

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

DOCKET/REPORT NO: 50-245/96-12

LICENSEE: Northeast Nuclear Energy Company

FACILITY: Millstone Nuclear Power Station Unit 1

DATES: December 2 - 6, 1996

EXAMINERS: D. Florek, Sr. Operations Engineer  
T. Walker, Sr. Operations Engineer  
D. Prawdzik, NRC Contract Examiner

APPROVED BY: Glenn W. Meyer, Chief  
Operator Licensing and Human Performance Branch  
Division of Reactor Safety

## EXAMINATION SUMMARY

### Examination Report 50-245/96-12 (OL)

Initial examinations were administered to four senior reactor operator (SRO) instant applicants and three SRO upgrade applicants during the period of December 2 - 6, 1996, at the Millstone Unit 1.

#### OPERATIONS

Six of seven applicants failed the examination. One SRO instant applicant passed the examination. The applicants were poorly prepared for the examinations. Significant generic weaknesses were noted in both the written and operating test. The average grade for the written was 75%. Significant weaknesses were identified during the operating test related to operating reactivity controls, diagnosis of instrument failures, and diagnosis of ECCS injection status.

An unresolved item was identified related to inconsistencies between the EOPs, the EOP bases document, the plant specific technical guidelines (PSTGs), and the Boiling Water Reactors Owners Group (BWROG) Emergency Procedure Guidelines (EPGs) for terminating and preventing RPV injection when all control rods are not inserted and it has not been determined that the reactor will remain shutdown under all conditions without boron.

## DETAILS

### 05.1 Operator Initial Examinations

#### a. Scope

The examiners administered initial examinations to four instant SRO applicants and three upgrade SRO applicants in accordance with NUREG-1021, "Examiner Standards," Revision 7.

#### b. Observations and Findings

The results of the initial examinations are summarized below:

	SRO PASS/FAIL
Written	2/5
Operating	2/5
Overall	1/6

The Northeast Utilities (NU) staff reviewed the written examination and assisted in the validation of the operating examination during the week of November 18, 1996. The NU staff provided comments on the examination that significantly improved the examination. The NU staff, who were involved with the examination review, signed security agreements to ensure that the initial examinations were not compromised.

In a letter, dated December 13, 1996 (see Attachment 2), NU provided ten comments on the written examination. The NRC accepted six of the ten comments. As a result, the correct answer was changed in four questions and two correct answers were accepted in two questions. The NRC resolution of facility comments is summarized in Attachment 3.

Because the examination contained a number of newly developed higher cognitive level questions, the examiners were monitoring the progress of the applicants during the administration of the written examination. Based on the progress at the three hour point the examiners concluded that most of the applicants would not have had sufficient time to complete the examination within 4 hours. The examiners then announced to the applicants that an additional 30 minutes would be added to the examination. All applicants completed the examination with the additional time allowed.

The performance on the written examination was poor. Based on the grading of the written examination the overall average examination grade was 74.7%. The administrative question area average was 58%, the systems question area average was 79%, and the events question area average was 77%, indicating that average performance in these areas was unacceptable. In particular, the examiners noted

that poor performance in the administrative area had been identified in Millstone exams a few years ago and addressed within the training program. Thirty percent of the questions on the written examination were missed by at least three of the applicants.

The following summarizes the questions that were missed by at least four applicants, indicating a weakness in the understanding of the subject.

SRO 1:	Ability to determine the posting requirements for an airborne radioactivity area
SRO 6:	Knowledge of inservice surveillance testing requirements
SRO 7:	Knowledge of surveillance periodicity and tolerances
SRO 10:	Knowledge of confined space permit requirements
SRO 11:	Knowledge of acceptable methods for performing a continuous fire watch
SRO 12:	Understanding of the requirements for a continuous use procedure
SRO 15:	Understanding of overtime limitations
SRO 23:	Ability to determine the cause of a downscale rod block monitor
SRO 35:	Ability to determine Technical Specification requirements for failure of an isolation condenser flow detector
SRO 41:	Understanding of containment spray valve operation
SRO 48:	Understanding of shutdown cooling temperature indications and limitations
SRO 50:	Understanding of ATWS recirc pump trip operation and recirc pump controller indications
SRO 80:	Understanding of reactor feed pump high level trip and initiation signals
SRO 84:	Ability to recognize a failure of primary containment and determine the correct emergency action level
SRO 85:	Ability to select the correct reactor pressure vessel alternate injection source with the condensate transfer pump house inaccessible



- SRO 88: Understanding of xenon reactivity effects
- SRO 91: Knowledge of the reason for LPCI heat exchanger flow limitations
- SRO 95: Knowledge of the effects of containment spray on containment differential pressures
- SRO 98: Ability to implement the secondary containment control emergency operating procedure
- SRO 100: Understanding of stack gas monitor operation

During the operating test, at least two applicants performed poorly in each of the following areas:

Operating controls that affect reactivity.

Recognizing and diagnosing instrument failures and taking action appropriate to the failure.

Using the crew to diagnose ECCS (emergency core cooling system) availability to inject into the vessel.

Performing SRO crew briefs with effective timing, sufficient content, sufficient look ahead, and identification of priority.

Reporting back to the SRO on the status of equipment that failed to work properly.

Performing the Emergency Director responsibilities related to site evacuations.

Recognizing the appropriate actions to take when in single loop operation and the plant is below the 80% rod line.

Understanding the recirculation pump response to a tachometer failure.

Applying the relationship between APRMs and IRMs and effectively using the technical specifications.

Understanding the effect on power operation if 24 VDC power is lost.

The above test items represent areas of weak understanding or performance and are provided to enable improvement of the training program.

During the dynamic simulator test, the following item was significant and a consistent positive observation.

Knowledge and understanding of the emergency operating procedures (EOPs).

During the development and administration of the examination, the examiners noted the following items for further NU consideration of possible procedure improvements.

Facility procedure SP 696.1 "Control Operators Log," could result in exceeding the 8 hour power average of 2011 MWth. If power is greater than 2011 MWth and then is at 2011 MWth for the next seven hours, then the 8 hour power average limit could be exceeded.

OP 349D "Nuclear Instrumentation (LPRM Channels)," did not contain a caution regarding minimum number of LPRMs for each ARPM consistent with OP 349C "Nuclear Instrumentation (APRM Channels)," even though it contained the same procedural steps.

OP-301 "Reactor Recirculation System," was confusing as to when to check for reverse flow following shutdown of a recirculation pump.

Guidance did not exist restricting the use of the emergency diesel or gas turbine generation under peak load generation conditions.

Alarm response procedures CRAB 905 A-3, 8-1 and 8-2 were unclear that only one SDV at the valid scram SDV water level was needed to initiate a full scram.

OP-525A "Degraded Fire in Control Room of Cable Vault," section 2.7.4 and 2.7.5 did not specify the need for local operation and the use of a key to complete these steps.

SP 668.2 "Gas Turbine Emergency Fast Start," did not provide clear guidance on exit of TS 3.5.F.3 to meet conditions of precaution 3.2.

c. Conclusions

The applicants were poorly prepared for the examination, and as a result, 6 of 7 applicants failed the examination. One SRO instant applicant passed the examination by a very small margin. Significant generic weaknesses were noted in both the written and operating test, and four of the seven applicants had written scores of 72 or below. Significant weaknesses were identified during the operating test related to operating reactivity controls, diagnosis of instrument failures, and diagnosis of ECCS injection status.

### **O3 Inconsistencies in Emergency Operating Procedures**

#### **a. Scope**

During examination preparation and review activities, the examiners noted some inconsistencies within the EOPs as compared to other sites. Subsequent followup reviews were then performed.

#### **b. Findings**

The examiners identified inconsistencies between the EOPs, the EOP bases document, the plant specific technical guidelines (PSTGs), and the Boiling Water Reactors Owners Group (BWROG) Emergency Procedure Guidelines (EPGs) for terminating and preventing RPV injection when all control rods are not inserted and it has not been determined that the reactor will remain shutdown under all conditions without boron.

The BWROG EPGs specify that all injection into the RPV (reactor pressure vessel) except SLC, CRD, and RCIC should be terminated and prevented prior to initiation of emergency RPV depressurization. The MP1 PSTGs do not indicate that the actions to terminate and prevent injection have to be completed prior to initiation of emergency depressurization. The justification for this deviation in the MP1 PSTGs states that it is not an intent change and that injection must be terminated prior to opening SRVs or bypass valves to emergency depressurize. Nonetheless, the EOP bases document also states that action to depressurize the RPV waits until it is confirmed that injection into the RPV is terminated and prevented. However, the EOP for emergency depressurization, which is consistent with the PSTG, does not require that the actions to terminate and prevent injection are completed prior to opening SRVs or bypass valves.

During administration of the examinations, the applicants did not wait for the actions to terminate and prevent injection to be completed prior to initiating actions to emergency depressurize. In one case reactor pressure dropped below the shutoff head of the core spray (CS) system before actions were taken to prevent injection and CS injected. During followup questioning, the applicant that was acting as the SRO in the scenario stated that it was not necessary or appropriate to wait until injection had been terminated and prevented to open SRVs or bypass valves. The applicant's actions and response were consistent with the direction in the EOP flow chart, but were not consistent with the EOP bases.

Additionally, the specific actions that are taken to terminate and prevent injection from the low pressure coolant injection (LPCI) system, do not assure that injection is prevented. No action is taken until the LPCI injection valve strokes full open at 350 psig RPV pressure. If RPV pressure is dropping rapidly, pressure may drop below the shutoff head of the LPCI pumps before the injection valve is closed, allowing LPCI to inject.

The applicable references are as follows:

- EOP 560.3, "Emergency Operating Procedures Technical Guidelines," pg 34
- EOP 560.4, "Deviation Justification Report," pgs 202 and 203
- EOP 560.6, "Millstone Unit 1 Emergency Operating Procedure Failure to Scram," pg 68
- EOP 575, sheet 3, "Failure to Scram - Emergency Depressurization," step DEP-4
- EOP 550.2, "Unit One Emergency Operating Procedure User's Guidelines," pg 17

c. Conclusion

This item is considered unresolved pending facility actions to resolve the inconsistencies between the BWR EPGs, PSTG, EOP bases document and the EOPS regarding actions to terminate and prevent low pressure injection prior to emergency depressurization. Unresolved item 50-245/96-12-01.

**E.8 Review of UFSAR Commitments**

A recent discovery of a licensee operating their facility in a manner contrary to the updated final safety analysis report (UFSAR) description highlighted the need for a special focused review that compares plant practices, procedures and/or parameters to the UFSAR descriptions. While performing the examination activities discussed in this report, the examiners reviewed portions of the UFSAR that related to the selected examination activities, questions or topic areas. The particular sections reviewed were Section 7.4.3, and Section 7.6.1.4. The specific areas reviewed were consistent with the UFSAR.

**V. Management Meetings**

**X1 Exit Meeting Summary**

At the conclusion of the examination, the examiners discussed their observations of the examination process with members of NU management. NU acknowledged the examiners' observations. The NU personnel present at the exit included the following:

- H. Haynes, Director, Nuclear Training
- W. Noll, Manager, Unit 1 Operations
- K. Murphy, Supervisor - Operator Training, Unit 1

NRC Personnel

- D. Florek, Sr. Operations Engineer
- T. Walker, Sr. Operations Engineer
- T. Easlick, Senior Resident Inspector
- J. Durr, DRP Section Chief

Attachments:

1. SRO Examination and Answer Key
2. Facility Comments on Written Examinations
3. NRC Resolution of Facility Comments on the Written Examinations
4. Simulation Facility Report

**ATTACHMENT 1**

**SRO EXAMINATION AND ANSWER KEY**

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

CANDIDATE'S NAME: MASTER

FACILITY: Millstone 1

REACTOR TYPE: BWR-GE3

DATE ADMINISTERED: December 2, 1996

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.

