

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-498/95-13
50-499/95-13

Licenses: NPF-76
NPF-80

Licensee: Houston Lighting & Power Company
P.O. Box 1700
Houston, Texas

Facility Name: South Texas Project Electric Generating Station, Units 1 and 2

Inspection At: Bay City, Texas

Inspection Conducted: August 21 through September 15, 1995


Inspectors: M. E. Murphy, Chief Examiner, Division of Reactor Safety

Accompanying Personnel: T. Guilfoil, Contractor Examiner
Sonalysts, Inc.

D. Lane, Contractor Examiner
Sonalysts, Inc.

B. McGonegal, Contractor Examiner
Sonalysts, Inc.

Approved:



J. V. Tapia, Acting Chief, Operations Branch
Division of Reactor Safety

10/3/95
Date

Inspection Summary

Areas Inspected (Units 1 and 2): Routine, announced inspection of the qualifications of applicants for operator licenses at the South Texas Project facility, which included an eligibility determination and administration of comprehensive written and operating examinations. The examination team also observed the performance of on-shift operators and plant conditions incident to the conduct of the applicant evaluations. The examiners used the guidance provided in NUREG-1021, "Operator Licensing Examiner Standards," Revision 7.

Results (Units 1 and 2):

Plant Operations

- All applicants for senior reactor operator licenses satisfied the requirements of 10 CFR 55.33(a)(2) and have been issued the appropriate licenses (Section 1).
- Applicants performed well on the written examination. Scores ranged from a low of 83 percent to a high of 90 percent, with an average of 87.5 percent (Section 1.2).
- Command and control were considered good and consistent with previously observed good performance (Section 1.3).
- The applicants' communications and self-checking disciplines were very good and mirrored observed performance in the plant (Sections 1.3 & 1.4).
- Facility training staff support of the operating examination was very good (Section 1.5).
- Simulator performance was less than expected since the incorporation of new program software. Several performance and modeling anomalies were identified during the validation and conduct of the operating examinations. Along with the backlog of licensee identified problems, the anomalies raised concern about the potential for negative training. The licensee's resolution of simulator problems will be tracked as an Inspector Follow-up Item (Section 1.5).

Plant Support

- The examiners concluded that cleanliness and housekeeping in the plant were very good.

Summary of Inspection Findings:

- Inspector Follow-up Item 50-498/9513-01;50-499/9513-01 was opened.

Attachments:

- Attachment 1- Persons Contacted and Exit Meeting
- Attachment 2- Simulation Facility Report
- Attachment 3- Facility Licensee Post-Examination Comments
- Attachment 4- Written Examination and Answer Key

DETAILS

1 LICENSED OPERATOR APPLICANT INITIAL QUALIFICATION EVALUATION (NUREG-1021)

During the inspection, the examiners evaluated the qualifications of ten license applicants for senior reactor operator licenses. The inspection assessed the eligibility of the applicants to be issued licenses to operate and direct operation of the reactivity controls of a commercial nuclear power facility in accordance with 10 CFR 55. The examination process utilized the guidance contained in NUREG-1021, "Operator License Examiner Standards," Revision 7, Supplement 1, Sections 200, 300, and 400 (series). Furthermore, the inspection included evaluations of facility materials, procedures, and simulation capability used to support development and administration of the examinations. Additionally, the examination team also observed the performance of on-shift operators and plant conditions incident to the conduct of the in-plant applicant evaluations.

After completion of the evaluations, the examiners recommended that all applicants for senior reactor licenses satisfied the requirements of 10 CFR 55.33(a)(2). All have been issued the appropriate licenses.

1 Facility Materials Submitted for Examination Development

The examiners reviewed the licensee's materials provided for development of the examination, which included station administrative and operating procedures, lesson plans, question banks, simulator scenarios, and job performance measures. All materials were adequate in scope, depth, and variety.

1.2 Written Examinations

The examiners developed a comprehensive senior reactor operator written examination in accordance with the guidelines of NUREG-1021, Revision 7, Supplement 1, Section 401. The examination consisted of 100 multiple choice questions. During the week of August 21, 1995, members of the facility operations and training departments, under the provisions of NUREG-1021, which require execution of a nondisclosure security agreement, reviewed the examinations at the South Texas Project site. The NRC considers the preadministration review of the examination by the facility as part of the examination development process. Therefore, the specific comments resulting from that review are not reported. The examiners incorporated the facility comments and administered the examinations to the license applicants on September 11, 1995.

The chief examiner provided the facility training staff with a copy of the as administered written examination and answer key on September 11, 1995, immediately following the completion of the examination by the applicants. The facility reviewed the as-administered examination and identified two questions that had two correct answers. The facility comments are provided in Attachment 3. Based on an analysis of the comments, supporting information

supplied by and communications with the facility staff, and other material available to the chief examiner, the facility comments were found to be technically correct and the actions requested by the facility to be in accordance with NUREG-1021, Revision 7, Supplement 1. Therefore, two correct answers were allowed for two questions, Nos. 97 and 100, and were incorporated in the master examination answer key in Attachment 4.

Overall, applicants performed well on the written examination. Scores ranged from a low of 83 percent to a high of 90 percent with an average of 87.5 percent overall. All the applicants passed the written examination.

The chief examiner reviewed applicant performance on individual questions. The below listed questions are those which 50 percent or more of the applicants answered incorrectly.

- Question Nos. 1, 18, 23, 28, 36, 38, 82, 88, and 89.

No specific areas of significant knowledge weakness were apparent in the responses to the above questions. Therefore, this information is provided to the facility training staff for internal consideration and use.

1.3 Operating Examinations

The examiners developed comprehensive operating examinations in accordance with the guidelines of NUREG-1021, Revision 7, Supplement 1, Section 301. The operating examinations consisted of three parts: administrative topics, control room systems and facility walk-through, and integrated plant operation. The examination team previewed and validated the various portions of the operating examinations at the South Texas Project site during the week of August 21, 1995, with the assistance of facility training and operations personnel under security agreement. The examiners administered the operating examinations during the week of September 11, 1995.

1.3.1 Integrated Plant Operations

The examiners evaluated three crews on three or four scenarios, as appropriate to the crew composition, using the South Texas Project plant-specific simulation facility. The examiners compared the applicants' actual performance during the scenarios with expected performance in accordance with the requirements of NUREG-1021, Revision 7, Supplement 1, Section 303.

The applicants demonstrated very good command and communications discipline during this portion of the operating examination. This level of command and communication performance was consistent with that observed in previous inspections and examinations. All applicants demonstrated good adherence to the self-checking program. Overall, performance across the crews was very good. All applicants passed this portion of the operating examination.

1.3.2 Administrative Topics and Control Room Systems/Facility Walk-Through

The examiners evaluated the administrative capability and system operations ability of each of the applicants, using job performance measures and prescribed questions. The tasks and questions related to the scope of potential duties of a licensed senior reactor operator. The administrative portion used job performance measures or prescribed questions to assess the ability of the applicants to carry out their various administrative responsibilities. The scope of system-related tasks included nonlicensed operator tasks outside the control room. The applicants performed some of the tasks in the simulation facility in the dynamic mode. They simulated the remainder of the tasks in the plant control room and at local operating stations throughout the plant through discussions. To further assess system knowledge, the examiners asked prescribed questions relating to the system involved in each task. The questions solicited "short-answer" responses and permitted the applicants to use operationally controlled references to aid in their responses, unless specifically annotated to require a response from memory.

Each applicant was required to enter the protected, vital, and radiation control areas to complete one or more tasks. Applicants were familiar with facility escort procedures on entering these areas with a visiting examiner. The applicants properly followed facility radiation control and foreign material exclusion procedures. The examiners noted that applicants were observant of activities in the plant.

The examiners combined the applicants' task performance and question responses in accordance with the guidelines of NUREG-1021, Revision 7, Supplement 1, Section 303, to evaluate performance on these portions of the operating examination. The applicants performed well and all passed this portion of the operating examination.

1.4 Observations

The examination team observed the performance of on-shift operators and plant conditions incident to the conduct of the in-plant applicant evaluations. These observations did not impact the evaluation of individual applicants and are included in this report for information only.

The examiners concluded that cleanliness and housekeeping in the plant was very good.

Control room communications were observed incident to the control room walk-through examinations. Shift crew alarm response and communications were very good and mirrored that demonstrated by applicants during the dynamic simulator portion of the operating examination.

1.5 Simulator Fidelity

During both the validation and conduct of the operating examinations, the simulator exhibited several performance and modeling anomalies. However, the anomalies had no adverse impact on applicant performance or examiner evaluations and examination validity. The facility initiated a new simulator software program in January of this year and has identified numerous performance and modeling problems. For example, during the period of this examination, 118 items were identified, including those encountered by the examiners during the validation and performance phases of the examination. The examiners were concerned about the number of performance and modeling problems and the potential for negative training. The licensee had established a recovery program for the backlog of simulator program performance and modeling problems. The status of this recovery program and any compensatory measures for negative training concerns will be reviewed during the next inspection and tracked as Inspector Follow-up Item 50-498/9513-01;50-499/9513-01.

ATTACHMENT 1

1 PERSONS CONTACTED

J. Brodsky, Nuclear Training Instructor
H. Butterworth, Manager, Operations Support
J. Carlin, Manager, Nuclear Training
M. DeFrees, Lead Instructor
B. Doss, Simulator Support Supervisor
W. Dowdy, Manager, Unit 2 Operations
D. Kline, Simulator Support
D. LeGrand, Manager, Operations Training
J. Lovell, Manager, Unit 1 Operations
R. McAnnally, Instructor
K. Struble, Shift Supervisor

All personnel listed above attended the exit meeting.

In addition to the personnel listed above, the examiners contacted other personnel during this inspection period.

2 EXIT MEETING

An exit meeting was conducted on September 15, 1995. During this meeting, the chief examiner reviewed the scope and generic findings of the inspection. The chief examiner did not disclose preliminary results of individual evaluations since they are subject to change during the final review and approval process. The licensee did not identify, as proprietary, any information provided to, or reviewed by, the examiners. The licensee did not state any position on the findings presented during the exit meeting.

ATTACHMENT 2

SIMULATION FACILITY REPORT

Facility Licensee: Houston Lighting & Power Company

Facility Docket: 50-498/499

Operating Tests Administered at: South Texas Project Electric Generating
Station, Units 1 and 2

Operating Tests Administered on: September 12-14, 1995

These observations do not constitute audit or inspection findings and are not, without further verification and review, indicative of noncompliance with 10 CFR 55.45(b). These observations do not affect NRC certification or approval of the simulation facility, other than to provide information which may be used in future evaluations.

During both the validation and conduct of the operating examinations, the simulator exhibited several performance and modeling anomalies. However, these anomalies had no adverse impact on applicant performance or examiner evaluations.

ATTACHMENT 3

FACILITY LICENSEE POST-EXAMINATION COMMENTS

COMMENTS ON NRC SRO EXAM GIVEN 9/11/95

1. Question 97

According to OPGP03-ZA-0010 section 4.6 substeps 4.6.2 and 4.6.5 (see attached) answers b and d are both correct. Suggest excepting both answers when grading exam.

