

U. S. NUCLEAR REGULATORY COMMISSION

REGION 1

Docket Nos: 50-354

Report Nos: 50-354/99-301

License Nos: NPF-57

Licensee: Public Service Electric and Gas Company

Facility: Hope Creek Nuclear Generating Station

Location: Hancocks Bridge, New Jersey

Dates: October 13, 1999 (Facility Administered Written Examination)
October 13-14, 1999 (Written Examination Grading)

Chief Examiner: Larry Briggs, Senior Operations Engineer

Examiners: John G. Caruso, Operations Engineer

Approved by: Richard J. Conte, Chief
Human Performance and Emergency Preparedness Branch
Division of Reactor Safety

SUMMARY OF FINDINGS

Hope Creek Generating Station NRC Examination Report 50-354/99-301

Findings were assessed according to potential risk significance and were assigned colors of *green, white, yellow, or red*. The inspection found only *non-colored* findings. *Green* findings, while not necessarily desirable, would have represented little risk to safety. *White* findings would have indicated issues with some increased risk to safety and which may have required additional NRC inspections. *Yellow* findings would have indicated more serious issues with higher potential risk to safety and would have required the NRC to take additional actions. *Red* findings would have represented an unacceptable loss of margin to safety and would have resulted in the NRC taking significant actions that could have included ordering the plant to shut down. The findings, considered in total with other inspection findings and performance indicators, will be used to determine overall plant performance.

- There were no findings.

Report Details

4. OTHER ACTIVITIES (OA)

4OA4 Operator Training and Qualifications

Senior Reactor Operator Initial Written Retake Exam

a. Scope

The NRC Chief examiner reviewed the written retake initial examination developed by the NRC staff to ensure that the examination was prepared and developed in accordance with the guidelines of the "Operator Licensing Examination Standards for Power Reactors" (NUREG-1021, Interim Revision 8). The exam review was conducted by telephone with a Hope Creek representative after the licensee had several days in which to conduct a detailed review and validation of the proposed exam. On October 13, 1999, the written exam was administered by the facility's training organization. Grading was completed on October 14, 1999.

b. Observations and Findings

.1 Grading and Results

One instant SRO applicant was administered an initial written licensing exam. The applicant successfully passed the written retake examination.

There were no facility post-examination comments.

.2 Examination Preparation and Quality

The written retake exam was developed by the NRC staff using the guidelines of the examination standards. The NRC exam author consulted with designated points of contact from the Hope Creek Licensed Operator Training staff during the exam development phase as needed to clarify technical as well as other plant specific details.

Hope Creek subsequently reviewed and validated the proposed exam. Some editorial/enhancement changes and/or additions to the proposed exam were requested by the licensee. Most of these comments involved minor non-technical changes that did not affect question acceptability but were made to further enhance clarity and readability. All licensee individuals consulted during development and review as well as those involved with administration of the exam signed onto a security agreement.

.3 Written Test Administration and Performance

The facility training department performed an analysis of questions missed on the written exam for individual weaknesses. There were six questions that were missed by the applicant. Discussions with the licensee indicate that these questions' subject areas will be discussed with the applicant prior to assumption of any licensed duties. As a result of the licensee's analysis, all six of these questions were determined to be valid and no post-exam changes or comments were requested. The licensee's action was determined to be acceptable.

.4 Miscellaneous Activities

The eligibility requirements for the senior reactor operator (SRO) applicant was reviewed and determined to be met.

Due to problems the licensee experienced in developing the February 1998 and December 1998 NRC exams (discussed in NRC Initial Examination Report 50-354/98-302, dated October 13, 1999) and based on a verbal commitment made during a management meeting held between the NRC and Hope Creek representatives on March 22, 1999, the NRC staff evaluated the Remediation Audit exam developed by Hope Creek and administered on September 22, 1999. The intent of the staff's evaluation was to determine if the Hope Creek Licensed Operator Training staff had improved in the area of developing an NRC initial operator license written exam that met NRC examination standards. The staff concluded that the overall quality of the Reactor Operator (RO) audit exam reflected an improvement in the ability of the licensee to develop an NRC type examination. However, 12 of the 25 questions that were developed to specifically test SRO license level knowledge were system questions written at an RO knowledge level.

4OA5 Exit Meeting Summary

On October 14, 1999, the Chief Human Performance and Emergency Preparedness Branch, Division of Reactor Safety provided exam results to Hope Creek training management representatives via telephone.

The Chief Human Performance and Emergency Preparedness Branch also expressed appreciation for the cooperation and assistance that was provided during the preparation of the exam by the licensee's training representatives/points of contact.

Attachments:

1. SRO Written Exam w/Answer Key

PARTIAL LIST OF PERSONS CONTACTED

FACILITY

D. Jackson	Nuclear Operations Training Manager
A. Faulkner	Operations/Training Representative
H. Hanson	Licensed Operator Training Supervisor
B. Havens	Licensed Operator Requalification Program Lead

NRC

L. Briggs	Senior Operations Engineer
J. Caruso	Operations Engineer

Attachment 1

SRO WRITTEN EXAM W/ANSWER KEY

HOPE CREEK - SRO EXAM - ANSWER KEY - 10/99

QUES	ANS					QUES	ANS				
1.	D					26.	D				
2.	D					27.	A				
3.	D					28.	D				
4.	A					29.	D				
5.	A					30.	B				
6.	D					31.	A				
7.	A					32.	C				
8.	D					33.	A				
9.	D					34.	B				
10.	C					35.	D				
11.	D					36.	D				
12.	C					37.	D				
13.	C					38.	B				
14.	A					39.	B				
15.	D					40.	D				
16.	B					41.	C				
17.	A					42.	A				
18.	B					43.	A				
19.	B					44.	C				
20.	A					45.	D				
21.	C					46.	A				
22.	B					47.	A				
23.	A					48.	C				
24.	D					49.	B				
25.	C					50.	D				

HOPE CREEK - SRO EXAM - ANSWER KEY - 10/99

QUES	ANS					QUES	ANS				
51.	B					76.	A				
52.	C					77.	A				
53.	D					78.	B				
54.	B					79.	C				
55.	C					80.	C				
56.	C					81.	B				
57.	A					82.	B				
58.	A					83.	C				
59.	C					84.	A				
60.	A					85.	C				
61.	C					86.	B				
62.	D					87.	C				
63.	D					88.	B				
64.	C					89.	B				
65.	C					90.	B				
66.	A					91.	A				
67.	B					92.	D				
68.	A					93.	A				
69.	A					94.	B				
70.	C					95.	D				
71.	B					96.	C				
72.	C					97.	D				
73.	D					98.	B				
74.	B					99.	B				
75.	C					100.	B				

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

APPLICANT'S NAME: _____

FACILITY: _____ HOPE CREEK _____

REACTOR TYPE: _____ BWR-GE4 _____

DATE ADMINISTERED: _____

INSTRUCTIONS TO APPLICANT:

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 80.00%. Examination papers will be picked up four (4) hours after the examination starts.

TEST VALUE	APPLICANT'S SCORE	FINAL GRADE %
100.00		

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

Applicant's Signature

Multiple Choice (Circle or X your choice). If you change your answer, write your selection in the blank.

MULTIPLE CHOICE

001 a b c d ____

002 a b c d ____

003 a b c d ____

004 a b c d ____

005 a b c d ____

006 a b c d ____

007 a b c d ____

008 a b c d ____

009 a b c d ____

010 a b c d ____

011 a b c d ____

012 a b c d ____

013 a b c d ____

014 a b c d ____

015 a b c d ____

016 a b c d ____

017 a b c d ____

018 a b c d ____

019 a b c d ____

020 a b c d ____

021 a b c d ____

022 a b c d ____

023 a b c d ____

024 a b c d ____

025 a b c d ____

026 a b c d ____

027 a b c d ____

028 a b c d ____

029 a b c d ____

030 a b c d ____

031 a b c d ____

032 a b c d ____

033 a b c d ____

034 a b c d ____

035 a b c d ____

036 a b c d ____

037 a b c d ____

038 a b c d ____

039 a b c d ____

040 a b c d ____

041 a b c d ____

042 a b c d ____

043 a b c d ____

044 a b c d ____

045 a b c d ____

Multiple Choice (Circle or X your choice). If you change your answer, write your selection in the blank.

046 a b c d ___

069 a b c d ___

047 a b c d ___

070 a b c d ___

048 a b c d ___

071 a b c d ___

049 a b c d ___

072 a b c d ___

050 a b c d ___

073 a b c d ___

051 a b c d ___

074 a b c d ___

052 a b c d ___

075 a b c d ___

053 a b c d ___

076 a b c d ___

054 a b c d ___

077 a b c d ___

055 a b c d ___

078 a b c d ___

056 a b c d ___

079 a b c d ___

057 a b c d ___

080 a b c d ___

058 a b c d ___

081 a b c d ___

059 a b c d ___

082 a b c d ___

060 a b c d ___

083 a b c d ___

061 a b c d ___

084 a b c d ___

062 a b c d ___

085 a b c d ___

063 a b c d ___

086 a b c d ___

064 a b c d ___

087 a b c d ___

065 a b c d ___

088 a b c d ___

066 a b c d ___

089 a b c d ___

067 a b c d ___

090 a b c d ___

068 a b c d ___

091 a b c d ___

A N S W E R S H E E T

Multiple Choice (Circle or X your choice). If you change your answer, write your selection in the blank.

