

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-254; 50-265  
Licenses No: DPR-29; DPR-30

Reports No: 50-254/96302(OL); 50-265/96302(OL)

Licensee: Commonwealth Edison Company (ComEd)

Facility: Quad Cities Nuclear Power Station, Units 1 & 2

Location: 22710 206th Avenue North  
Cordova, IL 61242

Dates: October 7 - October 11, 1996

Examiners: D. McNeil, Chief Examiner  
R. Doornbos, RIII Examiner  
T. Bettendorf, Pacific Northwest Laboratories

Approved by: Melvyn N. Leach, Chief, Operator Licensing Branch  
Division of Reactor Safety

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## EXECUTIVE SUMMARY

Quad Cities Nuclear Power Station, Units 1 and 2  
Examination Reports No. 50-254/96302; 50-265/96302

An NRC initial license examination was administered to eight individuals; three who had applied for Reactor Operator licenses and five who had applied for Senior Reactor Operator licenses.

Results: One Reactor Operator applicant failed the written portion of his examination and was denied an operating license. All other applicants passed all portions of their examinations and were issued Reactor Operator or Senior Reactor Operator licenses.

Summary: The examination material was prepared by the Quad Cities Nuclear Power Station training staff in accordance with the NRC operator licensing pilot program guidance, Operator Licensing Examiner Standards (NUREG 1021), and 10 CFR 55. The NRC chief examiner determined that some examination material did not meet all requirements of the examiner's standards and 10 CFR 55. Examination material not meeting minimum requirements was modified in accordance with the NRC chief examiner's request. (05.1)

One individual signed the examination security agreement and subsequently participated in a training session with license applicants in the simulator. The Quad Cities Station Training Department Training Instruction No. 103, Examination Security, specifically prohibited participation in instruction involving the applicants after signing the security agreement. (05.2)

The examination was conducted in accordance with NRC requirements. Facility personnel were responsive to the needs of the NRC examiners and their applicants. The examination was well controlled by facility personnel with only minor errors. Two generic weaknesses were noted during the administration of the in plant job performance measures. (05.3)

The QCNPS Operations Training Supervisor stated there would be no post examination comments from the facility. During the post examination review conducted by RIII NRC examiners, one answer key error was corrected and two questions were discovered to be unacceptable for use on an NRC examination. The two questions were subsequently deleted. (05.4)

The simulated plant process computer failed during the examination week. This required the applicants to operate the simulator during the dynamic simulator scenarios without the benefits of many of the video monitor displays the candidates were trained to use. The impact on applicant performance was minimal. The process computer was made available later in the week during administration of the job performance measures. (05.5)

## Report Details

### Summary of Examination

An NRC initial license examination for eight applicants was conducted at the Quad Cities Nuclear Power Station (QCNPS) during the week of October 7, 1996. QCNPS training department management agreed to participate in a program in which the licensee developed the examination material. NRC examiners reviewed and approved the QCNPS developed examination. NRC examiners administered the operating examination; QCNPS facility instructors administered the written examination. Examination preparation and administration was prescribed by NUREG-1021, "Operator Licensing Examiner Standards," Revision 7, and superseded in part by Interim Pilot Examination Guidance approved by Nuclear Reactor Regulation, Headquarters Operator Licensing Branch.

### I. Operations

#### **O5 Operator Training and Qualification**

##### **O5.1 Examination Development**

###### **a. Written Examination**

The submitted written examination met the minimum standards of NUREG-1021, Operator Licensing Examiner Standards. The chief examiner requested several replacement questions for the reactor operator (RO) examination to bring the examination into conformance with 10 CFR 55.41, Written examination: operators. Those questions required knowledge from reactor operators beyond that which is required for an RO by 10 CFR 55.41. The chief examiner also requested that several other questions be modified. The difficulty level of those questions was not correct for ROs. Some questions were simple memory questions that all employees at QCNPS should be able to answer by attending General Employee Training. Other questions required Senior Reactor Operator (SRO) knowledge to correctly answer the question. Those questions were deleted and replaced with questions applicable to the RO job classification. Some questions were acceptable as submitted, but were modified to bring the examination difficulty level into conformance with examinations recently administered by NRC examiners at other facilities.

###### **b. Administrative Job Performance Measures**

One of the submitted administrative job performance measures (JPMs) for the ROs was not accepted. The JPM required the ROs to perform at the Senior Reactor Operator (SRO) level. The JPM was replaced by another JPM that provided an evaluation at the correct licensing level.

###### **c. Operating Job Performance Measures**

The operating JPMs submitted by the facility instructors were acceptable, with only minor modifications being necessary to make them ready for the examination. The

operating JPM follow up questions did not meet the guidelines established on NUREG 1021, form ES-602-1. Most of the submitted questions were easy memory questions or could be quickly found (direct look-up) in an allowed reference.

d. Dynamic Simulator Scenarios

Of the five dynamic simulator scenarios submitted, none met all the guidance of NUREG-1021, Form ES-301-5. This form outlines the evolutions (reactivity, instrument failure, component failure, etc) and the number of evolutions each applicant is expected to perform during the dynamic simulator sessions. QCNPS instructors assigned to construct the scenarios mis-interpreted NUREG 1021 and the interim guidance instructions and believed that a normal evolution and a reactivity evolution were the same thing. This led to all scenarios needing a normal evolution such as a surveillance or significant, controlled evolution. Two of the submitted scenarios lacked sufficient instrument failures. The scenarios were modified to meet NRC requirements.

e. Conclusion

The facility instructors constructed an examination that was of good quality, but required many minor changes. The majority of the changes made to the operating examination were caused by a lack of understanding the requirements of NUREG 1021 and 10 CFR 55. After the requested modifications were made, the NRC chief examiner concluded the examination material was adequate to administer the examination.

05.2 Examination Security

a. Inspection Scope

QCNPS license applicants in the third of three simulator crews being trained on September 30, 1996, discovered a simulator hardware technician that had signed a security agreement participating in their training scenario and alerted QCNPS training department instructors and management. The NRC Chief Examiner reviewed the circumstances surrounding the event and the investigation conducted by facility personnel.

b. Observations and Findings

During development of the examination by facility and contractor personnel, a security agreement was initiated to keep track of personnel who had been exposed to examination specific material. QCNPS Training Department Training Instruction (QTI) No. 103, Section III.D.b, states, "At the point when any person gains specific knowledge of the content of an exam, that person shall read and sign the security agreement (NUREG-1021, Form ES-201-2/601-1, or equivalent) for that exam."



Contrary to this statement, simulator support personnel were directed to sign the security agreement by training department personnel without being exposed to examination specific material.

QTI No. 103, Section III.D.c, states, "Once a person has signed the security agreement, he/she shall no longer be involved in the training of individuals who will be taking the exam." Contrary to this requirement, a simulator support technician participated in a simulator training session for license applicants as the simulator operator subsequent to signing the security agreement.

Immediately upon being notified of the participation by the technician in the training session, QCNPS training department management initiated an investigation to determine if the examination had been compromised. Investigators interviewed approximately 40 station personnel and were able to determine that the technician: (1) failed to read and comprehend the security agreement prior to signing the agreement, (2) participated in the instruction of 2 simulator crews as the simulator operator, (3) had not been exposed to examination specific material when he signed the security agreement, (4) had not been exposed to examination material between the time he had signed the security agreement and the time he was discovered in the simulator, (5) had not participated on the simulator floor as an instructor, (6) was not allowed to select or direct the simulator scenario in any way, and therefore, (7) did not compromise the examination.

The investigators found that the simulator instructor and the applicants on the first two crews that attended the training should have identified the technician as someone that had signed the security agreement. They also found that no one had informed the simulator scheduler that the technician had signed the security agreement, thus allowing the scheduler to place the technician's name on the schedule to participate in a training scenario with the applicants.

The Chief Examiner reviewed the results of the investigation, discussed the event with several personnel at the facility and concluded that the investigation was thorough, rapid, and correct in its assessment. Based on that conclusion, the Chief Examiner determined that the examination had not been compromised and allowed the examination to be given as scheduled.

c. Conclusion

Multiple opportunities to prevent this occurrence were missed by facility personnel. Examination security was understood by first line supervision in the training department, but supervisor expectations of examination security were not fully understood nor implemented by some facility employees. Greater emphasis needs to be placed on the mechanics of how to implement the examination security agreement by first line supervisors to prevent reoccurrence of examination security problems.

### 05.3 Examination Administration

#### a. Observations

The examination was conducted in accordance with NRC requirements. The examination was well controlled except for the operating JPMs. Some operating JPMs were long and required a simulator setup unique to that operating JPM. This caused multiple resets of the simulator resulting in significant time delays with applicants waiting for their turn to perform certain operating JPMs. The NRC Chief Examiner discussed methods of controlling JPMs to expedite the examination process with the Operations Training Supervisor. The written examination, administrative JPMs and dynamic simulator were well controlled by facility personnel with only minor errors in examination control.

#### b. Job Performance Measures

Two generic weaknesses were noted during the administration of the in plant JPMs. (1) During the performance of a JPM to shift steam jet air ejectors, some candidates became confused while using the procedure. One candidate was unable to complete the procedure correctly and two candidates improperly isolated the in-service steam jet air ejector before placing the standby steam jet air ejector in service. (2) There are personnel monitoring portals located outside the common emergency diesel generator room. Some candidates used the portal monitor and some indicated they did not need to use the monitor. This indicates a lack of training or ineffective training concerning the use of portal monitors other than the portal monitors used for exiting the radiological controlled area of the plant.

#### c. Dynamic Simulator Scenarios

Candidates appeared well prepared for the dynamic simulator scenarios. QCNPS training personnel stationed at the instructor's console provided timely, accurate feedback to applicants during the scenarios. The feed back was provided in such a way that no prompting of applicants occurred.

#### d. Conclusion

QCNPS instructors need to pay more attention to detail to complete an examination without errors. The candidates were well prepared for the operating examination.

### 05.4 Post Examination Activities

#### Written Examination

QCNPS training department personnel were invited to submit post examination comments for the written examination. The Operations Training Supervisor contacted the NRC Chief Examiner on October 18, 1996, and indicated there would be no post examination comments from the facility.

During the post examination review conducted by RIII NRC examiners, one answer key error was corrected and two questions were discovered to be unacceptable for use on an NRC examination. The two questions were subsequently deleted.

RO question #49 (SRO question # 13) was deleted after it was determined there was no correct answer. One of the initial conditions of the question states there is 10,000 gallons of water in the condensate storage tank (CST). The question then asks what should occur based on the given plant conditions. The expected answer was that the suction for the High Pressure Core Injection (HPCI) system should shift from the CST to the torus. The actual setpoint for the shift is less than 10,000 gallons in the CST. Since the setpoint had not been exceeded in the initial conditions, the correct answer would have been: no change is expected. Since that answer was not provided, there is no correct answer to the question. RO question #49 (SRO question #13) was deleted from the written examination.

RO question #78 (SRO question #42) was deleted after it was discovered the question had no correct answer. The question asked for the immediate actions an operators would perform upon discovering a blown fuse. The expected answer was found in the supplementary actions of the procedure. Since no immediate actions were provided to answer the question, there was no correct answer for the question. RO question #78 (SRO question #42) was deleted from the written examination.

It was determined the answer key for RO question #94 (SRO question #58) was in error. The answer key indicated distractor a. was the correct answer. The answer key has been amended to accept only c. as the correct answer.

Several questions were found to be missed by more than 50% of the applicants. A list of these questions with a brief description of the training item missed is provided in Enclosure 3. The list should be reviewed by the QCNPS training department for feedback into the systematic approach to training (SAT) based program used by QCNPS in the initial license training program.

## 05.5 Simulator Observations

### Plant Process Computer

During the week of the examination the simulated the plant process computer failed. This required the candidates to operate the simulator without the benefits of many of the video monitor displays the candidates were trained to use. Candidates were well trained and able to control plant processes without the benefit of the simulated plant process computer. The impact was minimal during the dynamic simulator examination process. The process computer was made available later in the week during administration of the JPMs.

## V. Management Meetings

### **X<sup>1</sup> Exit Meeting Summary**

The NRC examiners conducted an exit meeting with members of licensee management on October 11, 1996. The licensee acknowledged the generic observations presented and indicated that materials reviewed were not considered proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Cook, Operations Manager  
J. Kudalls, Support Services Director  
A. Chernick, Training Supervisor  
R. Armitage, License Training Supervisor  
D. Bowman, Lead Examination Developer

NRC

C. Miller, Senior Resident Inspector  
L. Collins, Resident Inspector



SIMULATION FACILITY REPORT

Facility Licensee: Quad Cities Nuclear Power Station

Facility Licensee Docket Nos: 50-254; 50-265

Operating Tests Administered: October 7 - 11, 1996

The following documents observations made by the NRC examination team during the August 1996 initial license examination. These observations do not constitute audit or inspection findings and are not, without further verification and review, indicative of noncompliance with 10 CFR 55.45(b). These observations do not affect NRC certification or approval of the simulation facility other than to provide information which may be used in future evaluations. No licensee action is required in response to these observations.

During the conduct of the simulator portion of the operating tests, the following item was observed:

ITEM	DESCRIPTION
Plant Process Computer	The simulated plant process computer failed prior to the dynamic scenarios and was not available for applicant use. This did not impact the examination as operators were able to use instruments to obtain all necessary data to respond to simulated events.

Written Examination Weaknesses

Question #	Description
RO #3	Switch manipulations necessary to place torus cooling in service during a LOCA.
RO #13	Automatic actions that take place on an automatic voltage regulator failure.
RO #14	Reactor building vent fan response to a trip signal.
RO #16	Knowledge of the interlocks on the 1/2 250 VDC battery charger supply breakers.
RO #35	Fuel clad temperatures after an RPV emergency depressurization.
RO #36	RPV level instrument response under specified conditions.
RO #37/SRO #1	Immediate actions on loss of feedwater heating.
RO #42/SRO #6	Actions to take when a limiting rod pattern exists with a failure of the rod block monitor.
RO #46/SRO #10	Effect of placing the ADS drywell pressure reset switch in RESET.
RO #62/SRO #26	SBGT response to a loss of RPS bus power supplies.
RO #97/SRO #61	Indications of core instabilities.
SRO #81	Drywell pneumatic local alarm indications and meanings.

**U. S. NUCLEAR REGULATORY COMMISSION  
QUAD CITIES NUCLEAR POWER STATION  
WRITTEN EXAMINATION**

**APPLICANT INFORMATION**

Name: MASTER EXAMINATION	Region: III
Date: 10/11/96	Facility/Unit: QUAD CITIES UNITS I & II
License Level: RO	Reactor Type: GE

**INSTRUCTIONS**

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 percent. Examination papers will be picked up 4 hours after the examination starts.

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

\_\_\_\_\_  
Applicant's Signature

**RESULTS**

Examination Value	<u>98-100</u> Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

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

## QUESTION: 001 (1.00)

The mechanisms to ensure adequate core cooling are only core submergence,

- a. and Spray Cooling.
- b. Steam Cooling with injection, and Spray Cooling.
- c. Steam Cooling without injection, and Spray Cooling.
- d. Steam Cooling with injection, Steam Cooling without injection.

## QUESTION: 002 (1.00)

Rod withdrawal is in progress with rod F-8 selected. The step has a withdraw limit of 12. The operator mistakenly moves the selected rod to position 14. All other rods are in step. Which of the following statements best describes the RWM response to this event?

- a. Selected rods except F-8 can either be inserted or withdrawn.
- b. No other rod but F-8 can be moved in either direction until F-8 is inserted to within the limits of the current step.
- c. As long as the operator remains in the same step, the selected rods can be inserted only. No rods can be withdrawn until the withdraw error is corrected.
- d. No rod other than F-8 can be moved in either direction. Rod F-8 can be withdrawn and/or inserted. Withdraw blocks are not applied until a rod is 2 notches past its withdraw limit.



## QUESTION: 003 (1.00)

You have the following plant conditions:

- Drywell pressure - 3.2 psig
- Drywell temperature - 170°F
- Torus pressure - 1.8 psig
- Torus temperature - 96°F
- Reactor water level - +25 inches

The plant has scrambled on high Drywell pressure and QCGP 2-3 is being carried out. The RHR system was in a normal lineup at the beginning of the transient and all automatic actions occurred as designed. The Shift Engineer orders Torus Cooling started on the "A" RHR Loop. Which of the following switch manipulations will have to be performed in order to start Torus Cooling On the "A" RHR Loop IAW QCOP 1000-30?

- a. Place RHR Loop "B" CONTAINMENT CLG PERMISSIVE SWITCH 17 to ON position.
- b. Place RHR Loop "B" RHR SW START PERMISSIVE SWITCH 19 to MANUAL OVERRD position.
- c. Place RHR Loop "A" CNMT CLG 2/3 LVL AND ECCS INIT BYP SWITCH 18 to MANUAL OVERRD position.
- d. Place either RHR Loop "A" or Loop "B" CONTAINMENT CLG PERMISSIVE SWITCH 17 to ON position.

## QUESTION: 004 (1.00)

Unit 2 was operating at approximately 65% power when the "A" Recirc Pump tripped. Prior to ANY operator actions, a LOCA occurred. Plant conditions are as follows:

- Reactor Power: 0%
- Drywell Pressure: 7 psig and rising
- Reactor Pressure: 890 psig and decreasing
- "A" Recirc Loop Riser Pressure: 880 psig and decreasing
- "B" Recirc Loop Riser Pressure: 875 psig and decreasing

Which ONE of the following AUTOMATIC actions should occur?

- a. The "A" recirc loop discharge valve will close.
- b. The "B" recirc loop discharge valve will close.
- c. The "A" LPCI injection valves will be interlocked open only if reactor level drops below -59".
- d. The "B" LPCI injection valves will be interlocked closed only if reactor pressure drops below 325 psig.

## QUESTION: 005 (1.00)

During power operations on Unit 1, the following annunciators are received:

- 901-8 E-9 120/240V ESS SERVICE BUS ON EMERG SUPPLY
- 901-8 F-8 ESS SERV UPS TROUBLE

Which ONE of the following sources is powering the Essential Service Bus (ESS)?

- a. MCC 18-2
- b. Bus 18
- c. Bus 17
- d. 250 VDC

## QUESTION: 006 (1.00)

Which of the following conditions, in and of itself, would require the plant to be in HOT SHUTDOWN in 12 hours and COLD SHUTDOWN within the following 24 hours?

- a. 1 gpm pressure boundary leakage for 1 hour.
- b. 23 gpm identified Reactor Coolant system leakage for greater than 4 hours.
- c. 3 gpm unidentified Reactor Coolant system leakage for greater than 12 hours.
- d. 3 gpm increase in unidentified Reactor Coolant system leakage over a 24 hour period, with the mode Switch in STARTUP.

