

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Inspection Report: 50-382/94-01

License: NPF-38

Licensee: Entergy Operations, Inc.  
P.O. Box B  
Killona, Louisiana

Facility Name: Waterford Steam Electric Station, Unit 3

Inspection At: Waterford Steam Electric Station, Unit 3

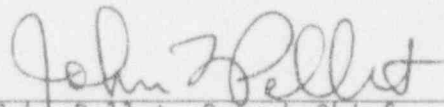
Inspection Conducted: February 28 through March 4, 1994

Inspector: Ryan E. Lantz, Lead Inspector/Examiner  
Division of Reactor Safety

Accompanying Personnel: A. Lopez, Examiner, Contractor  
Battelle Pacific NW Labs

N. Maguire-Moffitt, Examiner, Contractor  
Battelle Pacific NW Labs

Approved:

  
\_\_\_\_\_  
John Pellet, Branch Chief  
Operations Branch, Division of Reactor Safety

4/22/94  
Date

Inspection Summary

Areas Inspected: Routine, announced inspection of the qualifications of applicants for operator licenses at the Waterford, Unit 3 facility, which included an eligibility determination and administration of comprehensive written and operating examinations. The examination team also observed the performance of onshift 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, Sections 201, 202, 203, 301, 302, 303, 401, 402, and 403, issued January 1993.

Results:

- Seven of the nine applicants for reactor operator licenses satisfied the requirements of 10 CFR 55.33(a)(2) (Section 1.6).

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- The System Descriptions and other reference materials provided by the training department for examination development were good, with exceptions as noted (Section 1.1).
- Eight of the nine applicants passed the written examination, with scores ranging from a low of 77 percent to a high of 94 percent with an average of 87 percent (Section 1.2). Seven of the nine applicants passed the operating test (Sections 1.3.1 and 1.3.2).
- The examiners observed good communication practices from applicants during the conduct of the examinations, and effective, although less formal, communication from control room operators during plant walkthroughs (Section 1.3.1).
- Applicants were generally slow to manually initiate safety systems prior to their automatic initiation (Section 1.3.1).

Summary of Inspection Findings:

- There were no violations or deviations identified during the course of this inspection.

Attachments:

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

## DETAILS

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

During the inspection, the examiners evaluated the qualifications of nine license applicants for reactor operator (RO). The inspection assessed the eligibility and administrative and technical competency of the applicants to be issued licenses to operate the reactivity controls of a commercial nuclear power facility in accordance with 10 CFR 55 and NUREG-1021, "Operator License Examiner Standards," Revision 7, Sections 200 (series), 300 (series), and 400 (series). Further, the inspection included evaluations of facility materials, procedures, and simulation capability used to support development and administration of the examinations. These areas were evaluated using the guidance provided in the areas of NUREG-1021 cited above. Additionally, the examination team also observed the performance of onshift operators and plant conditions incident to the conduct of the applicant evaluations.

After completion of the evaluations, the examiners determined that seven of the nine applicants for RO licenses satisfied the requirements of 10 CFR 55.33(a)(2), who have been issued the appropriate licenses. One applicant failed the dynamic simulator and written portions of the examination and a second applicant failed the walkthrough portion of the examination. Their license applications were denied. Those applicants whose application for a license was denied may reapply in accordance with 10 CFR 55.35.

Performance results for individual applicants are not included in this report because inspection reports are placed in the NRC Public Document Room as a matter of course. Individual performance results are not subject to public disclosure.

#### 1.1 Facility Materials Submitted for Examination Development

The chief examiner 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 (JPMs). The procedures and lesson plans were adequate. Some JPMs were not current with the latest procedure revision.

The facility bank of written questions, dynamic simulator scenarios, and JPMs was adequate in scope, depth, and variety. The facility also maintains a detailed volume of system descriptions used for training which were easily referenced and technically accurate. The facility examination banks and system descriptions were used extensively in developing the examinations.

Several lesson plans were not revised to reflect current procedure revisions, and no lesson plan involving loss of a vital instrument bus or 125VDC bus was submitted. The inspectors noted that it is the facility practice to update each lesson plan immediately prior to use, which is necessary at a minimum; however, this did create uncertainty in examination generation and increased the preadministration review importance and difficulty.

There is no regulatory requirement for a facility to develop and maintain a bank of valid test items (questions, JPMs, and scenarios) for NRC use to develop examinations. However, because of the significant savings in development time, the NRC has expressed willingness to use such material if it is available and meets the standards of NUREG-1021.

## 1.2 Written Examinations

The examination team developed a comprehensive written RO examination in accordance with the guidelines of NUREG-1021, Revision 7, Section 401. The examination consisted of 100 multiple choice questions. During the week of February 22, 1994, members of the facility operations and training departments, under the provisions of NUREG-1021, which require execution of a non-disclosure security agreement, reviewed the examinations at the Waterford Unit 3 Training Center. 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 or otherwise retained. The chief examiner incorporated the facility comments and administered the examinations to the license applicants on February 28, 1994.

The chief examiner provided the facility training staff with a copy of the "as administered" written examination and answer key along with the preadministration review comments on February 28, 1994, immediately following the completion of the examination by the applicants. The facility reviewed the as administered examination and provided additional comments as enclosed in Attachment 4.

The chief examiner accepted all of the facility postexamination comments after a detailed review of the technical basis of the comments. Additionally, the chief examiner deleted two questions from the examination based on technical analysis of those questions. The chief examiner made the appropriate revisions to the examination key, as reflected in Attachment 3.

Overall, applicants performed marginally on the written examinations. Scores ranged from a low of 77 percent to a high of 95 percent with an average of 86 percent. Eight of the nine applicants passed the written examination.

The chief examiner reviewed applicant performance on individual questions and observed that the following questions were missed by 50 percent or more of the applicants responding to the question:

20, 50, 53, 92.

The questions are referenced here only by question number. Refer to Attachment 3 for the complete question and answer.



The chief examiner concluded that no specific area of significant knowledge weakness was apparent in the responses to the above questions. Therefore, the information is provided to the facility training staff for consideration as feedback into future training needs.

### 1.3 Operating Examinations

The examiners developed comprehensive operating examinations in accordance with the guidelines of NUREG-1021, Revision 7, Section 301. The operating examinations consisted of two parts, a dynamic simulator scenario portion and a control room/plant walkthrough portion. The chief examiner previewed and validated the various portions of the operating examinations in the Region IV office during the week of February 21, 1994, and onsite on February 24-26, 1994, with the assistance of facility training personnel under security agreement. The examination team administered the operating examinations during the week of February 28, 1994.

#### 1.3.1 Dynamic Simulator Scenarios

The examination team evaluated four crews (one consisting of three RO applicants rotating through two positions and three consisting of two RO applicants) on two scenarios using the Waterford Unit 3 plant-specific simulation facility. The examiners compared applicants' actual performance during the scenarios with expected performance in accordance with the requirements of NUREG-1021, Revision 7, Section 303, to evaluate applicants' competency on this portion of the operating examinations.

The examination team noted good communication practices among crew members, with only isolated instances of open-ended and informal communications. Comparative observations of onshift licensed operators, although somewhat less formal, also noted effective communication practices.

The applicants exhibited good familiarity with facility procedures, even infrequently used procedures. In general, the applicants were quick to evaluate which procedure was required and then locate and reference that procedure.

One generic operator performance weakness was noted. The applicants were slow to manually actuate safety initiations prior to the respective automatic actuation. In one instance, an applicant was directed (several minutes prior to reaching an imminent automatic safety injection setpoint) to manually initiate safety injection prior to the automatic initiation. The applicant acknowledged, but still failed to manually initiate the safety systems, relying on the automatic actuation to initiate. Facility operating practice taught is to manually actuate safety systems with senior reactor operators' direction prior to an automatic initiation and to act without direction if an automatic actuation setpoint is reached without the actuation occurring. In general, the applicants were slow to perform these manual actuations.

Eight of the nine applicants passed this portion of the operating examination.

### 1.3.2 Walkthrough Examinations

The examination team evaluated each of the RO applicants using ten job performance measures relating to tasks within the scope of potential duties of a licensed RO (which included non-licensed operator tasks outside the control room). The applicants performed some of the tasks in the simulation facility in the dynamic mode. They simulated (through discussions) the remainder of the tasks in the plant integrated control room and at local operating stations throughout the plant. Immediately following the performance of each task, the examiners asked pre-scripted questions relating to the system involved in the 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 response from memory. The examiners combined the applicants' task performance and question responses in accordance with the guidelines of NUREG-1021, Revision 7, Section 303, to evaluate performance on this portion of the operating examination.

Overall, the applicants performed adequately. One applicant did not correctly perform several of the required tasks, but no generic walkthrough weaknesses were noted by the examiners. Eight of the applicants passed this portion of the operating examination with satisfactory overall performance on systems and tasks. Each applicant was required to enter Controlled Access to complete one or more tasks.