092 a b c d ____

093 a b c d ____

094 a b c d ____

095 a b c d ____

096 a b c d ____

097 a b c d ____

098 a b c d ____

099 a b c d ____

100 a b c d ____

(***** 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 80.00% 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.

SENIOR REACTOR OPERATOR

QUESTION: #1 (1.00)

The plant is operating at low power/low flow conditions with the turbine control valve fast closure and turbine stop valve closure trips bypassed.

Under these conditions, which one of the following reactor protection system instrumentation setpoints is designed to be effective to protect the nuclear system process barriers?

- a. Average Power Range Monitor (APRM) flow biased scram.
- b. Reactor Vessel Water Level Low scram.
- c. MSIV closure scram.
- d. Reactor Vessel Steam Dome Pressure High scram.

QUESTION: #2

The reactor is operating at 95% power when a scram signal is generated due to a Turbine Trip.

Which condition will prevent the backup scram valves from venting the scram air header?

- a. The check valve bypassing one of the backup scram valves fails closed
- b. Solenoid power to one of the two backup scram valves fails to deenergize
- c. The backup scram valve closest in-line to the scram pilot valves fails to reposition
- d. RPS trip system "B" fails to deenergize

SENIOR REACTOR OPERATOR

QUESTION: #3

Given the following:

- HPCI has initiated from a valid Hi Drywell Pressure signal
- RPV Water level is 35"
- Reactor pressure is 980 psig

Then, the operator observes that the HPCI turbine control valve (FV-4879) is in the throttled position AND that turbine speed is decreasing. Additionally, the operator observes the following valves going closed:

- FV-4880, HPCI turbine stop valve
- HV-F006, HPCI pump discharge to Core Spray
- HV-8278, HPCI pump discharge to Feedwater
- HV-F012, HPCI minimum flow

Finally, the operator later notices that HPCI turbine speed is again increasing and HPCI realigns for injection without taking any actions.

Which of the following could have caused this HPCI response?

- a. automatic reset of the HPCI isolation logic
- b. automatic swap of the HPCI pump suction source
- c. incorrectly set HPCI flow controller
- d. mechanical overspeed HPCI trip

QUESTION: #4

Which of the following describes the condition that will cause a rod withdrawal block during a reactor startup with reactor power currently on IRM Range 2?

- a. SRM counts fall below 100 cps with the SRM detector partially withdrawn
- b. SRM counts fall below 100 cps with the SRM detector fully inserted
- c. SRM counts exceed 100 cps with the SRM detector partially withdrawn
- d. SRM counts exceed 100 cps with the SRM detector fully inserted

SENIOR REACTOR OPERATOR

QUESTION: #5 (1.0)

Given the following plant conditions:

- All APRM's indicate reactor power is 80%
- "A" Flow unit is reading 58%
- "B" Flow unit is reading 64%
- "C" Flow unit is reading 69%
- "D" Flow unit is reading 63%
- No scaling factors apply
- AGAFs are 1.00

In addition to a control rod withdrawal block, which of the following actions will occur?

- a. "A" flow comparator trips.
- b. "A" and "B" flow comparators trip.
- c. "C" flow comparator trips.
- d. "A" and "C" flow comparators trip.

QUESTION: #6 (1.00)

Which one of the following correctly describes Reactor Vessel Level or Drywell Pressure signal inputs to the Primary Containment Isolation System (PCIS)?

- a. PCIS LOCA LEVEL 1 logic signal for High Drywell Pressure (1.68 psig) originates from the Nuclear Steam Supply Shutoff System (NSSSS) sensors.
- b. PCIS LOCA LEVEL 2 logic signal for reactor vessel level 2 (-38 inches) originates from the Reactor Protective System (RPS) instrumentation.
- c. PCIS LOCA LEVEL 1 logic signal for reactor vessel level 1 (-129 inches) originates from the Nuclear Steam Supply Shutoff System (NSSSS) sensors.
- d. PCIS LOCA LEVEL 2 logic signal for High Drywell Pressure (1.68 psig) originates from the Reactor Protective System (RPS) instrumentation.

SENIOR REACTOR OPERATOR

QUESTION: #7 (1.00)

Following an ATWS, reactor power on the APRMs is 20% and HC.OP-EO.ZZ-0101A is currently being implemented.

- Suppression Pool temperature is 115° F

WHICH ONE of the following conditions would require lowering RPV water level until RPV level dropped below -50 inches?

- a. Drywell Pressure 1.6 psig, no SRV's are open or cycling
- b. Drywell Pressure 1.8 psig, no SRV's open
- c. Drywell Pressure 1.4 psig, 2 SRV's open
- d. Drywell Pressure 1.5 psig, 1 SRV cycling

QUESTION: #8 (1.00)

A scram has just occurred and the operators are executing OP.AB-ZZ-0000, Reactor Scram.

WHICH ONE of the following is the reason that step S-10 directs the operator to reset the scram if conditions permit?

- a. To reduce the potential for CRD pump runout and reduce the amount of time for the HCU accumulators to recharge.
- b. To prevent excessive discharge of hot radioactive water to the Reactor Building Equipment Drain Sump.
- c. To reestablish the normal primary vessel boundaries by isolating the CRD HCU from the scram discharge volume (SDV) and closing the SDV vent and drain valves.
- d. To minimize the amount of time that the operator is unable to manually insert control rods in the event that all control rods are not fully inserted.

SENIOR REACTOR OPERATOR

QUESTION: #9 (1.00)

Which of the following describes the effect of failing to restart the Turbine Building Ventilation System if it trips while operating in HC.OP-EO.ZZ-0104(Q)-FC, "Radioactive Release Control"? Assume a radioactive release in the turbine building is in progress.

- a. The Turbine Building release will be monitored but not treated.
- b. The total off-site calculated release could be higher than the actual release.
- c. The Turbine Building will go to a slightly negative pressure.
- d. The total offsite calculated release could be lower than the actual release.

QUESTION: #10 (1.00)

What is the basis of Step SP/L-20 of HC.OP-EO.ZZ-0102 which asks, "Can Suppression Pool level be maintained below 124 inches"?

- a. SRV tailpipes will be submerged.
- b. Supp chamber vent path will be uncovered.
- c. Supp chamber to drywell vacuum breaker inlets are submerged.
- d. Vent header drain lines will be submerged.

SENIOR REACTOR OPERATOR

QUESTION: #11 (1.00)

The plant was operating at 100% reactor power when the "A" reactor recirc pump tripped. The "B" recirc pump is now operating satisfactorily at 50% speed and 24,000 gpm drive flow.

HOW is core flow determined?

- a. By reading directly from Loop "B" recirculation drive flow indication.
- b. By reading directly from the operating loop jet pump flow indication.
- c. By adding idle jet pump loop flow and the operating jet pump loop flow.
- d. By reading directly from the total core flow recorder.

QUESTION: #12 (1.00)

The reactor is at 90% power. The plant operator inadvertently depresses the INCREASE push button for the bypass valve jack and holds it until the percent demand indication on panel 10C651D reads 100%.

WHICH ONE of the following describe the turbine control and bypass valve response?

- a. Control valves throttle close to raise reactor pressure, and bypass valves remain closed.
- b. Control valves open to the Speed/Load changer setpoint and then the bypass valves start to open.
- c. Control valves throttle close to maintain reactor pressure and bypass valves open.
- d. Control valves throttle open to lower reactor pressure, and bypass valves remain closed.

SENIOR REACTOR OPERATOR

QUESTION: #13 (1.00)

Given the following conditions:

- Drywell pressure 3.0 psig
- Reactor water level -135" inches

Both parameters have been at those values for 3.5 minutes. The plant operator then places all the low pressure ECCS pumps in pull-to-lock except for "A" and "B" core spray pumps.

WHICH ONE of the following describes ADS response?

- a. ADS blowdown is terminated but will resume when the 105 second timer times out
- b. ADS blowdown is terminated but will resume when the 5 minute timer times out
- c. ADS blowdown continues
- d. ADS blowdown is terminated

QUESTION: #14 (1.00)

A reactor startup is in progress with reactor pressure at 200 psig. A reactor scram occurs and the scram inlet valve for one control rod fails to open.

WHICH ONE of the following describe the effect of this failure?

- a. The control rod fails to scram and its blue scram light on the full core display does not illuminate.
- b. The control rod fails to scram and its blue scram light on the full core display illuminates.
- c. The control rod scrams and its blue scram light on the full core display does not illuminate.
- d. The control rod scrams and its blue scram light on the full core display illuminates.

SENIOR REACTOR OPERATOR

QUESTION: #15

Given the following conditions:

- The plant has been operating at 100% power for several weeks
- Main Steam Line (MSL) radiation levels have been averaging 80 mrem but are now slowing trending upwards
- Chemistry has verified the higher radiation readings are due to failed fuel

What are the Immediate Operator Actions required for the given conditions?

- a. Place additional Condensate Demineralizers in service if possible.
- b. Scram the reactor and close the Main Steam Isolation Valves when MSL levels are greater than 120 mrem.
- c. Direct Reactor Water Cleanup flow to the main condenser to reduce coolant activity.
- d. Reduce reactor power to maintain MSL radiation levels less than the alarm setpoint.