TEST VALUE	CANDIDATE'S SCORE	FINAL GRADE
100.00		

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

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

## ANSWER SHEET

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 \_\_\_\_

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

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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 \_\_\_\_



## ANSWER SHEET

Multiple Choice (Circle or X your choice)

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

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

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

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

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

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

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

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091 a b c d \_\_\_\_

## ANSWER SHEET

Multiple Choice (Circle or X your choice)

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

092 a b c d \_\_\_\_

093 a b c d \_\_\_\_

094 a b c d \_\_\_\_

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

## NRC RULES AND GUIDELINES FOR LICENSE EXAMINATIONS

During the administration of this examination the following rules apply:

1. Cheating on the examination means an automatic denial of your application and could result in more severe penalties.
2. After the examination has been completed, you must sign the statement on the cover sheet indicating that the work is your own and you have not received or given assistance in completing the examination. This must be done after you complete the examination.
3. Restroom trips are to be limited and only one applicant at a time may leave. You must avoid all contacts with anyone outside the examination room to avoid even the appearance or possibility of cheating.
4. Use black ink or dark pencil ONLY to facilitate legible reproductions.
5. Print your name in the blank provided in the upper right-hand corner of the examination cover sheet and each answer sheet.
6. Mark your answers on the answer sheet provided. **USE ONLY THE PAPER PROVIDED AND DO NOT WRITE ON THE BACK SIDE OF THE PAGE.**
7. The point value for each question is indicated in parentheses after the question.
8. If the intent of a question is unclear, ask questions of the examiner only.
9. When turning in your examination, assemble the completed examination with examination questions, examination aids and answer sheets. In addition, turn in all scrap paper.
10. 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.
11. To pass the examination, you must achieve a grade of 80% or greater.
12. There is a time limit of four (4) hours for completion of the examination.
13. 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)

Conditions in a recently surveyed area are:

50 dpm/100 cm<sup>2</sup> alpha loose surface  
0.50 DAC airborne radioactivity

WHICH ONE of the following describes the posting requirements for the area?

- a. Contaminated area - required  
Airborne radioactivity area - required
- b. Contaminated area - required  
Airborne radioactivity area - not required
- c. Contaminated area - not required  
Airborne radioactivity area - required
- d. Contaminated area - not required  
Airborne radioactivity area - not required

## QUESTION: 002 (1.00)

A 29 year old Northeast Utility radiation worker with a complete and current exposure history needs to perform work in a high radiation area. The expected job exposure is 1500 mrem. The worker has a lifetime Total Effective Dose Equivalent (TEDE) of 30.5 Rem and 750 mrem exposure for this year.

WHICH ONE of the following describes the worker's ability to perform the job?

- a. The worker cannot perform the job.
- b. The worker can perform the job without any additional exposure limits.
- c. The worker can perform the job with an additional exposure limit approved by RSP-Services only.
- d. The worker can perform the job with an additional exposure limit approved by RSP-Services and the Health Physics Manager.

## QUESTION: 003 (1.00)

The position of an open valve in a safety related system needs to be verified following maintenance on the system. Radiation levels in the area are 75 mR/hr and it is expected to take 10 minutes to verify the position of the valve.

WHICH ONE of the following describes the requirements for verification of the valve's position?

- a. Valve position must be verified using normal verification methods. Independent verification is required.
- b. Valve position must be verified using normal verification methods. Dual verification is required.
- c. An alternate verification method may be used in place of normal verification methods. Independent verification is required.
- d. An alternate verification method may be used in place of normal verification methods. Dual verification is required.

## QUESTION: 004 (1.00)

A flow transmitter is being returned to service.

WHICH ONE of the following describes the correct sequence to ensure system disturbances are not created?

- a. Open the low pressure side isolation valve.  
Close the equalizer valve.  
Open the high pressure side isolation valve.
- b. Open the low pressure side isolation valve.  
Open the high pressure side isolation valve.  
Close the equalizer valve.
- c. Close the equalizer valve.  
Open the high pressure side isolation valve.  
Open the low pressure side isolation valve.
- d. Open the high pressure side isolation valve.  
Open the low pressure side isolation valve.  
Close the equalizer valve.

## QUESTION: 005 (1.00)

WHICH ONE of the following is allowed when hanging tags in accordance with WC-2, "Tagging?"

- a. Two blue tags may be hung on an open drain valve if the same contact person has responsibility for both tags.
- b. A red tag may be hung on a closed breaker inside an energized electrical cabinet. The tag can be attached to the breaker with string and a small section of tygon hose.
- c. A red tag may be hung for a removed breaker. The tag can be attached to the breaker cubicle door with an adhesive hanger.
- d. The tagging authority may correct a typographical error by initialing and dating the handwritten correction on a yellow panel tag.

## QUESTION: 006 (1.00)

On 12/2/96, the plant was shutdown and cooled down for an unplanned outage. The outage is expected to last approximately five days. Prior to the unplanned shutdown, the plant had been operating continuously since 10/2/96. IST cold shutdown surveillance testing was last completed on 8/28/96.

WHICH ONE of the following describes the requirements for performance of IST cold shutdown surveillance testing during the unplanned outage?

- a. IST cold shutdown testing must begin within 48 hours of reaching cold shutdown and all IST cold shutdown testing must be completed prior to startup.
- b. IST cold shutdown testing must begin within 48 hours of reaching cold shutdown, but startup does not have to be delayed in order to complete the testing.
- c. IST cold shutdown testing is not required because the shutdown is not expected to last more than 90 days.
- d. IST cold shutdown testing is not required because the plant has been in continuous operation for less than 90 days.

QUESTION: 007 (1.00)

WHICH ONE of the following lists the tolerance and the station administrative periodicity for a surveillance with a "Q" frequency?

- a. Tolerance 31 days  
Periodicity 92 days
- b. Tolerance 31 days  
Periodicity 84 days
- c. Tolerance 10 days  
Periodicity 92 days
- d. Tolerance 10 days  
Periodicity 84 days

QUESTION: 008 (1.00)

WHICH ONE of the following has the responsibility for ensuring an Automated Work Order (AWO) package is complete and ready to performance?

- a. Tagging Authority
- b. Work Planning and Outage Management
- c. Shift Management/Unit Supervision
- d. Work Planning Quality Assurance Services

## QUESTION: 009 (1.00)

A battery charge was in progress when the "BATTERY ROOM HYDROGEN" alarm was received on CRP 903. The operator dispatched to the battery room reports that:

- the hydrogen monitor is reading approximately 40%
- the battery room exhaust fan is not running
- the exhaust fan switch on the main control panel is in AUTO
- the exhaust fan switch on MCC F-5 is in AUTO

WHICH ONE of the following describes the conditions in the battery room and the required actions? (The ARP is provided.)

- a. A warning condition exists and the battery room ventilation has malfunctioned. Verify detector power supply UP-1H, breaker 14 and circuit breaker located in detector cabinet are closed.
- b. A warning condition exists. Manually start the battery room exhaust fan and monitor hydrogen readings closely.
- c. A danger condition exists. Secure the battery charge, manually start the battery room exhaust fan, and rig temporary ventilation.
- d. A danger condition exists and the battery room ventilation has malfunctioned. Secure the battery charge and rig temporary ventilation.



## QUESTION: 010 (1.00)

Work needs to be performed in a confined space with the following potential atmospheric conditions:

- Oxygen levels of 20%
- Flammable gas levels at 30% of the lower flammability limit
- Toxic gas levels at 40% of the OSHA Permissible Exposure Limit (PEL).

Non-atmospheric/non-energy or energy hazards DO NOT exist in the space.

WHICH ONE of the following describes the permit requirements for the space?

- a. No permit is required for the given potential atmospheric conditions.
- b. No permit is required if the potential atmospheric hazards can be isolated or eliminated with a tagout.
- c. A permit is required, but the space can be temporarily downgraded to a non-permit required confined space if the atmospheric hazards can be controlled with forced ventilation.
- d. A permit is required, but the atmospheric hazards must be controlled with forced ventilation.

## QUESTION: 011 (1.00)

A continuous fire watch is required due to inoperable fire protection equipment.

WHICH ONE of the following is NOT an acceptable method for performing a continuous fire watch?

- a. One of the three licensed ROs on-shift acts as a continuous fire watch in the control room while performing his normal duties.
- b. A qualified HP technician acts as a continuous fire watch while monitoring a maintenance activity in the reactor building.
- c. A non-licensed operator acts as a continuous fire watch in two adjacent areas of the turbine building by moving from one area to the other every fifteen minutes.
- d. A qualified security guard acts as a continuous fire watch in the screen house and also performs five minute security patrols of a nearby area twice an hour.

## QUESTION: 012 (1.00)

WHICH ONE of the following describes the requirements for performance of a "Continuous Level of Use" procedure?

- a. The procedure steps must be read by the operator performing the task. The procedure steps cannot be read by another person.
- b. The procedure steps may be read by another operator, but both operators must be at the job site.
- c. The procedure steps may be read by another operator at a different location using telecommunications as long as a copy of the procedure is also located at the job site.
- d. The procedure steps may be read by another operator at a different location using telecommunications. It is not necessary to have a copy of the procedure at the job site as long as a copy of the procedure is in proximity to the job site.

## QUESTION: 013 (1.00)

WHICH ONE of the following describes equipment specifically associated with the Emergency Operating Procedures?

- a. Green annunciator windows.
- b. Instruments with green bordered labels.
- c. Annunciator windows with yellow and black borders.
- d. Components with yellow and black bordered labels.

## QUESTION: 014 (1.00)

WHICH ONE of the following describes how safety system out of service time is normally calculated for the purpose of safety system performance indicator monitoring?

- a. Out of service time is the difference between the time that the LCO was entered and the time that the LCO was exited.
- b. Out of service time is the difference between the time that the LCO was entered and the time that the tags were cleared.
- c. Out of service time is the difference between the time that the tags were hung and the time that the LCO was exited.
- d. Out of service time is the difference between the time that the tags were hung and the time that the tags were cleared.

## QUESTION: 015 (1.00)

A licensed SRO is needed to assist with special control rod testing. The test is scheduled to begin at 0600 on Sunday morning and should be completed by 1600 the same day. The SRO has worked the following hours on-shift over the last week:

Sunday -	0600 to 1600
Monday -	0600 to 1600
Tuesday -	Off
Wednesday -	0600 to 1800
Thursday -	0800 to 2000
Friday -	0800 to 2000
Saturday -	1200 to 0000

WHICH ONE of the following describes the approval that is required for the SRO to assist with the special test?

- a. No special approval is necessary because the overtime limits will not be exceeded.
- b. No special approval is necessary because the SRO will not be performing licensed duties.
- c. Operations Manager approval is necessary prior to exceeding the overtime limits.
- d. Operations Director approval is necessary prior to exceeding the overtime limits.

QUESTION: 016 (1.00)

- 0630 on 12/2/96 Inoperable equipment was identified that required the plant to be in Cold Shutdown within 24 hours in accordance with Technical Specifications (T/S).
- 0800 on 12/2/96 Attempts to repair the inoperable equipment were unsuccessful and an orderly shutdown was initiated.
- 0630 on 12/3/96 Reactor coolant temperature was 212°F and the mode switch was placed in SHUTDOWN.
- 0700 on 12/3/96 Reactor head vents were opened.

