EOP-4.0
LP-ASEC

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 8802

JUSTIFICATION:

a. Plausible since these indications are possible indications from RVLMS. Incorrectly reverses light indication and determines full.
b. ✓ When uncovered, red lights are lit and green lights are off.
c. Plausible since these indications are possible indications from RVLMS. All lights red indicates core is uncovered.
d. Plausible since these indications are possible indications from RVLMS. All lights red indicates core is uncovered.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of RVLMS indications during an accident.

REFERENCES SUPPLIED:

Question: 19

Which of the following describes the limitations of operating one (1) Containment Spray Pump following a RAS during a Loss of Coolant Accident?

A single Containment Spray Pump can supply ...

a. one (1) Containment Spray Valve AND one (1) HPSI Subcooling Valve simultaneously.

b. one (1) Containment Spray Valve OR one (1) HPSI Subcooling Valve at a time.

c. both Containment Spray Valves AND one (1) HPSI Subcooling Valve simultaneously.

d. one (1) Containment Spray Valve OR both HPSI Subcooling Valves at a time.

Answer:

a. one (1) Containment Spray Valve AND one (1) HPSI Subcooling Valve simultaneously.

QUESTION NUMBER:	SRO	19	RO	19
TIER/GROUP:	SRO	2/1	RO	2/2

K/A: 026A2.04
Ability to (a) predict the impacts of the following malfunctions or operations on the CSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of spray pump

K/A IMPORTANCE: SRO 4.2 RO 3.9

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 8

OBJECTIVE: ASHC0K4.01
Given Plant conditions involving a RAS, determine the combination of Spray Valves and HPSI subcooling lines the Containment Spray Pump(s) can supply IAW the in-use EOP.

REFERENCES: EOP-4.0

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 6061

JUSTIFICATION:

a. ✓ A single spray pump can supply both one spray valve and one subcooling valve simulataneously.

b. Plausible if candidate incorrectly recalls the capacity of a single spray pump. Can supply spray valve and subcooling valve.

c. Plausible if candidate incorrectly recalls the capacity of a single spray pump. Can supply spray valve and subcooling valve.

d. Plausible if candidate incorrectly recalls the capacity of a single spray pump. Can supply spray valve and subcooling valve.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of CS system limitations during abnormal plant response.

REFERENCES SUPPLIED:

Question: 20

Which of the following are the power supplies for the Reactor Protection System BC logic matrix?

a. Y-10 and Y-30

b. Y-10 and Y-40

c. Y-20 and Y-30

d. Y-20 and Y-40

Answer:

c. Y-20 and Y-30

QUESTION NUMBER:	SRO	20	RO	20
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 012K2.01
Knowledge of bus power supplies to the following: RPS channels, components, and interconnections

K/A IMPORTANCE:	SRO	3.7	RO	3.3
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	8

OBJECTIVE: ASGC0K2.01
Given Plant conditions, determine if the six RPS logic matrices have power.

REFERENCES:
ONP-24.2
ONP-24.3

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 213

JUSTIFICATION:

a. Plausible since these buses supply other matrixes. This combination supplies AC matrix.
b. Plausible since these buses supply other matrixes. This combination supplies AD matrix.
c. ✓ Y-20 supplies Channel 'B' and Y-30 supplies Channel 'C'.
d. Plausible since these buses supply other matrixes. This combination supplies BD matrix.

DIFFICULTY:

Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of RPS power supplies.

REFERENCES SUPPLIED:

Question: 21

A Containment High Pressure (CHP) signal will affect Primary Coolant Pump (PCP) operation by automatically ...

a. isolating charging flow.

b. isolating controlled bleedoff to the VCT.

c. starting the HP lift oil pumps.

d. tripping all four (4) PCPs.

Answer:

b. isolating controlled bleedoff to the VCT.

QUESTION NUMBER:	SRO	RO	21
TIER/GROUP:	SRO	RO	2/1

K/A: 003K6.04
Knowledge of the effect of a loss or malfunction on the following will have on the RCPS:
Containment isolation valves affecting RCP operation

K/A IMPORTANCE: SRO RO 2.8

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 2

OBJECTIVE: ASED0A3.01
Given plant conditions involving a CHP signal, predict the effects on PCP operation.

REFERENCES: EOP Supplement 6

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 9148

JUSTIFICATION:

a. Plausible since letdown and controlled bleedoff flows are isolated under these condtiions. Charging flow is not isolated by either a CHP or a CHR.

b. ✓ Controlled bleedoff is isolated by either a CHP or a CHR.

c. Plausible since oil pumps get automatic start when PCPs tripped. Lift oil pumps will start when operator trips PCPs.

d. Plausible since cooling flow is isolated to PCPs on CHP. PCP tripping is performed by operator, not automatically.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of PCP support system response to accident conditions.

REFERENCES SUPPLIED:

Question: 22

Given the following data during a power escalation:

TIME (min)	ΔT Power
0	81%
30	82%
60	84%
90	88%
120	88%

Given Attachment 2 and Attachment 5 of GOP-5, the calculated power escalation rate at TIME = 90 is ...

a. 4%/hour.

b. 5%/hour.

c. 6%/hour.

d. 8%/hour.

Answer:

c. 6%/hour.

QUESTION NUMBER:	SRO	RO	22
TIER/GROUP:	SRO	RO	3

K/A: 2.1.1
Knowledge of conduct of operations requirements

K/A IMPORTANCE:	SRO	RO	3.7
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	10

OBJECTIVE: IOTBG12.07
Given power escalation situation and Control Room references, determine the power escalation rate and any required actions IAW GOP-5.

REFERENCES: GOP-5

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 11899

JUSTIFICATION:

a. Plausible if candidate calculates average escalation rate by taking two hour window. Should use current minus 60 minutes earlier.

b. Plausible if candidate calculates escalation rate by using 30 minute value prior to and after questioned time. Should use current minus 60 minutes earlier.

c. ✓ Power escalation rate is the power at the current time minus the power 60 minutes previously.

d. Plausible if candidate calculates escalation rate by using 30 minute value prior to questioned time and doubling since previous value is 30 minutes earlier. Should use current minus 60 minutes earlier.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Calculation of power escalation rate after applying conditions used to determine rate.

REFERENCES SUPPLIED: GOP-5, Attachment 2
GOP-5, Attachment 5

Question: 23

Which of the following sets of safety functions are listed in order of priority (from highest to lowest)?

a.
1. Reactivity control
2. Maintenance of vital auxiliaries - air
3. Core heat removal
4. PCS heat removal

b.
1. PCS pressure control
2. PCS heat removal
3. Maintenance of vital auxiliaries - water
4. Containment isolation

c.
1. Maintenance of vital auxiliaries - electric
2. PCS pressure control
3. PCS heat removal
4. Containment atmosphere

d.
1. PCS inventory control
2. Core heat removal
3. Maintenance of vital auxiliaries - air
4. Maintenance of vital auxiliaries - water

Answer:

c.
1. Maintenance of vital auxiliaries - electric
2. PCS pressure control
3. PCS heat removal
4. Containment atmosphere

QUESTION NUMBER:		SRO	RO	23
TIER/GROUP:		SRO	RO	3

K/A: 2.4.16
Knowledge of EOP implementation hierarchy and coordination with other support procedures

K/A IMPORTANCE:		SRO	RO	3.0
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAAG28.01
List the Safety Functions in order of their priority per EOP 1.0.

REFERENCES: EOP Intro

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 9750

JUSTIFICATION:

a. Plausible since Reactivity Control is highest priority and core heat removal is higher than PCS heat removal. Priority order is Reactivity Control, Vital Auxiliaries - Electric, PCS Inventory Control, PCS Pressure Control, Core Heat Removal, PCS Heat Removal, Containment Isolation, Containment Atmosphere, Vital Auxiliaries - Water, and Vital Auxiliaries - Air.

b. Plausible since PCS Pressure Control is higher priority than PCS heat removal. Priority order is Reactivity Control, Vital Auxiliaries - Electric, PCS Inventory Control, PCS Pressure Control, Core Heat Removal, PCS Heat Removal, Containment Isolation, Containment Atmosphere, Vital Auxiliaries - Water, and Vital Auxiliaries - Air.

c. ✓ Priority order is Reactivity Control, Vital Auxiliaries - Electric, PCS Inventory Control, PCS Pressure Control, Core Heat Removal, PCS Heat Removal, Containment Isolation, Containment Atmosphere, Vital Auxiliaries - Water, and Vital Auxiliaries - Air.

d. Plausible since PCS Inventory Control is higher priority than Core Heat Removal. Priority order is Reactivity Control, Vital Auxiliaries - Electric, PCS Inventory Control, PCS Pressure Control, Core Heat Removal, PCS Heat Removal, Containment Isolation, Containment Atmosphere, Vital Auxiliaries - Water, and Vital Auxiliaries - Air.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of priority of safety functions.

REFERENCES SUPPLIED:

Question: 24

An Auxiliary Operator requires a DLI Watchman Test instrument to perform a surveillance test.

Which of the following individuals is responsible for ensuring the calibration date is checked?

a. Nuclear Control Operator

b. System Engineer

c. Control Room Supervisor

d. Person checking out the instrument

Answer:

d. Person checking out the instrument

QUESTION NUMBER:	SRO	RO	24
TIER/GROUP:	SRO	RO	3

K/A: 2.2.12
Knowledge of surveillance procedures

K/A IMPORTANCE:	SRO	RO	3.0
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	10

OBJECTIVE: ADAG0G1.01
Given conditions, determine what responsibilities each of the following positions have. a. Shift Supervisor b. Control Room Supervisor c. Shift Engineer d. Control Operator

REFERENCES: AP-4.07

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 10128

JUSTIFICATION:

a. Plausible since NCO may be directing the AO during the performance of the test. Not a specific responsibility of the NCO.
b. Plausible since the SE fulfills many crew support roles. Not a specific responsibility of the SE.
c. Plausible since the CRS is responsible for the implementation of procedures on shift. Not a specific responsibility of the CRS.
d. ✓ Person checking out equipment is responsible for verifying calibration.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of administrative requirements during surveillance testing.

REFERENCES SUPPLIED:

Question: 25

Which of the following two (2) automatic actions occur on a VCT LO-LO LEVEL of 7.9%?

a.
- Boric Acid Recirc Valves OPEN
- Boric Acid Pumps START

b.
- VCT Outlet Valve CLOSES
- SIRWT to Charging Pump Suction Valve OPENS

c.
- SIRWT to Charging Pump Suction Valve OPENS
- VCT Divert to VDT OPENS

d.
- SIRWT to Charging Pump Suction Valve OPENS
- Boric Acid Pumps START

Answer:

b.
- VCT Outlet Valve CLOSES
- SIRWT to Charging Pump Suction Valve OPENS

QUESTION NUMBER:	SRO	RO	25
TIER/GROUP:	SRO	RO	2/1

K/A: 004K4.12
Knowledge of CVCS design feature(s) and/or interlock(s) which provide for the minimum level of VCT

K/A IMPORTANCE:	SRO	RO	3.1
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	6

OBJECTIVE: ASFA0A3.01
Given Plant conditions involving VCT level, predict the automatic actions that will occur.

REFERENCES: ARP-4

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 516

JUSTIFICATION:

a. Plausible since this would result in flow to the VCT. Shifts charging pump suction to SIRWT.
b. ✓ Shifts charging pump suction to SIRWT.
c. Plausible since partially correct due to opening SIRWT suction. Shifts charging pump suction to SIRWT.
d. Plausible since partially correct due to opening SIRWT suction. Shifts charging pump suction to SIRWT.

DIFFICULTY:

Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of CVCS response to abnormal plant conditions.

REFERENCES SUPPLIED:

Question: 26

Given the following conditions:

An inadvertent Auxiliary Feedwater Actuation Signal (AFAS) has occurred.
AFW Pumps P-8A and P-8C are in MANUAL.
CV-0522B, Auxiliary Feedwater (AFW) Pump P-8B Normal Steam Supply, is in AUTO.

Which of the following describes the response of CV-0522B to the AFAS?

a. Automatically opens immediately

b. Automatically opens after a 30.5 second time delay

c. Automatically opens after a 112.5 second time delay

d. Must be opened by an Operator

Answer:

d. must be opened by an Operator.

QUESTION NUMBER:	SRO	RO	26
TIER/GROUP:	SRO	RO	2/1

K/A: 061K1.03
Knowledge of the physical connections and/or cause-effect relationships between the AFW and the following systems: Main steam system

K/A IMPORTANCE:	SRO	RO	3.5
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	7

OBJECTIVE: ASLD0A1.02
Given Plant conditions, determine the status of the AFW system.

REFERENCES: EOP Supplement 19
LP-ASLD

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 5259

JUSTIFICATION:

a. Plausible since P-8B will start, as required, following receipt of an AFAS. Does not open immediately.

b. Plausible since P-8B will start, as required, following receipt of an AFAS. Opens automatically after 112.5 seconds.

c. ✓ Starts automatically after 112.5 seconds since neither P-8A nor P-8C would have started due to being in manual.

d. Plausible since this would occur if CV-0522A were being used to supply P-8B from the alternate steam supply.

DIFFICULTY:

Comprehensive/Analysis Memory ✓ Rating 4

Knowledge of AFW operations during accident conditions.

REFERENCES SUPPLIED:

Question: 27

Plant procedures require that a licensed individual shall have the RPS and RPCIC panels in view at all times whenever ...

a. PCS boron concentration is less than 1720 ppm.

b. fuel is in the reactor vessel, regardless of the condition of the reactor vessel head.

c. fuel is in the reactor vessel AND the reactor vessel head is bolted.

d. the reactor is above the cold shutdown condition.

Answer:

b. fuel is in the reactor vessel, regardless of the condition of the reactor vessel head.

QUESTION NUMBER: SRO RO 27
TIER/GROUP: SRO RO 3

K/A: 2.1.2
Knowledge of operator responsibilities during all modes of plant operation

K/A IMPORTANCE: SRO RO 3.0

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: ADAG0G1.02
Describe the Control Panel Montioring Standard requirements IAW Admin Procedure 4.00.

REFERENCES: AP-4.00

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 5135

JUSTIFICATION:

a. Plausible since this a threshold value for boron concentration. Anytime fuel is in the vessel a licensed operator must have these panels in view.
b. ✓ Anytime fuel is in the vessel a licensed operator must have these panels in view.
c. Plausible since the head condition is a threshold condition for refueling operations. Anytime fuel is in the vessel a licensed operator must have these panels in view.
d. Plausible since this is a threshold condition for operability of safety systems. Anytime fuel is in the vessel a licensed operator must have these panels in view.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of operations administrative requirements.

REFERENCES SUPPLIED:

Question: 28

Given the following conditions:

- The plant is operating at 100% power.
- Charging Pump P-55C develops an oil leak and must be stopped.

To satisfy Technical Specifications and Standing Order 54, while maintaining **ALL** normal controls and interlocks, Charging Pump P-55B should be powered using ...

a. P-55A normal supply breaker (52-1205).

b. P-55B alternate supply breaker from LCC-13 (52-1308).

c. P-55C normal supply breaker (52-1105).

d. LCC-11 and LCC-12 bus crosstie breaker (52-1217).

Answer:

c. P-55C normal supply breaker (52-1105).

QUESTION NUMBER:	SRO	RO	28
TIER/GROUP:	SRO	RO	2/1

K/A: 004K2.03
Knowledge of bus power supplies to the Charging pumps

K/A IMPORTANCE:	SRO	RO	3.3
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	6

OBJECTIVE: ASFA0K6.02
Describe the effects on the operation and control of a charging pump when supplied from the alternate power source.

REFERENCES: SOP-2A

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 4806

JUSTIFICATION:

a. Plausible since P-55B is capable of being supplied from 3 different breakers. P-55B is not capable of being supplied by P-55A breaker.
b. Plausible since P-55B is capable of being supplied from 3 different breakers. This alignment would result in a loss of control functions and interlocks.
c. ✓ All interlocks and control functions are functional in this configuration.
d. Plausible since P-55B is capable of being supplied from 3 different breakers. P-55B would still be powered by its normal supply.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of alternate power supplies and interlocks to charging pumps.

REFERENCES SUPPLIED:

Question: 29

During the performance of the Emergency Operating Procedures a CAUTION applies ...

a. ONLY to the immediate action steps of the procedure containing the CAUTION statement.

b. to ALL steps following the CAUTION statement.

c. to the ENTIRE procedure containing the CAUTION statement.

d. ONLY to the step immediately following the CAUTION statement.

Answer:

d. ONLY to the step immediately following the CAUTION statement.

QUESTION NUMBER:	SRO	RO	29
TIER/GROUP:	SRO	RO	3

K/A: 2.4.20
Knowledge of operational implications of EOP warnings, cautions, and notes

K/A IMPORTANCE:	SRO	RO	3.3
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	10

OBJECTIVE: ADAE0G1.01
Describe the the following requirements IAW Admin Procedure 4.06. c. Use of Cautionary Information, Warnings, and Notes

REFERENCES: AP-10.53

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 12199

JUSTIFICATION:

a. Plausible since term "immediate" is included. Applies only to the step immediately following the caution.
b. Plausible if candidate determines that all following steps apply. Applies only to the step immediately following the caution.
c. Plausible if candidate determines that it applies to entire procedure. Applies only to the step immediately following the caution.
d. ✓ Applies only to the step immediately following the caution.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of EOP definitions and application of cautions.

REFERENCES SUPPLIED:

Question: 30

Given the following conditions:

- The plant is in Hot Shutdown.
- Technical Specification Surveillance Test, QO-1, Safety Injection System, is being performed.
- The WHITE push button light above Containment Spray Pump P-54B hand switch comes ON during the performance of the test.
- A short time later, an actual SIAS is received.

Depressing the WHITE push button under these conditions will ...

a. reset the standby feature of P-54B.

b. immediately start P-54B.

c. place P-54B in a standby condition.

d. **NOT** affect the operation of P-54B.

Answer:

b. immediately start P-54B.

QUESTION NUMBER:	SRO	RO 30
TIER/GROUP:	SRO	RO 2/2

K/A: 026A4.01
Ability to manually operate and/or monitor in the control room: CSS controls

K/A IMPORTANCE:	SRO	RO 4.5
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO 8

OBJECTIVE: ASHC0K4.02
Given Plant conditions, involving a SIS, RAS or CHP, predict the response of the Containment Spray System.

REFERENCES: QO-1

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 8270

JUSTIFICATION:

a. Plausible since white light is an indication of the standby status of pump. Pump will start, not reset the standby feature.

b. ✓ Upon initiation of SIS, the white standby light/push button for the Containment Spray Pumps will illuminate. Depressing the white standby light/push button when illuminated will result in a pump start.

c. Plausible since white light is an indication of the standby status of pump. White light being lit is indication of being in standby.

d. Plausible if candidate determines white light is an indication of control power for pump. Will cause pump to start.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions during testing and the application of knowledge of CS controls.

REFERENCES SUPPLIED:

Question: 31

The Radioactive Gas Effluent Monitoring (RGEM) System is used to ...

a. isolate the waste gas decay tanks on a high radiation level.

b. prevent workers, contaminated by radioactive gas, from leaving the RCA.

c. prevent a radioactive release by shutting down the reactor on a high radiation level.

d. monitor plant stack gas and record levels of radioactivity being released to the environment.

Answer:

d. monitor plant stack gas and record levels of radioactivity being released to the environment.

QUESTION NUMBER:	SRO	31	RO	31
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 073K1.01
Knowledge of the physical connections and/or cause-effect relationships between the PRM system and the following systems: Those systems served by PRMs

K/A IMPORTANCE: SRO 3.9 RO 3.6

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 11

OBJECTIVE: ASDC0G6.01
Describe the conditions where each of the following process monitors associated with the RGEM System are used. a. RIA-2325 (RGEM Iodine Monitor) b. RIA-2326 (RGEM Noble Gas Monitor) c. RIA-2327 (RGEM Noble Gas Monitor - high range)

REFERENCES: SOP-38

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 7744

JUSTIFICATION:

a. Plausible since high rad conditions cause other actuations. Provides monitoring capability only.

b. Plausible since function of radiation monitors is to limit exposure by alerting workers. Provides monitoring capability only.

c. Plausible since a reactor shutdown will limit continued buildup of radionuclides. Provides monitoring capability only.

d. ✓ Provides monitoring capability only.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of RGEM system function.

REFERENCES SUPPLIED:

Question: 32

Which of the following conditions would direct the operator to use the shunt push buttons located on DC Panels D-11A or D-21A, thereby isolating the respective station battery?

a. A fire in the cable spreading room

b. Surveillance testing to test discharge the battery

c. Prior to transferring an instrument bus to an alternate power source

d. A loss of DC control power to 2400 VAC Bus 1C or 1D

Answer:

a. A fire in the cable spreading room

QUESTION NUMBER:	SRO	32	RO	32
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 067AA2.16
Ability to determine and interpret the following as they apply to the Plant Fire on Site: Vital equipment and control systems to be maintained and operated during a fire

K/A IMPORTANCE:	SRO	4.0	RO	3.3
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	8

OBJECTIVE: ASAB0K4.01
Given Figure ASAB-01 of the 125 VDC distribution system, explain the following: b. Design features that ensure 125 VDC power to the D/Gs, 2400 VAC buses, LCCs 13 and 14 and C-150 in the event of fire in the cable spreading room

REFERENCES: ONP-25.1
ONP-25.2

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 6741

JUSTIFICATION:

a. ✓ Causes a loss of all DC power except D-11A and D-21A and should be done only for extreme fire situations.
b. Plausible since discharge test requires isolating components on bus. Would result in a loss of all DC power except D-11A and D-21A.
c. Plausible since this also requires local operator actions. Would result in a loss of all DC power except D-11A and D-21A.
d. Plausible since DGs supply these two buses. Would result in a loss of all DC power except D-11A and D-21A.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Comprehension of the effect of shunt buttons on battery buses.

REFERENCES SUPPLIED:

Question: 33

Given the following conditions:

- A loss of offsite power has occurred after operating the plant at full load for 154 days.
- The crew is responding to the event in accordance with EOP-8.0, Loss of Offsite Power/Forced Circulation Recovery.
- Offsite power will **NOT** be restored for another hour.

Assuming that all of the following parameters are stable, which of the following sets of conditions would require that SG steaming and feeding rates be adjusted due to **NOT** being able to verify natural circulation?

	AVERAGE QUALIFIED CETs	**LOOP Thots**	**LOOP Tcolds**	**PRESSURIZER PRESSURE**
a.	500 °F	490 °F	460 °F	970 psia
b.	480 °F	480 °F	460 °F	740 psia
c.	510 °F	500 °F	495 °F	960 psia
d.	470 °F	460 °F	415 °F	720 psia

Answer:

d.	470 °F	460 °F	415 °F	720 psia

QUESTION NUMBER:	SRO	33	RO	33
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: CA13AK2.2
Knowledge of the interrelations between the Natural Circulation Operations and the Facility's heat removal systems, including primary, emergency, decay heat removal systems, and relations between the proper operation of these systems

K/A IMPORTANCE:	SRO	3.6	RO	3.4

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 5

OBJECTIVE: TBAC0A2.03
Given a set of accident data, evaluate parameters to determine if natural circulation is occurring IAW the in-use EOP.

REFERENCES: EOP-8.0
Steam Tables

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible if candidate determines NC verification requirements not met since all of these parameters must be met. Meets all requirements for verification of natural circulation.

b. Plausible if candidate determines NC verification requirements not met since all of these parameters must be met. Meets all requirements for verification of natural circulation.

c. Plausible if candidate determines NC verification requirements not met since all of these parameters must be met. Meets all requirements for verification of natural circulation.

d. ✓ Core ΔT exceeds 50 °F, requiring adjustment to steaming/feeding rates.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Comparison of given conditions, after using steam tables to determine subcooling, to required conditions for verification of natural circulation.

REFERENCES SUPPLIED: Steam Tables

Question: 34

Given the following conditions:

- The plant is currently in Refueling Shutdown.
- Core alterations are in progress.
- Source Range channel NI-2 is in service with its associated audible indication in Containment operable.
- Source Range channel NI-1 fails offscale LOW.

Which of the following actions should be taken?

a. Initiate emergency boration to ensure adequate shutdown margin is maintained

b. Suspend all operations involving positive reactivity changes

c. Initiate 1/M plots if desired to continue with core alterations

d. Establish continuous monitoring of Source Range channel NI-2 if desired to continue with core alterations

Answer:

b. Suspend all operations involving positive reactivity changes

QUESTION NUMBER:	SRO	34	RO	34
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 032AK3.02
Knowledge of the reasons for the following responses as they apply to the Loss of Source Range Nuclear Instrumentation: Guidance contained in EOP for loss of source-range nuclear instrumentation

K/A IMPORTANCE:	SRO	4.1	RO	3.7

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: ASGA0G8.01
Given available Control Room references and Plant conditions, (except where denoted by a '*') determine the impact on the following Technical Specifications. e. 3.17.6 Item 1*

REFERENCES: TS 3.17.6

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8816

JUSTIFICATION:

a. Plausible since SDM must be met prior to and during refueling operations. Adequate shutdown margin was previously established to permit fuel movement.
b. ✓ TS entry condition, requires securing any positive reactivity additions to core.
c. Plausible since 1/M plots are used during fuel load. Both SR instruments are required operable to continue core alterations.
d. Plausible since this is an acceptable contingency used during other plant conditions. Both SR instruments are required operable to continue core alterations.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of operator actions required in the event of abnormal conditions.

REFERENCES SUPPLIED:

Question: 35

Given the following power levels:

- ΔT power = 50%
- NI-05 = 49%
- NI-06 = 50%
- NI-07 = 49%
- NI-08 = 50%

The PPC Power Dependent Insertion Limit, in inches WITHDRAWN, is Group 4 Rods at …

a. 26 inches.

b. 36 inches.

c. 46 inches.

d. 56 inches.

Answer:

b. 36 inches.

QUESTION NUMBER:	SRO	35	RO	35
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 0012.1.25
Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data (Control Rods)

K/A IMPORTANCE: SRO 3.1 RO 2.8

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: ASEE0G8.01
Given Plant conditions and using available references (except as noted by *), determine the impact of the following Tech Specs: 3.10.5

REFERENCES: Tech Data Book Fig. 1.9

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 9637

JUSTIFICATION:

a. Plausible if incorrect curve is used. This is the value for the intersection of Tech Spec PDIL curve and 50% power.
b. ✓ Intersection of PPC PDIL curve and 50% power.
c. Plausible if incorrect curve is used. This is the value for the intersection of PPC PPDIL curve and 50% power.
d. Plausible if curve read incorrectly. This is a value selected to maintain constant difference between distracters.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of information to graphical data to determine insertion limits.

REFERENCES SUPPLIED: Technical Data Book Figure 1.9

Question: 36

Given the following conditions:

- The plant is operating at 55% power.
- Both Main Feed Pumps are in service.
- Both Condensate Pumps are in service.
- Both Heater Drain Pumps are in service.

Assuming **NO** operator action, which of the following is most likely to lead to an automatic Reactor Trip?

a. P-10A, Heater Drain Pump, tripping

b. Condenser hotwell level lowering to 5%

c. CV-0711, Main Feed Pump Recirculation Valve, failing open

d. The output of LIC-0701, Main Feed to SG A, failing high

Answer:

b. Condenser hotwell level lowering to 5%

QUESTION NUMBER:	SRO	36	RO	36
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 056A2.04
Ability to (a) predict the impacts of the following malfunction; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps

K/A IMPORTANCE: SRO 2.8 RO 2.6

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 4

OBJECTIVE: ASLB0A2.01
Given Plant conditions and a failure, malfunction, or incorrect operation of any given Main Condensate or Main Feedwater System component, predict the impact on the operation of the Main Condensate and Main Feedwater System.

REFERENCES:
SOP-11
A-PAL-89-151

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 10174

JUSTIFICATION:

a. Plausible since inadequate suction pressure might be available at higher power levels. Power level is below that required for continued HDP operation to maintain feed pump suction.

b. ✓ Results in condensate pumps tripping which causes feed pumps to trip. SG levels drop and reactor trip occurs.

c. Plausible since at higher power levels diverting flow from the SGs will cause level to lower to trip. Recirc valve failing open at this power level can be compensated for by operating feed pumps.

d. Plausible since trip would be required if high level override failed to cause valve to close. FRV fails open, causing SG level to rise. High level override will cause valve to cycle open and closed.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of cascading effect of failure of condenser on condensate and then on FW.

REFERENCES SUPPLIED:

Question: 37

Given the following conditions AND the attached drawing:

- The plant is operating at 100% power.
- Due to a failure, both Containment Pressure Switches, SW-1 and SW-2, associated with PS-1802A are tripped.
- A loss of Preferred AC Bus Y-10 occurs.

Which of the following describes the plant response?

a. An SIAS will be generated ONLY on the LEFT channel

b. An SIAS will be generated ONLY on the RIGHT channel

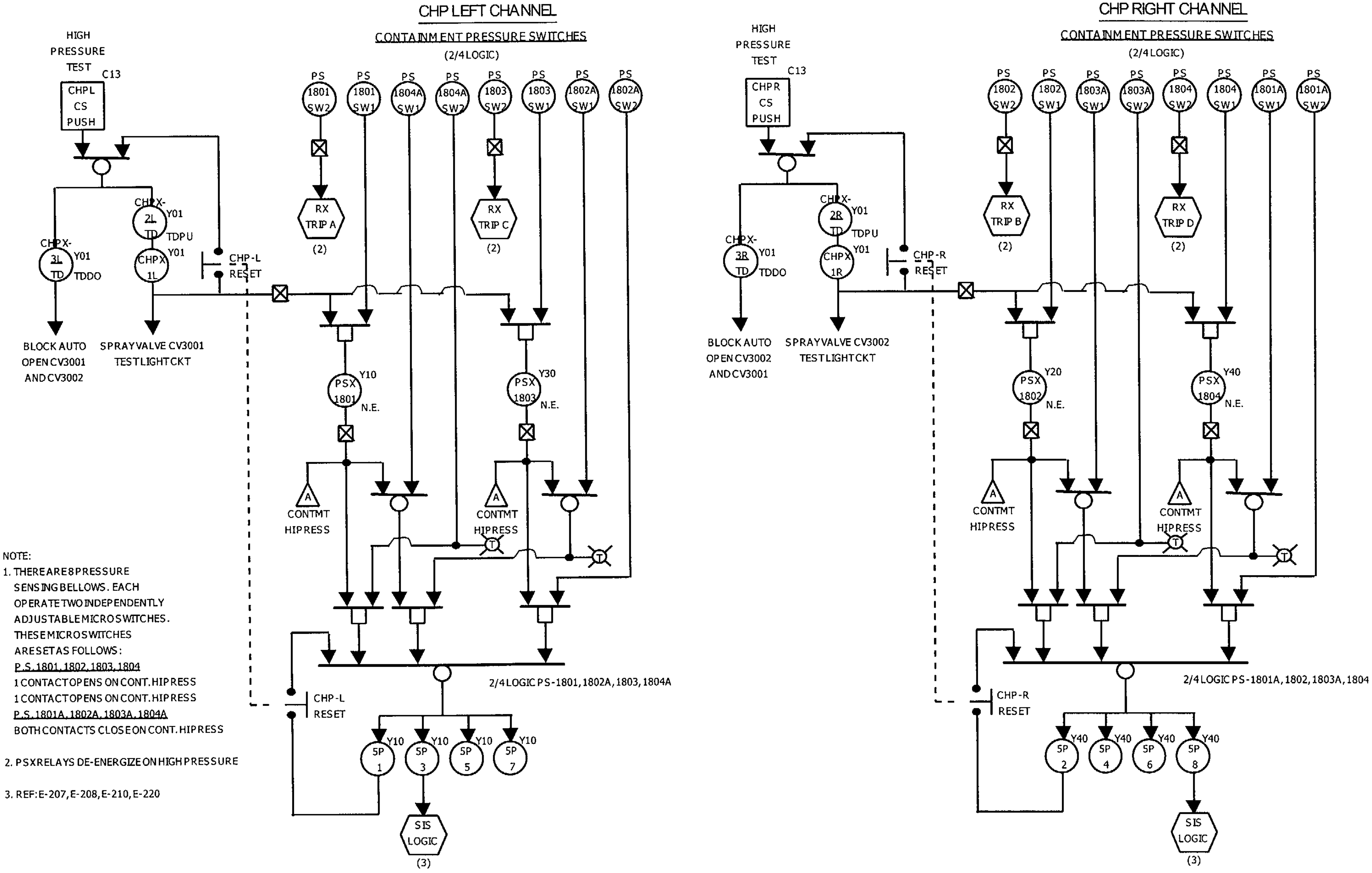
c. An SIAS will be generated on BOTH channels

d. An SIAS will **NOT** be generated on either channel

Answer:

d. An SIAS will **NOT** be generated on either channel

QUESTION #37 ATTACHMENT



NOTE:

1. THERE ARE 8 PRESSURE SENSING BELLOWS. EACH OPERATE TWO INDEPENDENTLY ADJUSTABLE MICROSWITCHES. THESE MICROSWITCHES ARE SET AS FOLLOWS:
   <u>P.S. 1801, 1802, 1803, 1804</u>
   1 CONTACT OPENS ON CONT. HI PRESS
   1 CONTACT OPENS ON CONT. HI PRESS
   <u>P.S. 1801A, 1802A, 1803A, 1804A</u>
   BOTH CONTACTS CLOSE ON CONT. HI PRESS

2. PSX RELAYS DE-ENERGIZE ON HIGH PRESSURE

3. REF: E-207, E-208, E-210, E-220

QUESTION NUMBER:	SRO	37	RO	37
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 016K3.09
Knowledge of the effect that a loss or malfunction of the NNIS will have on the following: ESFAS

K/A IMPORTANCE:	SRO	3.7	RO	3.5
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	7

OBJECTIVE: ASHB0K4.03
Given P&ID E-17 Sheet 6, determine the extent of CHP channel/equipment actuation for the following situations. a. Various combination of Containment Pressure switch actuations. d. Preferred 120 volt AC Bus availability

REFERENCES: E-17, Sheet 6

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible since Y-10 supplies power to left channel. The actuation relays require power and the Left Channel are powered by Y-10.
b. Plausible since PS-1802 input right channel. PS-1802A does not input the Right Channel of CHP.
c. Plausible since Y-10 supplies power to the left channel. The actuation relays require power and the Left Channel are powered by Y-10 and PS-1802A does not input the Right Channel of CHP.
d. ✓ Y-10 supplies power to the actuation relays for the Left Channel of CHP and PS-1802A does not input the right channel.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 4

Analysis of attached drawing to determine that power is required to cause an actuation.

REFERENCES SUPPLIED: Question 37 Attachment

Question: 38

Given the following conditions:

- The plant is on Shutdown Cooling using LPSI Pump P-67B.
- A loss of offsite power has occurred.
- Diesel Generator (DG) 1-1 has started and loaded its associated bus.

Which of the following describes the operation of LPSI Pump P-67B?

a. P-67B should have restarted as soon as DG 1-1 output breaker closed.

b. P-67B should have restarted 13 seconds after DG 1-1 output breaker closed.

c. P-67B is **NOT** running, but will restart automatically when the NSD Sequencer is reset.

d. P-67B is **NOT** running and must be manually restarted.

Answer:

d. P-67B is **NOT** running and must be manually restarted.

QUESTION NUMBER:	SRO	38	RO	38
TIER/GROUP:	SRO	2/3	RO	2/3

K/A: 005A4.01
Ability to manually operate and/or monitor in the control room: Controls and indication for RHR pumps

K/A IMPORTANCE: SRO 3.4 RO 3.6

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 7

OBJECTIVE: ASAC0G4.01
Describe the purpose of the normal shutdown and DBA sequencers IAW with FSAR, Chapter 3.7.2.

REFERENCES: E-17, Sheet 4
LP-ASAC

SOURCE: New Significantly Modified [✓ Modified/Direct]

Bank Number 8789

JUSTIFICATION:

a. Plausible since power is available to the bus immediately. The bus load sheds before the DG breaker will close and the LPSI pump is not sequenced on.
b. Plausible since the DBA sequencer starts pump. The NSD sequencer does not automatically restart the LPSI pumps. The pump must be manually started.
c. Plausible since the DBA sequencer starts pump. The LPSI pumps only start automatically as a result of the DBA sequencer.
d. ✓ The NSD sequencer does not automatically restart the LPSI pumps. The pump must be manually started.

DIFFICULTY:
[✓ Comprehensive/Analysis] Memory Rating 3

Analysis of fault of electrical system on SDC during different configurations.

REFERENCES SUPPLIED:

Question: 39

Given the following conditions:

- The plant is operating at 8% power following a startup.
- The Operators have just synchronized the Main Generator to the grid.
- EK-1165, NON CRITICAL SERV WATER LO PRESS, alarms.
- Critical Service Water Header Pressures are noted to be 35 psig.
- An Auxiliary Operator reports a break in the Non-Critical Service Water Header downstream of CV-1359, Non-Critical Service Water Isolation.
- The Control Room Supervisor orders CV-1359 CLOSED to isolate the leak.

Which of the following actions should be taken?

a. Trip the turbine, verify the reactor automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

b. Trip the reactor, verify the turbine automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

c. Trip the turbine and stabilize reactor power above the point of adding heat.

d. Maintain the reactor and turbine on-line.

Answer:

b. Trip the reactor, verify the turbine automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

QUESTION NUMBER:	SRO	39	RO	39
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 0622.4.24
Knowledge of loss of cooling water procedures (Loss of SW)

K/A IMPORTANCE:	SRO	3.7	RO	3.3
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAIG11.01
From memory, state the Immediate Actions for the following: a. ONP-6.1, Loss of Service Water

REFERENCES: ONP-6.1

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible since a turbine trip causes a reactor trip at higher power levels. A reactor trip will not automatically occur below 15% power.

b. ✓ A reactor trip is required as power is above 5%.

c. Plausible since at lower power levels the turbine should be tripped due to the loss of SW without requiring a reactor trip. With the plant above 5% a reactor trip is required.

d. Plausible since heating of the exciter is the minimum value possible while still generating heat and candidate may determine time is available to establish cooling. Exciter damage may occur in a short period of time if the generator is not taken off line.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Comprehension of non-critical service water effects on plant during different power levels.

REFERENCES SUPPLIED:

Question: 40

With the plant operating at 35% power, a loss of Component Cooling Water occurs.

Which of the following conditions will require a manual reactor trip?

a. PCP P-50B Thrust Bearing temperature at 187 °F

b. PCP P-50B Controlled Bleedoff temperature at 178 °F

c. Control Rod Drive Seal Leakoff temperatures all between 185 °F and 195 °F

d. PCP P-50B Lower Seal temperature at 177 °F

Answer:

a. PCP P-50B Thrust Bearing temperature at 187 °F

QUESTION NUMBER:	SRO	40	RO	40
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 015/017AK3.03
Knowledge of the reasons for the following responses as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Sequence of events for manually tripping reactor and RCP as a result of an RCP malfunction

K/A IMPORTANCE: SRO 4.0 RO 3.7

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAIT00.02
Given Plant conditions involving the symptoms of a loss of CCW, respond IAW ONP-6.2.