SENIOR REACTOR OPERATOR

QUESTION: #16

Given the following conditions:

- The "B" Emergency Diesel Generator (EDG) had started following a valid LOCA signal
- Some time later the EDG was shutdown using the local Emergency Stop pushbuttons due to fluctuating oil pressure
- Concurrent with stopping the EDG, the 10A402 bus lost power

Which of the following describes the actions, if any, regarding resetting the Engine Shutdown Relay (ESR) and the (86R) Lockout Relay to restart the "B" EDG and reenergize the 10A402 bus?

- a. ESR must be reset
(86R) Lockout Relay reset is not required
- b. ESR must be reset
(86R) Lockout Relay must be reset
- c. ESR reset is not required
(86R) Lockout Relay reset is not required
- d. ESR reset is not required
(86R) Lockout Relay must be reset

SENIOR REACTOR OPERATOR

QUESTION: #17

Given the following initial conditions:

- The plant is operating at 25% power performing a plant startup
- All plant systems are operating as designed
- The "A" Reactor Feedwater Pump is in service in auto at approximately 3850 rpm

Following a plant transient, the following conditions exist:

- The reactor failed to scram when required
- Reactor power is 14% and reactor pressure is 1105 psig
- The plant operator notes that the "A" RFP speed has slowed to approximately 2500 rpm
- The RFP TURBINE AUTO XFR TO MANUAL (B3-F3) annunciator is in alarm
- Reactor water level is currently at 25"

Which of the following describes the reason for the "A" RFP speed reduction?

- a. The "A" RFP is responding properly to a Redundant Reactivity Control System runback.
- b. The "A" RFP is responding to the Setpoint Setdown feature of Digital Feedwater Control calling for a lower level.
- c. The "A" RFP is responding to a Control Signal Failure.
- d. The "A" RFP is responding to a loss of one Primary Condensate Pump and one Secondary Condensate Pump.

QUESTION: #18

Which of the following describes the expected indicated steam flow response with an open Safety Relief Valve (SRV) and the reason for that response?

- a. Indicated steam flow goes up, because SRV steam flow is seen as additional steam flow over what is going to the main turbine.
- b. Indicated steam flow goes down, because the SRV steam flow is not monitored by the main steam system flow detectors.
- c. Indicated steam flow remains constant, because the Turbine Control Valves and Intercept Valves throttle open to maintain a steady MWe output.
- d. Indicated steam flow remains constant, because the Turbine Control Valves throttle closed to maintain constant reactor pressure.

SENIOR REACTOR OPERATOR

QUESTION: #19

Given the following conditions:

- The Fuel Pool Cooling system is operating with one pump and heat exchanger in service
- The Fuel Pool Gates are installed
- No makeup water sources are available

Which of the following is the expected effect on Spent Fuel Pool water level and cooling capability if a leak develops on the common FPCC Pump Suction?

- a. Cooling capability and water level will be unchanged.
- b. Cooling capability will be lost and water level will lower slightly and stabilize.
- c. Cooling capability will be unchanged and water level will lower slightly and stabilize.
- d. Cooling capability will be lost and water level will continuously lower.

QUESTION: #20

Which of the following conditions would prevent opening the RHR "B" Loop Inboard and Outboard Drywell Spray Valves (F021B and F016B) following a LOCA?

- a. The LPCI Injection Valve (F017B) is not fully closed.
- b. Less than 5 minutes have elapsed since the "B" RHR initiation occurred.
- c. The RHR Full Flow Test Valve (F024B) is not fully closed.
- d. Reactor water level is above -129 inches.

SENIOR REACTOR OPERATOR

QUESTION: #21

Given the following conditions:

- The plant has been operating at 75% power
- A loss of main condenser vacuum caused a complete Main Steam Isolation Valve (MSIV) closure
- Vacuum has been reestablished and is currently 15" Hg absolute

Which of the following conditions is REQUIRED in order to reset the NSSSS MSIV isolation logic?

- a. The Reactor Mode Switch must be in "Shutdown".
- b. The Main Condenser Low Vacuum Bypass Switches must be in "Bypass".
- c. The MSIV control switches must be in "Close".
- d. The Turbine Stop Valves must be closed.

QUESTION: #22

Given the following conditions:

- The plant has been operating at 100% power for several weeks
- All systems are operating as designed

Which of the following is the reason why periodic nitrogen makeup to the drywell is required for the given conditions?

- a. Leaks from drywell air operated equipment.
- b. PCIG normal system leakage.
- c. Normal periodic cycling of the Torus - Drywell Vacuum Breakers.
- d. Normal drywell air in-leakage.

SENIOR REACTOR OPERATOR

QUESTION: #23

Given the following conditions:

- The Reactor Core Isolation Cooling (RCIC) is operating in Full Flow Recirc
- The RCIC flow controller is in "Automatic"
- RCIC turbine speed is 2450 rpm

Which of the following describes the expected response of RCIC turbine speed and system flow if the operator throttles the RCIC Test Bypass To CST Isolation Valve (F022) in the "open" direction for the given conditions?

(Compare the conditions after they stabilize to before the valve was throttled.)

- RCIC turbine speed lowers
-- System flow remains unchanged
- RCIC turbine speed lowers
-- System flow goes down
- RCIC turbine speed raises
-- System flow remains unchanged
- RCIC turbine speed raises
-- System flow goes up

SENIOR REACTOR OPERATOR

QUESTION: #24

Given the following conditions:

- The plant has been operating at 100% power
- APRM Channel "D" is bypassed with the joystick
- Control rod 30-31 is selected
- All other plant systems are operating as designed

Which of the following occurs if APRM Channel "F" fails full "downscale" for the given conditions?

- a. Rod Block Monitor Channel "B" automatically shifts to the "B" APRM as its reference.
- b. Rod Block Monitor Channel "B" generates a rod withdrawal block on a failure to null.
- c. Rod Block Monitor Channel "B" is indicating 0%.
- d. Rod Block Monitor Channel "B" is bypassed on the reference APRM downscale.

QUESTION: #25

The plant is operating at 90% power with all systems operable. Which one of the following would cause **ONLY** the Reactor Water Cleanup (RWCU) Inboard Isolation Valve (F001) to close?

- a. RWCU system differential flow is excessive.
- b. The RWCU Filter/Demineralizer inlet temperatures are excessive.
- c. The "A" Reactor Protection System MG set tripped.
- d. The "D" NSSSS Manual Isolation pushbutton has been armed and depressed.

SENIOR REACTOR OPERATOR

QUESTION: #26

Given the following conditions:

- The plant has been operating at 75% power
- Valve stroke time testing is in progress on the "A" RHR Pump Torus Suction Valve (F004A)
- The valve is currently closed
- All other RHR system components are in their normal standby lineup
- A steam break causes drywell pressure to reach 2.0 psig.

Which of the following describes the response of the F004A valve and the "A" RHR pump?

- a. The F004A valve automatically opens and the "A" RHR Pump automatically starts after F004A is fully open.
- b. The F004A valve must be manually opened and the "A" RHR Pump automatically starts after F004A is fully open.
- c. The F004A valve automatically opens but the "A" RHR Pump must be started by the operator after F004A is fully open.
- d. The F004A valve must be manually opened and the "A" RHR Pump must be manually started after F004A is fully open.

QUESTION: #27

Given the following conditions:

- A plant startup is in progress with the Reactor Mode Switch in "Run"
- The Main Turbine is reset and is at 950 rpm accelerating to 1800 rpm
- A loss of 125 VDC power from distribution panel 1CD318 to the EHC control logic occurs

Which of the following is the expected plant response?

- a. Main turbine trips.
- b. Main turbine startup would continue at the selected acceleration rate.
- c. Main turbine speed will remain constant at 950 rpm.
- d. Main turbine control valves throttle closed due to a loss of the speed reference signal.

SENIOR REACTOR OPERATOR

QUESTION: #28

During a loss of offsite power, the operator is cautioned **not to acknowledge** the flashing "Trip" pushbuttons for the 4.16 KV Vital 1E Bus infeed breakers.

Which of the following will occur if these pushbuttons are pressed?

- a. That bus' feeder breaker will attempt to close until the anti-pump feature causes it to trip open and remain open.
- b. The Diesel Generator associated with that bus, if running, will trip and its output breaker will open.
- c. That bus' alternate feeder breaker will trip open and then immediately reclose when the pushbutton is released.
- d. The Diesel Generator associated with that bus will not load and its output breaker will not close.

QUESTION: #29

Which of the following describes the conditions requiring the Reactor Mode Switch to be placed in "Shutdown" on a sustained loss of Control Rod Drive charging water header pressure (<900 psig) with reactor pressure at 650 psig?

- a. Within 20 minutes of determining more than one CRD accumulator is inoperable and at least one of those inoperable accumulators is associated with a withdrawn control rod.
- b. Within 20 minutes of determining any CRD accumulator is inoperable and the inoperable accumulator is associated with a withdrawn control rod.
- c. Immediately upon determining more than one CRD accumulator is inoperable and all the inoperable accumulators are associated with fully inserted control rods.
- d. Immediately upon determining any CRD accumulator is inoperable and the inoperable accumulator is associated with a withdrawn control rod.

SENIOR REACTOR OPERATOR

QUESTION: #30

Given the following conditions:

- The plant has been operating at 20% power following a refueling outage
- An error during a surveillance has resulted in a Group 10 (Drywell Chilled Water) isolation signal
- The isolation goes to completion (all valves are closed)
- Drywell pressure is 1.25 psig and is steady

Which one of the following is a REQUIRED IMMEDIATE operator action for the given conditions?