WHICH ONE of the following describes the required notifications to the state and unusual event declaration for this situation?

- a. The state must be notified of the T/S shutdown by 0730 on 12/2/96. No unusual event declaration is required.
- b. The state must be notified of the T/S shutdown by 0900 on 12/2/96. No unusual event declaration is required.
- c. The state must be notified of the T/S shutdown by 0730 on 12/2/96. An unusual event must be declared on 12/3/96.
- d. The state must be notified of the T/S shutdown by 0900 on 12/2/96. An unusual event must be declared on 12/3/96.

## QUESTION: 017 (1.00)

A LOCA has occurred and a General Emergency - Bravo has just been declared. No release is in progress and it cannot be determined if and when a release will occur. The meteorological specialist has determined a projected plume direction. No constraining conditions exist. The Manager of Radiological Dose Assessment (MRDA) has recommended evacuation in an approximate 2-mile radius.

WHICH ONE of the following describes the assessment that the DSEO should make when reviewing the Protective Action Recommendation (PAR) recommended by the MRDA?

- a. The recommended PAR is appropriate for these conditions.
- b. The recommended PAR is not appropriate for these conditions because sheltering is preferred when a release is not in progress or imminent.
- c. The recommended PAR is not appropriate for these conditions because evacuation should not be recommended unless a General Emergency - Alpha has been declared.
- d. The recommended PAR is not appropriate for these conditions because the keyhole approach should have been used to recommend actions for the downwind sectors rather than for the entire ring.

## QUESTION: 018 (1.00)

The plant is operating at 100% power. RWCU was operating in the normal lineup with RWCU pump B running when the MCC-F3 feeder breaker from 12F tripped open due to a fault.

WHICH ONE of the following describes the expected RWCU system response?

- a. RWCU pump B continues to run. No system isolation signal is generated.
- b. RWCU pump B trips. No system isolation signal is generated.
- c. RWCU pump B trips. A system isolation signal is generated, but all system isolation valves do not close.
- d. RWCU pump B trips. A system isolation signal is generated and all system isolation valves close.

## QUESTION: 019 (1.00)

SBLC pump A is out of service for maintenance with the electrical supply breaker open and the control power fuses removed. An ATWS has occurred and SBLC was initiated ten minutes ago by placing the SBLC initiation keylock switch to the SYS 1 position and then to the SYS 2 position. Initial SBLC tank level was 60%. Reactor pressure is 1100 psig and reactor power is 25%.

WHICH ONE of the following conditions would indicate IMPROPER SBLC system operation?

- a. Annunciator "SLC TANK LOW LEVEL" is illuminated.
- b. SBLC pump discharge pressure indicates 1400 psig.
- c. Annunciator "SQUIB VALVE FIRED OR LOSS OF POWER" is illuminated.
- d. Amber light for squib valve A is not lit.

QUESTION: 020 (1.00)

The plant is operating at 85% power. The following are the indications received when the APRM meter function switches on Panel CRP 937/938 are placed in the AVERAGE, COUNT, and FLOW positions:

	AVERAGE	COUNT	FLOW
APRM 1	94%	70%	71%
APRM 2	74%	55%	71%
APRM 3	86%	80%	71%
APRM 4	99%	55%	63%
APRM 5	83%	65%	63%
APRM 6	75%	70%	63%

WHICH ONE of the following describes the expected plant response for these conditions?

- a. Rod block only
- b. Half scram only
- c. Rod block and half scram
- d. Rod block and full scram



## QUESTION: 021 (1.00)

APRM 4 is reading 82% with the following plant conditions:

Core Thermal Power =	85%
Total Recirc Flow =	70%
Total Core Flow =	75%
MFLPD =	0.92
FRP =	0.85
MFLCPR =	0.68

WHICH ONE of the following is the correct action concerning APRM 4?

- a. APRM 4 readings should be lowered.
- b. APRM 4 readings should be raised.
- c. APRM 4 readings should not be adjusted at the current power level.
- d. APRM 4 readings should not be adjusted because the readings are within 10% of actual power.

## QUESTION: 022 (1.00)

A plant startup is in progress with the mode switch in STARTUP/HOT STANDBY. IRM 12 is bypassed for maintenance. While preparing to place the mode switch in RUN, IRM 17 failed downscale and no automatic actions occurred.

WHICH ONE of the following describes the required procedural and/or technical specification actions for these conditions?

- a. Bypass IRM 17. The startup may continue.
- b. Insert a rod block. The startup cannot continue until IRM 17 is repaired.
- c. Insert a rod block and a half scram on the affected RPS channel. The startup cannot continue until IRM 17 is repaired.
- d. Initiate insertion of operable rods and complete insertion of all operable rods within four hours.

## QUESTION: 023 (1.00)

The plant is in a refueling outage. SRMs 21 and 23 are inoperable.

WHICH ONE of the following activities CANNOT be performed? Special dunking type detectors are NOT going to be used. A core map is provided.

- a. Removal of control rod 30-19.
- b. Loading of a new fuel assembly into core location 15-20.
- c. Removal of a spent fuel assembly from core location 47-44.
- d. Removal of LPRM string 20-33.

## QUESTION: 024 (1.00)

During control rod surveillance testing at 100% power, the 'A' Recirculation pump tripped. All of the appropriate actions were taken in response to the recirc pump trip. The following annunciators are received on CRP 905:

"RBM DOWNSCALE"  
"ROD OUT BLOCK"

WHICH ONE of the following could be the cause of these alarms?

- a. A voltage transient during the recirc pump trip caused the output of the averaging circuit for one of the RBMs to momentarily lower below 3/125 of scale.
- b. Local power around the selected rod decreased causing the RBM averaging circuit output signal to decrease below 22% of the reference APRM signal.
- c. Local power around the selected rod decreased causing the count circuit to determine that more than half of the LPRM inputs to the RBM were downscale.
- d. Flow Converter 1 generated a downscale signal to RBM 8.

## QUESTION: 025 (1.00)

During a plant shutdown, feed flow is 18% and steam flow is 21%. The following information is displayed on the RWM message display:

SR 26-07:16	SE IB WB
WE 14-19:08	A2-316
IE 30-03:12	IE 22-23:14
	IE 06-15:08

WHICH ONE of the following describes actions that can be taken by the operator due to the RWM?

- a. Any rod can be inserted or withdrawn because the plant is in the RWM transition zone
- b. RWM is enforcing the control rod sequence, rod 30-03 can be selected and inserted.
- c. RWM is enforcing the control rod sequence, rod 26-07 can be selected and inserted.
- d. RWM is enforcing the control rod sequence, rod 14-19 can be selected and inserted.

## QUESTION: 026 (1.00)

During a plant shutdown with the reactor at 15% power, the CRP 905 operator is inserting rods using single notch rod insertion. As rod 10-35 is being inserted, an RPIS failure occurs sending an INOP signal to the Reactor Manual Control System.

WHICH ONE of the following describes the expected response of rod 10-35 and the operator's ability to continue inserting rods?

- a. Rod 10-35 continues to insert and settles at the next notch. The operator can continue to insert rod 10-35 using the Rod Movement Control Switch or the EMERGENCY IN switch. The operator cannot select any other rods for insertion.
- b. Rod 10-35 continues to insert and settles at the next notch. The operator can continue to insert rod 10-35 using only the EMERGENCY IN switch, but cannot select any other rods for insertion.
- c. The insert cycle is halted and rod 10-35 settles at the original notch. The operator cannot insert rod 10-35 or any other rods any further using RMCS.
- d. Rod 10-35 is immediately deselected and settles at the original notch. The operator cannot insert rod 10-35 or any other rods any further using RMCS.

## QUESTION: 027 (1.00)

The CRD system was operating normally with the flow control valve in auto when the flow control valve mechanically bound.

WHICH ONE of the following describes the expected effect on CRD system response if the CRD FCV is mechanically bound?

- a. During RPV depressurization, there could be difficulty with rod motion, affecting rod speeds and unlatching.
- b. During RPV depressurization, there could be excessive rod speeds and rod drifts outward.
- c. During a scram, CRD pump runout could occur.
- d. During a scram, there could be slow scram times.

QUESTION: 028 (1.00)

On the initiation of a reactor scram from 100% power, the insert line of CRDM 22-19 breaks completely off at the insert port weld.

WHICH ONE of the following describes the expected response of rod 22-19 to the scram?

- a. Will immediately start to insert and will fully insert with reactor pressure only.
- b. Will immediately start to insert and will fully insert with accumulator pressure only.
- c. Will not insert until reactor and accumulator pressures equalize and will insert with reactor pressure only.
- d. Will hydraulically lock and will not insert.

## QUESTION: 029 (1.00)

Scram time testing has just been completed. The following data was collected for the 90% insertion times for the following 2x2 arrays:

ROD	SCRAM TIME	ROD	SCRAM TIME
14-11	4.075 sec	38-43	3.255 sec
14-15	3.348 sec	38-47	7.524 sec
18-11	3.462 sec	42-43	3.186 sec
18-15	5.121 sec	42-47	3.437 sec

AVERAGE SCRAM  
TIME FOR 3  
FASTEST IN  
ARRAY

3.628 sec

3.292 sec

WHICH ONE of the following describes the minimum actions required to continue reactor operation? (Assume all other control rods are operable and have scram insertion times within limits.)

- a. No action is required to continue reactor operation.
- b. Rod 38-47 must be fully inserted and electrically disarmed.
- c. Rods 18-15 and 38-47 must be fully inserted and electrically disarmed.
- d. Rods 14-11, 18-15, and 38-47 must be fully inserted and electrically disarmed.

## QUESTION: 030 (1.00)

WHICH ONE of the following correctly describes reactor core flow orificing?

- a. Orificing is used to provide increased coolant flow in the lower power fuel bundles which experience a higher resistance to flow than the higher power fuel bundles.
- b. Orificing is used to provide increased coolant flow in the higher power fuel bundles which experience a lower resistance to flow than the lower power fuel bundles.
- c. Orificing is used to prevent decreased coolant flow in the central fuel bundles which experience a higher resistance to flow than the peripheral fuel bundles.
- d. Orificing is used to prevent decreased coolant flow in the peripheral fuel bundles which experience a lower resistance to flow than the central fuel bundles.

## QUESTION: 031 (1.00)

The plant is operating at 100% power with the 'A' side instruments selected for RPV level control.

WHICH ONE of the following describes the plant response, without operator action, to a break in the reference leg that supplies the 'A' side NR GEMAC, WR Yarway, and Fuel Zone level instruments?

- a. Feedwater FRVs open. RPV water level increases and the feed pumps and turbine trip on actual high water level. The reactor scrams due to the turbine trip.
- b. Feedwater FRVs are not affected. The reactor scrams due to indicated level below the scram setpoint.
- c. Feedwater FRVs close. RPV water level decreases and the reactor scrams on actual low water level.
- d. The feed pumps and turbine trip due to indicated level above the trip setpoint. The reactor scrams due to the turbine trip.

## QUESTION: 032 (1.00)

Feedwater pump suction pressure is decreasing following a FWCI initiation. WHICH ONE of the following describes the earliest point in the transient that the feedwater pump will trip?

- a. Feedwater pump suction pressure is less than 335 psig for 10 seconds.
- b. Immediately when feedwater pump suction pressure is less than 335 psig.
- c. Feedwater pump suction pressure less than 85 psig for 10 seconds.
- d. Immediately when feedwater pump suction pressure is less than 85 psig.

## QUESTION: 033 (1.00)

The Feedwater system is being secured during a plant shutdown.

WHICH ONE of the following lineups will satisfy FWCI requirements?

