

Draft Submittal
(Pink Paper)

Reactor Operator Written Exam

U.S. Nuclear Regulatory Commission
Site-Specific RO Written Examination

Applicant Information

Name: _____

Date: _____

Facility/Unit: _____

Region: I II III IV

Reactor Type: W CE BW GE

Start Time: _____

Finish Time: _____

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheet. To pass the examination, you must achieve a final grade of at least 80.00 percent. Examination papers will be collected 6 hours after the examination begins.

All work

Initial Submittal
RO + SRO
DRAFT

Applicant Certification

I own. I have neither given nor received aid.

Applicant's Signature

Results

Examination Value _____

Points

Applicant's Score _____

Points

Applicant's Grade _____

Percent

Noted 9/22/08

1. Unit One reactor startup is in progress. Control rod 34-43 is stuck at position "00".

OP-07, Reactor Manual Control System Operating Procedure, directs attempting control rod withdraw by raising CRD drive water pressure to 300 psid drive header differential pressure.

Which one of the following identifies component manipulations that will raise drive header differential pressure?

- A. throttle open CRD flow control valve C11-F002 and/or
throttle open CRD pressure control valve C11-PCV-F003
- B. throttle open CRD flow control valve C11-F002 and/or
throttle closed CRD pressure control valve C11-PCV-F003
- C. throttle closed CRD flow control valve C11-F002 and/or
throttle open CRD pressure control valve C11-PCV-F003
- D. throttle closed CRD flow control valve C11-F002 and/or
throttle closed CRD pressure control valve C11-PCV-F003

REFERENCE:

SD-08, CRD Hydraulic System, Section 3.1 Component Control
Big Note BN-08.0.01 Control Rod Drive Hydraulics

EXPLANATION:

Using a CRD system diagram, the system configuration is such that closing the F003 or opening the F002 will raise CRD drive pressure differential.

CHOICE "A" - Incorrect. Throttling open the F003 will lower CRD drive pressure differential.

CHOICE "B" - Correct Answer

CHOICE "C" - Incorrect. Throttling closed the F002 will lower CRD drive pressure differential.

CHOICE "D" - Incorrect. Throttling closed the F002 will lower CRD drive pressure differential.

201003 Control Rod and Drive Mechanism

A1. Ability to predict and/or monitor changes in parameters associated with operating the CONTROL ROD AND DRIVE MECHANISM controls including:
(CFR: 41.5 / 45.5)

A1.02 CRD drive pressure 2.8 / 2.8

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-08, Obj. 6F. Given plant and CRDHS conditions, predict the values for the following CRDH system parameters: Drive Water Header Pressure.

COG LEVEL: Low

2. While placing the 2B Recirculation Pump in service, a complete failure of the #1 seal occurs.

Which one of the following identifies the expected system indications for this failure?

- A. #1 seal pressure - 0 psig;
#2 seal pressure - 500 psig;
Seal Staging Flow Hi annunciator in alarm
- B. #1 seal pressure - 0 psig;
#2 seal pressure - 500 psig;
Outer Seal Leakage Flow Detection Hi annunciator in alarm
- C. #1 seal pressure - 1000 psig;
#2 seal pressure - 1000 psig;
Seal Staging Flow Hi annunciator in alarm
- D. #1 seal pressure - 1000 psig;
#2 seal pressure - 1000 psig;
Outer Seal Leakage Flow Detection Hi annunciator in alarm

REFERENCE:

SD-02 Reactor Recirculation System
APP A-07 (4-5) Outer Seal Leakage Flow Detection Hi
APP-A-07 (5-5) Pump B Seal Staging Flow Hi

EXPLANATION:

Normal seal pressures at rated conditions are 1000 psig for seal #1 and 500 psig for seal #2. A failure of seal #1 will cause seal pressures to equalize at rated pressure of 1000 psig. Seal Staging Flow Hi alarm will be received on a failure of either seal.

Outer Seal Leakage Flow Detection Hi alarm requires the #2 seal failure.

CHOICE "A" - Incorrect. A failure of seal #1 does not cause its associated seal pressure to drop to zero.

CHOICE "B" - Incorrect. A failure of seal #1 does not cause its associated seal pressure to drop to zero.

CHOICE "C" - Correct Answer

CHOICE "D" - Incorrect. A failure of seal #1 will not cause the Outer Seal Leakage Flow Detection alarm

202001 Recirculation

A1. Ability to predict and/or monitor changes in parameters associated with operating the RECIRCULATION SYSTEM controls including: (CFR: 41.5 / 45.5)

A1.09 Recirculation pump seal pressures 3.3 / 3.3

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-02, Obj. 15a. Given plant conditions, determine if the following Reactor Recirculation System failures/malfunctions have occurred: #1 Recirculation Pump seal failure.