- a. Lineup and commence venting the drywell.
- b. Secure drywell inerting.
- c. Place the Reactor Mode Switch in "Shutdown".
- d. Monitor Reactor Recirc Pump seal parameters.

QUESTION: #31

Given the following conditions:

- A loss of coolant accident has occurred
- The Reactor Auxiliaries Cooling System (RACS) has been restored

Which of the following describes the availability/response of the Emergency Instrument Air Compressor (EIAC) for these conditions should instrument air header pressure begin lowering?

- a. The EIAC is not available until the LOCA signal is cleared, PCIS reset, and the 1E breaker is closed.
- b. The EIAC will automatically start on instrument air header pressure less than 85 psig if the LOCA signal is cleared.
- c. The EIAC is not available until the Non-1E breaker is closed and instrument air pressure is less than 85 psig.
- d. The EIAC will not automatically start but may be started manually from the Control Room or locally.

SENIOR REACTOR OPERATOR

QUESTION: #32

Given the following conditions:

- The Control Room has been abandoned in accordance with HC.OP-AB.ZZ-0130(Q), "Control Room Evacuation"
- Control has been established at the Remote Shutdown Panel in accordance with HC.OP-IO.ZZ-0008(Q), "Shutdown From Outside Control Room"
- RCIC is operating maintaining reactor water level at +35 inches
- Safety Relief Valves (SRV) are being used to cooldown
- Condensate Storage Tank (CST) level is 135,000 gallons
- The Condensate System is not available

Which of the following is correct for the given conditions?

- a. RCIC is operated without overspeed protection.
- b. Insufficient CST inventory is available to allow the cooldown to clear the shutdown cooling interlocks.
- c. The RCIC Gland Seal Condenser Condensate Pump must be manually operated.
- d. SRVs cannot be operated in a rotation that will evenly distribute heat to the Suppression Chamber.

QUESTION: #33

Given the following conditions:

- The plant is at 75% power
- Control rod 22-27 is being withdrawn one notch to Notch "22"

Which of the following is the REQUIRED IMMEDIATE operator action if a control rod drift alarm is received and the operator notes control rod 22-27 is continuing to move out and power is rising?

- a. Runback recirculation flow and insert control rods to reduce power.
- b. Vent control rod 22-27.
- c. Place the Rod Select key lock switch to "Off" (de-select the rod).
- d. Direct the local operator to perform a single rod scram on control rod 22-27.

SENIOR REACTOR OPERATOR

QUESTION: #34

Given the following conditions:

- The plant is operating at 95% power
- All Drywell Cooling Chilled Water pumps have tripped
- Drywell pressure is rising
- HC.OP-AB.ZZ-0201, "Drywell High Pressure/Loss of Drywell Cooling," has been entered and the Reactor Auxiliary Cooling System (RACS) is being aligned to supply backup cooling to the Chilled Water System

Which of the following describes the effect of failing to close the Chilled Water Isolation Supply and Return Valves (HV9532-2 and HV9532-1) before the transfer to RACS?

- a. The RACS Pump automatic start permissives will be bypassed until the valves are closed.
- b. RACS system flow will divert back into the Chilled Water system potentially overflowing the Chilled Water head tank.
- c. The RACS valves will not automatically sequence open to supply Chilled Water should a loss of offsite power occur.
- d. Chilled Water system flow will divert back into the RACS system potentially overflowing the RACS head tank.

QUESTION: #35

Which of the following is the criteria used to determine if HC.OP-AB.ZZ-0000(Q), "Reactor Scram," shall be exited and HC.OP-EO.ZZ-0101A, "Reactor/Pressure Vessel (RPV) Control," entered?

- a. Reactor period on SRM Period meters is stable at -80 seconds
- b. All APRM "downscale" lights are illuminated
- c. Three out of four RPS logic channels are de-energized
- d. All control rods, with the exception of one at Notch "20", are inserted to Notch "02"

SENIOR REACTOR OPERATOR

QUESTION: #36

Given the following conditions:

- The plant is operating at 20% power
- A main generator load reject has just occurred
- The power/load unbalance circuit tripped unexpectedly during the load reject

Which of the following is the expected response of the Turbine Control Valves and the Reactor Protection System (RPS) for the given conditions?

- a. -- The Turbine Control Valves throttle closed
-- RPS does not trip
- b. -- The Turbine Control Valves fast close
-- RPS trips
- c. -- The Turbine Control Valves throttle closed
-- RPS trips
- d. -- The Turbine Control Valves fast close
-- RPS does not trip

SENIOR REACTOR OPERATOR

QUESTION: #37

HPCI and RCIC both started and are injecting in response to a valid low reactor water level. Current plant conditions are as follows:

- Reactor water level is +25 inches, steady
- Reactor pressure is 845 psig, rising slowly
- Drywell pressure is 1.1 psig, steady
- RCIC has been aligned to Full Flow Recirc operation (CST to CST) for pressure control
- HPCI is injecting to the reactor for level control
- After 10 minutes of operation, a valid high suppression pool level is received

Which of the following would be the expected response of RCIC if a valid high suppression pool level is received for the given conditions?

- a. RCIC will remain in Full Flow Recirculation.
- b. RCIC will trip on high turbine exhaust pressure.
- c. RCIC will trip on low suction pressure.
- d. RCIC will operate on minimum flow.

SENIOR REACTOR OPERATOR

QUESTION: #38

Given the following conditions:

- A large break loss of coolant accident has occurred
- Drywell pressure reached a maximum of 22 psig
- Suppression chamber sprays have NOT been placed in service
- Drywell sprays are in service
- Drywell pressure is 4 psig and slowly lowering

Which of the following is the expected positions of the Torus-to-Drywell Vacuum Breakers and the Reactor Building-to-Torus Vacuum Breakers for the given conditions?

- a. -- The Torus-to-Drywell Vacuum Breakers are open
-- The Reactor Building-to-Torus Vacuum Breakers are open
- b. -- The Torus-to-Drywell Vacuum Breakers are open
-- The Reactor Building-to-Torus Vacuum Breakers are closed
- c. -- The Torus-to-Drywell Vacuum Breakers are closed
-- The Reactor Building-to-Torus Vacuum Breakers are closed
- d. -- The Torus-to-Drywell Vacuum Breakers are closed
-- The Reactor Building-to-Torus Vacuum Breakers are open

SENIOR REACTOR OPERATOR

QUESTION: #39

Following the runback of the Recirculation Pumps on a trip of a Primary Condensate Pump, the operator may monitor the Source Range Monitoring (SRM) period meters for strong deflections above and below "Infinity".

Under which of the following conditions may SRM period indications be considered accurate indication of thermal hydraulic instabilities?

- a. **Only** when the SRM detectors are fully withdrawn from the core.
- b. Anytime, regardless of detector position, if the detectors are stationary.
- c. **Only** when the SRM detectors are fully inserted into the core.
- d. Anytime the SRM detectors are moving.

QUESTION: #40

The unit is operating at 100% power. If the "INCREASE" Pressure Set pushbutton on the Turbine EHC Control Panel (10C651D) is maintained depressed, predict the initial response of the Main Turbine Bypass valves, RPV level and Reactor power.

	<u>Bypass Valves</u>	<u>RPV Level</u>	<u>Reactor Power</u>
a.	Remain closed	Increase	Increase
b.	Valves open	Increase	Decrease
c.	Valves open	Decrease	Decrease
d.	Remain closed	Decrease	Increase

SENIOR REACTOR OPERATOR

QUESTION: #41

The unit is at 100% power in a normal lineup and no equipment is out of service, the BP102 Primary Condensate pump trips. RPV level drops to the low level alarm setpoint, "RPV Level 4" (A7-C5) annunciator alarms. RPV level then recovers to 35" and is stable.

Assuming no further automatic plant response occurred, what action would be REQUIRED?

- a. Attempt to restart the Condensate pump.
- b. Initiate manual scram.
- c. Reduce recirculation pump speeds to 30%.
- d. Reduce reactor power to 90% via recirculation flow reduction.

QUESTION: #42 (1.0)

A plant transient occurs and the following conditions exist at time zero (00:00)

- Reactor Vessel Pressure - 1080 psig
- Reactor Vessel Level - +25 inches
- All APRM's reading >6% Reactor Power

20 seconds later (00:20), the following conditions exist:

- Reactor Vessel Pressure - 1070 psig decreasing
- Reactor Vessel Level - +5 inches decreasing
- All APRM's reading - <3% Reactor Power decreasing

If the above trends continue, which one of the following describe the effect, if any, of the RRCS initiation logic on the Reactor Recirc Pump RPT breakers and the feedwater system at Time=1 minute (01:00)?

- a. RPT breakers open, a feedwater runback was not initiated
- b. RPT breakers open, a feedwater runback was initiated
- c. RPT breakers not affected, a feedwater runback was not initiated
- d. RPT breakers not affected, a feedwater runback was initiated

SENIOR REACTOR OPERATOR

QUESTION: #43 (1.0)

Plant conditions are as follows:

- Main Turbine tripped from 100% power
- 10 Control rods failed to fully scram
- Reactor Power is 2%
- Reactor Mode Switch is in "SHUTDOWN"
- CRD drive water pressure is 260 psid
- Scram has been reset

Which one of the following describes why the RO cannot manually insert control rods at this time?