- a. String A selected for FWCI. FRV-5A in automatic and FRV-5B in balance. FRV-4A shut and FRV-4B open.
- b. String A selected for FWCI. FRV-5A in balance and FRV-5B in automatic. FRV-4A shut and FRV-4B shut.
- c. String B selected for FWCI. FRV-5A in manual and FRV-5B in automatic. FRV-4A open and FRV-4B shut.
- d. String B selected for FWCI. FRV-5A in manual and FRV-5B in manual. FRV-4A open and FRV-5B open.



## QUESTION: 034 (1.00)

The isolation condenser automatically initiated following an inadvertent MSIV closure. Later the isolation condenser automatically isolated and the control switches for all of the IC isolation valves were placed in the CLOSE position. The IC initiation signal has cleared.

WHICH ONE of the following correctly describes the operation of the isolation condenser valves under these conditions?

- a. If the switches for valves IC-1, IC-2, IC-3, IC-4, and IC-6/7 are placed in AUTO or AUTO-OPEN as applicable, the initiation signal can be reset.
- b. If the control switch for IC-4 is taken to the AUTO position after the initiation and isolation signals have been reset, IC-4 will not open.
- c. If the control switch for IC-6/7 is taken to the AUTO-OPEN position before the initiation and isolation signals have been reset, IC-6/7 will open.
- d. If the switches for valves IC-1, IC-2, IC-3, and IC-4 are taken to the OPEN position before the isolation signal has been reset, the valves will open.

## QUESTION: 035 (1.00)

WHICH ONE of the following describes the technical specification required actions if one IC steam line flow differential pressure detector has failed downscale.

- a. No action is required.
- b. Place the affected Group IV isolation channel in the tripped condition until the instrument is repaired.
- c. Close the IC isolation valves immediately. Reduce reactor power below 40% within 24 hours if the instrument cannot be repaired.
- d. Close the IC isolation valves immediately. Initiate an orderly shutdown and reduce reactor coolant temperature below 330°F within 24 hours if the instrument cannot be repaired.

## QUESTION: 036 (1.00)

A small loss of coolant accident has occurred coincident with a loss of normal power. At  $T = 0$  sec, the APR 120 second timer initiated on a valid signal.

In WHICH ONE of the following situations will the APR valves open at 120 seconds?

- a. The diesel generator failed to start. All other automatic actions occurred as expected due to the LOCA signal. The "Auto Blowdown Sys Fuse Monitor" annunciator came in at  $T = 30$  seconds and is still illuminated.
- b. All automatic actions occurred as expected due to the LOCA signal. At  $T = 30$  seconds drywell pressure decreased to 1.2 psig and the operator placed the Drywell High Pressure Reset Switch to the RESET position.
- c. The gas turbine failed to start. All other automatic actions occurred as expected due to the LOCA signal. At  $T = 60$  seconds the operator placed the APR System Bypass Switch in the BYPASS position momentarily and then returned the switch to the NORMAL position.
- d. All automatic actions occurred as expected due to the LOCA signal. The diesel generator and the gas turbine tripped at  $T = 60$  seconds.

## QUESTION: 037 (1.00)

A transient occurred which caused RPV water level to decrease. RPV water level dropped below the low-low level setpoint and the Core Spray pumps automatically started. The following conditions existed as the transient progressed:

T = 10 min The Core Spray pump control switches were taken to the STOP position  
RPV water level was -75 inches  
RPV pressure was 900 psig

T = 15 min Drywell pressure increased above the high pressure setpoint  
RPV water level was -100 inches  
RPV pressure was 800 psig

WHICH ONE of the following describes the expected response of the Core Spray pumps to the transient?

- a. The Core Spray pumps continue to run throughout the transient.
- b. The Core Spray pumps stop momentarily at T = 10 minutes and immediately restart when the operator releases the control switch.
- c. The Core Spray pumps stop at T = 10 minutes and restart at T = 15 minutes.
- d. The Core Spray pumps stop at T = 10 minutes and do not restart.

## QUESTION: 038 (1.00)

A LOCA is in progress and all of the low pressure ECCS pumps are operating and cavitating. RPV level is less than TAF.

WHICH ONE of the following correctly describes the first action that should be taken to maximize ECCS pump performance?

- a. Core Spray flow should be decreased until cavitation stops.
- b. Decrease Core Spray pump flow to 3600 per pump.
- c. LPCI flow should be decreased to 5000 gpm total flow.
- d. LPCI flow should be decreased until cavitation stops or until LPCI flow is 1000 gpm/train.

## QUESTION: 039 (1.00)

A valid LOCA initiation signal was received 5 minutes ago.

- Feedwater, condensate and core spray systems are NOT available. All other automatic actions occurred as expected.
- Jet pump A riser manifold pressure is lower than jet pump B riser manifold pressure.
- RPV level is -60" and decreasing.
- Reactor pressure is 800 psig and decreasing.

Section ALC of EOP 570 has been entered and the SRO needs to determine if at least 2 injection subsystems can be lined up with pump(s) running in accordance with step ALC-4.

WHICH ONE of the following describes the status of the LPCI subsystems?

- a. Only LPCI A can be considered lined up for injection due to LPCI loop selection.
- b. Only LPCI B can be considered lined up for injection due to LPCI loop selection.
- c. LPCI A and B can be considered lined up for injection, because the non-selected injection valve and crosstie valves can be manipulated to separate the subsystems after loop select interlocks have timed out.
- d. Neither LPCI A and B can be considered lined up for injection, because reactor pressure is above the LPCI shutoff head.

## QUESTION: 040 (1.00)

With the plant operating at 100% power, an operator performing a valve lineup inadvertently shuts LPCI system cross-tie valve, LP-8A and it remains uncorrected.

WHICH ONE of the following describes the effect, if any, of shutting LP-8A on LPCI system operation if an initiation signal is received?

- a. Shutting LP-8A could result in damage to LPCI A due to water hammer, because system keepfull is isolated from LPCI A.
- b. Shutting LP-8A could result in damage to LPCI B due to water hammer, because system keepfull is isolated from LPCI B.
- c. Shutting LP-8A will not affect LPCI system operation, because it is designed to shut automatically in response to LPCI loop selection.
- d. Shutting LP-8A will not affect LPCI system operation, because it is designed to open automatically on an initiation signal.

## QUESTION: 041 (1.00)

Following a LOCA, drywell sprays and torus sprays were in service on both LPCI subsystems. When directed to secure containment sprays, the operator placed the control switches for the following valves momentarily in the CLOSE position:

LP-13A - Outboard Torus Spray Valve  
LP-14B - Inboard Torus Spray Valve  
LP-15A - Outboard Drywell Spray Valve  
LP-16B - Inboard Drywell Spray Valve

WHICH ONE of the following lists the containment sprays that are still in service?

- a. No containment sprays.
- b. Torus spray only.
- c. Drywell spray only.
- d. Torus spray and drywell spray.

## QUESTION: 042 (1.00)

The plant is operating at 100% power. I&C has reported that the following torus water level transmitters failed their monthly instrument checks:

LI-1602A on CRP 925 (-10" to +10")  
LT-1630A PAM recorder on CRP 925 (2.2' to 22.2').

The remaining torus water level transmitters and the drywell water level transmitter have been demonstrated OPERABLE.

WHICH ONE of the following describes the most limiting technical specification required actions?

- a. Torus water level instrumentation calibration frequency must be increased to once per month. Plant operations can continue indefinitely because both transmitters supply the A channel.
- b. LT-1630A must be restored within 7 days or the plant must be in at least HOT SHUTDOWN within the next 12 hours.
- c. LT-1630A or the transmitter that supplies LI-1602A must be restored within 48 hours or the plant must be in at least HOT SHUTDOWN within the next 12 hours.
- d. The transmitter that supplies LI-1602A must be restored within 6 hours or a shutdown must be initiated and the plant must be in COLD SHUTDOWN or REFUEL within 24 hours.

QUESTION: 043 (1.00)

An event has occurred and the following conditions are noted:

The reactor building is at atmospheric pressure  
Torus pressure is 0.5 psig negative  
Drywell pressure is 0.3 psig.

WHICH ONE of the following describes the expected status of annunciators:

DRYWELL VAC RELIEF VLV 1-A OPEN (CRP 903 A2 window 1-3) and  
TORUS VACUUM BREAKER OFF SEAT (CRP 903 A3 window 4-7)?

(The applicable ARPs are provided.)

- a. DRYWELL VAC RELIEF VLV 1-A OPEN - lit  
TORUS VACUUM BREAKER OFF SEAT - lit
- b. DRYWELL VAC RELIEF VLV 1-A OPEN - lit  
TORUS VACUUM BREAKER OFF SEAT - not lit
- c. DRYWELL VAC RELIEF VLV 1-A OPEN - not lit  
TORUS VACUUM BREAKER OFF SEAT - lit.
- d. DRYWELL VAC RELIEF VLV 1-A OPEN - not lit  
TORUS VACUUM BREAKER OFF SEAT - not lit.

## QUESTION: 044 (1.00)

WHICH ONE of the following correctly describes the interlock between containment vent to SBT, valve AC-10, and the SBT system?

- a. On an automatic SBT start, valves SG-1A and SG-1B will only open if the AC-10 control switch is in the CLOSE position.
- b. On an automatic SBT start, AC-10 will close, if open, as soon as valve SG-1A or SG-1B leaves its fully closed seat.
- c. Following an automatic start, with SBT running, AC-10 will open if the keylock switch on CRP 905 is in the TORUS or DRYWELL position and the AC-10 control switch is taken to AUTO/OPEN.
- d. Following an automatic start, with SBT running, AC-10 will auto open when either SG-1A or SG-1B are open but will auto close if both SG-1A and SG-1B are open.

## QUESTION: 045 (1.00)

The Reactor Building "HVAC ISOLATIONS-RX BLDG" keylock switches (color turquoise) have been placed in "BYPASS" on CRP 902 as directed by EOP 590.17.

WHICH ONE of the following describes the function provided when these switches are placed in the "BYPASS" position.

- a. Allows operation of the reactor building transfer fans with any isolation signal present.
- b. Allows operation of the reactor building transfer fans if the exhaust fans are secured.
- c. Allows operation of the reactor building supply fans with high drywell pressure and low RPV water level.
- d. Allows operation of the reactor building supply fans with high reactor building ventilation exhaust radiation.



QUESTION: 046 (1.00)

Given the following conditions:

- The reactor mode switch is in REFUEL.
- One rod is withdrawn.
- The refueling platform is approaching the vessel and the following lights are lit on the operator's console:

"GRAPPLE NORMAL UP"  
"GRAPPLE ENGAGED"  
"HOIST LOADED"

WHICH ONE of the following describes the available operation of the main hoist when the refuel platform interlock travel limit switches are tripped?

- a. The main hoist can be raised or lowered.
- b. The main hoist can be raised only.
- c. The main hoist can be lowered only.
- d. The main hoist cannot be raised or lowered.

## QUESTION: 047 (1.00)

During a shutdown for refueling, rod 06-03 was stuck at position 12. The control rod was electrically disarmed. All other rods were fully inserted at 1000 on 11/04/96 and the RE determined that the reactor would remain shutdown under all conditions without boron with rod 06-03 stuck out. Troubleshooting was performed and rod 06-03 was fully inserted at 1400 on 11/08/96.

Fuel movement is in progress. RBCCW outlet temperature is 70°F. TBCCW outlet temperature is 65°F.

WHICH ONE of the following is the earliest time that SDC can be secured? (Attachment 1 of OP 305 is provided.)