## QUESTION: 007 (1.00)

The RWCU system in operation with "A" pump running and "B" pump available and in standby. The "A" RWCU pump trips. The system will:

- a. remain on line, with the Filter Demins on hold, when "B" pump auto starts.
- b. remain on line with the "B" pump auto starting, no low flow is experienced.
- c. trip on low flow causing the resin to slough off the Filter Demins, due to a loss of flow.
- d. remain in that lineup, with the Filter Demins going on hold. "B" pump has no auto start capability.

## QUESTION: 008 (1.00)

The Augmented Primary Containment Vent ("hardened vent") accepts flow from the \_\_\_\_\_ and provides a(n) \_\_\_\_\_ discharge to the \_\_\_\_\_.

- a. drywell only, treated; Chimney
- b. drywell or torus, untreated; Chimney
- c. torus only, untreated; Standby Gas Treatment System
- d. drywell or torus, treated; Standby Gas Treatment System

## QUESTION: 009 (1.00)

The Unit One Standby Coolant Valves are located \_\_\_\_\_. They are controlled by \_\_\_\_\_ switch(es) on the \_\_\_\_\_ panel.

- a. in the Low Pressure Heater Bay, a common, 912-1
- b. in the High Pressure heater bay, individual, 901-5
- c. in the Low Pressure Heater Bay, individual, 901-6
- d. outside the Rad Waste Doorway, a common, 912-5

## QUESTION: 010 (1.00)

With Unit One at full power, annunciator 901-5-A-1, SCRAM VALVE AIR SUPPLY LOW PRESSURE, alarms. What is this alarm actually measuring and what is expected to happen if the condition continues to degrade?

- a. Scram air header pressure is less than 75 psig. If not corrected, the scram valves will begin to open, scrambling in rods.
- b. The 1A Instrument Air Receiver pressure is less than 75 psig. If not corrected, the CRD Flow Control Valves will fail open, putting the pump in runout.
- c. Scram air header pressure is less than 75 psig. If not corrected, when scram air header pressure reaches 50 psig, an automatic scram signal will be generated.
- d. 1A Instrument Air Receiver pressure is less than 75 psig. If not corrected, the CRD Flow Control Valves will fail closed, which will prevent the ability to drive rods.

## QUESTION: 011 (1.00)

Unit 2 is operating at 100% power when all Unit 2 Generator Hydrogen Seal Oil pumps are lost. Hydrogen pressure drops and finally stabilizes at 25 psig. Given the resulting hydrogen pressure for this condition, which of the following represents an allowed generator output?

- a. 620 MW, 300 MVAR's lagging.
- b. 800 MW, 200 MVAR's leading.
- c. 750 MW, 50 MVAR's lagging.
- d. 680 MW, 150 MVAR's lagging.



## QUESTION: 012 (1.00)

Unit 1 is shutting down and reactor water temperature is 200°F, with "A" loop RHR operating in the SDC mode. The NSO begins to throttle closed MO-1-1001-28A, Outbd LPCI Inj. Vlv. Which of the following would be an expected response to this manipulation?

- a. RHR Flow recorder 1-1040-7 indicates that "A" loop flow has decreased and "B" loop flow has increased.
- b. RHR Flow recorder 1-1040-7 indicates that "A" loop flow has decreased to less than 1500 gpm; NO valves open to provide minimum flow protection.
- c. RHR Flow recorder 1-1040-7 indicates that "A" loop flow has decreased to less than 1500 gpm; MO-1-1001-47, SDC HDR DOWNSTREAM SV, closes if it's breaker is closed.
- d. RHR Flow recorder 1-1040-7 indicates that "A" loop flow has decreased; Flow Indicator 1-1040-11A "Containment Spray Flow indicates "A" loop flow has increased.

QUESTION: 013 (1.00)

Which of the following describes the automatic actions that will occur if the Unit One Main Generator Automatic Voltage Regulator fails high while in control?

- a. An annunciator will alarm immediately. 10 seconds later, if the overexcitation condition still exists, the Main Generator will trip.
- b. The Manual Voltage Regulator will take control immediately. 5 seconds later, if the overexcitation condition still exists, the Main Generator will trip.
- c. An annunciator will alarm and the Manual Voltage Regulator will take control immediately. If the overexcitation condition still exists 10 seconds later, the Main Generator will trip.
- d. An annunciator will alarm immediately. 10 seconds later, the Manual Voltage Regulator will take control. If the overexcitation condition still exists, 5 seconds later, the Main Generator will trip.

QUESTION: 014 (1.00)

Which of the following describes the way Reactor Building Vent Fans respond to an isolation signal?

- a. Both the Reactor Building Supply Fans and Exhaust Fans receive a trip signal directly from the isolation signal.
- b. The Reactor Building Supply Fans receive a trip signal directly from the isolation signal. The Reactor Building Exhaust Fans only receive a trip signal from the low flow condition resulting from the Isolation Dampers closing.
- c. The Reactor Building Exhaust Fans receive a trip signal directly from the isolation signal. The Reactor Building Supply Fans only receive a trip signal from the low flow condition resulting from the Isolation Dampers closing.
- d. Both the Reactor Building Supply Fans and Exhaust Fans only receive a trip signal from the low flow condition resulting from the Isolation Dampers closing.

QUESTION: 015 (1.00)

Why must the Priming Line Valve be opened prior to opening the System Isolation Valve when resetting a Multimatic Fire Valve after an actuation?

- a. The priming line will overpressurize if the System Isolation Valve is opened first.
- b. The Main Valve will open and water will flow out of the system if the priming line is not opened first.
- c. The priming line will drain water to the drain funnel if it is not opened before the System Isolation Valve.
- d. The Main Valve will not allow water to flow on a subsequent actuation if the priming line is not opened first.

## QUESTION: 016 (1.00)

Which of the following below describes the key interlock for the 1/2 250 VDC Battery Charger Supply Breakers?

- a. There is a single key which is required to close either of the Supply Breakers located at the 250 VDC Distribution Panels. This prevents closing both at the same time and cross connecting Busses 18 and 28.
- b. There is a single key which is required to close either of the Supply Breakers located at the 480 VAC MCCs. This prevents closing both at the same time and cross connecting the Unit One and Unit Two 250 VDC Batteries.
- c. There is a single key which is required to close either of the Supply Breakers located at the 250 VDC Distribution Panels. This prevents closing both at the same time and cross connecting the Unit One and Unit Two 250 VDC Batteries.
- d. There is a single key which is required to close the Supply Breaker at MCC 28-2. This administratively prevents closing both at the same time and cross connecting Busses 18 and 28.



## QUESTION: 017 (1.00)

A steam leak in the MSIV room has caused room temperature to reach 250°F. This is below the Maximum Safe Area Temperature of 304°F. Considering the definition of Maximum Safe Area Temperature, which one of the following statements is TRUE?

- a. Equipment in the MSIV room necessary for the safe shutdown of the plant is still operable.
- b. The temperature is below the room high temperature setpoint but personnel access is precluded.
- c. The temperature has exceeded the temperature for equipment operability but personnel access is still allowed.
- d. The reactor building ventilation system should be capable of reducing the area temperature even with the leak unisolated.

## QUESTION: 018 (1.00)

Given the following plant conditions:

- Drywell Flooding is in progress.
- Torus level is + 1 inch.
- HPCI suction has automatically swapped to it's alternate supply.
- All low pressure ECCS systems are operable.
- The Unit Supervisor has directed injection with systems which take a suction from outside containment.

Which one of the below listed systems can be used before any further alignment?

- a. RCIC.
- b. LPCI pumps.
- c. Standby Coolant.
- d. HPCI cooling water pump.

## QUESTION: 019 (1.00)

Unit 1 is in Mode 5 and core offload is in progress when the Refuel Foreman calls the control room to report all normal lighting has been lost on the refuel floor. Which one of the following is an effect?

- a. Loss of all fuel pool cooling pumps.
- b. Reactor building ventilation isolation.
- c. Reactor building door interlock mechanisms fail.
- d. Refuel floor ARM local auxiliary Unit will not function.

## QUESTION: 020 (1.00)

The operator was using the "continuous withdraw" mode of operation during a reactor startup. During rod withdrawal the operator observed indications that the RMCS timer had restarted, the settle function had been completed and the rod was automatically de-selected.

The condition that led to this sequence of events was:

- a. RPIS Inop.
- b. A Rod Worth Minimizer rod block.
- c. RMCS Rod Select Relay Malfunction.
- d. The operator released the Rod Notch Out Override switch.

## QUESTION: 021 (1.00)

DG 1 has just received a valid auto start signal. Which one of the conditions below will start Diesel Generator Cooling Water Pump? The pump will start:

- a. When DG-1 speed reaches 800 RPM.
- b. When DG-1 Start Relay (STR) is energized.
- c. 90 seconds after DG-1 speed reaches 200 RPM.
- d. 15 seconds after DG-1 Start Relay (STR) is energized.

## QUESTION: 022 (1.00)

Which item below describes the status of Backup Scram Solenoids 0302-19 A and 19B following receipt of a scram signal on RPS "A"?

- a. Both 19A and 19B are energized.
- b. Both 19A and 19B are de-energized.
- c. 19A is energized, 19B is de-energized.
- d. 19A is de-energized, 19B is energized.

## QUESTION: 023 (1.00)

The following conditions exist 4 minutes after a LOCA occurred on unit 1.

- Reactor level -70"
- Drywell Pressure 3.5 psig

What is the expected response of the Core Spray System if PS-1-0263-52A, ECCS RPV low pressure permissive, fails high and RPV pressure subsequently drop below 325 psig?

- a. Both "A" and "B" LPCS pumps will inject into the RPV.
- b. Neither pump injects into the RPV, both remain on minimum flow.
- c. "B" CS pump injects into the RPV, "A" CS pump remains on minimum flow.
- d. "A" CS pump injects into the RPV, "B" CS pump remains on minimum flow.

## QUESTION: 024 (1.00)

The following indications are observed on the CRD system following a reactor scram.

- Amps on the running CRD pump increase from 27 to 33.
- FCVs 6A and 6B closed.
- CRD system flow off scale high, greater than 100 gpm.
- Charging header pressure low, less than 1300 psig.

Which statement describes the proper action to be taken by the unit operator?

- a. Start the second CRD pump to reduce load on the operating pump.
- b. Monitor system operation, indications are normal for the described conditions.
- c. Place the CRD system flow controller in manual and attempt to reduce system flow.
- d. Throttle the drive header pressure control valve to restore normal system parameters.

## QUESTION: 025 (1.00)

Which statement describes how CRD drive header differential pressure is maintained as reactor pressure increases from 0 to 1000 psig during a reactor startup?

- a. The operator adjusts both the flow control and the drive pressure control valve to maintain drive header differential pressure.
- b. The operator periodically throttles the drive pressure control valve in the open direction to maintain drive header differential pressure.
- c. The operator periodically throttles the drive pressure control valve in the closed direction to maintain drive header differential pressure.
- d. The CRD flow control valve automatically opens to maintain system flow, thus automatically maintaining drive header differential pressure.

## QUESTION: 026 (1.00)

Assume the plant is operating normally at 100% steady state power. How will the following parameters be affected by a loss of air to the reactor feed pump minimum flow valves?

Answer	Indicated Total Feed Flow	RFP Disch Press	RPV Level	RFP Minimum Flow
a.	Decrease	Decrease	Decrease	Increase
b.	Remain as is	Remain as is	Remain as is	Remain as is
c.	Increase	Remain as is	Remain as is	Increase
d.	Remain as is	Remain as is	Decrease	Remain as is



QUESTION: 027 (1.00)

Which of the following causes the Main Turbine Bypass Valves to open if the main turbine should trip with the reactor at 60% power?

- a. Steam line pressure will be greater than the EHC pressure regulator signal.
- b. The bypass jack signal will be greater than the control valve demand signal.
- c. The EHC pressure regulator pressure signal will be less than the load limit setting.
- d. Turbine control valve demand signal will be less than the maximum combined flow limiter signal.

## QUESTION: 028 (1.00)

A full reactor scram has occurred due to a large LOCA coupled with a loss of all Off Site power. All low pressure ECCS has started and is injecting water to the vessel. Reactor water level is -180 inches and rising steadily. You are directed to place all available torus cooling in service. Torus temperature is currently 105°F. Which of the following statements best describes the actions you should take in placing torus cooling in service?

- a. When torus temperature reaches the Heat Capacity Limit, divert all RHR pumps to establish torus cooling.
- b. When reactor water level is greater than -142 inches, divert RHR pumps as needed to establish torus cooling.
- c. When reactor water level is greater than -172 inches, RHR pumps may be diverted as needed to establish torus cooling.
- d. When torus temperature reaches 110°F, RHR pumps may be diverted as needed to establish torus cooling since reactor water level is greater than -184 inches.

## QUESTION: 029 (1.00)

A total loss of Unit Two 24V DC has occurred due to a short in the system. Which of the following best describes the effect on Unit 2 operation?

- a. A full reactor scram will occur.
- b. Main Chimney isolation capability is lost.
- c. Control Room annunciator power will be lost.
- d. RCIC will automatically start, but not inject.

## QUESTION: 030 (1.00)

Unit 1 is shutdown and midway through a refueling outage. Unit 2 is operating at full power and in the third hour of LCO 3/4.9.3 due to the Unit 2 D/G out for planned maintenance and TR-22 OOS due to a cooling problem. It is anticipated that TR-22 will be returned to service in four (4) hours. Suddenly, a turbine trip occurs on Unit 2. The 1/2 D/G fails to start. Neither the 14-1 to 24-1 nor 13-1 to 23-1 crossties are closed. Which of the following best describes the status of the station?

- a. Both units have experienced a station blackout.
- b. A loss of off-site power is in progress on Unit 2.
- c. Both units have experienced a loss of off-site power.
- d. A loss of off-site power and station blackout is in progress on Unit 2.

## QUESTION: 031 (1.00)

A reactor cooldown is in progress with RHR in the shutdown cooling mode of operation. Reactor pressure is 50 psig. Fifteen minutes ago, reactor pressure was 90 psig. Which of the following best describes the overall cooldown rate (degrees F/hr) using the past fifteen minutes data?

- a. 99°F/hr
- b. 132°F/hr.
- c. 156°F/hr
- d. 192°F/hr

QUESTION: 032 (1.00)

The following conditions exist following a LOCA on Unit 1:

- The Unit Supervisor has entered QGA 500-3, "Drywell Flooding".
- RPV water level is unknown.
- Core cooling could not be established following entry into the RPV flooding procedure.
- 1A Core Spray pump is pumping water from the torus to the RPV.
- 1B Core Spray pump and all RHR pumps are pumping water from the CCSTs to the RPV.
- Additional available systems are being started as directed by procedure.
- Drywell and torus pressures are about 7.5 psig and steady.
- Drywell temperature is 225°F and rising.
- Containment water level is now 28 ft. and rising slowly.

Which action listed below should be taken next?

- a. Spray the drywell using one loop of RHR.
- b. Prevent injection from outside containment.
- c. Install jumpers to defeat the Group I isolation, and open the MSIVs.
- d. Control RPV pressure to prevent exceeding the ADS Valve Tailpipe Limit (QGA D10).

## QUESTION: 033 (1.00)

After a transient initiates on Unit 2, the following parameter values are noted on the 902-3 panel:

- Drywell pressure 4.5 psig rising.
- Drywell air temperature 140°F rising.
- Torus pressure 4.8 psig rising.
- Torus water temperature 82°F stable.

Which of the following is indicated?

- a. A safety valve has opened and closed.
- b. A high pressure discharge into the torus airspace.
- c. The containment is functioning normally following a water break LOCA.
- d. A high pressure discharge into the drywell and at least one torus to drywell vacuum breaker is open.

## QUESTION: 034 (1.00)

With the unit operating normally at 75% power, a transient causes the turbine generator to trip. The Unit NSO places the Mode Switch to SHUTDOWN. All systems respond normally.

Assuming no operator action, reactor pressure vessel level:

- a. Controls at +15 inches.
- b. Controls at +25 inches.
- c. Drops to the ECCS initiation setpoint.
- d. Controls at +18 inches, since level control is in 3 element.

QUESTION: 035 (1.00)

With all control rods fully inserted, QGA 500-2, STEAM COOLING, directs RPV Blowdown when RPV water level reaches -184 inches and no injection source is available.

How will the plant respond because of this action?

- a. Fuel temperatures will drop, giving some additional time to regain injection.
- b. Reactor core differential pressure will drop, increasing natural circulation.
- c. Reactor power will drop into the Source Range, lowering the fuel heat up rate.
- d. Torus radiation levels will rise significantly as steam is discharged from the relief valves.



## QUESTION: 036 (1.00)

Given the following plant conditions:

- A LOCA occurred 20 minutes ago.
- Reactor pressure is 150 psig.
- Drywell temperature is 260°F
- Reactor building temperature at 198°F
- RVWLIS backfill is in operation.

The following reactor water levels are noted:

Yarway wide range	-110 inches
GEMAC lower 400	-140 inches
Yarway narrow range	-50 inches
GEMAC upper 400	+80 inches

The Narrow Range Yarway level indicators are indicating higher than actual level because:

- a. density has dropped in the instrument reference legs.
- b. boiling has occurred in the instrument reference legs.
- c. gasses have come out of solution in the instrument reference legs.
- d. the reference leg condensing pot does not function properly at these temperatures.

## QUESTION: 037 (1.00)

Given the following:

- HEATER 2B2 HIGH LEVEL alarm (901-6, E-2) actuates and will not reset.
- Feedwater temperature drops 30°F.
- Recirculation pumps are in Individual Manual.
- Reactor power has risen 3% and continues to rise.
- Reactor power is 55% and core flow is 55% (80% FCL).

You should:

- a. manually scram the reactor.
- b. reduce recirculation flow by 10%.
- c. insert Cram Array control rods to 00.
- d. drive the selected rod group to its target in position.

## QUESTION: 038 (1.00)

You are reviewing a surveillance completed from the Control Room. One step required an operator to open a valve on an instrument rack in the Reactor Building. How should completion of this step be recorded on the surveillance sheet?

- a. The local operator places his initials next to the completed step, followed by the NSOs initials.
- b. The local operator's initials, placed by the NSO, and the US's initials should be next to the completed step.
- c. The local operator's initials, placed by the NSO, and the NSO's initials should be next to the completed step.
- d. The US's initials, the NSO's initials, and the local operator's initials should be next to the completed step.

QUESTION: 039 (1.00)

Given the following:

- A reactor startup is in progress.
- Reactor pressure is 920 psig.
- Reactor power is 3%.
- Core flow is 30%.