The examiners observed that applicants were very aware of activities in the plant and were quick to report discrepancies or unusual conditions to the control room.

### 1.4 Observations

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

- Material condition of the plant was noted as good, with the facility painting program and shift-to-shift clean up observed as especially active and effective. This was especially noteworthy given that the facility was preparing for a refueling/maintenance outage.
- Control room communications were observed incident to the control room walkthrough examinations. In general, communications were effective, but somewhat less formal than observations made during the dynamic simulator section of the operating examinations.

### 1.5 Simulator Fidelity

During the preparation of the operating examinations, the examination team observed several previously unidentified discrepancies in simulator fidelity. The facility had recently entered a new core model in the simulator, but as of the preparation week for the examinations, had not validated each previously

established simulator malfunction. For example, the new model did not recognize very small breaks in relatively large pipes, which resulted in erroneous indications for a small reactor coolant system (RCS) leak from a large (RCS cold leg) pipe. The facility staff was able to correct and/or compensate for the infidelities as they were identified during the preparation week, which allowed the as-proposed examinations to be validated with only minor modifications.

### 1.6 Conclusions

The examination team concluded that the performance of seven applicants for operator licenses satisfied the requirements of 10 CFR 55.33(a)(2) and recommended that licenses be issued.

In general, the examination team concluded that:

- Individual applicants and crews performed adequately. Seven of the nine applicants for reactor operator licenses satisfied the requirements of 10 CFR 55.33(a)(2) and have been issued the appropriate license.
- Applicant communication practices were a noted strength during the examinations.
- Facility reference materials adequately supported examination development. The facility system descriptions were a particularly useful reference.
- Applicants were slow to anticipate and take actions to prevent automatic safety actuations.

## ATTACHMENT 1

### 1 PERSONS CONTACTED

#### 1.1 Licensee Personnel

- \*R. Barkhurst, Vice President, Operations
- J. Delcano, Simulator Engineer
- R. Fletcher, Operations Instructor
- S. Hymel, Operations Instructor
- M. Jesse, Operations Instructor
- B. Lietzke, Operations Instructor
- \*B. Loetzerich, Licensing
- W. Lowrance, Simulator Engineer
- B. Matherne, Operations Instructor
- T. McCool, Operations Instructor
- \*J. O'Hern, Training Manager
- P. O'Malley, Operations Instructor
- \*D. Packer, General Manager, Plant Operations
- \*W. Smith, Simulator Training Supervisor
- \*R. Starkey, Manager, O&M/Plant Operations
- \*D. Vinci, Operations Superintendent
- W. VonForell, Simulator Engineer

#### 1.2 NRC Personnel

- \*R. Lantz, Reactor Engineer, Region IV

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

\*Denotes personnel that attended the exit meeting.

### 2 EXIT MEETING

An exit meeting was conducted on March 4, 1994. 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 examiner. The licensee did not state any position on the findings presented during the exit meeting.

## ATTACHMENT 2

### SIMULATION FACILITY REPORT

Facility Licensee: Waterford, Unit 3

Facility Docket: 50-382

Operating Tests Administered at: Waterford, Unit 3

Operating Tests Administered on: February 28 through March 3, 1994

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. No licensee action is required in response to these observations.

During the dynamic operation of the simulator in support of the operating tests, no previously unidentified simulator fidelity problems were observed. The facility and NRC examiners did identify several infidelities as described below during the examination preparation week, but successfully corrected those discrepancies prior to administration of the examinations.

- Small break loss of coolant accidents in large diameter RCS or pressurizer piping were not recognized as leaks by the newly installed core model. The standby coolant charging pumps would auto-start; however, RCS pressure and pressurizer level would not display the expected decrease, and, in fact, displayed an increasing trend that was opposite from what was expected in the actual plant.
- Increasing safety injection tank pressure and level was extremely slow as compared with plant operations experience and previous observations of modeling in the simulator. This was also attributed to the newly installed core model.



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ATTACHMENT 3

WRITTEN EXAMINATION KEYS

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  
REACTOR OPERATOR LICENSE  
REGION 4

CANDIDATE'S NAME: \_\_\_\_\_  
FACILITY: WaterFord 3  
REACTOR TYPE: PWR-CE80  
DATE ADMINISTERED: 94/02/28

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

A N S W E R S H E E T

Multiple Choice (Circle or X your choice)

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

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

A N S W E R   S H E E T

Multiple Choice    (Circle or X your choice)

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

046    a    b    c    d    \_\_\_

M U L T I P L E   C H O I C E

047    a    b    c    d    \_\_\_

048    a    b    c    d    \_\_\_

049    a    b    c    d    \_\_\_

050    a    b    c    d    \_\_\_

051    a    b    c    d    \_\_\_

052    a    b    c    d    \_\_\_

053    a    b    c    d    \_\_\_

054    a    b    c    d    \_\_\_

055    a    b    c    d    \_\_\_

056    a    b    c    d    \_\_\_

057    a    b    c    d    \_\_\_

058    a    b    c    d    \_\_\_

059    a    b    c    d    \_\_\_

060    a    b    c    d    \_\_\_

061    a    b    c    d    \_\_\_

062    a    b    c    d    \_\_\_

063    a    b    c    d    \_\_\_

064    a    b    c    d    \_\_\_

065    a    b    c    d    \_\_\_

066    a    b    c    d    \_\_\_

067    a    b    c    d    \_\_\_

068    a    b    c    d    \_\_\_

069    a    b    c    d    \_\_\_

070    a    b    c    d    \_\_\_

071    a    b    c    d    \_\_\_

072    a    b    c    d    \_\_\_

073    a    b    c    d    \_\_\_

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077    a    b    c    d    \_\_\_

078    a    b    c    d    \_\_\_

079    a    b    c    d    \_\_\_

080    a    b    c    d    \_\_\_

081    a    b    c    d    \_\_\_

082    a    b    c    d    \_\_\_

083    a    b    c    d    \_\_\_

084    a    b    c    d    \_\_\_

085    a    b    c    d    \_\_\_

086    a    b    c    d    \_\_\_

087    a    b    c    d    \_\_\_

088    a    b    c    d    \_\_\_

089    a    b    c    d    \_\_\_

090    a    b    c    d    \_\_\_

A N S W E R   S H E E T

Multiple Choice    (Circle or X your choice)

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

091    a    b    c    d    \_\_\_

M U L T I P L E   C H O I C E

092    a    b    c    d    \_\_\_

093    a    b    c    d    \_\_\_

094    a    b    c    d    \_\_\_

095    a    b    c    d    \_\_\_

096    a    b    c    d    \_\_\_

097    a    b    c    d    \_\_\_

098    a    b    c    d    \_\_\_

099    a    b    c    d    \_\_\_

100    a    b    c    d    \_\_\_



Policies and Guidelines  
for taking NRC Written Examinations

During the administration of this examination the following rules apply:

1. Cheating on the examination will result in a denial of your application and could result in more severe penalties.
2. After you complete the examination, 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.
3. To pass the examination, you must achieve a grade of 80% or greater.
4. The point value for each question is indicated in parentheses after the question.
5. There is a time limit of four (4) hours for completion of the examination.
6. Use only black ink or dark pencil to ensure legible copies.
7. Print your name in the blank provided on the examination cover sheet and the answer sheet.
8. Mark your answers on the answer sheet provided and do not leave any question blank.
9. If the intent of a question is unclear, ask questions of the examiner only.
10. Restroom trips are permitted, but only one applicant at a time will be allowed to leave. Avoid all contact with anyone outside the examination room to eliminate even the appearance or possibility of cheating.
11. When you complete the examination, assemble a package including the examination questions, examination aids and answer sheets and give it to the examiner or proctor. Remember to sign the statement on the examination cover sheet.
12. After you have turned in your examination, leave the examination area as defined by the examiner.

QUESTION: 001 (1.00)

WHICH ONE (1) of the following inputs to CEDMCS is provided by the Plant Protection System?

- a. UCL (Upper Control Limit).
- b. CWP (CEA Withdrawal Prohibit).
- c. AMI (Automatic Motion Inhibit).
- d. LGS (Lower Group Stop).

QUESTION: 002 (1.00)

Given the following:

- CEA Subgroup 3, which is Auto Selected to drop on activation of a Reactor Power Cutback (RXC) has just been placed on the hold bus.
- An automatic Reactor Power Cutback occurs.

WHICH ONE (1) of the following describes the effect of the RXC on Subgroup 3?

- a. Subgroup will not respond to RXC, but RO can insert the subgroup manually.
- b. Subgroup drives into the core when RO places CEDMCS in Auto Sequential.
- c. Subgroup drops into the core upon receipt of a reactor trip signal.
- d. Subgroup drops into core when operator depresses the RXC "Drop Subgrps" and "Event Select" pushbuttons.