- a. 698 hours from 1000 on 11/04/96.
- b. 363 hours from 1000 on 11/04/96.
- c. 698 hours from 1400 on 11/08/96.
- d. 863 hours from 1400 on 11/08/96.

## QUESTION: 048 (1.00)

Shutdown cooling has just been placed in service with both SDC pumps running. Recirc pump B is running and RPV water level is +40 inches. System temperatures are as follows:

Recirculation loop A temperature:	265°F
Recirculation loop B temperature:	260°F
SDC heat exchanger tube side outlet temperature:	200°F
RBCCW OUT S/D CLNG HX:	145°F

WHICH ONE of the following correctly describes the status of system temperatures?

- a. Shutdown cooling inlet temperature is indicative of reactor core temperatures.  
RBCCW OUT S/D CLNG HX temperature is within limits.
- b. Shutdown cooling inlet temperature is indicative of reactor core temperatures.  
RBCCW OUT S/D CLNG HX temperature is not within limits.
- c. Shutdown cooling inlet temperature is not indicative of reactor core temperatures.  
RBCCW OUT S/D CLNG HX temperature is within limits.
- d. Shutdown cooling inlet temperature is not indicative of reactor core temperatures.  
RBCCW OUT S/D CLNG HX temperature is not within limits.

QUESTION: 049 (1.00)

The plant is in single loop operation at power.

For WHICH ONE of the following conditions can the idle recirculation pump be started? (Consider administrative and functional limitations.)

- a. The idle recirculation MG set generator field breaker is closed. MG set lockout relays have been reset.
- b. The idle recirculation MG set lube oil pump discharge pressure is 55 psig. Lube oil temperature is 90°F.
- c. The idle pump was secured and isolated 4 hours ago. The pump was unisolated one hour ago. The idle pump suction temperature is 408°F. The operating pump suction temperature is 435°F.
- d. The idle recirculation pump suction and discharge valves are fully open. Differential pressure across the pump is 1.7 psid. The scoop tube lockup light is off and speed control is in manual.

QUESTION: 050 (1.00)

Recirc pump "B" M/A transfer station was in MAN with the output meter reading 50%. The vertical percent speed meter on the M/A station was reading 67% and the pump was running at approximately 67% speed.

WHICH ONE of the following describes the expected indication on the recirc pump "B" M/A transfer station output meter, vertical percent speed meter, and actual pump speed if the operator simultaneously depressed the ATWS "A" and "C" pushbuttons?

- a. The output meter is reading 50%.  
The vertical percent speed meter is reading 67%.  
The pump is running at 67% speed.
- b. The output meter is reading 50%.  
The vertical percent speed meter is reading approximately 80%.  
The pump is not running.
- c. The output meter is reading 50%.  
The vertical percent speed meter is reading offscale low.  
The pump is not running.
- d. The output meter is reading offscale low.  
The vertical percent speed meter is reading offscale low.  
The pump is not running.

## QUESTION: 051 (1.00)

WHICH ONE of the following correctly describes the purpose of the upper and lower limits established by the recirc speed dual limiter?

- a. The upper limit prevents exceeding MCPR limits. The lower limit prevents damage to the recirc pumps and motors caused by axial thrust.
- b. The upper limit prevents damage to the recirc pumps and motors caused by axial thrust. The lower limit prevents two pump operation in the thermal hydraulic instability region of the power to flow map.
- c. The upper limit insures stability of the hydraulic coupling. The lower limit reduces the effects of vessel bottom head thermal stress due to stagnation.
- d. The upper limit prevents damage to the recirc pumps due to excessive flow and vibration. The lower limit insures stability of the hydraulic coupling.

## QUESTION: 052 (1.00)

While in the Gas Turbine Building on a plant tour, you discover a small fire in the area of the generator lube oil pumps. You are a qualified fire fighter.

WHICH ONE of the following describes the actions that you should take in response to the fire?

- a. Leave the area immediately then report the fire to the Control Room. The carbon dioxide system will automatically initiate to extinguish the fire.
- b. Leave the area immediately then report the fire to the Control Room. The deluge system will automatically initiate to extinguish the fire.
- c. Report the fire to the Control Room then wait for the fire brigade to arrive before attempting to fight the fire.
- d. Report the fire to the Control Room then attempt to fight the fire as safely as possible.

## QUESTION: 053 (1.00)

A LOCA has occurred concurrent with a loss of normal power. The gas turbine is currently loaded to 11.2 MWe. Gas turbine exhaust temperature is increasing. If gas turbine exhaust temperature continues to increase WHICH ONE of the following actions will occur first?

- a. The gas turbine will automatically runback.
- b. The 14A-G tie breaker will trip open.
- c. The gas turbine will trip.
- d. The running FWCI feedwater pump supply breaker will trip open.

## QUESTION: 054 (1.00)

The following events occurred:

- |            |  |
|------------|--|
| T = 0      | Power was lost to the Vital AC MG set DC motor.  |
| T = 5 min  | Power was lost to the Vital AC MG set AC motor. The MG set stopped and the Vital AC bus automatically transferred to the alternate power supply. |
| T = 10 min | Power was restored to the Vital AC MG set DC motor.  |
| T = 15 min | Power was restored to the Vital AC MG set AC motor.  |

WHICH ONE of the following describes the effect of these events on the Vital AC bus? Assume only operator actions were the restoration of power to the AC and DC motors.

- a. The MG set automatically restarted at T = 10 min and the Vital AC bus automatically transferred back to the MG set.
- b. The MG set automatically restarted at T = 10 min and the Vital AC bus remained on the alternate power supply.
- c. The MG set automatically restarted at T = 15 min and the Vital AC bus automatically transferred back to the MG set.
- d. The MG set automatically restarted at T = 15 min and the Vital AC bus remained on the alternate power supply.

## QUESTION: 055 (1.00)

RPS Bus B is being supplied by transformer IRP-1 while maintenance is being performed on the normal supply 480 VAC motor control center. During performance of a core spray surveillance, a fault caused Bus 14E to drop to 1500 volts for 3 seconds when the core spray pump was started.

WHICH ONE of the following describes the expected effect on the RPS busses?

- a. Both RPS busses remain energized.
- b. RPS Bus A remains energized. RPS Bus B deenergizes resulting in a half scram.
- c. RPS Bus B remains energized. RPS Bus A deenergizes resulting in a half scram.
- d. Both RPS busses deenergize resulting in a full scram.

## QUESTION: 056 (1.00)

The plant was operating at 100% power when a generator load reject occurred. All TCVs and turbine BPVs responded as expected with the exception of BPV #4 which stuck fully closed.

WHICH ONE of the following describes the expected automatic actions as a direct result of the transient?

- a. Select rod insert only.
- b. Half scram only.
- c. Select rod insert and half scram.
- d. Full scram.



## QUESTION: 057 (1.00)

The plant was operating at 100% power with the EPR in control of reactor pressure when the Bypass Opening Jack (BPOJ) was taken to the LOWER position.

WHICH ONE of the following describes the expected plant response if the BPOJ switch is held in the LOWER position?

- a. The bypass valves will open fully, then the control valves will be closed by the EPR. Reactor pressure will stabilize at the EPR setpoint.
- b. The bypass valves will open fully, then the control valves will open until the control valve limit stop is reached. Reactor pressure will decrease and stabilize at a lower value than before the transient.
- c. The control valves will open until the control valve limit stop is reached, then the bypass valves will open fully. Reactor pressure will decrease until the MSIVs close.
- d. The control valves will open until the control valve limit stop is reached, then the bypass valves will open until the reactor flow limit is reached. Reactor pressure will decrease until the MSIVs close.

QUESTION: 058 (1.00)

The mode switch is in STARTUP/HOT STANDBY during a reactor startup. Containment High Range Radiation Monitor (CHRRM) RIT 1826 has failed upscale.

WHICH ONE of the following describes the availability of the primary containment atmosphere control functions in this condition?

- a. The H2/O2 analyzer and containment vent and purge are still available because both CHRRMs would have to fail to cause a Group VI isolation.
- b. The H2/O2 analyzer and containment vent and purge isolate. Both functions can be restored using the RIT-1826 Group 6 Bypass Switch.
- c. The H2/O2 analyzer and containment vent and purge isolate. Only the H2/O2 analyzer can be restored using the RIT-1826 Group 6 Bypass Switch.
- d. The H2/O2 analyzer and containment vent and purge isolate. Only the containment vent and purge can be restored using the RIT-1826 Group 6 Bypass Switch.

## QUESTION: 059 (1.00)

The control room operator records the following sump integrator data, 4 hours after the previous data was taken:

Drywell floor drain sump = 545 gallons (since last reading)

Drywell equipment drain sump = 5480 gallons (since last reading)

WHICH ONE of the following describes the required technical specification action?

- a. A shutdown is not required because all coolant leakage is within specifications.
- b. A shutdown is not required because unidentified leakage is within specifications.
- c. A shutdown is required because neither identified nor unidentified coolant leakage is within specifications.
- d. A shutdown is required because reactor coolant leakage is not within specifications.

## QUESTION: 060 (1.00)

The plant was operating at 100% power when all service water was lost due to an unisolable pipe break.

WHICH ONE of the following describes actions that can be taken to restore closed cooling water systems?

- a. Restore TBSCCW from Emergency Service Water, then crosstie TBSCCW and RBCCW to restore RBCCW.
- b. Restore TBCCW from Fire Protection, then crosstie TBCCW and TBSCCW to restore TBSCCW.
- c. Restore RBCCW from Emergency Service Water, then crosstie RBCCW and TBCCW to restore TBCCW.
- d. Restore TBSCCW from Fire Protection, then crosstie TBSCCW and TBCCW to restore TBCCW.

## QUESTION: 061 (1.00)

All RBCCW was lost. The reactor was scrammed, but a number of rods failed to insert. Boron injection was not initially required. Then RPV pressure was reduced to 500 psig for one hour. Current plant conditions are as follows:

RPV Pressure:	500 psig, steady
RPV Water Level:	+ 30", steady
Reactor Power:	40% on IRM Range 8, steady
Drywell Pressure:	7.5 psig, increasing
Drywell Temperature:	255°F, increasing

WHICH ONE of the following describes how RPV pressure should be controlled in accordance with ONP 524C and the EOPs now that RPV pressure has been at 500 psig for one hour?

- a. Maximize reactor cooldown rate. Cooldown rate may exceed 100°F/hr, but reactor temperature should be maintained greater than 25°F above drywell temperature.
- b. Maximize reactor cooldown rate, not to exceed 100°F/hr. Maintain reactor temperature greater than 25°F above drywell temperature.
- c. Cooldown the reactor at a rate not to exceed 60°F/hr. Maintain reactor temperature greater than 25°F above drywell temperature.
- d. Hold reactor pressure at 500 psig. Do not commence cooldown at this time

## QUESTION: 062 (1.00)

The plant was operating at 100% power when the in-service CRD pump tripped. The other CRD pump is available, but there will be a delay in starting it while tags are cleared.

WHICH ONE of the following CRP 905 A-2 alarms would NOT be expected as a result of the loss of CRD flow?

- a. "CRD HIGH TEMP"
- b. "CRD CHARGING WATER LOW PRESSURE"
- c. "CRD ACCUMULATOR TROUBLE" - The light on the local panel for the accumulator in alarm goes out when the button is pushed.
- d. "ROD OUT BLOCK"

## QUESTION: 063 (1.00)

The plant was operating at 95% steady state power when the following indications were observed:

- Reactor power increased slightly
- Reactor pressure decreased
- Reactor water level remained relatively steady
- Indicated steam flow decreased
- Generator output decreased

WHICH ONE of the following events has occurred?