Which ONE of the following will directly result in a reactor scram?

- a. Main Turbine Trip
- b. Reactor power of 16%
- c. Full Group I isolation
- d. Main Condenser vacuum at 20" Hg

QUESTION: 040 (1.00)

IAW QCAP 230-5, INDEPENDENT VERIFICATION, which of the following is the PREFERRED method for verifying the position of locked closed valve, 1-1001-127A, 1A RHR LOOP TO RB FLR DRN SUMP DRN VLV?

- a. Both verifiers check that the valve is locked in the S-lock log.
- b. Each verifier should remove the lock and attempt to close the valve.
- c. Both verifiers check that parameters downstream of the valve are correct.
- d. Turn the valve in the closed direction without removing the locking device.

QUESTION: 041 (1.00)

IAW QOA 4700-6, TOTAL LOSS OF INSTRUMENT AIR, 1(2)-3207A, the Low Flow Feedwater Regulator is closed in order to:

- a. prevent RFP runout.
- b. prevent a HPCI/RCIC isolation.
- c. prevent exceeding +48 inches RPV water level.
- d. isolate non-essential loads to preserve the air system as long as possible.

QUESTION: 042 (1.00)

Annunciator 901-5 A-7, RBM HIGH OR INOP, has just been received. From QOS 0005-03, "UNIT OPERATOR'S DAILY SURVEILLANCE OF NUCLEAR LIMITS", it has been determined that a Limiting Control Rod Pattern DOES exist.

You should:

- a. Leave the failed RBM channel in the tripped condition.
- b. Verify that one RBM channel is operable, then bypass the failed RBM channel.
- c. Bypass the failed RBM channel and establish a non-limiting control rod pattern.
- d. Bypass the failed RBM and station a second qualified person to verify rod movements.

## QUESTION: 043 (1.00)

A temporary modification to the Reactor Building Closed Cooling Water System requires that the intent of a step be changed in QCOP 3700-02, RBCCW System Startup and Operation. One interim procedure that affects QCOP 3700-02 is in effect but it affects a different step. What type of procedure change is required?

- a. A Procedure Change Request is required but only to review writing style.
- b. A Procedure Change Request is required with independent technical review.
- c. Write an additional interim procedure to supplement the existing QCOP 3700-02 and address the new concern.
- d. Conduct a 50.59 evaluation for the new concern and attach it to the current interim procedure to address the new concern.

## QUESTION: 044 (1.00)

Annunciator 912-1 D-1, "REACTOR BLDG COOLING WATER LOW PRESSURE", is received. In accordance with QCOA 3700-1, "RBCCW LOW PRESSURE", within one minute you should shutdown the:

- a. Drywell Coolers.
- b. Fuel Pool Cooling System.
- c. Reactor recirculation pumps.
- d. Reactor Water Cleanup System.

QUESTION: 045 (1.00)

Which of the following is a symptom which could indicate a situation requiring use of the QARPs to bring the affected unit to a safe shutdown condition?

- a. Severe flooding in the RHR Room
- b. Severe, uncontrolled fire in any one plant area.
- c. Complete loss of AC power to the unit for 48 hours.
- d. Inability to scram the reactor from the Control Room.

QUESTION: 046 (1.00)

Which of the following correctly describes the effect of placing the Drywell Pressure Reset keylock in RESET?

Placing the switch in RESET will.

- a. reset the ADS 110 second timer, if it has started.
- b. reset the ADS 8.5 minute timer, if it has started.
- c. cause ADS valves to close if they have opened on a valid initiation signal.
- d. prevent ADS initiation on LO-LO level combined with high drywell pressure.



## QUESTION: 047 (1.00)

A high drywell pressure signal (2.5 psig) coincident with a low low reactor level signal (-59") is received but only one Core Spray pump and NO RHR pumps start. ADS will initiate:

- a. in 110 seconds.
- b. in 8.5 minutes.
- c. 110 seconds after an RHR pump is started.
- d. when the second CS pump or any RHR pump is started.

## QUESTION: 048 (1.00)

RCIC is in Standby when a valid initiation signal occurs.

The minimum flow valve 1(2)-1301-60 will:

- a. Automatically open and remain open.
- b. Remain closed regardless of changes in system flow.
- c. Remain open, then close when system flow reaches 40 gpm.
- d. Automatically open, then close when system flow reaches 80 gpm.

QUESTION: 049 (1.00)

Given the following conditions:

- HPCI room temperature 150F.
- CCST level .7 feet (10,000 gals.)
- Reactor Pressure 150 psig.
- Pump Suction Pressure 10" Hg.
- Drywell Pressure 2.0 psig

How will the HPCI system respond?

- a. HPCI turbine should trip.
- b. HPCI pump suction should transfer to the Torus.
- c. HPCI steam supply isolation valves should close.
- d. HPCI turbine exhaust vacuum breakers should close.

*Deleted per Chief Examiner  
No correct answer.*

QUESTION: 050 (1.00)

Given:

- Unit Two is at 100% power.
- Reactor recirculation flow control is in EGC local manual.

Which of the following describes the unit's response to reducing LOAD SET?

- a. Reactor pressure and reactor power will be increased.
- b. Recirculation flow and reactor power will be reduced.
- c. Recirculation flow will drop and reactor pressure will increase.
- d. Turbine megawatts will be reduced and reactor power will remain constant.

## QUESTION: 051 (1.00)

The Unit 1 Diesel Generator started on undervoltage and closed in to Bus 14-1. Annunciator 901-8 G8, "DIESEL GENERATOR 1 RELAY TRIP", was then received. The diesel generator breaker opened and the diesel shutdown. What is the likely cause of the diesel generator breaker trip and subsequent diesel shutdown?

- a. A generator overcurrent condition.
- b. A generator differential overcurrent.
- c. An under frequency condition on Bus 14-1.
- d. A generator neutral winding overvoltage fault.

## QUESTION: 052 (1.00)

Unit 1 and Unit 2 are in COLD SHUTDOWN with one train of SBGTS out of service. Which ONE of the following changes in plant conditions would require BOTH trains of SBGTS to be operable?

- a. Unit 1 reactor water temperature rises above 212F.
- b. Unit 2 Operational Mode is changed to MODE 5 (Refueling).
- c. Unit 1 has a loss Secondary Containment Differential pressure.
- d. Unit 2 Reactor Building Outlet Damper AO 2-5742A is failed shut.

## QUESTION: 053 (1.00)

Which ONE of the following practices should be used to ensure personnel safety when closing in disconnects to place a 345KV line in service?

- a. Wear a helmet with a face shield and 500 volt rubber gloves.
- b. Verify that any temporary ground connected to the line is properly attached.
- c. Verify both disconnect circuit breakers are open from the control room and locally.
- d. Leave protective cards hanging until the disconnect is closed and the breakers are shut.

## QUESTION: 054 (1.00)

A caution in QCOP 2300-6, HPCI SYSTEM MANUAL START-UP, states that HPCI system operation should be avoided with torus temperature above 140°F. What is the reason for this caution?

- a. Pump damage due to cavitation.
- b. Turbine damage due to high exhaust temperature.
- c. Equipment damage due to inadequate lube oil cooling.
- d. Inadequate condensing in the Barometric Condenser will cause high airborne radiation problems.

## QUESTION: 055 (1.00)

With the reactor operating normally at full power, RWCU valve MO-2-1201-133, DEMIN BYPASS, is being throttled to maintain RWCU pump discharge pressure while one RWCU filter demineralizer is removed from service. During the evolution the bypass valve is opened too far, causing RWCU pump discharge pressure to drop below 1050 psig. Which of the following actions may occur?

- a. RWCU pumps will experience runout.
- b. RWCU pumps will trip on low pump flow.
- c. RWCU system will isolate on high temperature.
- d. The remaining on-service RWCU demin will isolate on low flow.

## QUESTION: 056 (1.00)

This year you have accumulated 10 REM Shallow Dose exposure. How much more external dose whole body skin exposure can you receive before you exceed the Legal Annual limit?

- a. 65 Rem
- b. 40 REM
- c. 10 Rem
- d. 5 Rem

## QUESTION: 057 (1.00)

You are directed to enter a LOCKED HIGH RAD AREA to perform a valve lineup. You will need:

- a. a Timekeeper to control access.
- b. to wear Class 4 Protective Clothing.
- c. to be accompanied by an RP Supervisor.
- d. to carry a copy of the latest survey map with you.

## QUESTION: 058 (1.00)

Unit 2 is operating at 100% power when Annunciator 902-3 C-2, "OFFGAS HIGH-HIGH RADIATION", is received. Which ONE of the following AUTOMATIC actions will occur?

- a. AO 2-5406, "OFFGAS TO STACK OR VENT" will close 15 mins. after the alarm is received.
- b. AO 5401A and B and 5402A and B, "SJAЕ SUCTION VLVS", close 15 mins. after the alarm is received.
- c. SO 2-5437, "PRESS DRN TK OUTLET", closes immediately, followed by AO 2-5406, "OFFGAS TO STACK OR VENT" closing 15 mins. later.
- d. AO 2-5408, "HOLDUP PIPE DRN", valve closes and the Charcoal Adsorber is automatically placed into service 15 mins. after the alarm is received.



QUESTION: 059 (1.00)

Given the following conditions on Unit 1:

- Reactor power is 40%
- APRM "3" fails "Downscale"
- APRM "3" has not been bypassed

Due to this, Rod Block Monitor (RBM) Channel "7":

- a. is not affected.
- b. is automatically bypassed.
- c. generates a rod withdrawal block.
- d. shifts to an alternate reference APRM.

QUESTION: 060 (1.00)

Given:

- Core thermal power is 37% of rated.
- Total core flow is 42 M lb/hr.

Which ONE of the following transients, or evolutions, will drive the plant closer to the instability region? Assume NO operator action. (Refer to figure 0202-24 as necessary.)

- a. Increasing recirc. flow.
- b. Lowering Main Condenser Vacuum.
- c. A Continuous Control Rod Withdrawal.
- d. Placing a "D" Feedwater Heater in service.

## QUESTION: 061 (1.00)

Which of the following Reactor recirculation conditions could interfere with proper LPCI Loop Selection?

	Reactor Power	Recirc Pump A Speed	Recirc Pump B Speed
a.	90%	100%	92%
b.	100%	102%	96%
c.	45%	37%	32%
d.	70%	93%	77%

## QUESTION: 062 (1.00)

Both Units are in Mode 5, no fuel moves are in progress. The 1/2 A SBGTS is in PRIMARY and the 1/2 B SBGTS is in STANDBY for upcoming System Engineering testing. RPS "B" is momentarily de-energized while swapping RPS power supplies from RESERVE to NORMAL. PCIS Group 2 Trip B trips on the loss of RPS.

How will the SBGTS system be affected?

- a. 1/2 SBGTS "B" will automatically start 25 seconds after the loss of RPS.
- b. 1/2 SBGTS "A" will automatically start 25 seconds after the loss of RPS.
- c. Both SBGTS trains will remain off since only 1/2 of an initiation signal is present.
- d. 1/2 SBGTS "A" will automatically start, 1/2 SBGTS "B" will automatically start 25 seconds later causing "A" to trip.

QUESTION: 063 (1.00)

Which one of the following would qualify as a "Temporary Alteration" as defined in QAP 300-12, "Temporary Alterations"?

- a. A circuit card is pulled to disable an annunciator.
- b. A hose is installed to drain a heat exchanger under an OOS.
- c. Installation of an electrical jumper for testing under an approved work procedure which is to be completed within 24 hours.
- d. An electrical lead is lifted in accordance with a surveillance procedure which is to be completed by the end of shift.

QUESTION: 064 (1.00)

Which of the following alarms is REQUIRED to be logged in the Nuclear Station Operator (NSO) Unit 2 Log?

- a. All unexpected alarms.
- b. An alarm that comes in and clears within 5 minutes.
- c. An unexpected alarm received during plant shutdown that clears after 8 minutes.
- d. An expected alarm received during a surveillance that is in for the duration of the surveillance.

## QUESTION: 065 (1.00)

Using the attached P&ID (M-38), determine how FCV 1-1901-58 will be affected by a loss of MCC 18-3. The valve will:

- a. fail in the open position.
- b. fail in the closed position.
- c. lock up in its current position.
- d. remain in its current position, due to the power feed swapping to MCC 19-4.

## QUESTION: 066 (1.00)

Which ONE of the following describes the operation of the PCIS Status Box on the Safety Parameter Display System (SPDS)?

- a. A 1/2 Group Isolation signal with no valve movement will cause a RED light.
- b. A full Group Isolation signal with no valve movement will cause a GREEN light.
- c. A full Group Isolation signal with 2 out of 2 isolation valves in a line closed will cause a RED light.
- d. A full Group Isolation signal with 1 out of 2 isolation valves in a line closed will cause a GREEN light.

## QUESTION: 067 (1.00)

A reactor scram occurs. QGA 100 has been entered. Shortly after the scram RPS "A" is lost. What ONF of the following describes the effect on the operators ability to control RPV pressure?

- a. RWCU is isolated and unavailable for pressure control.
- b. The Inboard RCIC Isolation valve is closed, making RCIC unavailable for pressure control.
- c. The Inboard MSIVs are closed, making the Main Condenser unavailable for pressure control.
- d. The Inboard MSL Drain Valve is closed, making the MSL Drains unavailable for pressure control.

## QUESTION: 068 (1.00)

Maximum torus cooling is in service on Unit 2 when an electrical fault causes Bus 23-1 to deenergize. All other buses remain energized. Which one of the following describes how the torus cooling lineup will be affected by this bus loss?

- a. The 2C and 2D RHR Pumps and the 2C and 2D RHRSW Pumps will be deenergized.
- b. All RHR Pumps will be operable; the 2A and 2B RHRSW Pumps will be deenergized.
- c. The 2A and 2B RHR Pumps and the 2A and 2B RHRSW Pumps will be deenergized.
- d. The 2A and 2B RHR Pumps will be deenergized; all RHRSW Pumps will be operable.

## QUESTION: 069 (1.00)

Unit 2 is at 100% power when the RPIS SYS INOP annunciator is received. Subsequently, a recirc. pump seal fails on the "B" pump. The RPIS failure is preventing insertion of the selected rod group. The NSO should:

- a. Scram the reactor.
- b. Insert the CRAM array.
- c. Reduce recirculation flow to 44 Mlbm/hr.
- d. Drive rods in reverse sequence to 00 using Emergency In.

## QUESTION: 070 (1.00)

While moving a spent fuel bundle in the Fuel Pool, a Fuel Pool Storage Low Level Alarm is received and Fuel Pool Level is confirmed to be decreasing. WHICH ONE of the following is the expected immediate operator action?

- a. Hold the bundle at its current height and stop further bridge movement.
- b. Determine the nearest open storage location and place the bundle in that location.
- c. Return the bundle to its original location (assume that it is not the nearest open location).
- d. Complete the move by placing the bundle in its required new position (assume that it is not the nearest open location).

## QUESTION: 071 (1.00)

Unit 2 is in Cold Shutdown with both recirc pumps secured. RHR loop B is aligned for SDC but secured. Moderator temperature is 145°F and stable. Vessel level is 96 inches. Inadvertent cycling of MO-2-1001-43A, RHR PUMP SDC SUCTION VLV with the "A" RHR pump drains open resulting in a vessel level drop of 8 inches.

Which of the following conditions now exist?

- a. RPV level is too low to ensure NPSH for restart of RHR pumps.
- b. RPV level is too low to support natural circulation in the vessel.
- c. RPV level is too low to maintain the upper 400 GEMAC reference leg full.
- d. Level is low enough that restart of a recirc pump may cause an inadvertent low level scram signal.

## QUESTION: 072 (1.00)

In addition to a sudden rise in indicated total core flow, which one of the following indications would be indicative of a jet pump failure?

- a. A rise in core thermal power.
- b. A drop in core plate differential pressure.
- c. A rise in main generator electrical output.
- d. A drop in individual recirc pump flow for a given speed.



## QUESTION: 073 (1.00)

Unit 2 is operating at 60% power with a HPCI surveillance in progress when the following annunciator is received:

- 3A TARGET ROCK RELIEF VLV OPEN

Assuming reactor pressure is normal, when would the crew be REQUIRED to initiate a manual reactor scram?

- a. When Torus Bulk Water Temperature reaches 95°F.
- b. When Torus Bulk Water Temperature reaches 110°F.
- c. Immediately AFTER verifying the safety relief valve (SRV) is actually open.
- d. Immediately, IF the SRV is actually open and it cannot be closed with the keylock switch.

## QUESTION: 074 (1.00)

Unit 2 is operating at approximately 90% rated power when a voltage transient in the EHC electrical system causes reactor steam dome pressure to increase to 1065 psig. Which one of the following statements describes the final plant conditions following this transient?

- a. The reactor scrams and the reactor recirculation pumps trip.
- b. The reactor scrams and the reactor recirculation pumps run back to minimum speed.
- c. The main turbine control valves open slightly to lower reactor pressure, then return to their original position.
- d. The main turbine bypass valves open to lower reactor pressure, then close after reactor pressure returns to normal.

## QUESTION: 075 (1.00)

An ATWS has occurred as the reactor failed to scram on high drywell pressure. Which of the following could occur if ADS initiated when level is intentionally lowered below the ADS initiation setpoint?

- a. A rapid cooldown of the moderator in the core, leading to a substantial power increase.
- b. A large reduction in control rod worth because of voiding, leading to a power excursion.
- c. An increase in injection of relatively cold, unborated water resulting in a rapid power rise.
- d. Loss of boron from the RPV to the torus, resulting in additional time required to shut down the reactor.

QUESTION: 076 (1.00)

Complete the following statement:

The basis for the RBM rod block function is to prevent exceeding the:

- a. MCPR Safety Limit for a single rod withdrawal error from a limiting control rod pattern.
- b. LHGR Limit for a fuel node during a single rod withdrawal error from any control rod pattern.
- c. MCPR Operating Limit for multiple rod withdrawal errors from a limiting control rod pattern.
- d. APLHGR Limit for a fuel bundle during multiple rod withdrawal errors from any control rod pattern.

QUESTION: 077 (1.00)

When can a check valve be used as an isolation boundary for an Out of Service?

- a. It is not allowed.
- b. If both upstream and downstream sides of the valve are depressurized.
- c. If the valve is gagged closed with an OOS card on the gagging device.
- d. If the valve is in series with a gate, globe, or ball valve that is closed on the OOS.

QUESTION: 078 (1.00)

Which of the following immediate actions is appropriate when replacing a blown fuse? (No Emergency Exists.)