QUESTION: 003 (1.00)

Given the following:

- CEA 17 Automatic CEDM Timing Module (ACTM) card has detected an inadequate holding current on the Upper Gripper coil.
- The card was unsuccessful in transferring to the Lower Gripper.

WHICH ONE (1) of the following is the response of the grippers to these conditions?

- a. Both the upper and lower grippers will be energized at low voltage.
- b. Both the upper and lower grippers will be energized at high voltage.
- c. Only the upper gripper will be energized at high voltage.
- d. Only the lower gripper will be energized at high voltage.

QUESTION: 004 (1.00)

Given the following:

- A plant heat-up is in progress.
- RCS cold leg temperature increased from 190 degrees F to 196 degrees F in the last ten minutes.

WHICH ONE (1) of the following actions will result in the MAXIMUM allowable RCS heat-up rate (HUR)?

- a. Increase HUR by 14 degrees F/hr.
- b. Increase HUR by 24 degrees F/hr.
- c. Decrease HUR by 6 degrees F/hr.
- d. Decrease HUR by 16 degrees F/hr.

QUESTION: 005 (1.00)

WHICH ONE (1) of the following RCP discharge piping locations provide penetrations for normal pressurizer spray?

- a. RCPs 1A and 2A.
- b. RCPs 1A and 1B.
- c. RCPs 1B and 2B.
- d. RCPs 2A and 2B.

QUESTION: 006 (1.00)

Given the following:

- RCS pressure is 2250 psia.
- The following conditions exist on RCP 1B:  
Vapor seal is at 75 psig  
Upper seal is at 1200 psig  
Middle seal is at 2200 psig

WHICH ONE (1) of the following RCP 1B seals is degraded?

- a. Vapor seal.
- b. Upper seal.
- c. Middle seal.
- d. Lower seal.

QUESTION: 007 (1.00)

Given the following:

- A Reactor Coolant Pump (RCP) was started at 8:10 and again at 9:30 to vent the RCS.
- It ran for a total of 40 minutes and has subsequently been at rest for 2 hours.

WHICH ONE (1) of the following is the EARLIEST that the pump may be re-started?

- a. Now (no further delay required)
- b. 30 minutes
- c. 60 minutes
- d. 120 minutes

QUESTION: 008 (1.00)

WHICH ONE (1) of the following is the reason for requiring RCS temperature to be greater than 500 degrees F. before starting the fourth Reactor Coolant Pump?

- a. To limit core uplift.
- b. To limit Steam Generator tube stresses.
- c. To prevent excessive RCP starting currents.
- d. To prevent exceeding RCS heatup rate limits.



QUESTION: 009 (1.00)

Given the following:

- A SIAS has occurred due to an Excessive Steam Demand event.
- Both EDGs are running with their output breakers OPEN.
- The charging pump selected by the AB assignment switch on CP-4 has tripped.
- Charging pump suction header pressure is 20 psia.
- The charging pump white TURN OFF light is LIT.

WHICH ONE (1) of the following caused the AB selected charging pump to trip?

- a. SIAS
- b. Undervoltage.
- c. Low suction pressure.
- d. Low lube oil pressure.

QUESTION: 010 (1.00)

WHICH ONE (1) of the following provides the interlock to close Letdown HX CCW FCV, (CC-636)?

- a. CVC-101, Letdown Stop Valve.
- b. CVC-109, Letdown Containment Isolation valve.
- c. CVC-113A, Letdown Flow Control Valve.
- d. CVC-123A, Letdown Backpressure Valve.

QUESTION: 011 (1.00)

Given the following:

- The plant has experienced a SIAS concurrent with a loss of offsite power.
- The "A" EDG has started and loaded its Safety Bus.

WHICH ONE (1) of the following describes the restart of the "A" LPSI pump?

- a. The pump should automatically restart as soon as the Safety Bus is energized.
- b. The pump should automatically restart 17 seconds after the Safety Bus is energized.
- c. The pump cannot restart until the Undervoltage Override (UVO) relay is de-energized.
- d. The pump must be manually restarted.

QUESTION: 012 (1.00)

WHICH ONE (1) of the following is the reason why the LPSI pump minimum flow recirculation valves (SI-1161 A/B) are required to be CLOSED when aligning the LPSI pumps for Shutdown Cooling (SDC)?

- a. To ensure that minimum SDC flow requirements are met.
- b. To ensure proper valve alignment for the containment spray system.
- c. To prevent boron stratification in the recirculation line.
- d. To prevent draining the RCS back to the RWSP.

QUESTION: 013 (1.00)

To WHICH ONE (1) of the following locations are the Safety Injection Tanks (SIT) vented when lowering pressure?

- a. Containment atmosphere.
- b. Reactor Drain Tank.
- c. Quench Tank.
- d. Holdup Tank.

QUESTION: 014 (1.00)

Given the following:

- The plant has tripped due to a small break loss of coolant accident (LOCA).
- The event is ongoing and the Recirculation Actuation System (RAS) has initiated.
- BOTH High Pressure Safety Injection (HPSI) pumps continue to operate at full capacity.

WHICH ONE (1) of the following provides cooling for the HPSI pump seals?

- a. A portion of the pumps discharge is cooled by Component Cooling Water (CCW).
- b. Mini-Recirc flow to the RWSP.
- c. The containment spray system is aligned to cool the SI sump.
- d. Mini-Recirc flow to the SI sump.

QUESTION: 015 (1.00)

WHICH ONE (1) of the following is a possible source of inventory for the Quench Tank? Assume no ESFAS actuation signals present.

- a. Reactor Drain Tank discharge.
- b. RCS loop drains.
- c. Reactor vessel head vent discharge.
- d. RCP Controlled Bleedoff drains.

QUESTION: 016 (1.00)

Given the following:

- CCW pumps "A" and "B" are in operation when an SIAS occurs.
- The "AB" CCW pump assignment switch is in "B" position and the WHITE light is LIT.

WHICH ONE (1) of the following describes the CCW system response?

- a. CCW pump "AB" starts and the "AB" CCW loop is supplied from CCW safety loop B.
- b. CCW pump "AB" starts and CCW flow to the Containment Fan coolers "B" and "D" increases.
- c. CCW pump "AB" does NOT start and CCW flow to the Containment Fan coolers "B" and "D" decreases.
- d. CCW pump "AB" does NOT start and "B" train suction and discharge cross-connect valves fail open.

QUESTION: 017 (1.00)

Given the following:

- RCS pressure is 2250 psia.
- Pressurizer Pressure Control System (PPCS) setpoint is 2250 psia.
- RCS boron concentration is 500 ppm boron.
- Pressurizer boron concentration is 350 ppm boron.

WHICH ONE (1) of the following methods is used to equalize RCS boron concentration per OP-010-001, "General Plant Operations"?

- a. ENERGIZE all Pressurizer Backup Heaters and reduce pressurizer spray controller setpoint potentiometer to establish spray flow and maintain RCS at 2250 psia.
- b. ENERGIZE all Pressurizer Proportional Heaters and reduce pressurizer spray controller setpoint potentiometer to establish spray flow and maintain RCS at 2250 psia.
- c. RAISE Pressurizer Pressure Control System setpoint to 2300 psia AND energize Pressurizer Proportional Heaters to maintain Pressurizer Spray flow.
- d. DECREASE Pressurizer Pressure Control System setpoint to 2220 psia AND energize Pressurizer Backup Heaters to maintain Pressurizer Spray flow.

QUESTION: 018 (1.00)

WHICH ONE (1) of the following is used to derive the pressurizer level setpoint program in the Reactor Regulating System (RRS) mode?

- a. RCS Tave.
- b. Tref.
- c. RCS delta T.
- d. Reactor power.



QUESTION: 019 (1.00)

For WHICH ONE (1) of the following accidents does the Variable Overpower Trip in the core protection calculators provide protection?

- a. Low Power CEA Bank Withdrawal.
- b. Asymmetric Steam Generator Trip.
- c. Inadvertent dilution during uppower transient.
- d. Partial Loss of RCS Flow.

QUESTION: 020 (1.00)

WHICH ONE (1) of the following is the reason that the Reactor Power Cutback (RXC) system must be disabled if both CEACs become inoperable?

- a. Auto Subgroup Select mode of RXC is inoperable.
- b. Power reduction required for CEAC inoperability requires that a feed pump be removed from service.
- c. Penalty factor inserted for CEAC inoperability assumes limited CEA insertion.
- d. All CEA Subgroups are de-selected on RXC when CEACs are made inoperable.

QUESTION: 021 (1.00)

WHICH ONE (1) of the following will decrease the margin to the DNBR Trip Setpoint?

- a. ASI changes from 0.0 to -0.1
- b. Tcold Loop 1 fails LOW.
- c. RCS pressure increases 25 psia.
- d. Delta-T Power is reduced via the subchannel potentiometer.

QUESTION: 022 (1.00)

Given the following:

- The plant is at 100% power.
- Channel "A" wide range PZR Pressure transmitter has failed low and its bistable is placed in BYPASS.