2. Question 100

According to OPGP03-ZO-EC01 Addendum 3 section 2.0 (see attached) answers b and d are both correct since a breaker can be an applicable control for caution tagging. Also the question was apparently not changed per comments made during exam review. Suggest excepting both answers b and d as correct.

QUESTION: 097 (1.00)

WHICH ONE of the following conditions would require DUAL VERIFICATION?

- a. Alignment of systems which perform a safety function.
- b. Whenever the consequences of human error warrant an additional barrier to prevent misperformance.
- c. Prior to relying on the component to perform its safety function.
- d. When specified in written instructions.

Performing and Verifying Station Activities

4.6 Dual Verification

- 4.6.1 Dual verification is the act, by a second individual in conjunction with the performer, of checking the performance of an activity, prior to or concurrent with the activity, to ensure that the correct activity is being performed on the correct component, or that the result obtained is the desired result.
- 4.6.2 Dual verification is intended to provide a barrier to ensure that human error does not occur.
- 4.6.3 Dual verification of actions applies to steps where the action has a recognized high risk to causing a Reactor Protection System or Engineered Safety Features actuation, significant equipment damage and/or personnel injury.
- 4.6.4 Dual verification of results applies to measurements or responses where the outcome has particular significance from a configuration or quality control standpoint or where a likelihood of human error due to environmental or human factors exists.
- 4.6.5 Dual verification shall be performed when specified in written instructions. Individuals who prepare written instructions are responsible for ensuring dual verification is specified where appropriate.
- 4.6.6 Dual Verification Method
- 4.6.6.1 Prior to step performance, the performer and verifier shall independently read or have read the step to be performed. The performer and the verifier shall agree that the step is understood.
- 4.6.6.2 The performer shall locate the component to which the step applies. The verifier shall orally concur that the correct component has been located.
- 4.6.6.3 Before performing the activity directed by the step the performer shall state his intention. The verifier shall state his concurrence.
- 4.6.6.4 As soon as practical after completion of the step the performer and verifier should document the performance/verification as specified in the controlling procedure.

5.0 References

- 5.1 Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants

QUESTION: 100 (1.00)

An MOV must be manually backseated/mainseated after remote operation to perform its normal function.

WHICH ONE of the following actions is required?

- a. Dispatch an operator to hang a Danger Tag at the applicable MOV handswitch.
- b. Dispatch an operator to hang a Caution Tag at the applicable MOV handswitch.
- c. Dispatch an operator to hang Danger Tags at the applicable MOV handswitch and associated breaker.
- d. Dispatch an operator to hang Caution Tags at the applicable MOV handswitch and associated breaker.

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

	OPGP03-ZO-ECO1	Rev. 4	Page 46 of 56
Equipment Clearance Orders			
Addendum 3	Backseating/Mainseating Guidelines		Page 1 of 2

CAUTION

- o MOVs should be manually backseated (handwheel) with minimum applied force to prevent exceeding the compensating spring pack deflection.
- o Valve wrenches SHALL NOT be used on MOVs for backseating/mainseating. (Reference 2.3.24)
- o Backseated/Mainseated valves should be returned to normal position prior to a thermal cycle on the valve.
- o For Technical Specification required cooldown, backseated/mainseated MOVs SHALL be returned to normal position as soon as possible.
- o Any safety-related MOV that is backseated/mainseated, SHALL be evaluated for operability by the Unit/Shift Supervisor for entry into the OTL.

- 1.0 The backseat of a valve may be used as a boundary for maintenance provided that:
 - 1.1 The applicable Work Document allows for maintenance on the valve on its backseat.
 - 1.2 The Plant Manager has authorized performance of maintenance on the valve on the backseat. This authorization may be delivered verbally to the Shift Supervisor.
- 2.0 IF a MOV must be manually backseated/mainseated to perform its normal function, THEN the Unit/Shift Supervisor SHALL perform the following:
 - 2.1 EVALUATE the operability of the MOV.
 - 2.2 DISPATCH an Operator to hang a Caution Tag on the applicable MOV controls.
 - 2.3 INITIATE a CR for an Engineering Review of the backseated/mainseated MOV to ensure MOV malfunctions are corrected. (Reference 2.4.5)
- 3.0 IF an MOV is backseated/mainseated electrically to perform its normal function, THEN perform the following:
 - 3.1 EVALUATE the operability of the MOV.
 - 3.2 CONTACT the On-Duty Electrical Supervisor for assistance in performing the electrical seating operation.

	OPGP03-ZO-ECO1	Rev. 4	Page 47 of 56
Equipment Clearance Orders			
Addendum 3	Backseating/Mainseating Guidelines		Page 2 of 2

- 3.3 DISPATCH an Operator to hang a Caution Tag on the applicable MOV controls.
- 3.4 INITIATE a CR for an Engineering Review of the backseated/mainseated MOV to ensure MOV malfunctions are corrected. (Reference 2.4.5)
- 4.0 IF a backseated/mainseated MOV must change positions to perform its intended safety function, THEN the MOV SHALL be declared "INOPERABLE" until motor operation can be verified AND an entry SHALL be made in the OTL to track inoperability. (Reference 2.4.5)
- 5.0 To return a backseated/mainseated valve to normal operation, the Unit/Shift Supervisor SHALL PERFORM the following:
- 5.1 RELEASE the ECO per this procedure.
- 5.2 IF valve was entered into the OTL, THEN ENSURE the following is performed:
- a. Satisfactory Post-Maintenance Testing has been performed (i.e., stroke-tested).
 - b. The backseated/mainseated valve is returned to normal configuration.
 - c. The associated system is in its proper safety configuration.
 - d. DECLARE the valve OPERABLE.
 - e. Close-out the associated OTL.

ATTACHMENT 4

WRITTEN EXAMINATION AND ANSWER KEY

NRC Official Use Only

Nuclear Regulatory Commission
Operator Licensing
Examination

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

NRC Official Use Only

U. S. NUCLEAR REGULATORY COMMISSION
SITE SPECIFIC EXAMINATION
SENIOR OPERATOR LICENSE
REGION 4

CANDIDATE'S NAME: _____
FACILITY: South Texas 1 & 2
REACTOR TYPE: PWR-WEC4
DATE ADMINISTERED: --/--/--

INSTRUCTIONS TO CANDIDATE:

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

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

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

Candidate's Signature

NRC RULES AND GUIDELINES FOR LICENSE EXAMINATIONS

During the administration of this examination the following rules apply:

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

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

QUESTION: 001 (1.00)

WHICH ONE of the following describes the Shift Supervisor's responsibilities associated with Fire Brigade duties per OPGP03-ZF-0011, "STPEGS Fire Brigade"?

- a. May direct available shift personnel that have no safe shutdown duties to report to the MOF Machine Shop and provide assistance to the fire brigade.
- b. Verify that the proper complement of fire brigade members is available on shift and arrange for replacements if necessary.
- c. May direct only available shift personnel that have fire response duties to report and provide assistance to the fire brigade.
- d. Coordinate the efforts of the fire brigade with off-site fire departments when outside assistance is required.

QUESTION: 002 (1.00)

WHICH ONE of the following describes the methods by which power is supplied to the ESF 4.16KV bus?

	13.8 KV Standby Bus -----	Switchgear 1L -----	ESF DG -----
a.	Preferred	Standby	Emergency
b.	Emergency	Preferred	Standby
c.	Standby	Preferred	Emergency
d.	Preferred	Emergency	Standby

QUESTION: 003 (1.00)

Given the following plant conditions:

- Unit 2 is in Mode 4 with RHR in operation.
- Cooldown is in progress.
- RHR is lost and CANNOT be restored.

WHICH ONE of the following methods of cooling will be utilized to remove the core decay heat?

- a. Feed all available Steam Generators and open PORVs on all available Steam Generators.
- b. Start a LHSI pump, with flow through an RHR heat exchanger, and initiate Hot Leg Injection.
- c. Manually initiate a Safety Injection, using RCS feed and bleed to remove decay heat.
- d. Start a LHSI pump, with flow through an RHR heat exchanger, and initiate Cold Leg Injection.

QUESTION: 004 (1.00)

WHICH ONE of the following actions is used to collapse a void in the reactor vessel with all RCPS stopped in accordance with OPOP05-EO-FRI3, "Response to Voids in Reactor Vessel"?

- a. Decrease temperature while maintaining system pressure.
- b. Increase system pressure using PZR heaters while maintaining PZR level.
- c. Start a SI pump to increase system pressure while keeping temperature constant.
- d. Fill the PZR solid and vent the reactor vessel head.

QUESTION: 005 (1.00)

Unit 2 was operating at 100% power when the following alarms actuate almost simultaneously:

- PR LOWER DET FLUX DEV HI/AUTO DEF.
- PR UPPER DET FLUX DEV HI/AUTO DEF.
- T REF/AUCT T TAVG DEV.
- RPI TROUBLE.

WHICH ONE of the following conditions has occurred?

- a. A power range NI has failed high.
- b. A control bank is misaligned.
- c. A power range NI has failed low.
- d. A control rod has dropped.

QUESTION: 006 (1.00)

Given the following Unit 2 Plant conditions:

- Unit is operating at 100% power.
- Toxic gas (carbon dioxide) forces the evacuation of the Control Room in accordance with OPOP04-ZO-0001, "Control room Evacuation."

WHICH ONE of the following should be attempted PRIOR to leaving the Control Room?

- a. Trip all Charging Pumps and initiate Excess Letdown.
- b. Trip the Main Turbine and trip all Reactor Coolant Pumps.
- c. Trip all Main Feedwater Pumps and start the Startup Feed Pump.
- d. Trip the reactor and initiate Main Steam isolation.

QUESTION: 007 (1.00)

Given the following plant conditions:

- Reactor is at 70% thermal power.
- Pressurizer level is increasing.
- PRZR PRESS HI alarm has actuated.
- Tave is greater than Tref.
- Turbine power is equivalent to reactor power.

WHICH ONE of the following is responsible for the conditions shown above?

- a. Uncontrolled rod withdrawal.
- b. Loss of feedwater heater.
- c. Inadvertent steam dump actuation.
- d. Inadvertent AFW actuation.

QUESTION: 008 (1.00)

WHICH ONE of the following plant accidents would NOT be indicated by the Area Radiation Monitor (ARM) system?

- a. Steam Generator Tube Rupture
- b. Gas Storage Tank Rupture
- c. Reactor coolant leakage at the Incore Instrument Seal Table.
- d. Reactor Coolant (RCS) to Component Cooling Water (CCW) Leak

QUESTION: 009 (1.00)

WHICH ONE of the following is the design basis accident protection provided by the power range HIGH NEUTRON FLUX POSITIVE RATE reactor trip?