- a. A recirculation pump increased speed slightly.
- b. An SRV has failed open.
- c. One set of SJAEs has tripped off and decreased turbine vacuum.
- d. RPV pressure control has shifted from the EPR to the MPR.

## QUESTION: 064 (1.00)

Given the following conditions:

- Unit 1 had been operating at 75% power
- A loss of Vital AC has just occurred
- A reactor scram has also occurred

WHICH ONE of the following reactor water level instruments is the operator directed to monitor prior to securing the reactor feedwater pumps after the scram?

- a. Wide Range GEMAC Floodup Level
- b. Wide Range Fuel Zone Level
- c. Narrow Range GEMAC Level
- d. ATWS Narrow Range Level

## QUESTION: 065 (1.00)

The plant was operating at 100% power when an electrical fault caused a loss of 480V bus 12D.

WHICH ONE of the following would be a concern and the corresponding required action if 12D cannot be restored?

- a. The reactor building may isolate due to loss of plant heating. SBT should be started if the reactor building isolates to maintain negative pressure.
- b. Airborne releases may occur in the recombiner building and the Xe/Kr building due to loss of ventilation. The MSIVs should be closed to limit airborne releases.
- c. Overheating of the reactor feed pumps may occur due to a loss of area coolers. An orderly shutdown and plant cooldown should be performed so that the pumps can be secured.
- d. Condenser vacuum may be lost due to loss of the condenser vacuum pump. A reactor scram should be initiated if condenser vacuum cannot be maintained.

## QUESTION: 066 (1.00)

The plant is operating at 100% power with the diesel generator tagged out for maintenance. A reactor scram occurs with a failure to fast transfer to the RSST.

WHICH ONE of the following describes the 125 VDC battery chargers, if any, that are supplying their respective buses immediately after the gas turbine generator energizes its respective buses.

- a. No battery chargers are supplying the DC buses.
- b. "A" or "C" battery charger only.
- c. "B" or "D" battery charger only.
- d. "A" and "B" battery chargers.

## QUESTION: 067 (1.00)

A complete loss of 24 VDC power occurred with the plant shutdown.

WHICH ONE of the following describes the source range monitoring equipment that are still energized or available?

- a. SRM high voltage power supplies and recorders on CRP 905.
- b. SRM electronic circuitry and detector drive power.
- c. SRM high voltage power supplies and electronic circuitry.
- d. SRM detector drive power and recorders on CRP 905.

## QUESTION: 068 (1.00)

The plant was in cold shutdown with both recirc pumps and both SDC pumps operating when both recirc pumps tripped. Operators were NOT able to close the discharge or suction valves for either pump. Reactor water level is +55 inches.

WHICH ONE of the following describes the status of SDC flow in this condition?

- a. Shutdown cooling flow will not bypass the core.
- b. Shutdown cooling flow will bypass the core through the A recirc pump only.
- c. Shutdown cooling flow will bypass the core through the B recirc pump only.
- d. Shutdown cooling flow will bypass the core through the A and B recirc pumps.



## QUESTION: 069 (1.00)

The plant was shutdown in preparation for a refueling outage at 1200 hours on 11/1. The reactor cavity was flooded. The following events occurred:

- 1200 hours on 11/4 - A total loss of decay heat removal capability occurred. The only source of injection available was one CRD pump.
- 1200 hours on 11/6 - A condensate transfer pump becomes available
- 1200 hours on 11/7 - Decay heat removal capability can be restored

WHICH ONE of the following describes the expected effect on reactor water level? (ONP 531 is provided.)

- a. Boiloff will not occur and the core will remain covered.
- b. Boiloff will occur, but the core will remain covered because makeup capacity will be sufficient.
- c. Boiloff will occur, but even though there is insufficient makeup capacity, decay heat removal capability will be restored prior to core uncover.
- d. Boiloff will occur and the core will be uncovered.

## QUESTION: 070 (1.00)

During refueling, WHICH ONE of the following correctly describes how the fuel pool gates should be positioned for a leak in the fuel pool and the reason for the action?

- a. The fuel pool gates should be closed to ensure that the steam dryer and steam separator are not uncovered.
- b. The fuel pool gates should be opened to ensure that the fuel pool cooling system remains operable.
- c. The fuel pool gates should be closed to minimize the loss of water in the reactor cavity.
- d. The fuel pool gates should be closed to ensure fuel pool level remains above the skimmer weirs.

## QUESTION: 071 (1.00)

During refueling operations, 35 days after plant shutdown, water level in the reactor cavity began to decrease due to an unisolable leak. A spent fuel bundle was being transferred to the spent fuel pool. When the operator attempted to lower the bundle back into the core, the hoist jammed and the bundle could not be lowered. When the water level dropped below the top of the bundle, the refuel floor area radiation monitor alarmed.

WHICH ONE of the following is the minimum required emergency action level for the current conditions?

- a. Unusual Event
- b. Alert
- c. Site Area Emergency
- d. General Emergency

## QUESTION: 072 (1.00)

Millstone Units 1 and 2 were both operating at 100% power. Millstone Unit 3 was shutdown for refueling. Transmission line 310 was out of service for corrective maintenance. A storm has just caused the loss of transmission lines 348 and 383.

WHICH ONE of the describes the current status of Units 1 and 2?

- a. Unit 1 and Unit 2 were both load-rejected.
- b. Unit 1 was load-rejected. Unit 2 is still on-line.
- c. Unit 1 is still on-line. Unit 2 was load rejected.
- d. Unit 1 and Unit 2 are both on-line.

## QUESTION: 073 (1.00)

A turbine trip occurred while the plant was operating at 100% power.

WHICH ONE of the following describes the response of the Extraction Steam nonreturn valves and the reason for the response?

- a. The nonreturn valves remain open to provide feedwater preheating which will ensure cold water is not injected into the RPV.
- b. The nonreturn valves remain open to provide steam to drive the SJAES and maintain condenser vacuum.
- c. The nonreturn valves close to prevent water from the tube side of the heaters from backing up into the turbine, potentially damaging turbine blading.
- d. The nonreturn valves close to prevent the feedwater heaters from acting as steam sources due to flashing, potentially causing turbine overspeed.

## QUESTION: 074 (1.00)

The plant was operating at 100% power when condenser vacuum began to decrease.

WHICH ONE of the following describes actions that would prevent a low condenser vacuum scram?

- a. If a loss of instrument air to the condenser air removal system occurred, then condenser vacuum could be maintained by transferring control of SJAE inlet pressure to manual.
- b. If a loss of instrument air to the AOG recombiner system occurred, then condenser vacuum could be maintained by shifting offgas flow to the 30 minute delay line.
- c. If a loss of Vital AC power occurred, then condenser vacuum could be maintained with the mechanical vacuum pump.
- d. If a loss of Instrument AC power occurred, then condenser vacuum could be maintained by maintaining turbine steam seal pressure with the steam seal regulator bypass and unloading valves.

## QUESTION: 075 (1.00)

WHICH ONE of the following correctly describes the bases for the reactor scrams that are designed to occur on a loss of condenser vacuum?

- a. The turbine stop valve closure scram prevents exceeding the reactor pressure safety limit.  
The low condenser vacuum scram is a backup that makes the resulting transient less severe.
- b. The turbine stop valve closure scram prevents exceeding the MCPR safety limit.  
The low condenser vacuum scram is a backup that makes the resulting transient less severe.
- c. The low condenser vacuum scram prevents exceeding the reactor pressure safety limit.  
The turbine stop valve closure scram is a backup that makes the resulting transient less severe.
- d. The low condenser vacuum scram prevents exceeding the MCPR safety limit.  
The turbine stop valve closure scram is a backup that makes the resulting transient less severe.

## QUESTION: 076 (1.00)

While resetting a reactor scram, the operator neglected to place the scram discharge volume isolation test switch to "ISOLATE." He performed the remainder of the procedure correctly.

WHICH ONE of the following describes the response of the SDV vent and drain valves?

- a. All SDV vent and drain valves open as soon as the scram reset switch is placed in the "GR 2 & 3" position.
- b. The vent and drain valves for one of the SDVs open as soon as the scram reset switch is placed in the "GR 2 & 3" position.
- c. One valve in each SDV vent and drain line open when the scram reset switch is placed in the "GR 2 & 3" position.
- d. All SDV vent and drain valves open when the scram reset switch is placed in the "GR 1 & 4" position.

## QUESTION: 077 (1.00)

A fire in the cable vault has caused all of the SRVs to open. The red indicator lights on CRP 903 are lit for all of the SRVs. Reactor pressure is 930 psig. The operator leaving the Control Room places the Appendix R CRIS switches in the ISOLATE position.

WHICH ONE of the following describes the immediate effect on the SRVs?

- a. All SRVs will remain open.
- b. All SRVs will close. All SRVs will reopen on high pressure only.
- c. All SRVs will close. All SRVs will reopen on high pressure. APR valves will reopen on an APR initiation.
- d. All SRVs will close. No SRVs will reopen on high pressure. APR valves will reopen on an APR initiation.

## QUESTION: 078 (1.00)

The control room has been evacuated due to a fire in the cable vault. It is necessary to shut down the diesel generator because no service water pumps are available.

WHICH ONE of the following actions should be completed prior to shutting down the diesel generator?

- a. Ensure CRD pump A is running in the self-cooling mode. Establish backfeed from Unit 2 if necessary.
- b. Initiate drywell cooling via LPCI keep-full or via Fire Protection fire hose.
- c. Verify 1-IC-1, steam isolation valve, and 1-IC-4, condensate return isolation valve, open.
- d. Ensure manual control of 1-IC-10, makeup isolation valve, has been established to provide IC makeup.

QUESTION: 079 (1.00)

WHICH ONE of the following conditions would be a safety limit violation?

- a. While operating at 30% power, the turbine bypass valves fail open. Reactor pressure drops to 800 psig before the MSIVs close and the reactor scrams.
- b. While operating at 75% power, a common mode failure in the recirculation flow controllers causes the speed of both recirc pumps to increase to the high speed stop. The Minimum Critical Power Ratio is 1.08.
- c. While operating at 90% power, a turbine trip occurs. The reactor fails to scram and the ATWS system logic trips the recirculation pumps and initiates ARI.
- d. While operating at 100% power, an inadvertent MSIV closure causes reactor pressure to increase. The reactor scrams and reactor pressure increases until 5 SRVs lift.

## QUESTION: 080 (1.00)

The plant was operating at 100% power with RFPs A and B running. RFP C was in standby. Feedwater string A was selected for FWCI. The following events occurred:

- Reactor water level increased rapidly due to a level control system malfunction. The RFPs and turbine tripped and the reactor scrammed.
- Reactor water level began to decrease and RFP B was manually started for RPV level control.
- A high drywell pressure signal was received and RFP B tripped on overcurrent.

WHICH ONE of the following describes the automatic response of RFPs A and C to the high drywell pressure and RFP B trip? Assume RPV level is greater than -48 inches.

- a. Neither RFP A nor C starts.
- b. Only RFP A starts.
- c. Only RFP C starts.
- d. Both RFP A and C start.

## QUESTION: 081 (1.00)

The plant was operating at 100% power with RFPs A and B running. Feedwater string B was selected for FWCI. A LNP occurred and power was restored to all the 4160V busses with the exception of 14A which has an electrical fault.

WHICH ONE of the following describes the expected response of the condensate system when RPV water level drops below the low low level setpoint and RPV pressure drops below 600 psig?