WHICH ONE (1) of the following will occur if the Channel "D" wide range PZR Pressure transmitter also failed low and its bistable is placed in BYPASS?

- a. Channel "D" will provide a one of four trip input for SIAS.
- b. Channel "D" will automatically replace Channel "A" in the trip logic.
- c. ESFAS channel actuation logic is reduced to a one of two trip logic.
- d. Both channels will be removed from BYPASS and an SIAS actuation will occur.

QUESTION: 023 (1.00)

Given the following:

- RCS cooldown and depressurization is in progress.
- RCS pressure is 350 psig.
- RCS temperature is 400 degrees.
- The control room has been evacuated per OP-901-502, "Evacuation of Control Room and subsequent Plant Shutdown".

WHICH ONE (1) of the following valves will automatically OPEN upon an inadvertent SIAS actuation?

- a. SI-139A - LPSI Flow Control Valve.
- b. SI-506A - Hot Leg Injection Isolation Valve.
- c. SI-331A - SIT Isolation Valves.
- d. SI-301 - Hot Leg Injection Drain Valve.

QUESTION: 024 (1.00)

WHICH ONE (1) of the following indications is generated by Reed Switch Position Transmitters (RSPT)?

- a. LOWER CONTROL LIMIT.
- b. DROPPED CEA.
- c. LOWER GROUP STOP.
- d. LOWER SEQUENTIAL PERMISSIVE.

QUESTION: 025 (1.00)

WHICH ONE (1) of the following provides the signal to generate an Auto Motion Inhibit (AMI)?

- a. CEAC
- b. CPC
- c. RRS
- d. RPS

QUESTION: 026 (1.00)

Given the following:

- Plant is at 100% steady state operation, MOL.
- DNBR/LPD Pretrip and Trip indications on the "A" CPC Remote Operator Module (ROM) are energized.
- DNBR/LPD margin meters for Channel A indicate low margin, all other channels indicate normal.

WHICH ONE (1) of the following Channel "A" conditions would cause these indications to be present?

- a. CEAC 1 in TEST.
- b. T cold failed low.
- c. Pressurizer pressure failed high.
- d. Excore Log Calibrate switch "NOT in OPERATE".

QUESTION: 027 (1.00)

Given the following:

- A controlled cooldown to MODE 5 is in progress.
- Steam Generator 1 & 2 pressures - 900 psia
- RCS Tcold - 532 degrees F.
- RCS pressure - 1780 psia.
- Pressurizer level - 33%.
- Charging pumps A & B are operating and letdown is in service.

WHICH ONE (1) of the following should be performed first to prevent an automatic ESPAS actuation?

- a. Raise pressurizer level to 40%.
- b. Bypass PZR pressure low trips.
- c. Reset S/G pressure low trip setpoint.
- d. Reset PZR pressure low trip setpoint.

QUESTION: 028 (1.00)

Given the following:

- Loop 1 Tavg indicates 574 degrees F.
- Loop 2 Tavg indicates 560 degrees F.
- Reactor Power is at 80%.

WHICH ONE (1) of the following is the cause of these indications?

- a. Loop 2 T-cold reading 525 F.
- b. Loop 2 T-cold reading 625 F.
- c. Loop 1 T-cold reading 525 F.
- d. Loop 1 T-cold reading 625 F.

QUESTION: 029 (1.00)

Given the following:

- A large break LOCA has occurred.
- The core is uncovered.
- Peak cladding temperature is 1600 degrees.

WHICH ONE (1) of the following describes the relationship between indicated Core Exit Thermocouple (CET) temperatures and the peak cladding temperature?

- a. CET temperature will be LOWER than peak clad temperature due to thermal lag.
- b. CET temperature will be LOWER due to electrical shunting.
- c. CET temperature will be HIGHER than peak clad temperature due to the presence of superheated steam around the detector.
- d. CET temperature will be HIGHER than peak clad temperature due to the large delta temperature between the CET and the reference junction temperature.

QUESTION: 030 (1.00)

Given the following:

- A LOCA has occurred and a void exists in the upper head.
- TWO (2) RCPs have just been started.

WHICH ONE (1) of the following describes the relationship between RVLMS indicated level and actual core level in the upper plenum during this condition?

- a. RVLMS indicated level will be HIGHER than actual level due to non-laminar flow in the core.
- b. RVLMS indicated level will be HIGHER than actual level due to a false low level in the separator tube.
- c. RVLMS indicated level will be LOWER than actual level due to venturi effect.
- d. RVLMS indicated level will be LOWER than actual level due to the decrease in reference junction temperature.

QUESTION: 031 (1.00)

WHICH ONE (1) of the following is the power supply to the "A" Containment Airborne Radioactivity Removal fan?

- a. 3A313
- b. 3A317
- c. PDP 360A
- d. PDP 384A

QUESTION: 032 (1.00)

WHICH ONE (1) of the following is an automatic response to a SIAS actuation?

- a. Containment Cooling HVAC safety discharge dampers CLOSE.
- b. Airborne Radioactivity Removal System Exhaust Fans START.
- c. Containment Cooling Fans shift to FAST speed.
- d. CEDM Cooling fans STOP.

QUESTION: 033 (1.00)

WHICH ONE (1) of the following reflects the operation of the Containment Spray system following a Recirculation Actuation Signal (RAS)?

- a. RWSP Outlet valves SI-106A(B) automatically CLOSE.
- b. LPSI pumps realign to increase NPSH of containment spray pumps.
- c. Safety Injection Sump isolation valves SI 602A(B) are MANUALLY OPENED.
- d. Minimum recirculation valves SI 120 and 121 A(B) are MANUALLY CLOSED.

QUESTION: 034 (1.00)

WHICH ONE (1) of the following is required to close Containment Spray Header Isolation valves, CS-125 A(B) after a valid CSAS signal?

- a. Reset the CSAS signal and the valves automatically close.
- b. Take the control switches on panel CP-8 to the open position to reset the logic and the valves will close.
- c. Reset the CSAS then place the control switches to the closed position.
- d. Reset CSAS, take the control switches to the open position and then place them in the closed position.



QUESTION: 035 (1.00)

WHICH ONE (1) of the following is used as a source of makeup to the Spent Fuel Pool, per OP 002-006, "Fuel Pool Cooling and Purification" when the Fuel Pool Level alarm is LIT?

- a. Primary Water Storage Tank.
- b. Condensate Storage Pool.
- c. Boric Acid Makeup Tank.
- d. Fire Water Storage Tank.

QUESTION: 036 (1.00)

WHICH ONE (1) of the following will PREVENT movement of the Refueling Machine Bridge and Trolley?

- a. Hoist is operating.
- b. Spreader is NOT extended.
- c. Suspended load is at setpoint.
- d. Hoist at Up Limit in Core Edge Zone.

QUESTION: 037 (1.00)

Given the following:

- The reactor tripped from 100% power ONE (1) minute ago.
- Steam Generator "A" level is 95% NR.
- Steam Generator "B" level is 40% NR.
- FWCS Level Channel Selector switches are selected to the BOTH position.

WHICH ONE (1) of the following is the expected status of the Feedwater Control System (FWCS)? (Assume NO operator action.)

- a. Feedwater is isolated to Steam Generator "A" and at 5% flow demand to Steam Generator "B".
- b. Feedwater is isolated to BOTH Steam Generators.
- c. Feedwater is at 5% flow demand to BOTH Steam Generators.
- d. Feedwater is at 5% flow demand to Steam Generator "A" and at 100 % flow demand to Steam Generator "B".

QUESTION: 038 (1.00)

Given the following:

- The plant has tripped from 100% power due to high Pressurizer pressure.
- Reactor Power Cutback is out of service.
- Reactor trip on Turbine trip is ENABLED.
- ALL Steam Bypass Control (SBCS) system valves are available.

WHICH ONE (1) of the following describes the response of the SBCS?

- a. Valve 6 will quick open.
- b. Valve 6 will modulate open.
- c. Valves 1 through 5 are blocked from a quick open signal.
- d. Valves 1 through 5 will quick open.

QUESTION: 039 (1.00)

Given the following:

- 86G2 white indicating light on CP-15 for the Main Generator is LIT.
- Exciter field breaker indicates OPEN.

WHICH ONE (1) of the following auxiliary transformer conditions could have caused this Main Generator trip?

- a. Low pressure.
- b. Sudden pressure.
- c. High temperature.
- d. Low temperature.

QUESTION: 040 (1.00)

WHICH ONE (1) of the following is the consequence of depressing Undervoltage Detector Test Switches 1 and 3 on the CEDMCS Maintenance and Supply Lamp Panel, Cabinet C4 Bay "A" simultaneously?

- a. TWO (2) reactor trip circuit breakers open.
- b. Any CEAs on the Hold Bus will drop into the core.
- c. The MG set output breakers will open resulting in an immediate reactor trip.
- d. A Reactor Trip Override (RTO) signal will be generated and the turbine will trip.