- a. Provides DNB protection by mitigating the consequences of a reactivity excursion from ALL power levels.
- b. Provides core protection during reactor startup by mitigating the consequences of startup of an idle RCP (cold water accident).
- c. Provides protection against rapid neutron flux increases which are characteristic of a control rod drive housing rupture.
- d. Complements the Pressurizer pressure reactor trip by limiting the pressure increase caused by a rapid power increase.

QUESTION: 010 (1.00)

WHICH ONE of the following can supply power to the Positive Displacement Charging pump in the event of a reactor trip and a loss of offsite power?

- a. TSC Diesel Generator.
- b. Lighting Diesel Generator.
- c. Standby Diesel Generator #11.
- d. Standby Diesel Generator #12.

QUESTION: 011 (1.00)

WHICH ONE of the following AUTOMATIC actions occurs as a result of a total loss of Main Feedwater, regarding the ATWS Mitigation System Actuation Circuit (AMSAC) from 100% power?

- a. AFW pumps start immediately and the turbine trips immediately.
- b. AFW pumps start immediately and the turbine trips after a 27 second time delay.
- c. AFW pumps start after 27 second time delay and the turbine trips immediately.
- d. AFW pumps start after a 27 second time delay and the turbine trips after a 27 second time delay.

QUESTION: 012 (1.00)

Given the following plant conditions:

- Unit 2 is in Mode 5.
- COMS is in service.
- RCP wide range pressure transmitter PT-405 has failed high.
- The following annunciators have alarmed:
 - PRZR PORV OPEN COMMAND
 - PRZR PORV DISCH TEMP HI
 - RCS COLD OVERPRESS ALERT-TRN A

WHICH ONE of the following is an IMMEDIATE action required by OPOP04-RP-0005, "COMS Actuation or Failure"?

- a. Place Cold "OVERPRESSURE MIT" switch for PCV-655A in BLOCK.
- b. Trip any RCP when #1 Seal D/P decreases to less than 220 psid.
- c. Place Cold "OVERPRESSURE MIT" switch for PCV-656A in BLOCK.
- d. Decrease charging AND increase letdown flow.

QUESTION: 013 (1.00)

Given the following plant conditions:

- Reactor startup is in progress.
- Source range level N31 is at $3.2E3$ CPS.
- Intermediate range N36 is indicating $2.2E-11$ AMPS.
- Intermediate range N35 is indicating $6.3E-11$ AMPS.
- Source range N32 has just failed LOW.

WHICH ONE of the following IMMEDIATE operator actions must be taken in response to the above conditions?

- a. Take the source range P-6 block switch for N-31 to "BLOCK", to deenergize N-31.
- b. Trip the reactor and enter E-0.
- c. Increase power until proper overlap is achieved between N-31 and N-35, then deenergize the remaining source range.
- d. Suspend all positive reactivity additions.

QUESTION: 014 (1.00)

WHICH ONE of the following actions MAY be delegated by the Emergency Director (ED) during a Site Area Emergency?

- a. Approving required notifications of offsite authorities.
- b. Approving exposures in excess of 10CFR20 limits.
- c. Approving the use of potassium-iodide.
- d. Approving commitments to the NRC.

QUESTION: 015 (1.00)

WHICH ONE of the following statements describes the Technical Specifications BASIS for removal of power to the accumulator isolation valves, SI-MOV-0039A, B, and C when operating with RCS pressure above 1000 psig?

- a. The valve motor operators have a history of overheating.
- b. Ensures that the safety analysis assumptions used for accumulator pressure and volume are valid.
- c. The valve stroke times may exceed the accident analysis values.
- d. Ensures that the valves satisfy the single failure criterion.

QUESTION: 016 (1.00)

Given the following Unit 2 conditions:

- Operating at 100% power at MOL.
- All systems are operable.
- While in AUTO rod control, Control Bank "D" starts stepping in slowly, but at a noticeable rate.

WHICH ONE of the following events will cause this response?

- a. A tube leak in the Regenerative Heat Exchanger.
- b. A tube leak in the Seal Water Heat Exchanger.
- c. A tube leak in the Letdown Heat Exchanger.
- d. A tube leak in the Excess Letdown Heat Exchanger

QUESTION: 017 (1.00)

WHICH ONE of the following, for a POST LOCA condition, is the reason for staging Trisodium Phosphate (TSP) in containment?

- a. TSP prevents the sump pH from exceeding 7.0.
- b. TSP washes iodine compounds from containment walls during recirculation phase of LOCA.
- c. TSP minimizes long term corrosive attack on certain metallic components inside containment.
- d. TSP eliminates the formation of hydrogen gas in the post LOCA environment.

QUESTION: 018 (1.00)

WHICH ONE of the following explains why loads in excess of 2,500 pounds are prevented from being moved over the spent fuel pool?

- a. Ensures that any possible distortion of fuel in the storage racks from the worst case dropped load accident will not result in a critical array.
- b. Prevents the SFP Bridge Crane from operating with loads in excess of the monorail hoist ratings.
- c. Ensures that the radioactivity released from the worst case dropped load accident would not exceed that of two fuel assemblies.
- d. Prevent the radiation release from dropping a heavy load into the spent fuel pool to less than 10% of the total gaseous activity from any single irradiated fuel assembly.

QUESTION: 019 (1.00)

While performing EO-E010, "Loss of Reactor or Secondary Coolant", WHICH ONE of the following is the MINIMUM containment hydrogen concentration above which Hydrogen Recombiners should NOT be placed in service?

- a. 3.5%
- b. 4.0%
- c. 5.5%
- d. 6.0%

QUESTION: 020 (1.00)

Given the following plant conditions:

- Unit 1 reactor power is at 1×10^{-9} amperes (Intermediate Range.)
- Nuclear Instrument channel N35 has just blown an instrument fuse.

WHICH ONE of the following will occur as a result of this failure?

- a. A single channel trip alert alarm but no reactor trip because 2/2 channels are required to trip the reactor.
- b. A single channel trip alert alarm but no reactor trip because the intermediate range level reactor trip is blocked at 1×10^{-9} amperes.
- c. A reactor trip due to the rate of change when the channel fails high.
- d. A reactor trip because the trip bistable deenergizes and the trip is active at 1×10^{-9} amps.

QUESTION: 021 (1.00)

Given the following plant conditions:

- Reactor is shutdown.
- Reactor decay heat is being removed by natural circulation.
- RCS pressure is 1550 psig.
- Average core thermocouple temperature is 402 degrees F.

WHICH ONE of the following describes the approximate amount of subcooling that exists in the RCS?

- a. 150 deg F.
- b. 200 deg F.
- c. 250 deg F.
- d. 300 deg F.

QUESTION: 022 (1.00)

WHICH ONE of the following describes the operation of the Containment Carbon Unit fans?

- a. The fans are operated manually from the Control Room. A LOOP or SI condition will stop any operating fans.
- b. The fans start automatically upon start of the Containment Purge fans to remove the majority of the radioactive particulates in containment.
- c. The fans are operated manually from the Control Room. An SI signal will trip the fans, a LOOP signal will restart the fans.
- d. The fans are operated manually from the Control Room and the Remote Shutdown Panel. They are unaffected by a LOOP or SI signal.

QUESTION: 023 (1.00)

Given the following plant conditions:

- Tave: 620 Deg. F.
- Source range count rate: 30 cps
- RCS wide range pressure: 2755 psia

WHICH ONE of the following describes the required operator actions in response to these parameters?

- a. Within 5 minutes reduce RCS pressure to within limits.
- b. Within 5 minutes reduce RCS temperature to within limits.
- c. Within allowable cooldown rate reduce RCS temperature AND RCS pressure to COLD SHUTDOWN.
- d. Within 1 hour be in HOT SHUTDOWN with RCS temperature and pressure within limits.

QUESTION: 024 (1.00)

OPOP05-EO-FRS1, "RESPONSE TO NUCLEAR POWER GENERATION/ATWS", directs the operator to initiate Emergency Boration of RCS and includes direction to

"Check Pressurizer Pressure - LESS THAN 2335 PSIG"

WHICH ONE of the following is the basis for the above check?

- a. Indicates sufficient boron is flowing into the RCS.
- b. Indicates the injected boron is lowering reactor power.
- c. Verifies charging inventory is NOT being depleted via the charging pump miniflow lines.
- d. Verifies that the pressurizer PORVs are operating properly.

QUESTION: 025 (1.00)

Given the following plant conditions:

- Unit 1 has experienced a reactor and turbine trip.
- CCP-1A is out of service for maintenance.
- CCP-1B has tripped.
- Containment Isolation Phase A and B have actuated.

Prior to starting a Centrifugal Charging Pump (CCP), OPOP05-EO-FRI2, "Response to Low Pressurizer Level," directs the operator to locally isolate RCP seal injection.

WHICH ONE of the following statements is the reason for isolating RCP seal injection?

- a. Protects the CCP from a runout condition.
- b. Protects the RCP seals from excessive differential pressure.
- c. Prevents possible crud injection into the RCP seal cavity.
- d. Prevents thermal shocking the RCP seals.

QUESTION: 026 (1.00)

WHICH ONE of the following DIRECTLY requires starting one or more RCPs under inadequate core cooling conditions per OPOP05-EO-FRC1, "Response to Inadequate Core Cooling" even if support conditions are not established?

- a. Core exit thermocouple indicate 1200 degrees F.
- b. All trains of ECCS have failed.
- c. Loss of all feedwater to S/Gs and all S/Gs have boiled dry.
- d. RVWL indicates less than 20%.

QUESTION: 027 (1.00)

Given the following plant conditions:

- Unit 1 is in MODE 5.
- RCS critical boron concentration is 1200 ppm.

WHICH ONE of the following conditions requires immediate emergency boration? (Assume control rod worth to be 200 PCM/rod). (Figure 3.1-2 is provided).

- a. SDM = 3.5 percent delta-rho with 2 immovable control rods in the fully withdrawn position.
- b. SDM = 3.0 percent delta-rho.
- c. SDM = 2.8 percent delta-rho with 1 immovable control rod in the fully withdrawn position.
- d. SDM = 2.0 percent delta-rho.

QUESTION: 028 (1.00)

Given the following Unit 1 conditions:

- The unit tripped due to a loss of off-site power.
- AFST level is at 485,000 gallons.
- D S/G feedwater line has ruptured.
- D S/G AFW flow control valve has failed open.
- Steam generator PORVs are being used to dump steam.
- The unit has been cooled down to 350 degrees F, at 25 degrees per hour.

WHICH ONE of the following is the MINIMUM time it will take to deplete the AFST contents for these conditions?

- a. 2 hours
- b. 4 hours
- c. 6 hours
- d. 8 hours

QUESTION: 029 (1.00)

Given the following plant conditions:

- Unit 1 is in Mode 4.
- RCS temperature is 345 degrees F.
- RCS pressure is 600 psig.
- Plant cooldown is in progress in accordance with OPOP03-ZG-0007, Plant Cooldown.

WHICH ONE of the following statements describes how plant operations are affected if Loop 2 Wide Range Pressure instrument, PT-405, fails HIGH?