- a. RWM rod block
- b. APRM rod block
- c. Low CRD drive water pressure
- d. Full Scram Discharge Volume

QUESTION: #44 (1.0)

- A reactor Startup was in progress following a 7 day forced outage.
- Criticality was achieved and heatup in progress.
- Problems with EHC delayed the rod withdrawals for approximately 1.5 hours.
- RPV pressure decreased from 360 psig to 325 psig during this delay.
- Control rod 14-19 was withdrawn one notch from 10 to 12 in order to re-establish a heatup rate. Reactor period continued to shorten and the operator re-inserted the rod to determine why period indication did not return to infinity.

The reactor period indication is normal because:

- a. A positive Moderator Temperature Coefficient exists.
- b. The Void fraction had decreased due to the lower pressure.
- c. Moderator temperature had decreased.
- d. Xenon burnout in the high flux region had begun.

SENIOR REACTOR OPERATOR

QUESTION: #45 (1.0)

Plant conditions are as follows:

- Reactor Power is at 70%
- Condenser Vacuum is 5.1" Hg absolute and degrading

Which one of the following states immediate operator actions REQUIRED?

- Place the standby SJAE in-service.
- Trip the Main Turbine, if 350 Mwe is reached and back pressure exceeds 5.0" Hg ABS.
- Ensure turbine sealing steam pressure is normal.
- Reduce reactor power as necessary to maintain condenser vacuum less than 5.0" Hg ABS.

QUESTION: #46

The following conditions exist:

- The unit is at 100% power.
- Narrow Range Level Transmitter (PDT-N004A) is upscale.
- Wide Range Level Transmitter (LT-N081C) fails upscale.

Which one of the following states the status of the Reactor Feedpump Turbines and the Main Turbine?

- | | <u>RFP Turbines</u> | <u>Main Turbine</u> |
|----|---------------------|---------------------|
| a. | operating | operating |
| b. | tripped | tripped |
| c. | tripped | operating |
| d. | operating | tripped |

SENIOR REACTOR OPERATOR

QUESTION: #47

A loss of coolant accident is in progress, the scram was successful and current conditions are as follows:

- Reactor water level
 - Narrow Range (LR-3683 A&B) indicates +5 to +8 inches
 - Wide Range (LR-R623A-B21 & R623B-B21) indicates -10 inches
- Drywell temperature SPDS points A2281 and A2283 indicate 425 degrees F
- All other drywell temperature SPDS points indicate less than or equal to 350 degrees F.
- Reactor pressure is 220 psig

Which of the following instruments are considered reliable for reactor water level indication?

- a. Narrow Range B (LR-3683B)
- b. Wide Range B (LR-R623B-B21)
- c. Narrow Range A (LR-3683A)
- d. Wide Range A (LR-R623A-B21)

QUESTION: #48

Given the following conditions:

- Unit is operating at 75% power
- One Safety Relief Valve opened one minute ago and will not close by pressing the appropriate SRV Open and Close pushbuttons
- Suppression Pool average water temperature is 115 degrees F and rising
- "SV ENRGZ" light not lit

What are the actions required for these conditions?

- a. Pull its associated fuses to close affected valve.
- b. Reduce the Reactor Recirculation Pumps to 45% speed.
- c. Place the Reactor Mode Switch in the "Shutdown" position.
- d. Reduce the Reactor Recirculation Pumps to 30% speed, then place the Reactor Mode Switch in the "Shutdown" position.

SENIOR REACTOR OPERATOR

QUESTION: #49 (100)

The unit is operating at 100% power.

Given the following conditions:

- Narrow Range "A" Rosemont Level Detector (PDT-N004A) fails high
- LI-R603A (RX LVL CH A) indicates high
- DFCS TROUBLE overhead in alarm
- LI-R603B (RX LVL CH B) indicates 32"
- LI-R603C (RX LVL CH C) indicates 36"

What is the expected system response assuming no operator action.

- a. The control circuit will transfer to single element and level stays near its setpoint.
- b. The "B" signal (PDT-N004B) is now the controlling signal.
- c. The "C" signal (PDT-N004C) is now the controlling signal.
- d. The control circuit will remain in three-element control and level control will lockup.

QUESTION: #50 (1.0)

The EOPs prohibit spraying the Drywell if the Drywell atmosphere is superheated. Which one of the following describes the consequences of ignoring this prohibition?

- a. Water sprayed into the Drywell will turn to steam raising pressure even further.
- b. The cold water will put excessive thermal stress on the Drywell which may lead to its failure.
- c. The effect is unpredictable and would result in putting the plant in an unanalyzed condition.
- d. The design negative differential pressure capability of the primary containment will be exceeded.

SENIOR REACTOR OPERATOR

QUESTION: #51 (1.0)

Given the following conditions:

- A loss of coolant accident has occurred
- Suppression Pool water level is 0"
- Suppression Pool water temperature is 210 degrees F
- Suppression Chamber pressure is 0.0 psig
- "A" RHR Loop flow is 9,500 gpm with the "A" Pump in operation
- "A" Core Spray loop flow is 3,500 gpm with the "A" Pump in operation
- The "B" RHR and "B" Core Spray Loops are not available
- Reactor water level has been recovered and is stable at +20 inches

Assuming reactor water level is maintained at its current value, which of the following must be done?

- a. Reduce "A" Core Spray Pump flow to 2,500 gpm and raise "A" RHR Pump flow to 10,500 gpm.
- b. Start the "C" Core Spray Pump, throttle the "A" Core Spray Loop flow to 5,000 gpm and throttle "A" RHR Loop flow to 8,000 gpm.
- c. Secure the "A" Core Spray Pump and throttle the "A" RHR Pump flow to maintain 13,000 gpm.
- d. Start the "C" Core Spray Pump, throttle the "A" Core Spray Loop flow to 7,000 gpm and reduce "A" RHR Loop flow to 6,000 gpm.

SENIOR REACTOR OPERATOR

QUESTION: #52

Plant conditions are as follows:

- RWCU resin spill has occurred in the Reactor Building
- Reactor Building HVAC Exhaust rad level is 2×10^{-2} mci/ml
- Access to the Reactor Building is required

Which one of the following actions is required?

- a. isolate Refuel Floor HVAC
- b. restore Reactor Building normal ventilation (RBVS)
- c. ensure Filtration Recirculation and Ventilation System (FRVS) initiated
- d. perform an Emergency Depressurization per HC.OP-EO.ZZ-0202.

QUESTION: #53 (1.0)

Given the following conditions:

- A power change from 75% to 100% using recirc flow has just been completed
- Over the next hour, the operators note that power is continuing to slowly decrease
- No operator actions are being taken
- Scoop tubes do not move

The power decrease is as expected because:

- a. Xenon concentration is rising from the power change.
- b. Feedwater temperature is decreasing following the 25% power change.
- c. Core inlet subcooling is greater at the higher recirculation flows.
- d. Recirculation Pump MG Set oil temperatures are rising.

SENIOR REACTOR OPERATOR

QUESTION: #54 (1.0)

The following events occur:

- A low RPV level causes HPCI to start
- RPV level starts to increase
- The HPCI Aux Oil Pump trips on overcurrent
- RPV level increases to +58 inches
- RPV level then decreases to -40 inches

Assuming no operator action, which one of the following describes the expected response of HPCI?

- a. HPCI will trip when the Aux Oil Pump trips and will not restart.
- b. HPCI will trip on High Level and will not restart.
- c. HPCI will trip on High Level and will restart on low level.
- d. HPCI will remain running throughout these events.

SENIOR REACTOR OPERATOR

QUESTION: #55 (1.0)

"A" Core Spray Pump was running in the test return mode for a surveillance when a plant transient resulted in the following conditions:

- A leak into the drywell results in pressure rising to 2.15 psig
- Reactor water level is -50 inches
- Reactor pressure is 690 psig

Select the system response for these conditions:

- a. The "A" Core Spray Pump trips, the CSS Full Flow Test Valve (HV-F015A) closes, the pump restarts and CS Loop Injection Valve (HV-F005A) opens.
- b. The "A" Core Spray Pump continues to run on minimum flow, the CSS Full Flow Test Valve (HV-F015A) closes and the CS Loop Injection Valve (HV-F005A) opens.
- c. The "A" Core Spray Pump continues to run on minimum flow, the CSS Full Flow Test Valve (HV-F015A) closes and the CS Loop Injection Valve (HV-F005A) does not reposition.
- d. The "A" Core Spray Pump trips, the CSS Full Flow Test Valve (HV-F015A) closes, the pump restarts and runs on minimum flow and CS Loop Injection Valve (HV-F005A) does not reposition.

QUESTION: #56 (1.0)

In attempting to inject SLC, the operator depressed the "A" P208 Start pushbutton control bezel. Pump 'A' receives a start signal but fails to start due to mechanical binding of its breaker. Which one of the following describes the expected response of the Squib Valve(s) and RWCU system isolation valve(s) to these events?

- a. Neither Squib valve will fire. RWCU inboard and outboard isolation valves (HV-F001 & HV-F004) will close.
- b. Only the 'A' Squib valve will fire. RWCU inboard isolation valve (HV-F001) will remain open.
- c. Only the 'A' Squib valve will fire. RWCU inboard isolation valve (HV-F001) will close.
- d. Neither Squib valve will fire. RWCU inboard and outboard isolation valves (HV-F001 & HV-F004) will not close.