QUESTION: 041 (1.00)

WHICH ONE (1) of the following conditions will AUTOMATICALLY close Feedwater Isolation valves FW-184A(B)?

- a. CIAS.
- b. SIAS.
- c. MSIS.
- d. FWCS High Level Override signal.

QUESTION: 042 (1.00)

Given the following:

	Steam Generator "A"	Steam Generator "B"
- NR Level	20% & decreasing	23% & constant
- Steam Pressure	700 psia	835 psia
- Feedwater Pressure	1200 psig	1200 psig

WHICH ONE (1) of the following is the current status of the Emergency Feedwater System (EFW)?

- a. Both Steam Generators are being fed by EFW.
- b. EFW will feed Steam Generator "A" once it reaches critical level.
- c. EFW will feed Steam Generator "B" once it reaches critical level.
- d. EFW will feed both Steam Generators when critical level is reached in each generator.

QUESTION: 043 (1.00)

WHICH ONE (1) of the following will PREVENT the actuation of the Diverse Emergency Feedwater Actuation System (DEFAS) if both Train "A" and "B" actuation push buttons are depressed?

- a. DEFAS in ENABLE.
- b. Both S/G's WR levels are at 65%.
- c. EFAS 1 and EFAS 2 NOT actuated.
- d. Both S/G's pressures are at 900 psia.

QUESTION: 044 (1.00)

WHICH ONE (1) of the following components would NOT be available during a loss of offsite power?

- a. Auxiliary Component Cooling Water pumps.
- b. Boric Acid Makeup Tank pumps.
- c. Essential Chillers.
- d. Auxiliary Feedwater pump.

QUESTION: 045 (1.00)

WHICH ONE (1) of the following describes the possible effect of closing the AC breaker on battery charger 1A before the DC breaker is closed?

- a. Excessive current flow through the batteries.
- b. Damage to the filter capacitor.
- c. The high voltage shutdown relay can be damaged.
- d. Ignition of the hydrogen generated during battery charging.

QUESTION: 046 (1.00)

Given the following:

- Routine surveillance testing of EDG "A" is in progress.
- The NAO just reported that the pre-lube system has been placed in operation; time is now 10:30.

WHICH ONE (1) of the following is the EARLIEST that a manual remote start of EDG "A" should be attempted?

- a. 10:40
- b. 10:45
- c. 11:00
- d. 11:30

QUESTION: 047 (1.00)

WHICH ONE (1) of the following will automatically terminate a liquid waste discharge from the Waste Condensate Tank to the river?

- a. Low circulating water discharge flow.
- b. Waste Condensate Tank Low Level.
- c. Resetting the Liquid Waste discharge flow integrator.
- d. Low sample flow through the discharge radiation monitor.

QUESTION: 048 (1.00)

WHICH ONE (1) of the following Waste Gas Compressor trips does not require reset to restart the compressor?

- a. Low suction pressure.
- b. Low oil level.
- c. High compressor discharge temperature.
- d. Oil/Gas leak detector activated 1st stage.

QUESTION: 049 (1.00)

WHICH ONE (1) of the following occurs when an internal fault causes ARM-IRE-5026S, "Purge Isolation A" to fail HIGH?

- a. Containment Atmosphere Release (CARS) Supply Fans A(B) trip.
- b. ALL Containment Purge Isolation valves will CLOSE.
- c. Containment Purge Isolation "A" valves will CLOSE and Containment Purge Isolation "B" valves will remain OPEN.
- d. Containment Purge Isolation "B" valves will CLOSE and Containment Purge Isolation "A" valves will remain OPEN.

QUESTION: 050 (1.00)

WHICH ONE (1) of the following valves will fail OPEN on a loss of instrument air? Backup air supplies are not available.

- a. Main Feedwater Isolation Valve (FW-184B).
- b. Essential Chiller B CCW Outlet Valve (CC-301B).
- c. Containment Isolation Firewater B (FP-601B).
- d. Emergency Feedwater Primary Flow Control Valve (EFW-224B).



QUESTION: 051 (1.00)

WHICH ONE (1) of the following sets of fire pumps will be running if system water pressure decreases to 120 psig due to a leak?

- a. Jockey pump and Motor Driven Fire pump.
- b. Motor Driven Fire pump and ONE (1) Diesel Fire pump.
- c. Jockey pump and ONE (1) Diesel Fire pump.
- d. BOTH Diesel Fire pumps.

QUESTION: 052 (1.00)

Given the following:

- The plant is at 100% power.
- All CEAs are fully withdrawn.
- A Regulating group 1 CEA drops to the bottom of the core without causing a reactor trip.
- CEDMCS is in AUTO.

WHICH ONE (1) of the following operator actions are expected per OP-901-102, "CEA or CEDMCS Malfunctions"?

- a. Place CEDMCS in OFF and manually adjust CEA positions as necessary to match Tav<sub>g</sub> and Tref.
- b. Leave CEDMCS in AUTO and adjust RCS boron concentration to match Tav<sub>g</sub> and Tref.
- c. Place CEDMCS in OFF and adjust turbine load to match Tav<sub>g</sub> and Tref.
- d. Manually trip the reactor and go to OP-902-000, "Emergency Entry Procedure".

QUESTION: 053 (1.00)

WHICH ONE (1) of the following is the reason for Transient CEA Insertion Limits?

- a. Ensures a MAXIMUM shutdown margin assuming an excess steam demand accident at the beginning of core life.
- b. Ensures a MAXIMUM shutdown margin assuming the failure of the highest reactivity worth single CEA.
- c. Ensures axial peaking factors are within acceptable levels.
- d. Ensures the potential effects of a CEA ejection accident are limited to acceptable levels.

QUESTION: 054 (1.00)

WHICH ONE (1) of the following is an indication of a reactor trip at the Reactor Trip Status Panel (CP-7)?

- a. M1 and M2 GREEN indicator lights are LIT.  
CEDM U/V 1, 2, 3, 4 WHITE indicator lights are OFF.
- b. K1 through K4 WHITE indicator lights are ON.  
TCB-1 through TCB-9 RED indicator lights are LIT.
- c. K1 and K2 WHITE indicator lights are OFF.  
M1 and M2 RED indicator lights are LIT.
- d. TCB-1 through TCB-9 RED indicator lights are LIT.  
CEDM U/V 1, 2, 3, 4 WHITE indicator lights are ON.

QUESTION: 055 (1.00)

Given the following:

- OP-902-000, "Emergency Entry Procedure" is being performed following an uncomplicated reactor trip.
- All control systems are operating normally.
- The operator is verifying the Feedwater Control System is in Reactor Trip Override.

WHICH ONE (1) of the following describes how far OPEN the startup feedwater reg valves (FW-166 A/B) should be?

- a. 5%.
- b. 15%.
- c. 23%.
- d. 34%.

QUESTION: 056 (1.00)

WHICH ONE (1) of the following safety functions has the HIGHEST priority and is required to be addressed FIRST when implementing OP-902-008, "Safety Function Recovery Procedure"?

- a. Vital Auxiliaries
- b. RCS Inventory and Pressure Control
- c. Reactivity Control
- d. RCS and Core Heat Removal

QUESTION: 057 (1.00)

WHICH ONE (1) of the following provides MAXIMUM cooling to the core for a Small Break (.004 sq. ft) Loss Of Coolant Accident (SBLOCA)?

- a. Reflux boiling.
- b. Break flow cooling.
- c. Single phase Natural Circulation.
- d. Two phase Natural Circulation.

QUESTION: 058 (1.00)

Given the following:

-The plant is operating at 75% power and the latest leak rate data shows:

- 11.5 GPM - Total RCS leakage rate
- 3.8 GPM - Leakage into the Quench Tank
- 2.3 GPM - Leakage into the Reactor Drain Tank
- 0.8 GPM - Leakage past check valves from RCS to SITs
- 0.8 GPM - Total primary to secondary leakage (Assume distributed over both S/Gs)
- 2.2 GPM - Charging pump leakage

WHICH ONE (1) of the following Technical Specification leakage limits has been exceeded and will require a plant shutdown?

- a. PRESSURE BOUNDARY LEAKAGE.
- b. UNIDENTIFIED LEAKAGE.
- c. IDENTIFIED LEAKAGE.
- d. PRIMARY to SECONDARY LEAKAGE.

QUESTION: 059 (1.00)

WHICH ONE (1) of the following is the reason for establishing hot and cold leg injection flow following a large break LOCA?

- a. To quench steam in the hot legs and prevent formation of thermal stratification in the core.
- b. To prevent boron precipitation in the hot legs.
- c. To quench steam in the reactor vessel and prevent formation of thermal stratification in the hot legs.
- d. To prevent boron precipitation in the reactor vessel.