REFERENCES: ONP-6.2

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 10678

JUSTIFICATION:

a. ✓ Thrust bearing temperature exceeds limit of 175 °F.
b. Plausible since bleedoff has temperature limit. Within limit of 185 °F.
c. Plausible since drive leakoff has temperature limit. Within limit of 200 °F.
d. Plausible since seal has temperature limit. Within limit of 185 °F.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of CCW conditions requiring a reactor trip.

REFERENCES SUPPLIED:

Question: 41

Given the following conditions:

- The reactor is operating at 19% power.
- Wide Range Nuclear Instrument channel NI-3 instantaneously fails high.

Assuming **NO** other failures, which of the following is required?

a. The reactor must be shut down in an orderly manner until NI-3 is repaired.

b. Continue power operations and repair NI-3.

c. Ensure the reactor automatically trips on high Startup Rate.

d. The reactor should be manually tripped and EOP-1.0 entered.

Answer:

b. Continue power operations and repair NI-3.

QUESTION NUMBER:	SRO	41	RO	41
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 033AA2.07
Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Confirmation of reactor trip

K/A IMPORTANCE: SRO 4.2 RO 3.9

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 7

OBJECTIVE: ASGC0K4.07
Given Plant conditions including the RPS, determine the trip logic present.

REFERENCES: ARP-21

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 9168

JUSTIFICATION:

a. Plausible since both WR channels are required operable. If power is reduced below 15% a trip will occur.
b. ✓ Above 15% power the high rate trip is disabled.
c. Plausible since below 15% power a trip will occur. Trip does not occur at this level.
d. Plausible since below 15% power a trip will occur. Trip does not occur at this level.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of failure of excore NI while operating at different power levels.

REFERENCES SUPPLIED:

Question: 42

Given the attached drawing and the following conditions:

- Controlled Bleedoff temperature is 120 °F.
- Controlled Bleedoff flow is 1 gpm.
- Controlled Bleedoff pressure is 90 psig.

Which of the following PCP malfunctions have occurred?

a. The upper seal (3rd stage) has failed

b. The middle seal (2nd stage) has failed

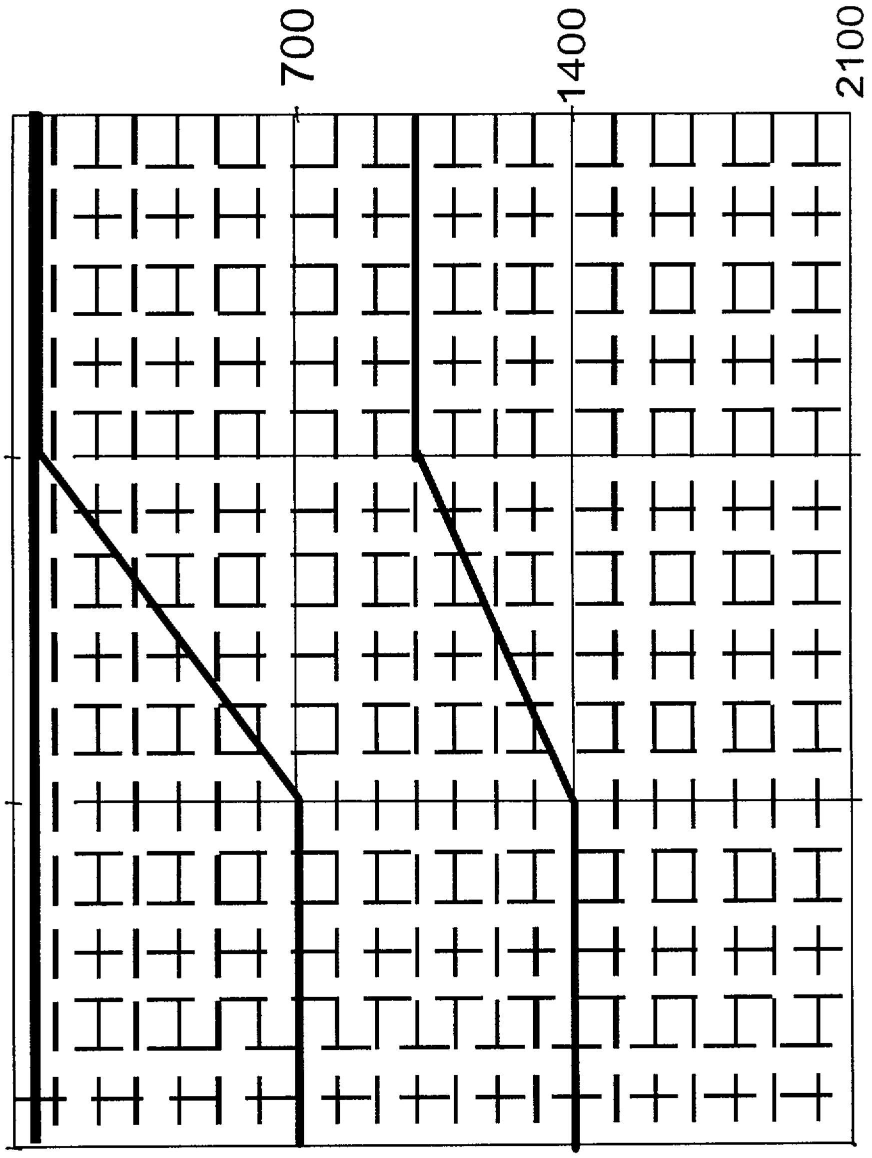
c. The lower seal (1st stage) has failed

d. The upper (3rd stage) pressure breakdown device has plugged

Answer:

a. The upper seal (3rd stage) has failed

QUESTION #42 ATTACHMENT



QUESTION NUMBER: SRO 42 RO 42
TIER/GROUP: SRO 2/1 RO 2/1

K/A: 003A4.04
Ability to manually operate and/or monitor in the control room: RCP seal differential pressure instrumentation

K/A IMPORTANCE: SRO 3.0 RO 3.1

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 2

OBJECTIVE: ASED0A5.01
Given traces of PCP seal pressures, identify which seal(s) has(have) failed.

REFERENCES: ARP-5

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 295

JUSTIFICATION:

a. ✓ An upper seal failure causes the first seal to lower pressure to 1000 psi and the second seal to lower pressure to bleedoff pressure.

b. Plausible since middle seal failure causes pressure to change. A middle seal failure causes the first seal to lower pressure to 1000 psi and the third seal to lower pressure to bleedoff pressure.

c. Plausible since lower seal failure causes pressure to change. A lower seal failure causes the middle seal to lower pressure to 1000 psi and the upper seal to lower pressure to bleedoff pressure.

d. Plausible since plugged device causes pressure to change. A plugged device would cause no pressure drop across the other two seals so the entire pressure drop would be across the third seal.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of graphical data required to determine PCP seal failure.

REFERENCES SUPPLIED: Question 42 Attachment

Question: 43

Given the following conditions:

- The Feed Reg Valve Controllers, LIC-0701 and LIC-0703, are both in AUTO.
- The Feed Pump Combined Speed Controller, HIC-0525, is in CASCADE.
- The Individual Speed Controllers, HIC-0526 and HIC-0529, are both in CASCADE.
- The plant is operating at 80% power when the Main Turbine trips.

Assuming **NO** operator actions, which of the following describe the response of the Feed Water System?

a.
- Feed Reg Valves ramp closed
- Feed Pump Speed ramps to approximately 3250 rpm

b.
- Feed Reg Valves ramp closed
- Feed Pump Speed remains at pre-trip speed

c.
- Feed Reg Valves remain at pre-trip position
- Feed Pump Speed ramps to approximately 3250 rpm

d.
- Feed Reg Valves remain at pre-trip position
- Feed Pump Speed remains at pre-trip speed

Answer:

c.
- Feed Reg Valves remain at pre-trip position
- Feed Pump Speed ramps to approximately 3250 rpm

QUESTION NUMBER:	SRO	43	RO	43
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 059K4.18
Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Automatic feedwater reduction on plant trip

K/A IMPORTANCE:	SRO	3.0	RO	2.8
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	4

OBJECTIVE: ASLC0K6.02
Given plant conditions, predict the response of the SGWLC system.

REFERENCES: EOP-1.0

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 1227

JUSTIFICATION:

a. Plausible since pumps ramp to minimum speed. The feed reg valves swap to manual and remain in the current position.

b. Plausible since these conditions are addressed by actions in procedure. The feed pumps automatically ramp to minimum speed while the feed reg valves swap to manual and remain in the current position.

c. ✓ The feed pumps automatically ramp to minimum speed while the feed reg valves swap to manual and remain in the current position.

d. Plausible since FRVs swap to manual. The feed pumps automatically ramp to minimum speed.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Analysis of the effect of a plant trip on the FW system.

REFERENCES SUPPLIED:

Question: 44

Ten (10) minutes have elapsed since an inadvertent SIAS.

Which of the following results in the greatest heat load on the Component Cooling Water System?

a. Letdown Heat Exchanger

b. Primary Coolant Pumps

c. Shutdown Cooling Heat Exchangers

d. Spent Fuel Pool Heat Exchanger

Answer:

a. Letdown Heat Exchanger

QUESTION NUMBER:	SRO	44	RO	44
TIER/GROUP:	SRO	2/3	RO	2/3

K/A: 008K3.01
Knowledge of the effect that a loss or malfunction of the CCWS will have on the following: Loads cooled by CCWS

K/A IMPORTANCE:	SRO	3.5	RO	3.4

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 4

OBJECTIVE: ASCA0K1.03
State the components that are the largest heat loads on the CCW System during normal operations, cold shutdown conditions, and during accident conditions.

REFERENCES: FSAR Table 9-4

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 4747

JUSTIFICATION:

a. ✓ Heat load is approximately 11.8E6 Btu/hr post-SI.
b. Plausible since this is a heat load post-SI. Heat load is approximately 2.3E6 Btu/hr post-SI.
c. Plausible since this is a large heat load post-RAS. Heat load is 0 Btu/hr post-SI, although it achieves a maximum of 95E6 But/hr post-RAS.
d. Plausible since this is a large heat load under normal plant conditions. Heat load is 0 Btu/hr post-SI since it isolates on an SIAS.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of the relative loads on the CCW system.

REFERENCES SUPPLIED:

Question: 45

While obtaining a hydrogen sample from the containment atmosphere, the Hydrogen Monitoring System containment isolation valves must be opened prior to placing the system in ANALYZE to ...

a. prevent damage to the sample pump.

b. prevent damage to the analyzer.

c. prevent unnecessary Control Room annunciators from alarming.

d. ensure the valves remain open in the event of a CHP or CHR signal.

Answer:

a. prevent damage to the sample pump.

QUESTION NUMBER: SRO 45 RO 45
TIER/GROUP: SRO 2/2 RO 2/3

K/A: 0282.1.32
Ability to explain and apply all system limits and precautions (Hydrogen Recombiner and Purge Control)

K/A IMPORTANCE: SRO 3.8 RO 3.4

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 9

OBJECTIVE: ASHE0G7.01
Explain the basis of any given Containment Hydrogen Analyzer and Recombiner System Operating Procedure (SOP-38) Plant Requirement, Precaution or Limitation, Caution, or Note.

REFERENCES: SOP-38

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 10928

JUSTIFICATION:

a. ✓ The sample pump operating without a suction path will result in pump damage.
b. Plausible since system damage is a concern. Damage will occur to pump, not analyzer.
c. Plausible since minimal alarms are desirable during post-accident response. No alarms should be received if the sequence of performance is reversed.
d. Plausible since the valves are required to open to obtain a sample. The valves will close on a CHP or CHR if opened with the switch in the NORM position. The sequence of operation does not affect this.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of hydrogen analyzer system precautions.

REFERENCES SUPPLIED:

Question: 46

Given the following conditions:

- A liquid batch release is being performed from T-91 to the lake at 75 gpm.
- P-40A, Dilution Water Pump, is operating.
- RIA-1049, Liquid Radwaste Monitor, alarms.

Which of the following terminates the release?

a. CV-1051, 1" Discharge Isolation, closes

b. CV-1054, Discharge Isolation (common), closes

c. P-40A, Dilution Water Pump, trips

d. An Operator closes MV-RW127, Effluent to Dilution Line

Answer:

a. CV-1051, 1" Discharge Isolation, closes

QUESTION NUMBER: SRO 46 RO 46
TIER/GROUP: SRO 1/1 RO 1/2

K/A: 059AA2.05
Ability to determine and interpret the following as they apply to the Accidental Liquid Radwaste Release: Occurrence of automatic safety actions as a result of a high PRM system signal

K/A IMPORTANCE: SRO 3.9 RO 3.6

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 11

OBJECTIVE: ISEB0A3.02
Given normally available references, predict the automatic actions associated with a high radiation signal on RIA-1049.

REFERENCES: ARP-8

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 9893

JUSTIFICATION:

a. ✓ Valve automatically closes on high radiation.
b. Plausible since closure would terminate release. Valve remains open, but is closed by an operator.
c. Plausible since pump is used for dilution of release. Pump remains running, but can be stopped by an operator.
d. Plausible since closure would terminate release. Manual valve which is aligned prior to and after the discharge.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of the automatic response to a high rad alarm.

REFERENCES SUPPLIED:

Question: 47

During recovery from a LOCA inside containment, the operators have established simultaneous hot and cold leg injection in accordance with EOP-4.0, Loss of Coolant Accident Recovery.

Assuming all equipment is operating properly, which of the following describes the correct flow rates that should be observed?

	LOOP 1 HOT LEG FLOW FI-0316A	**LOOP 1 HOT LEG FLOW FI-0317A**	**HPSI FLOW TO LOOP 1A FI-0308A**	**HPSI FLOW TO LOOP 1B FI-0310A**	**HPSI FLOW TO LOOP 2A FI-0312A**	**HPSI FLOW TO LOOP 2B FI-0313A**
a.	275 gpm	275 gpm	137.5 gpm	137.5 gpm	137.5 gpm	137.5 gpm
b.	550 gpm	0 gpm	275 gpm	275 gpm	0 gpm	0 gpm
c.	183.3 gpm	183.3 gpm	183.3 gpm	183.3 gpm	183.3 gpm	183.3 gpm
d.	350 gpm	350 gpm	100 gpm	100 gpm	100 gpm	100 gpm

Answer:

a.	275 gpm	275 gpm	137.5 gpm	137.5 gpm	137.5 gpm	137.5 gpm

QUESTION NUMBER:	SRO	47	RO	47
TIER/GROUP:	SRO	1/1	RO	1/2

K/A: 011EA1.16
Ability to operate and monitor the following as they apply to a Large Break LOCA: Balancing of HPI loop flows

K/A IMPORTANCE: SRO 3.5 RO 3.5

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 8

OBJECTIVE: TBAGG22.01
Given Plant conditions involving hot/cold leg injection entry conditions determine: b. The expected flow rate to each hot/cold leg.

REFERENCES: EOP-4.0

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 5020

JUSTIFICATION:

a. ✓ HPSI flow to each of the hot legs should be approximately equal to the total of the HPSI flow to the train-related cold legs.

b. Plausible if candidate determines flow is to be established using one train only. Flow should be established by both trains.

c. Plausible if candidate determines that each indication should be equal. Hot leg and cold leg flows should be equalized such that the total for each hot leg equals the total for both train-related cold legs.

d. Plausible if candidate determines cold leg flow should be higher than hot leg. Flows should be equalized.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Comprehends and applies the requirements for simultaneous injection during an accident.

REFERENCES SUPPLIED:

Question: 48

Given the following conditions:

- The plant is operating at 50% power.
- A Steam Generator Tube Leak is suspected.
- Total PCS Xenon-133 is 200 µCi/kg.
- Condenser off-gas flow is 2 cfm.
- RIA-0631, Condenser Off-Gas Monitor, is indicating 6.00E3 cpm.

The estimated steam generator tube leakage is ...

a. 0.008 gpm.

b. 0.015 gpm.

c. 0.030 gpm.

d. 0.045 gpm.

Answer:

b. 0.015 gpm.

QUESTION NUMBER:	SRO	48	RO	48
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 037AA2.12
Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: Flow rate of leak

K/A IMPORTANCE: SRO 4.1 RO 3.3

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAFG28.01
Given ONP 23.2 and plant parameters, estimate the size of a S/G tube leak.

REFERENCES: ONP23.2

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 1291

JUSTIFICATION:

a. Plausible if lowers reading by multiplying by power level. Power level is previously accounted for.

b. ✓ Intersection of 2 cfm and 6E3 cpm is 0.03. Correcting for PCS xenon activity, a final value of 0.015 is obtained.

c. Plausible if does not correct for PCS xenon activity. PCS xenon activity must be accounted for.

d. Plausible if raises reading by dividing by power level. Power level is previously accounted for.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Applications of given information to graphical data to determine leak rate.

REFERENCES SUPPLIED: ONP-23.2, Attachment 1

Question: 49

Given the following conditions:

- The plant is operating at 100% power.
- P-55B, Charging Pump B, is in MANUAL control.
- P-55C, Charging Pump C, is in AUTO control.
- Charging flow is 40 gpm.
- Letdown flow is 44 gpm.
- Pressurizer level is cycling between 55% and 57% every 25 minutes.

Which of the following is the cause of these conditions?

a. Anti-pump lockout of P-55C has **NOT** been reset

b. Letdown flow controller is improperly calibrated

c. Charging Pump P-55A is tagged out

d. Backup Pressurizer Level control signal is malfunctioning

Answer:

c. Charging Pump P-55A is tagged out

QUESTION NUMBER: SRO 49 RO 49
TIER/GROUP: SRO 2/1 RO 2/1

K/A: 004K3.05
Knowledge of the effect that a loss or malfunction of the CVCS will have on PZR LCS

K/A IMPORTANCE: SRO 4.2 RO 3.8

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 3

OBJECTIVE: ASFAG12.04
Describe the two modes of CVCS operation for maintaining PZR level when the variable speed charging pump is out of service.

REFERENCES: SOP-2A

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 4944

JUSTIFICATION:

a. Plausible since P-55C has lockout feature. P-55C would not be available under these conditions so level would continue to lower.
b. Plausible if controller was malfunctioning. This is proper letdown flow under these conditions.
c. ✓ Charging flow is constant with letdown flow slightly higher. Pressurizer level lowers until P-55C starts and rises until P-55C stops.
d. Plausible if back control was malfunctioning. The backup pressurizer level control system controls level in this band.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of abnormal pressurizer level conditions to determine potential cause.

REFERENCES SUPPLIED:

Question: 50

The Low Suction Pressure Trip for Auxiliary Feedwater Pump P-8B is DISABLED upon ...

a. placing C-150, Auxiliary Shutdown Panel, in service.

b. loss of Preferred AC Bus Y-10.

c. placing C-33, Auxiliary Shutdown Panel, in service.

d. loss of Preferred AC Bus Y-30.

Answer:

a. placing C-150, Auxiliary Shutdown Panel, in service.

QUESTION NUMBER:	SRO	50	RO	50
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 061K6.01
Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Controllers and positioners

K/A IMPORTANCE: SRO 2.8 RO 2.5

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 4

OBJECTIVE: ASLD0A5.01
Describe the operating conditions which disable the P-8B low suction automatic trip

REFERENCES: ONP-25.2

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 628

JUSTIFICATION:

- a. ✓ The LSPT is bypassed when control is at C-150. Approximately 20 minutes of tank usage remains when the light comes on at this location.
- b. Plausible since Y-10 and Y-30 input P-8A/C LSPT. P-8B LSPT is powered by Y-20, but a LSPT occurs when power is lost.
- c. Plausible since C-33 is used for shutdown outside control room. LSPT is affected by operation of C-150, not C-33.
- d. Plausible since Y-10 and Y-30 input P-8A/C LSPT. P-8B LSPT is powered by Y-20, but a LSPT occurs when power is lost.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Comprehension of the LSP trip of AFW and the effect on the trip caused by actions/failures.

REFERENCES SUPPLIED:

Question: 51

The MAXIMUM running amp limits for the motor-driven Auxiliary Feedwater Pumps ensures ...

a. the pumps will **NOT** be "dead-headed."

b. the full-load motor heat will **NOT** be exceeded.

c. bus power supply overcurrent protection is maintained.

d. required work of the pumps during accident conditions are maintained within limits.

Answer:

b. the full-load motor heat will **NOT** be exceeded.

QUESTION NUMBER:	SRO	RO	51
TIER/GROUP:	SRO	RO	2/1

K/A: 061A1.05
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the AFW controls including: AFW flow/motor amps

K/A IMPORTANCE: SRO RO 3.6

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: ASLD0G7.09
Explain the basis of any given AFW System Operation Procedure (SOP-12) Plant Requirement, Precaution and Limitation, and Caution/Note.

REFERENCES:
SOP-12
LP-ASLD

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 625

JUSTIFICATION:

a. Plausible since operating a pump at shutoff head is not desirable. Running a pump at shutoff head will result in motor current being low.

b. ✓ Motor overheating will occur if full load current is exceeded.

c. Plausible since an overcurrent condition on a component will cause an increase in bus current. Bus protection is provided by relays related to the bus, not to individual components.

d. Plausible since accident requirements are typically different from normal requirements. Pump work required during accident conditions will determine current drawn, not be limited by the current permitted.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of reasons for AFW system limitations.

REFERENCES SUPPLIED:

Question: 52

While operating the Spent Fuel Handling Machine (SFHM), you have received permission to use the OVERRIDE KEYSWITCH from the Refueling SRO to access a location beyond the computer software boundary at the pool edge.

What is the consequence of failing to observe trolley movement carefully while using the keyswitch to move the bridge and trolley?

a. The SFHM will shut down if the computer zone is exited.

b. Movement into the tilt pit area is prohibited.

c. It is possible to impact the wall.

d. Movement over the fuel elevator is prohibited.

Answer:

c. It is possible to impact the wall.

QUESTION NUMBER:	SRO	RO	52
TIER/GROUP:	SRO	RO	2/3

K/A: 034A3.01
Ability to monitor automatic operation of the Fuel Handling System including: Travel limits

K/A IMPORTANCE:	SRO	RO	2.5
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	10

OBJECTIVE: ASIB0G7.09
Explain the basis of any given Spent Fuel Handling Machine Operating Procedure (SOP-28) Plant Requirement, Precaution and Limitation, and Caution/Note.

REFERENCES: SOP-28
LP-ASIB

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 11733

JUSTIFICATION:

a. Plausible since this is a normal limit. Boundary limit is bypassed by use of override keyswitch.

b. Plausible since this area is susceptible to impacting the wall due to bypassing the extreme travel limit. Movement into the tilt pit is still available.

c. ✓ The west wall does not have a hard stop to allowing accessing the tilt pits. Using the override bypasses the extreme travel end limit switch.

d. Plausible since it would not be desirable to be capable of placing a spent fuel assembly in the fuel elevator. Movement over the fuel elevator is available.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of placing refueling equipment in an abnormal configuration.

REFERENCES SUPPLIED:

Question: 53

Which of the following best describes the type of override used to OPEN the PCS Sampling Valves, CV-1910 and CV-1911, after a closure caused by a CHR or CHP signal?

a. Override key switch

b. Operator action to manually isolate and bleed off the air supply to the valves

c. Operator action to manually handjack the valves

d. Jumpering the power supply to the solenoid valves to allow air to the valves

Answer:

d. Jumpering the power supply to the solenoid valves to allow air to the valves

QUESTION NUMBER:	SRO	RO	53
TIER/GROUP:	SRO	RO	2/2

K/A: 002K6.15
Knowledge of the effect or a loss or malfunction on the post-accident sampling

K/A IMPORTANCE:	SRO	RO	TBD
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	9

OBJECTIVE: ASHEG12.10
Given Plant conditions, including a Containment Isolation Signal, describe the actions needed to allow sample flow to the PASM panel and/or NSSS panel.

REFERENCES: EI-7.0
LP-ASHE

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 10964

JUSTIFICATION:

a. Plausible since this is a common method of opening a valve isolated by an actuation signal. Must use a jumper.
b. Plausible since this is a common method of opening a valve isolated by an actuation signal. Must use a jumper.
c. Plausible since this is a common method of opening a valve isolated by an actuation signal. Must use a jumper.
d. ✓ Jumpering of the CHP and CHR relay inputs to the valves is required to open the valves.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 4

Knowledge of PCS sampling valve interlocks and overrides.

REFERENCES SUPPLIED:

Question: 54

For purposes of administrative control, the plant is considered to be above the COLD SHUTDOWN condition whenever PCS temperature is greater than or equal to ...

a. 200 °F as indicated on any operable cold leg temperature instrument.

b. 200 °F as indicated on any operable hot leg temperature instrument.

c. 210 °F as indicated on any operable cold leg temperature instrument.

d. 210 °F as indicated on any operable hot leg temperature instrument.

Answer:

c. 210 °F as indicated on any operable cold leg temperature instrument.

QUESTION NUMBER:	SRO	RO	54
TIER/GROUP:	SRO	RO	3

K/A: 2.1.22
Ability to determine Mode of Operation

K/A IMPORTANCE:	SRO	RO	2.8
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	10

OBJECTIVE: ADAG0G1.17
Describe the clarification definitions for 'cold shutdown condition' and '300 F condition' IAW Admin Procedure 4.00.

REFERENCES: AP-4.00

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 11712

JUSTIFICATION:

a. Plausible if candidate determines temperature is 200 °F. Any cold leg temperature above 210 °F is above cold shutdown.

b. Plausible if candidate determines temperature is 200 °F and if candidate determines hot leg to be parameter. Any cold leg temperature above 210 °F is above cold shutdown.

c. ✓ Considered to be above cold shutdown when any cold leg temperature is above this temperature.

d. Plausible if candidate determines hot leg to be parameter. Any cold leg temperature above 210 °F is above cold shutdown.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of operations administrative requirements.

REFERENCES SUPPLIED:

Question: 55

Given the following conditions:

- The plant is operating at 90% power.
- A fire in the Turbine Building has just been reported to the Control Room.

The Control Room Operator is required to ...

a. commence a rapid shut down of the plant.

b. trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

c. announce the fire location over the PA system and sound the fire alarm.

d. be immediately relieved and respond to the fire location as Fire Brigade Leader.

Answer:

c. announce the fire location over the PA system and sound the fire alarm.

QUESTION NUMBER:	SRO	RO	55
TIER/GROUP:	SRO	RO	3

K/A: 2.4.25
Knowledge of fire protection procedures

K/A IMPORTANCE:	SRO	RO	2.9
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	10

OBJECTIVE: ASBAG11.01
State the Nuclear Control Operator's actions in the event of a fire.

REFERENCES: FPIP-2

SOURCE: New   Significantly Modified ✓   Modified/Direct

Bank Number 11804

JUSTIFICATION:

a. Plausible since this would be a safe condition if fire affected equipment required to maintain plant on line. Shutdown decision is Shift Supervisor's.

b. Plausible since this would be a safe condition if fire affected equipment required to maintain plant on line. Shutdown decision is Shift Supervisor's.

c. ✓ CO is required to sound alarm, announce fire, and review ONP-25.1.

d. Plausible since the senior on shift AO assumes fire brigade leader position. CO is not member of fire brigade while standing watch in control room.

DIFFICULTY:
Comprehensive/Analysis   Memory ✓   Rating 2

Knowledge of operator actions during a fire.

REFERENCES SUPPLIED:

Question: 56

Given the following conditions:

- A reactor shut down is in progress.
- Group 1 and Group 2 Regulating Rods are fully withdrawn.
- Group 3 Regulating Rods are at 105 inches.
- Group 4 Regulating Rods are at 25 inches.
- Manual Rod Sequencing is being used to insert rods.

The next rod insertion should be ...

a. Group 3 to 93 inches.

b. Group 3 to 85 inches.

c. Group 4 to 13 inches.

d. Group 4 to the LEL.

Answer:

c. Group 4 to 13 inches.

QUESTION NUMBER:	SRO	RO	56
TIER/GROUP:	SRO	RO	2/1

K/A: 001K5.01
Knowledge of the following operational implications as they apply to the CRDS: Understanding and application of individual and over-lapped rod bank curves

K/A IMPORTANCE:	SRO	RO	3.3
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	6

OBJECTIVE: ASEET00.01
Given plant conditions, and Control Room references, operate the Control Rod Drive System in all modes of operation IAW the references.

REFERENCES: SOP-6

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 7593

JUSTIFICATION:

a. Plausible since group 3 or 4 rods must be moved. Rods are to be maintained 80 inches plus 12 inches, minus 0 inches apart. This would cause rods to be 68 inches apart, which is not acceptable.

b. Plausible since group 3 or 4 rods must be moved. Rods are to be maintained 80 inches plus 12 inches, minus 0 inches apart. This would cause rods to be 60 inches apart, which is not acceptable.

c. ✓ Rods are to be maintained 80 inches plus 12 inches, minus 0 inches apart. This would cause rods to be 92 inches apart, which is acceptable.

d. Plausible since group 4 rods are near the LEL. Rods are to be maintained 80 inches plus 12 inches, minus 0 inches apart. This would cause rods to be 102 inches apart, which is not acceptable.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of rod control system limitations to determine operator actions.

REFERENCES SUPPLIED: SOP-6, Attachment 3

Question: 57

Given the following conditions:

- The plant is operating at 100% power.
- PCS Tave is 560 °F.
- All control systems are in automatic.
- The turbine trips on low condenser vacuum.
- Condenser vacuum stabilizes at 14"Hg.

Which of the following describes the response of the Atmospheric Dump Valves (ADVs) and Turbine Bypass Valve (TBV) to this event?

a.
  - The ADVs quick open and modulate closed as Tave lowers.
  - The TBV quick opens and modulates closed as steam pressure lowers.

b.
  - The ADVs quick open and modulate closed as Tave lowers.
  - The TBV remains closed.

c.
  - The ADVs quick open and modulate closed as steam pressure lowers.
  - The TBV quick opens and modulates closed as Tave lowers.

d.
  - The ADVs quick open and modulate closed as steam pressure lowers.
  - The TBV remains closed.

Answer:

a.
  - The ADVs quick open and modulate closed as Tave lowers.
  - The TBV quick opens and modulates closed as steam pressure lowers.

QUESTION NUMBER:	SRO	RO	57
TIER/GROUP:	SRO	RO	2/3

K/A: 041K4.18
Knowledge of SDS design feature(s) and/or interlock(s) which provide for the following: Turbine trip

K/A IMPORTANCE:	SRO	RO	3.4
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	5

OBJECTIVE: ASJB0K4.04
Given Plant conditions and available Control Room references (when applicable): b. Determine if a quick opening or a normal ramp opening of the ADVs and TBV should occur.

REFERENCES:
E-238, Sheet 2
LP-ASJB

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 9172

JUSTIFICATION:

a. ✓ The ADVs quick open on the turbine trip and modulate closed as temperature lowers. The TDV uses the steam pressure signal to modulate since it will be the higher signal.

b. Plausible since vacuum has lowered, but is still above the interlock setpoint of 5" Hg. The TDV will operate.

c. Plausible since the TDV uses the higher signal of pressure or temperature. The ADVs respond to temperature, not pressure.

d. Plausible since vacuum has lowered, but is still above the interlock setpoint of 5" Hg and since the TDV uses the higher signal of pressure or temperature. The ADVs respond to temperature, not pressure. The TDV will operate.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Comprehension of steam dump response to changing plant conditions.

REFERENCES SUPPLIED:

Question: 58

Given the following log of events:

TIME	EVENT
0800:00	Reactor at 40% power
0815:00	P-50A vibration logged at 3 mils (same as previous shift)
1300:00	EK-0913, PRI COOLANT PUMP VIB ALERT/MON TROUBLE, alarms
1300:30	P-50A vibration noted to be 9 mils
1300:45	P-50A bearing temperatures noted to have risen approximately 20 °F since beginning of shift
1305:00	Power reduction commenced
1307:00	EK-0914, PRI COOLANT PUMP VIBRATION DANGER, alarms
1307:30	P-50A vibration noted to be 26 mils
1307:30	Reactor at 32% power

Which of the following actions should be taken?

a. Continue lowering power and trip P-50A when below 15%

b. Trip P-50A immediately and stabilize power below 15%

c. Trip the reactor, trip P-50A, and go to EOP-1.0, Standard Post-Trip Actions.

d. Trip P-50A immediately and continue the plant shut down to Hot Shutdown.

Answer:

c. Trip the reactor, trip P-50A, and go to EOP-1.0, Standard Post-Trip Actions.

QUESTION NUMBER:	SRO	RO	58
TIER/GROUP:	SRO	RO	2/1

K/A: 003A2.02
Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences: Conditions which exist for an abnormal shutdown of an RCP

K/A IMPORTANCE:	SRO	RO	3.7
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	2

OBJECTIVE: ASED0G9.01
Given various plant conditions, one or more of the following annunciators in the alarmed condition: EK-0913, PCP vibration alert; EK-0914, PCP vibration danger; c. Use Control Room references to determine the actions necessary to be performed

REFERENCES:
ARP-5
SOP-1

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 299

JUSTIFICATION:

a. Plausible since 15% power is threshold for other trips being enabled. Plant must be tripped prior to stopping PCP.
b. Plausible since 15% power is threshold for other trips being enabled. Plant must be tripped prior to stopping PCP.
c. ✓ Indications are a severe problem exists with PCP. Reactor is tripped due to being at power, and the PCP should be stopped immediately.
d. Plausible since this secures pump immediately. Plant will automatically trip.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of given information to determine operator action in response to PCP failure.

REFERENCES SUPPLIED:

Question: 59

Shutdown Cooling has just been initiated.

What effect does this have on the Service Water (SW) System **INITIALLY**?

a. SW bay level will be significantly lower

b. SW system pressure will be lower

c. SW system pressure will be higher

d. SW intake screen differential pressure will be lower

Answer:

b. SW system pressure will be lower

QUESTION NUMBER:	SRO	RO 59
TIER/GROUP:	SRO	RO 2/3

K/A: 076K1.08
Knowledge of the physical connections and/or cause-effect relationships between the SWS and the RHR system

K/A IMPORTANCE:	SRO	RO 3.5
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO 4

OBJECTIVE: ISDA0K5.02
Given a change to one of the following parameters, describe the effect on Service Water System temperature and pressure. b. Plant operating mode

REFERENCES: SOP-16
LP-ISDA

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 4067

JUSTIFICATION:

a. Plausible if candidate determines that higher flow results in lowering level. SW bay level will remain constant.

b. ✓ A greater heat load requires more SW flow. As flow rises, pressure lowers.

c. Plausible if candidate determines that increased heat load will cause temperature and pressure to rise. A greater heat load requires more SW flow. As flow rises, pressure lowers.

d. Plausible if candidate determines that increased flow causing lower pressure causes lower differential pressure. A greater heat load requires more SW flow. As flow rises, differential pressure across components rise.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of the effect of parallel flowpaths on the SW system.

REFERENCES SUPPLIED:

Question: 60

Valves such as vents and drains are **NOT** required to be locked in the appropriate positions if the MAXIMUM amount of flow that the valve could allow, IF LEFT FULL OPEN, is less than what percent of the main flow?

a. 5%

b. 7.5%

c. 10%

d. 12.5%

Answer:

a. 5%

QUESTION NUMBER:	SRO		RO	60
TIER/GROUP:	SRO		RO	3

K/A: 2.1.29
Knowledge of how to conduct and verify valve lineups

K/A IMPORTANCE:	SRO		RO	3.4
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: ISAAG13.20
Discuss the requirements for "Control of Manual Locked Valves" IAW AP 4.02.

REFERENCES: AP-4.02

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 6658

JUSTIFICATION:

a. ✓ Limit is 5% of main flow.
b. Plausible if candidate determines value was greater than 5%. Limit is 5% of main flow.
c. Plausible if candidate determines value was greater than 5%. Limit is 5% of main flow.
d. Plausible if candidate determines value was greater than 5%. Limit is 5% of main flow.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 4

Knowledge of operations administrative requirements for valve alignments.

REFERENCES SUPPLIED:

Question: 61

Reactor Power is being lowered from 99.9% to 99.2% in preparation for Auxiliary Feed Pump testing by adjusting GV-4 closed.

WITHOUT making any adjustment in rod position or boron concentration, which of the following describes the response of Tave and Tref as turbine load is lowered?

	T-AVE	**T-REF**
a.	Lowers	Lowers
b.	Lowers	Rises
c.	Rises	Lowers
d.	Rises	Rises

Answer:

c.	Rises	Lowers

QUESTION NUMBER:	SRO	61	RO	61
TIER/GROUP:	SRO	2/3	RO	2/3

K/A: 045K4.01
Knowledge of MT/G system design feature(s) and/or inter-lock(s) which provide for the Programmed controller for relationship between steam pressure at T/G inlet (impulse, first stage) and plant power level

K/A IMPORTANCE: SRO 2.9 RO 2.7

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 5

OBJECTIVE: RHAA0A1.02
Given plant conditions, analyze the data and predict any effect on any of the following: a. PCS parameters

REFERENCES: Tech Data Book Figure 3.3

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 9652

JUSTIFICATION:

a. Plausible since both Tave and Tref are affected. Tave rises due to less heat removed from the PCS.
b. Plausible since both Tave and Tref are affected. Closing down on the governor valves causes Tref to lower and as less heat is removed from the PCS, Tave rises.
c. ✓ Closing down on the governor valves causes Tref to lower and as less heat is removed from the PCS, Tave rises.
d. Plausible since both Tave and Tref are affected. Tref lowers due to a lower pressure at the first stage of the turbine.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of PCS and secondary response to changing plant conditions.

REFERENCES SUPPLIED:

Question: 62

Given the following conditions:

- The reactor is shut down.
- PCS temperature is 230 °F.

The most acceptable method of reducing pressure inside Containment is to open …

a. the personnel air lock doors.

b. CV-1805 and CV-1806, Containment Purge Exhaust Isolation Valves, and vent Containment through the stack.

c. CV-1065 and CV-1064, CWRT Vent Isolation Valves, and vent Containment through the VGCH to the stack.

d. the emergency escape lock.

Answer:

c. CV-1065 and CV-1064, CWRT Vent Isolation Valves, and vent Containment through the VGCH to the stack.

QUESTION NUMBER:	SRO	62	RO	62
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 0292.1.33
Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications (Containment Purge)

K/A IMPORTANCE: SRO 4.0 RO 3.4

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: ASDB0G8.01
Given Plant conditions and Control Room references (except where noted by a "*"), determine the impact on the following Technical Specifications: 3.6.5

REFERENCES: SOP-24

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 7616

JUSTIFICATION:

a. Plausible since this would be acceptable in cold shutdown. Not permitted to open both doors at same time above cold shutdown.

b. Plausible since this would be acceptable in cold shutdown. Above cold shutdown conditions, these valves are required to be maintained locked closed.

c. ✓ Above cold shutdown conditions, containment integrity must be maintained. Method used to purge containment above 210 °F.

d. Plausible since this would be acceptable in cold shutdown. Emergency escape hatch is required to be installed above cold shutdown.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of TS requirements for containment integrity.

REFERENCES SUPPLIED:

Question: 63

Given the following conditions:

- The plant is operating at 100% power.
- Permission has been given to test the Y-50 ABT Transfer Switch.

Assuming **NO** operator actions, which of the following will occur if the transfer operation occurs too slowly?

a. The reactor will trip due to the turbine tripping.

b. The reactor will trip on high pressurizer pressure.

c. Turbine power will automatically be lowered to approximately 50%.

d. The reactor will trip on PCS low flow.

Answer:

a. The reactor will trip due to the turbine tripping.