- a. Ensure a PIF is written
- b. Contact engineering prior to replacing the fuse, if it is like for like.
- c. Immediately replace the fuse with one of the same amperage rating, until a like for like can be found.
- d. Immediately replace the fuse with one of the same voltage rating, until a like for like can be found.

*deleted from*

*correct answer is not an  
immediate action*

## QUESTION: 079 (1.00)

Drywell temperature is 200°F. The RPV was RAPIDLY depressurized from 1000 psig to 50 psig. Which ONE of the following correctly describes the effect of the RVWLIS backfill modification on RPV level indication during this transient?

- a. Wide and Narrow range RPV level indication remains reliable throughout the transient since no gasses come out of solution.
- b. Narrow range level indication remains accurate but Wide range level is unreliable since RVWLIS is not connected to Wide range instruments.
- c. Wide range level indication remains accurate but Narrow range level is unreliable since RVWLIS is not connected to Narrow range instruments.
- d. Wide and Narrow range RPV level indication is unreliable since RVWLIS is designed to counteract the effects of vaporization of reference leg water.

## QUESTION: 080 (1.00)

With Unit 1 at full load, how will the 1B Feed Water Regulating Valve respond to a trip of the valve's hydraulic pumps?

- a. The valve will continue to operate in AUTOMATIC using the standby pump from the 1A skid.
- b. The valve immediately locks in place with the loss of power to both hydraulic pumps.
- c. The valve will operate using accumulator pressure until low oil pressure causes a lockup.
- d. The valve will automatically close and the 1A valve will open as needed to provide feed flow to the reactor.

## QUESTION: 081 (1.00)

Which of the following describes the response of the CAM system when reactor water level reaches -59 inches?

- a. Either the Torus sample valves or the Drywell sample valves will open immediately on each subsystem.
- b. Both the Torus sample valves and the Drywell sample valves will open immediately on the selected subsystem.
- c. Either the torus or drywell sample valves will open when 8 1/2 minutes has expired or RPV pressure drops to 325 psig.
- d. Both subsystems will receive a permissive signal; their selected valves will not open until Drywell pressure reaches 2.5 psig.

## QUESTION: 082 (1.00)

With the 1/2C RBCCW Pump running on Bus 19, what actions must be taken to restart the pump on Bus 19 if a LOCA on Unit One causes Drywell pressure to increase  $> 2.5$  psig?

- a. Place BOTH of the U1 DIV I and DIV II DW CLR/RBCCW/FPC TRIP BYPASS Switches in the BYPASS position and manually restart the pump.
- b. Place BOTH of the U1 DIV I and DIV II DW CLR/RBCCW/FPC TRIP BYPASS Switches in the BYPASS position and the pump will restart automatically.
- c. Place EITHER the U1 DIV I or the U2 DIV 1 DW CLR/RBCCW/FPC TRIP BYPASS Switches in the BYPASS position and manually restart the pump.
- d. Place EITHER the U1 DIV I or the U2 DIV 1 DW CLR/RBCCW/FPC TRIP BYPASS Switches in the BYPASS position and the pump will restart automatically.



## QUESTION: 083 (1.00)

With Unit One at full power, annunciator 912-1-D-2, TURB BLDG COOLING WATER LOW PRESS, alarms. The SER and panel indications show that the problem is with the Unit One TBCCW system. Which of the following describes what the alarm tile is telling the operator and what are the possible consequences if the condition is not corrected?

- a. There is low pressure at the inlet of the Unit One TBCCW Pumps. If not corrected, the loads cooled by TBCCW will overheat.
- b. There is low pressure at the outlet of the Unit One TBCCW Pumps. If not corrected, the loads cooled by TBCCW will overheat.
- c. There is a low level in the Unit One TBCCW expansion tank. If not corrected, the TBCCW pumps will trip on low suction pressure.
- d. There is a low level in the Unit One TBCCW expansion tank. If not corrected, selected loads cooled by TBCCW will auto trip on low cooling flow signals.

## QUESTION: 084 (1.00)

Given a copy of QCOP 5400-7 Att. A., determine the required Preheater Outlet Pressure to decrease 1B Recombiner Outlet temperature from 575°F to 550°F. Preheater outlet pressure is currently 250 psig.

- a. 160 psig
- b. 185 psig
- c. 195 psig
- d. 210 psig

## QUESTION: 085 (1.00)

QGA Detail D-1 tells you that an RRV water level instrument may not be used if Drywell temperature is at or above RRV Saturation Temperature.

This is because:

- a. the variable leg is assumed to have flashed, causing level to read falsely low.
- b. the reference leg is assumed to have flashed, causing level to read falsely high.
- c. both the variable and reference legs are assumed to have flashed, causing level to read falsely low.
- d. outgassing of non-condensibles is assumed to have occurred, causing level to read falsely high.

## QUESTION: 086 (1.00)

An ATWS has occurred, only one quarter of the control rods are inserted. RRV water level is being maintained between -120 and -80 inches. Reactor pressure is 850 psig. Hot Shutdown Boron Weight has just been injected. Under which condition below would you expect the reactor to go critical again?

- a. Cooldown of the reactor.
- b. Placing RCIC in service to maintain vessel level.
- c. Placing RWCU on service to stabilize reactor pressure.
- d. Decay of Xenon concentration over the next several hours.

## QUESTION. 087 (1.00)

According to QCFHP 110-2, Inadvertent Criticality During Fuel Moves, which of the following indications will positively identify a criticality event in progress while a fuel bundle is being lowered into the core during refueling operations?

- a. Source range monitor spiking repeatedly.
- b. A high refuel floor radiation alarm sounds.
- c. Refuel bridge reverse motion interlock activates.
- d. A sustained upward trend on the nearest source range instrument to the fuel bundle location.

## QUESTION: 088 (1.00)

Modification M-4-2-94-007, performed during the Spring 1995 Outage on Unit 2, installed four shroud stabilizers on the Core Shroud. What is the purpose of this modification?

- a. Minimize the possibility of shroud access cover failure.
- b. To add seismic restraints to limit vertical motion of the shroud.
- c. Prevent flow paths from inside the shroud to the annulus region.
- d. Prevent existing cracks from providing a flow path to drywell atmosphere.

QUESTION: 089 (1.00)

It has been determined that LPRM 24-57A must be bypassed. When the LPRM mode switch (S1) is placed in BYPASS the following annunciators are received at the 90X-5 panel.

- CHANNEL A/B NEUTRON MONITOR
- CHANNEL 1-3 APRM HI-HI OR INOP
- CHANNEL A REACTOR SCRAM

Which of the following is correct with regard to the LPRM system?

- a. The selected LPRM was the ninth detector bypassed in APRM 1.
- b. The selected LPRM was the eighth detector bypassed in APRM 3.
- c. The selected LPRM was the second A level detector bypassed in APRM 2.
- d. The selected LPRM was the third A level detector bypassed in APRM 3.

## QUESTION: 090 (1.00)

RCIC is operating in RPV pressure control mode following a transient from full power operations. RPV level was never lower than -35". The annunciator which indicates RCIC pump suction auto transfer actuates. Which one of the following describes the expected RCIC system response to these conditions?

- a. Torus suction valves, MO-25 & 26 open. CCST suction valve MO-22 remains open.
- b. Torus suction valves, MO-25 & 26 remain closed. CCST suction valve MO-22 remains open.
- c. Torus suction valves, MO-25 & 26 open. CCST suction valve MO-22 closes when MO-25 & 26 are full open.
- d. Torus suction valves, MO-25 & 26 open. CCST suction valve MO-22 closes as soon as MO-25 & 26 begin to open.

## QUESTION: 091 (1.00)

A plant startup is in progress. Assume all rods are fully inserted and RPV pressure is zero when rod pull to criticality is commenced. Which one of the following startup/heatup scenarios meets ALL of the Tech. Spec. requirements for a reactor startup?

	-F prior to pulling rods	-F when critical	-F at POAH	-F at POAH plus 30 min	-F at POAH plus 60 min
a.	85F	95F	102F	142F	182F
b.	95F	105F	108F	160F	200F
c.	105F	111F	115F	165F	210F
d.	115F	118F	120F	162F	222F

## QUESTION: 092 (1.00)

The plant is in Operational Mode 5. All shorting links have been removed to comply with Tech. Specs. A scram signal is received on both divisions of RPS.

Which of the following could have generated the trip signal?

- a. SRM down scale, <3cps.
- b. SRM detector not full in.
- c. SRM high count rate, 10E6 cps.
- d. SRM function switch not in OPERATE.

## QUESTION: 093 (1.00)

A plant transient has occurred which requires the injection of boron into the RPV via Standby Liquid Control. The operator places the SBLC system control switch to the 2+1 position. What is the expected response of the SBLC pumps to the initiation if the B SQUIB valve fails to fire?

- a. Both SBLC pumps should start and supply a total of 80 gpm to the RPV.
- b. Both SBLC pumps should start and supply a total of 40 gpm to the RPV.
- c. A SBLC pump should start and supply 40 gpm to the RPV, B SBLC pump remains off.
- d. A SBLC pump should start and supply 80 gpm to the RPV, B SBLC pump remains off.



## QUESTION: 094 (1.00)

The plant is operating at 100% steady state power. The operator notes the "A" steam line flow indicator, 640-23A, on 90X-5 is trending toward zero. Assume no operator action is taken. Which statement below describes the response of RPV level if this indicator continues to drop to zero?

RPV level will:

- a. decrease to the low level trip setpoint.
- b. increase to the high level trip setpoint.
- c. decrease and be maintained at a new, lower, steady state water level.
- d. increase and be maintained at a new, higher, steady state water level.

## QUESTION: 095 (1.00)

A LOCA is in progress. RHR Loop Select Logic has determined that injection into the RPV will be through the B recirculation loop. MO-1000-29B fails to automatically open when the reactor low pressure premissive is satisfied. Select the statement below that describes the action(s) necessary to initiate RHR LPCI flow into the RPV. Assume that RPV level remains below -59" and injection valve 29B cannot be opened.

- a. RHR injection valves 28A and 29A must be manually opened because of loop select interlocks.
- b. Reset the LPCI Loop Select Logic, RHR injection valves 28A and 29A will automatically open.
- c. Reset the LPCI Loop Select Logic, then open RHR injection valves 28A and 29A using the control switches on 90X-3.
- d. Wait for the 5 minute Loop Select Timer to time out, then open RHR injection valves 28A and 29A using the control switches on 90X-3.

## QUESTION: 096 (1.00)

Unit 1 is operating at full power when a transient occurs. During the transient, alarms 901-5-F-8, RX VESSEL LOW LEVEL, and 901-5 G-8, FW PUMP MAXIMUM CAPACITY, actuate, and RPV level is noted to be +5 inches and rising rapidly. The NSO attempts to control level manually. Which of the following is TRUE regarding manual RPV level control?

- a. The operator will have control over all feed reg valves, since RPV level is  $> -20$  inches.
- b. The operator will have control over the low flow valve, but not the main feed regulating valves.
- c. Placing feed regulating valve controllers in manual will have no effect on feed flow to the reactor.
- d. Depressing the 1A(B) VLV RESET pushbuttons on the 901-5 panel will allow the operator to control level manually.

## QUESTION: 097 (1.00)

The plant was operating at 100% rated power when the "A" recirculation pump tripped. As an immediate action of QCOA 0202-4, the operator is directed to monitor for oscillations indicating core instability. Which of the following is an indication that core wide oscillations are occurring?

- a. Excessive core plate Dp noise exceeding a value of 0.5 psi peak to peak.
- b. Regular oscillations of reactor water level with a 2-3 second periodicity.
- c. Noise signal on the LPRMs with a characteristic periodicity of 1.5 to 2.5 seconds.
- d. High values of APRM noise that occur with no regular frequency and are random in magnitude.

## QUESTION: 098 (1.00)

Unit 2 is operating at 80% power when the gland seal and gland steam 55 foot loop seal is blown; condenser vacuum begins to decrease. Which of the following IMMEDIATE actions should be taken?

- a. Trip the main turbine at 5 in. Hg back pressure.
- b. Continuously insert all CRAM rods to position 00.
- c. Reduce recirc flow and insert control rods as necessary.
- d. Send Rad Protection to monitor the turbine building for high airborne activity.

## QUESTION: 099 (1.00)

Unit 1 is in cold shutdown with RHR loop A in shutdown cooling when RHRSW is lost. The following plant conditions exist:

- Reactor water temperature is 190°F and rising at 2°F every 10 minutes.
- Reactor water level is +40 inches.
- The drywell airlock is open.
- Recirc loop A is in operation, loop B is secured.

Assuming that shutdown cooling cannot be restored, which of the following actions should be considered within the next 1 to 2 hours?

- a. Re-establish primary containment integrity.
- b. Increase CRD flow to promote shutdown cooling.
- c. Place the B recirculation loop back in service.
- d. Shut the MSIVs to prevent flooding the main steam lines.

## QUESTION: 100 (1.00)

Work in the area of the Unit 1 Reactor Building ventilation radiation monitors has resulted in the loss of signals from both the A and B radiation monitor channels. The crew should verify:

- a. Unit 1 Reactor Building ventilation has isolated.
- b. Reactor Building ventilation continues to operate normally.
- c. Only the inboard Reactor Building ventilation dampers have shut.
- d. Only the outboard Reactor Building ventilation dampers have shut.

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

ANSWER: 001

d.

REFERENCE:

QGA INTRO LP page 32,34  
295031K101 ..(KA's)

ANSWER: 002

b.

REFERENCE:

LIC-0207 page 16,18  
QCOP 207-1 page 2  
201006K511 ..(KA's)

ANSWER: 003

b.

REFERENCE:

LIC-1000 page 38  
219000K403 ..(KA's)

ANSWER: 004

a.

REFERENCE:

LIC-1000  
QCOA 1000 page 1  
203000K411 ..(KA's)

ANSWER: 005

a.

REFERENCE:

QCAN 901-8 E-9 2  
6000-1 Electrical Distribution  
262002K401 ..(KA's)

ANSWER: 006

a.

REFERENCE:

LIC-0201  
TSUP 3.6.H page 11  
290002G005 ..(KA's)

ANSWER: 007

d.

REFERENCE:

LIC-1200 page 12  
NLO-1200  
204000A204 ..(KA's)

ANSWER: 008

b.

REFERENCE:

LIC-1602 Figure 1  
295010K301 ..(KA's)

ANSWER: 009

c.

REFERENCE:

LIC-3900 page 12,26  
295031A108 ..(KA's)

ANSWER: 010

a.

REFERENCE:

LIC-4700  
QCAN 901(2)-5-A-1  
295019G005 ..(KA's)

ANSWER: 011

d.

REFERENCE:

LIC 5300 page 50  
QCOP 5100-5 page 3  
QCGP 1-1 Attachment A page 2  
245000K603 ..(KA's)

ANSWER: 012

b.

REFERENCE:

LIC-1000  
QCOP 1000-05 page 9  
205000K502 ..(KA's)

ANSWER: 013

d.

REFERENCE:

LIC-6000

OCAN-901(2)-8-G-10

245000K609 ..(KA's)

*Deleted per Chief Examiner  
no correct answer.*

ANSWER: 019

d.

REFERENCE:

ILF-1800 page 30

295034K101 ..(KA's)

ANSWER: 014

a.

REFERENCE:

4E-1400A

4E-1387B

LIC-5751 page 32

288000K402 ..(KA's)

ANSWER: 020

a.

REFERENCE:

LIC-0281 LP page 36

201002K301 ..(KA's)

ANSWER: 015

b.

REFERENCE:

LO/NLO-4100 page 30

QCOP 4100-4

286000K504 ..(KA's)

ANSWER: 021

b.

REFERENCE:

LIC 6600

264000K104 ..(KA's)

ANSWER: 016

d.

REFERENCE:

QOP 6900-1 page 6,7

263000K402 ..(KA's)

ANSWER: 022

b.

REFERENCE:

LIC-0500

212000K408 ..(KA's)

ANSWER: 017

a.

REFERENCE:

QGA 300 LP page 10

295032K104 ..(KA's)

ANSWER: 023

a.

REFERENCE:

4E-1431

4E-1430 Sheet 2

LIC 1400 page 50

4E-1430 Sheet 1

216000K306 ..(KA's)

ANSWER: 018

c.

REFERENCE:

QGA 500-3

295024K101 ..(KA's)

ANSWER: 024

b.

REFERENCE:

IC 0300-2

201001A204 ..(KA's)



ANSWER: 025

d.

REFERENCE:

LIC 300-2

201001A308 ..(KA's)

ANSWER: 026

a.

REFERENCE:

LIC-3200 page 80

259001K601 ..(KA's)

ANSWER: 027

a.

REFERENCE:

LIC-5652 Figure 6

295005K307 ..(KA's)

ANSWER: 028

b.

REFERENCE:

QGA 200 LP page 28

QGA Intro LP, page 33, 34

295013A101 ..(KA's)

ANSWER: 029

a.

REFERENCE:

QGA 6900-3 page 2

295004K203 ..(KA's)

ANSWER: 030

d.

REFERENCE:

QCOA 6100-3

295003K106 ..(KA's)

ANSWER: 031

b.

REFERENCE:

QCOS 0201-02

Steam Tables

295021A201 ..(KA's)

ANSWER: 032

c.

REFERENCE:

QGA 500-3 LP page 10,12

295029G012 ..(KA's)

ANSWER: 033

b.

REFERENCE:

LIC 1600-1 page 82,84

295024A204 ..(KA's)

ANSWER: 034

b.

REFERENCE:

QCOP 0600-02 page 3

295006K202 ..(KA's)

ANSWER: 035

a.

REFERENCE:

QGA 500-2 LP page 6

295031K305 ..(KA's)

ANSWER: 036

a.

REFERENCE:

QGA Details LP, pages 4, 6, and 8.

295028K203 ..(KA's)

ANSWER: 037

b.

REFERENCE:

QCOA 3500-1 page 2  
295014A102 ..(KA's)

ANSWER: 038

c.

REFERENCE:

QCAP 211-2 page 4  
294001A106 ..(KA's)

ANSWER: 039

b.

REFERENCE:

ILT 0500 page 44  
212000K412 ..(KA's)

ANSWER: 040

d.

REFERENCE:

QCAP 230-5 page 10  
294001K101 ..(KA's)

ANSWER: 041

c.

REFERENCE:

QOA 4700-6 page 3  
295019K203 ..(KA's)

ANSWER: 042

a.

REFERENCE:

QCOS 0700-07 page 5  
215002A205 ..(KA's)

ANSWER: 043

b.

REFERENCE:

LER 1-93-017  
QCAP 1100-5 page 5  
QCAP 1100-4  
294001A103 ..(KA's)

ANSWER: 044

c.