- a. Pressurizer PORV, PCV-656A opens.
- b. Pressurizer PORV, PCV-655A opens.
- c. Pressurizer heaters deenergize.
- d. Pressurizer spray valves open.

QUESTION: 030 (1.00)

WHICH ONE of the following describes the method for marking and ensuring that a procedure in continual use is the current revision?

- a. The procedure is stamped "FOR INFORMATION ONLY" and requires only initial verification.
- b. The procedure is stamped "WORKING COPY" and requires only initial verification.
- c. The procedure is stamped "FOR INFORMATION ONLY" and is verified current to the controlled copy every shift.
- d. The procedure is stamped "WORKING COPY" and is verified current to the controlled copy every shift.

QUESTION: 031 (1.00)

WHICH ONE of the following describes the normal power source for a Class 1E, 125 VDC bus?

- a. 480V Class 1E MCC through a battery charger to the DC bus.
- b. 480V Class 1E MCC through a static inverter to the DC battery to the DC bus.
- c. 480V Non-Class 1E MCC through a battery charger to the DC battery to the DC bus.
- d. 480V Non-Class 1E MCC through a static inverter to the DC bus.

QUESTION: 032 (1.00)

Given the following Unit 1 conditions:

- Reactor power - 5%.
- No equipment out-of-service.
- RCS temperature, pressure and level are at normal values.
- S/G levels are in the normal operating range.
- Power is lost to the 120 VAC CLASS 1E Vital Distribution Panel DP-1201.

WHICH ONE of the following describes the effect of the power loss?

- a. Reactor trip.
- b. All 3 trains of Control Room Ventilation actuate.
- c. Charging flow decreases.
- d. Group I steam dumps fail open.

QUESTION: 033 (1.00)

WHICH ONE of the following methods is used to verify that an immovable Control Group "D" rod is NOT UNTRIPPABLE per OPOP04-RS-0001, "Control Rod Malfunction"?

- a. Remove power from the DC Hold Bus to the affected rod and verify the Stationary Gripper coil deenergizes.
- b. Verify ALL other rods in Control Group "D" are TRIPPABLE.
- c. Place the affected rod on the DC Hold Bus and verify that the Stationary Gripper has the correct resistance to current flow.
- d. Verify Stationary Gripper, Movable Gripper, and Lift Coil are energized with the correct current and proper sequence.

QUESTION: 034 (1.00)

WHICH ONE of the following provides an input to the Reactor Vessel Water Level instrumentation system?

- a. Reactor Vessel differential pressure.
- b. Loop 1 wide range pressure.
- c. Heated junction thermocouple.
- d. Loop 3 Tcold instrument.

QUESTION: 035 (1.00)

Given the following plant conditions:

- OPOP05-EO-EC00, "Loss of All AC Power" is in effect.
- Depressurization of the steam generators is in progress.

A procedural caution states that the depressurization should be stopped if narrow range levels cannot be maintained greater than specified levels.

WHICH ONE of the following is the concern behind this step?

- a. PTS due to excessive cooldown.
- b. Loss of adequate heat sink due to reduced heat transfer area.
- c. RCS voiding due to rapid depressurization.
- d. Loss of natural circulation due to accumulator nitrogen injection.

QUESTION: 036 (1.00)

Moisture separating equipment in the Steam Generators ensures that steam quality is a minimum of 99.75 percent providing certain conditions are met.

WHICH ONE of the following would violate conditions required to maintain steam quality at 99.75 percent?

- a. Steady state operation up to 100 percent steam flow with boiler water at the upper limit of the normal operating level.
- b. A step load change of 10 percent power in the range of 15 to 100 percent of full steam flow.
- c. Loading or unloading at 5 percent power per minute in the range of 15 to 100 percent of full steam flow.
- d. A step decrease of 50 percent power with water maintained at the normal operating level and automatic steam dump operation.

QUESTION: 037 (1.00)

WHICH ONE of the following is the purpose of the Carbon Filter Units used in the Containment Ventilation System?

Removal of:

- a. Radioiodine.
- b. Hydrogen.
- c. Ultra-fine particulates.
- d. Steam.

QUESTION: 038 (1.00)

If a power mismatch signal is generated by the Rod Control System, WHICH ONE of the following parameters determines the magnitude of the gain imposed by the variable gain unit?

- a. Auctioneered Loc. High Tave.
- b. RCS Loop T-HOT.
- c. Auctioneered High Nuclear Power.
- d. Turbine impulse pressure.

QUESTION: 039 (1.00)

Given the following plant conditions:

- One bank "C" Shutdown rod has fallen into the core.
- A dropped rod recovery is in progress per OPOP04-RS-0001, "Control Rod Malfunction"
- Rod recovery has commenced.
- An URGENT failure alarm is NOT present.

WHICH ONE of the following explains WHY the URGENT failure alarm is NOT energized?

- a. There is no master cyclor input for Shutdown Bank "C".
- b. Shutdown rods receive no input from the bank overlap unit.
- c. There is only one (1) group of rods in Shutdown Bank "C".
- d. Shutdown rods have no multiplexing thyristors.

QUESTION: 040 (1.00)

Given the following plant conditions:

- Loop 1 Tavg channel is 573 degrees F.
- Loop 2 Tavg channel is 571 degrees F.
- Loop 3 Tavg channel is 569 degrees F.
- Loop 4 Tavg channel is 568 degrees F.
- Tref is 570 degrees F.
- Rod Control System is in Automatic.

WHICH ONE of the following explains how the Rod Control System will respond?

- a. Rods will step in at 72 steps/min to lower Tavg.
- b. Rods will step in at 48 steps/min to lower Tavg.
- c. Rods will step in at 6 steps/min to lower Tavg.
- d. Rods will not move because the difference between Tavg and Tref is insufficient to cause rod motion.

QUESTION: 041 (1.00)

Given the following plant conditions:

- Operators are preparing to start "A" Reactor Coolant Pump.
- RCS temperature is 345 degrees F.
- RCS pressure is 400 psig.
- The Bearing Oil Lift Pump for "A" RCP has been running for one (1) minute.

WHICH ONE of the following conditions will cause the BLUE "permissive" indicating light for 11 RCP to NOT be ILLUMINATED?

Bearing Oil Lift Pump ...

- a. ... discharge is directed to the upper shoes.
- b. ... discharge is directed to the lower shoes.
- c. ... has been running for less than two (2) minutes.
- d. ... discharge oil pressure is less than 600 psig.

QUESTION: 042 (1.00)

Given the following plant conditions:

- RCS temperature is 360 degrees F.
- RCS pressure is 400 psig.
- The reactor trip breakers are open.

WHICH ONE of the following is the MINIMUM number of Reactor Coolant Pumps that must be OPERABLE?

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

QUESTION: 043 (1.00)

Given the following plant conditions:

- Unit is at beginning of core life.
- Unit is at 100% power.
- VCT level is 32%.
- All controls are in automatic.
- LT 113, VCT level transmitter, fails high.
- Assume no operator action.

WHICH ONE of the following describes the FINAL ACTUAL VCT level?

- a. Increases to 100% (full).
- b. Increases to 95% where letdown flow diverts to the RHUT.
- c. Cycles between 28% and 48% due to auto-makeup.
- d. Decreases to 0% (empty).

QUESTION: 044 (1.00)

WHICH ONE of the following conditions will automatically UNBLOCK both the Unit 1 Pressurizer Low Pressure and the Low Compensated Steamline Pressure safety injection actuation signals?

- a. Pressurizer pressure increases to 2015 psig.
- b. Tavg decreases to 563 degrees F.
- c. Steam generator pressure increases to 740 psig.
- d. Main steam line differential pressure decreases to 120 psig.

QUESTION: 045 (1.00)

WHICH ONE of the following would FIRST result in the failure of the ROD BOTTOM alarm to extinguish during a reactor startup?

- a. Control bank A rod bottom bypass bistable did not actuate when control bank A was greater than 12 steps withdrawn.
- b. Shutdown bank A rod bottom bypass bistable did not reset when shutdown bank A was greater than 12 steps withdrawn.
- c. Control bank B rod bottom bypass bistable did not actuate when control bank B was greater than 4 steps withdrawn.
- d. Shutdown bank B rod bottom bypass bistable did not reset when shutdown bank B was greater than 4 steps withdrawn.

QUESTION: 046 (1.00)

WHICH ONE of the following conditions would result in tripping a Steam Generator Feedwater Pump under normal operating conditions?

- a. Main turbine trip.
- b. Main condenser vacuum is 17" Hg.
- c. Steam generator level of 88%.
- d. Pump bearing oil pressure of 12 psig.

QUESTION: 047 (1.00)

WHICH ONE of the following indications would result if the reactor head to inner vessel seal failed?

- a. Pressurizer Relief Tank level would increase.
- b. SI on high containment pressure.
- c. SI on low PZR pressure.
- d. Reactor Coolant Drain Tank level would increase.

QUESTION: 048 (1.00)

A glycol chiller tank is used in the Gaseous Waste Processing System to lower the water content of the air entering the system.

WHICH ONE of the following is the reason for this action?

- a. Prevents fouling of the radiation monitor.
- b. Increases efficiency of the charcoal absorber beds.
- c. Prevents internal corrosion in the Gaseous Waste System.
- d. Increases the efficiency of the HEPA filter.

QUESTION: 049 (1.00)

Given the following plant conditions:

- Unit 2 is at 50% power.
- Rod control is in MANUAL.
- Loop 1 cold leg temperature detector TE-410B fails high.
- No operator action is taken.

WHICH ONE of the following will be the final pressurizer level?

- a. Empty
- b. 25%
- c. 60%
- d. Full

QUESTION: 050 (1.00)

WHICH ONE of the following RCB HVAC Subsystems is designed to reduce gaseous and particulate activity and control pressure in the RCB during normal at power operations?

- a. Containment Normal Purge
- b. Containment Supplementary Purge
- c. Reactor Containment Fan Coolers
- d. Containment Carbon Units

QUESTION: 051 (1.00)

Given the following spent fuel pool conditions:

- Pool water level: 60 feet
- Pool water Boron concentration: 2580 ppm
- Pool reactivity: $K_{eff} = .96$

WHICH ONE of the following describes whether the above conditions are in compliance with limits imposed on the spent fuel pool?

Pool Level -----	Pool Boron Conc. -----	Pool Reactivity -----
a. compliance	compliance	compliance
b. compliance	non-compliance	compliance
c. non-compliance	compliance	non-compliance
d. non-compliance	non-compliance	non-compliance

QUESTION: 052 (1.00)

WHICH ONE of the following is the NORMAL source of makeup water to the Spent Fuel Pool to replenish losses caused by evaporation?

- a. Reactor Makeup Water System
- b. RWST
- c. Boron Recycle System
- d. Demineralized Water System

QUESTION: 053 (1.00)

WHICH ONE of the following prevents inadvertently raising an irradiated fuel assembly in the New Fuel Elevator, assuming no interlocks are bypassed?