QUESTION NUMBER:	SRO	63	RO	63
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 057AA1.01
Ability to operate and/or monitor the following as they apply to the Loss of Vital AC Instrument Bus: Manual inverter swapping

K/A IMPORTANCE:	SRO	3.7	RO	3.7

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: ASAB0G7.09
Explain the basis of any given Preferred DC, Preferred AC, and Instrument AC System (SOP-30), Plant Requirement, Precaution or Limitation, Caution, or Note.

REFERENCES: SOP-30

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 11290

JUSTIFICATION:

a. ✓ May result in loss of cooling tower pumps on low basin level.
b. Plausible since a loss of 2 protection buses would cause a trip. Y-50 transfer switch supplies power to Y-01, not any of the protection buses.
c. Plausible since a loss of 2 protection buses would cause a trip. Y-50 transfer switch supplies power to Y-01, not any of the protection buses.
d. Plausible since a loss of 2 protection buses would cause a trip. Y-50 transfer switch supplies power to Y-01, not any of the protection buses.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 4

Analysis of the effect of improper operations on the cooling tower system and the effect of this response on the plant.

REFERENCES SUPPLIED:

Question: 64

Given the following conditions:

- The plant is operating at 40% power.
- While performing Technical Specification Surveillance Procedure QO-34, Control Rod Exercising, it is determined that Regulating Group 4 Rod 39 will **NOT** move and it is declared inoperable.
- PCS boron concentration is 880 ppm.
- Core Burnup is 6000 MWd/MTU.
- EM-04-08, Shutdown Margin Requirements, is being performed due to the inoperable rod.
- When calculating the Shutdown Margin Requirements, 100% power boron concentration is required to be recorded.

100% power boron concentration should be recorded as approximately ...

a. 400 ppm.

b. 600 ppm.

c. 800 ppm.

d. 1000 ppm.

Answer:

c. 800 ppm.

QUESTION NUMBER:	SRO	64	RO	64
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 0052.1.25
Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data (Inoperable/Stuck Rod)

K/A IMPORTANCE:	SRO	3.1	RO	2.8
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: ASEE0G9.01
Given various Plant conditions, c. Use applicable control room references to determine the actions required. EK-0911 Rod Position 4 inches Deviation EK-0912 Rod Position 8 inches Deviation

REFERENCES: Tech Data Book Figure 6.1
EM-04-08

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible if candidate estimates boron concentration to be approximately ½ of current due to being less than 50% power and boron changes being linear. Actual value is 800 ppm.

b. Plausible if candidate estimates boron concentration to be approximately ¾ of current due to being less than 50% power and boron changes not being linear. Actual value is 800 ppm.

c. ✓ At 6000 MWd/MTU, full power boron concentration is expected to be 800 ppm per Figure 6.1 of the TDB.

d. Plausible if candidate estimates boron concentration to be approximately 1.2 times current due to being less than 50% and boron changes not being linear. Actual value is 800 ppm.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Application of given information to graphical data to determine boron concentration.

REFERENCES SUPPLIED: EM-04-08, Attachment 1
Technical Data Book Figure 6.1

Question: 65

Given the following conditions:

- A Steam Generator Tube Rupture has occurred in SG 'A'.
- Actions are being performed in accordance with EOP-5.0, Steam Generator Tube Rupture Recovery.
- PCS temperature is 505 °F.
- SG 'A' pressure is 980 psia.
- Condenser vacuum is 2"Hg.

Steam pressure in SG 'A' should be controlled by ...

a. unisolating and opening the MSIV Bypass to allow steaming of SG 'A' through the Turbine Bypass Valve.

b. unisolating and operating an Atmospheric Dump Valve on SG 'A'.

c. cooling down the PCS by steaming SG 'B' using the Turbine Bypass Valve.

d. cooling down the PCS by steaming SG 'B' using an Atmospheric Dump Valve.

Answer:

b. unisolating and operating an Atmospheric Dump Valve on SG 'A'.

QUESTION NUMBER:	SRO	65	RO	65
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 0382.4.7
Knowledge of event based EOP mitigation strategies (SGTR)

K/A IMPORTANCE:	SRO	3.8	RO	3.1
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	12

OBJECTIVE: TBAF0A2.12
Given plant conditions involving a SGTR with the affected S/G isolated, discuss options available for cooling, depressurizing, and providing inventory control of the affected S/G including potential reactivity effects.

REFERENCES: EOP-5.0

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible since use of the TBV minimizes the radioactive release to the environment. The TBV is not available due to low vacuum.

b. ✓ Due to low vacuum, the TBV is not available so an ADV on the affected SG is required to be used to depressurize the SG.

c. Plausible since this would result in the minimal radiaoactive release to the environment. Cooling down the PCS will not result in the affected SG depressurizing.

d. Plausible since this would minimize the radiaoactive release to the environment. Cooling down the PCS will not result in the affected SG depressurizing.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions to determine best method for maintaining ruptured SG pressure.

REFERENCES SUPPLIED:

Question: 66

Which of the following combination of SIRWT levels will provide the required logic to generate a Recirculation Actuation Signal (RAS)?

	LS-0327 (LEFT CHANNEL)	**LS-0328 (RIGHT CHANNEL)**	**LS-0329 (LEFT CHANNEL)**	**LS-0330 (RIGHT CHANNEL)**
a.	1%	5%	5%	1%
b.	1%	5%	1%	5%
c.	5%	1%	5%	1%
d.	5%	1%	5%	5%

Answer:

a.	1%	5%	5%	1%

QUESTION NUMBER:	SRO	66	RO	66
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 013A3.01
Ability to monitor automatic operation of the ESFAS input channels and logic

K/A IMPORTANCE:	SRO	3.9	RO	3.7
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	7

OBJECTIVE: ASHA0A3.01
State the initiating parameters, including set points and logics, for: c. Recirculation Actuation Signal

REFERENCES: E-17, Sheet 5
LP-ASHA

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8822

JUSTIFICATION:

a. ✓ RAS actuation requires either LS-0327 or LS-0329 below 2% AND either LS-0328 or LS-0330 below 2%.
b. Plausible since combination of levels is required for RAS. Either LS-0328 or LS-0330 must also be below 2%.
c. Plausible since combination of levels is required for RAS. Either LS-0327 or LS-0329 must also be below 2%.
d. Plausible since combination of levels is required for RAS. Either LS-0327 or LS-0329 must also be below 2%.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Analysis of SIRWT level conditions to knowledge of RAS setpoint actuation.

REFERENCES SUPPLIED:

Question: 67

Given the following conditions and the attached drawing:

- Battery Chargers #1 and #2 are in service.
- Battery Charger #3 is inoperable and is to be tagged out.

The following sequence of events occur:

- Breaker 52-285 (Station Battery Charger #3) is opened.
- Breaker 72-15 (Charger #1) is mistakenly opened.

Which of the following additional breaker trips will result in a reactor trip?

a. 72-10

b. 72-18

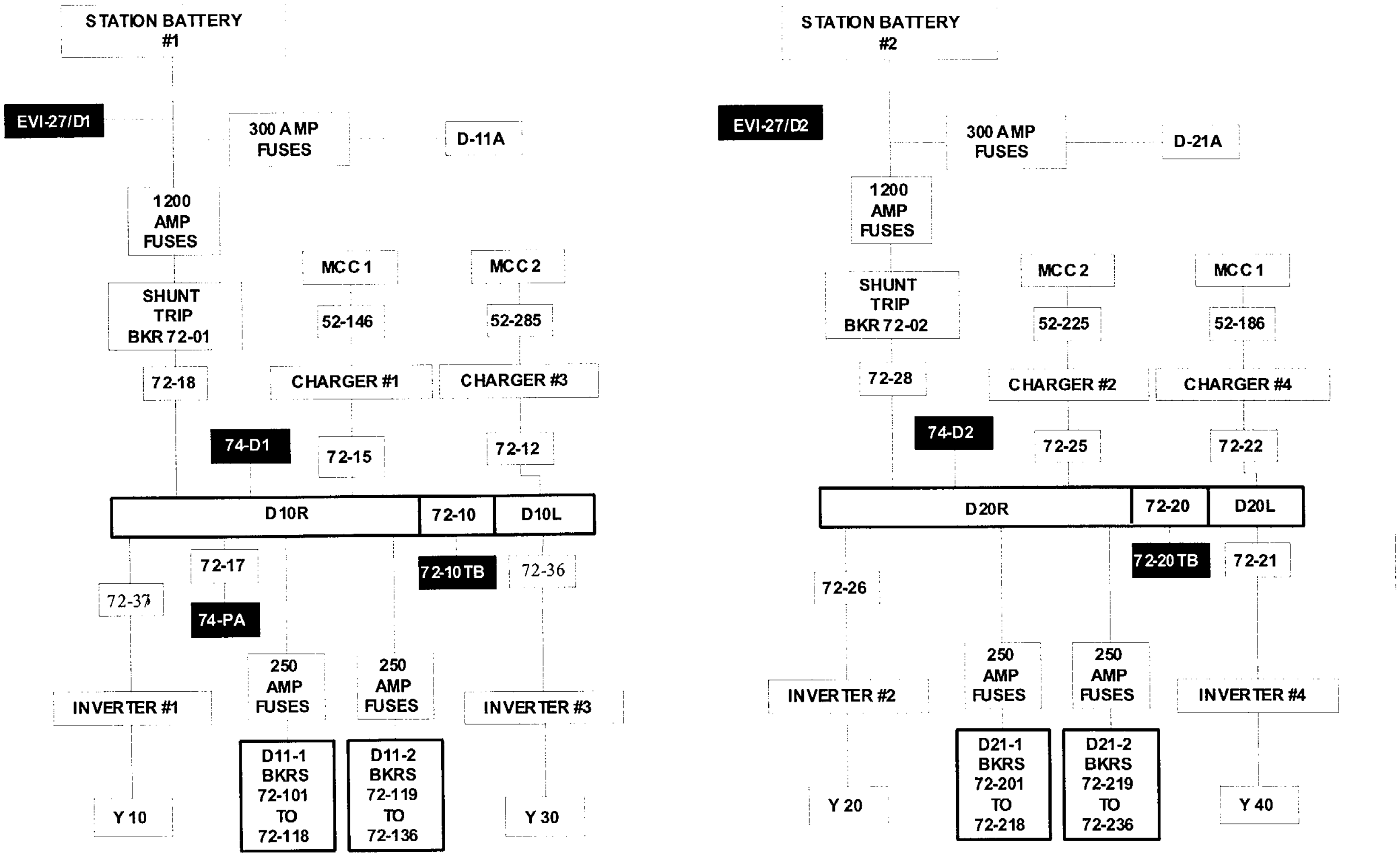
c. 72-36

d. 72-37

Answer:

b. 72-18

QUESTION #67 ATTACHMENT



QUESTION NUMBER:	SRO	67	RO	67
TIER/GROUP:	SRO	2/1	RO	2/2

K/A: 063K3.02
Knowledge of the effect that a loss or malfunction of the DC electrical system will have on the components using DC control power

K/A IMPORTANCE:	SRO	3.7	RO	3.5
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	5

OBJECTIVE: TBAQG10.01
Given plant conditions, identify the expected plant responses for the following: c. Loss of DC Power

REFERENCES: E-8, Sheet 2

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 3954

JUSTIFICATION:

a. Plausible since this is the bus-tie breaker. 72-10 tripping will result in only 1 inverter being de-energized which will not cause a reactor trip.
b. ✓ 72-18 tripping will result in 2 inverters being de-energized which will cause a reactor trip.
c. Plausible since this is an inverter supply breaker. 72-36 tripping will result in only 1 inverter being de-energized which will not cause a reactor trip.
d. Plausible since this is an inverter supply breaker. 72-37 tripping will result in only 1 inverter being de-energized which will not cause a reactor trip.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of effect of loss of DC control power on reactor protection system.

REFERENCES SUPPLIED: Question 67 Attachment

Question: 68

Which of the following air compressors is affected by a loss of LCC-11?

a. C-2B, Instrument Air Compressor 2B

b. C-2C, Instrument Air Compressor 2C

c. C-6B, High Pressure Air Compressor 6B

d. C-6C, High Pressure Air Compressor 6C

Answer:

b. C-2C, Instrument Air Compressor 2C

QUESTION NUMBER:	SRO	68	RO	68
TIER/GROUP:	SRO	2/3	RO	2/3

K/A: 078K2.01
Knowledge of bus power supplies to the following: Instrument air compressor

K/A IMPORTANCE: SRO 2.9 RO 2.7

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 4

OBJECTIVE: ASBC0A4.02
Given plant conditions involving the Plant Instrument and Service Air System, determine the operational status of the Plant Instrument Air Compressors.

REFERENCES: SOP-30

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 4790

JUSTIFICATION:

a. Plausible since voltage level is common to all compressors. Compressor supplied by LCC-12, breaker 52-1207.
b. ✓ Compressor supplied by LCC-11, breaker 52-1107.
c. Plausible since voltage level is common to all compressors. Compressor supplied by MCC-8, breaker 52-811. MCC-8 supplied by LCC-12.
d. Plausible since voltage level is common to all compressors. Compressor supplied by MCC-4, breaker 52-467. MCC-4 supplied by LCC-14

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of power supplies to air compressors.

REFERENCES SUPPLIED:

Question: 69

Annunciator EK-1309, Spent Fuel Pool Lo Level, alerts the operators that …

a. makeup should be provided to maintain adequate shielding.

b. the SIRW Tank is potentially "backleaking" into the SFP.

c. the SFP Pumps must be secured due to loss of NPSH.

d. the SFP heat exchanger has a potential CCW leak.

Answer:

a. makeup should be provided to maintain adequate shielding.

QUESTION NUMBER:	SRO	69	RO	69
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 033A2.03
Ability to (a) predict the impacts of the following malfunction; and (b) based those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions: Abnormal spent fuel pool water level or loss of water level

K/A IMPORTANCE: SRO 3.5 RO 3.1

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 9

OBJECTIVE: ASCB0G9.01
Given various Plant conditions, one or more of the following annunciators in the alarmed condition: b. Describe the effect of a valid alarm condition on the operation of the Spent Fuel Pool System EK-1309, Spent Fuel Pool Lo Level

REFERENCES: ARP-8

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 974

JUSTIFICATION:

a. ✓ Low level indicates that level is being lost. Makeup must be provided to ensure adequate shielding of SFP.

b. Plausible since backleakage would cause level to change. Level would be rising if SIRWT were backleaking to SFP.

c. Plausible since loss of NPSH is a concern when losing level in suction source to pumps. Level is still above suction for pumps when alarm occurs.

d. Plausible since level would be lowering if pressure were higher in SFP cooling. CCW has a higher pressure so leakage would be into SFP.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Comprhension of the cause of the SFP alarm and the reason for alarm.

REFERENCES SUPPLIED:

Question: 70

During a sustained station blackout, the following conditions exist:

- PCS subcooling is determined to be 12 °F.
- The project Reactor Shutdown calculation indicates a the reactor will remain shutdown.

A natural circulation cooldown should be commenced to establish a subcooling margin of ...

a. between 25 °F and 50 °F.

b. between 50 °F and 75 °F.

c. between 75 °F and 100 °F.

d. greater than 100 °F.

Answer:

a. between 25 °F and 50 °F.

QUESTION NUMBER:	SRO	70	RO	70
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 055EK1.02
Knowledge of the operational implications of the following concepts as they apply to the Station Blackout: Natural circulation cooling

K/A IMPORTANCE:	SRO	4.4	RO	4.1
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAR0G7.01
Given plant conditions involving a loss of all AC power: a. Describe the major actions necessary to stabilize plant conditions. b. Describe the consequences of failing to perform any given EOP 3.0 step.

REFERENCES: EOP-3.0
EOP Setpoint Basis

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. ✓ Lower limit ensures subcooling exists, while upper limit minimizes pressure rise and PCS leakage with no makeup capabilities.

b. Plausible since generally more subcooling is desirable to ensure adequate heat removal. Range is 25 °F to 50 °F.

c. Plausible since generally more subcooling is desirable to ensure adequate heat removal. Range is 25 °F to 50 °F.

d. Plausible since generally more subcooling is desirable to ensure adequate heat removal. Range is 25 °F to 50 °F.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of limits of subcooling requirements during natural circulation.

REFERENCES SUPPLIED:

Question: 71

Given the following conditions:

- Reactor power is 1%.
- Alarms have come in indicating a dropped rod.
- The core mimic indicates a dropped rod.
- Tave is slowly lowering.

Which of the following actions should be taken?

a. Shut down the reactor and then recover the rod.

b. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

c. Stabilize the plant and recover the rod.

d. Lower power below the point of adding heat, stabilize the plant, and recover the rod.

Answer:

b. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

QUESTION NUMBER:	SRO	71	RO	71
TIER/GROUP:	SRO	1/1	RO	1/2

K/A: 003AK3.04
Knowledge of the reasons for the following responses as they apply to the Dropped Control Rod: Actions contained in EOP for dropped control rod

K/A IMPORTANCE:	SRO	4.1	RO	3.8
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAN0A2.09
Given Plant conditions involving a dropped control rod, determine if a manual reactor trip is required IAW ONP-5.1.

REFERENCES: ONP-5.1
Tech Spec 1.0

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 12177

JUSTIFICATION:

a. Plausible since this will align all rods prior to withdrawing the dropped rod. A trip is required.
b. ✓ With the plant in Hot Standby (< 2% power), a single dropped rod requires a reactor trip.
c. Plausible since stabilizing and recovering the rod would be appropriate at a higher power level. A trip is required.
d. Plausible since stabilizing the plant would be required prior to recovering the rod if power was higher. A trip is required.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions to determine operator response to dropped rod.

REFERENCES SUPPLIED:

Question: 72

Given the following conditions:

- ΔT power is 88.5%.
- NI power is 88%.
- A feedwater transient occurs.

Which of the following would require a manual reactor trip?

a. Steam Generator levels both at 35% and stable

b. Steam Generator levels both at 45% and lowering

c. EK-0143, FW PUMP P1A TURBINE K7A TRIP, in alarm and the Throttle & Trip valves closed

d. PCS Tave rising slowly

Answer:

c. EK-0143, FW PUMP P1A TURBINE K7A TRIP, in alarm and the Throttle & Trip valves closed

QUESTION NUMBER:	SRO	72	RO	72
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 054AK3.01
Knowledge of the reasons for the following responses as they apply to the Loss of Main Feedwater (MFW): Reactor and/or turbine trip, manual and automatic

K/A IMPORTANCE:	SRO	4.4	RO	4.1
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAEG11.01
State the immediate actions of a Loss of Feedwater event IAW ONP 3.

REFERENCES: ONP-3.0

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8038

JUSTIFICATION:

a. Plausible since level is abnormally low. This is above the low level trip setpoint of the reactor.
b. Plausible since level is abnormally low and still lowering. This is above the low level trip setpoint of the reactor.
c. ✓ If either feed pump trips with power above 80%, a reactor trip is required.
d. Plausible since this is an expected condition following a feed water pump trip until adequate FW can be supplied by the remaining pump. Does not require a trip.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Analysis of secondary plant conditions requiring a reactor trip.

REFERENCES SUPPLIED:

Question: 73

Which of the following valves will close on a Containment High Pressure signal, but will remain open on a Containment High Radiation signal?

a. CV-2083, Controlled Bleed-off Containment Isol

b. CV-0770, SG 'B' Bottom Blowdown

c. CV-0701, SG 'A' Main Feed Reg Valve

d. SV-2414A, Hydrogen Monitor Right Channel

Answer:

c. CV-0701, SG 'A' Main Feed Reg Valve

QUESTION NUMBER:	SRO	73	RO	73
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 013A1.07
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with Containment radiation

K/A IMPORTANCE:	SRO	3.9	RO	3.6
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	9

OBJECTIVE: TBALG33.01
Given plant conditions, identify the expected plant responses for the following: b. Spurious containment isolation

REFERENCES: EOP Supplement 6

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 5317

JUSTIFICATION:

a. Plausible since bleedoff is contained in VCT so spread of contamination is limited. Closes on either a CHP or a CHR.

b. Plausible since maintaining blowdown for sampling may be desirable in event of SGTR. Closes on either a CHP or a CHR.

c. ✓ Feed reg valves remain open on a containment high radiation (CHR) condition, but close on a CHP.

d. Plausible since bypass feature is available to allow sampling containment. Closes on either a CHP or a CHR.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of containment isolation valve response to initiating signals.

REFERENCES SUPPLIED:

Question: 74

To determine the current high alarm setpoint on an Analog Radiation Monitor, the operator must depress the HIGH push button after placing the selector switch in ...

a. OPERATE.

b. HV.

c. CAL.

d. OFF.

Answer:

c. CAL.

QUESTION NUMBER:	SRO	74	RO	74
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 072A4.01
Ability to manually operate and/or monitor in the control room: Alarm and interlock setpoint checks and adjustments

K/A IMPORTANCE:	SRO	3.3	RO	3.0

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 11

OBJECTIVE: ASDC0G4.03
Given a diagram of an area or process monitor linear/log analog rate meter, state the function any given control or indicator.

REFERENCES: SOP-38

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 7728

JUSTIFICATION:

a. Plausible since this is a position on the selector switch that is normally aligned. Selector switch must be in CAL to check alert and high alarms.

b. Plausible since this is a position on the selector switch that is used for specific functions. Selector switch must be in CAL to check alert and high alarms.

c. ✓ Selector switch must be in CAL to check alert and high alarms.

d. Plausible since this is a position on the selector switch that is used for specific functions and with switch in OFF, actuation may occur. Selector switch must be in CAL to check alert and high alarms.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowedge of indications and controls on radiation monitors.

REFERENCES SUPPLIED:

Question: 75

Given the attached drawing and the following conditions:

- The system is being tagged out for repairs on the FLANGE and realignment of the motor to the pump coupling.
- Tags are to be placed on the following components:
  - ➢ PUMP SUCTION VALVE - CLOSED
  - ➢ PUMP SUPPLY BREAKER - OPEN
  - ➢ LOOP #1 ISOLATION VALVE - CLOSED
  - ➢ LOOP #2 ISOLATION VALVE - CLOSED
  - ➢ DRAIN VALVE - OPEN
- The PUMP DISCHARGE VALVE is **NOT** to be tagged.

Which of the following would be a satisfactory **SEQUENCE** for performing this tagging?

a.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG PUMP SUCTION VALVE
3. CLOSE and TAG LOOP #1 ISOLATION VALVE
4. CLOSE and TAG LOOP #2 ISOLATION VALVE
5. OPEN and TAG DRAIN VALVE

b.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG PUMP SUCTION VALVE
3. CLOSE and TAG LOOP #1 ISOLATION VALVE
4. CLOSE and TAG LOOP #2 ISOLATION VALVE
5. OPEN and TAG DRAIN VALVE

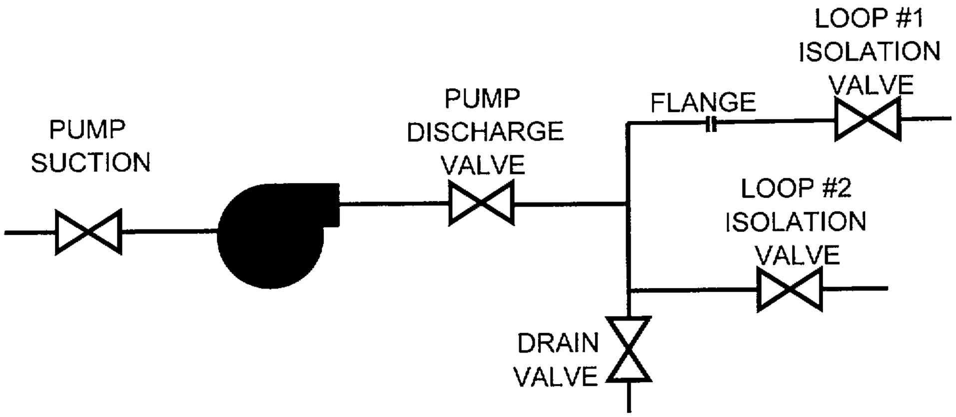
c.
1. CLOSE PUMP DISCHARGE VALVE
2. CLOSE and TAG PUMP SUCTION VALVE
3. OPEN and TAG PUMP SUPPLY BREAKER
4. CLOSE and TAG LOOP #1 ISOLATION VALVE
5. CLOSE and TAG LOOP #2 ISOLATION VALVE
6. OPEN and TAG DRAIN VALVE

d.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG LOOP #1 ISOLATION VALVE
3. CLOSE and TAG LOOP #2 ISOLATION VALVE
4. OPEN and TAG DRAIN VALVE
5. CLOSE and TAG PUMP SUCTION VALVE

Answer:

a.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG PUMP SUCTION VALVE
3. CLOSE and TAG LOOP #1 ISOLATION VALVE
4. CLOSE and TAG LOOP #2 ISOLATION VALVE
5. OPEN and TAG DRAIN VALVE

QUESTION #75 ATTACHMENT



QUESTION NUMBER:	SRO	75	RO	75
TIER/GROUP:	SRO	3	RO	3

K/A: 2.2.13
Knowledge of tagging and clearance procedures

K/A IMPORTANCE:	SRO	3.8	RO	3.6
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: PSTOT00.12
Given a request to Remove from Service, develop the Remove from Service order IAW AP 4.10.

REFERENCES: AP-4.10

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. ✓ Pump breaker should be tagged first, followed by discharge path, suction path, and then vents/drains.

b. Plausible if candidate determines incorrect sequence. Discharge should be tagged before suction.

c. Plausible if candidate determines incorrect sequence. Pump breaker should be tagged before mechanical tags.

d. Plausible if candidate determines incorrect sequence. Suction should be tagged before vents/drains.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 2

Application of tagging procedure requirements to system.

REFERENCES SUPPLIED: Question 75 Attachment

Question: 76

Given the following conditions:

- Indicated SG level is 62%.
- Containment temperature is 215 °F.
- SG pressure is 300 psia.

Actual SG level is …

a. 48%.

b. 53%.

c. 57%.

d. 62%.

Answer:

b. 53%.

QUESTION NUMBER:	SRO	76	RO	76
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 035K4.02
Knowledge of S/GS design feature(s) and/or interlock(s) which provide for the S/G level indication

K/A IMPORTANCE:	SRO	3.5	RO	3.2
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAC0A2.04
Given plant conditions, determine corrected steam generator level IAW EOP Supplement 11.

REFERENCES: EOP Supplement 11

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 1189

JUSTIFICATION:

a. Plausible if candidate makes level correction but uses incorrect curve for pressure. Incorrect pressure curve used.
b. ✓ 5% level correction must be made for temperature, then determine intersection of 300 psia curve and 57%.
c. Plausible if candidate uses incorrect curve for pressure and fails to make level correction. Incorrect pressure curve used and level correction applied incorrectly.
d. Plausible if candidate uses correct curve for pressure but fails to make level correction. Level correction applied incorrectly.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of given information to graphical data to determine SG level.

REFERENCES SUPPLIED: EOP Supplement 11

Question: 77

Given the following conditions:

- The plant is operating at 85% power.
- Cooling Tower Pump 'B' trips.
- Main Condenser vacuum begins lowering.
- The crew begins lowering power using ONP-26, Rapid Power Reduction.
- Power level reaches 55% when, EK-0111, VACUUM LO, alarms due to vacuum at 24" Hg.
- Vacuum **CONTINUES LOWERING** and does **NOT** recover to greater than 24" Hg.

Which of the following actions should be taken?

a. Trip the turbine and stabilize reactor power.

b. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

c. Continue the rapid power reduction until condenser vacuum stabilizes.

d. Continue the power reduction, using normal de-escalation rates, until condenser vacuum stabilizes.

Answer:

b. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

QUESTION NUMBER:	SRO	77	RO	77
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 051AA2.02
Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: Conditions requiring reactor and/or turbine trip

K/A IMPORTANCE: SRO 4.1 RO 3.9

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAKG11.01
State the Immediate Actions as listed in the following ONPs. c. ONP 14, Loss of Condenser Vacuum

REFERENCES: ONP-14

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 7935

JUSTIFICATION:

a. Plausible since vacuum does not cause a reactor trip, only a turbine trip. A reactor trip is required if above 15%.
b. ✓ With power above 15%, if vacuum does not stabilize above the low vacuum alarm, a reactor trip is required.
c. Plausible since still above the automatic trip setpoint. A reactor trip is required.
d. Plausible since still above the automatic trip setpoint. A reactor trip is required.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions to determine operator response to loss of vacuum.

REFERENCES SUPPLIED:

Question: 78

Given the following conditions:

- PCS temperature is 430 °F.
- The Low Temperature Overpressure Protection System (LTOP) is in service.
- A plant transient causes an LTOP actuation.
- Following the actuation, with Pressurizer Pressure at 375 psia, the operator notes that Pressurizer PORV PRV-1042B is still OPEN.
- Placing the hand switch for PORV PRV-1042B to CLOSE has **NO** effect.

Which of the following actions should be taken?

a. Allow pressure to lower to less than 350 psia, then verify PRV-1042B closes

b. Depress the RED Reset Push Button on Channel A LTOP

c. Place the Channel A LTOP Defeat/Enable key switch to DEFEAT

d. Place PORV Isolation Valve MO-1042A to CLOSE

Answer:

d. Place PORV Isolation Valve MO-1042A to CLOSE

QUESTION NUMBER:	SRO	78	RO	78
TIER/GROUP:	SRO	1/2	RO	1/1

K/A: 027AA1.01
Ability to operate and/or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: PZR heaters, sprays, and PORVs

K/A IMPORTANCE:	SRO	3.9	RO	4.0
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	3

OBJECTIVE: TBAN0A2.08
Given plant conditions involving a PZR pressure controller malfunction, determine the consequences of failing to perform any given step contained within ONP 18.

REFERENCES: ONP-18

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible if candidate determines that reset pressure is lower. The PORV should have closed by this pressure.
b. Plausible if candidate determines this will remove actuation signal. Only resets the trip indication.
c. Plausible since this removes actuation signal. Removes actuation signal, but valve should have closed already.
d. ✓ The PORV should have closed and must be isolated.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Analysis of plant conditions to determine proper action to take regarding failed PORV.

REFERENCES SUPPLIED:

Question: 79

Given the following conditions:

- The plant is operating at 12% power.
- DC Bus D21-2 de-energizes and isolates due to a fault.

Which of the following actions should be taken?

a. Trip the reactor and enter EOP-1.0.

b. Trip the turbine and stabilize reactor power.

c. Trip the reactor and trip all PCPs, and then enter EOP-1.0.

d. Ensure closed CV-2001, Letdown Stop Valve, and manually control charging.

Answer:

a. Trip the reactor and enter EOP-1.0.

QUESTION NUMBER:	SRO	79	RO	79
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 058AK3.02
Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: Actions contained in EOP for loss of DC power

K/A IMPORTANCE:	SRO	4.2	RO	4.0
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAQG11.01
State the immediate actions from memory for the following: c. Loss of DC Power

REFERENCES: ONP-2.3

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8014

JUSTIFICATION:

a. ✓ A loss of D21-2 causes a loss of non-critical SW. A reactor trip is required since power is above 5%.
b. Plausible since loss of load trip occurs above 15%. A reactor trip is required since power is above 5%.
c. Plausible if thought that cooling flow is lost to PCPs. PCPs are not required to be tripped.
d. Plausible since this action is required for loss of D11-1. A reactor trip is required since power is above 5%.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions to determine operator response to loss of DC power.

REFERENCES SUPPLIED:

Question: 80

Given the following conditions:

- An approach to criticality is being performed per GOP-3.0.
- Regulating Group 3 rods are currently at 5 inches.

Which of the following rod matrix lights should be ON for each group of rods?

	SHUTDOWN RODS	**GROUP 1 RODS**	**GROUP 2 RODS**	**GROUP 3 RODS**	**GROUP 4 RODS**	**PART-LENGTH RODS**
a.	Red Blue	Red	White	Amber	White	Red
b.	Blue White	Amber	Amber	White	Green	Red
c.	Red Blue	Amber	Amber	White	White	Amber
d.	Red Blue	Red	White	White	Green	Red

Answer:

d.	Red Blue	Red	White	White	Green	Red

QUESTION NUMBER:	SRO	80	RO	80
TIER/GROUP:	SRO	2/1	RO	2/2

K/A: 014A1.02
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RPIS controls, including: Control rod position indication on control room panels

K/A IMPORTANCE: SRO 3.6 RO 3.2

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 2

OBJECTIVE: ASEE0G4.08
Given Control Room , determine the function of the green, red, amber, blue and white core matrix lights for each type control rod as applicable.

REFERENCES: SOP-6

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 7757

JUSTIFICATION:

a. Plausible since all except Group 3 and Group 4 indications are correct. Group 3 should be white and Group 4 should be green.

b. Plausible since all except Shutdown, Group 1 and Group 2 indications are correct. SD should be red/blue, Group 1 should be red, and Group 2 should be white.

c. Plausible since all except Group 1, Group 2, Group 4, and PL indications are correct. Group 1 should be red, Group 2 should be white, Group 4 should be green, and PL should be red.

d. ✓ SD rods are at top (red/blue), Group 1 rods at top (red), Group 2 rods at approximately 85 inches (white), Group 3 rods at 5 inches (white), Group 4 rods at LEL (green), and PL rods at top (red).

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Analysis of plant conditions to determine proper indications displayed by core matrix.

REFERENCES SUPPLIED: SOP-6, Attachment 3

Question: 81

Assuming normal turbine and control rod operations are performed, which of the following describes the plant response as reactor power is raised from 5% to 100%?

	T-REF	**T-AVE**	**SG PRESSURE**
a.	Lowers	Rises	Rises
b.	Rises	Rises	Lowers
c.	Rises	Lowers	Lowers
d.	Lowers	Lowers	Rises

Answer:

b.	Rises	Rises	Lowers

QUESTION NUMBER:	SRO	81	RO	81
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 002K5.11
Knowledge of the operational implications of the relationship between effects of the primary coolant system and the secondary coolant system

K/A IMPORTANCE:	SRO	4.2	RO	4.0

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 5

OBJECTIVE: ASJB0A1.03
Given Plant conditions involving changing steam demand with no operator action, determine the effect on main steam pressure and PCS temperature.

REFERENCES: Tech Data Book Figure 3.3

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 3779

JUSTIFICATION:

a. Plausible since Tave rises. Tref rises and SG pressure lowers.

b. ✓ Withdrawing rods and diluting causes Tave to rise. Tref rises as more steam is admitted to turbine, and steam pressure lowers as steam flow rises.

c. Plausible since Tref rises and SG pressure lowers. Tave rises as rods are withdrawn and dilution occurs.

d. Plausible since Tref rises. Tave rises as rods are withdrawn and dilution occurs and SG pressure lowers as steam flow rises.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of changing plant conditions to determine PCS and secondary indication changes.

REFERENCES SUPPLIED:

Question: 82

According to AP-7.02, ALARA Program, an electrician who becomes aware of a potential radiation exposure problem should ensure it is evaluated by documenting the problem and submitting it to the ...

a. Control Room Supervisor.

b. Plant Safety Coordinator.

c. Radiation Safety Supervisor/Health Physicist.

d. Property Protection Supervisor.

Answer:

c. Radiation Safety Supervisor/Health Physicist.

QUESTION NUMBER: SRO 82 RO 82
TIER/GROUP: SRO 3 RO 3

K/A: 2.3.2
Knowledge of facility ALARA program

K/A IMPORTANCE: SRO 2.9 RO 2.5

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 12

OBJECTIVE: ADAAG15.04
Describe the following IAW Admin Procedure 7.13. f. Individual responsibilities for proper radiation safety.

REFERENCES: AP-7.02

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 5360

JUSTIFICATION:

a. Plausible since this is a supervisor. Concern should be raised with ALARA members, HP, Shift Supervisor, or immediate supervisor.
b. Plausible since this is a coordinator. Concern should be raised with ALARA members, HP, Shift Supervisor, or immediate supervisor.
c. ✓ Concern should be raised with ALARA members, HP, Shift Supervisor, or immediate supervisor.
d. Plausible since this is a supervisor. Concern should be raised with ALARA members, HP, Shift Supervisor, or immediate supervisor.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of ALARA administrative requirements.

REFERENCES SUPPLIED:

Question: 83

Given the following conditions:

- Tave and Tref are initially matched.
- A plant transient occurs which results in Tave being 5 °F higher than Tref.

Assuming **NO** rod movement or boron concentration changes were made …

a. final main steam pressure is higher than initial conditions.

b. main steam pressure remains constant since reactor power remains constant.

c. final main steam pressure is lower than initial conditions.

d. main steam pressure remains constant since governor valves will adjust to maintain constant pressure.

Answer:

a. final main steam pressure is higher than initial conditions.

QUESTION NUMBER:	SRO	83	RO	83
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 039A1.06
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MRSS controls including: Main steam pressure

K/A IMPORTANCE:	SRO	3.1	RO	3.0
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	5

OBJECTIVE: RHAA0A1.02
Given plant conditions, analyze the data and predict any effect on any of the following: b. Reactor power f. SG parameters

REFERENCES: Steam Tables

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 7612

JUSTIFICATION:

a. ✓ Tave rising without adjusting boron or rods can only be caused by lower steam flow. Lower steam flow results in higher steam pressure.
b. Plausible since steam flow and power are interdependent. Steam pressure is dependent on Tave and steam flow, not reactor power.
c. Plausible since pressure will change. Steam pressure rises as steam flow lowers.
d. Plausible since governor valves respond to changes in load. Governor valves adjust to maintain load, not steam pressure.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of changing plant conditions to determine secondary plant response.

REFERENCES SUPPLIED: Steam Tables

Question: 84

Given the following conditions:

- Power has just been rapidly lowered from 60% to 20% in accordance with ONP-26, Rapid Power Reduction.
- SG levels are approximately 78% and rising slowly.
- Pressurizer pressure is 1985 psia and rising slowly.
- Pressurizer level is 39% and lowering slowly.
- PCS Tave is 523 °F and lowering slowly.

Which of the following actions should be taken?

a. Lower feedwater flow rate

b. Start an additional charging pump

c. Withdraw regulating rods approximately 10 steps

d. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions

Answer:

d. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions

QUESTION NUMBER:	SRO	84	RO	84
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: CA11AK3.2
Knowledge of the reasons for the following responses as they apply to the RCS Overcooling: Normal, abnormal and emergency operating procedures associated with RCS Overcooling

K/A IMPORTANCE: SRO 3.4 RO 2.9

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAK0A2.07
Given plant conditions involving a rapid power reduction, determine if a manual reactor trip is required IAW ONP 26.

REFERENCES: ONP-26

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible since SG levels are high and Tave is low. A reactor trip is required based on PCS Tave.
b. Plausible since pressurizer level is low. A reactor trip is required based on PCS Tave.
c. Plausible since temperature is low. A reactor trip is required based on PCS Tave.
d. ✓ Tave below 525 °F requires a reactor trip.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant response to overcooling condition of the PCS to determine proper actions.