QUESTION: 060 (1.00)

WHICH ONE (1) of the following describes when Safety Injection (SI) flows are BALANCED as hot and cold leg injection is established following a large break LOCA?

- a. Two cold leg flows equal two hot leg flows.
- b. Two hot leg flows equal the four cold leg flows.
- c. Total SI flow equals the four cold leg flows.
- d. Total SI flow equals two hot leg flows.

QUESTION: 061 (1.00)

WHICH ONE (1) of the following is the MAXIMUM time allowed for operation of a Reactor Coolant Pump following loss of Component Cooling Water flow per OP-901-130, "Reactor Coolant Pump Malfunction"?

- a. 1 minute
- b. 3 minutes
- c. 5 minutes
- d. 10 minutes

QUESTION: 062 (1.00)

WHICH ONE (1) of the following conditions requires emergency boration per OP-901-103, "Emergency Boration"?

- a. Reg Group 6 CEA positioned just below the Power Dependent Insertion Limit.
- b. During refueling  $K_{eff}$  is equal to 0.95.
- c. Shutdown margin is 2.1%  $\Delta k/k$  with  $T_{avg}$  at 195 degrees F.
- d. A main steam line safety valve sticks full OPEN and will NOT reclose with the reactor at 1% power.

QUESTION: 063 (1.00)

Given the following:

- The plant is at 80% power.
- CP-901-103, "Emergency Boration" is being implemented.
- Charging flow is 44 gpm.

WHICH ONE (1) of the following is a positive indication that emergency boration is flowing into the RCS?

- a. Boric Acid Makeup Tank level is decreasing.
- b. Boric Acid pump is running.
- c. CEA insertion with CEDMCS in automatic sequential.
- d. POWER DEPENDENT INSERTION LIMIT alarm is lit.

QUESTION: 064 (1.00)

Given the following:

- The Unit has been shutdown for 3 days following 100 days of operating at 100% power.
- The RCS temperature is 140 degrees F.
- The RC is at midloop.
- A total loss of shutdown cooling occurs.
- Core cooling cannot be re-established.

WHICH ONE (1) of the following is the MINIMUM time expected for the RCS to reach saturation?

- a. 15 minutes
- b. 45 minutes
- c. 120 minutes
- d. 180 minutes



QUESTION: 065 (1.00)

WHICH ONE (1) of the following occurs when CCW "A" surge tank level decreases to approximately 56%?

- a. CCW makeup valve (CMU 538A) OPENS.
- b. CCW makeup pump "A" STARTS.
- c. CCW "A" Dry Cooling Tower Bypass (CC 134A) CLOSSES.
- d. CCW "A" and "B" trains split to isolate the leak.

QUESTION: 066 (1.00)

Given the following:

- The plant is at 100% power.
- All control systems are in AUTOMATIC.
- A pressurizer spray valve is stuck OPEN.
- NO operator action is taken.

WHICH ONE (1) of the following will occur as RCS pressure decreases to 2210 psia?

- a. Proportional heaters are fully energized.
- b. Pressurizer PRESSURE HI/LO alarm is actuated.
- c. Backup heaters are energized.
- d. Low pressurizer pressure reactor trip setpoint is reached.

QUESTION: 067 (1.00)

Given the following:

- The plant is at 90% power.
- Pressurizer level control channel Y is selected for control and indicates 55%.
- Pressurizer Hi-Lo and Lo-Lo alarms are ACTUATED.
- All pressurizer heaters are DEENERGIZED.
- No backup charging pumps are running.

WHICH ONE (1) of the following is the cause for the above conditions?

- a. Channel X has failed LOW
- b. Channel Y has failed LOW
- c. Channel X has failed HIGH
- d. Channel Y has failed HIGH

QUESTION: 068 (1.00)

Given the following:

- The plant is in MODE 6 - REFUELING.
- Startup Nuclear Instrument channel "A" has just failed LOW.
- Startup Nuclear Instrument channel "B" is in service with its associated audible indication in containment OPERABLE.
- Core alterations are in progress.

WHICH ONE (1) of the following Technical Specification Action Statements should be implemented?

- a. Immediately suspend core alterations and all operations involving positive reactivity changes.
- b. Place Channel "B" audio range select switch to the count rate 1 position.
- c. Immediately evacuate the refueling area until the audible alarm from Channel "A" is returned to service.
- d. Initiate and continue boration at greater than 40 gpm until RCS boron concentration increases to 1720 ppm.

QUESTION: 069 (1.00)

WHICH ONE (1) of the following criteria is used while performing a Neutron flux Log Power CHANNEL CHECK to compare Log Safety channel A with Log Safety channel B to determine that it is OPERABLE?

- a. Channels must be within 2% log power of each other.
- b. Channels must be within 1/2 decade of each other.
- c. Channels must be within 2% calibrated linear power of each other.
- d. Channels must be within 1/2 linear distance between decades of each other.

QUESTION: 070 (1.00)

Given the following:

- The plant is reducing power due to a Steam Generator tube leak.
- Current power level is 75%.
- Letdown flow is at minimum.
- One (1) charging pump is running.
- Pressurizer level is being maintained.
- CBO is 1.5 gpm/RCP

WHICH ONE (1) of the following is the approximate amount of primary to secondary leakage?

- a. 6 gpm
- b. 10 gpm
- c. 16 gpm
- d. 20 gpm

QUESTION: 071 (1.00)

WHICH ONE (1) of the following indicates that a Steam Generator Tube Rupture is occurring?

- a. Pressurizer pressure DECREASE with affected SG steam flow LESS than feed flow.
- b. Pressurizer pressure INCREASE with affected SG steam flow LESS than feed flow.
- c. Pressurizer pressure DECREASE with affected SG steam flow GREATER than feed flow.
- d. Pressurizer pressure INCREASE with affected SG steam flow GREATER than feed flow.

QUESTION: 072 (1.00)

WHICH ONE (1) of the following criteria is used to determine which steam generator is to be isolated if BOTH are diagnosed as ruptured?

- a. The steam generator with the highest radiation levels.
- b. The steam generator with the highest water level.
- c. The steam generator with the lowest steam pressure.
- d. The steam generator with the lowest feedwater flow.

QUESTION: 073 (1.00)

Given the following:

- A steam line break exists upstream of the "A" Steam Generator MSIV.
- MSIS has automatically initiated.

WHICH ONE (1) of the following conditions could result if a steaming flowpath from the unaffected steam generator is NOT established following dryout of the affected steam generator?

- a. Rapid repressurization of the RCS and subsequent Pressurized Thermal Shock (PTS) conditions.
- b. Inability to open S/G "B" MSIV due to pressure difference created when affected steam generator reaches dryout conditions.
- c. A rapid increase in T-cold of the unaffected loop resulting in an interruption of natural circulation.
- d. A possible return to criticality due to the positive reactivity effect of reducing moderator temperature.

QUESTION: 074 (1.00)

WHICH ONE (1) of the following describes how Steam Generator and Pressurizer indications are affected by post accident containment conditions?

- a. Indicated SG pressure is less than actual and indicated PZR level is greater than actual.
- b. Indicated PZR pressure is less than actual and indicated SG level is greater than actual.
- c. Indicated SG pressure is greater than actual and indicated SG level is less than actual.
- d. Indicated PZR pressure is greater than actual and indicated PZR level is less than actual.

QUESTION: 075 (1.00)

WHICH ONE (1) of the following is the MAXIMUM condenser vacuum at which a turbine/reactor trip will occur on low condenser vacuum?

- a. 26 IN Hg
- b. 25 IN Hg
- c. 20 IN Hg
- d. 18 IN Hg

QUESTION: 076 (1.00)

Given the following:

- The AB Emergency Feedwater pump has started in response to an EFAS signal.
- The NAO inadvertently tripped and reset the overspeed trip mechanism while conducting a visual check of the pump.

WHICH ONE (1) of the following is the response of the pump if the NPO reopens the turbine stop valve (MS-416) from control room panel CP-8? Assume no other operator action is taken.

- a. The pump will NOT start because the electrical overspeed trip must also be reset.
- b. The pump will NOT start because the control switch has not been placed in EFAS OVERRIDE.
- c. The pump will start and trip on actual overspeed.
- d. The pump will start and remain at idle speed.

QUESTION: 077 (1.00)

Given the following:

- The plant tripped from 100% power.
- A station blackout is in progress.
- The CRS has directed the RAB operator to locally open circuit breakers listed on OP-902-005 attachments "Switchgear Room "A", "B", and "AB" Removable loads."

WHICH ONE (1) of the following is the reason for taking these actions?

- a. To prevent damage to equipment if inadvertently started without proper support systems.
- b. To avoid overloading the emergency diesel generators if one subsequently starts.
- c. To prevent operation of equipment with de-energized instrumentation.
- d. To extend the battery life assuming the station blackout will last at least four hours.



QUESTION: 078 (1.00)

Given the following:

- A Loss of Offsite power has occurred.
- All expected automatic actions have occurred.
- RCS Subcooling Margin indicates 40 degrees F.