SENIOR REACTOR OPERATOR

QUESTION: #57 (1.0)

The plant is operating at 100% power, all systems operable, and in their normal alignment, when RCIC isolates due to a failed RCIC Steam Supply Low Pressure transmitter on Logic Train "B".

Following I&C repair of the transmitter, operations resets the RCIC Logic Train "B" isolation logic.

Which one of the following describes the additional operator actions required to place RCIC in a normal standby alignment with the plant at 100% power?

- a. The RCIC TURBINE TRIP and THROTTLE VALVE (HV-4282) actuator and valve stem must be relatched and the valve reopened from the control room and the OUTBOARD STEAM SUPPLY VALVE (HV-F008) must be reopened.
- b. The RCIC TURBINE TRIP and THROTTLE VALVE (HV-4282) actuator and valve stem must be relatched and the valve reopened from the control room and the RCIC INBOARD STEAM SUPPLY VALVE (HV-F007) must be reopened.
- c. The RCIC TURBINE TRIP and THROTTLE VALVE (HV-4282) must be reset locally and the OUTBOARD STEAM SUPPLY VALVE (HV-F008) must be reopened.
- d. The RCIC TURBINE TRIP and THROTTLE VALVE (HV-4282) must be reset locally and the RCIC INBOARD STEAM SUPPLY VALVE (HV-F007) must be reopened.

SENIOR REACTOR OPERATOR

QUESTION: #58 (1.0)

All actions required by HC.OP-EO.ZZ-0202, "Emergency Depressurization," have been taken but only 3 Safety Relief Valves (SRV) can be opened and no other means of depressurization is available.

Which of the following describes the EOP bases for the minimum required number of SRVs for Emergency Depressurization?

- a. to ensure steam removal rate from the core is sufficient to remove all decay heat.
- b. to ensure the pressure reduction rate will allow low pressure injection systems to inject soon enough to recover level before core uncover occurs.
- c. to ensure steam removal rate during a LOCA is adequate to prevent exceeding the drywell design pressure.
- d. to ensure the pressure reduction rate will allow low pressure injection systems to inject prior to reaching the Minimum Steam Cooling RPV Water Level.

QUESTION: #59 (1.0)

The plant is in OPCON 2 with the following IRM indications:

<u>IRM</u>	<u>RANGE</u>	<u>READING</u>
A	6	79
B	6	83
C	6	123
D	6	Bypassed
E	6	97
F	6	122
G	6	81
H	6	103

Which one of the following actions are required?

- a. Bypass C IRM
- b. Shutdown the plant per HC.OP-IO.ZZ-0004
- c. Immediately scram the reactor
- d. Position all IRMs to range 7

SENIOR REACTOR OPERATOR

QUESTION: #60 (1.0)

Plant conditions are as follows:

- 100% power
- Scram Discharge Volume Inboard Drain Valve (HV-F011) is failed closed
- CRD Scram Discharge Volume Not Drained (C6 E4) alarmed 10 seconds ago

Which one of the following describes control rod response to a valid scram signal?

- a. all control rods will fully insert
- b. no control rods fully insert
- c. ONLY control rods associated with north side HCU's will insert
- d. ONLY control rods associated with south side HCU's will insert

QUESTION: #61 (1.0)

The following conditions exist:

- The plant is shut down
- Reactor Coolant temperature is 235° F
- The 'A' RHR loop is in Shutdown Cooling
- The 'B' RHR loop is out of service
- A LPCI initiation signal on low RPV level occurs

Which one of the following describes the operator actions, if any, must be taken in order for "A" RHR Pump to start injecting?

- a. None, the system will realign for injection automatically.
- b. Close RHR Shutdown Cooling Suction Valve (HV-F006A), open RHR Pump Torus Suction Valve (HV-F004A), manually open RHR LPCI Injection Valve (HV-F017A), manually start "A" RHR Pump.
- c. Close RHR Shutdown Cooling Suction Valve (HV-F006A), open RHR Pump Torus Suction Valve (HV-F004A), manually start "A" RHR Pump.
- d. Close RHR Shutdown Cooling Suction Valve (HV-F006A), open RHR Pump Torus Suction Valve (HV-F004A), "A" RHR Pump will start automatically.

SENIOR REACTOR OPERATOR

QUESTION: #62 (1.0)

Which of the following would be the cause of a high RACs expansion tank level?

- a. Broken tube inside the in-service RACS Heat Exchanger.
- b. Reactor Building Equipment Drain Sump Cooler internal leak.
- c. Tube rupture in RWCU regenerative Heat Exchanger.
- d. Tube rupture Reactor Recirc Pump Seal Cooler Heat Exchanger.

QUESTION: #63 (1.0)

The plant is operating at full power when the following Recirc Pump Seal readings are as noted:

#1 seal pressure is 1032 psig
#2 seal pressure is 150 psig

Which one of the following is the cause of these conditions?

- a. Normal operation of both seals.
- b. Failure of both seals.
- c. Partial failure of the #1 seal.
- d. Partial failure of the #2 seal.

SENIOR REACTOR OPERATOR

QUESTION: #64 (1.0)

Following a LOCA plant conditions are as follows:

- Reactor Pressure: 600 psig
- Reactor Level: -25 inches
- Containment Spray is in service using "A" RHR pump
- HV-F017A is closed (the "Auto Open Ovrdr" pushbutton has been depressed)
- White "Overridden" status light illuminated

The RPV pressure subsequently lowers to 300 psig

Which one of the following describes the response of the "A" RHR System?

- a. HV-F017A re-opens, "Overridden" light lit
- b. HV-F017A re-opens, "Overridden" light out
- c. HV-F017A remains closed, "Overridden" light lit
- d. HV-F017A remains closed, "Overridden" light out

QUESTION: #65 (1.0)

- The plant is operating at 100% power
- All systems operable

A complete loss of instrument air occurs resulting in which one of the following (assume no operator action occurs)?

- a. Service air supply header isolation valve (1-KAHV-7595) closes at 75 psig instrument air header pressure
- b. The inboard MSIV's drift closed
- c. Reactor Building ventilation fans trip on low flow
- d. Emergency inst. Air compressor (EIAC) gets start signal at 92 psig

SENIOR REACTOR OPERATOR

QUESTION: #66 (1.0)

The plant is operating at 100% power when a fault causes the Main Generator field voltage to reach 105%. Both Main Generator output breakers are closed. If this condition persists for at least 10 seconds, which of the following actions will automatically occur?

- a. A main generator lockout signal will be initiated when the regular lockout relay energizes.
- b. A unit protection lockout signal will be initiated when the regular lockout relay energizes.
- c. A main generator lockout signal will be initiated when the backup lockout relay energizes.
- d. A unit protection lockout signal will be initiated when the backup lockout relay energizes.

QUESTION: #67 (1.0)

The "A" train of normal control room ventilation is operating ("B" train is in standby) when RE-4858D fails offscale high.

Which one of the following describes CREF status?

- a. will remain in standby, no CREF units will be operating.
- b. will automatically initiate only "A" CREF unit
- c. will automatically initiate only "B" CREF unit
- d. will automatically initiate both "A" and "B" CREF units

SENIOR REACTOR OPERATOR

QUESTION: #68 (1.0)

Which one of the following describes the Hope Creek Radiation Control Program Whole Body Dose Control Level Limits (TEDE) and the action required to exceed these level limits?

	<u>Whole Body Dose Control Level Limit(TEDE)</u>	<u>Action Req'd to Exceed Control Level Limit</u>
a.	3000 mrem/yr TEDE	Approval of Rad Pro Manager
b.	3000 mrem/yr TEDE	Approval of Rad Pro Supervisor
c.	4000 mrem/yr TEDE	Approval of Rad Pro Manager
d.	4000 mrem/yr TEDE	Approval of Rad Pro Supervisor

QUESTION: #69 (1.0)

The Reactor Mode switch is in the REFUEL position, and the Refueling Platform (bridge) is over the Reactor Vessel. Which one of the following would cause a Rod Block under these conditions?

- a. The Fuel Grapple is loaded with fuel.
- b. The Fuel Grapple is in the FULL UP position.
- c. The frame mounted Auxiliary Hoist is loaded with fuel.
- d. All rods are Full-In, except for a selected rod at position 02.

SENIOR REACTOR OPERATOR

QUESTION: #70 (1.0)

Normal power to the SPDS Computer has failed. Power is currently being supplied to SPDS in the "BACK-UP POWER" mode.

What is the expected response after approximately four hours if the batteries discharge and normal power has not been restored and no other problems exist?

- a. "SHUTDOWN IMMINENT" red alarm indicating light blinks on SPDS UPS, inverter will shutdown.
- b. "OVERLOAD" red indicating alarm light blinks on SPDS UPS, inverter will shutdown.
- c. "ON BYPASS" red alarm indicating light blinks red on SPDS UPS, inverter will continue to operate.
- d. "MINOR ALARM" red alarm indicating light is lit on SPDS UPS, inverter will continue to operate.

QUESTION: #71 (1.0)

A Traversing Incore Probe (TIP) trace is in progress when a high drywell pressure event (> 1.68 psig) occurs due to a leak in the recirculation system. Three minutes following the event, the Plant Reactor Operator reports the following indications on the TIP Valve Control Monitor.