REFERENCES SUPPLIED:

Question: 85

While performing Containment Isolation criteria verification in EOP-1.0, which of the following would **BOTH** require that Contingency Actions be taken?

a.
- Containment pressure > 4.0 psig
- Containment Area Monitor in alarm

b.
- Containment pressure > 4.0 psig
- Condenser Off Gas Monitor in alarm

c.
- Containment pressure > 4.0 psig
- Main Steam Line Monitor in alarm

d.
- Containment Area Monitor in alarm
- Condenser Off Gas Monitor in alarm

Answer:

a.
- Containment pressure > 4.0 psig
- Containment Area Monitor in alarm

QUESTION NUMBER:	SRO	85	RO	85
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 0072.4.1
Knowledge of EOP entry conditions and immediate action steps (Reactor Trip)

K/A IMPORTANCE:	SRO	4.6	RO	4.3
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBABG10.02
Given conditions involving a reactor trip, determine any required EOP 1.0 right-hand contingency action(s).

REFERENCES: EOP-1.0

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 5339

JUSTIFICATION:

a. ✓ If containment pressure is above 0.85 psig or if containment rad monitors are in alarm, contingency actions are required.
b. Plausible since this is indicative of a SG tube rupture. No contingency actions for off gas monitor.
c. Plausible since this is indicative of a SG tube rupture. No contingency actions for steamline monitor.
d. Plausible since this is indicative of a SG tube rupture. No contingency actions for off gas monitor.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of contingency actions during immediate operator actions.

REFERENCES SUPPLIED:

Question: 86

RIA-1809, Auxiliary Building Radwaste Area Vent Rad Monitor, has reached the high alarm condition.

Which of the following fans will be tripped?

a. V-10, Auxiliary Building Radwaste Area Supply Fan

b. V-67, Radwaste Addition Supply Fan

c. V-68, Radwaste Addition Exhaust Fan

d. V-70, Radwaste Addition Fuel Handling Area Exhaust Fan

Answer:

a. V-10, Auxiliary Building Radwaste Area Supply Fan

QUESTION NUMBER:	SRO	86	RO	86
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 060AK2.02
Knowledge of the interrelations between the Accidental Gaseous Radwaste Release and the Auxiliary building ventilation system

K/A IMPORTANCE:	SRO	3.1	RO	2.7
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	9

OBJECTIVE: ASDB0K4.16
Given plant conditions involving a high radiation condition and P&IDs, predict the effect on the Purge and Ventilation System

REFERENCES:
ARP-8
M-218, Sh. 4

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 7624

JUSTIFICATION:
a. ✓ V-10 is only fan tripped by RIA-1809.
b. Plausible since tripped by other rad monitors. V-10 is tripped by RIA-1809.
c. Plausible since tripped by other rad monitors. V-10 is tripped by RIA-1809.
d. Plausible since tripped by other rad monitors. V-10 is tripped by RIA-1809.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 4

Ability to determine operation of components using P&ID.

REFERENCES SUPPLIED:
M-218, Sh. 4
M-656

Question: 87

While operating with reactor power above 15%, the power range safety channels ...

a. enable the loss of load reactor trip signals.

b. enable the high power rate reactor trip signals.

c. generate loss of load reactor trip signals.

d. generate high power rate reactor trip signals.

Answer:

a. enable the loss of load reactor trip signals.

QUESTION NUMBER:	SRO	87	RO	87
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 015K5.12
Knowledge of the operational implications of the following concepts as they apply to the NIS: Quadrant power tilt, including long-range effects

K/A IMPORTANCE:	SRO	3.6	RO	3.2
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	8

OBJECTIVE: ASGA0K1.01
Describe the output signal locations of each range of nuclear instrumentation and set points (if applicable).

REFERENCES: TS 3.17.1

SOURCE: New   Significantly Modified ✓   Modified/Direct

Bank Number 7600

JUSTIFICATION:

a. ✓ Above 15% the loss of load trip is enabled.
b. Plausible since enabled/disabled by same bistables as loss of load trip. Trip is enabled below 15% power.
c. Plausible since PR enables/disables trip. Trip is generated by turbine auto stop oil pressure.
d. Plausible since enabled/disabled by PR nuclear instruments. Trip is generated by WR nuclear instruments.

DIFFICULTY:
Comprehensive/Analysis   Memory ✓   Rating 2

Knowledge of function of power range excore NIs.

REFERENCES SUPPLIED:

Question: 88

Given the following conditions:

- The SIRW Tank boron concentration is to be raised from 1900 ppm to 2000 ppm.
- SIRW Tank level is currently 97% (289,955 gallons).
- Boric Acid Storage Tank "B" concentration is 13,100 ppm.

Approximately how many gallons of boric acid are required to be added to the SIRW Tank?

a. 2300 gallons

b. 2450 gallons

c. 2600 gallons

d. 2750 gallons

Answer:

c. 2600 gallons

QUESTION NUMBER:	SRO	88	RO	88
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 0062.1.25
Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data (ECCS)

K/A IMPORTANCE:	SRO	3.1	RO	2.8
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	6

OBJECTIVE: ASFBG35.02
Given control room references, perform the following Primary Coolant System boron calculations: a. The volumes of boric acid and PMW (primary make-up water) required for make-up additions to the VCT

REFERENCES: Tech Data Book Figure 8.2

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 1093

JUSTIFICATION:

a. Plausible if candidate incorrectly calculates values. Correct value is 2612 gallons.
b. Plausible if candidate incorrectly calculates values. Correct value is 2612 gallons.
c. ✓ Using formula 5B of Figure 8.2, calculation yields 2612 gallons.
d. Plausible if candidate incorrectly calculates values. Correct value is 2612 gallons.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of given information to graphical data to determine boration needs.

REFERENCES SUPPLIED: Technical Data Book Figure 8.2

Question: 89

Given the following conditions:

- While performing a valve alignment, an Auxiliary Operator must enter an area containing a radioactive hot spot.
- The radiological survey indicates that the dose rate two (2) feet from the hot spot is 200 mRem/hr.
- The AO will be four (4) feet from the hot spot while aligning the valve.

The AO will be exposed to a radiation field of approximately ...

a. 150 mRem/hr.

b. 100 mRem/hr.

c. 50 mRem/hr.

d. 25 mRem/hr.

Answer:

c. 50 mRem/hr.

QUESTION NUMBER:	SRO	89	RO	89
TIER/GROUP:	SRO	3	RO	3

K/A: 2.3.10
Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure

K/A IMPORTANCE:	SRO	3.3	RO	2.9
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	12

OBJECTIVE: ADAAG15.02
Given a radiation exposure scenario, determine the ALARA solution using the radiation exposure theory inverse square law.

REFERENCES: LP-ADAA

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 12111

JUSTIFICATION:

a. Plausible if candidate incorrectly applies inverse square law. Uses ¾ of value instead of ¼.
b. Plausible if candidate incorrectly applies inverse square law. Uses ½ of value instead of ¼.
c. ✓ Using inverse square law, radiation field is 50 mrem/hr.
d. Plausible if candidate incorrectly applies inverse square law. Uses $^1/_8$ of value instead of ¼.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of the inverse square law to determine dose rate.

REFERENCES SUPPLIED:

Question: 90

Given the following conditions:

- The plant tripped from 40% power due to a loss of load.
- The reactor and the turbine tripped as designed.
- 'F' Bus in the Switchyard was also lost at the time of the trip.
- **NO** other equipment has malfunctioned.
- EOP-1.0, Standard Post-Trip Actions, has been completed.
- The operator reported that BOTH 2400 VAC Buses 1C and 1D are energized.

Buses 1C and 1D are being supplied by ...

a. their respective Diesel Generators.

b. Startup Transformer 1-2.

c. Safeguards Transformer 1-1.

d. Startup Transformer 1-1.

Answer:

b. Startup Transformer 1-2.

QUESTION NUMBER:	SRO	90	RO	90
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 062K1.04
Knowledge of the physical connections and/or cause-effect relationships between the AC distribution system and the off-site power sources

K/A IMPORTANCE: SRO 4.2 RO 3.7

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 7

OBJECTIVE: ASAA0G7.02
Given any manual or automatic operation of the Electrical Distribution equipment, predict the expected status of the following controls and indications: b. Relays 1. Start up transformer auxiliary undervoltage relays 2. Bus and incoming breaker relays.

REFERENCES:
EOP-1.0
E-1
LP-ASAA

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 12103

JUSTIFICATION:

a. Plausible if candidate determines 345 KV Bus F also supplies Startup Transformer 1-2. Startup Transformer 1-2 will supply Buses 1C and 1D.

b. ✓ 345 KV Bus F supplies Safeguards Transformer 1-1. Buses 1C and 1D will auto transfer to Startup Transformer 1-2 on loss of Safeguards Transformer 1-1.

c. Plausible if candidate determines Safeguards Transformer 1-1 supplied by 345 KV Bus R. 345 KV Bus F supplies Safeguards Transformer 1-1.

d. Plausible if candidate determines Startup Transformer 1-1, instead of Startup Transformer 1-2, was alternate supply. Startup Transformer 1-2 will supply Buses 1C and 1D.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions to determine response of safeguards buses to accident.

REFERENCES SUPPLIED:

Question: 91

Given the following conditions:

- A steamline break has occurred inside containment.
- Containment pressure is currently 2.4 psig after peaking at 11.5 psig.
- Containment temperature is currently 155 °F after peaking at 205 °F.
- Pressurizer pressure is 240 psia and stable.
- Average Qualified CET temperature is 275 °F and stable.
- Average Loop Thot is 270 °F and stable.
- Corrected Pressurizer Level is 48% and stable (cold cal).

Which of the following actions must be taken PRIOR to placing Shutdown Cooling in service?

a. Lower pressurizer pressure

b. Raise pressurizer level

c. Lower Average Qualified CET temperature

d. Raise subcooling

Answer:

a. Lower pressurizer pressure

QUESTION NUMBER:	SRO	91	RO	91
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 040AA1.12
Ability to operate and/or monitor the following as they apply to the Steam Line Rupture: RCS pressure and temperature

K/A IMPORTANCE:	SRO	4.2	RO	4.2
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAD0G7.02
Given plant conditions involving an Excess Steam Demand Event, determine the consequences of failure to perform any given step within EOP 6.0.

REFERENCES: EOP-6.0
EOP Supplement 1

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 5005

JUSTIFICATION:

a. ✓ Pressure must be lowered below 195 psia to allow placing SDC in service.

b. Plausible since pressurizer level must be above a required minimum level to establish SDC. Pressurizer level is adequate.

c. Plausible since temperature must be below threshold level for placing SDC in service. Temperature is within limit of 293 °F.

d. Plausible since subcooling must be above threshold level to place SDC in service. Subcooling is adequate.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 4

Analysis of given information to graphical data to determine required operator actions for SDC.

REFERENCES SUPPLIED: EOP-6.0, Step 61
EOP Supplement 1

Question: 92

Given the following conditions:

- The plant was operating at 15% power.
- An automatic reactor trip and safety injection occurred as a result of lowering Pressurizer Pressure.
- Pressurizer pressure is currently 1000 psia.
- PCS temperature was stable prior to the Safety Injection, but has lowered since Pressurizer pressure dropped below 1200 psia.
- Pressurizer level was rising prior to the Safety Injection and is continuing to rise.

This transient is indicative of a ...

a. steam line break.

b. double-ended hot leg break.

c. stuck open pressurizer safety valve.

d. steam generator tube rupture.

Answer:

c. stuck open pressurizer safety valve.

QUESTION NUMBER:	SRO	92	RO	92
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 008AA2.20
Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: The effect of an open PORV or code safety, based on observation of plant parameters

K/A IMPORTANCE:	SRO	3.6	RO	3.4

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 5

OBJECTIVE: TBAG0G7.02
Explain how an abnormally high PZR level may be an indication of a loss of coolant accident.

REFERENCES: LP-TBAG

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 12107

JUSTIFICATION:

a. Plausible since PCS pressure lowers as a result of a steam line break. Pressurizer level lowers as the PCS cools down.
b. Plausible since PCS pressure lowers as a result of a LOCA. Pressurizer level lowers as inventory is lost.
c. ✓ A stuck open pressurizer safety valve will cause saturation conditions to be reached in the PCS, resulting in water being displaced into the pressurizer as pressure lowers in the top.
d. Plausible since PCS pressure lowers as a result of a SGTR. Pressurizer level lowers as inventory is lost.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Comprehension of the plant response and indications to different accidents.

REFERENCES SUPPLIED:

Question: 93

Given the following conditions:

- A spent fuel bundle has been dropped in the spent fuel pool.
- Radiation levels in the spent fuel pool area have reached the high radiation setpoint.
- All automatic actions have occurred.

Which fan must be manually aligned in response to this event?

a. V-7, Fuel Handling Supply Fan

b. V-8B, Fuel Handling Exhaust Fan

c. V-69, Fuel Handling Area Supply Fan

d. V-70A, Fuel Handling Area Exhaust Fan

Answer:

a. V-7, Fuel Handling Supply Fan

QUESTION NUMBER:	SRO	93	RO	93
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 061AA1.01
Ability to operate and/or monitor the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: Automatic actuation

K/A IMPORTANCE: SRO 3.6 RO 3.6

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 12

OBJECTIVE: TBALG10.01
Given plant conditions, identify the required operator action(s) for the following: d. Fuel handling accident

REFERENCES: ONP-11.2

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8878

JUSTIFICATION:

a. ✓ Immediate action for ONP-11.2 to stop this fan.
b. Plausible since fan is part of fuel building ventilation. Fan should remain running during this event.
c. Plausible since fan is part of fuel building ventilation. Fan is automatically tripped by high radiation level.
d. Plausible since fan is part of fuel building ventilation. Fan trips when supply fan trips.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of automatic response to high radiation alarms.

REFERENCES SUPPLIED:

Question: 94

Which of the following Nuclear Instruments will become de-energized upon a loss of Preferred AC Bus Y-30?

a. Power Range channel NI-5

b. Power Range channel NI-6

c. Source/Wide Range channel NI-1/3

d. Source/Wide Range channel NI-2/4

Answer:

c. Source/Wide Range channel NI-1/3

QUESTION NUMBER:	SRO	94	RO	94
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 015K2.01
Knowledge of bus power supplies to the following: NIS channels, components, and interconnections

K/A IMPORTANCE:	SRO	3.7	RO	3.3
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAP0K6.01
Given a Subsequent Action of the following Off-Normal Procedures, determine the consequences of omitting a particular step in those actions. d. ONP-24.4 Loss of Preferred AC Bus Y-40

REFERENCES: ONP-24.3

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 9166

JUSTIFICATION:

a. Plausible since supplied by a preferred AC bus. Power supply is Y-10.
b. Plausible since supplied by a preferred AC bus. Power supply is Y-20.
c. ✓ Power supply is Y-30. De-energizes on loss of power.
d. Plausible since supplied by a preferred AC bus. Power supply is Y-40.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of power supplies to excore NIs.

REFERENCES SUPPLIED:

Question: 95

Which of the following describes the interlock between MOV-3081, HPSI Train 1 Cold Leg Isolation Valve, and MOV-3083, Hot Leg Injection Valve?

a. The hand switch for MOV-3081 must be in AUTO before MOV-3083 may be opened

b. MOV-3083 must be closed before MOV-3081 may be opened

c. SS-3083B, Hot Leg Injection Selector Switch, must be in the "MO-3083" position before MOV-3081 may be closed

d. MOV-3081 must be closed before MOV-3083 may be opened

Answer:

d. MOV-3081 must be closed before MOV-3083 may be opened

QUESTION NUMBER:	SRO	95	RO	95
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 006K4.17
Knowledge of ECCS design feature(s) and/or interlock(s) which provide for the Safety Injection Valve Interlocks

K/A IMPORTANCE:	SRO	4.1	RO	3.8
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	7

OBJECTIVE: ASHA0K4.01
Describe the basis for the interlocks and piping configuration associated with hot leg injection valves (MO-3080, 3082 and MO-3081, 3083).

REFERENCES:
M-203, Sheet 2
EOP-4.0
LP-ASHA

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 5115

JUSTIFICATION:

a. Plausible if candidate determines that AUTO position will cause valve to close. 3081 must be closed before opening 3083.

b. Plausible if candidate determines that interlock functions in both directions. 3081 must be closed before opening 3083.

c. Plausible if candidate determines that 3083 position will cause 3081 to close. 3081 must be closed before opening 3083.

d. ✓ To prevent HPSI pump runout, the cold leg injection valve must be closed before the hot leg injection valve is opened.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of interlocks associated with SI valves.

REFERENCES SUPPLIED:

Question: 96

Given the following conditions:

- The plant is operating at 100% power.
- Due to a leak, Feedwater heater E-6A must be bypassed and isolated for repairs.

Which of the following actions must be taken prior to bypassing and isolating the heater?

a. Lower power to less than 97% to prevent exceeding reactor thermal power limits

b. Lower power to less than 97% to prevent exceeding turbine backpressure limits

c. Lower load to less than 600 MWe to prevent exceeding turbine backpressure limits

d. Lower load to less than 600 MWe to prevent exceeding lower feedwater temperature limits

Answer:

a. Lower power to less than 97% to prevent exceeding reactor thermal power limits

QUESTION NUMBER:	SRO	RO	96
TIER/GROUP:	SRO	RO	2/1

K/A: 0562.1.32
Ability to explain and apply all system limits and precautions (Condensate)

K/A IMPORTANCE:	SRO	RO	3.4
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	4

OBJECTIVE: ASJD0G7.09
State the basis for any given SOP-10 or SOP-8 Plant Requirement, Precaution or Limitation, Caution, or Note concerning the Heater Extraction Drain System.

REFERENCES: SOP-10

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 7841

JUSTIFICATION:

a. ✓ Load must be lowered 3% to prevent exceeding power limits.

b. Plausible if candidate determines limitation is due to turbine considerations. Load must be lowered 3% to prevent exceeding power limits.

c. Plausible since this is limit if 2 heaters are bypassed. Load must be lowered 3% to prevent exceeding power limits.

d. Plausible since this is limit if 2 heaters are bypassed. Load must be lowered 3% to prevent exceeding power limits.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Comprehension of system requirements and the reason for requirements.

REFERENCES SUPPLIED:

Question: 97

Which of the following signals will prevent an automatic start of the Engineered Safeguards Room Sump Pumps?

a. Recirculation Actuation Signal (RAS)

b. Safety Injection Actuation Signal (SIAS)

c. Containment High Radiation (CHR)

d. Containment High Pressure (CHP)

Answer:

c. Containment High Radiation (CHR)

QUESTION NUMBER: SRO RO 97
TIER/GROUP: SRO RO 2/1

K/A: 013K1.17
Knowledge of the physical connections and/or cause effect relationships between the ESFAS and the LRS

K/A IMPORTANCE: SRO RO 2.6

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 8

OBJECTIVE: ASHB0A3.05
Describe the effect of a CHR Signal on the Engineered Safeguard Room sump pumps.

REFERENCES: ARP-8

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 5300

JUSTIFICATION:

a. Plausible since desirable to maintain water in containment sump on RAS. Only blocked by CHR.
b. Plausible since SIAS blocks other pump starts. Only blocked by CHR.
c. ✓ Containment High Radiation blocks automatic start of pumps.
d. Plausible since CHP blocks other pump starts. Only blocked by CHR.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of the the effect of ESF signals on containment sumps.

REFERENCES SUPPLIED:

Question: 98

Given the following conditions:

- Refueling Operations are being performed on the "B" Shift.
- The Control Room Operator is performing a review of the Refueling Shift Checklists, when she discovers that a PCS boron sample has **NOT** been taken/logged since the previous "C" Shift.

Which of the following actions must be taken?

a. Stop fuel movement

b. Review the logbook to ensure **NO** dilutions have occurred

c. Stop all heavy load movements

d. Ensure the oncoming "C" Shift takes a sample

Answer:

a. Stop fuel movement

QUESTION NUMBER:	SRO	RO	98
TIER/GROUP:	SRO	RO	3

K/A: 2.2.26
Knowledge of refueling administrative requirements

K/A IMPORTANCE:	SRO	RO	2.5
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	10

OBJECTIVE: IOTD0A1.01
Given appropriate refueling conditions and appropriate Control Room references: b Determine the consequences of a failure to perform any given procedure step when required.

REFERENCES: TS 3.8.1

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 781

JUSTIFICATION:

a. ✓ Refueling boron concentration must be checked shiftly. If not performed, refueling operations must be immediately stopped.
b. Plausible since this would likely ensure boron concentration is still met. Refueling operations must be stopped immediately.
c. Plausible if candidate determines that this was the immediate action. Refueling operations must be stopped immediately.
d. Plausible if candidate determines that this was a daily requirement and not shiftly. Refueling operations must be stopped immediately.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of operations administrative requirements during refueling.

REFERENCES SUPPLIED:

Question: 99

The plant is operating at full power when the following conditions are noted:

	LEVEL	**PRESSURE**	**FEED FLOW**	**STEAM FLOW**
SG 'A'	65% - Stable	770 psia - Stable	5.6 x 10^6 lbm/hr	5.6 x 10^6 lbm/hr
SG 'B'	92% - Rising	730 psia - Lowering	5.85 x 10^6 lbm/hr	5.6 x 10^6 lbm/hr

- Pressurizer pressure is lowering.
- Pressurizer level is lowering.
- PCS Tave is lowering.
- **NO** operator actions have been taken.

Which of the following actions should be taken?

a. Take manual control of the malfunctioning feed water pump and lower speed to return SG level to normal

b. Trip the turbine, ensure the ractor trips, and go to EOP-1.0, Standard Post-Trip Actions.

c. Rapidly lower plant load to within the capacity of a single feed water pump and trip the malfunctioning feed water pump

d. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

Answer:

d. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

QUESTION NUMBER:	SRO	RO	99
TIER/GROUP:	SRO	RO	2/1

K/A: 059A2.03
Ability to (a) predict the impacts of the following malfunctions or operations on the MFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Overfeeding event

K/A IMPORTANCE:	SRO	RO	2.7
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	5

OBJECTIVE: TBAEG11.04
State the immediate actions of an Excess Feedwater event IAW ONP 10.

REFERENCES: ONP-10

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 5102

JUSTIFICATION:

a. Plausible since this action would be valid if level were not this high. Reactor trip is required.
b. Plausible since a trip is required. The reactor trip is always tripped before the turbine.
c. Plausible since this action would be valid if level were not this high. Reactor trip is required.
d. ✓ With SG level at 92% and rising, the high level override has not reduced feed flow. Above 15% power, a reactor trip is required.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of given plant conditions to determine operator actions during a FW malfunction.

REFERENCES SUPPLIED:

Question: 100

A 26 year-old Auxiliary Operator has received a total effective dose equivalent (TEDE) of 1200 mRem this year (all at Palisades).

What is the MAXIMUM additional exposure he can receive prior to obtaining an extension from the General Manager Plant Operations due to exceeding his Annual Dose Control Level?

a. 300 mRem

b. 800 mRem

c. 2800 mRem

d. 3800 mRem

Answer:

b. 800 mRem

QUESTION NUMBER:	SRO	RO	100
TIER/GROUP:	SRO	RO	3

K/A: 2.3.4
Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized

K/A IMPORTANCE:	SRO	RO	2.5
10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	12

OBJECTIVE: ADAAG15.01
Describe the following IAW Admin Procedure 7.04. a. Dose limits and control levels.

REFERENCES: AP-7.04

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 5055

JUSTIFICATION:

a. Plausible since 1500 is dose review level. No approval required for receiving up to 2000.
b. ✓ To exceed 2000 mRem per year, all dose being from Consumers Energy, a worker must get extension approval from the General Manager Plant Operations.
c. Plausible since 4000 is annual dose control level for those workers who receive dose from Consumers Energy and other plants. Permitted up to 2000 mRem.
d. Plausible since 5000 is annual legal limit. Permitted up to 2000 mRem.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Calculation of remaining dose based on knowledge of dose limits.

REFERENCES SUPPLIED:

Question: 1

When the top one (1) foot of the Reactor Core becomes uncovered ...

a. CETs will indicate that saturated conditions exist.

b. CETs will indicate that superheated conditions exist.

c. incore NI readings will indicate abnormally low.

d. excore NI readings will indicate abnormally low.

Answer:

b. CETs will indicate that superheated conditions exist.

QUESTION NUMBER:	SRO	1	RO	1
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 074EK1.03
Knowledge of the operational implications of the following concepts as they apply to the Inadequate Core Cooling: Processes for removing decay heat from the core

K/A IMPORTANCE: SRO 4.9 RO 4.5

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 7

OBJECTIVE: TBAH0A2.02
Describe the once-through method of core cooling and the conditions for use.

REFERENCES:
EOP-4.0
EOP-9.0
LP-ASGA

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 9888

JUSTIFICATION:

a. Plausible since saturated conditions will exist until core is uncovered. Conditions reach superheat.
b. ✓ As the core uncovers, heat is added to the steam flowing past the uncovered portion of the fuel. This results in superheated conditions.
c. Plausible since voiding affects incore NI indication. Indication goes up instead of lowering.
d. Plausible since leakage changes as core is uncovered. Indication rises instead of lowers.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Understands that adding heat to steam created in the core results in superheated conditions and the indications of superheated conditions.

REFERENCES SUPPLIED:

Question: 2

Following a loss of 120 VAC Preferred Bus Y-20, the Anticipated Transient Without Scram (ATWS) System trip logic is ...

a. 1-out-of-3.

b. 2-out-of-3.

c. 1-out-of-4.

d. 2-out-of-4.

Answer:

b. 2-out-of-3.

QUESTION NUMBER:	SRO	2	RO	2
TIER/GROUP:	SRO	1/1	RO	1/2

K/A: 029EK2.06
Knowledge of the interrelations between the ATWS and breakers, relays, and disconnects

K/A IMPORTANCE:	SRO	3.1	RO	2.9
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	6

OBJECTIVE: ASGC0A2.10
Describe the function and operation of the ATWS trip system.

REFERENCES: ONP-24.1
LP-ASGC

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 7710

JUSTIFICATION:

a. Plausible since RPS protection normally goes to 1-of-3 configuration upon loss of power to channel. ATWS is energize to actuate.

b. ✓ Loss of power to an inputting pressure transmitter will not cause the input to actuate since it is "energize to actuate." This leaves system in 2-of-3 logic.

c. Plausible since RPS protection normally causes channel to trip on loss of power. ATWS is energize to actuate.

d. Plausible if candidate believes Y-10 has no effect on ATWS. On loss of power, input is no longer available, so logic is now 2-of-3.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of power supplies to ATWS and the recognition that the ATWS is energized to actuate.

REFERENCES SUPPLIED:

Question: 3

Given the following conditions:

- A loss of all offsite power has occurred.
- A small break LOCA has occurred concurrently.
- Tave is 559 °F.
- Tcold is 548 °F.
- Thot is 570 °F.
- Average Qualified CETs is 565 °F.
- Pressurizer pressure is 1500 psia.

While performing EOP-1.0, Standard Post-Trip Actions, PCS subcooling should be determined to be ...

a. 26 °F.

b. 31 °F.

c. 37 °F.

d. 48 °F.

Answer:

b. 31 °F.

QUESTION NUMBER:	SRO	3	RO	3
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 009EK1.02
Knowledge of the operational implications of the following concepts as they apply to the small break LOCA: Use of steam tables

K/A IMPORTANCE:	SRO	4.2	RO	3.5
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	5

OBJECTIVE: RHAA0A4.01
Given Natural Circulation plant conditions, explain why readings from the Subcooled Margin Monitor should not be used to determine PCS subcooling.

REFERENCES: Steam tables
EOP-1.0

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 11869

JUSTIFICATION:

a. Plausible since with no PCPs running, alternate indications must be used. CETs are to be used to determine subcooling with no PCPs operating.

b. ✓ Saturation temperature for 1500 psia is 596 °F. CETs are used due to no PCPs operating, so subcooling margin is saturation less CETs.

c. Plausible since with no PCPs running, alternate indications must be used. CETs are to be used to determine subcooling with no PCPs operating.

d. Plausible since with no PCPs running, alternate indications must be used. CETs are to be used to determine subcooling with no PCPs operating.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 4

Ability to apply information to steam table usage and recognize which temperatures should be used under different conditions.

REFERENCES SUPPLIED: Steam Tables

Question: 4

Given the following conditions:

- The plant is operating at 100% power.
- Instrument air pressure lowers to 75 psig and stabilizes.
- RED indicating lights are observed ON for Air Compressors C-2A, C-2B, and C-2C.

What is the effect of continuing to operate the plant with an instrument air pressure of 75 psig?

a. Service air is isolated. However, this has **NO** effect on continued plant operation at 100% power.

b. The standby air compressor starts. However, there will be **NO** effect on continued plant operation unless erratic valve operation occurs.

c. Instrument air to containment and service air are isolated. However, this has **NO** effect on continued plant operation at 100% power.

d. Service air is isolated. This will eventually result in a trip due to the loss of the cooling tower pumps.

Answer:

d. Service air is isolated. This will eventually result in a trip due to the loss of the cooling tower pumps.

QUESTION NUMBER:	SRO	4	RO	4
TIER/GROUP:	SRO	1/2	RO	1/3

K/A: 065AK3.03
Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air: Effects on plant operation of isolating certain equipment from instrument air

K/A IMPORTANCE:	SRO	3.4	RO	2.9
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	4

OBJECTIVE: ASBC0A4.02
Given plant conditions involving the Plant Instrument and Service Air System, determine the operational status of the Plant Instrument Air Compressors.

REFERENCES: ONP-7.1

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 1175

JUSTIFICATION:

a. Plausible since SA is not normally considered a vital system. Will eventually lose cooling tower pumps.
b. Plausible since SA is not normally considered a vital system. Will eventually lose cooling tower pumps.
c. Plausible since SA is not normally considered a vital system. Will eventually lose cooling tower pumps.
d. ✓ IA to SA isolates at 85 psig. Continued operation with SA isolated will eventually cause cooling tower pumps to trip due to loss of air pressure to basin level transmitters.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Comprehends the effect of a loss of instrument air on other systems and the overall effect on the plant.

REFERENCES SUPPLIED:

Question: 5

The consequence of installing an incore detector in the wrong core location would be ...

a. an error introduced into the Estimated Critical Position (ECP).

b. the improper length may unknowingly result in data being gathered at improper core elevations.

c. excessive radiation upon removal of the incore during the next refueling.

d. the incore detector could become an unanalyzed source of neutrons.

Answer:

b. the improper length may unknowingly result in data being gathered at improper core elevations.

QUESTION NUMBER:	SRO	5	RO	5
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 017K1.01
Knowledge of the physical connections and/or cause-effect relationships between the ITM system and the following systems: Plant computer

K/A IMPORTANCE: SRO 3.2 RO 3.2

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: IOTD0A1.01
Given appropriate refueling conditions and appropriate Control Room references: b. Determine the consequences of a failure to perform any given procedure step when required.

REFERENCES: LP-IOTD

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 9757

JUSTIFICATION:

- a. Plausible since previous power history is included in ECP calculation. Elevation of data is affected.
- b. ✓ Length of detector determines core elevation where data is identified.
- c. Plausible since detectors are radiation hazard when removed. Location will not affect radiation levels appreciably.
- d. Plausible since detectors use neutron source as method of detection. Strength is extremely minimal compared to strength of flux at power.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of reason for performing procedural steps during refueling.

REFERENCES SUPPLIED:

Question: 6

A fault on 2400 VAC Bus 1C has caused the bus to de-energize and isolate.

Assuming **NO** operator action has been taken, which of the following Pressurizer Heaters have power available?

a.
- All 4 groups of Backup Heaters
- Both groups of Proportional Heaters

b.
- 2 groups of Backup Heaters
- 1 group of Proportional Heaters

c.
- All 4 groups of Backup Heaters
- Neither group of Proportional Heaters

d.
- 2 groups of Backup Heaters
- Neither group of Proportional Heaters

Answer:

a.
- All 4 groups of Backup Heaters
- Both groups of Proportional Heaters

QUESTION NUMBER:	SRO	6	RO	6
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 010K2.01
Knowledge of bus power supplies to the following: PZR heaters

K/A IMPORTANCE:	SRO	3.4	RO	3.0
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	3

OBJECTIVE: ASFE0K2.01
Given Plant conditions, determine if the Pressurizer heaters still have power.

REFERENCES: E-4, Sheet 1
LP-ASFE

SOURCE: New   Significantly Modified ✓   Modified/Direct

Bank Number 9184

JUSTIFICATION:

a. ✓ Heaters are powered from LCC-15 and LCC-16, which are powered from Bus 1E and 1D, respectively.

b. Plausible since heaters are powered from equivalent level of voltage using different buses. Heaters are powered from LCC-15 and LCC-16, which are powered from Bus 1E and 1D, respectively.

c. Plausible since heaters are powered from equivalent level of voltage using different buses. Heaters are powered from LCC-15 and LCC-16, which are powered from Bus 1E and 1D, respectively.

d. Plausible since heaters are powered from equivalent level of voltage using different buses. Heaters are powered from LCC-15 and LCC-16, which are powered from Bus 1E and 1D, respectively.

DIFFICULTY:
Comprehensive/Analysis   Memory ✓   Rating 2

Knowledge of power supplies to the pressurizer heaters.

REFERENCES SUPPLIED:

Question: 7

The WHITE light associated with 4160 VAC Bus 1B Breaker 252-201, Station Power Transformer 1-1, being LIT indicates the breaker ...

a. closing springs are charged.

b. undervoltage relays are reset.

c. is racked to the TEST position.

d. has control power available.

Answer:

a. closing springs are charged.

QUESTION NUMBER:	SRO	7	RO	7
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 062A4.01
Ability to manually operate and/or monitor in the control room: All breakers (including available switchyard)

K/A IMPORTANCE:	SRO	3.1	RO	3.3
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	7

OBJECTIVE: ASAA0G7.02
Given any manual or automatic operation of the Electrical Distribution equipment, predict the expected status of the following controls and indications: a. Indicator lights lighted 3. Breaker status indicating lights

REFERENCES: SOP-30

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8786

JUSTIFICATION:

a. ✓ White light indicates that closing springs are charged.
b. Plausible if thought that expected white lights are associated with individual breakers. White lights above undervoltage relays indicate status.
c. Plausible if thought that white light indicates test position. No indication in Control Room that breaker is in test position.
d. Plausible if thought that expected white lights are associated with individual breakers. White lights associated with buses indicate status of control power.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of indications associated with breakers.

REFERENCES SUPPLIED:

Question: 8

Which of the following is considered to be a breech of Containment Integrity in accordance with ONP-4.2, Loss of Containment Integrity?

a. It is determined that Penetration 15 (CCW Return) local leak rate test (LLRT) was improperly performed last Refueling Outage.

b. The Personnel Air Lock fails the door inner seal leak test.

c. Debris blown by a tornado penetrates the Containment Building.

d. CV-2009, Letdown Isolation, becomes mechanically bound in the open position.

Answer:

c. Debris blown by a tornado penetrates the Containment Building.

QUESTION NUMBER:	SRO	8	RO	8
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 069AA2.01
Ability to determine and interpret a Loss of Containment Integrity

K/A IMPORTANCE:	SRO	4.3	RO	3.7
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	9

OBJECTIVE: TBALT00.02
Given plant conditions involving symptoms of a breach or violation of containment integrity, respond IAW ONP 4.2.

REFERENCES: ONP-4.2

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 5315

JUSTIFICATION:

a. Plausible since affects containment leakage surveillance requirements. This would not be a breech of integrity, but would require entry into Tech Specs to address the improperly performed surveillance.

b. Plausible since affects containment leakage surveillance requirements. This would not be a breech of integrity, but would require entry into Tech Specs to address the failed surveillance.

c. ✓ Visual holes/failures of containment caused by nature or accidents are considered breech of containment integrity.

d. Plausible since affects containment leakage surveillance requirements. This would not be a breech of integrity, but would require entry into Tech Specs to address the failed isolation valve.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of symptoms requiring entry into procedures.

REFERENCES SUPPLIED:

Question: 9

Given the following conditions:

- A large break LOCA has occurred.
- Following the Safety Injection, pressurizer pressure has stabilized at approximately 50 psia.
- Containment pressure is approximately 14 psig.
- While responding to the LOCA in accordance with EOP-4.0, Loss of Coolant Accident Recovery, EK-1172, COMPONENT CLG SURGE TANK T-3 HI-LO LEVEL, alarms.
- Component Cooling Surge Tank level is 90% and rising slowly.
- Component Cooling Water to Containment has **NOT** been restored.

Assuming all systems are responding as expected, a potential cause of high low level is leakage from the ...

a. SFP Heat Exchanger following the SIAS.

b. SDC Heat Exchanger following the RAS.

c. CVCS Letdown Heat Exchanger following the SIAS.

d. PCP Mechanical Seal Coolers following the RAS.

Answer:

b. SDC Heat Exchanger following the RAS.

QUESTION NUMBER:	SRO	9	RO	9
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 026AA2.02
Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: The cause of possible CCW loss

K/A IMPORTANCE:	SRO	3.6	RO	2.9
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAI0K6.01
Given Plant conditions involving a loss of Service Water, CCW, or Instrument Air (including system leaks) and Control Room references, determine: a. The probable cause (including the location of the leak if applicable)

REFERENCES: FSAR Table 9-4
EOP-4.0

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible since this is a potential leakage path during normal operations. The SFP heat exchanger is isolated by the SIAS.
b. ✓ SDC is at a higher pressure than CCW when aligned under these conditions.
c. Plausible since this is a potential leakage path during normal operations. The letdown heat exchanger is isolated by CHP.
d. Plausible since this is a potential leakage path during normal operations. CCW is isolated to containment by the CHP.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of potential relative pressures of components cooled by CCW during different plant conditions.

REFERENCES SUPPLIED:

Question: 10

Given the following conditions:

- The plant is at 100% power.
- CVCS charging and letdown are secured for a short period of time to perform maintenance.
- PCS temperature is maintained constant.

Which of the following describes the trend of pressurizer and VCT levels?

	PRESSURIZER LEVEL	**VCT LEVEL**
a.	Lowers	Rises
b.	Constant	Constant
c.	Lowers	Constant
d.	Constant	Rises

Answer:

a.	Lowers	Rises

QUESTION NUMBER:	SRO	10	RO	10
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 022AA1.09
Ability to operate and/or monitor the following as they apply to the Loss of Reactor Coolant Pump Makeup: RCP seal flows, temperatures, pressures, and vibrations

K/A IMPORTANCE: SRO 3.3 RO 3.2

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 6

OBJECTIVE: ASFA0A2.01
Given Plant conditions and a failure, malfunction, or incorrect operation of any given CVCS System component, predict the impact on the operation of the CVCS System.

REFERENCES: SOP-2A

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 12129

JUSTIFICATION:

a. ✓ PCP bleedoff is still aligned to the VCT under these conditions.
b. Plausible since most sources to CVCS are isolated under these conditions. Pressurizer level lowers and VCT level rises.
c. Plausible since PCP bleedoff can be aligned to RDT. Pressurizer level lowers and VCT level rises.
d. Plausible since PCP bleedoff can be isolated during certain conditions. Pressurizer level lowers and VCT level rises.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Comprehension that controlled bleedoff is still aligned and the effect of bleedoff on CVCS and PCS.

REFERENCES SUPPLIED:

Question: 11

Given the following conditions:

- A loss of all offsite power occurred 25 minutes ago.
- The crew is performing the actions of EOP-3.0.