- a. Fuel pool bridge crane is interlocked to prevent loading irradiated fuel assembly into the elevator.
- b. The elevator will not rise if any Fuel Handling Building ARMs is in alarm.
- c. Operators verify elevator is empty before raising the elevator.
- d. The elevator will not rise if any fuel element is in it.

QUESTION: 054 (1.00)

WHICH ONE of the following is the maximum rated run time for an Emergency Diesel Generator loaded at 6050 KW?

- a. 1 day
- b. 7 days
- c. 83 days
- d. 365 days

QUESTION: 055 (1.00)

An operate failure was just received on a radiation monitor channel that is monitored by the RM-11.

WHICH ONE of the following colors would indicate the channel operate failure on the RM-11?

- a. dark blue
- b. light blue (cyan)
- c. white
- d. magenta

QUESTION: 056 (1.00)

Given the following plant conditions:

- A leak of 40 gpm develops in a fire protection system header.
- The fire protection system is in a normal lineup.
- All Diesel driven Fire pumps are available in auto.
- Firewater header pressure is 110 psig.

WHICH ONE of the following will result?

- a. Firewater jockey pump is running and diesel driven fire pump 11 starts.
- b. Firewater jockey pump stops, diesel driven fire pump 11 starts.
- c. Firewater jockey pump is running and diesel driven fire pumps 11 and 12 start.
- d. Firewater jockey pump stops and all diesel driven fire pumps start.

QUESTION: 057 (1.00)

Given the following plant conditions:

- Unit 2 is in MODE 4.
- RHR is in service.
- RCS pressure is 320 psig and INCREASING.
- RCS temperature is 340 degrees F.
- ALL system lineups are in a normal shutdown configuration.

WHICH ONE of the following will act FIRST to prevent overpressurizing the RHR System?

- a. RHR inlet isolation valves will auto close at 332 psig.
- b. Pressurizer PORVs will OPEN at 450 psig.
- c. LHSI pump hot leg relief valves will open at 500 psig.
- d. RHR pumps discharge relief valves will open at 600 psig.

QUESTION: 058 (1.00)

Given the following plant conditions:

- Unit 1 is in Mode 2 at 567 degrees F.
- Steam Dump Mode Selector switch is in the STEAM PRESS position.
- Steam Header Pressure Controller is set for 1183 psig.
- Condenser pressure is 1" Hg. Abs.
- Main Steam Header pressure transmitter (PT-557) fails high.

WHICH ONE of the following describes the Steam Dump System response?

- a. Steam Dump System will not be armed.
- b. Steam Dump System will be armed only.
- c. Only one bank of steam dump valves will open.
- d. All steam dump valves will open.

QUESTION: 059 (1.00)

While performing the Instrument Air System Valve Operability Test, PSP03-IA-0001, instrument air supply may be interrupted for a period of time.

WHICH ONE of the following conditions may result from the interruption of air supply?

- a. The RHR Outlet Temperature Control valves and other containment valves may move to their respective failed positions.
- b. The Yard Distribution Instrument Air Isolation Valve may move to the failed closed position actuating the IAS Header Pressure Low alarm at 90 psig.
- c. The Service Air System/Instrument Air System Crossconnect valve may move to the failed open position actuating the SAS/IAS Crossover Valve open alarm at 100 psig.
- d. All Instrument Air System valves will remain in their initial positions.

QUESTION: 060 (1.00)

Given the following plant conditions:

- Unit 2 is at 50% power.
- Control rods are in AUTOMATIC.

WHICH ONE of the following instrument malfunctions would result in a continuous rod withdrawal?

- a. Loop 3 Th RTD fails LOW.
- b. Power range channel N-42 fails LOW.
- c. Loop 1 Tc RTD fails HIGH.
- d. PT-505 fails HIGH.

QUESTION: 061 (1.00)

Given the following plant conditions:

- Reactor power was initially at 100%.
- Rod D-8 in Bank D has dropped.
- QPTR has just been calculated to be 1.10.
- Making preparations to recover rod.

WHICH ONE of the following describes the minimum actions required by Technical Specifications in the NEXT 2 hours for the conditions given?

- a. Reduce reactor power to LESS THAN 76%.
- b. Reduce reactor power to LESS THAN 70%.
- c. Reduce reactor power to LESS THAN 50%.
- d. Place the reactor in HOT STANDBY.

QUESTION: 062 (1.00)

Given the following plant conditions:

- A large-break LOCA has occurred.
- Appropriate actions in accordance with OPOP05-EO-E000, "Reactor Trip or Safety Injection", and OPOP05-EO-E010, "Loss of Reactor or Secondary Coolant," have been completed.
- ECCS is operating in the Recirculation Mode.
- RCS pressure is stable at about 200 psig.

WHICH ONE of the following statements describes the primary method of decay heat removal?

- a. Heat transfer between the RCS and the S/Gs due to natural circulation flow.
- b. Heat transfer between the RCS and the S/Gs due to RHR forced circulation flow.
- c. The injection of water from the containment sump and the removal of steam/water out the break.
- d. The condensation of reflux boiling in the S/Gs.

QUESTION: 063 (1.00)

Given the following plant conditions:

- A safety injection has occurred.
- OPOP05-EO-E000, "Reactor Trip or Safety Injection" is in progress.
- Containment temperature is 195 degrees F.
- RCS pressure is 1515 psig.

WHICH ONE of the following actions should be taken in this situation?

- a. Immediately trip all RCPs.
- b. Complete the immediate actions of OPOP05-EO-E000 and then trip all RCPs.
- c. Verify at least one High Head Safety Injection pump running and then trip all RCPs.
- d. No specific actions are required, continue in OPOP05-EO-E000.

QUESTION: 064 (1.00)

Given the following plant conditions:

- Unit 2 is operating at 100% power.
- A leak has developed in the Component Cooling Water (CCW) system.
- CCW surge tank level has decreased to 62%.

WHICH ONE of the following valves will have automatically closed?

- a. CCW A Supply to Charging Pump Header, CC-MOV-0768.
- b. CCW to Excess Letdown Heat Exchanger, CC-MOV-0393.
- c. CCW Supplies to Common Header Isolation, CC-MOV-0312, 0314, and 0316.
- d. CCW Returns from RHR Heat Exchangers, CC-FCV-4531, 4548, and 4565.

QUESTION: 065 (1.00)

WHICH ONE of the following actions is the FIRST required by OPOP05-EO-FRS1, "Response to Nuclear Power Generation/ATWS", if the turbine will NOT manually trip from the control room?

- a. Close the MSIVs and MSIBs.
- b. Trip turbine from main turbine front standard.
- c. Manually runback turbine.
- d. Pull To Lock all EH pumps.

QUESTION: 066 (1.00)

WHICH ONE of the following is a function of the ATWS Mitigation System Activation Circuit (AMSAC)?

- a. Initiate SI.
- b. Close the MSIVs.
- c. Actuate AFW.
- d. Isolate main feedwater.

QUESTION: 067 (1.00)

Given the following plant conditions:

- Steam generator 1D is faulted outside of containment.
- Performing actions of OPOP05-EO-EO20, "Faulted Steam Generator Isolation."
- AFW system is in operation.

WHICH ONE of the following actions concerning the AFW pumps should be taken?

- a. Shutdown the AFW Pumps immediately.
- b. Run the AFW Pumps until all narrow range SG levels are above 5%.
- c. Run the AFW Pumps only if less than 576 gpm is available to the SGs.
- d. Isolate the AFW Pumps from SG 1D (steam and AFW flow).

QUESTION: 068 (1.00)

WHICH ONE of the following parameters can be used shortly after event initiation to discriminate between a minor steamline rupture and a similarly sized small-break loss-of-coolant accident, both inside containment?

- a. T-cold temperatures.
- b. RCS pressure.
- c. Pressurizer level.
- d. ECCS injection flow rates.

QUESTION: 069 (1.00)

Given the following plant conditions:

- Unit 1 is operating at 100% power.
- Condenser vacuum is decreasing.

WHICH ONE of the following condenser vacuum conditions will first result in the loss of condenser steam dumps?

- a. 25" Hg vacuum
- b. 22" Hg vacuum
- c. 20" Hg vacuum
- d. 14" Hg vacuum

QUESTION: 070 (1.00)

Given the following Unit 1 conditions:

- A loss of offsite power has occurred.
- The ESF busses have NOT been reenergized.
- OPOP05-EO-EC00 "Loss of All AC Power" is in progress.
- The crew has completed the depressurization of all steam generators at maximum controllable rate.

The following sequence of steps is then encountered in OPOP05-EO-EC00:

- Step 20a verifies SI actuated.
- Step 20b directs the SI signal to be reset.

WHICH ONE of the following is the basis for these steps?

- a. This sequence enables the DG output breakers to close in on the deenergized ESF busses.
- b. This sequence provides the capability for manual loading of ESF equipment onto the ESF busses.
- c. This sequence provides an automatic supply of ESW to the DG coolers.
- d. This sequence enables the sequencer to load ESF equipment onto the ESF busses.

QUESTION: 071 (1.00)

WHICH ONE of the following describes the responsibilities of the Unit/Shift Supervisor upon notification of a fire on the plant site?

- a. Sound the evacuation alarm from the Main Control Board and implement OPGP03-ZF-0012, "Fire Fighting."
- b. Notify the security force at the Secondary Alarm Station of the fire.
- c. Alert personnel of the reported fire such that OPGP03-ZF-0012, "Fire Fighting" can be implemented.
- d. Serve as the Fire Brigade Leader and implement OPGP03-ZF-0012, "Fire Fighting".

QUESTION: 072 (1.00)

WHICH ONE of the following quantities of radioactive material contained in an unprotected outdoor tank will FIRST require immediate suspension of addition to the tank?

- a. 10 microcuries
- b. 100 microcuries
- c. 10 curies
- d. 100 curies

QUESTION: 073 (1.00)

WHICH ONE of the following groups of instrument readings should result in an automatic reactor trip from 100% power? (Assume zero tolerance on instrument setpoints.)

a. Power range (percent)	107	108	108	109
b. Pressurizer level (percent)	90	91	91	92
c. Pressurizer pressure (psig)	1869	1870	1871	1872
d. "B" S/G level (percent)	33	34	34	35

QUESTION: 074 (1.00)

Given the following plant conditions:

- Unit 2 is in Mode 3.
- Pressurizer pressure is 1600 psig.
- PRT pressure is 15 psig.
- PORV PCV-655A is leaking.
- Pressurizer steam quality is 99.9%.

WHICH ONE of the following represents the condition of the steam entering the PRT? (Assume an ideal thermodynamic process).

- a. Superheated steam at 212 degrees F.
- b. Superheated steam at 230 degrees F.
- c. Saturated steam-water mixture at 240 degrees F.
- d. Saturated steam-water mixture at 250 degrees F.