WHICH ONE (1) of the following is used to confirm natural circulation flow has been established?

- a. Loop delta temperature of 68 degrees F.
- b. Hot and Cold leg temperature are increasing.
- c. Both Steam Generators have 160 gpm EFW flow and constant levels.
- d. Delta temperature between CET's and Hot legs of 15 degrees F.

QUESTION: 079 (1.00)

WHICH ONE (1) of the following Reactor Trip breakers would indicate OPEN on a loss of vital instrument bus SUPS MD?

- a. Breakers 1,2,3,4
- b. Breakers 5,6,7,8
- c. Breakers 1,2,5,6
- d. Breakers 3,4,7,8

QUESTION: 080 (1.00)

WHICH ONE (1) of the following describes 4.16KV breaker operation if DC control power is lost?

- a. Breakers will remain in their "as is" condition and operation would only be possible by manual means.
- b. Automatic breaker trips would remain operational but remote operation of breakers would not be possible.
- c. Breakers would remain remotely operable but automatic trip functions would become inoperable.
- d. Breakers would trip open and operation would only be possible by manual means.

QUESTION: 081 (1.00)

Given the following:

- A waste gas release is in progress.
- PRM-IRE-0648 "GASEOUS WASTE MANAGEMENT" is in HIGH alarm.

WHICH ONE (1) of the following automatic actions occurs as a result of these conditions?

- a. Gas Decay Tank outlet valves (GWM 305 A,B,C) CLOSE.
- b. Waste Gas Discharge Flow Control valve (GWM 309) CLOSES.
- c. The operating RAB exhaust fan trips.
- d. Containment Vent Header Isolation Valves (GWM 104/105) CLOSE.

QUESTION: 082 (1.00)

WHICH ONE (1) of the following is the MAXIMUM instrument air header pressure requiring a reactor trip?

- a. 95 psig
- b. 85 psig
- c. 75 psig
- d. 65 psig

QUESTION: 083 (1.00)

Given the following:

- The Control Room has been evacuated for reasons other than fire.
- The reactor trip and turbine trip were verified before evacuating.
- The Moisture Separator Reheater (MSR) controls were NOT RESET before evacuating the control room.

WHICH ONE (1) of the following is the reason that the MSR controls are required to be reset prior to evacuating the control room?

- a. To facilitate secondary depressurization when required by procedure.
- b. To ensure that MSR temperature can be controlled from LCP-43.
- c. To prevent excessive cooling of the RCS.
- d. To minimize the possibility of overheating the last two rows of blades in the LP turbines.

QUESTION: 084 (1.00)

Given the following:

- The control room had to be evacuated due to a fire in the +35 Cable Spreading room.
- The fire has burned for 30 minutes.
- OP-901-502, "Evacuation of the Control Room" has been entered and operator actions are being taken at LCP-43.

WHICH ONE (1) of the following is considered a reliable indication for monitoring RCS pressure?

- a. Pressurizer pressure controller.
- b. Hot Leg 1 pressure indication.
- c. Safety channel "B" wide range pressurizer pressure.
- d. Safety channel "D" narrow range pressurizer pressure.

QUESTION: 085 (1.00)

WHICH ONE (1) of the following methods is used to control RCS Tavg following a reactor trip from full power operation due to a total loss of all AC power (Station Blackout)?

- a. Automatically by the Steam Bypass valves.
- b. Automatically by the Atmospheric Dump valves.
- c. Local manual operation of the Steam Bypass valves.
- d. Local manual operation of the Atmospheric Dump valves.

QUESTION: 086 (1.00)

WHICH ONE (1) of the following is the reason for ONLY stopping two (2) RCPs when performing RCS and Core Heat Removal Success path IV-1, "Forced Circulation - No SIAS", in accordance with OP-902-008?

- a. To increase safety injection flow by decreasing RCS cold leg pressure.
- b. To minimize reactor coolant pump heat input to the RCS.
- c. To minimize the possibility of a tube rupture by the decreasing delta-pressure across the steam generators.
- d. To ensure that in case of a LOCA condition additional RCS inventory will not be lost.

QUESTION: 087 (1.00)

Given the following:

- Specific activity of the reactor coolant has exceeded 1.0 microcurie/gram DOSE EQUIVALENT I-131 for greater than 48 hours.

WHICH ONE (1) of the following is the reason for the requirement to cooldown to below 500 degrees F within six (6) hours?

- a. Reduces the amount of release assuming a steam generator tube simultaneously ruptures.
- b. Increases reliability of the data collected for actual iodine determination.
- c. Minimizes the iodine spiking phenomena which occurs due to the large change in THERMAL POWER level caused by the plant shutdown.
- d. Increases coolant density sufficiently to enable self shielding thereby reducing on-site exposure.

QUESTION: 088 (1.00)

WHICH ONE (1) of the following ensures operability of control valves when performing valve lineups, per OP-100-009, "Control of Valves and Breakers"?

- a. MAN-AUTO bypass levers are in the MAN position.
- b. All manual overrides are installed.
- c. Locking pins are installed on valve operators.
- d. Air is available to pneumatically operated valves.

QUESTION: 089 (1.00)

WHICH ONE (1) of the following is a responsibility of the Nuclear Plant Operator (NPO) when issuing Caution Tags?

- a. Making Caution Index entries.
- b. Performing the quarterly review of Caution index.
- c. Ensuring that a Caution Tag(s) needs to be issued.
- d. Determining if Caution tagging requirements still exist.

QUESTION: 090 (1.00)

WHICH ONE (1) of the following describes how an independent verification for a manually operated throttle valve is performed?

- a. Move the valve slightly in the closed direction and then return it to its original position.
- b. Compare visual observation of stem or indicator position with the remote indication position.
- c. Concurrently observe another operator initially positioning the valve.
- d. Inspect the last valve lineup sheet and compare recorded valve position with the required valve position.

QUESTION: 091 (1.00)

WHICH ONE (1) of the following describes the application of NOTES in emergency operating procedures (EOPs)?

- a. Apply to the entire procedure in which the NOTE is listed.
- b. Apply to the step immediately preceding the NOTE.
- c. Only apply to the immediate action steps of that procedure.
- d. Only apply to the step immediately following the NOTE.



QUESTION: 092 (1.00)

Given the following:

- An emergency condition exists.
- The individual holding a clearance and his Supervisor are NOT available.

WHICH ONE (1) of the following individuals has approval authority for removing the tags on the clearance?

- a. Shift Supervisor.
- b. Control Room Supervisor.
- c. Duty Plant Manager.
- d. Operations Superintendent.

QUESTION: 093 (1.00)

WHICH ONE (1) of the following individuals is the FIRST to assume the duty of the Emergency Coordinator (EC) if the Shift Supervisor is NOT available?

- a. Duty Plant Manager.
- b. Control Room Supervisor.
- c. Operations Superintendent.
- d. Emergency Operations Facility Director.

QUESTION: 094 (1.00)

WHICH ONE (1) of the following methods should be used to extinguish a fire on the +46 elevation of the Fuel Handling Building?

- a. Solid stream of water.
- b. Water spray/fog.
- c. Dry chemical.
- d. Foam.

QUESTION: 095 (1.00)

Given the following:

- An ALERT was declared at 0945 hours.

WHICH ONE (1) of the following is the LATEST time that notification of Operational Hotline Members (OHL) must be completed?

- a. 10:00
- b. 10:15
- c. 10:30
- d. 10:45

QUESTION: 096 (1.00)

WHICH ONE (1) of the following is the MAXIMUM period that a Radiation Work Permit (RWP) for a repetitive task may be approved?

- a. One week.
- b. One month.
- c. One quarter.
- d. One year.

QUESTION: 097 (1.00)

WHICH ONE (1) of the following activities requires the continuous use of the procedure by a qualified watch stander?

- a. Checking condenser air inleakage.
- b. Shifting Instrument Air compressors.
- c. Loading and Synchronizing the Emergency Diesel Generator.
- d. Transferring DWST to CST using Condensate transfer pump.

QUESTION: 098 (1.00)

WHICH ONE (1) of the following is the MINIMUM frequency for re-verifying that a FIELD CONTROLLED copy of an operating procedure is current?

- a. Seven (7) days
- b. Fourteen (14) days.
- c. Thirty (30) days
- d. Ninety (90) days.

QUESTION: 099 (1.00)

WHICH ONE (1) of the following 10 CFR 20 terms identifies external exposure of skin or an extremity?

- a. Deep Dose Equivalent (DDE).
- b. Committed Effective Dose Equivalent (CEDE).
- c. Total Effective Dose Equivalent (TEDE).
- d. Shallow Dose Equivalent (SDE).

QUESTION: 100 (1.00)

WHICH ONE (1) of the following is the MAXIMUM oxygen concentration that is considered to be an oxygen deficient atmosphere?