Which of the following actions are taken to minimize the hydraulic/thermal shock to the Service Water (SW) System while starting the FIRST pump?

a. Fully close the pump discharge valve, start the SW Pump, then throttle the valve

b. Fully open the pump discharge valve, start the SW Pump, then throttle the valve

c. Fully close the pump discharge valve, throttle the valve, then start the SW Pump

d. Slowly pressurize the SW System using a Diesel Fire Pump, then start the SW Pump

Answer:

c. Fully close the pump discharge valve, throttle the valve, then start the SW Pump

QUESTION NUMBER:	SRO	11	RO	11
TIER/GROUP:	SRO	1/3	RO	1/3

K/A: 056AA1.07
Ability to operate and/or monitor the following as they apply to the Loss of Offsite Power: Service water pump

K/A IMPORTANCE: SRO 3.2 RO 3.2

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAR0G7.01
Given plant conditions involving a loss of all AC power: b. Describe the consequences of failing to perform any given EOP 3.0 step.

REFERENCES: EOP Supplement 24

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 7938

JUSTIFICATION:

a. Plausible since many centrifigul pumps are started with discharge valve open. Pump discharge valve is throttled open 2 turns prior to starting first pump.
b. Plausible since this will prevent overpressurizing the system. Pump discharge valve is throttled open 2 turns prior to starting first pump.
c. ✓ Pump discharge valve is throttled open 2 turns prior to starting first pump.
d. Plausible since FW is a backup to SW and contains a diesel pump which could have been started. Pump discharge valve is throttled open 2 turns prior to starting first pump.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of procedural requirements during accident conditions.

REFERENCES SUPPLIED:

Question: 12

Which of the following describes the Containment Air Cooler and Fan configuration for a post-LOCA DBA condition?

	"A" FANS	**"B" FANS**	**SW HIGH CAPACITY OUTLET VALVES OPEN**	**SW INLET VALVES OPEN**
a.	Running	Tripped	VHX-1, VHX-2, VHX-3, VHX-4	VHX-1, VHX-2, VHX-3 **ONLY**
b.	Tripped	Running	VHX-1, VHX-2, VHX-3 **ONLY**	VHX-1, VHX-2, VHX-3, VHX-4
c.	Running	Tripped	VHX-1, VHX-2, VHX-3 **ONLY**	VHX-1, VHX-2, VHX-3 **ONLY**
d.	Tripped	Running	VHX-1, VHX-2, VHX-3, VHX-4	VHX-1, VHX-2, VHX-3, VHX-4

Answer:

a.	Running	Tripped	VHX-1, VHX-2, VHX-3, VHX-4	VHX-1, VHX-2, VHX-3 **ONLY**

QUESTION NUMBER:	SRO	12	RO	12
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 022A3.01
Ability to monitor automatic operation of the CCS, including: Initiation of safeguards mode of operation

K/A IMPORTANCE:	SRO	4.3	RO	4.1
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	9

OBJECTIVE: ASHD0K3.01
Determine the effect on the Containment Air Coolers System for the following : c. Safety Injection Actuation Signal (SIAS).

REFERENCES: EOP Supplement 5

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8830

JUSTIFICATION:

a. ✓ A' fans are running, 'B' fans are tripped, all 4 coolers have SW outlet valves open, and coolers 1, 2, and 3 have inlet valve open.

b. Plausible if candidate determines that fan operation and SW valve operation. A' fans are running, 'B' fans are tripped, all 4 coolers have SW outlet valves open, and only coolers 1, 2, and 3 have inlet valves open.

c. Plausible since fan operation and inlet valves are correct. All 4 coolers have SW outlet valves open.

d. Plausible since outlet valves are correct. A' fans are running,'B' fans are tripped, and only coolers 1, 2, and 3 have inlet valves open.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of containment air cooling response to accident conditions.

REFERENCES SUPPLIED:

Question: 13

Given the following conditions:

- LIA-0105, Reactor Vessel Level, is indicating 63%.
- The indicator position switch for LIA-0105 is in WIDE RANGE.
- PCS temperature is 150 °F.

The PCS level, in feet and inches, is ...

a. 619' 0".

b. 619' 4".

c. 624' 0".

d. 624' 4".

Answer:

d. 624' 4".

QUESTION NUMBER:	SRO	13	RO	13
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 011K6.05
Knowledge of the effect of a loss or malfunction on the function of PZR level gauges as post-accident monitors

K/A IMPORTANCE:	SRO	3.7	RO	3.1
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	2

OBJECTIVE: ASEC0A1.01
Given normally available control room references, the status of the PCS and readings from the following instruments, determine if the readings are normal. a. Reactor Vessel Level (LIA-0105)

REFERENCES: SOP-1

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 1056

JUSTIFICATION:

a. Plausible if candidate uses Narrow Range curve and subtracts level correction. Incorrect curve used and level correction applied incorrectly.

b. Plausible if candidate uses Narrow Range curve, although level correction is correctly added. Incorrect curve used.

c. Plausible if candidate subtracts level correction, although Wide Range level indication is correctly used. Level correction applied incorrectly.

d. ✓ Add 1% to indication due to temperature correction. Intersection of Wide Range curve and 64% is 624'3".

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Ability to apply given information to graphical data for PCS.

REFERENCES SUPPLIED: SOP-1, Attachment 6 (Pages 1-3)

Question: 14

Given the following conditions:

- Diesel Generator 1-1 is operating at full load, paralleled with the grid.
- The Main Generator voltage is adjusted from 60 MVARs overexcited to 75 MVARs underexcited.

Assuming **NO** operator actions, a change may occur in Diesel Generator 1-1 ...

a. current.

b. frequency.

c. voltage.

d. speed.

Answer:

a. current.

QUESTION NUMBER:	SRO	14	RO	14
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 064A3.05
Ability to monitor automatic operation of the ED/G system, including: Operation of the governor control of frequency and voltage control in parallel operation

K/A IMPORTANCE: SRO 2.9 RO 2.8

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 8

OBJECTIVE: ASAC0K1.01
Explain the effect on diesel generator Reactive load for any specified change in bus/grid voltage when operating the D/G in the parallel mode.

REFERENCES:
SOP-22
D-PAL-89-131

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 3858

JUSTIFICATION:

a. ✓ Lowering grid voltage (adjusting VARs) will result in a paralleled DG in picking up the lowered VARs, thus changing current since voltage is held constant.
b. Plausible since an unparalleled DG frequency will change. Frequency maintained constant by grid.
c. Plausible since voltage would change if not maintained constant by voltage regulator. Current changes to adjust VARs.
d. Plausible since an unparalleled DG speed will change. Speed and frequency maintained constant by grid.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of the effect of grid changes on the DG when in parallel operations.

REFERENCES SUPPLIED:

Question: 15

While implementing ONP-25.2, Alternate Safe Shutdown Procedure, the crew is taking actions for Reactivity Control.

Which of the following valves associated with Reactivity Control can be operated from Control Panel C-33?

a. Boric Acid Pump Recirc Valve, CV-2130

b. Charging Pumps Suction From SIRWT, MO-2160

c. Boric Acid Gravity Feed Valve, MO-2169

d. VCT Outlet Valve, MO-2087

Answer:

c. Boric Acid Gravity Feed Valve, MO-2169

QUESTION NUMBER:	SRO	15	RO	15
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 068AK2.01
Knowledge of the interrelations between the Control Room Evacuation and Auxiliary shutdown panel layout

K/A IMPORTANCE: SRO 4.0 RO 3.9

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 6

OBJECTIVE: ASFA0G6.01
List the CVCS components which can be operated from Panel C-33.

REFERENCES: ONP-25.2

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 529

JUSTIFICATION:

a. Plausible since this is a boric acid valve, several of which are controlled from C-33. Valve is not controlled from Panel C-33.

b. Plausible since this is a CVCS valve, several of which are controlled from C-33. Valve is not controlled from Panel C-33.

c. ✓ Valve can be operated from Panel C-33 or locally after removing power.

d. Plausible since this is a CVCS valve, several of which are controlled from C-33. Valve is not controlled from Panel C-33.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of equipment which can be controlled from shutdown panel.

REFERENCES SUPPLIED:

Question: 16

Emergency boration and a reactor trip are IMMEDIATE ACTIONS required during a(n) ...

a. steam line break caused by a failed weld.

b. breech of containment integrity caused by an earthquake.

c. excessive feedwater event caused by a failed controller.

d. uncontrolled 60 inch insertion of two (2) Group 4 regulating rods.

Answer:

b. breech of containment integrity caused by an earthquake.

QUESTION NUMBER:	SRO	16	RO	16
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 024AK3.01
Knowledge of the reasons for the following responses as they apply to the Emergency Boration: When emergency boration is required

K/A IMPORTANCE:	SRO	4.4	RO	4.1
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBALG11.01
State the immediate actions for the following: a. Loss of containment integrity

REFERENCES: ONP-4.2

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8879

JUSTIFICATION:

a. Plausible since boration and a trip add negative reactivity to counter the rise in power. Addressed by excessive load increase which requires lowering load as an immediate action.

b. ✓ Both actions are immediate actions in response to a loss of containment integrity.

c. Plausible since boration and a trip add negative reactivity to counter the rise in power. Addressed by excessive feedwater increase which requires taking manual control of the plant as an immediate action.

d. Plausible since two rods requires a trip in the subsequent actions. Addressed by control rod drop which has no immediate actions required.

DIFFICULTY:

Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of immediate operator actions.

REFERENCES SUPPLIED:

Question: 17

Given the following conditions:

- The PCS is being filled from Reduced Inventory 5 days following a forced outage to replace a PCP seal package.
- Current PCS level is 628' 5".
- Both SGs have level at approximately 50%.
- Current Average Qualified CET temperature is 140 °F.
- Shutdown Cooling has been lost.

The PCS will reach 200 °F in approximately ...

a. 11 to 15 minutes.

b. 16 to 20 minutes.

c. 21 to 25 minutes.

d. 26 to 30 minutes.

Answer:

b. 16 to 20 minutes.

QUESTION NUMBER:	SRO	17	RO	17
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 025AK1.01
Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System: Loss of RHRS during all modes of operation

K/A IMPORTANCE: SRO 4.3 RO 3.9

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAO0A2.01
Given plant conditions and ONP 17, determine the time to 200 °F.

REFERENCES: ONP-17

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible if candidate uses incorrect curves or data points. Incorrect curves or data points used.
b. ✓ Using ONP-17, Attachment 1, intersection of 5 day curve and 140 °F initial temperature is approximately 18 minutes.
c. Plausible if candidate uses incorrect curves or data points. Incorrect curves or data points used.
d. Plausible if candidate uses incorrect curves or data points. Incorrect curves or data points used.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of given information to graphical data to determine heatup rate.

REFERENCES SUPPLIED: ONP-17, Attachment 1 (all pages)

Question: 18

The Reactor Vessel Level Monitoring System (RVLMS) lights indicate all GREEN lights OFF and all RED lights LIT.

This indicates that the reactor vessel level is ...

a. completely full.

b. at or below the top of the fuel.

c. in the head region.

d. at or above the top of the hot legs.

Answer:

b. at or below the top of the fuel.

QUESTION NUMBER:	SRO	18	RO	18
TIER/GROUP:	SRO	1/3	RO	1/3

K/A: CA16AK1.3
Knowledge of the operational implications of the following concepts as they apply to the Excess RCS Leakage: Annunciators and conditions indicating signals, and remedial action associated with the Excess RCS Leakage

K/A IMPORTANCE: SRO 3.5 RO 3.2

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 2

OBJECTIVE: ASEC0K6.05
State the functions provided by the following Reactor Vessel and Internals instrumentation: c. Reactor Vessel Level Monitoring System (RVLMS)

REFERENCES:
EOP-4.0
LP-ASEC

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 8802

JUSTIFICATION:

a. Plausible since these indications are possible indications from RVLMS. Incorrectly reverses light indication and determines full.
b. ✓ When uncovered, red lights are lit and green lights are off.
c. Plausible since these indications are possible indications from RVLMS. All lights red indicates core is uncovered.
d. Plausible since these indications are possible indications from RVLMS. All lights red indicates core is uncovered.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of RVLMS indications during an accident.

REFERENCES SUPPLIED:

Question: 19

Which of the following describes the limitations of operating one (1) Containment Spray Pump following a RAS during a Loss of Coolant Accident?

A single Containment Spray Pump can supply ...

a. one (1) Containment Spray Valve AND one (1) HPSI Subcooling Valve simultaneously.

b. one (1) Containment Spray Valve OR one (1) HPSI Subcooling Valve at a time.

c. both Containment Spray Valves AND one (1) HPSI Subcooling Valve simultaneously.

d. one (1) Containment Spray Valve OR both HPSI Subcooling Valves at a time.

Answer:

a. one (1) Containment Spray Valve AND one (1) HPSI Subcooling Valve simultaneously.

QUESTION NUMBER:	SRO	19	RO	19
TIER/GROUP:	SRO	2/1	RO	2/2

K/A: 026A2.04
Ability to (a) predict the impacts of the following malfunctions or operations on the CSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of spray pump

K/A IMPORTANCE: SRO 4.2 RO 3.9

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 8

OBJECTIVE: ASHC0K4.01
Given Plant conditions involving a RAS, determine the combination of Spray Valves and HPSI subcooling lines the Containment Spray Pump(s) can supply IAW the in-use EOP.

REFERENCES: EOP-4.0

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 6061

JUSTIFICATION:

a. ✓ A single spray pump can supply both one spray valve and one subcooling valve simulataneously.

b. Plausible if candidate incorrectly recalls the capacity of a single spray pump. Can supply spray valve and subcooling valve.

c. Plausible if candidate incorrectly recalls the capacity of a single spray pump. Can supply spray valve and subcooling valve.

d. Plausible if candidate incorrectly recalls the capacity of a single spray pump. Can supply spray valve and subcooling valve.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of CS system limitations during abnormal plant response.

REFERENCES SUPPLIED:

Question: 20

Which of the following are the power supplies for the Reactor Protection System BC logic matrix?

a. Y-10 and Y-30

b. Y-10 and Y-40

c. Y-20 and Y-30

d. Y-20 and Y-40

Answer:

c. Y-20 and Y-30

QUESTION NUMBER:	SRO	20	RO	20
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 012K2.01
Knowledge of bus power supplies to the following: RPS channels, components, and interconnections

K/A IMPORTANCE: SRO 3.7 RO 3.3

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 8

OBJECTIVE: ASGC0K2.01
Given Plant conditions, determine if the six RPS logic matrices have power.

REFERENCES:
ONP-24.2
ONP-24.3

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 213

JUSTIFICATION:

a. Plausible since these buses supply other matrixes. This combination supplies AC matrix.
b. Plausible since these buses supply other matrixes. This combination supplies AD matrix.
c. ✓ Y-20 supplies Channel 'B' and Y-30 supplies Channel 'C'.
d. Plausible since these buses supply other matrixes. This combination supplies BD matrix.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of RPS power supplies.

REFERENCES SUPPLIED:

Question: 21

Why is Refueling Shutdown Margin higher than Cold Shutdown Margin requirements?

a. Refueling Operations require maintaining the core subcritical with all control rods withdrawn

b. The colder PCS temperature during Refueling Operations adds more positive reactivity

c. Refueling Operations include dry fuel storage (DFS) operations and compatibility with DFS conditions is necessary

d. The colder PCS temperature during Refueling Operations makes the Reactor Vessel more susceptible to brittle fracture

Answer:

a. Refueling Operations require maintaining the core subcritical with all control rods withdrawn

QUESTION NUMBER:	SRO	21	RO
TIER/GROUP:	SRO	2/2	RO

K/A: 0342.2.25
Knowledge of bases in technical specifications for limiting conditions for operations and safety limits (Fuel Handling)

K/A IMPORTANCE: SRO 3.7 RO

10CFR55 CONTENT: 55.43(b) SRO 2 55.41(b) RO

OBJECTIVE: IOTD0G5.08
Describe the basis for the following Technical Specifications. a. 3.8.1

REFERENCES: TS 3.8.1

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 3806

JUSTIFICATION:

a. ✓ CSD Margin assumes rods inserted while Refueling SDM assumes all rods withdrawn.
b. Plausible since colder temperatures do add additional positive reactivity. CSD temperature can be as low as Refueling temperature.
c. Plausible since DFS is a consideration when refueling. CSD Margin assumes rods inserted while Refueling SDM assumes all rods withdrawn.
d. Plausible since colder temperatures do raise concerns with brittle fracture. CSD temperature can be as low as Refueling temperature.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of Tech Spec basis for refueling boron.

REFERENCES SUPPLIED:

Question: 22

Given the following conditions:

- The time is currently 1445 on a Saturday.
- One of the oncoming 'C' Shift Control Room Operators has called in sick.

Which of the following Operators should be utilized to replace the sick Operator?

a. An operator who has worked his normal 'B' shift Saturday and came in at 0600 to relieve another operator early. His turnover time totaled 15 minutes.

b. An operator who has worked his normal 'B' shift Saturday and came in at 2345 on Friday to cover for vacation. His turnover time totaled 30 minutes.

c. An operator who worked the 'A' shift and was relieved at 0805 which included 20 minutes turnover time.

d. An operator who worked 'A' shift and 4 hours over on 'B' shift on Friday. He reported back to work at 1950 on Friday and was relieved at 0805. His total turnover time was 30 minutes.

Answer:

c. An operator who worked the 'A' shift and was relieved at 0805 which included 20 minutes turnover time.

QUESTION NUMBER:	SRO	22		RO
TIER/GROUP:	SRO	3		RO

K/A: 2.1.4
Knowledge of shift staffing requirements

K/A IMPORTANCE:	SRO	3.4		RO
10CFR55 CONTENT:	55.43(b) SRO	5	55.41(b) RO	

OBJECTIVE: ADAA0G1.05
Given an employee's work history for the past 168 hours, determine if the employee would exceed restrictions if assigned more overtime.

REFERENCES: AP-1.00

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 10105

JUSTIFICATION:

a. Plausible since related to calculating allowable overtime hours. Would exceed 16 hours in 24-hour period.
b. Plausible since related to calculating allowable overtime hours. Would exceed 16 hours in 24-hour period.
c. ✓ Operator falls within limitations of working hours.
d. Plausible since related to calculating allowable overtime hours. Would exceed 24 hours in 48-hour period.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of administrative requirements for overtime to determine required actions.

REFERENCES SUPPLIED:

Question: 23

Following an accident in the plant, which of the following would indicate that a Safety Function parameter is outside its acceptable range on the Critical Functions Monitoring System (CFMS)?

a. YELLOW border around CNMT PRESSURE HI used to monitor Containment Isolation

b. MAGENTA border around CNMT PRESSURE HI used to monitor Containment Isolation

c. YELLOW border around SW PUMP used to monitor Maintenance of Vital Auxiliaries - Water

d. MAGENTA border around SW PUMP used to monitor Maintenance of Vital Auxiliaries - Water

Answer:

b. MAGENTA border around CNMT PRESSURE HI used to monitor Containment Isolation

QUESTION NUMBER:	SRO	23	RO
TIER/GROUP:	SRO	3	RO

K/A: 2.4.4
Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures

K/A IMPORTANCE:	SRO	4.3	RO
10CFR55 CONTENT:	55.43(b) SRO	5	55.41(b) RO

OBJECTIVE: TBAAG35.01
Describe the Critical Function Monitor System (CFMS) portions of the PPC and how they can be used to verify the status of EOP safety functions.

REFERENCES: LP-TBAA

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 11877

JUSTIFICATION:

a. Plausible since yellow is used in many applications to indicate alarm condition. Would have magenta border.

b. ✓ Magenta border around parameter indicates it is outside limits. Containment pressure is monitored parameter.

c. Plausible since SW Pump is part of MVA-Water requirements. MVA-Water (SW Pump) is not monitored by PPC.

d. Plausible since SW Pump is part of MVA-Water requirements. MVA-Water (SW Pump) is not monitored by PPC.

DIFFICULTY:

Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of CFMS computer indications during an accident.

REFERENCES SUPPLIED:

Question: 24

In accordance with Admin 4.02, Control of Equipment, planned LCO related maintenance ...

a. should be limited to **NO** more than 50% of the allowable outage time, but may be extended to 75% of the allowable outage time.

b. should be limited to **NO** more than 75% of the allowable outage time, but may be extended to 100% of the allowable outage time.

c. requires approval by the General Manager Plant Operations for any extension beyond 50% of the allowable outage time.

d. requires approval by the Operations Support Supervisor for any extension beyond 75% of the allowable outage time.

Answer:

a. should be limited to **NO** more than 50% of the allowable outage time, but may be extended to 75% of the allowable outage time.

QUESTION NUMBER:	SRO	24	RO
TIER/GROUP:	SRO	3	RO

K/A: 2.2.24
Ability to analyze the effect of maintenance activities on LCO status

K/A IMPORTANCE:	SRO	3.8	RO
10CFR55 CONTENT:	55.43(b) SRO	5	55.41(b) RO

OBJECTIVE: ADAI0G1.13
Describe the following IAW Admin Procedure 4.02. c. LCO Work Rules

REFERENCES: AP-4.02

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 11717

JUSTIFICATION:

a. ✓ Limited to no more than 50%, but may be extended with Operations Support Supervisor permission to 75%.
b. Plausible since 75% is less than the LCO limitation. Limit is 50% with extension to 75% with approval.
c. Plausible since correctly identifies 50% allowable time. Approval is granted by Operations Support Supervisor.
d. Plausible since correct position is identified for extension up to 75%. Operations Support Supervisor can extend up to 75%.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of maintenance administrative requirements.

REFERENCES SUPPLIED:

Question: 25

Access to a Very High Radiation Area (> 500 Rads in one hour at one meter) requires prior authorization from the ...

a. Duty Health Physics Technician.

b. Shift Supervisor.

c. General Manager Plant Operations.

d. NRC Resident Inspector.

Answer:

c. General Manager Plant Operations.

QUESTION NUMBER: SRO 25 RO
TIER/GROUP: SRO 3 RO

K/A: 2.3.1
Knowledge of 10CFR20 and related facility radiation control requirements

K/A IMPORTANCE: SRO 3.0 RO

10CFR55 CONTENT: 55.43(b) SRO 4 55.41(b) RO

OBJECTIVE: ADAAG15.04
Describe the following IAW Admin Procedure 7.13. c. Very High Radiation Area Access.

REFERENCES: AP-7.13

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 11710

JUSTIFICATION:

a. Plausible since HP tech is responsible for ensuring HP requirements are met on shift. Requires prior authorization from General Manager Plant Operations.
b. Plausible since Shift Supervisor is responsible for overall operation of plant. Requires prior authorization from General Manager Plant Operations.
c. ✓ Requires prior authorization from General Manager Plant Operations.
d. Plausible since NRC enforces compliance with 10CFR20 regulations. Requires prior authorization from General Manager Plant Operations.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of ALARA administrative requirements.

REFERENCES SUPPLIED:

Question: 26

Chemistry reports that the PCS gross (beta-gamma) specific activity has exceeded the 100/E μCi/gm limit.

The plant is to be placed in Hot Shutdown with Tave less than 500 °F to ...

a. enhance the ability of the mixed bed demineralizers to remove fission products.

b. minimize the deposition of fission products and activation products on the core surfaces.

c. prevent additional fuel cladding oxidation from occurring.

d. prevent the release of radioactivity to the environment in the event of a SGTR.

Answer:

d. prevent the release of radioactivity to the environment in the event of a SGTR.

QUESTION NUMBER: SRO 26 RO
TIER/GROUP: SRO 1/1 RO

K/A: 076AK3.06
Knowledge of the reasons for the following responses as they apply to the High Reactor Coolant Activity: Actions contained in EOP for high reactor coolant activity

K/A IMPORTANCE: SRO 3.8 RO

10CFR55 CONTENT: 55.43(b) SRO 5 55.41(b) RO

OBJECTIVE: ASFB0G5.01
Given Tech Specs, excluding the basis section, state the basis for the following Tech Specs: a. TS 3.1.4 Maximum Primary Coolant Radioactivity

REFERENCES: TS 3.1.4

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 5098

JUSTIFICATION:

a. Plausible since demineralizer efficiency changes with temperature. Minimizes likelihood of release in the event of a SGTR.
b. Plausible since deposition increases with boiling. Minimizes likelihood of release in the event of a SGTR.
c. Plausible since fuel cladding oxidation is a concern which accident analysis addresses. Minimizes likelihood of release in the event of a SGTR.
d. ✓ Saturation pressure for 500 °F is below the lift pressure of the SG ADVs.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of Tech Spec basis for high PCS activity.

REFERENCES SUPPLIED:

Question: 27

The Duty and Call Superintendent is required to be notified for ALL of the following conditions **EXCEPT** ...

a. entry into ONP-5.1, Control Rod Drop, to recover a dropped rod at power.

b. if shift staffing is less than permitted by Technical Specifications due to an ill crew member being sent home and the replacement operator will be 1.5 hours late.

c. if work being performed by an outside contractor is progressing too slowly to be considered satisfactory as a result of poor interfacing.

d. for a 24-hour report to the NRC due to an unplanned contamination event that requires access to the contaminated area by workers be restricted by imposing additional radiological controls.

Answer:

b. if shift staffing is less than permitted by Technical Specifications due to an ill crew member being sent home and the replacement operator will be 1.5 hours late.

QUESTION NUMBER:	SRO	27	RO
TIER/GROUP:	SRO	3	RO

K/A: 2.1.14
Knowledge of system status criteria which require the notification of plant personnel

K/A IMPORTANCE:	SRO	3.3	RO
10CFR55 CONTENT:	55.43(b) SRO	5	55.41(b) RO

OBJECTIVE: ADAD0G3.01
Given a plant condition and using plant procedures, formulate required reports and identify proper notifications.

REFERENCES: AP-4.00

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 8846

JUSTIFICATION:

a. Plausible since EOP or ONP entry is performed by operating crew. Entry into EOP or ONP requires notification.

b. ✓ SS is required to ensure that shift manning is restored, but is not required to contact Duty & Call.

c. Plausible since contractors report to individual supervisors or contract supervisors. Notification is required in the event of problems with contractors since the D&C is liason between groups.

d. Plausible since Licensing would also be notified to verify correct reporting requirements. Reportable occurrences require Duty & Call notification.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of operations administrative requirements for notifications.

REFERENCES SUPPLIED:

Question: 28

The basis for the Standing Order 54 restrictions on shipping cask movement is to prevent …

a. fuel damage.

b. personnel injury.

c. cask contamination.

d. cask damage.

Answer:

a. fuel damage.

QUESTION NUMBER:	SRO	28	RO
TIER/GROUP:	SRO	1/3	RO

K/A: 0362.1.12
Ability to apply technical specifications for a system (Fuel Handling Accident)

K/A IMPORTANCE:	SRO	4.0	RO
10CFR55 CONTENT:	55.43(b) SRO	2	55.41(b) RO

OBJECTIVE: ASIA0G5.05
State the basis for the shipping cask movement restrictions imposed by Standing Order 54 Section 3.21.

REFERENCES: Standing Order 54

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 815

JUSTIFICATION:

a. ✓ Analysis addresses the criticality concerns with damaged fuel assemblies due to a dropped cask.
b. Plausible since personnel injury is always a concern around lifting heavy loads. Basis addresses criticality concerns with damaged fuel assemblies due to a dropped cask.
c. Plausible since casks cannot be shipped off site with external contamination levels in excess of limits. Cask contamination is bounded by the analysis for fuel damage.
d. Plausible since cask damage could lead to excessive radiation levels which would prevent cask shipment. Cask damage is bounded by the analysis for fuel damage.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of Tech Spec basis for refueling requirements.

REFERENCES SUPPLIED:

Question: 29

A step which directs the performance of action(s) whenever a specified set of conditions exist in an Emergency Operating Procedure is a ...

a. Continuous step.

b. Non-instructional step.

c. Non-sequential step.

d. Sequential step.

Answer:

c. Non-sequential step.

QUESTION NUMBER:	SRO 29	RO	
TIER/GROUP:	SRO 3	RO	

K/A: 2.4.17
Knowledge of EOP terms and definitions

K/A IMPORTANCE:	SRO 3.8	RO	
10CFR55 CONTENT:	55.43(b) SRO 5	55.41(b) RO	

OBJECTIVE: TBAAG37.03
Define the following terms used in implementing the EOPs. b. Nonsequential Step

REFERENCES: AP-4.06

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 5765

JUSTIFICATION:

a. Plausible since this is included in the set of definitions in AP-4.06. Instructions or contingency actions that are to be performed whenever plant conditions permit.

b. Plausible since this is included in the set of definitions in AP-4.06. Provides information that does not direct any actions.

c. ✓ Non-sequential steps direct the performance of action(s) whenever a specified set of conditions exist.

d. Plausible since this is included in the set of definitions in AP-4.06. Steps which must be performed in a specified order and are not dependent upon plant conditions.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of EOP definitions and application of types of steps.

REFERENCES SUPPLIED:

Question: 30

Given the following conditions:

- A plant heatup is in progress following a Refueling Outage.
- PCS temperature is 400 °F.
- PCS pressure is 1500 psia.
- Pressurizer level is 42%.
- SG levels are 75%.
- SG pressures are 300 psia.

If a loss of BOTH 2400 VAC Buses 1C and 1D were to occur due to bus lockouts, the event should be mitigated by performing the actions of ...

a. ONP-1.0, Loss of Load

b. EOP-1.0, Standard Post-Trip Actions

c. EOP-3.0, Station Blackout Recovery

d. EOP-8.0, Loss of Offsite Power/Forced Circulation Recovery

Answer:

c. EOP-3.0, Station Blackout Recovery

QUESTION NUMBER:	SRO	30	RO
TIER/GROUP:	SRO	1/1	RO

K/A: CA132.4.4
Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures (Natural Circulation)

K/A IMPORTANCE: SRO 4.3 RO

10CFR55 CONTENT: 55.43(b) SRO 5 55.41(b) RO

OBJECTIVE: TBAB0A2.04
Given post reactor trip conditions, determine the proper follow-up EOP IAW the Diagnostic Flowchart.

REFERENCES: EOP-1.0

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 9746

JUSTIFICATION:

a. Plausible since a loss of load could be implied to mean a loss of electrical power. Addresses loss of turbine/electrical load from a power condition.
b. Plausible since entry would be made to this procedure if the plant were initially operating in a power condition. Entry is made only if a reactor trip occurs. While recovering from an outage, this would provide no guidance.
c. ✓ Entry is made if both 1C and 1D buses are de-energized.
d. Plausible since 1C and 1D could be lost in the event of a loss of offsite power. Entry is made if 1C or 1D is energized, but buses 1A and 1B are de-energized.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of plant conditions to determine procedure to be used.

REFERENCES SUPPLIED:

Question: 31

The Radioactive Gas Effluent Monitoring (RGEM) System is used to ...

a. isolate the waste gas decay tanks on a high radiation level.

b. prevent workers, contaminated by radioactive gas, from leaving the RCA.

c. prevent a radioactive release by shutting down the reactor on a high radiation level.

d. monitor plant stack gas and record levels of radioactivity being released to the environment.

Answer:

d. monitor plant stack gas and record levels of radioactivity being released to the environment.

QUESTION NUMBER:	SRO	31	RO	31
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 073K1.01
Knowledge of the physical connections and/or cause-effect relationships between the PRM system and the following systems: Those systems served by PRMs

K/A IMPORTANCE: SRO 3.9 RO 3.6

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 11

OBJECTIVE: ASDC0G6.01
Describe the conditions where each of the following process monitors associated with the RGEM System are used. a. RIA-2325 (RGEM Iodine Monitor) b. RIA-2326 (RGEM Noble Gas Monitor) c. RIA-2327 (RGEM Noble Gas Monitor - high range)

REFERENCES: SOP-38

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 7744

JUSTIFICATION:

a. Plausible since high rad conditions cause other actuations. Provides monitoring capability only.
b. Plausible since function of radiation monitors is to limit exposure by alerting workers. Provides monitoring capability only.
c. Plausible since a reactor shutdown will limit continued buildup of radionuclides. Provides monitoring capability only.
d. ✓ Provides monitoring capability only.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of RGEM system function.

REFERENCES SUPPLIED:

Question: 32

Which of the following conditions would direct the operator to use the shunt push buttons located on DC Panels D-11A or D-21A, thereby isolating the respective station battery?

a. A fire in the cable spreading room

b. Surveillance testing to test discharge the battery

c. Prior to transferring an instrument bus to an alternate power source

d. A loss of DC control power to 2400 VAC Bus 1C or 1D

Answer:

a. A fire in the cable spreading room

QUESTION NUMBER:	SRO	32	RO	32
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 067AA2.16
Ability to determine and interpret the following as they apply to the Plant Fire on Site: Vital equipment and control systems to be maintained and operated during a fire

K/A IMPORTANCE: SRO 4.0 RO 3.3

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 8

OBJECTIVE: ASAB0K4.01
Given Figure ASAB-01 of the 125 VDC distribution system, explain the following: b. Design features that ensure 125 VDC power to the D/Gs, 2400 VAC buses, LCCs 13 and 14 and C-150 in the event of fire in the cable spreading room

REFERENCES: ONP-25.1
ONP-25.2

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 6741

JUSTIFICATION:

a. ✓ Causes a loss of all DC power except D-11A and D-21A and should be done only for extreme fire situations.
b. Plausible since discharge test requires isolating components on bus. Would result in a loss of all DC power except D-11A and D-21A.
c. Plausible since this also requires local operator actions. Would result in a loss of all DC power except D-11A and D-21A.
d. Plausible since DGs supply these two buses. Would result in a loss of all DC power except D-11A and D-21A.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Comprehension of the effect of shunt buttons on battery buses.

REFERENCES SUPPLIED:

Question: 33

Given the following conditions:

- A loss of offsite power has occurred after operating the plant at full load for 154 days.
- The crew is responding to the event in accordance with EOP-8.0, Loss of Offsite Power/Forced Circulation Recovery.
- Offsite power will **NOT** be restored for another hour.

Assuming that all of the following parameters are stable, which of the following sets of conditions would require that SG steaming and feeding rates be adjusted due to **NOT** being able to verify natural circulation?

	AVERAGE QUALIFIED CETs	**LOOP Thots**	**LOOP Tcolds**	**PRESSURIZER PRESSURE**
a.	500 °F	490 °F	460 °F	970 psia
b.	480 °F	480 °F	460 °F	740 psia
c.	510 °F	500 °F	495 °F	960 psia
d.	470 °F	460 °F	415 °F	720 psia

Answer:

d.	470 °F	460 °F	415 °F	720 psia

QUESTION NUMBER: SRO 33 RO 33
TIER/GROUP: SRO 1/1 RO 1/1

K/A: CA13AK2.2
Knowledge of the interrelations between the Natural Circulation Operations and the Facility's heat removal systems, including primary, emergency, decay heat removal systems, and relations between the proper operation of these systems

K/A IMPORTANCE: SRO 3.6 RO 3.4

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 5

OBJECTIVE: TBAC0A2.03
Given a set of accident data, evaluate parameters to determine if natural circulation is occurring IAW the in-use EOP.

REFERENCES: EOP-8.0
Steam Tables

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible if candidate determines NC verification requirements not met since all of these parameters must be met. Meets all requirements for verification of natural circulation.

b. Plausible if candidate determines NC verification requirements not met since all of these parameters must be met. Meets all requirements for verification of natural circulation.

c. Plausible if candidate determines NC verification requirements not met since all of these parameters must be met. Meets all requirements for verification of natural circulation.

d. ✓ Core ΔT exceeds 50 °F, requiring adjustment to steaming/feeding rates.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Comparison of given conditions, after using steam tables to determine subcooling, to required conditions for verification of natural circulation.

REFERENCES SUPPLIED: Steam Tables

Question: 34

Given the following conditions:

- The plant is currently in Refueling Shutdown.
- Core alterations are in progress.
- Source Range channel NI-2 is in service with its associated audible indication in Containment operable.
- Source Range channel NI-1 fails offscale LOW.

Which of the following actions should be taken?

a. Initiate emergency boration to ensure adequate shutdown margin is maintained

b. Suspend all operations involving positive reactivity changes

c. Initiate 1/M plots if desired to continue with core alterations

d. Establish continuous monitoring of Source Range channel NI-2 if desired to continue with core alterations

Answer:

b. Suspend all operations involving positive reactivity changes

QUESTION NUMBER:	SRO	34	RO	34
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 032AK3.02
Knowledge of the reasons for the following responses as they apply to the Loss of Source Range Nuclear Instrumentation: Guidance contained in EOP for loss of source-range nuclear instrumentation

K/A IMPORTANCE:	SRO	4.1	RO	3.7
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: ASGA0G8.01
Given available Control Room references and Plant conditions, (except where denoted by a '*') determine the impact on the following Technical Specifications. e. 3.17.6 Item 1*

REFERENCES: TS 3.17.6

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8816

JUSTIFICATION:

a. Plausible since SDM must be met prior to and during refueling operations. Adequate shutdown margin was previously established to permit fuel movement.
b. ✓ TS entry condition, requires securing any positive reactivity additions to core.
c. Plausible since 1/M plots are used during fuel load. Both SR instruments are required operable to continue core alterations.
d. Plausible since this is an acceptable contingency used during other plant conditions. Both SR instruments are required operable to continue core alterations.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of operator actions required in the event of abnormal conditions.

REFERENCES SUPPLIED:

Question: 35

Given the following power levels:

- ΔT power = 50%
- NI-05 = 49%
- NI-06 = 50%
- NI-07 = 49%
- NI-08 = 50%

The PPC Power Dependent Insertion Limit, in inches WITHDRAWN, is Group 4 Rods at ...

a. 26 inches.

b. 36 inches.

c. 46 inches.

d. 56 inches.

Answer:

b. 36 inches.

QUESTION NUMBER:	SRO	35	RO	35
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 0012.1.25
Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data (Control Rods)

K/A IMPORTANCE: SRO 3.1 RO 2.8

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: ASEE0G8.01
Given Plant conditions and using available references (except as noted by *), determine the impact of the following Tech Specs: 3.10.5

REFERENCES: Tech Data Book Fig. 1.9

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 9637

JUSTIFICATION:

a. Plausible if incorrect curve is used. This is the value for the intersection of Tech Spec PDIL curve and 50% power.
b. ✓ Intersection of PPC PDIL curve and 50% power.
c. Plausible if incorrect curve is used. This is the value for the intersection of PPC PPDIL curve and 50% power.
d. Plausible if curve read incorrectly. This is a value selected to maintain constant difference between distracters.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of information to graphical data to determine insertion limits.

REFERENCES SUPPLIED: Technical Data Book Figure 1.9

Question: 36

Given the following conditions:

- The plant is operating at 55% power.
- Both Main Feed Pumps are in service.
- Both Condensate Pumps are in service.
- Both Heater Drain Pumps are in service.

Assuming **NO** operator action, which of the following is most likely to lead to an automatic Reactor Trip?

a. P-10A, Heater Drain Pump, tripping

b. Condenser hotwell level lowering to 5%

c. CV-0711, Main Feed Pump Recirculation Valve, failing open

d. The output of LIC-0701, Main Feed to SG A, failing high

Answer:

b. Condenser hotwell level lowering to 5%

QUESTION NUMBER:	SRO	36	RO	36
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 056A2.04
Ability to (a) predict the impacts of the following malfunction; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps

K/A IMPORTANCE: SRO 2.8 RO 2.6

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 4

OBJECTIVE: ASLB0A2.01
Given Plant conditions and a failure, malfunction, or incorrect operation of any given Main Condensate or Main Feedwater System component, predict the impact on the operation of the Main Condensate and Main Feedwater System.