QUESTION: 075 (1.00)

Given the following containment history with a small LOCA in progress:

Time	Cnmt Temp	Cnmt Press	Cnmt Humidity	Cnmt Radiation
0815	178 Deg F	2 psig	90%	9.0 X 10E2 R/Hr
0830	180 Deg F	4 psig	100%	7.3 X 10E3 R/Hr
0845	183 Deg F	6 psig	100%	9.5 X 10E4 R/Hr
0900	185 Deg F	10 psig	100%	2.0 X 10E5 R/Hr

WHICH ONE of the following describes the EARLIEST time at which adverse containment should have been declared?

- a. 0815
- b. 0830
- c. 0845
- d. 0900

QUESTION: 076 (1.00)

During a small break LOCA, SI has been terminated and OPOP05-EO-ES12, "Post LOCA Cooldown and Depressurization" has been entered.

WHICH ONE of the following conditions would require SI reinitiation?

- a. RCS pressure at 1803 psig.
- b. RCS subcooling at 15 degrees F.
- c. PZR level at 25%.
- d. Containment pressure at 5 psig.

QUESTION: 077 (1.00)

Given the following plant conditions:

- Unit 1 is critical at 2×10^{-10} amps.
- The source range high flux trip has been blocked.
- Intermediate Range Channel N-35 detector has failed.

WHICH ONE of the following Technical Specification action statements is applicable?

- a. Place the inoperable channel in the tripped condition within one hour.
- b. Restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above the P-6 setpoint.
- c. Operation may continue, not to exceed 10% power (P-10).
- d. Verify compliance with the SHUTDOWN MARGIN requirements within 1 hour and at least once per 12 hours thereafter.

QUESTION: 078 (1.00)

WHICH ONE of the following conditions would require entry into OPOP04-RC-0004, "Steam Generator Tube Leakage"?

- a. Chemical analysis has confirmed "1C" SG tube leakage of 1.5 gallons per minute.
- b. Charging flow unexpectedly GREATER THAN letdown flow.
- c. Chemical analysis has confirmed "1A" SG Tube leakage of 300 gallons per day.
- d. "1D" SG N16 Primary to Secondary Leak Monitor indicates a SG tube leak of 400 gallons per day.

QUESTION: 079 (1.00)

The crew is responding to a ruptured tube in 1A steam generator using OPOP05-EO-E030, "Steam Generator Tube Rupture."

WHICH ONE of the following is the basis for the temperature to which the RCS must be cooled down before the RCS can be depressurized?

- a. This is the saturation temperature for 1A S/G pressure.
- b. This temperature ensures the required RCS subcooling is maintained during the depressurization.
- c. This temperature is below the maximum temperature limit for initiation of RHR cooldown.
- d. This is the saturation temperature for the lowest pressure intact S/G used for cooldown.

QUESTION: 080 (1.00)

When establishing bleed and feed cooling per OPOP05-EO-FRH1, "Response to Loss of Secondary Heat Sink," both PORVs are opened.

WHICH ONE of the following is the reason for manually opening the PORVs rather than allowing them to open and close automatically.

- a. RCP damage may occur due to inadequate seal injection with RCS pressure at the PORV setpoint.
- b. Depressurizing a SG for condensate feed with RCS pressure at the PORV setpoint will exceed U-tube delta-P limits.
- c. A water solid RCS at NOP/NOT has a high potential to challenge the RCS pressure safety limit.
- d. Maintaining both PORVs fully open is necessary to provide adequate core cooling flow.

QUESTION: 081 (1.00)

Loss of WHICH ONE of the following Class 1E 125 VDC power trains will render the 24 AFW pump inoperable?

- a. Train A
- b. Train B
- c. Train C
- d. Train D

QUESTION: 082 (1.00)

WHICH ONE of the following is the MAXIMUM expected dose to a person at the site boundary following an uncontrolled release from a Gas Storage tank containing $1.0E5$ curies of noble gases?

- a. A skin exposure of 3.0 rem.
- b. Not more than 10 times the 10-CFR-20 limit for the most limiting isotope over a one hour period.
- c. A whole body exposure of 0.5 rem.
- d. A small fraction of the 10-CFR-100 limit for the most limiting isotope over a two hour period.

QUESTION: 083 (1.00)

Given the following plant conditions:

- Unit 1 is at 50% power.
- The crew is experiencing problems controlling feedwater flow.
- Instrument Air pressure is 60 psig and slowly decreasing.
- "C" MSIV open and closed indicating lights are lit.

WHICH ONE of the following actions must be taken?

- a. Open Service and Instrument Air Crossover Valve.
- b. Commence a power reduction to hot shutdown.
- c. Close Instrument Air to Yard Isolation Valve.
- d. Trip the reactor and go to OPOP05-EO-E000, "Reactor Trip or Safety Injection".

QUESTION: 084 (1.00)

Pressurizer level transmitter LT-465 is selected for control by the hand switch on CP004 when the reference leg for LT-465 develops a slow leak.

WHICH ONE of the following describes the responses of the level indicators listed below?

LI-465 (Pzr level)	LI-467 (Pzr level)	LI-112 (VCT level)
a. Increasing	Decreasing	Decreasing
b. Decreasing	Increasing	Increasing
c. Increasing	Decreasing	Increasing
d. Decreasing	Increasing	Decreasing

QUESTION: 085 (1.00)

Given the following plant conditions:

- Unit is in Mode 6.
- Refueling is in progress.
- Water level in the Refueling Water Cavity is decreasing.
- Radiation levels are increasing in the RCB.
- No fuel is being moved.

WHICH ONE of the following is an IMMEDIATE ACTION required by these symptoms?

- a. Initiate containment evacuation.
- b. Return the Fuel Transfer Cart to the SFP side.
- c. Close at least one door in each airlock.
- d. Stop SFPC pumps.

QUESTION: 086 (1.00)

During WHICH ONE of the following conditions could OPOP05-EO-ES00, "Rediagnosis", be used?

- a. During the performance of OPOP05-EO-ES02, "Natural Circulation Cooldown," when a twenty (20) gpm Steam Generator tube leak is detected.
- b. After transition to OPOP05-EO-E30, "Steam Generator Tube Rupture".
- c. During the performance of OPOP05-EO-ES10, "Loss of Reactor Or Secondary Coolant", when a RED path is detected in Heat Sink.
- d. After transition to OPOP05-EO-ES01, "Reactor Trip Recovery", following an inadvertent reactor trip.

QUESTION: 087 (1.00)

An on-coming Unit Reactor Operator has worked the following schedule:

Day:	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Hrs:	12	8	12	8	8	8	8	12	8	12	12	12	12	?

WHICH ONE of the following is the MAXIMUM number of hours the individual may work on day 14 without obtaining special authorization assuming the operator has a minimum of 8 hours off between each shift?

- a. 2 hours
- b. 4 hours
- c. 8 hours
- d. 12 hours

QUESTION: 088 (1.00)

In WHICH ONE of the following areas should 2 way radios NEVER be used?

- a. Control Room.
- b. At the Auxiliary Shutdown Panel
- c. ESF switchgear rooms.
- d. In the RCB during reactor operation.

QUESTION: 089 (1.00)

WHICH ONE of the following describes the requirements for a NIGHT ORDER over thirty days old that contains significant direction or information?

- a. Placed in the Memorandum section of the Operations Manual.
- b. Transferred to the Policies and Practices section of the Operations Manual.
- c. Incorporated into the applicable procedure.
- d. Rewritten and reissued as a new Night Order.

QUESTION: 090 (1.00)

Given the following plant conditions:

- Unit 1 is in Mid-loop operation.
- The reactor has been shutdown for 1 month.
- A complete loss of RHR has occurred.
- RCS temperature was 130 degrees F when RHR was lost.

WHICH ONE of the following is the minimum time period after which reactor vessel boiling is expected to occur? (Addendum 4 to OPOP03-ZG-0009 is provided).

- a. 42 minutes
- b. 33 minutes
- c. 25 minutes
- d. 19 minutes

QUESTION: 091 (1.00)

Given the following plant conditions:

- A reactor trip from full power occurred 60 minutes ago.
- RCS pressure is 620 psig.
- Loops 1 and 4 cold leg temperatures are 240 degrees F.
- Loops 2 and 3 cold leg temperatures are 255 degrees F.
- CSF Status Tree OPOP05-EO-FO04 is in effect (Provided)

WHICH ONE of the following states the appropriate CSF color code:

- a. Green
- b. Yellow
- c. Orange
- d. Red

QUESTION: 092 (1.00)

Given the following plant conditions:

- Unit 1 is in Mode 5.
- Unit 2 is in Mode 4.

WHICH ONE of the following is the MINIMUM number of Licensed Senior Operators that shall be in the Unit 1 control room per Technical Specifications?

- a. 0
- b. 1
- c. 2
- d. 3

QUESTION: 093 (1.00)

Given the following Unit 2 conditions:

- A reactor trip has occurred.
- The Post Trip Review Report was properly prepared and evaluated.
- The cause of the trip has been clearly identified and corrected.
- All required equipment and systems operated as designed during the event and recovery.

WHICH ONE of the following is the MINIMUM level of management that has the authority to give permission to restart the reactor?

- a. Shift Supervisor
- b. Plant Operations Review Committee
- c. Plant Operations Manager
- d. Plant Manager

QUESTION: 094 (1.00)

WHICH ONE of the following is the LOWEST organizational position having the overall authority to invoke a stop work order for any activity involving operation?

- a. Plant Operation Manager
- b. Shift Supervisor
- c. Unit Supervisor
- d. Reactor Operator

QUESTION: 095 (1.00)

Given the following plant conditions:

- An event occurred at 0800 that was classified as a Site Area Emergency.
- The assembly alarm was actuated at the time of the classification.

WHICH ONE of the following is the MAXIMUM time after the assembly alarm in which accountability must be completed?

- a. 15 minutes
- b. 30 minutes
- c. 45 minutes
- d. 60 minutes

QUESTION: 096 (1.00)

WHICH ONE of the following types of procedures would be used for complex activities which require significant coordination between multiple personnel at various locations?

- a. IN HAND
- b. AVAILABLE
- c. WORKING COPY
- d. REFERENCED

QUESTION: 097 (1.00)

WHICH ONE of the following conditions would require DUAL VERIFICATION?

- a. Alignment of systems which perform a safety function.
- b. Whenever the consequences of human error warrant an additional barrier to prevent misperformance.
- c. Prior to relying on the component to perform its safety function.
- d. When specified in written instructions.

QUESTION: 098 (1.00)

WHICH ONE of the following radiation exposures has a STPEGS Administrative Action Level established at two (2) rem per year?

- a. Committed Dose Equivalent (CDE).
- b. Shallow Dose Equivalent, Wholebody (SDE, WB).
- c. Total Organ Dose Equivalent (TODE).
- d. Total Effective Dose Equivalent (TEDE).

QUESTION: 099 (1.00)

Work must be performed in the Auxiliary Building near a point source that is producing a gamma radiation measurement of 500 mrem/hr at a distance of 2 feet.

WHICH ONE of the following methods of work performance will result in the lowest TOTAL personnel radiation exposure?