REFERENCE:

QCOA 3700-1 page 2  
295018K201 ..(KA's)

ANSWER: 045

b.

REFERENCE:

QARP 000-2 page 1  
QARP LP  
295016G011 ..(KA's)

ANSWER: 046

d.

REFERENCE:

LIC-0203 page 46  
218000K501 ..(KA's)

ANSWER: 047

a.

REFERENCE:

LIC-0203 page 38  
218000K102 ..(KA's)

ANSWER: 048

d.

REFERENCE:

LIC-1300 page 20  
217000A201 ..(KA's)

ANSWER: 049

deleted

REFERENCE:

LIC-2300 page 70

QCOP 2300-01, page 3 and 4

QCAN 901(2)-3 A-1

206000K419 ..(KA's)

ANSWER: 050

b.

REFERENCE:

IC-5652 page 70

241000A112 ..(KA's)

ANSWER: 051

b.

REFERENCE:

LO/NLO-6600 page 44

264000K401 ..(KA's)

ANSWER: 052

a.

REFERENCE:

LIC-7500 page 50

TSUP 3.7.P

261000G005 ..(KA's)

ANSWER: 053

c.

REFERENCE:

QOP 6400-2 page 1

294001K107 ..(KA's)

ANSWER: 054

c.

REFERENCE:

LO/NLO-1601

QCOP 2300-06 page 12

295026K101 ..(KA's)

ANSWER: 055

a.

REFERENCE:

QCOP 1200-11 page 2

LIC-1200

204000G010 ..(KA's)

ANSWER: 056

b.

REFERENCE:

ILT-HP-CH2

TH-HP-Chapter 2 page 6

QCAP 630-06, page 17

294001K103 ..(KA's)

ANSWER: 057

a.

REFERENCE:

ILT-HP-CH2

TH-HP-Chapter 2 page 20

QCAP 0620-01, page 8

294001K104 ..(KA's)

ANSWER: 058

a.

REFERENCE:

LIC-5450 page 44

QCAN 901(2)-3 C-2

271000K408 ..(KA's)

ANSWER: 059

b.

REFERENCE:

LIC-0705 page 32

215002K604 ..(KA's)

ANSWER: 060

c.

REFERENCE:

LIC-0202 page 94  
202002K102 ..(KA's)

ANSWER: 061

d.

REFERENCE:

LIC-0202 1 page 110  
202001K116 ..(KA's)

ANSWER: 062

a.

REFERENCE:

LIC-7500 page 22  
261000A201 ..(KA's)

ANSWER: 063

a.

REFERENCE:

QAP 0300-12 page 2,3  
Temp Alts OJT/OJE  
294001K102 ..(KA's)

ANSWER: 064

c.

REFERENCE:

QCAP 0211-02 page 11  
CREW-OJT  
294001A106 ..(KA's)

ANSWER: 065

b.

REFERENCE:

P&ID M38 AF  
LO/NLO-1900  
294001A107 ..(KA's)

ANSWER: 066

d.

REFERENCE:

Plant Process Computer  
QOP 9900-102 page 4  
294001A115 ..(KA's)

ANSWER: 067

a.

REFERENCE:

QOA 7000-01 page 2,3,6  
1600-2 Containment Auxiliaries  
223002K608 ..(KA's)

ANSWER: 068

d.

REFERENCE:

LIC-1000 page 88  
219000K202 ..(KA's)

ANSWER: 069

a.

REFERENCE:

LIC-0280  
QCOA 0280-01 page 1  
214000K303 ..(KA's)

ANSWER: 070

b.

REFERENCE:

QCOA 1900-1 page 2  
QCFHP 0110-05 page 1  
295023G010 ..(KA's)

ANSWER: 071

b.

REFERENCE:

LIC-1000  
QCOA 1000-02 page 5  
QCOP 1000-05 page 7  
205000K303 ..(KA's)

ANSWER: 072

b.

REFERENCE:

LIC-0800

QCOA 0202-01 page 1

295001A205 ..(KA's)

ANSWER: 073

d.

REFERENCE:

QCOA 0203-01 page 2

LIC-0203

295013A201 ..(KA's)

ANSWER: 074

b.

REFERENCE:

LIC-0500 page 42

295025K201 ..(KA's)

ANSWER: 075

c.

REFERENCE:

QGA 101 LP page 6

295037G007 ..(KA's)

ANSWER: 076

a.

REFERENCE:

LIC-0705 page 2

215002K401 ..(KA's)

ANSWER: 077

c.

REFERENCE:

QCAP 230-4 page 12

294001K102 ..(KA's)

ANSWER: 078

~~on~~ deleted

REFERENCE:

QCAP 0400-13 page 2

294001K107 ..(KA's)

ANSWER: 079

a.

REFERENCE:

QCOP 0201-11 page 3,4,5

216000K506 ..(KA's)

ANSWER: 080

c.

REFERENCE:

LIC-0600 page 54

259002K413 ..(KA's)

ANSWER: 081

c.

REFERENCE:

LIC-2400 page 38

223001K404 ..(KA's)

ANSWER: 082

a.

REFERENCE:

LIC-3700 page 22

295018G006 ..(KA's)

ANSWER: 083

b.

REFERENCE:

QCAN 912-1-D-2

LIC-3800

295018G005 ..(KA's)

ANSWER: 084

c.

REFERENCE:

QCOP 5400-7 Att. A.  
294001A108 ..(KA's)

ANSWER: 085

b.

REFERENCE:

QGA DETAILS LP page 6  
295028K203 ..(KA's)

ANSWER: 086

a.

REFERENCE:

QGA 101 LP page 34,36  
295037K104 ..(KA's)

ANSWER: 087

d.

REFERENCE:

LIC/FH-0805  
QCFHP 110-2 page 1  
295023K103 ..(KA's)

ANSWER: 088

c.

REFERENCE:

ILT 201-1 page 14  
290002K402 ..(KA's)

ANSWER: 089

a.

REFERENCE:

LIC-0703 page 62  
215005A308 ..(KA's)

ANSWER: 090

c.

REFERENCE:

LIC-1300  
217000A403 ..(KA's)

ANSWER: 091

c.

REFERENCE:

ILT 201-1 Figure 21  
QCGP 1-1 page 2  
0201-1 page 38  
290002G005 ..(KA's)

ANSWER: 092

c.

REFERENCE:

LIC 0700-1  
215004K402 ..(KA's)

ANSWER: 093

a.

REFERENCE:

LIC-1100 page 8,18  
211000A202 ..(KA's)

ANSWER: 094

c.

REFERENCE:

LIC 0600  
259002K603 ..(KA's)

ANSWER: 095

a.

REFERENCE:

LIC-1000 page 24  
203000A203 ..(KA's)

ANSWER: 096

c.

REFERENCE:

QCAN 901(2)-5 G-8 page 1

QCOA-0201-9 page 3

295009A102 ..(KA's)

ANSWER: 097

c.

REFERENCE:

QCOA-0202-4 page 6,7

295001G010 ..(KA's)

ANSWER: 098

c.

REFERENCE:

QOA 3300-02

295002G010 ..(KA's)

ANSWER: 099

a.

REFERENCE:

QCOA 1000-2

295021A201 ..(KA's)

ANSWER: 100

a.

REFERENCE:

LIC 1701 page 84

272000A309 ..(KA's)

(\*\*\*\*\* END OF E. (AMINATION) \*\*\*\*\*)



## ANSWER KEY

## MULTIPLE CHOICE

023 a

001 d

024 b

002 b

025 d

003 b

026 a

004 a

027 a

005 a

028 b

006 a

029 a

007 d

030 d

008 b

031 b

009 c

032 c

010 a

033 b

011 d

034 b

012 b

035 a

013 d

036 a

014 a

037 b

015 b

038 c

016 d

039 b

017 a

040 d

018 c

041 c

019 d

042 a

020 a

043 b

021 b

044 c

022 b

045 b

## ANSWER KEY

## MULTIPLE CHOICE

068 d

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

MULTIPLE CHOICE

091 c

092 c

093 a

094 c

095 a

096 c

097 c

098 c

099 a

100 a

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

**U. S. NUCLEAR REGULATORY COMMISSION  
QUAD CITIES NUCLEAR POWER STATION  
WRITTEN EXAMINATION**

**APPLICANT INFORMATION**

Name: MASTER EXAMINATION	Region: III
Date: 10/11/96	Facility/Unit: QUAD CITIES UNITS I & II
License Level: SRO	Reactor Type: GE

**INSTRUCTIONS**

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 percent. Examination papers will be picked up 4 hours after the examination starts.

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

\_\_\_\_\_  
Applicant's Signature

**RESULTS**

Examination Value	<u>98-100</u> Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

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

## QUESTION: 001 (1.00)

Given the following:

- HEATER 2B2 HIGH LEVEL alarm (901-6, E-2) actuates and will not reset.
- Feedwater temperature drops 30°F.
- Recirculation pumps are in Individual Manual.
- Reactor power has risen 3% and continues to rise.
- Reactor power is 55% and core flow is 55% (80% FCL).

You should:

- a. manually scram the reactor.
- b. reduce recirculation flow by 10%.
- c. insert Cram Array control rods to 00.
- d. drive the selected rod group to its target in position.

## QUESTION: 002 (1.00)

You are reviewing a surveillance completed from the Control Room. One step required an operator to open a valve on an instrument rack in the Reactor Building. How should completion of this step be recorded on the surveillance sheet?

- a. The local operator places his initials next to the completed step, followed by the NSOs initials.
- b. The local operator's initials, placed by the NSO, and the US's initials should be next to the completed step.
- c. The local operator's initials, placed by the NSO, and the NSO's initials should be next to the completed step.
- d. The US's initials, the NSO's initials, and the local operator's initials should be next to the completed step.

## QUESTION: 003 (1.00)

Given the following:

- A reactor startup is in progress.
- Reactor pressure is 920 psig.
- Reactor power is 3%.
- Core flow is 30%.

Which ONE of the following will directly result in a reactor scram?

- a. Main Turbine Trip
- b. Reactor power of 16%
- c. Full Group I isolation
- d. Main Condenser vacuum at 20" Hg

## QUESTION: 004 (1.00)

IAW QCAP 230-5, INDEPENDENT VERIFICATION, which of the following is the PREFERRED method for verifying the position of locked closed valve, 1-1001-127A, 1A RHR LOOP TO RB FLR DRN SUMP DRN VLV?

- a. Both verifiers check that the valve is locked in the S-lock log.
- b. Each verifier should remove the lock and attempt to close the valve.
- c. Both verifiers check that parameters downstream of the valve are correct.
- d. Turn the valve in the closed direction without removing the locking device.



QUESTION: 005 (1.00)

IAW QOA 4700-6, TOTAL LOSS OF INSTRUMENT AIR, 1(2)-3207A, the Low Flow Feedwater Regulator is closed in order to:

- a. prevent RFP runout.
- b. prevent a HPCI/RCIC isolation.
- c. prevent exceeding +48 inches RPV water level.
- d. isolate non-essential loads to preserve the air system as long as possible.

QUESTION: 006 (1.00)

Annunciator 901-5 A-7, RBM HIGH OR INOP, has just been received. From QOS 0005-03, "UNIT OPERATOR'S DAILY SURVEILLANCE OF NUCLEAR LIMITS", it has been determined that a Limiting Control Rod Pattern DOES exist.

You should:

- a. Leave the failed RBM channel in the tripped condition.
- b. Verify that one RBM channel is operable, then bypass the failed RBM channel.
- c. Bypass the failed RBM channel and establish a non-limiting control rod pattern.
- d. Bypass the failed RBM and station a second qualified person to verify rod movements.

## QUESTION: 007 (1.00)

A temporary modification to the Reactor Building Closed Cooling Water System requires that the intent of a step be changed in QCOP 3700-02, RBCCW System Startup and Operation. One interim procedure that affects QCOP 3700-02 is in effect but it affects a different step. What type of procedure change is required?

- a. A Procedure Change Request is required but only to review writing style.
- b. A Procedure Change Request is required with independent technical review.
- c. Write an additional interim procedure to supplement the existing QCOP 3700-02 and address the new concern.
- d. Conduct a 50.59 evaluation for the new concern and attach it to the current interim procedure to address the new concern.

## QUESTION: 008 (1.00)

Annunciator 912-1 D-1, "REACTOR BLDG COOLING WATER LOW PRESSURE", is received. In accordance with QCOA 3700-1, "RBCCW LOW PRESSURE", within one minute you should shutdown the:

- a. Drywell Coolers.
- b. Fuel Pool Cooling System.
- c. Reactor recirculation pumps.
- d. Reactor Water Cleanup System.

## QUESTION: 009 (1.00)

Which of the following is a symptom which could indicate a situation requiring use of the QARPs to bring the affected unit to a safe shutdown condition?

- a. Severe flooding in the RHR Room
- b. Severe, uncontrolled fire in any one plant area.
- c. Complete loss of AC power to the unit for 48 hours.
- d. Inability to scram the reactor from the Control Room.

## QUESTION: 010 (1.00)

Which of the following correctly describes the effect of placing the Drywell Pressure Reset keylock in RESET?

Placing the switch in RESET will:

- a. reset the ADS 110 second timer, if it has started.
- b. reset the ADS 8.5 minute timer, if it has started.
- c. cause ADS valves to close if they have opened on a valid initiation signal.
- d. prevent ADS initiation on LO LO level combined with high drywell pressure.

## QUESTION: 011 (1.00)

A high drywell pressure signal (2.5 psig) coincident with a low low reactor level signal (-59") is received but only one Core Spray pump and NO RHR pumps start. ADS will initiate:

- a. in 110 seconds.
- b. in 8.5 minutes.
- c. 110 seconds after an RHR pump is started.
- d. when the second CS pump or any RHR pump is started.

## QUESTION: 012 (1.00)

RCIC is in Standby when a valid initiation signal occurs.

The minimum flow valve 1(2)-1301-60 will:

- a. Automatically open and remain open.
- b. Remain closed regardless of changes in system flow.
- c. Remain open, then close when system flow reaches 40 gpm.
- d. Automatically open, then close when system flow reaches 80 gpm.

## QUESTION: 013 (1.00)

Given the following conditions:

- HPCI room temperature 150F.
- CCST level .7 feet (10,000 gals.)
- Reactor Pressure 150 psig.
- Pump Suction Pressure 10" Hg.
- Drywell Pressure 2.0 psig

*Deleted per Chief Examiner  
no correct answer.*

How will the HPCI system respond?

- a. HPCI turbine should trip.
- b. HPCI pump suction should transfer to the Torus.
- c. HPCI steam supply isolation valves should close.
- d. HPCI turbine exhaust vacuum breakers should close.

## QUESTION: 014 (1.00)

Given:

- Unit Two is at 100% power.
- Reactor recirculation flow control is in EGC local manual.

Which of the following describes the unit's response to reducing LOAD SET?

- a. Reactor pressure and reactor power will be increased.
- b. Recirculation flow and reactor power will be reduced.
- c. Recirculation flow will drop and reactor pressure will increase.
- d. Turbine megawatts will be reduced and reactor power will remain constant.

## QUESTION: 015 (1.00)

The Unit 1 Diesel Generator started on undervoltage and closed in to Bus 14-1. Annunciator 901-8 G8, "DIESEL GENERATOR 1 RELAY TRIP", was then received. The diesel generator breaker opened and the diesel shutdown.

What is the likely cause of the diesel generator breaker trip and subsequent diesel shutdown?

- a. A generator overcurrent condition.
- b. A generator differential overcurrent.
- c. An under frequency condition on Bus 14-1.
- d. A generator neutral winding overvoltage fault.

## QUESTION: 016 (1.00)

Unit 1 and Unit 2 are in COLD SHUTDOWN with one train of SBGTS out of service. Which ONE of the following changes in plant conditions would require BOTH trains of SBGTS to be operable?

- a. Unit 1 reactor water temperature rises above 212°F.
- b. Unit 2 Operational Mode is changed to MODE 5 (Refueling).
- c. Unit 1 has a loss Secondary Containment Differential pressure.
- d. Unit 2 Reactor Building Outlet Damper AO 2-5742A is failed shut.

## QUESTION: 017 (1.00)

Which ONE of the following practices should be used to ensure personnel safety when closing in disconnects to place a 345KV line in service?

- a. Wear a helmet with a face shield and 500 volt rubber gloves.
- b. Verify that any temporary ground connected to the line is properly attached.
- c. Verify both disconnect circuit breakers are open from the control room and locally.
- d. Leave protective cards hanging until the disconnect is closed and the breakers are shut.

## QUESTION: 018 (1.00)

A caution in QCOP 2300-6, HPCI SYSTEM MANUAL START-UP, states that HPCI system operation should be avoided with torus temperature above 140°F. What is the reason for this caution?

- a. Pump damage due to cavitation.
- b. Turbine damage due to high exhaust temperature.
- c. Equipment damage due to inadequate lube oil cooling.
- d. Inadequate condensing in the Barometric Condenser will cause high airborne radiation problems.



## QUESTION: 019 (1.00)

With the reactor operating normally at full power, RWCU valve MO-2-1201-133, DEMIN BYPASS, is being throttled to maintain RWCU pump discharge pressure while one RWCU filter demineralizer is removed from service. During the evolution the bypass valve is opened too far, causing RWCU pump discharge pressure to drop below 1050 psig. Which of the following actions may occur?

- a. RWCU pumps will experience runout.
- b. RWCU pumps will trip on low pump flow.
- c. RWCU system will isolate on high temperature.
- d. The remaining on-service RWCU demin will isolate on low flow.

## QUESTION: 020 (1.00)

This year you have accumulated 10 REM Shallow Dose exposure. How much more external dose whole body skin exposure can you receive before you exceed the Legal Annual limit?

- a. 65 Rem
- b. 40 REM
- c. 10 Rem
- d. 5 Rem

## QUESTION: 021 (1.00)

You are directed to enter a LOCKED HIGH RAD AREA to perform a valve lineup. You will need:

- a. a Timekeeper to control access.
- b. to wear Class 4 Protective Clothing.
- c. to be accompanied by an RP Supervisor.
- d. to carry a copy of the latest survey map with you.

## QUESTION: 022 (1.00)

Unit 2 is operating at 100% power when Annunciator 902-3 C-2, "OFFGAS HIGH-HIGH RADIATION", is received. Which ONE of the following AUTOMATIC actions will occur?

- a. AO 2-5406, "OFFGAS TO STACK OR VENT" will close 15 mins. after the alarm is received.
- b. AO 5401A and B and 5402A and B, "SJAЕ SUCTION VLVS", close 15 mins. after the alarm is received.
- c. SO 2-5437, "PRESS DRN TK OUTLET", closes immediately, followed by AO 2-5406, "OFFGAS TO STACK OR VENT" closing 15 mins. later.
- d. AO 2-5408, "HOLDUP PIPE DRN", valve closes and the Charcoal Adsorber is automatically placed into service 15 mins. after the alarm is received.