REFERENCES:
SOP-11
A-PAL-89-151

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 10174

JUSTIFICATION:

a. Plausible since inadequate suction pressure might be available at higher power levels. Power level is below that required for continued HDP operation to maintain feed pump suction.

b. ✓ Results in condensate pumps tripping which causes feed pumps to trip. SG levels drop and reactor trip occurs.

c. Plausible since at higher power levels diverting flow from the SGs will cause level to lower to trip. Recirc valve failing open at this power level can be compensated for by operating feed pumps.

d. Plausible since trip would be required if high level override failed to cause valve to close. FRV fails open, causing SG level to rise. High level override will cause valve to cycle open and closed.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of cascading effect of failure of condenser on condensate and then on FW.

REFERENCES SUPPLIED:

Question: 37

Given the following conditions AND the attached drawing:

- The plant is operating at 100% power.
- Due to a failure, both Containment Pressure Switches, SW-1 and SW-2, associated with PS-1802A are tripped.
- A loss of Preferred AC Bus Y-10 occurs.

Which of the following describes the plant response?

a. An SIAS will be generated ONLY on the LEFT channel

b. An SIAS will be generated ONLY on the RIGHT channel

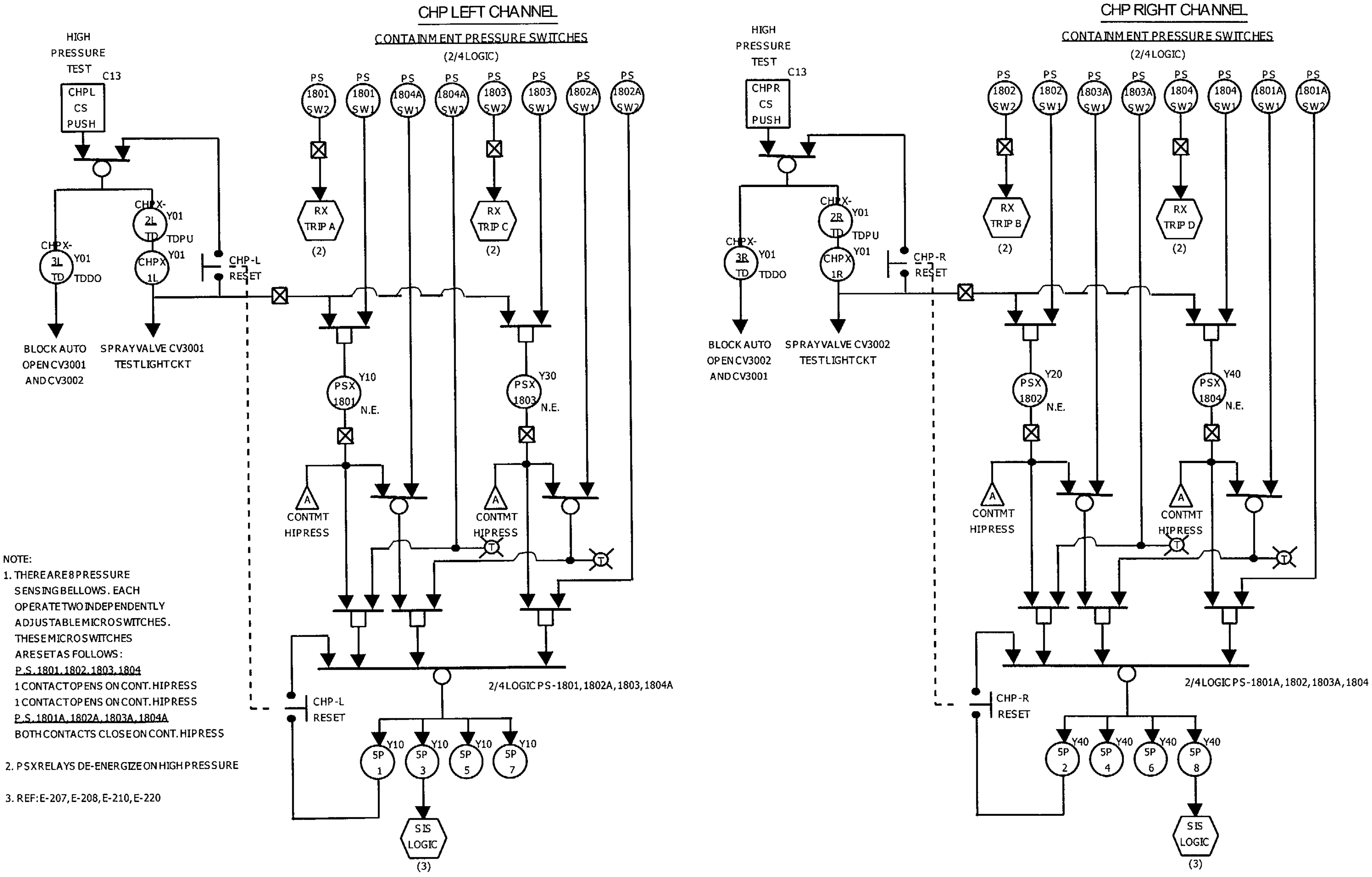
c. An SIAS will be generated on BOTH channels

d. An SIAS will **NOT** be generated on either channel

Answer:

d. An SIAS will **NOT** be generated on either channel

QUESTION #37 ATTACHMENT



NOTE:

1. THERE ARE 8 PRESSURE SENSING BELLOWS. EACH OPERATE TWO INDEPENDENTLY ADJUSTABLE MICROSWITCHES. THESE MICROSWITCHES ARE SET AS FOLLOWS:
   P.S. 1801, 1802, 1803, 1804
   1 CONTACT OPENS ON CONT. HI PRESS
   1 CONTACT OPENS ON CONT. HI PRESS
   P.S. 1801A, 1802A, 1803A, 1804A
   BOTH CONTACTS CLOSE ON CONT. HI PRESS
2. PSX RELAYS DE-ENERGIZE ON HIGH PRESSURE
3. REF: E-207, E-208, E-210, E-220

QUESTION NUMBER:	SRO	37	RO	37
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 016K3.09
Knowledge of the effect that a loss or malfunction of the NNIS will have on the following: ESFAS

K/A IMPORTANCE:	SRO	3.7	RO	3.5
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	7

OBJECTIVE: ASHB0K4.03
Given P&ID E-17 Sheet 6, determine the extent of CHP channel/equipment actuation for the following situations. a. Various combination of Containment Pressure switch actuations. d. Preferred 120 volt AC Bus availability

REFERENCES: E-17, Sheet 6

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible since Y-10 supplies power to left channel. The actuation relays require power and the Left Channel are powered by Y-10.

b. Plausible since PS-1802 input right channel. PS-1802A does not input the Right Channel of CHP.

c. Plausible since Y-10 supplies power to the left channel. The actuation relays require power and the Left Channel are powered by Y-10 and PS-1802A does not input the Right Channel of CHP.

d. ✓ Y-10 supplies power to the actuation relays for the Left Channel of CHP and PS-1802A does not input the right channel.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 4

Analysis of attached drawing to determine that power is required to cause an actuation.

REFERENCES SUPPLIED: Question 37 Attachment

Question: 38

Given the following conditions:

- The plant is on Shutdown Cooling using LPSI Pump P-67B.
- A loss of offsite power has occurred.
- Diesel Generator (DG) 1-1 has started and loaded its associated bus.

Which of the following describes the operation of LPSI Pump P-67B?

a. P-67B should have restarted as soon as DG 1-1 output breaker closed.

b. P-67B should have restarted 13 seconds after DG 1-1 output breaker closed.

c. P-67B is **NOT** running, but will restart automatically when the NSD Sequencer is reset.

d. P-67B is **NOT** running and must be manually restarted.

Answer:

d. P-67B is **NOT** running and must be manually restarted.

QUESTION NUMBER:	SRO	38	RO	38
TIER/GROUP:	SRO	2/3	RO	2/3

K/A: 005A4.01
Ability to manually operate and/or monitor in the control room: Controls and indication for RHR pumps

K/A IMPORTANCE:	SRO	3.4	RO	3.6
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	7

OBJECTIVE: ASAC0G4.01
Describe the purpose of the normal shutdown and DBA sequencers IAW with FSAR, Chapter 3.7.2.

REFERENCES: E-17, Sheet 4
LP-ASAC

SOURCE: New   Significantly Modified   Modified/Direct ✓

Bank Number 8789

JUSTIFICATION:

a. Plausible since power is available to the bus immediately. The bus load sheds before the DG breaker will close and the LPSI pump is not sequenced on.

b. Plausible since the DBA sequencer starts pump. The NSD sequencer does not automatically restart the LPSI pumps. The pump must be manually started.

c. Plausible since the DBA sequencer starts pump. The LPSI pumps only start automatically as a result of the DBA sequencer.

d. ✓ The NSD sequencer does not automatically restart the LPSI pumps. The pump must be manually started.

DIFFICULTY:
Comprehensive/Analysis ✓   Memory   Rating 3

Analysis of fault of electrical system on SDC during different configurations.

REFERENCES SUPPLIED:

Question: 39

Given the following conditions:

- The plant is operating at 8% power following a startup.
- The Operators have just synchronized the Main Generator to the grid.
- EK-1165, NON CRITICAL SERV WATER LO PRESS, alarms.
- Critical Service Water Header Pressures are noted to be 35 psig.
- An Auxiliary Operator reports a break in the Non-Critical Service Water Header downstream of CV-1359, Non-Critical Service Water Isolation.
- The Control Room Supervisor orders CV-1359 CLOSED to isolate the leak.

Which of the following actions should be taken?

a. Trip the turbine, verify the reactor automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

b. Trip the reactor, verify the turbine automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

c. Trip the turbine and stabilize reactor power above the point of adding heat.

d. Maintain the reactor and turbine on-line.

Answer:

b. Trip the reactor, verify the turbine automatically trips, and go to EOP-1.0, Standard Post-Trip Actions.

QUESTION NUMBER:	SRO	39	RO	39
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 0622.4.24
Knowledge of loss of cooling water procedures (Loss of SW)

K/A IMPORTANCE:	SRO	3.7	RO	3.3
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAIG11.01
From memory, state the Immediate Actions for the following: a. ONP-6.1, Loss of Service Water

REFERENCES: ONP-6.1

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible since a turbine trip causes a reactor trip at higher power levels. A reactor trip will not automatically occur below 15% power.

b. ✓ A reactor trip is required as power is above 5%.

c. Plausible since at lower power levels the turbine should be tripped due to the loss of SW without requiring a reactor trip. With the plant above 5% a reactor trip is required.

d. Plausible since heating of the exciter is the minimum value possible while still generating heat and candidate may determine time is available to establish cooling. Exciter damage may occur in a short period of time if the generator is not taken off line.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 2

Comprehension of non-critical service water effects on plant during different power levels.

REFERENCES SUPPLIED:

Question: 40

With the plant operating at 35% power, a loss of Component Cooling Water occurs.

Which of the following conditions will require a manual reactor trip?

a. PCP P-50B Thrust Bearing temperature at 187 °F

b. PCP P-50B Controlled Bleedoff temperature at 178 °F

c. Control Rod Drive Seal Leakoff temperatures all between 185 °F and 195 °F

d. PCP P-50B Lower Seal temperature at 177 °F

Answer:

a. PCP P-50B Thrust Bearing temperature at 187 °F

QUESTION NUMBER:	SRO	40	RO	40
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 015/017AK3.03
Knowledge of the reasons for the following responses as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Sequence of events for manually tripping reactor and RCP as a result of an RCP malfunction

K/A IMPORTANCE: SRO 4.0 RO 3.7

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAIT00.02
Given Plant conditions involving the symptoms of a loss of CCW, respond IAW ONP-6.2.

REFERENCES: ONP-6.2

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 10678

JUSTIFICATION:

a. ✓ Thrust bearing temperature exceeds limit of 175 °F.
b. Plausible since bleedoff has temperature limit. Within limit of 185 °F.
c. Plausible since drive leakoff has temperature limit. Within limit of 200 °F.
d. Plausible since seal has temperature limit. Within limit of 185 °F.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of CCW conditions requiring a reactor trip.

REFERENCES SUPPLIED:

Question: 41

Given the following conditions:

- The reactor is operating at 19% power.
- Wide Range Nuclear Instrument channel NI-3 instantaneously fails high.

Assuming **NO** other failures, which of the following is required?

a. The reactor must be shut down in an orderly manner until NI-3 is repaired.

b. Continue power operations and repair NI-3.

c. Ensure the reactor automatically trips on high Startup Rate.

d. The reactor should be manually tripped and EOP-1.0 entered.

Answer:

b. Continue power operations and repair NI-3.

QUESTION NUMBER:	SRO	41	RO	41
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 033AA2.07
Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Confirmation of reactor trip

K/A IMPORTANCE:	SRO	4.2	RO	3.9
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	7

OBJECTIVE: ASGC0K4.07
Given Plant conditions including the RPS, determine the trip logic present.

REFERENCES: ARP-21

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 9168

JUSTIFICATION:

a. Plausible since both WR channels are required operable. If power is reduced below 15% a trip will occur.
b. ✓ Above 15% power the high rate trip is disabled.
c. Plausible since below 15% power a trip will occur. Trip does not occur at this level.
d. Plausible since below 15% power a trip will occur. Trip does not occur at this level.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of failure of excore NI while operating at different power levels.

REFERENCES SUPPLIED:

Question: 42

Given the attached drawing and the following conditions:

- Controlled Bleedoff temperature is 120 °F.
- Controlled Bleedoff flow is 1 gpm.
- Controlled Bleedoff pressure is 90 psig.

Which of the following PCP malfunctions have occurred?

a. The upper seal (3rd stage) has failed

b. The middle seal (2nd stage) has failed

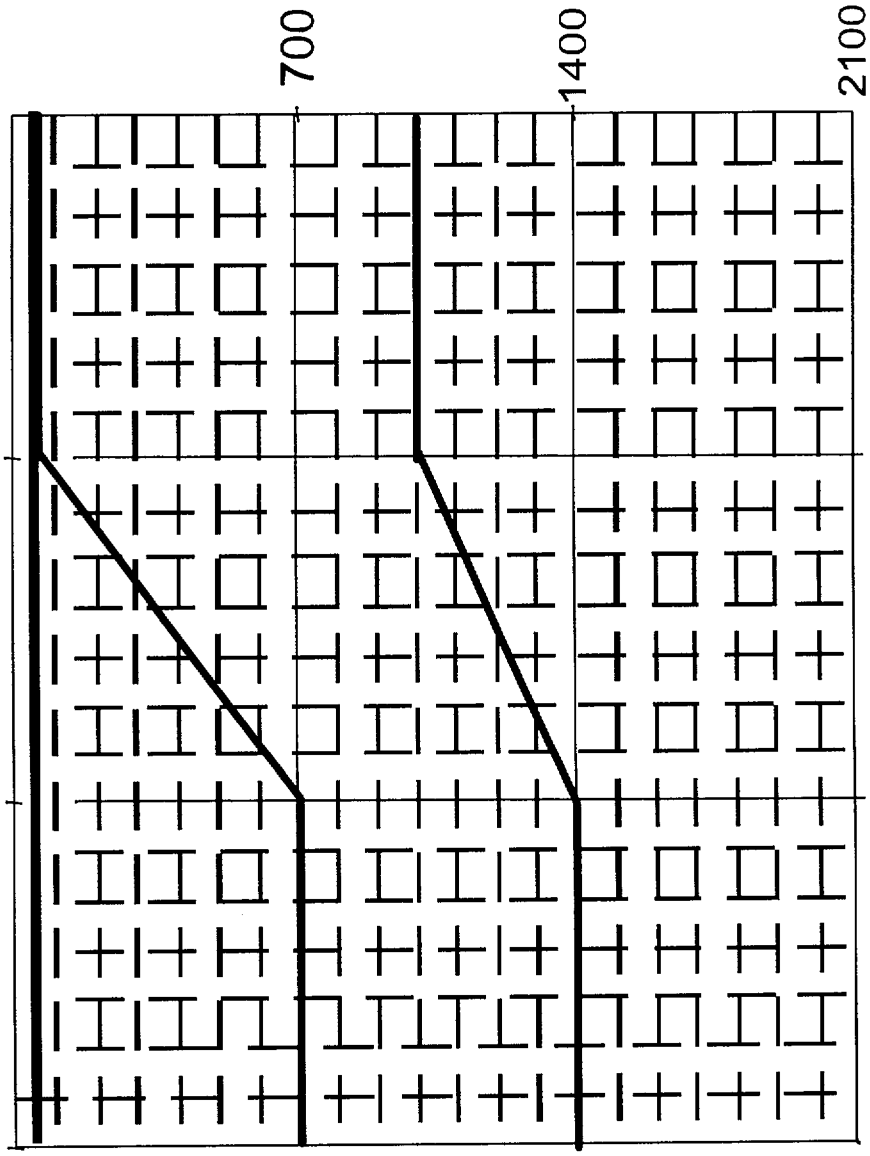
c. The lower seal (1st stage) has failed

d. The upper (3rd stage) pressure breakdown device has plugged

Answer:

a. The upper seal (3rd stage) has failed

QUESTION #42 ATTACHMENT



QUESTION NUMBER:	SRO	42	RO	42
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 003A4.04
Ability to manually operate and/or monitor in the control room: RCP seal differential pressure instrumentation

K/A IMPORTANCE:	SRO	3.0	RO	3.1
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	2

OBJECTIVE: ASED0A5.01
Given traces of PCP seal pressures, identify which seal(s) has(have) failed.

REFERENCES: ARP-5

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 295

JUSTIFICATION:

a. ✓ An upper seal failure causes the first seal to lower pressure to 1000 psi and the second seal to lower pressure to bleedoff pressure.

b. Plausible since middle seal failure causes pressure to change. A middle seal failure causes the first seal to lower pressure to 1000 psi and the third seal to lower pressure to bleedoff pressure.

c. Plausible since lower seal failure causes pressure to change. A lower seal failure causes the middle seal to lower pressure to 1000 psi and the upper seal to lower pressure to bleedoff pressure.

d. Plausible since plugged device causes pressure to change. A plugged device would cause no pressure drop across the other two seals so the entire pressure drop would be across the third seal.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of graphical data required to determine PCP seal failure.

REFERENCES SUPPLIED: Question 42 Attachment

Question: 43

Given the following conditions:

- The Feed Reg Valve Controllers, LIC-0701 and LIC-0703, are both in AUTO.
- The Feed Pump Combined Speed Controller, HIC-0525, is in CASCADE.
- The Individual Speed Controllers, HIC-0526 and HIC-0529, are both in CASCADE.
- The plant is operating at 80% power when the Main Turbine trips.

Assuming **NO** operator actions, which of the following describe the response of the Feed Water System?

a.
- Feed Reg Valves ramp closed
- Feed Pump Speed ramps to approximately 3250 rpm

b.
- Feed Reg Valves ramp closed
- Feed Pump Speed remains at pre-trip speed

c.
- Feed Reg Valves remain at pre-trip position
- Feed Pump Speed ramps to approximately 3250 rpm

d.
- Feed Reg Valves remain at pre-trip position
- Feed Pump Speed remains at pre-trip speed

Answer:

c.
- Feed Reg Valves remain at pre-trip position
- Feed Pump Speed ramps to approximately 3250 rpm

QUESTION NUMBER:	SRO	43	RO	43
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 059K4.18
Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Automatic feedwater reduction on plant trip

K/A IMPORTANCE:	SRO	3.0	RO	2.8
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	4

OBJECTIVE: ASLC0K6.02
Given plant conditions, predict the response of the SGWLC system.

REFERENCES: EOP-1.0

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 1227

JUSTIFICATION:

a. Plausible since pumps ramp to minimum speed. The feed reg valves swap to manual and remain in the current position.

b. Plausible since these conditions are addressed by actions in procedure. The feed pumps automatically ramp to minimum speed while the feed reg valves swap to manual and remain in the current position.

c. ✓ The feed pumps automatically ramp to minimum speed while the feed reg valves swap to manual and remain in the current position.

d. Plausible since FRVs swap to manual. The feed pumps automatically ramp to minimum speed.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of the effect of a plant trip on the FW system.

REFERENCES SUPPLIED:

Question: 44

Ten (10) minutes have elapsed since an inadvertent SIAS.

Which of the following results in the greatest heat load on the Component Cooling Water System?

a. Letdown Heat Exchanger

b. Primary Coolant Pumps

c. Shutdown Cooling Heat Exchangers

d. Spent Fuel Pool Heat Exchanger

Answer:

a. Letdown Heat Exchanger

QUESTION NUMBER:	SRO	44	RO	44
TIER/GROUP:	SRO	2/3	RO	2/3

K/A: 008K3.01
Knowledge of the effect that a loss or malfunction of the CCWS will have on the following:
Loads cooled by CCWS

K/A IMPORTANCE:	SRO	3.5	RO	3.4

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 4

OBJECTIVE: ASCA0K1.03
State the components that are the largest heat loads on the CCW System during normal operations, cold shutdown conditions, and during accident conditions.

REFERENCES: FSAR Table 9-4

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 4747

JUSTIFICATION:

a. ✓ Heat load is approximately 11.8E6 Btu/hr post-SI.
b. Plausible since this is a heat load post-SI. Heat load is approximately 2.3E6 Btu/hr post-SI.
c. Plausible since this is a large heat load post-RAS. Heat load is 0 Btu/hr post-SI, although it achieves a maximum of 95E6 But/hr post-RAS.
d. Plausible since this is a large heat load under normal plant conditions. Heat load is 0 Btu/hr post-SI since it isolates on an SIAS.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of the relative loads on the CCW system.

REFERENCES SUPPLIED:

Question: 45

While obtaining a hydrogen sample from the containment atmosphere, the Hydrogen Monitoring System containment isolation valves must be opened prior to placing the system in ANALYZE to ...

a. prevent damage to the sample pump.

b. prevent damage to the analyzer.

c. prevent unnecessary Control Room annunciators from alarming.

d. ensure the valves remain open in the event of a CHP or CHR signal.

Answer:

a. prevent damage to the sample pump.

QUESTION NUMBER:	SRO	45	RO	45
TIER/GROUP:	SRO	2/2	RO	2/3

K/A: 0282.1.32
Ability to explain and apply all system limits and precautions (Hydrogen Recombiner and Purge Control)

K/A IMPORTANCE:	SRO	3.8	RO	3.4
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	9

OBJECTIVE: ASHE0G7.01
Explain the basis of any given Containment Hydrogen Analyzer and Recombiner System Operating Procedure (SOP-38) Plant Requirement, Precaution or Limitation, Caution, or Note.

REFERENCES: SOP-38

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 10928

JUSTIFICATION:

a. ✓ The sample pump operating without a suction path will result in pump damage.
b. Plausible since system damage is a concern. Damage will occur to pump, not analyzer.
c. Plausible since minimal alarms are desirable during post-accident response. No alarms should be received if the sequence of performance is reversed.
d. Plausible since the valves are required to open to obtain a sample. The valves will close on a CHP or CHR if opened with the switch in the NORM position. The sequence of operation does not affect this.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of hydrogen analyzer system precautions.

REFERENCES SUPPLIED:

Question: 46

Given the following conditions:

- A liquid batch release is being performed from T-91 to the lake at 75 gpm.
- P-40A, Dilution Water Pump, is operating.
- RIA-1049, Liquid Radwaste Monitor, alarms.

Which of the following terminates the release?

a. CV-1051, 1" Discharge Isolation, closes

b. CV-1054, Discharge Isolation (common), closes

c. P-40A, Dilution Water Pump, trips

d. An Operator closes MV-RW127, Effluent to Dilution Line

Answer:

a. CV-1051, 1" Discharge Isolation, closes

QUESTION NUMBER:	SRO	46	RO	46
TIER/GROUP:	SRO	1/1	RO	1/2

K/A: 059AA2.05
Ability to determine and interpret the following as they apply to the Accidental Liquid Radwaste Release: Occurrence of automatic safety actions as a result of a high PRM system signal

K/A IMPORTANCE:	SRO	3.9	RO	3.6
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	11

OBJECTIVE: ISEB0A3.02
Given normally available references, predict the automatic actions associated with a high radiation signal on RIA-1049.

REFERENCES: ARP-8

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 9893

JUSTIFICATION:

a. ✓ Valve automatically closes on high radiation.
b. Plausible since closure would terminate release. Valve remains open, but is closed by an operator.
c. Plausible since pump is used for dilution of release. Pump remains running, but can be stopped by an operator.
d. Plausible since closure would terminate release. Manual valve which is aligned prior to and after the discharge.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of the automatic response to a high rad alarm.

REFERENCES SUPPLIED:

Question: 47

During recovery from a LOCA inside containment, the operators have established simultaneous hot and cold leg injection in accordance with EOP-4.0, Loss of Coolant Accident Recovery.

Assuming all equipment is operating properly, which of the following describes the correct flow rates that should be observed?

	LOOP 1 HOT LEG FLOW FI-0316A	**LOOP 1 HOT LEG FLOW FI-0317A**	**HPSI FLOW TO LOOP 1A FI-0308A**	**HPSI FLOW TO LOOP 1B FI-0310A**	**HPSI FLOW TO LOOP 2A FI-0312A**	**HPSI FLOW TO LOOP 2B FI-0313A**
a.	275 gpm	275 gpm	137.5 gpm	137.5 gpm	137.5 gpm	137.5 gpm
b.	550 gpm	0 gpm	275 gpm	275 gpm	0 gpm	0 gpm
c.	183.3 gpm	183.3 gpm	183.3 gpm	183.3 gpm	183.3 gpm	183.3 gpm
d.	350 gpm	350 gpm	100 gpm	100 gpm	100 gpm	100 gpm

Answer:

a.	275 gpm	275 gpm	137.5 gpm	137.5 gpm	137.5 gpm	137.5 gpm

QUESTION NUMBER: SRO 47 RO 47
TIER/GROUP: SRO 1/1 RO 1/2

K/A: 011EA1.16
Ability to operate and monitor the following as they apply to a Large Break LOCA: Balancing of HPI loop flows

K/A IMPORTANCE: SRO 3.5 RO 3.5

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 8

OBJECTIVE: TBAGG22.01
Given Plant conditions involving hot/cold leg injection entry conditions determine: b. The expected flow rate to each hot/cold leg.

REFERENCES: EOP-4.0

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 5020

JUSTIFICATION:

a. ✓ HPSI flow to each of the hot legs should be approximately equal to the total of the HPSI flow to the train-related cold legs.

b. Plausible if candidate determines flow is to be established using one train only. Flow should be established by both trains.

c. Plausible if candidate determines that each indication should be equal. Hot leg and cold leg flows should be equalized such that the total for each hot leg equals the total for both train-related cold legs.

d. Plausible if candidate determines cold leg flow should be higher than hot leg. Flows should be equalized.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Comprehends and applies the requirements for simultaneous injection during an accident.

REFERENCES SUPPLIED:

Question: 48

Given the following conditions:

- The plant is operating at 50% power.
- A Steam Generator Tube Leak is suspected.
- Total PCS Xenon-133 is 200 µCi/kg.
- Condenser off-gas flow is 2 cfm.
- RIA-0631, Condenser Off-Gas Monitor, is indicating 6.00E3 cpm.

The estimated steam generator tube leakage is ...

a. 0.008 gpm.

b. 0.015 gpm.

c. 0.030 gpm.

d. 0.045 gpm.

Answer:

b. 0.015 gpm.

QUESTION NUMBER:	SRO	48	RO	48
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 037AA2.12
Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: Flow rate of leak

K/A IMPORTANCE:	SRO	4.1	RO	3.3
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAFG28.01
Given ONP 23.2 and plant parameters, estimate the size of a S/G tube leak.

REFERENCES: ONP23.2

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 1291

JUSTIFICATION:

a. Plausible if lowers reading by multiplying by power level. Power level is previously accounted for.
b. ✓ Intersection of 2 cfm and 6E3 cpm is 0.03. Correcting for PCS xenon activity, a final value of 0.015 is obtained.
c. Plausible if does not correct for PCS xenon activity. PCS xenon activity must be accounted for.
d. Plausible if raises reading by dividing by power level. Power level is previously accounted for.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Applications of given information to graphical data to determine leak rate.

REFERENCES SUPPLIED: ONP-23.2, Attachment 1

Question: 49

Given the following conditions:

- The plant is operating at 100% power.
- P-55B, Charging Pump B, is in MANUAL control.
- P-55C, Charging Pump C, is in AUTO control.
- Charging flow is 40 gpm.
- Letdown flow is 44 gpm.
- Pressurizer level is cycling between 55% and 57% every 25 minutes.

Which of the following is the cause of these conditions?

a. Anti-pump lockout of P-55C has **NOT** been reset

b. Letdown flow controller is improperly calibrated

c. Charging Pump P-55A is tagged out

d. Backup Pressurizer Level control signal is malfunctioning

Answer:

c. Charging Pump P-55A is tagged out

QUESTION NUMBER:	SRO	49	RO	49
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 004K3.05
Knowledge of the effect that a loss or malfunction of the CVCS will have on PZR LCS

K/A IMPORTANCE:	SRO	4.2	RO	3.8
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	3

OBJECTIVE: ASFAG12.04
Describe the two modes of CVCS operation for maintaining PZR level when the variable speed charging pump is out of service.

REFERENCES: SOP-2A

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 4944

JUSTIFICATION:

a. Plausible since P-55C has lockout feature. P-55C would not be available under these conditions so level would continue to lower.

b. Plausible if controller was malfunctioning. This is proper letdown flow under these conditions.

c. ✓ Charging flow is constant with letdown flow slightly higher. Pressurizer level lowers until P-55C starts and rises until P-55C stops.

d. Plausible if back control was malfunctioning. The backup pressurizer level control system controls level in this band.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of abnormal pressurizer level conditions to determine potential cause.

REFERENCES SUPPLIED:

Question: 50

The Low Suction Pressure Trip for Auxiliary Feedwater Pump P-8B is DISABLED upon ...

a. placing C-150, Auxiliary Shutdown Panel, in service.

b. loss of Preferred AC Bus Y-10.

c. placing C-33, Auxiliary Shutdown Panel, in service.

d. loss of Preferred AC Bus Y-30.

Answer:

a. placing C-150, Auxiliary Shutdown Panel, in service.

QUESTION NUMBER:	SRO	50	RO	50
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 061K6.01
Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Controllers and positioners

K/A IMPORTANCE:	SRO	2.8	RO	2.5
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	4

OBJECTIVE: ASLD0A5.01
Describe the operating conditions which disable the P-8B low suction automatic trip

REFERENCES: ONP-25.2

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 628

JUSTIFICATION:

a. ✓ The LSPT is bypassed when control is at C-150. Approximately 20 minutes of tank usage remains when the light comes on at this location.
b. Plausible since Y-10 and Y-30 input P-8A/C LSPT. P-8B LSPT is powered by Y-20, but a LSPT occurs when power is lost.
c. Plausible since C-33 is used for shutdown outside control room. LSPT is affected by operation of C-150, not C-33.
d. Plausible since Y-10 and Y-30 input P-8A/C LSPT. P-8B LSPT is powered by Y-20, but a LSPT occurs when power is lost.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Comprehension of the LSP trip of AFW and the effect on the trip caused by actions/failures.

REFERENCES SUPPLIED:

Question: 51

Given the following conditions:

- The plant was operating at 40% power when a large break LOCA occurred inside containment.
- Containment Spray has actuated and both trains are operating.
- Actions are being performed per EOP-4.0, Loss of Coolant Accident Recovery.

How is the Containment Air Cooler System required to be operated in this condition?

a. At least one (1) Containment Cooler 'A' Fan running to prevent the formation of explosive/flammable pockets of hydrogen inside containment.

b. All four (4) Containment Cooler 'A' Fans running since the Containment Spray System, by itself, is **NOT** capable of maintaining containment pressure below design pressure.

c. At least one (1) Containment Cooler 'A' Fan running since the Containment Spray System, by itself, is **NOT** capable of maintaining containment temperature below design temperature.

d. All four (4) Containment Cooler 'A' Fans running to ensure adequate cooling to prevent concrete dryout from interfering with Containment Sump Recirculation, if needed.

Answer:

a. At least one (1) Containment Cooler 'A' Fan running to prevent the formation of explosive/flammable pockets of hydrogen inside containment.

QUESTION NUMBER:	SRO	51	RO
TIER/GROUP:	SRO	1/1	RO

K/A: 0112.1.12
Ability to apply technical specifications for a system (LOCA)

K/A IMPORTANCE:	SRO	4.0	RO
10CFR55 CONTENT:	55.43(b) SRO	2	55.41(b) RO

OBJECTIVE: ASHD0G5.02
Describe the basis for the following Technical Specifications. b. 3.6.4

REFERENCES: EOP-4.0
Standing Order 62

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 5016

JUSTIFICATION:

a. ✓ Prevents the formation of hydrogen pockets by maintaining air flow.
b. Plausible since previous requirements identified both spray and coolers as being required. Containment temperature can be maintained by Containment Spray.
c. Plausible since previous requirements identified both spray and coolers as being required. Containment temperature can be maintained by Containment Spray.
d. Plausible since ensuring sump recirc capabilities is a requirement for post-accident conditions. Shield cooling provides this function.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions to determine required actions and the Tech Spec basis for the actions.

REFERENCES SUPPLIED:

Question: 52

Given the following conditions:

- The plant is operating at 50% power.
- A Technical Specification ACTION has been entered due to a Safety Injection Pump failing its surveillance test.

The Work Request issued to repair the pump should be clearly identified as ...

a. Emergency Maintenance.

b. Urgent Maintenance.

c. Rework Maintenance.

d. Fix-It-Now Maintenance.

Answer:

b. Urgent Maintenance.

QUESTION NUMBER:	SRO	52	RO
TIER/GROUP:	SRO	3	RO

K/A: 2.2.18
Knowledge of the process for managing maintenance activities during shutdown operations

K/A IMPORTANCE:	SRO	3.6	RO
10CFR55 CONTENT:	55.43(b) SRO	5	55.41(b) RO

OBJECTIVE: ADAI0G1.02
Given conditions involving plant maintenance, determine if the activity should be performed under normal, emergency and/or urgent maintenance.

REFERENCES: AP-5.01

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 10133

JUSTIFICATION:

a. Plausible since this is a type of maintenance identified in AP-5.01. Emergency maintenance is to protect the health and safety of the public and plant employees, allow for safe shutdown, or prevent significant or additional damage.

b. ✓ To exit the Tech Spec action associated with the surveillance failure, urgent maintenance is assigned to this repair.

c. Plausible since this is a type of maintenance identified in AP-5.01. Rework maintenance is additional maintenance activities on a device or component to correct a problem that was previously considered corrected.

d. Plausible since this is a type of maintenance identified in AP-5.01. Fix-it-now maintenance is minor maintenance which can be fixed in a short period of time without requiring plant configuration changes.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of administrative requirements related to maintenance activities.

REFERENCES SUPPLIED:

Question: 53

Given the following conditions:

- The crew is performing EOP-6.0, Excess Steam Demand Event.
- The Main Steam Isolation Valves are closed.
- ALL PCPs are stopped.
- SG 'B' has been isolated.

Which of the following indications is **NOT** used in verifying that the MOST AFFECTED SG has been isolated?

a. Steam Flow

b. SG Level

c. SG Pressure

d. Loop Tcold Temperatures

Answer:

a. Steam Flow

QUESTION NUMBER:	SRO	53	RO
TIER/GROUP:	SRO	1/1	RO

K/A: CE05EK3.2
Knowledge of the reasons for the following responses as they apply to normal, abnormal and emergency operating procedures associated with Excess Steam Demand

K/A IMPORTANCE: SRO 3.8 RO

10CFR55 CONTENT: 55.43(b) SRO 5 55.41(b) RO

OBJECTIVE: TBAD0A1.03
Given any symptom of an Excess Steam Demand Event, explain how you would attempt to verify that symptom.

REFERENCES: EOP-6.0

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 12207

JUSTIFICATION:

a. ✓ With the MSIVs closed and the SG isolated, steam flow is not expected to occur, so it is not a reliable indication of determining if the correct SG is isolated.

b. Plausible since the break may have been isolated during the isolation and flow into and out of the affected SG is isolated so no change in level might be expected. Level will continue to lower as the SG continues blowing down.

c. Plausible since the break may have been isolated during the isolation and flow into and out of the affected SG is isolated so no change in pressure might be expected. With the MSIVs closed, steam pressure is a good indicator of the most affected SG during an ESDE.

d. Plausible since the break may have been isolated during the isolation and flow into and out of the affected SG is isolated so no change in PCS temperature might be expected. With all PCPs stopped, a greater drop in temperature will be evident on the loop Tcolds with the most affected SG.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of the relative reliability of indications during a steam break.

REFERENCES SUPPLIED:

Question: 54

Operating requirements and clarification or interpretation of Technical Specifications are found in the ...

a. Shift Supervisor's logbook.

b. Daily Orders logbook.

c. Standing Orders.

d. Shift Turnover Checklist.

Answer:

c. Standing Orders.

QUESTION NUMBER:	SRO	54	RO
TIER/GROUP:	SRO	3	RO

K/A: 2.1.15
Ability to manage short-term information such as night and standing orders

K/A IMPORTANCE:	SRO	3.0	RO
10CFR55 CONTENT:	55.43(b) SRO	5	55.41(b) RO

OBJECTIVE: ADAG0G1.11
Describe the function and authorization of the following IAW Admin Procedure 4.00. b. Standing Orders

REFERENCES: AP-4.00

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 5108

JUSTIFICATION:

a. Plausible since information important to operability and other items are entered into the SS logbook. Operating requirements and clarification or interpretation of Tech Specs are provided in Standing Orders.

b. Plausible since information important to day to day operation are entered in the Daily Orders logbook. Operating requirements and clarification or interpretation of Tech Specs are provided in Standing Orders.

c. ✓ Operating requirements and clarification or interpretation of Tech Specs are provided in Standing Orders.

d. Plausible since information important to shift operations are passed between crews using the Shift Turnover Checklist. Operating requirements and clarification or interpretation of Tech Specs are provided in Standing Orders.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of administrative requirements regarding logging entries.

REFERENCES SUPPLIED:

Question: 55

Which of the following would be a violation of fire protection procedures?

a. A piece of fixed fire protection equipment is removed from service for minor repairs without prior approval of the Plant Property Protection Supervisor.

b. A temporary storage area for acetylene bottles is set up in the West Engineered Safeguards Room for an upcoming system modification.

c. A Fire Brigade member is sent home due to an illness and his relief will **NOT** be in for an hour from the time he went home.

d. Used anti-Cs are being stored in a metal container in the Charging Pump Room.

Answer:

b. A temporary storage area for acetylene bottles is set up in the West Engineered Safeguards Room for an upcoming system modification.