- a. Operators A and B working together require 3 hours each to perform the work at a distance of 16 feet from the point source.
- b. Operators A and B working together require 1 hour each to perform the work at a distance of 8 feet from the point source.
- c. Operator A requires 3 hours to perform the work at a distance of 8 feet from the point source.
- d. Operator B requires 1 hour to perform the work at a distance of 4 feet from the point source.

QUESTION: 100 (1.00)

An MOV must be manually backseated/mainseated after remote operation to perform its normal function.

WHICH ONE of the following actions is required?

- a. Dispatch an operator to hang a Danger Tag at the applicable MOV handswitch.
- b. Dispatch an operator to hang a Caution Tag at the applicable MOV handswitch.
- c. Dispatch an operator to hang Danger Tags at the applicable MOV handswitch and associated breaker.
- d. Dispatch an operator to hang Caution Tags at the applicable MOV handswitch and associated breaker.

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

REQUIRED SHUTDOWN MARGIN FOR MODE 5

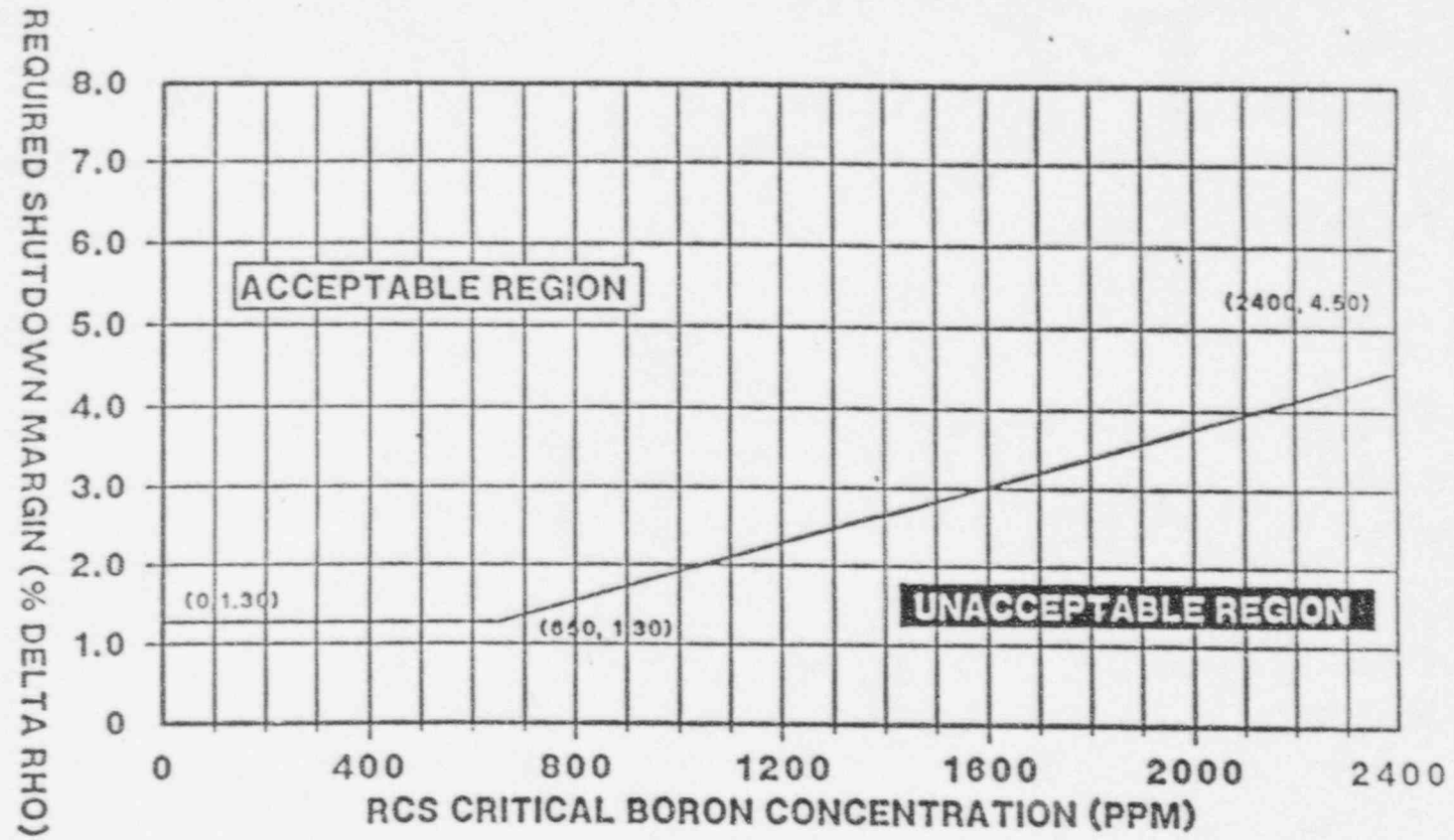
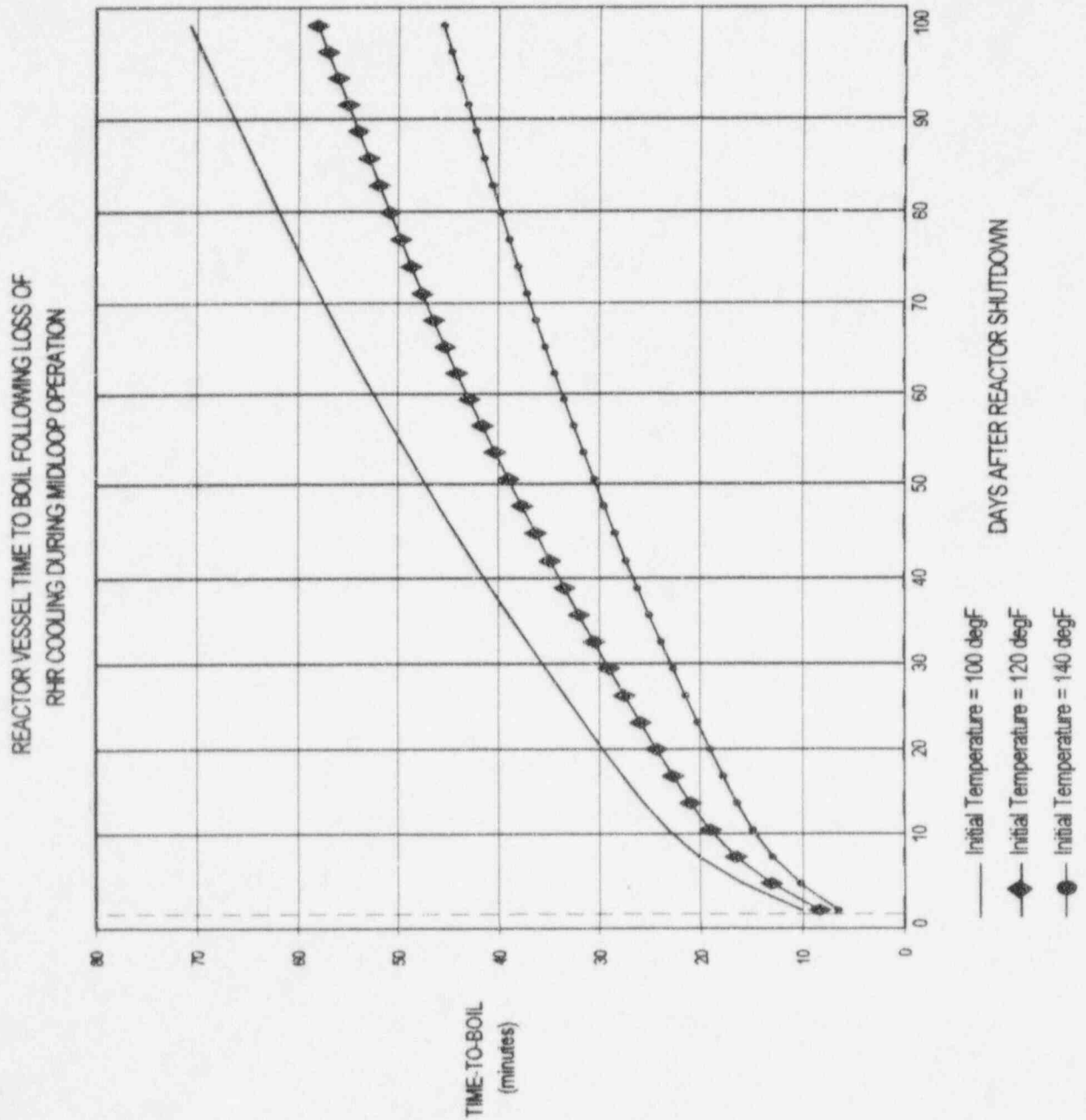
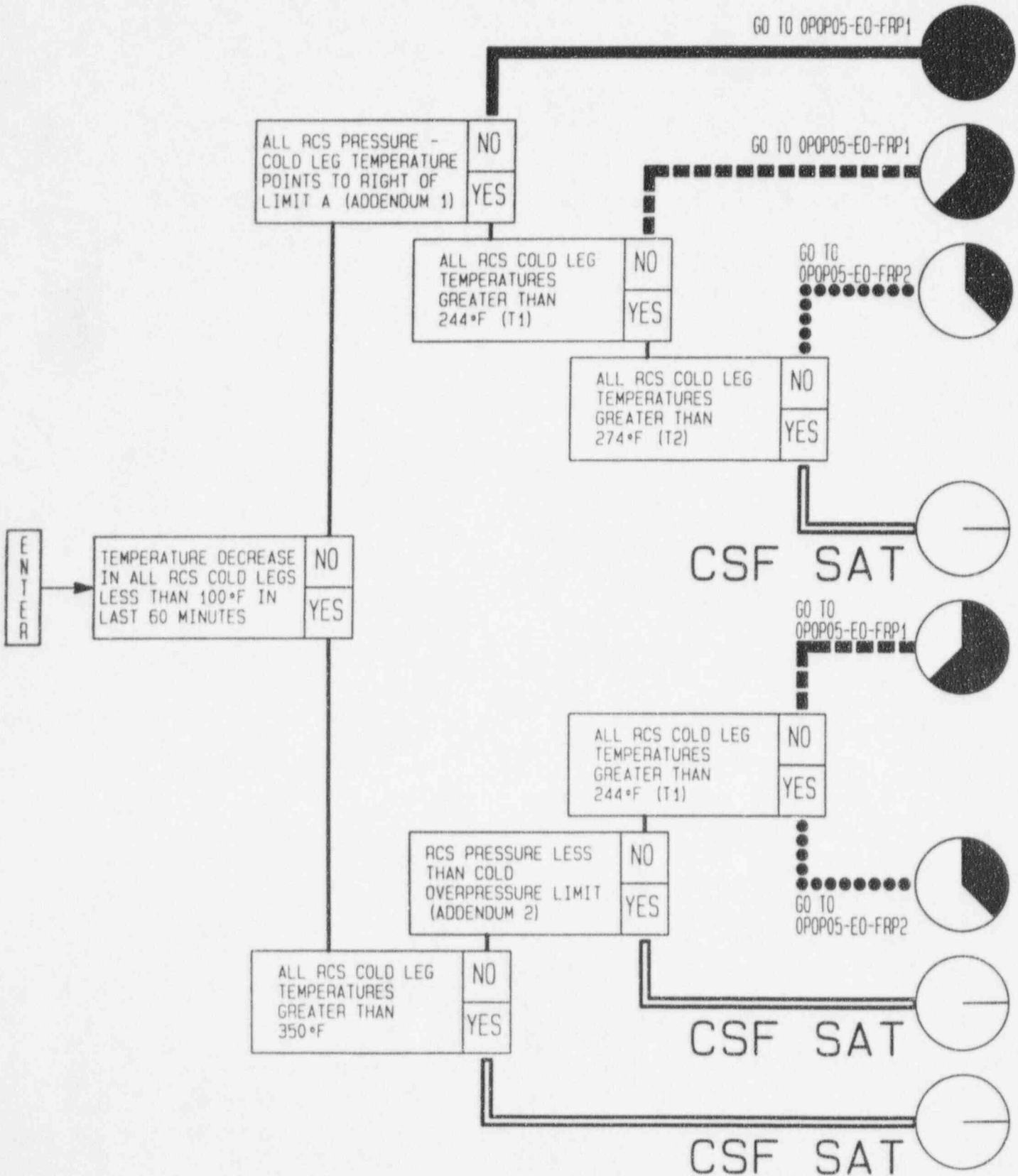