- | | |
|--------------------------------|---------------------|
| - "SQUIB MONITOR" lights | - both extinguished |
| - "SHEAR VALVE MONITOR" lights | - both extinguished |
| - "BALL VALVE OPEN" lights | - both illuminated |
| - "BALL VALVE CLOSED" lights | - both extinguished |

Which of the following describes the status of the TIP system and the required operator actions?

- a. The system has responded as designed. Operator action is required to close the ball valves.
- b. The TIP detectors may not have withdrawn. Withdraw the detectors and verify the ball valves close.
- c. The system has responded as designed. Operator action is required to fire the shear valves.
- d. The TIP detectors may not have withdrawn. Fire the shear valves, withdraw the remaining cable and then close the ball valves.

SENIOR REACTOR OPERATOR

QUESTION: #72 (1.0)

Loss of 125 VDC Channel "B" (1BD417) will affect the ADS system in which one of the following ways?

- a. The "B" ADS SRV Pilot Solenoids will lose power.
- b. None of the ADS valves can be opened.
- c. The "A" ADS SRV Pilot Solenoids will lose power.
- d. Only ADS valves A, C, and E will remain fully functional.

QUESTION: #73 (1.0)

Under which one of the following conditions may a worker's blocking tag be used on a piece of equipment:

- a. To isolate the equipment from high voltage (> 600 Volts).
- b. In conjunction with a yellow permissive tag (YPT) on the same piece of equipment.
- c. As part of a group tagging request.
- d. In conjunction with a white caution tag (WCT) on the same piece of equipment.

SENIOR REACTOR OPERATOR

QUESTION: #74 (1.0)

You are required to perform work in an area which has the following contamination level and radiation dose rate:

Contamination=	25 dpm/100 cm ² alpha - Loose Surface Contamination
Radiation Dose Rate=	100 mrem/hr DDE @ 30 cm from the source

How will the area be posted?

- a. Radiation Area Only
- b. High Radiation Area and Contaminated Area
- c. High Radiation Area Only
- d. Radiation Area and Contaminated Area

QUESTION: #75 (1.0)

10 CFR 50.54(X) and NC.NA-AP.ZZ-0005, "Station Operating Practices," state, in part, "reasonable action that departs from a license condition or a Technical Specification in an emergency when this action is immediately needed to protect the public health and safety is permitted..."

These actions:

- a. shall be approved by the Plant Manager prior to the action taking place.
- b. shall be approved by any member of the plant who holds an SRO license.
- c. shall be approved by a licensed SRO on the operating shift prior to the action taking place.
- d. shall be reported to the NRC within 15 minutes of the action being taken.

SENIOR REACTOR OPERATOR

QUESTION: #76

Given the following conditions:

- The plant is operating at 50% power
- Suppression pool cooling is in service
- High Pressure Coolant Injection (HPCI) is operating in the CST to CST mode for a surveillance
- During the surveillance, suppression pool temperature reached 96 degrees F

What are the requirements for entry into, and implementation of, HC.OP-EO.ZZ-102, "Primary Containment Control," for these conditions?

- a. The Emergency Operating Procedure entry condition is modified to 105 degrees F while surveillance testing to the suppression pool is in progress.
- b. HC.OP-EO.ZZ-102 actions may be deferred for 24 hours while suppression pool temperature is reduced to less than 95 degrees F.
- c. The HPCI surveillance procedures allow 4 hours to reduce suppression pool temperature below 95 degrees F before HC.OP-EO.ZZ-102 entry is required.
- d. The actions of HC.OP-EO.ZZ-102 are required to be performed as soon as suppression pool temperature is above 95 degrees F.

QUESTION: #77

Given the following conditions:

- A failure-to-scram (ATWS) condition exists
- Reactor power is 22%
- Standby Liquid Control is injecting
- The Scram Discharge Volume did NOT isolate
- Suppression pool level is 54" and lowering
- A greater than Max Safe Operating Temperature exists in two (2) Reactor Building areas

Which of the following are the appropriate actions for these conditions?

- a. Immediately open 5 ADS Safety Relief Valves.
- b. Take no action until power is less than 4% or all rods are inserted.
- c. Immediately open the Turbine Bypass Valves.
- d. Take no action until suppression pool reaches 38.5 inches.

SENIOR REACTOR OPERATOR

QUESTION: #78

Given the following conditions:

- Loss of Offsite Power occurred and no emergency diesels are available
- HC.OP-EO.ZZ-0321 is implemented
- Reactor Core Isolation Cooling (RCIC) is providing injection to the reactor
- Reactor pressure is 45 psig and stable
- Torus water indicated level is 26 inches and lowering due to a leak in the torus
- Suppression pool temperature is 155 degrees F and rising
- The plant is operating in accordance with HC.OP-EO.ZZ.0102, "Primary Containment Control"

Which of the following is the expected result with RCIC continuing to run under these conditions?

- a. The Heat Capacity Temperature Limit will be exceeded.
- b. RCIC will trip.
- c. Suppression chamber design pressure will be exceeded.
- d. RCIC will cavitate.

QUESTION: #79

The plant is in a refueling outage. Fuel movement is in progress. The refueling bridge operator is moving a fuel assembly from the pool to the core when the control room RO reports to the Refuel Floor that the SRM in the destination core quadrant has failed upscale and will not be returned to service until the next shift.

What action is required by the refuel bridge operator if the assembly has been raised to just below the top of the fuel pool storage racks?

- a. Continue the move, stopping just short of the core to allow for repair of the SRM
- b. Suspend the move, leave the bundle as-is until the SRM is repaired
- c. Suspend the move, insert the fuel assembly to its previous position in the fuel pool
- d. Continue the move, it can be completed because of symmetric SRM coverage

SENIOR REACTOR OPERATOR

QUESTION: #80 (1.0)

Plant conditions are as follows:

- Drywell Pressure: 1.2 psig
- Suppression Pool Level: 78" and stable
- Suppression Pool Temperature: 190° F and rising at a rate of 1° F per minute
- Reactor Pressure: 800 psig and steady

Which one of the following actions is required per EOP's?

- a. Reduce Suppression Pool level
- b. Spray the Suppression Pool
- c. Depressurize the RPV to stay on safe side of SPT-P
- d. Immediately conduct an Emergency RPV Depressurization per HC.OP-EO.ZZ-0202

QUESTION: #81 (1.0)

HC.OP-EO.ZZ-103/4(Q)-FC, Reactor Building and Rad Release Control and HC.OP-EO.ZZ-0101(Q)-FC, RPV Control are being executed due to a primary system discharging into the HPCI Room. RPV level never went less than -25", and RPV parameters are within the desired bands.

- HPCI Room (4111) is verified to be at 10"
- Both Reactor Building Floor Drain Sump Pumps serving the HPCI Room floor drains have been running continuously for the past 30 minutes, but level in the HPCI Room has remained at 10"
- Core Spray Pump Room "A" is at 3" and rising approximately 1" per every 10 minutes

How should RPV pressure be controlled?

- a. Depressurize using bypass valves, exceeding the cooldown rate is permitted.
- b. Depressurize using bypass valves, exceeding the cooldown rate is **NOT** permitted.
- c. Emergency Depressurize the RPV.
- d. Maintain RPV pressure between 800 psig and 1087 psig.

SENIOR REACTOR OPERATOR

QUESTION: #82 (1.0)

The plant is operating at 100% power.

Which one of the following (Spent Fuel Storage Pool) activities must be directly supervised by a licensed SRO or SRO limited to fuel handling?

- a. Normal movement of special movable detectors.
- b. Irradiated fuel handling involving blade guide movement.
- c. Channeling or de-channeling new fuel in the fuel prep machine.
- d. Mounting of the control rod grapple on the monorail aux hoist.

QUESTION: #83 (1.0)

Which of the following is the Technical Specification limit value that is changed during single loop operation?

- a. Linear Heat Generation Rate thermal limit
- b. The size of the Immediate Exit region of the Power/Flow Map
- c. Minimum Critical Power Ratio Safety Limit
- d. The Temperature/Pressure limits for heatups and cooldowns

SENIOR REACTOR OPERATOR

QUESTION: #84 (1.0)

RCIC System is lined-up for automatic operation.

All ECCS are operable except for HPCI system which is inoperable.

SACS Loop "B" cooling water is lost to both RCIC Pump Room coolers.

Which one of the following describes RCIC System operability **at this time** and actions, if any, required?

- a. RCIC is inoperable, be in a least HOT SHUTDOWN within the next 12 hours
- b. RCIC is inoperable, reduce reactor steam dome pressure below 150 psig in 24 hours
- c. RCIC is operable, realign "A" loop of SACS to RCIC Pump Room coolers
- d. RCIC is operable, verify room temp does not exceed HC.OP-EO.ZZ-0103/4, Table 1, max normal operating temperature limit

QUESTION: #85 (1.0)

The plant is operating at 100% power with all systems operable. A severe storm warning is in effect for all of Salem County, NJ, for the next 5 hours. The following conditions exist:

- Met tower data shows winds steady at 45 mph from the southeast
- Delaware River level is at 95.2 feet PSE&G datum

The Coast Guard reports that the tide has turned and river level has peaked. Additionally, Site Protection reports that although the rain is letting up in intensity, a portion of the site access road has collapsed from flooding and access and exit from the site is impossible at this time.