QUESTION NUMBER:	SRO	55	RO
TIER/GROUP:	SRO	3	RO

K/A: 2.4.25
Knowledge of fire protection procedures

K/A IMPORTANCE:	SRO	3.4	RO
10CFR55 CONTENT:	55.43(b) SRO	5	55.41(b) RO

OBJECTIVE: ASBA0G5.01
Given plant conditions, Fire Protection Implementing Procedures and Administrative Procedures, determine: b. Required actions

REFERENCES: FPIP-7

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 5362

JUSTIFICATION:

a. Plausible since removal of FP equipment affects the plant's capability to fight fires. Minor maintenance is permitted provided contingency actions are established.
b. ✓ Combustible gases are only permitted to be stored in approved storage areas.
c. Plausible since the Fire Brigade staffing being less than required would hinder the plant's ability to fight fires. Permitted to be less than 5 for up to 2 hours provided provisions are made to restaff within the 2 hours.
d. Plausible since anti-Cs are combustible materials. Combustibles are permitted to be temporarily stored in containers provided they are removed as soon as practical and do not inhibit access/egress.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of different conditions to determine compliance with fire protection procedures.

REFERENCES SUPPLIED:

Question: 56

Which of the following describes the change in PCS pH and boron concentration if a fresh CVCS delithiating demineralizer is placed in service **WITHOUT** performing a resin saturation treatment?

	pH	**BORON CONCENTRATION**
a.	Lowers	Lowers
b.	Lowers	Rises
c.	Rises	Lowers
d.	Rises	Rises

Answer:

a.	Lowers	Lowers

QUESTION NUMBER:	SRO	56	RO
TIER/GROUP:	SRO	2/1	RO

K/A: 004K4.02
Knowledge of CVCS design feature(s) and/or interlock(s) which provide for the control of pH, and range of acceptability

K/A IMPORTANCE:	SRO	2.6	RO
10CFR55 CONTENT:	55.43(b) SRO	6	55.41(b) RO

OBJECTIVE: ASFA0G7.09
Describe the basis for any given CVCS and BAHT System (SOP 2A) Plant Requirement, Precaution or Limitation, Caution, or Note.

REFERENCES: SOP-2B

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 12204

JUSTIFICATION:

a. ✓ Demineralizer will absorb boron, removing it from PCS and removing lithium causes pH to lower.
b. Plausible since pH lowers. Boron concentration lowers.
c. Plausible since boron concentration lowers. PCS pH lowers.
d. Plausible since both pH and boron concentration are affected. Both pH and boron concentration lower.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Comprehension of the effects of demineralizer operation on PCS parameters.

REFERENCES SUPPLIED:

Question: 57

Which of the following is considered a Temporary Modification?

a. Installing jumpers to bypass an automatic actuation as directed by a channel calibration procedure

b. Lifting leads on an inoperable valve motor operator for testing

c. Connecting cables from a 480 VAC MCC to a temporary power panel for outage maintenance work

d. Installing a temporary drain hose to allow changing oil in a pump

Answer:

c. Connecting cables from a 480 VAC MCC to a temporary power panel for outage maintenance work

QUESTION NUMBER:	SRO	57	RO
TIER/GROUP:	SRO	3	RO

K/A: 2.2.11
Knowledge of the process for controlling temporary changes

K/A IMPORTANCE:	SRO	3.4	RO
10CFR55 CONTENT:	55.43(b) SRO	5	55.41(b) RO

OBJECTIVE: ADAK0G1.02
Describe the following requirements IAW Admin Procedure 9.31: a. Temporary Modification (definition and exclusions)

REFERENCES: AP-9.31

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 12222

JUSTIFICATION:

a. Plausible since jumpers are not part of the plant installed equipment. Not considered a temporary modification since directed by procedure.

b. Plausible since this would be considered a temporary modification if the valve motor operator were operable. Modifications to inoperable equipment is not a temporary mod unless left once the equipment is returned to operable.

c. ✓ Electrical jumpers are considered to be a temporary modification unless provided for in a procedure.

d. Plausible since hoses are not part of the plant installed equipment. Hoses installed for draining are not considered temporary modifications.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of different conditions to determine compliance with maintenance procedures.

REFERENCES SUPPLIED:

Question: 58

Given the following conditions:

- A steam break on SG 'A' has occurred inside containment and the crew is responding per EOP-6.0, Excess Steam Demand Event.
- The Technical Support Center reports that SG 'A' also has indications of steam generator tube leakage.
- The indications of steam generator tube leakage are confirmed by the Control Room.

Which of the following actions should be taken?

a. Perform the actions of EOP-6.0 and EOP-5.0, Steam Generator Tube Rupture, in parallel.

b. Complete performing the actions of EOP-6.0, then go to EOP-5.0, Steam Generator Tube Rupture.

c. Go to EOP-5.0, Steam Generator Tube Rupture, and return to EOP-6.0 when the actions of EOP-6.0 are completed.

d. Go to EOP-9.0, Functional Recovery, and perform the actions necessary to recover/maintain the Safety Functions.

Answer:

d. Go to EOP-9.0, Functional Recovery, and perform the actions necessary to recover/maintain the Safety Functions.

QUESTION NUMBER:	SRO	58	RO
TIER/GROUP:	SRO	1/2	RO

K/A: CE09EK1.2
Knowledge of the operational implications of the following concepts as they apply to the Functional Recovery: Normal, abnormal and emergency operating procedures associated with Functional Recovery

K/A IMPORTANCE:	SRO	4.0	RO
10CFR55 CONTENT:	55.43(b) SRO	5	55.41(b) RO

OBJECTIVE: TBAB0A2.04
Given post reactor trip conditions, determine the proper follow-up EOP IAW the Diagnostic Flowchart.

REFERENCES: EOP-1.0

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 12216

JUSTIFICATION:

a. Plausible since both a steam break and a tube leak exist and individual procedures address each. When more than one event has been diagnosed, actions should be taken in accordance with EOP-9.0 to ensure safety functions are met.

b. Plausible since both a steam break and a tube leak exist and individual procedures address each. When more than one event has been diagnosed, actions should be taken in accordance with EOP-9.0 to ensure safety functions are met.

c. Plausible since both a steam break and a tube leak exist and individual procedures address each. When more than one event has been diagnosed, actions should be taken in accordance with EOP-9.0 to ensure safety functions are met.

d. ✓ When more than one event has been diagnosed, actions should be taken in accordance with EOP-9.0 to ensure safety functions are met.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions to determine procedural guidance for multiple failures.

REFERENCES SUPPLIED:

Question: 59

While performing a system checklist, several pages become contaminated.

Which of the following actions should be taken?

a. Make a new copy of the checklist and transfer signatures to the new copy

b. Substitute copies of the contaminated pages and mark them "Original Contaminated"

c. Make an entry in the "Comment" section of the checklist detailing which pages are contaminated and note that the pages are available at Radiation Protection

d. Telephone the Control Room and have all data transposed to another copy

Answer:

b. Substitute copies of the contaminated pages and mark them "Original Contaminated"

QUESTION NUMBER:	SRO	59	RO
TIER/GROUP:	SRO	3	RO

K/A: 2.3.4
Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized

K/A IMPORTANCE: SRO 3.1 RO

10CFR55 CONTENT: 55.43(b) SRO 4 55.41(b) RO

OBJECTIVE: ADAG0G1.09
Describe the requirements for the use of procedures IAW Admin Procedures 4.00 and 10.53.

REFERENCES: AP-4.00

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 12225

JUSTIFICATION:

a. Plausible since the new copy of the checklist will contain original signatures. Replacing original pages is not permitted except by making copies and marking "original contaminated."

b. ✓ Copies of the original are required and they must be clearly marked "Original Contaminated."

c. Plausible since contaminated materials are not to be released from the RCA. Pages are required to be filed with the original procedure.

d. Plausible since steps in operating procedures are called into the Control Room for signature. Copies of the original are required and they must be clearly marked "Original Contaminated."

DIFFICULTY:

Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of administrative requirements regarding contamination control.

REFERENCES SUPPLIED:

Question: 60

A Hot Work Permit would be required if Hot Work is to be performed in the ...

a. Electrical Shop.

b. Instrument and Control Shop.

c. Chemistry Lab.

d. Craft Fabrication Shop.

Answer:

c. Chemistry Lab.

QUESTION NUMBER:	SRO	60	RO
TIER/GROUP:	SRO	3	RO

K/A: 2.1.26
Knowledge of non-nuclear safety procedures (eg rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen)

K/A IMPORTANCE:	SRO	2.6	RO
10CFR55 CONTENT:	55.43(b) SRO	5	55.41(b) RO

OBJECTIVE: ASBAT00.05
Given Plant conditions, the status of Fire Protection System equipment and Control Room references, implement Fire Protection System compensatory actions IAW Fire Protection Implementing Procedures and Administrative Procedures.

REFERENCES: FPIP-7

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8175

JUSTIFICATION:

a. Plausible since hot work permits are required for any work that results in a potential fire hazard. Hot work permits are required except when performed in Machine Shops, Welding Shops, Electrical Shops, Instrument and Control Shops, and Craft Fabrication Shops.

b. Plausible since hot work permits are required for any work that results in a potential fire hazard. Hot work permits are required except when performed in Machine Shops, Welding Shops, Electrical Shops, Instrument and Control Shops, and Craft Fabrication Shops.

c. ✓ Hot work permits are required except when performed in Machine Shops, Welding Shops, Electrical Shops, Instrument and Control Shops, and Craft Fabrication Shops.

d. Plausible since hot work permits are required for any work that results in a potential fire hazard. Hot work permits are required except when performed in Machine Shops, Welding Shops, Electrical Shops, Instrument and Control Shops, and Craft Fabrication Shops.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of administrative requirements regarding maintenance work.

REFERENCES SUPPLIED:

Question: 61

Reactor Power is being lowered from 99.9% to 99.2% in preparation for Auxiliary Feed Pump testing by adjusting GV-4 closed.

WITHOUT making any adjustment in rod position or boron concentration, which of the following describes the response of Tave and Tref as turbine load is lowered?

	T-AVE	**T-REF**
a.	Lowers	Lowers
b.	Lowers	Rises
c.	Rises	Lowers
d.	Rises	Rises

Answer:

c.	Rises	Lowers

QUESTION NUMBER:	SRO	61	RO	61
TIER/GROUP:	SRO	2/3	RO	2/3

K/A: 045K4.01
Knowledge of MT/G system design feature(s) and/or inter-lock(s) which provide for the Programmed controller for relationship between steam pressure at T/G inlet (impulse, first stage) and plant power level

K/A IMPORTANCE:	SRO	2.9	RO	2.7

10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	5

OBJECTIVE: RHAA0A1.02
Given plant conditions, analyze the data and predict any effect on any of the following: a. PCS parameters

REFERENCES: Tech Data Book Figure 3.3

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 9652

JUSTIFICATION:

a. Plausible since both Tave and Tref are affected. Tave rises due to less heat removed from the PCS.

b. Plausible since both Tave and Tref are affected. Closing down on the governor valves causes Tref to lower and as less heat is removed from the PCS, Tave rises.

c. ✓ Closing down on the governor valves causes Tref to lower and as less heat is removed from the PCS, Tave rises.

d. Plausible since both Tave and Tref are affected. Tref lowers due to a lower pressure at the first stage of the turbine.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of PCS and secondary response to changing plant conditions.

REFERENCES SUPPLIED:

Question: 62

Given the following conditions:

- The reactor is shut down.
- PCS temperature is 230 °F.

The most acceptable method of reducing pressure inside Containment is to open …

a. the personnel air lock doors.

b. CV-1805 and CV-1806, Containment Purge Exhaust Isolation Valves, and vent Containment through the stack.

c. CV-1065 and CV-1064, CWRT Vent Isolation Valves, and vent Containment through the VGCH to the stack.

d. the emergency escape lock.

Answer:

c. CV-1065 and CV-1064, CWRT Vent Isolation Valves, and vent Containment through the VGCH to the stack.

QUESTION NUMBER:	SRO	62	RO	62
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 0292.1.33
Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications (Containment Purge)

K/A IMPORTANCE:	SRO	4.0	RO	3.4
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: ASDB0G8.01
Given Plant conditions and Control Room references (except where noted by a '*'), determine the impact on the following Technical Specifications: 3.6.5

REFERENCES: SOP-24

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 7616

JUSTIFICATION:

a. Plausible since this would be acceptable in cold shutdown. Not permitted to open both doors at same time above cold shutdown.
b. Plausible since this would be acceptable in cold shutdown. Above cold shutdown conditions, these valves are required to be maintained locked closed.
c. ✓ Above cold shutdown conditions, containment integrity must be maintained. Method used to purge containment above 210 °F.
d. Plausible since this would be acceptable in cold shutdown. Emergency escape hatch is required to be installed above cold shutdown.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of TS requirements for containment integrity.

REFERENCES SUPPLIED:

Question: 63

Given the following conditions:

- The plant is operating at 100% power.
- Permission has been given to test the Y-50 ABT Transfer Switch.

Assuming **NO** operator actions, which of the following will occur if the transfer operation occurs too slowly?

a. The reactor will trip due to the turbine tripping.

b. The reactor will trip on high pressurizer pressure.

c. Turbine power will automatically be lowered to approximately 50%.

d. The reactor will trip on PCS low flow.

Answer:

a. The reactor will trip due to the turbine tripping.

QUESTION NUMBER:	SRO	63	RO	63
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 057AA1.01
Ability to operate and/or monitor the following as they apply to the Loss of Vital AC Instrument Bus: Manual inverter swapping

K/A IMPORTANCE: SRO 3.7 RO 3.7

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: ASAB0G7.09
Explain the basis of any given Preferred DC, Preferred AC, and Instrument AC System (SOP-30), Plant Requirement, Precaution or Limitation, Caution, or Note.

REFERENCES: SOP-30

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 11290

JUSTIFICATION:

a. ✓ May result in loss of cooling tower pumps on low basin level.
b. Plausible since a loss of 2 protection buses would cause a trip. Y-50 transfer switch supplies power to Y-01, not any of the protection buses.
c. Plausible since a loss of 2 protection buses would cause a trip. Y-50 transfer switch supplies power to Y-01, not any of the protection buses.
d. Plausible since a loss of 2 protection buses would cause a trip. Y-50 transfer switch supplies power to Y-01, not any of the protection buses.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 4

Analysis of the effect of improper operations on the cooling tower system and the effect of this response on the plant.

REFERENCES SUPPLIED:

Question: 64

Given the following conditions:

- The plant is operating at 40% power.
- While performing Technical Specification Surveillance Procedure QO-34, Control Rod Exercising, it is determined that Regulating Group 4 Rod 39 will **NOT** move and it is declared inoperable.
- PCS boron concentration is 880 ppm.
- Core Burnup is 6000 MWd/MTU.
- EM-04-08, Shutdown Margin Requirements, is being performed due to the inoperable rod.
- When calculating the Shutdown Margin Requirements, 100% power boron concentration is required to be recorded.

100% power boron concentration should be recorded as approximately ...

a. 400 ppm.

b. 600 ppm.

c. 800 ppm.

d. 1000 ppm.

Answer:

c. 800 ppm.

QUESTION NUMBER:	SRO	64	RO	64
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 0052.1.25
Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data (Inoperable/Stuck Rod)

K/A IMPORTANCE: SRO 3.1 RO 2.8

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: ASEE0G9.01
Given various Plant conditions, c. Use applicable control room references to determine the actions required. EK-0911 Rod Position 4 inches Deviation EK-0912 Rod Position 8 inches Deviation

REFERENCES: Tech Data Book Figure 6.1
EM-04-08

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible if candidate estimates boron concentration to be approximately ½ of current due to being less than 50% power and boron changes being linear. Actual value is 800 ppm.
b. Plausible if candidate estimates boron concentration to be approximately ¾ of current due to being less than 50% power and boron changes not being linear. Actual value is 800 ppm.
c. ✓ At 6000 MWd/MTU, full power boron concentration is expected to be 800 ppm per Figure 6.1 of the TDB.
d. Plausible if candidate estimates boron concentration to be approximately 1.2 times current due to being less than 50% and boron changes not being linear. Actual value is 800 ppm.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Application of given information to graphical data to determine boron concentration.

REFERENCES SUPPLIED: EM-04-08, Attachment 1
Technical Data Book Figure 6.1

Question: 65

Given the following conditions:

- A Steam Generator Tube Rupture has occurred in SG 'A'.
- Actions are being performed in accordance with EOP-5.0, Steam Generator Tube Rupture Recovery.
- PCS temperature is 505 °F.
- SG 'A' pressure is 980 psia.
- Condenser vacuum is 2"Hg.

Steam pressure in SG 'A' should be controlled by ...

a. unisolating and opening the MSIV Bypass to allow steaming of SG 'A' through the Turbine Bypass Valve.

b. unisolating and operating an Atmospheric Dump Valve on SG 'A'.

c. cooling down the PCS by steaming SG 'B' using the Turbine Bypass Valve.

d. cooling down the PCS by steaming SG 'B' using an Atmospheric Dump Valve.

Answer:

b. unisolating and operating an Atmospheric Dump Valve on SG 'A'.

QUESTION NUMBER:	SRO	65	RO	65
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 0382.4.7
Knowledge of event based EOP mitigation strategies (SGTR)

K/A IMPORTANCE:	SRO	3.8	RO	3.1
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	12

OBJECTIVE: TBAF0A2.12
Given plant conditions involving a SGTR with the affected S/G isolated, discuss options available for cooling, depressurizing, and providing inventory control of the affected S/G including potential reactivity effects.

REFERENCES: EOP-5.0

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible since use of the TBV minimizes the radioactive release to the environment. The TBV is not available due to low vacuum.

b. ✓ Due to low vacuum, the TBV is not available so an ADV on the affected SG is required to be used to depressurize the SG.

c. Plausible since this would result in the minimal radiaoactive release to the environment. Cooling down the PCS will not result in the affected SG depressurizing.

d. Plausible since this would minimize the radiaoactive release to the environment. Cooling down the PCS will not result in the affected SG depressurizing.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions to determine best method for maintaining ruptured SG pressure.

REFERENCES SUPPLIED:

Question: 66

Which of the following combination of SIRWT levels will provide the required logic to generate a Recirculation Actuation Signal (RAS)?

	LS-0327 (LEFT CHANNEL)	**LS-0328 (RIGHT CHANNEL)**	**LS-0329 (LEFT CHANNEL)**	**LS-0330 (RIGHT CHANNEL)**
a.	1%	5%	5%	1%
b.	1%	5%	1%	5%
c.	5%	1%	5%	1%
d.	5%	1%	5%	5%

Answer:

a.	1%	5%	5%	1%

QUESTION NUMBER:	SRO	66	RO	66
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 013A3.01
Ability to monitor automatic operation of the ESFAS input channels and logic

K/A IMPORTANCE:	SRO	3.9	RO	3.7
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	7

OBJECTIVE: ASHA0A3.01
State the initiating parameters, including set points and logics, for: c. Recirculation Actuation Signal

REFERENCES: E-17, Sheet 5
LP-ASHA

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8822

JUSTIFICATION:

a. ✓ RAS actuation requires either LS-0327 or LS-0329 below 2% AND either LS-0328 or LS-0330 below 2%.

b. Plausible since combination of levels is required for RAS. Either LS-0328 or LS-0330 must also be below 2%.

c. Plausible since combination of levels is required for RAS. Either LS-0327 or LS-0329 must also be below 2%.

d. Plausible since combination of levels is required for RAS. Either LS-0327 or LS-0329 must also be below 2%.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Analysis of SIRWT level conditions to knowledge of RAS setpoint actuation.

REFERENCES SUPPLIED:

Question: 67

Given the following conditions and the attached drawing:

- Battery Chargers #1 and #2 are in service.
- Battery Charger #3 is inoperable and is to be tagged out.

The following sequence of events occur:

- Breaker 52-285 (Station Battery Charger #3) is opened.
- Breaker 72-15 (Charger #1) is mistakenly opened.

Which of the following additional breaker trips will result in a reactor trip?

a. 72-10

b. 72-18

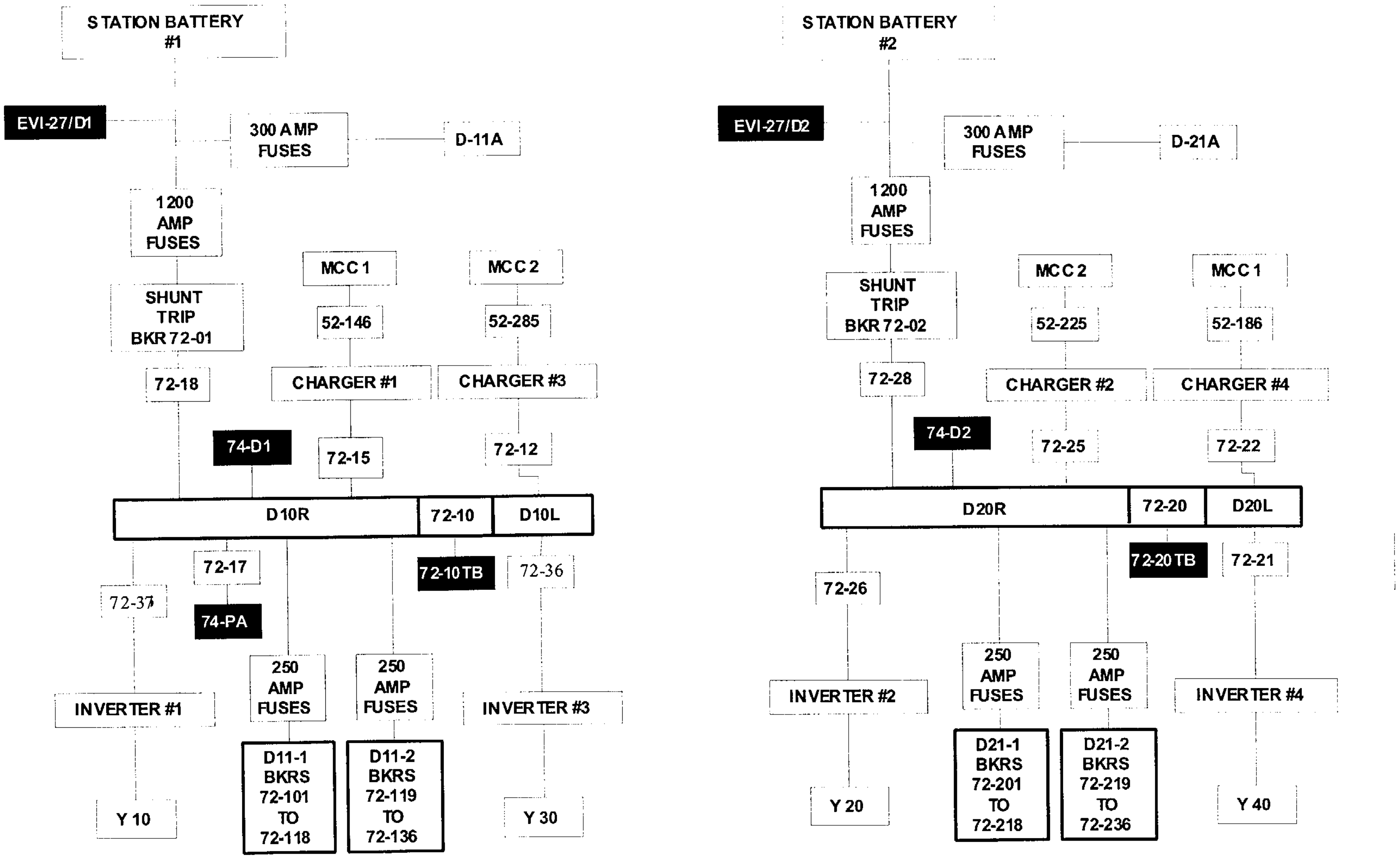
c. 72-36

d. 72-37

Answer:

b. 72-18

QUESTION #67 ATTACHMENT



QUESTION NUMBER:	SRO	67	RO	67
TIER/GROUP:	SRO	2/1	RO	2/2

K/A: 063K3.02
Knowledge of the effect that a loss or malfunction of the DC electrical system will have on the components using DC control power

K/A IMPORTANCE: SRO 3.7 RO 3.5

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 5

OBJECTIVE: TBAQG10.01
Given plant conditions, identify the expected plant responses for the following: c. Loss of DC Power

REFERENCES: E-8, Sheet 2

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 3954

JUSTIFICATION:

a. Plausible since this is the bus-tie breaker. 72-10 tripping will result in only 1 inverter being de-energized which will not cause a reactor trip.

b. ✓ 72-18 tripping will result in 2 inverters being de-energized which will cause a reactor trip.

c. Plausible since this is an inverter supply breaker. 72-36 tripping will result in only 1 inverter being de-energized which will not cause a reactor trip.

d. Plausible since this is an inverter supply breaker. 72-37 tripping will result in only 1 inverter being de-energized which will not cause a reactor trip.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of effect of loss of DC control power on reactor protection system.

REFERENCES SUPPLIED: Question 67 Attachment

Question: 68

Which of the following air compressors is affected by a loss of LCC-11?

a. C-2B, Instrument Air Compressor 2B

b. C-2C, Instrument Air Compressor 2C

c. C-6B, High Pressure Air Compressor 6B

d. C-6C, High Pressure Air Compressor 6C

Answer:

b. C-2C, Instrument Air Compressor 2C

QUESTION NUMBER:	SRO	68	RO	68
TIER/GROUP:	SRO	2/3	RO	2/3

K/A: 078K2.01
Knowledge of bus power supplies to the following: Instrument air compressor

K/A IMPORTANCE:	SRO	2.9	RO	2.7
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	4

OBJECTIVE: ASBC0A4.02
Given plant conditions involving the Plant Instrument and Service Air System, determine the operational status of the Plant Instrument Air Compressors.

REFERENCES: SOP-30

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 4790

JUSTIFICATION:

a. Plausible since voltage level is common to all compressors. Compressor supplied by LCC-12, breaker 52-1207.

b. ✓ Compressor supplied by LCC-11, breaker 52-1107.

c. Plausible since voltage level is common to all compressors. Compressor supplied by MCC-8, breaker 52-811. MCC-8 supplied by LCC-12.

d. Plausible since voltage level is common to all compressors. Compressor supplied by MCC-4, breaker 52-467. MCC-4 supplied by LCC-14

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of power supplies to air compressors.

REFERENCES SUPPLIED:

Question: 69

Annunciator EK-1309, Spent Fuel Pool Lo Level, alerts the operators that ...

a. makeup should be provided to maintain adequate shielding.

b. the SIRW Tank is potentially "backleaking" into the SFP.

c. the SFP Pumps must be secured due to loss of NPSH.

d. the SFP heat exchanger has a potential CCW leak.

Answer:

a. makeup should be provided to maintain adequate shielding.

QUESTION NUMBER:	SRO	69	RO	69
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 033A2.03
Ability to (a) predict the impacts of the following malfunction; and (b) based those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions: Abnormal spent fuel pool water level or loss of water level

K/A IMPORTANCE: SRO 3.5 RO 3.1

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 9

OBJECTIVE: ASCB0G9.01
Given various Plant conditions, one or more of the following annunciators in the alarmed condition: b. Describe the effect of a valid alarm condition on the operation of the Spent Fuel Pool System EK-1309, Spent Fuel Pool Lo Level

REFERENCES: ARP-8

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 974

JUSTIFICATION:

a. ✓ Low level indicates that level is being lost. Makeup must be provided to ensure adequate shielding of SFP.

b. Plausible since backleakage would cause level to change. Level would be rising if SIRWT were backleaking to SFP.

c. Plausible since loss of NPSH is a concern when losing level in suction source to pumps. Level is still above suction for pumps when alarm occurs.

d. Plausible since level would be lowering if pressure were higher in SFP cooling. CCW has a higher pressure so leakage would be into SFP.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Comprhension of the cause of the SFP alarm and the reason for alarm.

REFERENCES SUPPLIED:

Question: 70

During a sustained station blackout, the following conditions exist:

- PCS subcooling is determined to be 12 °F.
- The project Reactor Shutdown calculation indicates a the reactor will remain shutdown.

A natural circulation cooldown should be commenced to establish a subcooling margin of ...

a. between 25 °F and 50 °F.

b. between 50 °F and 75 °F.

c. between 75 °F and 100 °F.

d. greater than 100 °F.

Answer:

a. between 25 °F and 50 °F.

QUESTION NUMBER:	SRO	70	RO	70
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 055EK1.02
Knowledge of the operational implications of the following concepts as they apply to the Station Blackout: Natural circulation cooling

K/A IMPORTANCE: SRO 4.4 RO 4.1

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAR0G7.01
Given plant conditions involving a loss of all AC power: a. Describe the major actions necessary to stabilize plant conditions. b. Describe the consequences of failing to perform any given EOP 3.0 step.

REFERENCES:
EOP-3.0
EOP Setpoint Basis

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. ✓ Lower limit ensures subcooling exists, while upper limit minimizes pressure rise and PCS leakage with no makeup capabilities.
b. Plausible since generally more subcooling is desirable to ensure adequate heat removal. Range is 25 °F to 50 °F.
c. Plausible since generally more subcooling is desirable to ensure adequate heat removal. Range is 25 °F to 50 °F.
d. Plausible since generally more subcooling is desirable to ensure adequate heat removal. Range is 25 °F to 50 °F.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of limits of subcooling requirements during natural circulation.

REFERENCES SUPPLIED:

Question: 71

Given the following conditions:

- Reactor power is 1%.
- Alarms have come in indicating a dropped rod.
- The core mimic indicates a dropped rod.
- Tave is slowly lowering.

Which of the following actions should be taken?

a. Shut down the reactor and then recover the rod.

b. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

c. Stabilize the plant and recover the rod.

d. Lower power below the point of adding heat, stabilize the plant, and recover the rod.

Answer:

b. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

QUESTION NUMBER: SRO 71 RO 71
TIER/GROUP: SRO 1/1 RO 1/2

K/A: 003AK3.04
Knowledge of the reasons for the following responses as they apply to the Dropped Control Rod: Actions contained in EOP for dropped control rod

K/A IMPORTANCE: SRO 4.1 RO 3.8

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAN0A2.09
Given Plant conditions involving a dropped control rod, determine if a manual reactor trip is required IAW ONP-5.1.

REFERENCES: ONP-5.1
Tech Spec 1.0

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 12177

JUSTIFICATION:

a. Plausible since this will align all rods prior to withdrawing the dropped rod. A trip is required.
b. ✓ With the plant in Hot Standby (< 2% power), a single dropped rod requires a reactor trip.
c. Plausible since stabilizing and recovering the rod would be appropriate at a higher power level. A trip is required.
d. Plausible since stabilizing the plant would be required prior to recovering the rod if power was higher. A trip is required.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions to determine operator response to dropped rod.

REFERENCES SUPPLIED:

Question: 72

Given the following conditions:

- ΔT power is 88.5%.
- NI power is 88%.
- A feedwater transient occurs.

Which of the following would require a manual reactor trip?

a. Steam Generator levels both at 35% and stable

b. Steam Generator levels both at 45% and lowering

c. EK-0143, FW PUMP P1A TURBINE K7A TRIP, in alarm and the Throttle & Trip valves closed

d. PCS Tave rising slowly

Answer:

c. EK-0143, FW PUMP P1A TURBINE K7A TRIP, in alarm and the Throttle & Trip valves closed

QUESTION NUMBER:	SRO	72	RO	72
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 054AK3.01
Knowledge of the reasons for the following responses as they apply to the Loss of Main Feedwater (MFW): Reactor and/or turbine trip, manual and automatic

K/A IMPORTANCE:	SRO	4.4	RO	4.1

10CFR55 CONTENT:	55.43(b) SRO	55.41(b) RO	10

OBJECTIVE: TBAEG11.01
State the immediate actions of a Loss of Feedwater event IAW ONP 3.

REFERENCES: ONP-3.0

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8038

JUSTIFICATION:

a. Plausible since level is abnormally low. This is above the low level trip setpoint of the reactor.
b. Plausible since level is abnormally low and still lowering. This is above the low level trip setpoint of the reactor.
c. ✓ If either feed pump trips with power above 80%, a reactor trip is required.
d. Plausible since this is an expected condition following a feed water pump trip until adequate FW can be supplied by the remaining pump. Does not require a trip.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 2

Analysis of secondary plant conditions requiring a reactor trip.

REFERENCES SUPPLIED:

Question: 73

Which of the following valves will close on a Containment High Pressure signal, but will remain open on a Containment High Radiation signal?

a. CV-2083, Controlled Bleed-off Containment Isol

b. CV-0770, SG 'B' Bottom Blowdown

c. CV-0701, SG 'A' Main Feed Reg Valve

d. SV-2414A, Hydrogen Monitor Right Channel

Answer:

c. CV-0701, SG 'A' Main Feed Reg Valve

QUESTION NUMBER:	SRO	73	RO	73
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 013A1.07
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with Containment radiation

K/A IMPORTANCE: SRO 3.9 RO 3.6

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 9

OBJECTIVE: TBALG33.01
Given plant conditions, identify the expected plant responses for the following: b. Spurious containment isolation

REFERENCES: EOP Supplement 6

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 5317

JUSTIFICATION:

a. Plausible since bleedoff is contained in VCT so spread of contamination is limited. Closes on either a CHP or a CHR.

b. Plausible since maintaining blowdown for sampling may be desirable in event of SGTR. Closes on either a CHP or a CHR.

c. ✓ Feed reg valves remain open on a containment high radiation (CHR) condition, but close on a CHP.

d. Plausible since bypass feature is available to allow sampling containment. Closes on either a CHP or a CHR.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of containment isolation valve response to initiating signals.

REFERENCES SUPPLIED:

Question: 74

To determine the current high alarm setpoint on an Analog Radiation Monitor, the operator must depress the HIGH push button after placing the selector switch in …

a. OPERATE.

b. HV.

c. CAL.

d. OFF.

Answer:

c. CAL.

QUESTION NUMBER:	SRO	74	RO	74
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 072A4.01
Ability to manually operate and/or monitor in the control room: Alarm and interlock setpoint checks and adjustments

K/A IMPORTANCE: SRO 3.3 RO 3.0

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 11

OBJECTIVE: ASDC0G4.03
Given a diagram of an area or process monitor linear/log analog rate meter, state the function any given control or indicator.

REFERENCES: SOP-38

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 7728

JUSTIFICATION:

a. Plausible since this is a position on the selector switch that is normally aligned. Selector switch must be in CAL to check alert and high alarms.
b. Plausible since this is a position on the selector switch that is used for specific functions. Selector switch must be in CAL to check alert and high alarms.
c. ✓ Selector switch must be in CAL to check alert and high alarms.
d. Plausible since this is a position on the selector switch that is used for specific functions and with switch in OFF, actuation may occur. Selector switch must be in CAL to check alert and high alarms.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowedge of indications and controls on radiation monitors.

REFERENCES SUPPLIED:

Question: 75

Given the attached drawing and the following conditions:

- The system is being tagged out for repairs on the FLANGE and realignment of the motor to the pump coupling.
- Tags are to be placed on the following components:
  - ➢ PUMP SUCTION VALVE - CLOSED
  - ➢ PUMP SUPPLY BREAKER - OPEN
  - ➢ LOOP #1 ISOLATION VALVE - CLOSED
  - ➢ LOOP #2 ISOLATION VALVE - CLOSED
  - ➢ DRAIN VALVE - OPEN
- The PUMP DISCHARGE VALVE is **NOT** to be tagged.

Which of the following would be a satisfactory **SEQUENCE** for performing this tagging?

a.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG PUMP SUCTION VALVE
3. CLOSE and TAG LOOP #1 ISOLATION VALVE
4. CLOSE and TAG LOOP #2 ISOLATION VALVE
5. OPEN and TAG DRAIN VALVE

b.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG PUMP SUCTION VALVE
3. CLOSE and TAG LOOP #1 ISOLATION VALVE
4. CLOSE and TAG LOOP #2 ISOLATION VALVE
5. OPEN and TAG DRAIN VALVE

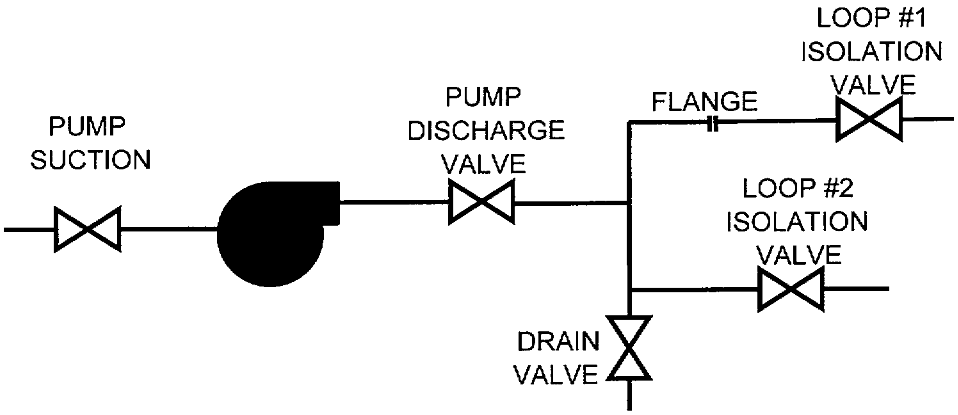
c.
1. CLOSE PUMP DISCHARGE VALVE
2. CLOSE and TAG PUMP SUCTION VALVE
3. OPEN and TAG PUMP SUPPLY BREAKER
4. CLOSE and TAG LOOP #1 ISOLATION VALVE
5. CLOSE and TAG LOOP #2 ISOLATION VALVE
6. OPEN and TAG DRAIN VALVE

d.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG LOOP #1 ISOLATION VALVE
3. CLOSE and TAG LOOP #2 ISOLATION VALVE
4. OPEN and TAG DRAIN VALVE
5. CLOSE and TAG PUMP SUCTION VALVE

Answer:

a.
1. OPEN and TAG PUMP SUPPLY BREAKER
2. CLOSE and TAG PUMP SUCTION VALVE
3. CLOSE and TAG LOOP #1 ISOLATION VALVE
4. CLOSE and TAG LOOP #2 ISOLATION VALVE
5. OPEN and TAG DRAIN VALVE

QUESTION #75 ATTACHMENT



QUESTION NUMBER:	SRO	75	RO	75
TIER/GROUP:	SRO	3	RO	3

K/A: 2.2.13
Knowledge of tagging and clearance procedures

K/A IMPORTANCE:	SRO	3.8	RO	3.6
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: PSTOT00.12
Given a request to Remove from Service, develop the Remove from Service order IAW AP 4.10.

REFERENCES: AP-4.10

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. ✓ Pump breaker should be tagged first, followed by discharge path, suction path, and then vents/drains.
b. Plausible if candidate determines incorrect sequence. Discharge should be tagged before suction.
c. Plausible if candidate determines incorrect sequence. Pump breaker should be tagged before mechanical tags.
d. Plausible if candidate determines incorrect sequence. Suction should be tagged before vents/drains.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 2

Application of tagging procedure requirements to system.

REFERENCES SUPPLIED: Question 75 Attachment

Question: 76

Given the following conditions:

- Indicated SG level is 62%.
- Containment temperature is 215 °F.
- SG pressure is 300 psia.

Actual SG level is …

a. 48%.

b. 53%.

c. 57%.

d. 62%.

Answer:

b. 53%.

QUESTION NUMBER:	SRO	76	RO	76
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 035K4.02
Knowledge of S/GS design feature(s) and/or interlock(s) which provide for the S/G level indication

K/A IMPORTANCE:	SRO	3.5	RO	3.2
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAC0A2.04
Given plant conditions, determine corrected steam generator level IAW EOP Supplement 11.