## QUESTION: 023 (1.00)

Given the following conditions on Unit 1:

- Reactor power is 40%
- APRM "3" fails "Downscale"
- APRM "3" has not been bypassed

Due to this, Rod Block Monitor (RBM) Channel "7":

- a. is not affected.
- b. is automatically bypassed.
- c. generates a rod withdrawal block.
- d. shifts to an alternate reference APRM.

## QUESTION: 024 (1.00)

Given:

- Core thermal power is 37% of rated.
- Total core flow is 42 M lb/hr.

Which ONE of the following transients, or evolutions, will drive the plant closer to the instability region? Assume NO operator action. (Refer to figure 0202-24 as necessary.)

- a. Increasing recirc. flow.
- b. Lowering Main Condenser Vacuum.
- c. A Continuous Control Rod Withdrawal.
- d. Placing a "D" Feedwater Heater in service.

## QUESTION: 025 (1.00)

Which of the following Reactor recirculation conditions could interfere with proper LPCI Loop Selection?

	Reactor Power	Recirc Pump A Speed	Recirc Pump B Speed
a.	90%	100%	92%
b.	100%	102%	96%
c.	45%	37%	32%
d.	70%	93%	77%

## QUESTION: 026 (1.00)

Both Units are in Mode 5, no fuel moves are in progress. The 1/2 A SBGTS is in PRIMARY and the 1/2 B SBGTS is in STANDBY for upcoming System Engineering testing. RPS "B" is momentarily de-energized while swapping RPS power supplies from RESERVE to NORMAL. PCIS Group 2 Trip B trips on the loss of RPS.

How will the SBGTS system be affected?

- a. 1/2 SBGTS "B" will automatically start 25 seconds after the loss of RPS.
- b. 1/2 SBGTS "A" will automatically start 25 seconds after the loss of RPS.
- c. Both SBGTS trains will remain off since only 1/2 of an initiation signal is present.
- d. 1/2 SBGTS "A" will automatically start, 1/2 SBGTS "B" will automatically start 25 seconds later causing "A" to trip.

QUESTION: 027 (1.00)

Which one of the following would qualify as a "Temporary Alteration" as defined in QAP 300-12, "Temporary Alterations"?

- a. A circuit card is pulled to disable an annunciator.
- b. A hose is installed to drain a heat exchanger under an OOS.
- c. Installation of an electrical jumper for testing under an approved work procedure which is to be completed within 24 hours.
- d. An electrical lead is lifted in accordance with a surveillance procedure which is to be completed by the end of shift.

QUESTION: 028 (1.00)

Which of the following alarms is REQUIRED to be logged in the Nuclear Station Operator (NSO) Unit 2 Log?

- a. All unexpected alarms.
- b. An alarm that comes in and clears within 5 minutes.
- c. An unexpected alarm received during plant shutdown that clears after 8 minutes.
- d. An expected alarm received during a surveillance that is in for the duration of the surveillance.

## QUESTION: 029 (1.00)

Using the attached P&ID (M-38), determine how FCV 1-1901-58 will be affected by a loss of MCC 18-3. The valve will:

- a. fail in the open position.
- b. fail in the closed position.
- c. lock up in its current position.
- d. remain in its current position, due to the power feed swapping to MCC 19-4.

## QUESTION: 030 (1.00)

Which ONE of the following describes the operation of the PCIS Status Box on the Safety Parameter Display System (SPDS)?

- a. A 1/2 Group Isolation signal with no valve movement will cause a RED light.
- b. A full Group Isolation signal with no valve movement will cause a GREEN light.
- c. A full Group Isolation signal with 2 out of 2 isolation valves in a line closed will cause a RED light.
- d. A full Group Isolation signal with 1 out of 2 isolation valves in a line closed will cause a GREEN light.

## QUESTION: 031 (1.00)

A reactor scram occurs. QGA 100 has been entered. Shortly after the scram RPS "A" is lost. What ONE of the following describes the effect on the operators ability to control RPV pressure?

- a. RWCU is isolated and unavailable for pressure control.
- b. The Inboard RCIC Isolation valve is closed, making RCIC unavailable for pressure control.
- c. The Inboard MSIVs are closed, making the Main Condenser unavailable for pressure control.
- d. The Inboard MSL Drain Valve is closed, making the MSL Drains unavailable for pressure control.

## QUESTION: 032 (1.00)

Maximum torus cooling is in service on Unit 2 when an electrical fault causes Bus 23-1 to deenergize. All other buses remain energized. Which one of the following describes how the torus cooling lineup will be affected by this bus loss?

- a. The 2C and 2D RHR Pumps and the 2C and 2D RHRSW Pumps will be deenergized.
- b. All RHR Pumps will be operable; the 2A and 2B RHRSW Pumps will be deenergized.
- c. The 2A and 2B RHR Pumps and the 2A and 2B RHRSW Pumps will be deenergized.
- d. The 2A and 2B RHR Pumps will be deenergized; all RHRSW Pumps will be operable.



## QUESTION: 033 (1.00)

Unit 2 is at 100% power when the RPIS SYS INOP annunciator is received. Subsequently, a recirc. pump seal fails on the "B" pump. The RPIS failure is preventing insertion of the selected rod group.

The NSO should:

- a. Scram the reactor.
- b. Insert the CRAM array.
- c. Reduce recirculation flow to 44 Mlbm/hr.
- d. Drive rods in reverse sequence to 00 using Emergency In.

## QUESTION: 034 (1.00)

While moving a spent fuel bundle in the Fuel Pool, a Fuel Pool Storage Low Level Alarm is received and Fuel Pool Level is confirmed to be decreasing.

WHICH ONE of the following is the expected immediate operator action?

- a. Hold the bundle at its current height and stop further bridge movement.
- b. Determine the nearest open storage location and place the bundle in that location.
- c. Return the bundle to its original location (assume that it is not the nearest open location).
- d. Complete the move by placing the bundle in its required new position (assume that it is not the nearest open location).

## QUESTION: 035 (1.00)

Unit 2 is in Cold Shutdown with both recirc pumps secured. RHR loop B is aligned for SDC but secured. Moderator temperature is 145°F and stable. Vessel level is 96 inches. Inadvertent cycling of MO-2-1001-43A, RHR PUMP SDC SUCTION VLV with the "A" RHR pump drains open resulting in a vessel level drop of 8 inches.

Which of the following conditions now exist?

- a. RPV level is too low to ensure NPSH for restart of RHR pumps.
- b. RPV level is too low to support natural circulation in the vessel.
- c. RPV level is too low to maintain the upper 400 GEMAC reference leg full.
- d. Level is low enough that restart of a recirc pump may cause an inadvertent low level scram signal.

## QUESTION: 036 (1.00)

In addition to a sudden rise in indicated total core flow, which one of the following indications would be indicative of a jet pump failure?

- a. A rise in core thermal power.
- b. A drop in core plate differential pressure.
- c. A rise in main generator electrical output.
- d. A drop in individual recirc pump flow for a given speed.

## QUESTION: 037 (1.00)

Unit 2 is operating at 60% power with a HPCI surveillance in progress when the following annunciator is received:

- 3A TARGET ROCK RELIEF VLV OPEN

Assuming reactor pressure is normal, when would the crew be REQUIRED to initiate a manual reactor scram?

- a. When Torus Bulk Water Temperature reaches 95°F.
- b. When Torus Bulk Water Temperature reaches 110°F.
- c. Immediately AFTER verifying the safety relief valve (SRV) is actually open.
- d. Immediately, IF the SRV is actually open and it cannot be closed with the keylock switch.

## QUESTION: 038 (1.00)

Unit 2 is operating at approximately 90% rated power when a voltage transient in the EHC electrical system causes reactor steam dome pressure to increase to 1065 psig. Which one of the following statements describes the final plant conditions following this transient?

- a. The reactor scrams and the reactor recirculation pumps trip.
- b. The reactor scrams and the reactor recirculation pumps run back to minimum speed.
- c. The main turbine control valves open slightly to lower reactor pressure, then return to their original position.
- d. The main turbine bypass valves open to lower reactor pressure, then close after reactor pressure returns to normal.

## QUESTION: 039 (1.00)

An ATWS has occurred as the reactor failed to scram on high drywell pressure. Which of the following could occur if ADS initiated when level is intentionally lowered below the ADS initiation setpoint?

- a. A rapid cooldown of the moderator in the core, leading to a substantial power increase.
- b. A large reduction in control rod worth because of voiding, leading to a power excursion.
- c. An increase in injection of relatively cold, unborated water resulting in a rapid power rise.
- d. Loss of boron from the RPV to the torus, resulting in additional time required to shut down the reactor.

QUESTION: 040 (1.00)

Complete the following statement:

The basis for the RBM rod block function is to prevent exceeding the:

- a. MCPR Safety Limit for a single rod withdrawal error from a limiting control rod pattern.
- b. LHGR Limit for a fuel node during a single rod withdrawal error from any control rod pattern.
- c. MCPR Operating Limit for multiple rod withdrawal errors from a limiting control rod pattern.
- d. APLHGR Limit for a fuel bundle during multiple rod withdrawal errors from any control rod pattern.

QUESTION: 041 (1.00)

When can a check valve be used as an isolation boundary for an Out of Service?

- a. It is not allowed.
- b. If both upstream and downstream sides of the valve are depressurized.
- c. If the valve is gagged closed with an OOS card on the gagging device.
- d. If the valve is in series with a gate, globe, or ball valve that is closed on the OOS.

QUESTION: 042 (1.00)

*Delete per Chief Examiner  
correct answer is not immediate  
action*

Which of the following immediate actions is appropriate when replacing a blown fuse? (No Emergency Exists.)

- a. Ensure a PIF is written
- b. Contact engineering prior to replacing the fuse, if it is like for like.
- c. Immediately replace the fuse with one of the same amperage rating, until a like for like can be found.
- d. Immediately replace the fuse with one of the same voltage rating, until a like for like can be found.

## QUESTION: 043 (1.00)

Drywell temperature is 200°F. The RPV was RAPIDLY depressurized from 1000 psig to 50 psig. Which ONE of the following correctly describes the effect of the RVWLIS backfill modification on RPV level indication during this transient?

- a. Wide and Narrow range RPV level indication remains reliable throughout the transient since no gasses come out of solution.
- b. Narrow range level indication remains accurate but Wide range level is unreliable since RVWLIS is not connected to Wide range instruments.
- c. Wide range level indication remains accurate but Narrow range level is unreliable since RVWLIS is not connected to Narrow range instruments.
- d. Wide and Narrow range RPV level indication is unreliable since RVWLIS is designed to counteract the effects of vaporization of reference leg water.



## QUESTION: 044 (1.00)

With Unit 1 at full load, how will the 1B Feed Water Regulating Valve respond to a trip of the valve's hydraulic pumps?

- a. The valve will continue to operate in AUTOMATIC using the standby pump from the 1A skid.
- b. The valve immediately locks in place with the loss of power to both hydraulic pumps.
- c. The valve will operate using accumulator pressure until low oil pressure causes a lockup.
- d. The valve will automatically close and the 1A valve will open as needed to provide feed flow to the reactor.

## QUESTION: 045 (1.00)

Which of the following describes the response of the CAM system when reactor water level reaches -59 inches?

- a. Either the Torus sample valves or the Drywell sample valves will open immediately on each subsystem.
- b. Both the Torus sample valves and the Drywell sample valves will open immediately on the selected subsystem.
- c. Either the torus or drywell sample valves will open when 8 1/2 minutes has expired or RPV pressure drops to 325 psig.
- d. Both subsystems will receive a permissive signal; their selected valves will not open until Drywell pressure reaches 2.5 psig.

## QUESTION: 046 (1.00)

With the 1/2C RBCCW Pump running on Bus 19, what actions must be taken to restart the pump on Bus 19 if a LOCA on Unit One causes Drywell pressure to increase > 2.5 psig?

- a. Place BOTH of the U1 DIV I and DIV II DW CLR/RBCCW/FPC TRIP BYPASS Switches in the BYPASS position and manually restart the pump.
- b. Place BOTH of the U1 DIV I and DIV II DW CLR/RBCCW/FPC TRIP BYPASS Switches in the BYPASS position and the pump will restart automatically.
- c. Place EITHER the U1 DIV I or the U2 DIV 1 DW CLR/RBCCW/FPC TRIP BYPASS Switches in the BYPASS position and manually restart the pump.
- d. Place EITHER the U1 DIV I or the U2 DIV 1 DW CLR/RBCCW/FPC TRIP BYPASS Switches in the BYPASS position and the pump will restart automatically.

## QUESTION: 047 (1.00)

With Unit One at full power, annunciator 912-1-D-2, TURB BLDG COOLING WATER LOW PRESS, alarms. The SER and panel indications show that the problem is with the Unit One TBCCW system. Which of the following describes what the alarm tile is telling the operator and what are the possible consequences if the condition is not corrected?

- a. There is low pressure at the inlet of the Unit One TBCCW Pumps. If not corrected, the loads cooled by TBCCW will overheat.
- b. There is low pressure at the outlet of the Unit One TBCCW Pumps. If not corrected, the loads cooled by TBCCW will overheat.
- c. There is a low level in the Unit One TBCCW expansion tank. If not corrected, the TBCCW pumps will trip on low suction pressure.
- d. There is a low level in the Unit One TBCCW expansion tank. If not corrected, selected loads cooled by TBCCW will auto trip on low cooling flow signals.

## QUESTION: 048 (1.00)

Given a copy of QCOP 5400-7 Att. A., determine the required Preheater Outlet Pressure to decrease 1B Recombiner Outlet temperature from 575°F to 550°F. Preheater outlet pressure is currently 250 psig.

- a. 160 psig
- b. 185 psig
- c. 195 psig
- d. 210 psig

## QUESTION: 049 (1.00)

QGA Detail D-1 tells you that an RPV water level instrument may not be used if Drywell temperature is at or above RPV Saturation Temperature.

This is because:

- a. the variable leg is assumed to have flashed, causing level to read falsely low.
- b. the reference leg is assumed to have flashed, causing level to read falsely high.
- c. both the variable and reference legs are assumed to have flashed, causing level to read falsely low.
- d. outgassing of non-condensibles is assumed to have occurred, causing level to read falsely high.

## QUESTION: 050 (1.00)

An ATWS has occurred, only one quarter of the control rods are inserted. RPV water level is being maintained between -120 and -80 inches. Reactor pressure is 850 psig. Hot Shutdown Boron Weight has just been injected. Under which condition below would you expect the reactor to go critical again?

- a. Cooldown of the reactor.
- b. Placing RCIC in service to maintain vessel level.
- c. Placing RWCU on service to stabilize reactor pressure.
- d. Decay of Xenon concentration over the next several hours.

## QUESTION: 051 (1.00)

According to QCFHP 110-2, Inadvertent Criticality During Fuel Moves, which of the following indications will positively identify a criticality event in progress while a fuel bundle is being lowered into the core during refueling operations?

- a. Source range monitor spiking repeatedly.
- b. A high refuel floor radiation alarm sounds.
- c. Refuel bridge reverse motion interlock activates.
- d. A sustained upward trend on the nearest source range instrument to the fuel bundle location.

## QUESTION: 052 (1.00)

Modification M-4-2-94-007, performed during the Spring 1995 Outage on Unit 2, installed four shroud stabilizers on the Core Shroud. What is the purpose of this modification?

- a. Minimize the possibility of shroud access cover failure.
- b. To add seismic restraints to limit vertical motion of the shroud.
- c. Prevent flow paths from inside the shroud to the annulus region.
- d. Prevent existing cracks from providing a flow path to drywell atmosphere.

QUESTION: 053 (1.00)

It has been determined that LPRM 24-57A must be bypassed. When the LPRM mode switch (S1) is placed in BYPASS the following annunciators are received at the 90X-5 panel.

- CHANNEL A/B NEUTRON MONITOR
- CHANNEL 1-3 APRM HI-HI OR INOP
- CHANNEL A REACTOR SCRAM

Which of the following is correct with regard to the LPRM system?

- a. The selected LPRM was the ninth detector bypassed in APRM 1.
- b. The selected LPRM was the eighth detector bypassed in APRM 3.
- c. The selected LPRM was the second A level detector bypassed in APRM 2.
- d. The selected LPRM was the third A level detector bypassed in APRM 3.

## QUESTION: 054 (1.00)

RCIC is operating in RPV pressure control mode following a transient from full power operations. RPV level was never lower than -35". The annunciator which indicates RCIC pump suction auto transfer actuates. Which one of the following describes the expected RCIC system response to these conditions?

- a. Torus suction valves, MO-25 & 26 open. CCST suction valve MO-22 remains open.
- b. Torus suction valves, MO-25 & 26 remain closed. CCST suction valve MO-22 remains open.
- c. Torus suction valves, MO-25 & 26 open. CCST suction valve MO-22 closes when MO-25 & 26 are full open.
- d. Torus suction valves, MO-25 & 26 open. CCST suction valve MO-22 closes as soon as MO-25 & 26 begin to open.



## QUESTION: 055 (1.00)

A plant startup is in progress. Assume all rods are fully inserted and RPV pressure is zero when rod pull to criticality is commenced. Which one of the following startup/heatup scenarios meets ALL of the Tech. Spec. requirements for a reactor startup?

(Use the attached Minimum Reactor Vessel Metal Temperature vs. Reactor Vessel Pressure curve as necessary)

	-F prior to pulling rods	-F when critical	-F at POAH	-F at POAH plus 30 min	-F at POAH plus 60 min
a.	85F	95F	102F	142F	182F
b.	95F	105F	108F	160F	200F
c.	105F	111F	115F	165F	210F
d.	115F	118F	120F	162F	222F

## QUESTION: 056 (1.00)

The plant is in Operational Mode 5. All shorting links have been removed to comply with Tech. Specs. A scram signal is received on both divisions of RPS.

Which of the following could have generated the trip signal?

- a. SRM down scale, <3cps.
- b. SRM detector not full in.
- c. SRM high count rate, 10E6 cps.
- d. SRM function switch not in OPERATE.

QUESTION: 057 (1.00)

A plant transient has occurred which requires the injection of boron into the RPV via Standby Liquid Control. The operator places the SBLC system control switch to the 2+1 position. What is the expected response of the SBLC pumps to the initiation if the B SQUIB valve fails to fire?