- a. FWCI does not initiate. A condensate pump and condensate booster pump must be manually started to restore RPV level. The ECT pump must be manually started to restore hotwell level.
- b. Condensate pump B and condensate booster pump B automatically start due to the FWCI initiation and inject to restore RPV level. The ECT pump automatically starts due to the FWCI initiation.
- c. Condensate pump B and condensate booster pump B automatically start due to the FWCI initiation and inject to restore RPV level. The ECT pump automatically starts when hotwell level drops below 12 inches.
- d. Condensate pump B and condensate booster pump B automatically start due to the FWCI initiation and inject to restore RPV level. The ECT pump must be manually started to restore hotwell level.



## QUESTION: 082 (1.00)

The plant was operating at 100% power when a break occurred on the instrument air header. The reactor scrammed on low scram pilot header pressure and EOP 570 was entered.

WHICH ONE of the following describes methods that can be used for RPV level and pressure control?

- a. Feedwater for RPV level control. SRVs for RPV pressure control.
- b. Feedwater for RPV level control. RWCU Reject Mode for RPV pressure control.
- c. Maximize CRD for RPV level control. Main steam line drains for RPV pressure control.
- d. Maximize CRD for RPV level control. Isolation Condenser for RPV pressure control.

QUESTION: 083 (1.00)

The plant was operating at 100% power when the plant scrammed due to a loss of feedwater. A loss of normal power occurred due to a failure of the RSST. All rods inserted and the diesel generator (DG) and gas turbine (GT) started and are loaded as follows.

DG CURRENT LOADING

GT CURRENT LOADING

1800 KW

9200 KW

LPCI pump C is the only ECCS pump running. RPV level is decreasing and torus temperature is increasing.

WHICH ONE of the following describes sources of RPV injection and torus cooling that can be lined up under these conditions? Figures 7.2 and 7.3 from ONP-503B are attached.

- a. Core Spray pump A for RPV injection.  
LPCI B subsystem for torus cooling.
- b. LPCI pump A for RPV injection.  
LPCI B subsystem for torus cooling.
- c. Core Spray pump B for RPV injection.  
LPCI A subsystem for torus cooling.
- d. LPCI pump B for RPV injection.  
LPCI A subsystem for torus cooling.

## QUESTION: 084 (1.00)

A LOCA occurred 5 minutes ago that caused RPV water level and pressure to decrease rapidly. The reactor failed to automatically scram. All control rods inserted on the manual scram. No injection subsystems are available. Efforts are in progress to lineup alternate injection subsystems. The following conditions exist:

- RPV pressure is 50 psig and steady
- RPV level is -175" and decreasing slowly
- Drywell pressure is 1.4 psig and steady.

WHICH ONE of the following is the minimum required emergency action level for the current condition?

- a. Alert - Charlie One
- b. Site Area Emergency - Charlie Two
- c. General Emergency - Bravo
- d. General Emergency - Alpha

## QUESTION: 085 (1.00)

Following a major loss of coolant accident and LNP, RPV level cannot be maintained above TAF. The operating crew determines that an alternate injection system needs to be aligned in order to recover RPV level. Reports from the field indicate that the condensate transfer pump house is inaccessible. RPV pressure is 80 psig.

WHICH ONE of the following lineups should be used to make up to the vessel given the current plant conditions?

- a. Fire Water via Condensate Transfer and Core Spray
- b. Fire Water via SLC injection drain line
- c. Emergency Service Water
- d. ECCS Keep-Full

## QUESTION: 086 (1.00)

During WHICH ONE of the following conditions would it be allowable to use Core Spray with suction from the CST in accordance with the EOPs?

- a. During performance of Alternate Level Control with two condensate pumps lined up and running.
- b. During performance of ATWS - RPV Flooding with LPCI pump A lined up and running, 4 SRVs open and RPV pressure at 225 psig.
- c. During performance of Primary Containment Flooding with one condensate pump available.
- d. During performance of ATWS - Primary Containment Flooding with LPCI pump B available.

## QUESTION: 087 (1.00)

A reactor scram has occurred and approximately 1/2 of the control rods failed to insert. The following indications are available:

- SCRAM DISCH VOLUME HI LEVEL SCRAM annunciators lit.
- Approximately 1/2 of the individual white lights on CRP 905 are illuminated.
- 4 of the CRD Scram Solenoid Group lights on CRP 905 are illuminated.

WHICH ONE of the following describes the most likely cause of the failure of the rods to insert and the first action that should be taken to attempt to insert the remaining rods?

- a. The problem is most likely electrical. The RPS circuit breakers should be opened.
- b. The problem is most likely electrical. The ATWS system should be deenergized and RPS should be bypassed.
- c. The problem is most likely mechanical. The RPS circuit breakers should be opened.
- d. The problem is most likely mechanical. The ATWS system should be deenergized and RPS should be bypassed.

## QUESTION: 088 (1.00)

The plant was operating at 100% power when an ATWS occurred. No rod motion occurred. 24% of SLC tank level was injected and the boron has been mixed. RPV pressure is being maintained at 1000 psig and RPV level is in the normal band.

WHICH ONE of the following describes the expected current status of the reactor and the expected status of the reactor 8 hours later? Assume RPV pressure and level are held constant, no additional boron is injected and no control rods are inserted.

- a. The reactor is currently subcritical and will be more subcritical 8 hours later.
- b. The reactor is currently subcritical and will be less subcritical 8 hours later.
- c. The reactor is currently critical and will be more critical 8 hours later.
- d. The reactor is currently critical, but will be subcritical 8 hours later.

## QUESTION: 089 (1.00)

EOP 575, Sheet 1, "Failure-to-Scram," is being implemented. Six rods are stuck out. Reactor power is 50% on IRM range 6 and decreasing slowly. SBLC is injecting. Initial tank level was 64%. Current tank level is 32%.

WHICH ONE of the following describes the appropriate actions that should be taken if RPV water level cannot be determined?

- a. Exit section FSL. Go to EOP 575, Sheet 4, "FS - RPV Flooding." Cooldown may commence in accordance with section FSP.
- b. Exit sections FSL and FSP. Go to EOP 575, Sheet 4, "FS - RPV Flooding."
- c. Exit EOP 575. Go to EOP 570, Sheet 1. Exit section RL. Go to EOP 570, Sheet 4, "RPV Flooding." Cooldown may commence in accordance with section RP.
- d. Exit EOP 575. Go to EOP 570, Sheet 1. Exit sections RL and RP. Go to EOP 570, Sheet 4, "RPV Flooding."

## QUESTION: 090 (1.00)

Following a loss of coolant accident the reactor is shutdown and the recirculation pumps are tripped. Reactor pressure is 75 psig. Drywell temperature indications are:

TI 1602-6A: 315°F	TR 1602-6, Point 1: 340°F
TI 1602-6B: 305°F	TR 1602-6, Point 9: 310°F

WHICH ONE of the following is an accurate RPV level indication?

- a. -50" on WR LI 263-115 on CRP 903
- b. +2" on Floodup LI 263-101 on CRP 904
- c. -45" on NR Yarway B on CRP 905
- d. -33" on NR ATWS B on CRP 980

## QUESTION: 091 (1.00)

During torus cooling, LPCI flow through the heat exchanger is limited to 5000 gpm to prevent damage to the heat exchanger.

WHICH ONE of the following is the reason that only one LPCI pump may be operating with the heat exchanger bypass valve closed (rather than running 2 pumps and throttling LPCI flow)?

- a. One pump operation reduces the damage to the test return valve due to flow induced vibration.
- b. Higher ESW flow can be established with only one LPCI pump running, which results in better heat exchanger performance.
- c. Operation of only one pump increases system reliability, allowing one pump to remain in standby readiness for RPV injection.
- d. Operation of only one pump allows the pump to operate with additional margin to pump cavitation.

## QUESTION: 092 (1.00)

An ATWS occurred and power was lost to bus 14E. All rods have been inserted and power has just been restored to 14E. Current conditions are as follows:

RPV Level:	-110" and stable
LPCI A is injecting	5000 gpm with both pumps running
Torus Water Level:	12'
Torus Temperature:	174°F
Torus Bottom Pressure:	3 psig

WHICH ONE of the following is the highest containment cooling flow that can be established now that Core Spray and LPCI B subsystems are available and all rods are inserted?

- a. 3000 gpm.
- b. 5000 gpm.
- c. 6000 gpm.
- d. 10000 gpm.

## QUESTION: 093 (1.00)

The plant was operating at 100% power when the reactor scrammed on low water level. Both SBTG trains automatically started. Current plant conditions are as follows:

- RPV water level is -5" and decreasing slowly
- Drywell pressure is 1.2 psig and increasing slowly
- Drywell temperature is 160°F and increasing slowly

WHICH ONE of the following describes the actions that should be taken to vent the primary containment in accordance with OP 311?

- a. The containment cannot be vented because it is not permissible to bypass the Group II isolation signal under these conditions.
- b. The containment can be vented. Both SBTG trains can be left in service.
- c. The containment can be vented. One SBTG train must be locked out.
- d. The containment can be vented. Both SBTG trains must be locked out.

## QUESTION: 094 (1.00)

When executing EOP 580, "Primary Containment Control," emergency depressurization is required if torus water level cannot be maintained above 10.5 feet.

WHICH ONE of the following becomes uncovered at 10.5 feet?

- a. Drywell downcomers.
- b. SRV tailpipes.
- c. ECCS suction strainers.
- d. Reactor building to torus vacuum breakers.



QUESTION: 095 (1.00)

WHICH ONE of the following correctly describes the effects of spraying the containment with torus water level above 24 feet?

- a. The drywell to torus differential pressure limit could be exceeded. Torus to reactor building differential pressure is not a concern.
- b. The torus to reactor building differential pressure limit could be exceeded. Drywell to torus differential pressure is not a concern.
- c. Both drywell to torus and torus to reactor building differential pressure limits could be exceeded.
- d. Differential pressure limits are not a concern, but there is no benefit to spraying the torus with the torus spray nozzles covered.

QUESTION: 096 (1.00)

A LOCA has occurred. Plant conditions are as follows:

- Drywell pressure is 25 psig and increasing
- Drywell temperature is 350°F and increasing
- Torus water level is 16 feet and steady
- RPV water level is -60" and steady
- RPV pressure is 700 psig and steady

WHICH ONE of the following describes the appropriate actions in accordance with EOP 580, "Primary Containment Control?"

- a. Initiate both drywell and torus sprays.
- b. Initiate drywell sprays only.
- c. Initiate torus sprays only.
- d. Do not initiate containment sprays.

## QUESTION: 097 (1.00)

A LOCA has occurred and containment sprays are unavailable. The following conditions exist in primary containment:

- Drywell pressure is 35 psig and increasing
- Torus bottom pressure is 40 psig and increasing
- Torus water level is 16 feet and steady
- Drywell hydrogen concentration is 8%
- Drywell oxygen concentration is 4%
- Torus hydrogen concentration is 5%
- Torus oxygen concentration is 6%

WHICH ONE of the following describes the appropriate actions in accordance with EOP 580, "Primary Containment Control?"

- a. Vent the torus via the hardened vent and simultaneously purge the drywell until hydrogen and oxygen concentrations are within limits and torus bottom pressure drops below 35 psig.
- b. Vent the torus via the hardened vent until torus bottom pressure drops below 35 psig, then secure the vent. Purge the drywell until hydrogen and oxygen concentrations are within limits.
- c. Vent the torus via the hardened vent until torus bottom pressure drops below 35 psig, then secure the vent. Drywell purge is not required.
- d. Do not vent the torus until torus bottom pressure exceeds the Pressure Suppression Pressure (PSP) limit or approaches 71 psig.