FIGURE 3.1-2

REQUIRED SHUTDOWN MARGIN VERSUS RCS CRITICAL BORON CONCENTRATION

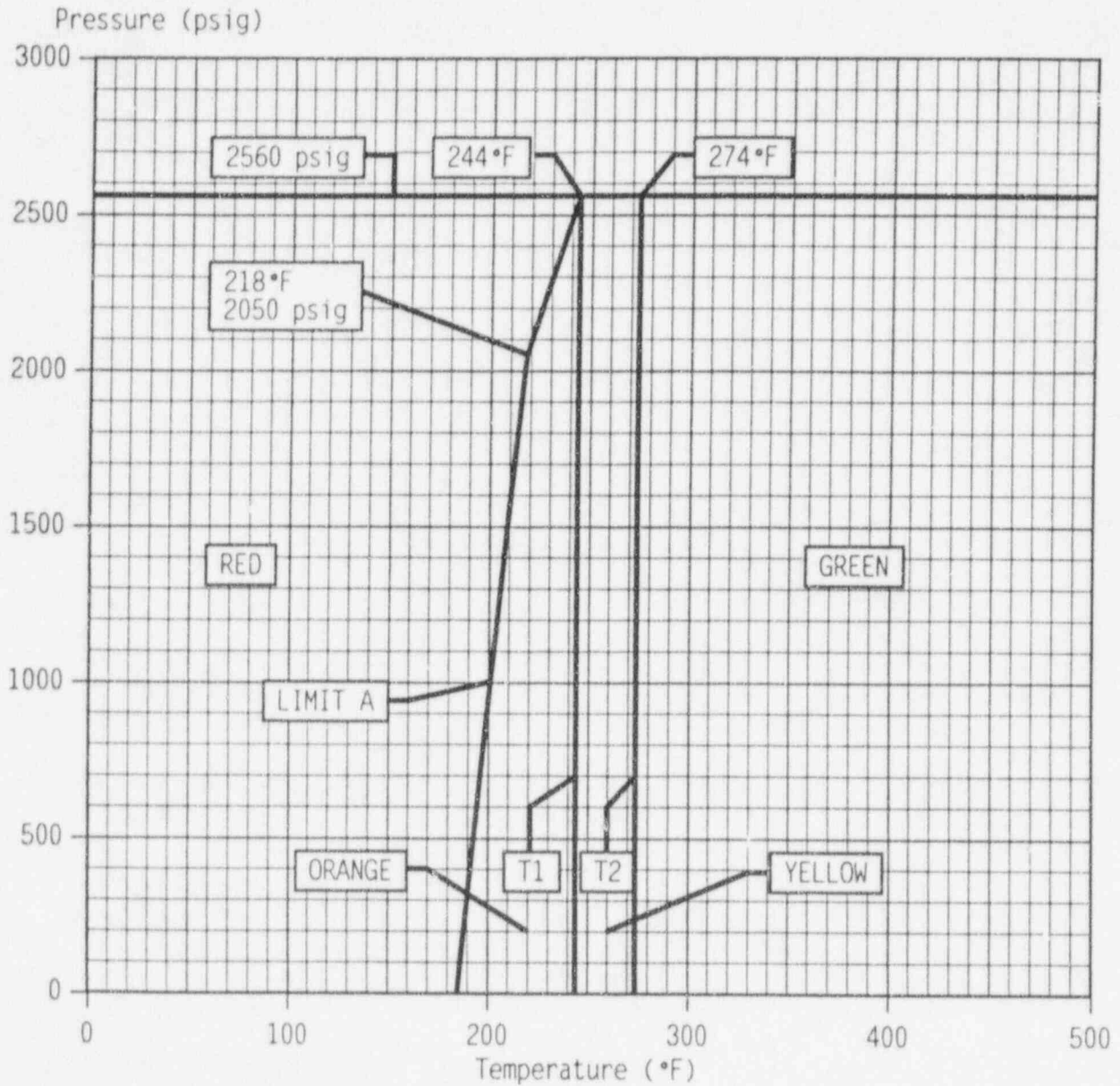
ADDENDUM 4
REACTOR VESSEL TIME TO BOIL FOLLOWING LOSS OF RHR
DURING MID-LOOP OPERATION
(Page 1 of 1)
(Reference 2.14)





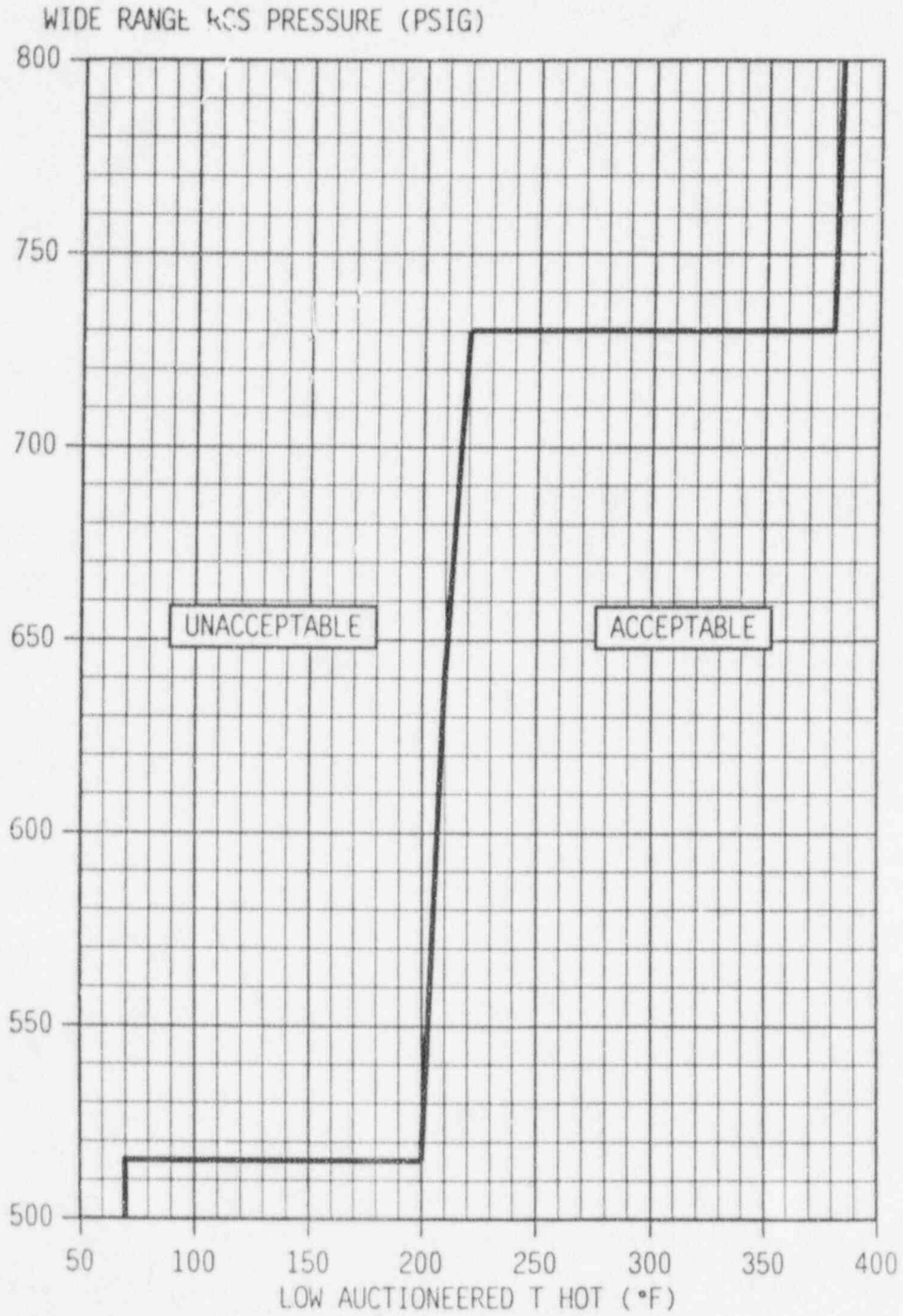
ADDENDUM 1
INTEGRITY OPERATIONAL LIMITS

Integrity Operational Limits



ADDENDUM 2
COLD OVERPRESSURE LIMITS

COLD OVERPRESSURE LIMITS



ANSWER KEY

MULTIPLE CHOICE

001	a	III II	023	a	III I
002	d	II	024	a	I
003	a		025	d	
004	b		026	a	
005	d		027	d	
006	d		028	b	III
007	a		029	b	IIII
008	a	I	030	d	
009	c		031	a	
010	a		032	a	III
011	d	I	033	d	I
012	b		034	c	
013	d		035	b	I
014	d		036	d	III II
015	d	II	037	a	
016	b		038	d	III I
017	c		039	c	I
018	a	III I	040	c	
019	b	I	041	d	
020	d		042	b	I
021	b		043	c	I
022	a	I	044	a	
			045	a	II

ANSWER KEY

046	c I	069	c
047	d III	070	b
048	b	071	c
049	c	072	c II
050	b	073	c
051	c	074	d III
052	a II	075	c
053	d I	076	b
054	b III	077	c I
055	a I	078	a I
056	a I	079	b II
057	d	080	d
058	d I	081	d I
059	a III	082	c II IIII
060	d I	083	d
061	b II	084	c I
062	c	085	b
063	d	086	b II
064	b	087	b
065	d II	088	c II
066	c	089	a II I
067	d	090	c
068	a II	091	c

A N S W E R K E Y

- 092 a
- 093 d l
- 094 b lll
- 095 b
- 096 a
- 097 d & b
- 098 d
- 099 a
- 100 b & d l

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