REFERENCES: EOP Supplement 11

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 1189

JUSTIFICATION:

a. Plausible if candidate makes level correction but uses incorrect curve for pressure. Incorrect pressure curve used.

b. ✓ 5% level correction must be made for temperature, then determine intersection of 300 psia curve and 57%.

c. Plausible if candidate uses incorrect curve for pressure and fails to make level correction. Incorrect pressure curve used and level correction applied incorrectly.

d. Plausible if candidate uses correct curve for pressure but fails to make level correction. Level correction applied incorrectly.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of given information to graphical data to determine SG level.

REFERENCES SUPPLIED: EOP Supplement 11

Question: 77

Given the following conditions:

- The plant is operating at 85% power.
- Cooling Tower Pump 'B' trips.
- Main Condenser vacuum begins lowering.
- The crew begins lowering power using ONP-26, Rapid Power Reduction.
- Power level reaches 55% when, EK-0111, VACUUM LO, alarms due to vacuum at 24" Hg.
- Vacuum **CONTINUES LOWERING** and does **NOT** recover to greater than 24" Hg.

Which of the following actions should be taken?

a. Trip the turbine and stabilize reactor power.

b. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

c. Continue the rapid power reduction until condenser vacuum stabilizes.

d. Continue the power reduction, using normal de-escalation rates, until condenser vacuum stabilizes.

Answer:

b. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions.

QUESTION NUMBER:	SRO	77	RO	77
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 051AA2.02
Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: Conditions requiring reactor and/or turbine trip

K/A IMPORTANCE: SRO 4.1 RO 3.9

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAKG11.01
State the Immediate Actions as listed in the following ONPs. c. ONP 14, Loss of Condenser Vacuum

REFERENCES: ONP-14

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 7935

JUSTIFICATION:

a. Plausible since vacuum does not cause a reactor trip, only a turbine trip. A reactor trip is required if above 15%.
b. ✓ With power above 15%, if vacuum does not stabilize above the low vacuum alarm, a reactor trip is required.
c. Plausible since still above the automatic trip setpoint. A reactor trip is required.
d. Plausible since still above the automatic trip setpoint. A reactor trip is required.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions to determine operator response to loss of vacuum.

REFERENCES SUPPLIED:

Question: 78

Given the following conditions:

- PCS temperature is 430 °F.
- The Low Temperature Overpressure Protection System (LTOP) is in service.
- A plant transient causes an LTOP actuation.
- Following the actuation, with Pressurizer Pressure at 375 psia, the operator notes that Pressurizer PORV PRV-1042B is still OPEN.
- Placing the hand switch for PORV PRV-1042B to CLOSE has **NO** effect.

Which of the following actions should be taken?

a. Allow pressure to lower to less than 350 psia, then verify PRV-1042B closes

b. Depress the RED Reset Push Button on Channel A LTOP

c. Place the Channel A LTOP Defeat/Enable key switch to DEFEAT

d. Place PORV Isolation Valve MO-1042A to CLOSE

Answer:

d. Place PORV Isolation Valve MO-1042A to CLOSE

QUESTION NUMBER:	SRO	78	RO	78
TIER/GROUP:	SRO	1/2	RO	1/1

K/A: 027AA1.01
Ability to operate and/or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: PZR heaters, sprays, and PORVs

K/A IMPORTANCE:	SRO	3.9	RO	4.0
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	3

OBJECTIVE: TBAN0A2.08
Given plant conditions involving a PZR pressure controller malfunction, determine the consequences of failing to perform any given step contained within ONP 18.

REFERENCES: ONP-18

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible if candidate determines that reset pressure is lower. The PORV should have closed by this pressure.
b. Plausible if candidate determines this will remove actuation signal. Only resets the trip indication.
c. Plausible since this removes actuation signal. Removes actuation signal, but valve should have closed already.
d. ✓ The PORV should have closed and must be isolated.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Analysis of plant conditions to determine proper action to take regarding failed PORV.

REFERENCES SUPPLIED:

Question: 79

Given the following conditions:

- The plant is operating at 12% power.
- DC Bus D21-2 de-energizes and isolates due to a fault.

Which of the following actions should be taken?

a. Trip the reactor and enter EOP-1.0.

b. Trip the turbine and stabilize reactor power.

c. Trip the reactor and trip all PCPs, and then enter EOP-1.0.

d. Ensure closed CV-2001, Letdown Stop Valve, and manually control charging.

Answer:

a. Trip the reactor and enter EOP-1.0.

QUESTION NUMBER:	SRO	79	RO	79
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 058AK3.02
Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: Actions contained in EOP for loss of DC power

K/A IMPORTANCE:	SRO	4.2	RO	4.0
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAQG11.01
State the immediate actions from memory for the following: c. Loss of DC Power

REFERENCES: ONP-2.3

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8014

JUSTIFICATION:

a. ✓ A loss of D21-2 causes a loss of non-critical SW. A reactor trip is required since power is above 5%.
b. Plausible since loss of load trip occurs above 15%. A reactor trip is required since power is above 5%.
c. Plausible if thought that cooling flow is lost to PCPs. PCPs are not required to be tripped.
d. Plausible since this action is required for loss of D11-1. A reactor trip is required since power is above 5%.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions to determine operator response to loss of DC power.

REFERENCES SUPPLIED:

Question: 80

Given the following conditions:

- An approach to criticality is being performed per GOP-3.0.
- Regulating Group 3 rods are currently at 5 inches.

Which of the following rod matrix lights should be ON for each group of rods?

	SHUTDOWN RODS	GROUP 1 RODS	GROUP 2 RODS	GROUP 3 RODS	GROUP 4 RODS	PART-LENGTH RODS
a.	Red Blue	Red	White	Amber	White	Red
b.	Blue White	Amber	Amber	White	Green	Red
c.	Red Blue	Amber	Amber	White	White	Amber
d.	Red Blue	Red	White	White	Green	Red

Answer:

d.	Red Blue	Red	White	White	Green	Red

QUESTION NUMBER:	SRO	80	RO	80
TIER/GROUP:	SRO	2/1	RO	2/2

K/A: 014A1.02
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RPIS controls, including: Control rod position indication on control room panels

K/A IMPORTANCE:	SRO	3.6	RO	3.2

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 2

OBJECTIVE: ASEE0G4.08
Given Control Room , determine the function of the green, red, amber, blue and white core matrix lights for each type control rod as applicable.

REFERENCES: SOP-6

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 7757

JUSTIFICATION:

a. Plausible since all except Group 3 and Group 4 indications are correct. Group 3 should be white and Group 4 should be green.

b. Plausible since all except Shutdown, Group 1 and Group 2 indications are correct. SD should be red/blue, Group 1 should be red, and Group 2 should be white.

c. Plausible since all except Group 1, Group 2, Group 4, and PL indications are correct. Group 1 should be red, Group 2 should be white, Group 4 should be green, and PL should be red.

d. ✓ SD rods are at top (red/blue), Group 1 rods at top (red), Group 2 rods at approximately 85 inches (white), Group 3 rods at 5 inches (white), Group 4 rods at LEL (green), and PL rods at top (red).

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Analysis of plant conditions to determine proper indications displayed by core matrix.

REFERENCES SUPPLIED: SOP-6, Attachment 3

Question: 81

Assuming normal turbine and control rod operations are performed, which of the following describes the plant response as reactor power is raised from 5% to 100%?

	T-REF	**T-AVE**	**SG PRESSURE**
a.	Lowers	Rises	Rises
b.	Rises	Rises	Lowers
c.	Rises	Lowers	Lowers
d.	Lowers	Lowers	Rises

Answer:

b.	Rises	Rises	Lowers

QUESTION NUMBER:	SRO	81	RO	81
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 002K5.11
Knowledge of the operational implications of the relationship between effects of the primary coolant system and the secondary coolant system

K/A IMPORTANCE: SRO 4.2 RO 4.0

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 5

OBJECTIVE: ASJB0A1.03
Given Plant conditions involving changing steam demand with no operator action, determine the effect on main steam pressure and PCS temperature.

REFERENCES: Tech Data Book Figure 3.3

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 3779

JUSTIFICATION:

a. Plausible since Tave rises. Tref rises and SG pressure lowers.
b. ✓ Withdrawing rods and diluting causes Tave to rise. Tref rises as more steam is admitted to turbine, and steam pressure lowers as steam flow rises.
c. Plausible since Tref rises and SG pressure lowers. Tave rises as rods are withdrawn and dilution occurs.
d. Plausible since Tref rises. Tave rises as rods are withdrawn and dilution occurs and SG pressure lowers as steam flow rises.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of changing plant conditions to determine PCS and secondary indication changes.

REFERENCES SUPPLIED:

Question: 82

According to AP-7.02, ALARA Program, an electrician who becomes aware of a potential radiation exposure problem should ensure it is evaluated by documenting the problem and submitting it to the ...

a. Control Room Supervisor.

b. Plant Safety Coordinator.

c. Radiation Safety Supervisor/Health Physicist.

d. Property Protection Supervisor.

Answer:

c. Radiation Safety Supervisor/Health Physicist.

QUESTION NUMBER:	SRO	82	RO	82
TIER/GROUP:	SRO	3	RO	3

K/A: 2.3.2
Knowledge of facility ALARA program

K/A IMPORTANCE:	SRO	2.9	RO	2.5
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	12

OBJECTIVE: ADAAG15.04
Describe the following IAW Admin Procedure 7.13. f. Individual responsibilities for proper radiation safety.

REFERENCES: AP-7.02

SOURCE: New Significantly Modified [✓ Modified/Direct]

Bank Number 5360

JUSTIFICATION:

a. Plausible since this is a supervisor. Concern should be raised with ALARA members, HP, Shift Supervisor, or immediate supervisor.
b. Plausible since this is a coordinator. Concern should be raised with ALARA members, HP, Shift Supervisor, or immediate supervisor.
c. ✓ Concern should be raised with ALARA members, HP, Shift Supervisor, or immediate supervisor.
d. Plausible since this is a supervisor. Concern should be raised with ALARA members, HP, Shift Supervisor, or immediate supervisor.

DIFFICULTY:
Comprehensive/Analysis [✓ Memory] Rating 2

Knowledge of ALARA administrative requirements.

REFERENCES SUPPLIED:

Question: 83

Given the following conditions:

- Tave and Tref are initially matched.
- A plant transient occurs which results in Tave being 5 °F higher than Tref.

Assuming **NO** rod movement or boron concentration changes were made ...

a. final main steam pressure is higher than initial conditions.

b. main steam pressure remains constant since reactor power remains constant.

c. final main steam pressure is lower than initial conditions.

d. main steam pressure remains constant since governor valves will adjust to maintain constant pressure.

Answer:

a. final main steam pressure is higher than initial conditions.

QUESTION NUMBER:	SRO	83	RO	83
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 039A1.06
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MRSS controls including: Main steam pressure

K/A IMPORTANCE:	SRO	3.1	RO	3.0

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 5

OBJECTIVE: RHAA0A1.02
Given plant conditions, analyze the data and predict any effect on any of the following: b. Reactor power f. SG parameters

REFERENCES: Steam Tables

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 7612

JUSTIFICATION:

a. ✓ Tave rising without adjusting boron or rods can only be caused by lower steam flow. Lower steam flow results in higher steam pressure.
b. Plausible since steam flow and power are interdependent. Steam pressure is dependent on Tave and steam flow, not reactor power.
c. Plausible since pressure will change. Steam pressure rises as steam flow lowers.
d. Plausible since governor valves respond to changes in load. Governor valves adjust to maintain load, not steam pressure.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of changing plant conditions to determine secondary plant response.

REFERENCES SUPPLIED: Steam Tables

Question: 84

Given the following conditions:

- Power has just been rapidly lowered from 60% to 20% in accordance with ONP-26, Rapid Power Reduction.
- SG levels are approximately 78% and rising slowly.
- Pressurizer pressure is 1985 psia and rising slowly.
- Pressurizer level is 39% and lowering slowly.
- PCS Tave is 523 °F and lowering slowly.

Which of the following actions should be taken?

a. Lower feedwater flow rate

b. Start an additional charging pump

c. Withdraw regulating rods approximately 10 steps

d. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions

Answer:

d. Trip the reactor and go to EOP-1.0, Standard Post-Trip Actions

QUESTION NUMBER: SRO 84 RO 84
TIER/GROUP: SRO 1/1 RO 1/1

K/A: CA11AK3.2
Knowledge of the reasons for the following responses as they apply to the RCS Overcooling: Normal, abnormal and emergency operating procedures associated with RCS Overcooling

K/A IMPORTANCE: SRO 3.4 RO 2.9

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAK0A2.07
Given plant conditions involving a rapid power reduction, determine if a manual reactor trip is required IAW ONP 26.

REFERENCES: ONP-26

SOURCE: New ✓ Significantly Modified Modified/Direct

Bank Number NA

JUSTIFICATION:

a. Plausible since SG levels are high and Tave is low. A reactor trip is required based on PCS Tave.
b. Plausible since pressurizer level is low. A reactor trip is required based on PCS Tave.
c. Plausible since temperature is low. A reactor trip is required based on PCS Tave.
d. ✓ Tave below 525 °F requires a reactor trip.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant response to overcooling condition of the PCS to determine proper actions.

REFERENCES SUPPLIED:

Question: 85

While performing Containment Isolation criteria verification in EOP-1.0, which of the following would **BOTH** require that Contingency Actions be taken?

a.
- Containment pressure > 4.0 psig
- Containment Area Monitor in alarm

b.
- Containment pressure > 4.0 psig
- Condenser Off Gas Monitor in alarm

c.
- Containment pressure > 4.0 psig
- Main Steam Line Monitor in alarm

d.
- Containment Area Monitor in alarm
- Condenser Off Gas Monitor in alarm

Answer:

a.
- Containment pressure > 4.0 psig
- Containment Area Monitor in alarm

QUESTION NUMBER:	SRO	85	RO	85
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 0072.4.1
Knowledge of EOP entry conditions and immediate action steps (Reactor Trip)

K/A IMPORTANCE:	SRO	4.6	RO	4.3
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBABG10.02
Given conditions involving a reactor trip, determine any required EOP 1.0 right-hand contingency action(s).

REFERENCES: EOP-1.0

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 5339

JUSTIFICATION:

a. ✓ If containment pressure is above 0.85 psig or if containment rad monitors are in alarm, contingency actions are required.
b. Plausible since this is indicative of a SG tube rupture. No contingency actions for off gas monitor.
c. Plausible since this is indicative of a SG tube rupture. No contingency actions for steamline monitor.
d. Plausible since this is indicative of a SG tube rupture. No contingency actions for off gas monitor.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of continguency actions during immediate operator actions.

REFERENCES SUPPLIED:

Question: 86

RIA-1809, Auxiliary Building Radwaste Area Vent Rad Monitor, has reached the high alarm condition.

Which of the following fans will be tripped?

a. V-10, Auxiliary Building Radwaste Area Supply Fan

b. V-67, Radwaste Addition Supply Fan

c. V-68, Radwaste Addition Exhaust Fan

d. V-70, Radwaste Addition Fuel Handling Area Exhaust Fan

Answer:

a. V-10, Auxiliary Building Radwaste Area Supply Fan

QUESTION NUMBER: SRO 86 RO 86
TIER/GROUP: SRO 1/2 RO 1/2

K/A: 060AK2.02
Knowledge of the interrelations between the Accidental Gaseous Radwaste Release and the Auxiliary building ventilation system

K/A IMPORTANCE: SRO 3.1 RO 2.7

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 9

OBJECTIVE: ASDB0K4.16
Given plant conditions involving a high radiation condition and P&IDs, predict the effect on the Purge and Ventilation System

REFERENCES:
ARP-8
M-218, Sh. 4

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 7624

JUSTIFICATION:

a. ✓ V-10 is only fan tripped by RIA-1809.
b. Plausible since tripped by other rad monitors. V-10 is tripped by RIA-1809.
c. Plausible since tripped by other rad monitors. V-10 is tripped by RIA-1809.
d. Plausible since tripped by other rad monitors. V-10 is tripped by RIA-1809.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 4

Ability to determine operation of components using P&ID.

REFERENCES SUPPLIED:
M-218, Sh. 4
M-656

Question: 87

While operating with reactor power above 15%, the power range safety channels ...

a. enable the loss of load reactor trip signals.

b. enable the high power rate reactor trip signals.

c. generate loss of load reactor trip signals.

d. generate high power rate reactor trip signals.

Answer:

a. enable the loss of load reactor trip signals.

QUESTION NUMBER:	SRO	87	RO	87
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 015K5.12
Knowledge of the operational implications of the following concepts as they apply to the NIS: Quadrant power tilt, including long-range effects

K/A IMPORTANCE: SRO 3.6 RO 3.2

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 8

OBJECTIVE: ASGA0K1.01
Describe the output signal locations of each range of nuclear instrumentation and set points (if applicable).

REFERENCES: TS 3.17.1

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 7600

JUSTIFICATION:

a. ✓ Above 15% the loss of load trip is enabled.

b. Plausible since enabled/disabled by same bistables as loss of load trip. Trip is enabled below 15% power.

c. Plausible since PR enables/disables trip. Trip is generated by turbine auto stop oil pressure.

d. Plausible since enabled/disabled by PR nuclear instruments. Trip is generated by WR nuclear instruments.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of function of power range excore NIs.

REFERENCES SUPPLIED:

Question: 88

Given the following conditions:

- The SIRW Tank boron concentration is to be raised from 1900 ppm to 2000 ppm.
- SIRW Tank level is currently 97% (289,955 gallons).
- Boric Acid Storage Tank "B" concentration is 13,100 ppm.

Approximately how many gallons of boric acid are required to be added to the SIRW Tank?

a. 2300 gallons

b. 2450 gallons

c. 2600 gallons

d. 2750 gallons

Answer:

c. 2600 gallons

QUESTION NUMBER:	SRO	88	RO	88
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 0062.1.25
Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data (ECCS)

K/A IMPORTANCE: SRO 3.1 RO 2.8

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 6

OBJECTIVE: ASFBG35.02
Given control room references, perform the following Primary Coolant System boron calculations: a. The volumes of boric acid and PMW (primary make-up water) required for make-up additions to the VCT

REFERENCES: Tech Data Book Figure 8.2

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 1093

JUSTIFICATION:

a. Plausible if candidate incorrectly calculates values. Correct value is 2612 gallons.
b. Plausible if candidate incorrectly calculates values. Correct value is 2612 gallons.
c. ✓ Using formula 5B of Figure 8.2, calculation yields 2612 gallons.
d. Plausible if candidate incorrectly calculates values. Correct value is 2612 gallons.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of given information to graphical data to determine boration needs.

REFERENCES SUPPLIED: Technical Data Book Figure 8.2

Question: 89

Given the following conditions:

- While performing a valve alignment, an Auxiliary Operator must enter an area containing a radioactive hot spot.
- The radiological survey indicates that the dose rate two (2) feet from the hot spot is 200 mRem/hr.
- The AO will be four (4) feet from the hot spot while aligning the valve.

The AO will be exposed to a radiation field of approximately ...

a. 150 mRem/hr.

b. 100 mRem/hr.

c. 50 mRem/hr.

d. 25 mRem/hr.

Answer:

c. 50 mRem/hr.

QUESTION NUMBER:	SRO	89	RO	89
TIER/GROUP:	SRO	3	RO	3

K/A: 2.3.10
Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure

K/A IMPORTANCE:	SRO	3.3	RO	2.9
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	12

OBJECTIVE: ADAAG15.02
Given a radiation exposure scenario, determine the ALARA solution using the radiation exposure theory inverse square law.

REFERENCES: LP-ADAA

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 12111

JUSTIFICATION:

a. Plausible if candidate incorrectly applies inverse square law. Uses ¾ of value instead of ¼.
b. Plausible if candidate incorrectly applies inverse square law. Uses ½ of value instead of ¼.
c. ✓ Using inverse square law, radiation field is 50 mrem/hr.
d. Plausible if candidate incorrectly applies inverse square law. Uses $^1/_8$ of value instead of ¼.

DIFFICULTY:

Comprehensive/Analysis ✓ Memory Rating 3

Application of the inverse square law to determine dose rate.

REFERENCES SUPPLIED:

Question: 90

Given the following conditions:

- The plant tripped from 40% power due to a loss of load.
- The reactor and the turbine tripped as designed.
- 'F' Bus in the Switchyard was also lost at the time of the trip.
- **NO** other equipment has malfunctioned.
- EOP-1.0, Standard Post-Trip Actions, has been completed.
- The operator reported that BOTH 2400 VAC Buses 1C and 1D are energized.

Buses 1C and 1D are being supplied by ...

a. their respective Diesel Generators.

b. Startup Transformer 1-2.

c. Safeguards Transformer 1-1.

d. Startup Transformer 1-1.

Answer:

b. Startup Transformer 1-2.

QUESTION NUMBER:	SRO	90	RO	90
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 062K1.04
Knowledge of the physical connections and/or cause-effect relationships between the AC distribution system and the off-site power sources

K/A IMPORTANCE: SRO 4.2 RO 3.7

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 7

OBJECTIVE: ASAA0G7.02
Given any manual or automatic operation of the Electrical Distribution equipment, predict the expected status of the following controls and indications: b. Relays 1. Start up transformer auxiliary undervoltage relays 2. Bus and incoming breaker relays.

REFERENCES:
EOP-1.0
E-1
LP-ASAA

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 12103

JUSTIFICATION:

a. Plausible if candidate determines 345 KV Bus F also supplies Startup Transformer 1-2. Startup Transformer 1-2 will supply Buses 1C and 1D.

b. ✓ 345 KV Bus F supplies Safeguards Transformer 1-1. Buses 1C and 1D will auto transfer to Startup Transformer 1-2 on loss of Safeguards Transformer 1-1.

c. Plausible if candidate determines Safeguards Transformer 1-1 supplied by 345 KV Bus R. 345 KV Bus F supplies Safeguards Transformer 1-1.

d. Plausible if candidate determines Startup Transformer 1-1, instead of Startup Transformer 1-2, was alternate supply. Startup Transformer 1-2 will supply Buses 1C and 1D.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions to determine response of safeguards buses to accident.

REFERENCES SUPPLIED:

Question: 91

Given the following conditions:

- A steamline break has occurred inside containment.
- Containment pressure is currently 2.4 psig after peaking at 11.5 psig.
- Containment temperature is currently 155 °F after peaking at 205 °F.
- Pressurizer pressure is 240 psia and stable.
- Average Qualified CET temperature is 275 °F and stable.
- Average Loop Thot is 270 °F and stable.
- Corrected Pressurizer Level is 48% and stable (cold cal).

Which of the following actions must be taken PRIOR to placing Shutdown Cooling in service?

a. Lower pressurizer pressure

b. Raise pressurizer level

c. Lower Average Qualified CET temperature

d. Raise subcooling

Answer:

a. Lower pressurizer pressure

QUESTION NUMBER:	SRO	91	RO	91
TIER/GROUP:	SRO	1/1	RO	1/1

K/A: 040AA1.12
Ability to operate and/or monitor the following as they apply to the Steam Line Rupture: RCS pressure and temperature

K/A IMPORTANCE: SRO 4.2 RO 4.2

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 10

OBJECTIVE: TBAD0G7.02
Given plant conditions involving an Excess Steam Demand Event, determine the consequences of failure to perform any given step within EOP 6.0.

REFERENCES:
EOP-6.0
EOP Supplement 1

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 5005

JUSTIFICATION:

a. ✓ Pressure must be lowered below 195 psia to allow placing SDC in service.

b. Plausible since pressurizer level must be above a required minimum level to establish SDC. Pressurizer level is adequate.

c. Plausible since temperature must be below threshold level for placing SDC in service. Temperature is within limit of 293 °F.

d. Plausible since subcooling must be above threshold level to place SDC in service. Subcooling is adequate.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 4

Analysis of given information to graphical data to determine required operator actions for SDC.

REFERENCES SUPPLIED:
EOP-6.0, Step 61
EOP Supplement 1

Question: 92

Given the following conditions:

- The plant was operating at 15% power.
- An automatic reactor trip and safety injection occurred as a result of lowering Pressurizer Pressure.
- Pressurizer pressure is currently 1000 psia.
- PCS temperature was stable prior to the Safety Injection, but has lowered since Pressurizer pressure dropped below 1200 psia.
- Pressurizer level was rising prior to the Safety Injection and is continuing to rise.

This transient is indicative of a ...

a. steam line break.

b. double-ended hot leg break.

c. stuck open pressurizer safety valve.

d. steam generator tube rupture.

Answer:

c. stuck open pressurizer safety valve.

QUESTION NUMBER:	SRO	92	RO	92
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 008AA2.20
Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: The effect of an open PORV or code safety, based on observation of plant parameters

K/A IMPORTANCE: SRO 3.6 RO 3.4

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 5

OBJECTIVE: TBAG0G7.02
Explain how an abnormally high PZR level may be an indication of a loss of coolant accident.

REFERENCES: LP-TBAG

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 12107

JUSTIFICATION:

a. Plausible since PCS pressure lowers as a result of a steam line break. Pressurizer level lowers as the PCS cools down.
b. Plausible since PCS pressure lowers as a result of a LOCA. Pressurizer level lowers as inventory is lost.
c. ✓ A stuck open pressurizer safety valve will cause saturation conditions to be reached in the PCS, resulting in water being displaced into the pressurizer as pressure lowers in the top.
d. Plausible since PCS pressure lowers as a result of a SGTR. Pressurizer level lowers as inventory is lost.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 2

Comprehension of the plant response and indications to different accidents.

REFERENCES SUPPLIED:

Question: 93

Given the following conditions:

- A spent fuel bundle has been dropped in the spent fuel pool.
- Radiation levels in the spent fuel pool area have reached the high radiation setpoint.
- All automatic actions have occurred.

Which fan must be manually aligned in response to this event?

a. V-7, Fuel Handling Supply Fan

b. V-8B, Fuel Handling Exhaust Fan

c. V-69, Fuel Handling Area Supply Fan

d. V-70A, Fuel Handling Area Exhaust Fan

Answer:

a. V-7, Fuel Handling Supply Fan

QUESTION NUMBER:	SRO	93	RO	93
TIER/GROUP:	SRO	1/2	RO	1/2

K/A: 061AA1.01
Ability to operate and/or monitor the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: Automatic actuation

K/A IMPORTANCE: SRO 3.6 RO 3.6

10CFR55 CONTENT: 55.43(b) SRO 55.41(b) RO 12

OBJECTIVE: TBALG10.01
Given plant conditions, identify the required operator action(s) for the following: d. Fuel handling accident

REFERENCES: ONP-11.2

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 8878

JUSTIFICATION:

a. ✓ Immediate action for ONP-11.2 to stop this fan.
b. Plausible since fan is part of fuel building ventilation. Fan should remain running during this event.
c. Plausible since fan is part of fuel building ventilation. Fan is automatically tripped by high radiation level.
d. Plausible since fan is part of fuel building ventilation. Fan trips when supply fan trips.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of automatic response to high radiation alarms.

REFERENCES SUPPLIED:

Question: 94

Which of the following Nuclear Instruments will become de-energized upon a loss of Preferred AC Bus Y-30?

a. Power Range channel NI-5

b. Power Range channel NI-6

c. Source/Wide Range channel NI-1/3

d. Source/Wide Range channel NI-2/4

Answer:

c. Source/Wide Range channel NI-1/3

QUESTION NUMBER:	SRO	94	RO	94
TIER/GROUP:	SRO	2/1	RO	2/1

K/A: 015K2.01
Knowledge of bus power supplies to the following: NIS channels, components, and interconnections

K/A IMPORTANCE:	SRO	3.7	RO	3.3
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	10

OBJECTIVE: TBAP0K6.01
Given a Subsequent Action of the following Off-Normal Procedures, determine the consequences of omitting a particular step in those actions. d. ONP-24.4 Loss of Preferred AC Bus Y-40

REFERENCES: ONP-24.3

SOURCE: New   Significantly Modified ✓   Modified/Direct

Bank Number 9166

JUSTIFICATION:

a. Plausible since supplied by a preferred AC bus. Power supply is Y-10.
b. Plausible since supplied by a preferred AC bus. Power supply is Y-20.
c. ✓ Power supply is Y-30. De-energizes on loss of power.
d. Plausible since supplied by a preferred AC bus. Power supply is Y-40.

DIFFICULTY:
Comprehensive/Analysis   Memory ✓   Rating 2

Knowledge of power supplies to excore NIs.

REFERENCES SUPPLIED:

Question: 95

Which of the following describes the interlock between MOV-3081, HPSI Train 1 Cold Leg Isolation Valve, and MOV-3083, Hot Leg Injection Valve?

a. The hand switch for MOV-3081 must be in AUTO before MOV-3083 may be opened

b. MOV-3083 must be closed before MOV-3081 may be opened

c. SS-3083B, Hot Leg Injection Selector Switch, must be in the "MO-3083" position before MOV-3081 may be closed

d. MOV-3081 must be closed before MOV-3083 may be opened

Answer:

d. MOV-3081 must be closed before MOV-3083 may be opened

QUESTION NUMBER:	SRO	95	RO	95
TIER/GROUP:	SRO	2/2	RO	2/2

K/A: 006K4.17
Knowledge of ECCS design feature(s) and/or interlock(s) which provide for the Safety Injection Valve Interlocks

K/A IMPORTANCE:	SRO	4.1	RO	3.8
10CFR55 CONTENT:	55.43(b) SRO		55.41(b) RO	7

OBJECTIVE: ASHA0K4.01
Describe the basis for the interlocks and piping configuration associated with hot leg injection valves (MO-3080, 3082 and MO-3081, 3083).

REFERENCES:
M-203, Sheet 2
EOP-4.0
LP-ASHA

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 5115

JUSTIFICATION:

a. Plausible if candidate determines that AUTO position will cause valve to close. 3081 must be closed before opening 3083.
b. Plausible if candidate determines that interlock functions in both directions. 3081 must be closed before opening 3083.
c. Plausible if candidate determines that 3083 position will cause 3081 to close. 3081 must be closed before opening 3083.
d. ✓ To prevent HPSI pump runout, the cold leg injection valve must be closed before the hot leg injection valve is opened.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 3

Knowledge of interlocks associated with SI valves.

REFERENCES SUPPLIED:

Question: 96

Given the following conditions:

- The plant is in Hot Standby.
- At 1000 on May 13, 2000, it is determined that a required surveillance on a Technical Specification component was **NOT** performed within the required time schedule.
- The ACTION statement for the component requires that the plant be placed in Hot Shutdown within six (6) hours if found inoperable.

The plant must be placed in Hot Shutdown **NO LATER THAN** ...

a. 1600 on May 13th.

b. 2200 on May 13th.

c. 1000 on May 14th.

d. 1600 on May 14th.

Answer:

d. 1600 on May 14th.

QUESTION NUMBER:	SRO	96	RO
TIER/GROUP:	SRO	3	RO

K/A: 2.1.33
Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications

K/A IMPORTANCE:	SRO	4.0	RO
10CFR55 CONTENT:	55.43(b) SRO	5	55.41(b) RO

OBJECTIVE: ADAT0A1.05
Given Technical Specifications and a structure, system or component; determine the surveillance requirements for that structure, system or component.

REFERENCES: TS 4.0.3

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 12232

JUSTIFICATION:

a. Plausible since this is 6 hours after discovery. A 24 hour period is permitted to complete the missed surveillance prior to performing the required shutdown.
b. Plausible since some time period is permitted to allow completion of the surveillance prior to entering the action. A 24 hour period is permitted to complete the missed surveillance prior to performing the required shutdown.
c. Plausible since 24 hours is permitted to allow completion of the surveillance prior to entering the action. A 24 hour period is permitted to complete the missed surveillance prior to performing the required shutdown.
d. ✓ The action requirements may be delayed for up to 24 hours to permit the completion of the surveillance when the allowable outage time limits of the action requirements are less than 24 hours.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Analysis of plant conditions to determine applicability of Tech Spec shutdown requirements.

REFERENCES SUPPLIED:

Question: 97

When PCS temperature is below 450 °F, the PCP operation is limited to a MAXIMUM number of three (3) to ...

a. limit PCS heatup rates.

b. ensure an adequate NPSH.

c. limit steam generator tube stresses.

d. prevent core uplift.

Answer:

d. prevent core uplift.

QUESTION NUMBER:		SRO	97		RO
TIER/GROUP:		SRO	2/1		RO

K/A: 003K5.09
Knowledge of the operational implications of the following concepts as they apply to the RCPS: Effects of RCP operation on ΔP, especially at lower temperatures

K/A IMPORTANCE:		SRO	2.6		RO
10CFR55 CONTENT:	55.43(b)	SRO	2	55.41(b)	RO

OBJECTIVE: ASED0K1.21
Given SOP-1 Attachment 2 and values for PCS temperature and pressure, determine if PCP operation is allowed.

REFERENCES: SOP-1
EOP Setpoint

SOURCE: New   Significantly Modified   Modified/Direct ✓

Bank Number 8805

JUSTIFICATION:

a. Plausible since PCS heatup limits also apply, but are not dependent on PCP configuration. Limited for core uplift considerations.

b. Plausible since PCS pressure will be lowered as PCS temperature is lowered. Limited for core uplift considerations.

c. Plausible since tube stresses are a consideration for primary to secondary ΔP. Limited for core uplift considerations.

d. ✓ A maximum of 3 PCPs are permitted to be operated below 450 °F for core uplift considerations.

DIFFICULTY:
Comprehensive/Analysis   Memory ✓   Rating 3

Knowledge of system operating limitations reasons.

REFERENCES SUPPLIED:

Question: 98

Given the following conditions:

- EOP-5.0, Steam Generator Tube Rupture, is being performed.
- All rods are fully inserted.
- Latest PCS boron concentration is 780 ppm.
- Cold Shutdown PCS boron concentration is 1180 ppm.
- Refueling boron concentration is 2350 ppm.
- CBAST concentration is 12,100 ppm.
- CBAST level is 84%.

To ensure Cold Shutdown Boron Concentration is met prior to cooling down, CBAST level must be lowered to approximately ...

a. 44%.

b. 40%.

c. 36%.

d. 32%.

Answer:

b. 40%.

QUESTION NUMBER:	SRO	98	RO
TIER/GROUP:	SRO	1/1	RO

K/A: 024AK1.03
Knowledge of the operational implications of the following concepts as they apply to Emergency Boration: Calculation of boration time from volumetric boron addition and addition rate

K/A IMPORTANCE:	SRO	2.9	RO
10CFR55 CONTENT:	55.43(b) SRO	6	55.41(b) RO

OBJECTIVE: RTC0G28.06
Given Plant conditions and EOP Supplement 35, determine the change in BAST level required for any requested change in PCS boron concentration.

REFERENCES: EOP Supplement 35

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 11545

JUSTIFICATION:

a. ✓ A 400 ppm change requires level be lowered 44% (11.0% per 100 ppm change with a boron concentration of 12,000 ppm).
b. Plausible if candidate uses value for 13,000 ppm instead of 12,000 ppm. Required change is 44%.
c. Plausible if candidate incorrectly calculates change. Required change is 44%.
d. Plausible if candidate incorrectly calculates change. Required change is 44%.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of given information to graphical data to determine boration requirements.

REFERENCES SUPPLIED: EOP Supplement 35

Question: 99

Following declaration of an emergency, the Shift Supervisor shall ensure the NRC is notified via the Emergency Notification System, as soon as possible, but in all cases within ...

a. 15 minutes.

b. 30 minutes.

c. 60 minutes.

d. 90 minutes.

Answer:

c. 60 minutes.

QUESTION NUMBER:	SRO	99	RO
TIER/GROUP:	SRO	3	RO

K/A: 2.4.30
Knowledge of which events related to system operations/status should be reported to outside agencies

K/A IMPORTANCE:	SRO	3.6	RO
10CFR55 CONTENT:	55.43(b) SRO	5	55.41(b) RO

OBJECTIVE: ADAD0G3.02
Apply administrative and corporate philosophy to incident reporting requirements.

REFERENCES: AP-4.00

SOURCE: New Significantly Modified Modified/Direct ✓

Bank Number 715

JUSTIFICATION:

a. Plausible since 15 minute notification is required to county and state officials. NRC notification requirement is as soon as possible, but within 1 hour.
b. Plausible since this time frame is within reasonable time based on 15 minute and 60 minute requirements. NRC notification is required as soon as possible, but within 1 hour.
c. ✓ Notifications shall be made as soon as possible, but within 1 hour.
d. Plausible since this time frame is within reasonable time based on 15 minute and 60 minute requirements. NRC notification is required as soon as possible, but within 1 hour.

DIFFICULTY:
Comprehensive/Analysis Memory ✓ Rating 2

Knowledge of communication requirements during Emergency Plan implementation.

REFERENCES SUPPLIED:

Question: 100

Given the following conditions and Technical Specification 3.7.9:

- The plant is at 25% power.
- 125 VDC Bus Section D10-L is inoperable due to a ground of undetermined origin.
- Preferred AC Bus Y-30 is being supplied by the Bypass Regulator.
- While preparing to work on D10-L, an Electrical Technician mistakenly goes to 125 VDC Bus Section D20-L and causes this bus section to de-energize.
- Due to the Technician's error, Bus Section D-20L **CANNOT** be immediately re-energized.

Which of the following actions should be taken?

a. Restore **EITHER** D10-L **OR** D20-L to OPERABLE status within 8 hours, or be in HOT STANDBY within the following 6 hours.

b. Restore **BOTH** D10-L **AND** D20-L to OPERABLE status within 8 hours, or be in HOT SHUTDOWN within the following 12 hours.

c. Make preparations within the next hour to be in HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the following 6 hours.

d. Restore **BOTH** D10-L **AND** D20-L to OPERABLE status within 8 hours, or be in HOT STANDBY within the following 6 hours.

Answer:

c. Make preparations within the next hour to be in HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the following 6 hours.

QUESTION NUMBER:	SRO	100	RO
TIER/GROUP:	SRO	2/1	RO

K/A: 0632.1.12
Ability to apply technical specifications for a system (DC Electrical)

K/A IMPORTANCE:	SRO	4.0	RO
10CFR55 CONTENT:	55.43(b) SRO	2	55.41(b) RO

OBJECTIVE: ASAB0G8.01
Given plant conditions and Figure ASAB-01, identify the Preferred AC and 125 Volt DC electrical system components that are required to be operable per Technical Specification 3.7.

REFERENCES: TS 3.7.9

SOURCE: New Significantly Modified ✓ Modified/Direct

Bank Number 9087

JUSTIFICATION:

a. Plausible if candidate determines only one bus must be restored. With both D10-L and D20-L inoperable, entry must be made into TS 3.0.3 per TS 3.7.9.E.

b. Plausible if candidate determines time is permitted to restore buses to service prior to commencing shutdown. With both D10-L and D20-L inoperable, entry must be made into TS 3.0.3 per TS 3.7.9.E.

c. ✓ With both D10-L and D20-L inoperable, entry must be made into TS 3.0.3 per TS 3.7.9.E.

d. Plausible if candidate determines time is permitted to restore buses to service prior to commencing shutdown. With both D10-L and D20-L inoperable, entry must be made into TS 3.0.3 per TS 3.7.9.E.

DIFFICULTY:
Comprehensive/Analysis ✓ Memory Rating 3

Application of given conditions to determine Tech Spec action requirements.

REFERENCES SUPPLIED: TS 3.7.9