Which ONE of the following actions is required per the HCGS Event Classification Guide?

- a. Alert
- b. Unusual Event
- c. 1 Hour report
- d. 4 Hour report

SENIOR REACTOR OPERATOR

QUESTION: #86 (1.0)

The plant is operating at 80% power when an inadvertent isolation of feedwater heating occurs to the 6A and 6B feedwater heaters.

WHICH ONE of the following describes the immediate operator actions that the CRS shall direct in response to plant conditions ?

- a. restore feedwater heating to increase feedwater temperature to the pre-feedwater heater trip value.
- b. immediately reduce power to at least 20% below the pre-feedwater heater trip value.
- c. place the mode switch in Shutdown
- d. Immediately isolate the condensate to the 6A and 6B feedwater heaters

QUESTION: #87 (1.0)

The plant is in an "ALERT" and the OSC is activated. The OSC Coordinator wants to dispatch an individual, in lieu of a team, to investigate a plant equipment problem.

Assuming acceptable communications are established, which one of the following describe a condition under which the OSC Coordinator is permitted to dispatch an individual to investigate the problem?

- a. If the problem was caused by a suspected act of sabotage
- b. If the task requires entry into a heat stress area
- c. If the individual's exposure would reach 75 mrem
- d. Only with the approval of the Emergency Duty Officer

SENIOR REACTOR OPERATOR

QUESTION: #88 (1.0)

Given the following conditions:

- The plant has had a loss of all feedwater from 90% power
- 75 control rods did NOT insert on the scram
- At -195 inches, the Control Room Supervisor directed an Emergency Depressurization
- All injection to the reactor (except boron, CRD and RCIC) was terminated and prevented
- 4 Safety Relief Valves are open

Injection flow to the reactor will be reinitiated when:

- a. reactor power is less than 3%.
- b. reactor pressure is 240 psig.
- c. reactor water level is -210 inches
- d. reactor pressure is 75 psig above torus pressure.

QUESTION: #89 (1.0)

You have declared an Alert.

During the initial 15 minute notifications, conditions change and you escalate to a Site Area Emergency (SAE).

WHICH ONE of the following describes the requirements for the initial 15 minute notification?

- a. stop Alert notification, perform SAE notification without noting escalation
- b. stop Alert notification, perform SAE notification noting the escalation
- c. complete Alert notification, then perform notification for SAE
- d. continue Alert notification noting escalation to SAE

SENIOR REACTOR OPERATOR

QUESTION: #90 (1.0)

Given the following conditions:

- A startup is in progress with power at 4%
- The Mode Switch is in "Startup"
- Reactor pressure is 1000 psig
- Reactor water level is +35 inches
- No APRMs or IRMs are bypassed

If a loss of the Channel 'A' 24 VDC power supply to the nuclear instrumentation system occurs, what Tech Spec action, if any, is required?

- a. Restore the inop electrical channel to operable status within 2 hours or be in at least Hot Shutdown within the next 12 hours.
- b. Place the inop RPS Channel in the tripped condition within 12 hours.
- c. No Tech Spec actions are required because the Channel 'B' 24 VDC power supply is operable.
- d. Place the inop RPS Channel in the tripped condition within 1 hour.

SENIOR REACTOR OPERATOR

QUESTION: #91 (1.0)

The following conditions exist following the receipt of an automatic scram signal:

- Reactor power: 0%
- RPV pressure: 950 psig AND dropping
- RPV level: +25 inches AND steady
- Drywell pressure: .5 psig AND steady
- Scram Air Header pressure: 0 psig
- Control Rod 34-27 is at position 48
- All other Control Rods are fully inserted
- Boron has NOT been injected to the RPV

Which one of the following procedures will be used to direct insertion of control rod 34-27?

- a. HC.OP-IO.ZZ-0004, "Shutdown from Rated Power to Cold Shutdown"
- b. AB-000, "Reactor Scram"
- c. HC.OP-EO.ZZ-0101, "Reactor Pressure Vessel Control"
- d. HC.OP-EO.ZZ-0101A, "ATWS-RPV Control"

QUESTION: #92 (1.0)

To ensure compliance with Tech Specs, administrative controls are placed on opening the drywell and suppression chamber purge system supply and exhaust isolation valves.

Which one of the following describe the actual administrative control placed on opening these valves?

- a. A permit shall be initiated with the plant in any operational condition and is valid for any rolling 24-hour period.
- b. A permit shall be initiated with the plant in any operational condition and is valid for one calendar day ending at 2400.
- c. A permit shall be initiated with the plant in operating condition 1, 2 or 3 and is valid for any 24-hour rolling period.
- d. A permit shall be initiated with the plant in operating condition 1, 2 or 3 and is valid for one calendar day ending at 2400.

SENIOR REACTOR OPERATOR

QUESTION: #93 (1.0)

Which one of the following is a temporary modification?

- a. Bypassing a malfunctioning local alarm panel annunciator which cannot immediately be extinguished by corrective maintenance
- b. Connection of sample tubing to obtain a reactor coolant sample
- c. Temporary shielding installed in accordance with an approved rad pro procedure
- d. Installation of a pressure gauge on an instrument tap

QUESTION: #94 (1.0)

Given the following plant conditions:

- The Unit is operating at rated power
- The "B" Core Spray suction valve failed closed on 10/14/99 at 0500
- The "D" Core Spray pump motor became grounded due to water spraying on the windings on 10/16/99 @ 0500
- All other systems are operable

Which one of the following is the REQUIRED action?

- a. Restore both pumps to operable status by 10/23/99 @ 0500 or be in Hot Shutdown within the next 12 hours.
- b. Restore both pumps to operable status by 10/21/99 @ 0500 or be in Hot Shutdown within the next 12 hours.
- c. Restore one pump to operable status by 10/21/99 @ 0500 or be in Cold Shutdown within the next 36 hours.
- d. Restore one pump to operable status by 10/23/99 @ 0500 or be in Cold Shutdown within the next 36 hours.

SENIOR REACTOR OPERATOR

QUESTION: #95 (1.0)

Technical Specifications require that the Primary Containment Instrument Gas System low-low pressure alarm system receive a channel functional test on a MONTHLY basis. The last three dates on which this surveillance was performed are 0600 on July 15, 0600 on August 19, and 0600 on September 18.

Which one of the following date/time combinations is the latest time and date on which this surveillance can be accomplished without exceeding the maximum interval requirements of Technical Specifications?

- a. By 0600 on October 18
- b. By 2359 on October 19
- c. By 0600 on October 25
- d. By 2359 on October 26

QUESTION: #96 (1.0)

Which one of the following describes the only position on the shift complement specified in the Technical Specifications that can NOT be reduced temporarily by one less than the minimum to accommodate unexpected absence of on-duty shift crew members?

- a. Shift Technical Advisor
- b. Control Room Supervisor
- c. Operations Superintendent
- d. Radiation Protection Technician

SENIOR REACTOR OPERATOR

QUESTION: #97 (1.0)

A leak had developed in the RWCU pump room. The normal radiation level inside the pump room had been 4.5 mr/hr and the level outside the room had been 2 mr/hr. What radiation level outside the pump room would be considered to be the "maximum safe operating radiation limit"?

- a. 20 mr/hr
- b. 200 mr/hr
- c. 1000 mr/hr
- d. 2000 mr/hr

QUESTION: #98 (1.0)

A plant startup is in progress. You just took shift turnover as the CRS.

- Reactor power is 10%
- Mode Switch is in Startup/Hot Standby

While reviewing the required paperwork prior to taking the Mode Switch to Run, you note that 2 Main Turbine Bypass Valves are inoperable. No other problems are found. The valves will not be repaired for at least 24 hours.

Which one of the following actions would be permitted by Tech Specs at this time?

- a. The Mode Switch must remain in Startup/Hot Standby.
- b. The Mode Switch may be placed in Run.
- c. The Mode Switch may be placed in Run, but a thermal power increase is not permitted.
- d. The Mode Switch must be placed in Shutdown within the next 4 hours.

SENIOR REACTOR OPERATOR

QUESTION: #99 (1.0)

Given the below unit conditions:

- Mode 4
- Reactor water temperature is 140° F
- The reactor has been shutdown for 70 hours

The plant has experienced a total loss of shutdown cooling. Procedure HC.OP-AB.ZZ.0142, Loss of Shutdown Cooling is being executed.

Using the attached graph from HC.OP-AB.ZZ-0142, how soon must primary and secondary containment be established?

- a. 38 minutes
- b. 60 minutes
- c. 82 minutes
- d. 102 minutes

QUESTION: #100 (1.0)

Using the attached portions of Technical Specifications, answer the following:

Unit is at 100% rated power. Initially, all Emergency Diesel Generators (EDGs) are operable. The following sequence of events occurs:

- February 4, at 0400, 'A' EDG is declared INOPERABLE
- February 4, at 1800, 'B' EDG is declared INOPERABLE
- February 4, at 1900, 'A' EDG is declared OPERABLE

Assuming all periodic tests and verifications are performed on schedule, the 'B' EDG must be restored to operability by _____, or be in at least HOT SHUTDOWN within the next 12 hours and COLD SHUTDOWN within the following 24 hours.

- a. 0400 on February 18
- b. 0400 on February 7
- c. 1800 on February 7
- d. 1800 on February 18