- a. 22.5%.
- b. 21%.
- c. 20.5%.
- d. 19%.

## A N S W E R   K E Y

## MULTIPLE CHOICE

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

## A N S W E R   K E Y

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

A N S W E R   K E Y

091    d

M U L T I P L E   C H O I C E

092    c

093    b

094    a

095    a

096    c

097    c

098    b

099    d

100    d





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Vice President, Operations  
Department 1

W3F1-94-0027  
A4.05  
PR

March 3, 1994

Mr. Leonard J. Callan  
Regional Administrator, Region IV  
U.S. Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 400  
Arlington, TX 76011

Subject: Waterford 3 SES  
Docket No. 50-382  
License No. NPF-38  
Facility Comments to Written Licensing Examinations

Gentlemen:

Please find attached our formal comments to the NRC's written operator licensing examination conducted at Waterford 3 SES on February 28, 1994. The comments include the specific examination question number and answer, the applicable references, and our recommendations for each comment.

Facility Comments to Written Licensing Examinations

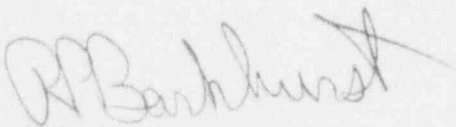
W3F1-94-0027

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March 3, 1994

Should you have any questions concerning this submittal, please contact  
J.M. O'Hern at (504) 739-6001.

Very truly yours,



R.P. Barkhurst  
Vice President, Operations  
Waterford 3

RPB/BRL/tjs  
Attachment

cc: (w/Attachment)  
J.L. Pellet (NRC Region IV)  
Ryan Lantz (NRC Region IV)

(w/o Attachment)  
S.L. McCrory (NRC Region IV)  
NRC, Document Control Desk  
R.B. McGehee  
N.S. Reynolds  
NRC Resident Inspectors Office

Question Number: 14

Question:

Given the following:

- The plant has tripped due to a small break loss of coolant accident (LOCA)
- The event is ongoing and the Recirculation Actuation System (RAS) has initiated.
- BOTH High Pressure Safety Injection (HPSI) pumps continue to operate at full capacity.

WHICH ONE (1) of the following provides cooling for the HPSI pump seals?

- a. A portion of the pumps discharge is cooled by Component Cooling Water (CCW)
- b. Mini-Recirc flow to the RWSP.
- c. The containment spray system is aligned to cool the SI sump.
- d. Mini-Recirc flow to the SI sump

Answer:

c

Reference:

ZSI-000-01, p.22, LO 4

SD-SI, Safety Injection, p. 10-11, 34-35

KA 006030k603

Comment:

The correct answer is "a"

Recommendation:

Change answer key to accept "a"

Reference:

Same as original

Question Number: 19

Question:

For WHICH ONE (1) of the following accidents does the Variable Overpower Trip in the core protection calculators provide protection?

- a. Low Power CEA Bank Withdrawal
- b. Asymmetric Steam Generator Trip
- c. Inadvertent dilution during uppower transient.
- d. Partial Loss of RCS Flow.

Answer:

a

Reference:

ZCPC-700-01, CPC and CEAC, Obj. 14, pg 40  
LP, CPC and CEAC, LO-3  
KA 012000K402

Comment:

Answer "c" is also correct due to the term uppower transient in the distractor. UNT-007-011 defines transients as > 10% full power in less than a minute. An inadvertent dilution concurrent with and uppower transient could be construed as exceeding the 12 %/min setpoint of the VOPT.

Recommendation:

Accept answers "a" and "c"

Reference:

UNT-007-011

Question Number: 21

Question:

WHICH ONE (1) of the following will decrease the margin to the DNBR Trip Setpoint?

- a. ASI changes from 0.0 to -0.1.
- b. Tcold Loop 1 fails LOW.
- c. RCS pressure increases 25 psia.
- d. Delta-T Power is reduced via the subchannel potentiometer.

Answer:

a

Reference:

ZCPC-700-01, p. 16-26, LO 2

ZENI-000-01, Excore Nuclear Instrumentation, p. 36

KA 012000k501

Comment:

A low failure of Tcold will cause the  $\Delta T$  power to increase in the CPC power calculation and the flux power to increase due to the Tc minimum selection for temperature shadowing. Therefore the power selection block in the CPC will send out a higher power level and that will reduce the DNBR margin. A DNBR Trip and Pretrip will occur.

Recommendation:

Accept answer "a" and "b"

Reference:

SD-CPC, Core Protection Calculator System Description, p. 21

FSAR Table 7.2-5 Plant Protection System Failure Mode and Effects Analysis, p. 2 of 115

Question Number: 26

Question:

Given the following:

- Plant is at 100% steady state operation, MOL.
- DNBR/LPD Pretrip and Trip indications on the "A" CPC Remote Operator Module (ROM) are energized.
- DNBR/LPD margin meters for Channel A indicate low margin, all other channels indicate normal.

WHICH ONE (1) of the following Channel "A" conditions would cause these indications to be present?

- a. CEAC 1 in TEST.
- b. Tcold failed low.
- c. Pressurizer pressure failed high.
- d. Excore Log Calibrate switch "NOT in Operate".

Answer:

d

Reference:

ZENI-000-01, Excore Nuclear Instrumentation, Obj. 4, p. 39-40  
KA 015000k101

Comment:

A low failure of Tcold will cause the  $\Delta T$  power to increase in the CPC power calculation and the flux power to increase due to the Tc minimum selection for temperature shadowing. Therefore the power selection block in the CPC will send out a higher power level and that will reduce the DNBR margin. A DNBR/LPD Trip and Pretrip will occur.

Recommendation:

Accept answer "b" and "d"

Reference:

SD-CPC, Core Protection Calculator System Description, p. 21  
FSAR Table 7.2-5 Plant Protection System Failure Mode and Effects Analysis, p. 2 of 115

Question Number: 64

Question:

Given the following:

- The Unit has been shutdown for 3 days following 100 days of operating at 100% power.
- The RCS temperature is 140 degrees F.
- The RCS is at midloop.
- A total loss of shutdown cooling occurs.
- Core cooling cannot be re-established.

WHICH ONE (1) of the following is the MINIMUM time expected for the RCS to reach saturation?

- a. 15 minutes
- b. 45 minutes
- c. 120 minutes
- d. 180 minutes

Answer:

a

Reference:

OP-901-131, Shutdown Cooling Malfunction, Att. 3  
Generic Letter 88-17  
KA 000025G012

Comment:

The normal process that would be followed to be in shutdown cooling midloop operations would meet Infrequently Performed Test/Evolutions (IPTE) criteria which includes crew briefings. During the briefings RCS Draindown lessons learned would be discussed. To discriminate between distractors "a" and "b" on a closed reference examination would require memorization of the heat up curve. Selection of either of these distractors indicates a sensitivity to the fact that during a loss of shutdown cooling event changes occur rapidly.

Recommendation:

Accept either "a" or "b" as correct answers

Reference:

Original References  
OP-001-003, RCS Draindown, Limitation #8, page 17  
UNT-005-027, Infrequently Performed Test / Evolutions  
OP-001-003, RCS DRaindown, Attachment 11.18, RCS Draindown Lessons Learned, SOER 88-3  
SOER 88-3, RCS Draindown Lessons Learned



Question Number: 74

Question:

WHICH ONE (1) of the following describes how Steam Generator and Pressurizer indications are affected by post accident containment conditions?

- a. Indicated SG pressure is less than actual and indicated PZR level is greater than actual.
- b. Indicated PZR pressure is less than actual and indicated SG level is greater than actual.
- c. Indicated SG pressure is greater than actual and indicated SG level is less than actual.
- d. Indicated PZR pressure is greater than actual and indicated PZR level is less than actual.

Answer:

b

Reference:

ZMCD-003-00, MCD Vital Instrumentation, p. 12-20, LO 9 & 10  
KA 000040k202

Comment:

Steam Generator and Pressurizer pressure instruments are of the same type and the Steam Generator and Pressurizer level instruments are of the same type. The effects of a post accident containment conditions will be the same.

Recommendation:

Accept answers "a" and "b"

Reference:

Same as original

Question Number: 85

Question:

WHICH ONE (1) of the following methods is used to control RCS Tavg following a reactor trip from full power operation due to a total loss of all AC power (Station Blackout)?

- a. Automatically by the Steam Bypass valves.
- b. Automatically by the Atmospheric Dump Valves.
- c. Local manual operation of the Steam Bypass valves.
- d. Local manual operation of the Atmospheric Dump valves.

Answer:

b

Reference:

ZPPE-005-00, p. 11-12, LO 2  
KA 000055A204

Comment:

Procedure OP-902-005 Case II directs that the Atmospheric Dump Valve be used for decay heat removal. This procedure does not specify that automatic operation be used.

Recommendation:

Accept both answers "b" and "d"

Reference:

OP-902-005 Case II Page 53 of 87, Step 16