- a. Both SBLC pumps should start and supply a total of 80 gpm to the RPV.
- b. Both SBLC pumps should start and supply a total of 40 gpm to the RPV.
- c. A SBLC pump should start and supply 40 gpm to the RPV, B SBLC pump remains off.
- d. A SBLC pump should start and supply 80 gpm to the RPV, B SBLC pump remains off.

## QUESTION: 058 (1.00)

The plant is operating at 100% steady state power. The operator notes the "A" steam line flow indicator, 640-23A, on 90X-5 is trending toward zero. Assume no operator action is taken. Which statement below describes the response of RPV level if this indicator continues to drop to zero?

RPV level will:

- a. decrease to the low level trip setpoint.
- b. increase to the high level trip setpoint.
- c. decrease and be maintained at a new, lower, steady state water level.
- d. increase and be maintained at a new, higher, steady state water level.

## QUESTION: 059 (1.00)

A LOCA is in progress. RHR Loop Select Logic has determined that injection into the RPV will be through the B recirculation loop. MO-1000-29B fails to automatically open when the reactor low pressure premissive is satisfied. Select the statement below that describes the action(s) necessary to initiate RHR LPCI flow into the RPV. Assume that RPV level remains below -59" and injection valve 29B cannot be opened.

- a. RHR injection valves 28A and 29A must be manually opened because of loop select interlocks.
- b. Reset the LPCI Loop Select Logic, RHR injection valves 28A and 29A will automatically open.
- c. Reset the LPCI Loop Select Logic, then open RHR injection valves 28A and 29A using the control switches on 90X-3.
- d. Wait for the 5 minute Loop Select Timer to time out, then open RHR injection valves 28A and 29A using the control switches on 90X-3.

## QUESTION: 060 (1.00)

Unit 1 is operating at full power when a transient occurs. During the transient, alarms 901-5-F-8, RX VESSEL LOW LEVEL, and 901-5 G-8, FW PUMP MAXIMUM CAPACITY, actuate, and RPV level is noted to be + 5 inches and rising rapidly. The NSO attempts to control level manually. Which of the following is TRUE regarding manual RPV level control?

- a. The operator will have control over all feed reg valves, since RPV level  $> -20$  inches.
- b. The operator will have control over the low flow valve, but not the main feed regulating valves.
- c. Placing feed regulating valve controllers in manual will have no effect on feed flow to the reactor.
- d. Depressing the 1A(B) VLV RESET pushbuttons on the 901-5 panel will allow the operator to control level manually.

## QUESTION: 061 (1.00)

The plant was operating at 100% rated power when the "A" recirculation pump tripped. As an immediate action of QCOA 0202-4, the operator is directed to monitor for oscillations indicating core instability. Which of the following is an indication that core wide oscillations are occurring?

- a. Excessive core plate Dp noise exceeding a value of 0.5 psi peak to peak.
- b. Regular oscillations of reactor water level with a 2-3 second periodicity.
- c. Noise signal on the LPRMs with a characteristic periodicity of 1.5 to 2.5 seconds.
- d. High values of APRM noise that occur with no regular frequency and are random in magnitude.

## QUESTION: 062 (1.00)

Unit 2 is operating at 80% power when the gland seal and gland steam 55 foot loop seal is blown; condenser vacuum begins to decrease. Which of the following IMMEDIATE actions should be taken?

- a. Trip the main turbine at 5 in. Hg back pressure.
- b. Continuously insert all CRAM rods to position 00.
- c. Reduce recirc flow and insert control rods as necessary.
- d. Send Pad Protection to monitor the turbine building for high airborne activity.

## QUESTION: 063 (1.00)

Unit 1 is in cold shutdown with RHR loop A in shutdown cooling when RHRSW is lost. The following plant conditions exist:

- Reactor water temperature is 190°F and rising at 2°F every 10 minutes.
- Reactor water level is +40 inches.
- The drywell airlock is open.
- Recirc loop A is in operation, loop B is secured.

Assuming that shutdown cooling cannot be restored, which of the following actions should be considered within the next 1 to 2 hours?

- a. Re-establish primary containment integrity.
- b. Increase CRD flow to promote shutdown cooling.
- c. Place the B recirculation loop back in service.
- d. Shut the MSIVs to prevent flooding the main steam lines.

## QUESTION: 064 (1.00)

Work in the area of the Unit 1 Reactor Building ventilation radiation monitors has resulted in the loss of signals from both the A and B radiation monitor channels. The crew should verify:

- a. Unit 1 Reactor Building ventilation has isolated.
- b. Reactor Building ventilation continues to operate normally.
- c. Only the inboard Reactor Building ventilation dampers have shut.
- d. Only the outboard Reactor Building ventilation dampers have shut.



## QUESTION: 065 (1.00)

Which of the following is a responsibility of the Acting Station Director/Station Director?

- a. Require the general public to shelter or evacuate as needed.
- b. Distribute potassium iodide tablets to the general populace.
- c. Provide for access control to the Control Room, TSC, and OSC, as appropriate.
- d. Authorization of personnel exposure beyond 10CFR20 limits under emergency conditions.

## QUESTION: 066 (1.00)

During a GSEP condition, state agency updates are required. If an ALERT were declared at 0945 the initial state agency notification should be done by \_\_\_\_\_, and updates should be done by \_\_\_\_\_ and \_\_\_\_\_.

- a. 1015, 1000, 1200
- b. 1000, 1200, 1300
- c. 1015, 1145, 1245
- d. 1000, 1100, 1200

## QUESTION: 067 (1.00)

Given the following initial conditions:

- Unit 1 is in cold shutdown during a maintenance outage.
- Shutdown Cooling is in service on the "A" RHR Loop.
- Bus 14-1 is de-energized for maintenance.
- All other buses are energized.

A transient results in a loss of Bus 13-1. Reactor water temperature is slowly rising and is now 215°F. Your required actions are:

- a. Trip the "A" Recirc. Pump.
- b. Confirm LPCI has initiated.
- c. Evacuate the Reactor Building.
- d. Confirm a Group 2 isolation has occurred.

## QUESTION: 068 (1.00)

QGA 500-2, STEAM COOLING, directs RPV Blowdown when RPV water level reaches -184 inches and no injection source is available. Why is this action taken?

- a. Blowdown results in significant void formation which reduces reactor power production.
- b. Blowdown increases steam flow up through the core improving heat transfer from the fuel.
- c. At lower pressures, less enthalpy is required to create steam, thus more steam is available for cooling.
- d. RPV Blowdown dumps any radioactivity resulting from fuel failure into the torus, preventing uncontrolled release later.

## QUESTION: 069 (1.00)

A LOCA has occurred. Reactor pressure is 150 psig. Drywell temperature is 260°F, and Reactor building temperature at 198°F. The following reactor water levels are noted:

Yarway wide range	-110 inches
GEMAC lower 400	-140 inches
Yarway narrow range	-50 inches
GEMAC upper 400	+80 inches

Which of the above level indicators cannot be used in these plant conditions?

- a. GEMAC upper 400
- b. GEMAC lower 400
- c. Yarway wide range
- d. Yarway narrow range

QUESTION: 070 (1.00)

PRIMARY CONTAINMENT CONTROL, QGA 200, has an override that states:

IF: Drywell pressure drops BELOW 2.5 psig  
THEN: Stop Drywell sprays.

Which of the following statements describes the reason for this step?

- a. 2.5 psig corresponds to 180°F, so there is no need to continue drywell sprays.
- c. It makes one more RHR loop available as soon as possible for injection into the reactor pressure vessel.
- c. This action ensures that the drywell structure doesn't endure excessive thermal stresses due to rapid cooldown.
- d. It prevents drawing a negative pressure in the containment, which would open the vacuum breakers and draw air into the containment.

## QUESTION: 071 (1.00)

Unit 1 has experienced a LOCA in the drywell as the "A" FW line failed at the vessel nozzle. HPCI is being used to maintain RPV level. With HPCI flow at 2500 gpm and reactor pressure at 250 psig and dropping slowly, level is constant at -80 inches CRD, CS and RHR are operable. A HPCI Room high area temperature alarm is received and HPCI Room temperature is 152°F and rising. An EA confirms that there is a steam leak on the HPCI governor valve.

Which action below should be taken?

- a. Isolate HPCI.
- b. Conduct an RPV Blowdown.
- c. Anticipate RPV Blowdown and rapidly depressurize.
- d. Evacuate the HPCI room and install jumpers to defeat the automatic isolation.

## QUESTION: 072 (1.00)

An entry into the Unit One LP Heater Bay at power is scheduled to repair a heater LCV. Hydrogen addition is on at normal flow rates. Admission to the area may be granted by:

- a. The Operations Shift Supervisor.
- b. The Radiation Protection Shift Supervisor.
- c. Operations and Radiation Protection Supervision.
- d. The Radiation Protection Technician and Work Supervisor in charge of the job.

## QUESTION: 073 (1.00)

The plant is operating at 100% power and has been for the last two weeks. The chemist calls the control room and informs the operator:

- Cl is 0.6 ppb
- COND is 0.066 F/T
- I-131 is 6.5 uCi/g.
- SO4 is 1.2 ppb

You should:

- a. after 48 hours, reactor water must be sampled every 4 hours until within the limits.
- b. isolate all main steam lines within 12 hours or be in at least HOT SHUTDOWN within the following 12 hours.
- c. immediately begin sampling reactor water every 4 hours. After 48 hours, if the condition is not corrected, close the MSIVs.
- d. enter a 48 hour LCO has been entered, if the problem can not be fixed within 48 hours the plant must be in HOT SHUTDOWN with the main steam lines closed in 12 hours.

## QUESTION: 074 (1.00)

QGA 200, "Primary Containment Control," primary containment pressure control path, directs the primary containment to be vented. Why does the procedure direct the operator to vent via the torus as the preferred method vice via the drywell? Venting the primary containment via the torus will:

- a. Reduce the levels of radioactivity released as it passes through the water in the torus.
- b. Allow better control of the release rate due to the sizing of the path's piping and valves.
- c. Allow a more rapid reduction in primary containment pressure than venting from the drywell
- d. Minimize chugging due to loss of non-condensibles from the drywell atmosphere.



QUESTION: 075 (1.00)

Complete the following statement:

Three fission product barriers would be considered lost if:

- a. A casualty occurs which leads to a TAF blowdown. RPV flooding is subsequently entered and level is restored on the narrow range level instruments.
- b. A fuel failure results in a sustained 120 R/hour on the DW radiation monitors and a Group I isolation occurs due to sustained HI-HI radiation on the MSL radiation monitors.
- c. A large LOCA results in DW pressure peaking at 12.5# and vessel level below TAF. All isolations and auto starts occur as designed. Vessel level drops to -134" for several minutes and is subsequently restored.
- d. A steam leak occurs in the MSIV Room resulting in room temperatures of 320°F. The Group I isolation fails; however, ECCS Systems operate correctly and restore vessel level prior to reaching TAF.

## QUESTION: 076 (1.00)

Given the following plant conditions:

- Rx pressure is 900 psig
- Rx scram and all rods are in to 00
- MSIVs are closed
- RPV level -142" and lowering
- No high pressure injection systems are available

The Unit Supervisor directs RPV blowdown per QGA 500-1. The operator reports only four ADS valves opened. Which of the following actions is required?

- a. Enter QGA 500-2 to steam cool the core since four ADS valves will not depressurize the RPV.
- b. Allow the vessel to depressurize through the open ADS valves.
- c. Re-open MSIVs to establish condenser as a heat sink and open the turbine bypass valves.
- d. Enter QGA 500-4 to flood the RPV since the condenser is unavailable.

## QUESTION: 077 (1.00)

Following a major transient, the following conditions exist:

- Torus Pressure 15 psig
- Torus Water Level 14 ft.
- Torus Water Temperature 145°F
- DW Pressure 4 psig
- DW Temperature 275°F and INCREASING
- Reactor Pressure 1000 psig and STABLE
- RPV Water Level +9 inches and INCREASING

What action should be taken to control containment parameters?

- a. Conduct an RPV Blowdown.
- b. Initiate Drywell sprays.
- c. Vent the Torus using SBT.
- d. Reduce RPV pressure to at least below 900 psig.

## QUESTION: 078 (1.00)

Given the following information:

- Torus pressure is 0 psig
- Torus level is 10 feet
- Torus temperature is 150°F.
- RHR Pump "A" is the only available RHR pump.

What is the approximate MAXIMUM flow that can be achieved with NO LPCI pump cavitation?

- a. 3000 gpm
- b. 4000 gpm
- c. 5000 gpm
- d. 6000 gpm

## QUESTION: 079 (1.00)

Control Rod J-1 was selected and was given a notch-out withdraw signal to move it from 08 to 10.

- Alarm 901-5 A-3, Control Rod Drift, annunciates.
- Alarm 901-5 B-3, RWM Block, annunciates.
- Alarm 901-5 C-3, Control Rod Block, annunciates.

The NSO notes that position indication is lost for rod J-1. According to Tech Specs, what actions if any, are required for control rod J-1?

- a. Substitute position 10 in the rod worth minimizer for control rod J-1.
- b. Move control rod J-1 to a known position, or fully insert rod J-1 and disarm the directional control valves.
- c. Commence insertion of all operable control rods immediately and have all control rods fully inserted within 12 hours.
- d. Immediately fully insert rod J-1. Electrically disarm it's directional control valves if the position indication cannot be repaired within 12 hours.

## QUESTION: 080 (1.00)

The plant is operating in Mode Three. The IMs report that LT 57A on Unit One has a trip setpoint of +4". With regards to the containment isolation function, what actions are required by Tech. Specs.?

- a. Establish Secondary Containment with SBT system operating within one hour.
- b. Be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.
- c. Close the affected system isolation valves within one hour and declare the affected system inoperable.
- d. Declare LT 57A INOP, and place a trip on the channel of the affected Group Isolation circuits within one hour.

## QUESTION: 081 (1.00)

Unit Two has just raised load from 50% to 100% power. The next Core Monitoring Code indicates that MFLPD at location 27-32-4 is 1.002. Which of the action(s) is(are) required by Tech Specs?

- a. Reduce thermal power to less than 25% of rated within 4 hours.
- b. Be in HOT SHUTDOWN within 2 hours and comply with Tech Spec 6.7.
- c. Initiate corrective action within 15 minutes and have MFLPD less than 1.0000 within 6 hours.
- d. Be in at least HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the following 24 hours.

## QUESTION: 082 (1.00)

Unit Two is operating at 75% power when 2B Main Steam Line Radiation Monitor fails downscale. Which one of the following will satisfy the LCO?

- a. Be in at least STARTUP with the associated isolation valves closed within 8 hours.
- b. Place the B MSL Radiation Monitor Trip System in a tripped condition within one hour.
- c. Be in at least HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the next 24 hours.
- d. Close the affected system isolation valves within one hour and declare the affected system inoperable.

## QUESTION: 083 (1.00)

What does the red Dryer Failure Indicating Light on the in service Dryer for the Drywell Pneumatic system being lit mean and what is a possible consequence if it is not corrected?

- a. The temperature at the outlet of the Dryer is above the alarm setpoint. If not corrected, the efficiency of the downstream filter may be affected.
- b. The moisture content at the outlet of the Dryer is above the alarm setpoint. If not corrected, the efficiency of the downstream filter may be affected.
- c. The temperature at the outlet of the Dryer is above the alarm setpoint. If not corrected, the Compressor will trip and pressure will be maintained by either Nitrogen Makeup or Instrument Air.
- d. The moisture content at the outlet of the Dryer is above the alarm setpoint. If not corrected, the Compressor will trip and pressure will be maintained by either the Nitrogen Makeup or Instrument Air.



## QUESTION: 084 (1.00)

The Unit 1 125VDC battery has been determined INOPERABLE during maintenance and requires replacement. Both Units are operating at full power. How long can the Alternate 125VDC Batteries, with a full capacity charger, be used in place of the Normal Unit 1 125VDC Batteries, before the LCO requiring a shutdown is entered for either Unit?

- a. 72 hours
- b. 96 hours
- c. 7 days
- d. 14 days

## QUESTION: 085 (1.00)

A reactor startup is in progress on Unit One with reactor power on Range 8 of the IRMs. The 125 VDC Logic power is lost to the Unit One "B" Core Spray system. What actions are now required?

- a. Maintain the reactor in Mode 2 until logic power is restored.
- b. Enter a 30 day LCO because the B Core Spray pump is inoperable.
- c. Enter a 7 day LCO for Core Spray subsystem B and the B Diesel Generator.
- d. Be in HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the next 24 hours.

## QUESTION: 086 (1.00)

QGA 500-3, "Drywell Flooding" directs the RPV vented when the Primary Containment water level reaches 28 ft. This action ensures which ONE of the following?

- a. The core will be submerged when drywell level reaches 27 ft.
- b. The drywell will be vented via the reactor vessel vent path.
- c. RPV level instrument reference legs will be free of non-condensables.
- d. Vessel level will have reached the main steam lines when drywell flooding is complete.

## QUESTION: 087 (1.00)

While operating a 100% steady state power, unit 1 experiences a loss of TR-12. A recommendation is made to start and load EDG 1 and 1/2 to their respective buses in anticipation of a loss of off-site power. What effect would these actions have if a loss of off-site power were to occur on unit 1?

- a. EDGs may overload due to failure of loads to shed when power is lost.
- b. Reliability of power will be enhanced because the buses are already energized from the EDGs.
- c. Power to loads on the buses will be lost momentarily as the loads are shed and sequenced back on.
- d. Power to the buses will be lost momentarily as the EDG output breakers automatically trip open and reclose.

## QUESTION: 088 (1.00)

The plant is in MODE 5 with a core offload in progress. All IRM indications are lost. Based on these conditions, which one of the following describes the actions that should be taken by the NSO?

- a. Halt CORE ALTERATIONS until IRM indication is restored.
- b. Halt CORE ALTERATIONS until the Shorting Links are installed.
- c. No action is needed; IRM indication is not required in MODE 5.
- d. Dispatch an operator to the Essential Services Bus to investigate the loss of power to the IRMs.

## QUESTION: 089 (1.00)

A reactor scram has occurred due to a main turbine trip. The ADS valves are cycling to maintain reactor pressure. Which one of the following statements describes the actions that should be taken for this condition and the basis for those actions?

- a. Open ADS valves to reduce pressure to 940 psig and minimize heat load on the condenser.
- b. Open ADS valves manually to reduce pressure to 940 psig and minimize dynamic stresses on the tailpipes.
- c. No action is necessary, the relief valves are left in automatic to allow time for the bypass valves to take control of pressure.
- d. The NSO should operate Relief valves manually only if needed to prevent safety valve actuation, to minimize heat input to the containment.

## QUESTION: 090 (1.00)

The plant is operating at 100% power. All components and systems are aligned for normal power operation. The "A" reactor feed pump auto trips due to an oil leak. RPV level begins to trend down. No other automatic actions have occurred. Which statement below describes the action(s) required to maintain RPV level within normal operating bands?