QUESTION: 098 (1.00)

The plant was operating at 100% power, when the reactor building PEO reported that water was spraying from the running RWCU pump. When attempting to isolate the system, system inlet valve 1-CU-2 could not be closed. All other RWCU isolation valves were verified closed. Current conditions are as follows:

Temperature Switch:

1290-26A:	160 °F	1290-26E:	190 °F
1290-26B:	170 °F	1290-26F:	185 °F
1290-26C:	155 °F	1290-26G:	200 °F
1290-26D:	205 °F	1290-26H:	180 °F

Radiation Monitor:

ARM 7:	100 mR/hr
ARM 8:	100 mR/hr
ARM 9:	1000 mR/hr

WHICH ONE of the following describes the required EOP actions for the current conditions?

- a. Power operations may continue while attempting to shut 1-CU-2.
- b. Initiate a shutdown.
- c. Scram the reactor.
- d. Scram and emergency depressurize the reactor.

## QUESTION: 099 (1.00)

A steam leak area high temperature alarm was received on CRP 903-A2. An operator has verified that the alarm is valid.

WHICH ONE of the following temperature conditions would require emergency depressurization?

- |                        |          |        |
|------------------------|----------|--------|
| a. Temperature Switch: | 260-18A: | 200 °F |
|                        | 260-18B: | 210 °F |
|                        | 260-18C: | 205 °F |
|                        | 260-18D: | 145 °F |
| b. Temperature Switch: | 1040-8A: | 230 °F |
|                        | 1040-8B: | 200 °F |
|                        | 1040-8C: | 270 °F |
|                        | 1040-8D: | 250 °F |
| c. Temperature Switch: | 1040-8E: | 160 °F |
|                        | 1040-8F: | 195 °F |
|                        | 1040-8G: | 185 °F |
|                        | 1040-8H: | 200 °F |
| d. Temperature Switch: | 1340-7A: | 160 °F |
|                        | 1340-7B: | 120 °F |
|                        | 1340-7C: | 200 °F |
|                        | 1340-7D: | 200 °F |

## QUESTION: 100 (1.00)

A fuel cladding failure has occurred. The following alarms are in on CRP 903:

- "KAMAN STACK GAS HI RAD" 903 A4 (1-3)
- "STACK GAS MONITOR IN DISABLE POSITION" 903 A3 (5-7)

WHICH ONE of the following describes the stack gas monitor status?

- a. Both the Kaman and the GE stack gas monitors are in service.
- b. Only the Kaman stack gas monitor is in service.
- c. Only the GE stack gas monitor is in service.
- d. Neither the Kaman or the GE stack monitor is in service.

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

## ANSWER KEY

## MULTIPLE CHOICE

023 c

001 ~~a~~ a

024 a

002 a

025 d

003 c

026 d

004 a

027 c

005 c

028 a

006 b

029 b

007 b

030 c

008 b

031 c

009 b

032 c

010 d

033 a

011 c

034 d

012 c

035 b

013 c

036 a

014 ~~a~~ a

037 d

015 d

038 c

016 ~~a~~ d or b

039 c

017 a

040 a

018 c

041 b

019 b

042 b

020 c

043 b

021 b

044 b

022 a

045 c

## ANSWER KEY

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

## ANSWER KEY

092 c

093 c or a

094 a

095 c

096 c

097 b

098 a

099 d

100 a

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

**ATTACHMENT 2**

**FACILITY COMMENTS ON WRITTEN EXAMINATIONS**





Northeast  
Utilities System

Millstone Offices • Rope Ferry Rd., Waterford, CT

P.O. Box 128  
Waterford, CT 06385-0128  
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December 13, 1996  
Docket No. 50-245  
B16087

Mr. H. J. Miller  
U.S. Nuclear Regulatory Commission  
Region I  
475 Allendale Road  
King of Prussia, PA 19406-1415

Millstone Nuclear Power Station, Unit No. 1  
NRC Exam Comments

The purpose of this letter is to forward comments regarding the written NRC license examination administered at Millstone Unit No. 1 on December 2, 1996.

These comments result from a review of the examination conducted by members of the Millstone Unit No. 1 operating and training staff. References are provided to substantiate these comments.

Please contact Mr. Kevin Murphy, Supervisor, Operator Training, Millstone Unit No. 1 with any questions concerning this submittal.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY



P. D. Hinnenkamp  
Director, Unit Operations

cc: S. Dembek, NRC Project Manager, Millstone Unit No. 1  
T. A. Easlick, Senior Resident Inspector, Millstone Unit No. 1

Attachment 1

Millstone Nuclear Power Station, Unit No. 1

NRC Exam Comments

December 1996

## NRC EXAM COMMENTS

The following changes to the answer key are recommended based on changes performed during the validation:

**Question 58:**

Incorrect answer in key. Answer was not changed during validation.

Recommend changing key to Answer "B".

The following changes to the answer key are recommended based on additional technical justification:

**Question 14:**

WC-1, pg. 20, Rev. 2 provides the guidance for determining the safety system out-of-service time. The out-of-service time is calculated as the difference between the time that the LCO was entered and the time the LCO was exited. Answer "A" reflects safety system out-of-service time.

Recommend accepting answer "A" as the only correct answer.

**Question 48:**

OP 305 Section 3.10 states "Without forced circulation (reactor recirc pump or SDC pump running), shutdown cooling inlet temperature (reactor recirc loop 'A') is not indicative of reactor temperatures." The question stem includes both reactor recirc pump "B" and both SDC pumps. Therefore, shutdown cooling inlet temperature is indicative of reactor core temperatures. Answer "A" reflects this condition.

Recommend accepting answer "A".

The following changes to the answer key are recommended based on a difference in the interpretation of the question by the students:

**Question 16:**

During normal plant shutdowns, the plant enters COLD SHUTDOWN with the MSIVs open, vented to the main condenser. Therefore it is very reasonable to believe that COLD SHUTDOWN was achieved in time on 12/3/96 and no UNUSUAL EVENT report was required. This would make answer "B" correct.

If the candidate assumes, as the question had intended, that the vessel was isolated and COLD SHUTDOWN was not achieved until the head vents were opened, an Unusual Event report would be required and choice "D" is correct.

Recommend accepting either "B" or "D".

**Question 54:**

The question stem states "Assume only operator actions were the restoration of power to the AC and DC motors." The stem does not include the status of field flashing. After restoring power to the motors, OP 343, Section 5.1.7, requires the operator to "Momentarily PRESS pushbutton "GEN FIELD FLASH" and OBSERVE voltage buildup to 235 - 245 volts."

If the candidate assumed the "GEN FIELD FLASH" pushbutton still needs to be depressed in order to flash the generator field then answer "D" would be correct. If the student assumed the "GEN FIELD FLASH" pushbutton has been depressed, then "C" would be correct.

Recommend accepting either Answer "C" or "D".

**Question 85:**

The stem of the question states the "Reports from the field indicate that the condensate transfer pump house is inaccessible." Without giving any additional information on why exactly the condensate transfer pump house is not accessible, it may be assumed that the condensate transfer pumps are not available for ECCS keep full. Since no other injection source is mentioned in the question stem, fire water via SBLC injection drain line may be used.

Recommend accepting either answer "B" or "D".

**Question 93:**

The question attempts to determine if the primary containment can be vented in accordance with OP 311. OP 311, Section 4.10.3a, specifies the conditions necessary to vent in the given conditions. "Drywell pressure is expected to remain less than 2 psig." The stem of the question indicates drywell pressure is 1.2 psig and drywell temp is 160°F both increasing slowly. Therefore, if the candidate assumes drywell pressure will not remain below 2 psig, answer "A" is correct. If the candidate assumes drywell pressure will remain below 2 psig, answer "C" is correct. The stem of the question does not provide the level of detail to make this specifically clear.

Recommend accepting either answer "A" or "C".

**Question 98:**

The temperature and radiation readings provided do not include any trend information. If the isolation was successful, the temperature and radiation readings would begin to trend downward. If the candidate assumed the readings were constant and the leak was not fully isolated, EOP 585, step SC-15, would direct the initiation of a reactor scram. This is a reasonable assumption based on the elevated temperatures and radiation without a trend if it is assumed that an isolation valve is leaking by. This action is reflected in answer "C". Additionally, a reactor scram in this condition would be a conservative and prudent action. If the candidate assumes the leak is isolated, answer "A" remains correct.

Recommend accepting either answer "A" or "C".

**Question 100:**

The question stem does not provide a specific sequence of events for the fuel cladding failure and the associated annunciators. This could result in some confusion on the status of the GE stack monitor. Additionally, with the STACK GAS MONITOR IN DISABLE POSITION and a fuel cladding failure condition, the GE monitors would saturate, and therefore, would not provide any valid information and could be considered out of service. Annunciator Alarm Response procedure 903A3 (5-7) provides information that with the monitor in DISABLE, the monitor will not purge on a high radiation condition. If the candidate assumed a saturated GE monitor was not in service, answer "B" would be correct. If the candidate assumed the GE monitor was still in service, however, the information was incorrect, and answer "A" would be correct.

Recommend accepting either answer "A" or "B".

The following changes to the answer key are recommended based on a lack of operational orientation and difficulty in interpretation:

**Question 6:**

This question does not represent a fundamental level of memory that is appropriate for an SRO applicant. In Service Testing cold shutdown surveillance testing requirements would not be expected to be recalled from memory.

Recommend deleting the question.

### ATTACHMENT 3

#### NRC RESOLUTION OF FACILITY COMMENTS ON WRITTEN EXAMINATION

- SRO 6: Comment not accepted. The question was designed to test general knowledge of inservice surveillance testing administrative requirements and purpose. Detailed knowledge of testing requirements was not needed to answer the question. The facility did not indicate that this question was not appropriate during the pre-examination review. No change was made to the answer key.
- SRO 14: Comment accepted. The correct answer was changed to answer "a" based on the revised procedure reference provided by the facility.
- SRO 16: Comment accepted. Answer "b" was accepted as an additional correct answer.
- SRO 48: Comment accepted. The correct answer was changed to answer "a".
- SRO 54: Comment noted. The question stem states that "assume only operator actions were the restoration of power to the ac and dc" motors. Therefore, the generator field would not have been flashed. If the generator field was not flashed, answer "c" would be incorrect. The correct answer was changed to answer "d".
- SRO 58: Comment accepted. The correct answer was changed to answer "b". This error was recognized by the NRC staff during examination administration.
- SRO 85: Comment not accepted. The condensate transfer pumps can be operated from the control room; therefore, access to the pump house is not required for ECCS keep full. There was no reason to assume that the pumps were not available because the pump house was not accessible. This question was discussed during the pre-examination review with the facility and revised to address this concern. No change was made to the answer key.
- SRO 93: Comment accepted. Answer "a" was accepted as an additional correct answer.
- SRO 98: Comment not accepted. The question was intended to test the applicant's ability to recognize that the system would be isolated even if 1-CU-2 could not be closed. The stem specifically states that the other isolation valves were verified closed; therefore, it was not reasonable to assume that the leak was not fully isolated. The question asks for the "required" actions. A scram is not required if the system is isolated; therefore, answer "c" is not correct. No change was made to the answer key.
- SRO 100: Comment not accepted. With the monitor in DISABLE, the GE monitor would not isolate on a high radiation condition; therefore, it would still be "in service." The question does not ask if the monitor will provide valid information. This question was discussed during the pre-examination review with the facility and revised to address this concern. No change was made to the answer key.

## ATTACHMENT 4

### SIMULATION FACILITY REPORT

Facility License: DPR-21

Facility Docket No: 50-245

Operating Test Administration: December 2-6, 1996

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

<u>ITEM</u>	<u>DESCRIPTION</u>
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None