- a. Drive cram arrays to lower power and maintain level.
- b. Manually start the standby reactor feed pump IAW QOP 3200-3.
- c. Trip one recirc pump and run the other to minimum to maintain level.
- d. Take manual control of FWRVs and open the FWRVs as needed to maintain level.

## QUESTION: 091 (1.00)

A valid reactor scram signal is received and the NSO takes immediate actions IAW QCGP 2-3 and reports no control rod movement. The NSO notes that all "blue" scram lights are lit. Which one of the following statements best describes the actions that must be taken in order to attempt control rod insertion?

- a. Bypass the SDV high level scram, reset RPS, reset ARI from 90X-5.
- b. Reset RPS, disarm the ARI initiation switches, initiate a manual scram.
- c. Bypass reactor scram signals, reset RPS, manually de-energize the ARI solenoids.
- d. Reset RPS after a 10 second time delay, manually override ARI to energize the solenoids.

## QUESTION: 092 (1.00)

Both units are operating at 100% power. Alarm 912-1 F3, STACK GAS HI RAD, is received and confirmed to be valid. Which statement below describes the immediate actions that should be taken by the crew for the described conditions?

- a. Hold reactor power constant on both units.
- b. Significantly reduce power on both units.
- c. Scram the unit that is believed to be the cause of the increase.
- d. Significantly reduce power on the unit believed to be the cause of the increase.

## QUESTION: 093 (1.00)

Both units were aligned for normal full power operation. A grid disturbance caused a loss of off-site power to unit 1. This was followed shortly by a loss of off-site power to unit 2. All AC systems have responded as designed. Assume no operator actions have been taken to this point. Which statement below describes expected status of the EDG 1/2 if a LOCA signal were now to be received on unit 2?

EDG 1/2:

- a. output breaker will OPEN, and then close to bus 23-1.
- b. will remain running and its output breaker will remain closed to bus 13-1.
- c. will remain running and its output breaker will remain closed to bus 23-1.
- d. will remain running, its output breaker will trip, and the diesel will run unloaded.

## QUESTION: 094 (1.00)

An ATWS has occurred coupled with a loss of both CRD pumps. QGA 101, RPV Control (ATWS), has been entered. Emergency Depressurization may be required in approximately 15 to 20 minutes due to low reactor water level. Which of the following operator actions will be affected by the emergency depressurization?

- a. The ability to scram the reactor.
- b. The ability to bypass and reset ARI.
- c. The ability to restart the CRD pumps.
- d. The ability to inject SBLC at the proper flowrate.

## QUESTION: 095 (1.00)

A primary system leak has resulted in radiation levels exceeding Maximum Safe Operating Levels in more than one area. Which of the following will be accomplished by emergency depressurizing the RPV?

- a. Depressurization reduces the driving head for flow from the leak.
- b. The depressurization will rapidly void the core, reducing power faster than a scram.
- c. Cooldown of the coolant will increase solubility, keeping radioactive gases in solution.
- d. Emergency depressurization rejects heat to the drywell vice outside the primary containment.

## QUESTION: 096 (1.00)

Over the last 24 hours, the Unit 1 250 VDC battery voltage has been degrading slowly and has now reached 258 VDC on float charge. Which of the following actions is required?

- a. Commence a Unit 1 reactor shutdown immediately.
- b. Restore the battery to operable status in 72 hours.
- c. Place HPCI INOP and test RCIC and ADS for operability.
- d. Perform a capacity test of the Unit 2 250 VDC battery within 12 hours.

## QUESTION: 097 (1.00)

A severe, uncontrolled fire has developed in the central turbine building mezzanine level. What immediate action must be taken to control reactor pressure before leaving the control room?

- a. Place RCIC in a full flow test lineup.
- b. Open one ADS valve and close the MSIVs.
- c. Inhibit ADS and place the ADS valve control switches in OFF.
- d. Reduce pressure set to 850 psig and verify bypass valves open.



## QUESTION: 098 (1.00)

Given the following plant conditions, determine the maximum Unit 1 electrical output:

- Date is October 7.
  - Unit 2 is operating at 600 MWe, holding load.
  - Upstream River temperature obtained from Chemistry is 72°F.
  - River flow is 12,000 cfs.
- a. 133 MWe.
  - b. 200 MWe.
  - c. 250 MWe.
  - d. 800 MWe.

## QUESTION: 099 (1.00)

The NSO is conducting CRD Weekly Exercising.

- Annunciator 902-5 A-2, "ROD OVTRVL" alarms for rod A-8.

Which ONE of the following actions would NOT satisfy the requirements for the plant conditions?

- a. SCRAM rod A-8 and give it an insert signal every shift.
- b. Place the Unit in at least HOT SHUTDOWN within the next 12 hours.
- c. Declare rod A-8 inoperable, fully insert it and electrically disarm the directional control valves.
- d. Attempt to recouple rod A-8 by fully inserting it into the core and then demonstrate that it has been recoupled by demonstrating that the rod will not go to the overtravel position.

QUESTION: 100 (1.00)

QGA 100 has been and Alternate Injection Systems are needed to restore and maintain RPV water level greater than +8". RPV pressure is 700 psig and steady. Which ONE of the Alternate Injection paths listed below will provide injection flow for the given plant conditions?

- a. Condensate cross tie
- b. Fire System through RHR.
- c. HPCI Cooling Water Pump.
- d. SSMP from the Fire System.

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

ANSWER: 001

b.

REFERENCE:

QCOA 3500-1 page 2  
295014A102 ..(KA's)

ANSWER: 002 (1.00)

c.

REFERENCE:

QCAP 211-2 page 4  
294001A106 ..(KA's)

ANSWER: 003

b.

REFERENCE:

ILT 0500 page 44  
212000K412 ..(KA's)

ANSWER: 004

d.

REFERENCE:

QCAP 230-5 page 10  
294001K101 ..(KA's)

ANSWER: 005

c.

REFERENCE:

QOA 4700-6 page 3  
295019K203 ..(KA's)

ANSWER: 006

a.

REFERENCE:

QCOS 0700-07 page 5  
215002A205 ..(KA's)

ANSWER: 007

b.

REFERENCE:

LER 1-93-017  
QCAP 1100-5 page 5  
QCAP 1100-4  
294001A103 ..(KA's)

ANSWER: 008

c.

REFERENCE:

QCOA 3700-1 page 2  
295018K201 ..(KA's)

ANSWER: 009

b.

REFERENCE:

QARP 000-2 page 1  
QARP LP  
295016G011 ..(KA's)

ANSWER: 010

d.

REFERENCE:

LIC-0203 page 46  
218000K501 ..(KA's)

ANSWER: 011

a.

REFERENCE:

LIC-0203 page 38  
218000K102 ..(KA's)

ANSWER: 012

d.

REFERENCE:

LIC-1300 page 20  
217000A201 ..(KA's)

ANSWER: 013 *Detail per Chief Examiner  
no correct answer*  
b.

REFERENCE:  
LIC-2300 page 70  
QCOP 2300-01, page 3 and 4  
QCAN 901(2)-3 A-1  
206000K419 ..(KA's)

ANSWER: 014  
b.

REFERENCE:  
LIC-5652 page 70  
241000A112 ..(KA's)

ANSWER: 015  
b.

REFERENCE:  
LO/NLO-6600 page 44  
264000K401 ..(KA's)

ANSWER: 016  
a.

REFERENCE:  
LIC-7500 page 50  
TSUP 3.7.P  
261000G005 ..(KA's)

ANSWER: 017  
c.

REFERENCE:  
QOP 6400-2 page 1  
294001K107 ..(KA's)

ANSWER: 018  
c.

REFERENCE:  
LO/NLO-1601  
QCOP 2300-06 page 12  
295026K101 ..(KA's)

ANSWER: 019  
a.

REFERENCE:  
QCOP 1200-11 page 2  
LIC-1200  
204000G010 ..(KA's)

ANSWER: 020  
b.

REFERENCE:  
ILT-HP-CH2  
TH-HP-Chapter 2 page 6  
QCAP 630-06, page 17  
294001K103 ..(KA's)

ANSWER: 021  
a.

REFERENCE:  
ILT-HP-CH2  
TH-HP-Chapter 2 page 20  
QCAP 0620-01, page 8  
294001K104 ..(KA's)

ANSWER: 022  
a.

REFERENCE:  
LIC-5450 page 44  
QCAN 901(2)-3 C-2  
271000K408 ..(KA's)

ANSWER: 023  
b.

REFERENCE:  
LIC-0705 page 32  
215002K604 ..(KA's)

ANSWER: 024  
c.

REFERENCE:  
LIC-0202 page 94  
202002K102 ..(KA's)

ANSWER: 025

d.

REFERENCE:

LIC-0202 1 page 110  
202001K116 ..(KA's)

ANSWER: 026

a.

REFERENCE:

LIC-7500 page 22  
261000A201 ..(KA's)

ANSWER: 027

a.

REFERENCE:

QAP 0300-12 page 2,3  
Temp Alts OJT/OJE  
294001K102 ..(KA's)

ANSWER: 028

c.

REFERENCE:

QCAP 0211-02 page 11  
CREW-OJT  
294001A106 ..(KA's)

ANSWER: 029

b.

REFERENCE:

P&ID M38 AF  
LO/NLO-1900  
294001A107 ..(KA's)

ANSWER: 030

d.

REFERENCE:

Plant Process Computer  
QOP 9900-102 page 4  
294001A115 ..(KA's)

ANSWER: 031

a.

REFERENCE:

QOA 7000-01 page 2,3,6  
1600-2 Containment Auxiliaries  
223002K608 ..(KA's)

ANSWER: 032

d.

REFERENCE:

LIC-1000 page 88  
219000K202 ..(KA's)

ANSWER: 033

a.

REFERENCE:

LIC-0280  
QCOA 0280-01 page 1  
214000K303 ..(KA's)

ANSWER: 034

b.

REFERENCE:

QCOA 1900-1 page 2  
QCFHP 0110-05 page 1  
295023GO10 ..(KA's)

ANSWER: 035

b.

REFERENCE:

LIC-1000  
QCOA 1000-02 page 5  
QCOP 1000-05 page 7  
205000K303 ..(KA's)

ANSWER: 036

b.

REFERENCE:

LIC-0800  
QCOA 0202-01 page 1  
295001A205 ..(KA's)

ANSWER: 037

d.

REFERENCE:

QCOA 0203-01 page 2  
LIC-0203  
295013A201 ..(KA's)

ANSWER: 038

b.

REFERENCE:

LIC-0500 page 42  
295025K201 ..(KA's)

ANSWER: 039

c.

REFERENCE:

QGA 101 LP page 6  
295037G007 ..(KA's)

ANSWER: 040

a.

REFERENCE:

LIC-0705 page 2  
215002K401 ..(KA's)

ANSWER: 041

c.

REFERENCE:

QCAP 230-4 page 12  
294001K102 ..(KA's)

ANSWER: 042

a.

REFERENCE:

QCAP 0400-13 page 2  
294001K107 ..(KA's)

*Deleted*  
*no correct answer*

ANSWER: 043

a.

REFERENCE:

QCOP 0201-11 page 3,4,5  
216000K506 ..(KA's)

ANSWER: 044

c.

REFERENCE:

LIC-0600 page 54  
259002K413 ..(KA's)

ANSWER: 045

c.

REFERENCE:

LIC-2400 page 38  
223001K404 ..(KA's)

ANSWER: 046

a.

REFERENCE:

LIC-3700 page 22  
295018G006 ..(KA's)

ANSWER: 047

b.

REFERENCE:

QCAN 912-1-D-2  
LIC-3800  
295018G005 ..(KA's)

ANSWER: 048

c.

REFERENCE:

QCOP 5400-7 Att. A.  
294001A108 ..(KA's)

ANSWER: 049 (1.00)

b.

REFERENCE:

QGA DETAILS LP page 6  
295028K203 ..(KA's)

ANSWER: 050

a.

REFERENCE:

QGA 101 LP page 34,36  
295037K104 ..(KA's)

ANSWER: 051

d.

REFERENCE:

LIC/FH-0805  
QCFHP 110-2 page 1  
295023K103 ..(KA's)

ANSWER: 052

c.

REFERENCE:

ILT 201-1 page 14  
290002K402 ..(KA's)

ANSWER: 053

a.

REFERENCE:

LIC-0703 page 62  
215005A308 ..(KA's)

ANSWER: 054

c.

REFERENCE:

LIC-1300  
217000A403 ..(KA's)

ANSWER: 055 (1.00)

c.

REFERENCE:

ILT 201-1 Figure 21  
QCGP 1-1 page 2  
0201-1 page 38  
290002G005 ..(KA's)

ANSWER: 056

c.

REFERENCE:

LIC 0700-1  
215004K402 ..(KA's)

ANSWER: 057

a.

REFERENCE:

LIC-1100 page 8,18  
211000A202 ..(KA's)

ANSWER: 058

c.

REFERENCE:

LIC 0600  
259002K603 ..(KA's)

ANSWER: 059

a.

REFERENCE:

LIC-1000 page 24  
203000A203 ..(KA's)

ANSWER: 060

c.

REFERENCE:

QCAN 901(2)-5 G-8 page 1  
QCOA-0201-9 page 3  
295009A102 ..(KA's)



ANSWER: 061

c.

REFERENCE:

QCOA-0202-4 page 6,7  
295001G010 ..(KA's)

ANSWER: 067 (1.00)

a.

REFERENCE:

QCOA 1000-02 page 4  
295021G011 ..(KA's)

ANSWER: 062

c.

REFERENCE:

QOA 3300-02  
295002G010 ..(KA's)

ANSWER: 068

b.

REFERENCE:

QGA 500-2 LP page 6  
295031K305 ..(KA's)

ANSWER: 063

a.

REFERENCE:

QCOA 1000-2  
295021A201 ..(KA's)

ANSWER: 069

d.

REFERENCE:

QGA DETAILS LP page 4,6,8  
295028K203 ..(KA's)

ANSWER: 064

a.

REFERENCE:

LIC 1701 page 84  
272000A309 ..(KA's)

ANSWER: 070

d.

REFERENCE:

QGA 200 LP page 12  
295024G012 ..(KA's)

ANSWER: 065

d.

REFERENCE:

QEP 105-1  
GSEP Manual page 4-105  
294001A116 ..(KA's)

ANSWER: 071

a.

REFERENCE:

QGA 300 LP page 8, 10  
295032G012 ..(KA's)

ANSWER: 066

b.

REFERENCE:

QEP 0300-01 page 2  
294001A116 ..(KA's)

ANSWER: 072

c.

REFERENCE:

QCAP 0620-02 page 2  
294001K104 ..(KA's)

ANSWER: 073 (1.00)

b.

REFERENCE:

TSUP 3.6.I. page 13  
204000G005 ..(KA's)

ANSWER: 074

a.

REFERENCE:

QCOP 1600-13  
QGA 200 page 50  
295010K301 ..(KA's)

ANSWER: 075

b.

REFERENCE:

QEP 0200-T1 page 4  
295038K102 ..(KA's)

ANSWER: 076

c.

REFERENCE:

QGA 500-1 LP page 12  
295031G012 ..(KA's)

ANSWER: 077

a.

REFERENCE:

QGA 200 LP page 22  
295024G012 ..(KA's)

ANSWER: 078

b.

REFERENCE:

QGA DETAILS LP figure II-D  
295030K102 ..(KA's)

ANSWER: 079

b.

REFERENCE:

LIC-0280  
TSUP 3.3.I. page 14  
201002G005 ..(KA's)

ANSWER: 080

d.

REFERENCE:

TSUP Table 3.2.A-1  
216000G005 ..(KA's)

ANSWER: 081

c.

REFERENCE:

TSUP 3.11.B  
LIC-0800  
290002K501 ..(KA's)

ANSWER: 082

b.

REFERENCE:

TSUP Table 3.1.A-1  
TSUP Table 3.2.A  
223002G005 ..(KA's)

ANSWER: 083

a.

REFERENCE:

LIC-4700  
P&ID M-24 Sheet 2  
295019G005 ..(KA's)

ANSWER: 084

d.

REFERENCE:

TSUP 3.9.C page 13  
LO/NLO-6900  
263000G005 ..(KA's)

ANSWER: 085

c.

REFERENCE:

TSUP 3/4.5-2  
TSUP 3/4.9-2,3  
4E 1430 sheet 2  
209001G005 ..(KA's)

ANSWER: 086

a.

REFERENCE:

QGA 500-3 LP page 10  
295029G012 ..(KA's)

ANSWER: 092

a.

REFERENCE:

QCOA 1700-01  
295017G012 ..(KA's)

ANSWER: 087

a.

REFERENCE:

QOA 6100-1  
295003A101 ..(KA's)

ANSWER: 093

a.

REFERENCE:

ILT-6600 page 94,96  
295003K202 ..(KA's)

ANSWER: 088

a.

REFERENCE:

QCOA 0700-03  
LIC-0702  
295006A105 ..(KA's)

ANSWER: 094

a.

REFERENCE:

QCOA 300-1  
ILT 0300-2  
295022K301 ..(KA's)

ANSWER: 089

b.

REFERENCE:

QGA-100 LP page 46, 48  
295007A104 ..(KA's)

ANSWER: 095

a.

REFERENCE:

QGA 300  
295033K301 ..(KA's)

ANSWER: 090

b.

REFERENCE:

LIC-3200  
QCOA 0201-9, page 3  
QOA 3200-1, page 1  
295009G012 ..(KA's)

ANSWER: 096

b.

REFERENCE:

TSUP 3/4.9-12  
295004G003 ..(KA's)

ANSWER: 091

c.

REFERENCE:

QCOP 300-28  
295015A202 ..(KA's)

ANSWER: 097

c.

REFERENCE:

QARP 700-01 page 1  
295016A108 ..(KA's)

ANSWER: 098 (1.00)

b.

REFERENCE:

QAP 300-T24

QAP 300-32 page 1,2

294001A108 ..(KA's)

ANSWER: 099

a.

REFERENCE:

TSUP 3.3.H page 3/4.3-12

201003G005 ..(KA's)

ANSWER: 100

d.

REFERENCE:

QCOP 4100-11, page 1

QCOP 2300-10, page 1

QCOS 2900-01, page 5

QCOP 3300-12, page 3

295031G012 ..(KA's)

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

## ANSWER KEY

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

## ANSWER KEY

## MULTIPLE CHOICE

068 b

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

ANSWER KEY

MULTIPLE CHOICE

091 c

092 a

093 a

094 a

095 a

096 b

097 c

098 b

099 a

100 d

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