COG LEVEL: High

3. Given the following plant conditions:

Reactor water level	-25 inches
Reactor pressure	55 psig
Vessel Injection	4500 gpm from RHR

Which one of the following identifies the current status of Adequate Core Cooling and the operational implications of these conditions?

- A. Adequate Core Cooling **IS** met;
Clad temperatures are expected to exceed 1500° F
- B. Adequate Core Cooling **IS** met;
Clad temperatures are expected to remain $\leq 1500^\circ$ F
- C. Adequate Core Cooling **IS NOT** met;
Significant Fuel Damage will occur above 1500° F fuel clad temperature
- D. Adequate Core Cooling **IS NOT** met;
Significant Hydrogen generation will occur above 1500° F fuel clad temperature

REFERENCE:

Introduction to ECCS Student Handout
CLS-LP-110B Introduction to ECCS

EXPLANATION:

Four viable methods of Adequate Core Cooling (ACC) exist within the EOPs.

- Core Submergence (Level above TAF),
- Steam Cooling with Injection (Level above LL4),
- Steam Cooling without Injection (Level above LL5) and
- Reactor water level at jet pump suction with core spray flow of at least 4700 gpm.

The conditions listed satisfy the ACC requirements for Steam Cooling with Injection.

If reactor water level were to drop below LL4, and RHR injection were maintained, ACC would not be met. By maintaining this method of ACC, the core will generate sufficient steam to preclude any clad temperature from exceeding 1500F.

CHOICE "A" - Incorrect. Clad temperatures will remain below 1500F

CHOICE "B" - Correct Answer

CHOICE "C" - Incorrect. ACC is maintained.

CHOICE "D" - Incorrect. ACC is maintained

203000 RHR/LPCI: Injection Mode

K5. Knowledge of the operational implications of the following concepts as they apply to RHR/LPCI:
INJECTION MODE (PLANT SPECIFIC) : (CFR: 41.5 / 45.3)

K5.02 Core cooling methods 3.5 / 3.7

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-110B, Obj. 1A. Define the following terms: Adequate core cooling.

COG LEVEL: High

4. Following a dual unit loss of off-site power, the only energized 4KV E-Bus is E2.

Which one of the following pumps has an available power supply?

- A. 1A RHR Pump
- B. 2C RHR Pump
- C✓ 1D RHR SW Booster Pump
- D. 2B RHR SW Booster Pump

REFERENCE:
SD-17 Residual Heat Removal System

EXPLANATION:
Each of the above listed pumps is powered from a different plant 4KV Emergency bus.
The 1D RHR SW Booster Pump is powered from E-2.

- CHOICE "A" - Incorrect. Powered from E3
- CHOICE "B" - Incorrect. Powered from E1
- CHOICE "C" - Correct Answer
- CHOICE "D" - Incorrect. Powered from E4

205000 Shutdown Cooling

K2. Knowledge of electrical power supplies to the following: (CFR: 41.7)

K2.01 Pump motors 3.1* / 3.1*

SOURCE: New

LESSON PLAN/OBJECTIVE:
CLS-LP-17, Obj. 17a. List the normal and emergency power sources for the following: RHR pumps.

COG LEVEL: Low

5. If suppression pool water level cannot be maintained above -6.5 feet, Primary Containment Control Procedure gives specific direction regarding HPCI operation.

Which one of the following identifies this direction, and its bases?

Secure HPCI:

- A. ✓ irrespective of adequate core cooling, to prevent primary containment failure due to overpressurization.
- B. irrespective of adequate core cooling, to prevent HPCI turbine damage due to high exhaust pressure
- C. unless required to maintain adequate core cooling, to prevent primary containment failure due to overpressurization.
- D. unless required to maintain adequate core cooling, to prevent HPCI turbine damage due to high exhaust pressure.

REFERENCE:

00I-37.8 Primary Containment Control Procedure Basis Document

EXPLANATION:

Per the PCCP, steps SP/L-26 and 27, if suppression pool level cannot be maintained above -6.5 feet then secure HPCI irrespective of ACC. Per OI-37.8, the bases for these steps is to prevent primary containment failure due to overpressurization.

CHOICE "A" - Correct Answer

CHOICE "B" - Incorrect. High Turbine exhaust pressure will cause a HPCI turbine trip but is not a concern under these conditions.

CHOICE "C" - Incorrect. HPCI must be secured irrespective of ACC. Under other degraded conditions, such as NPSH limits, you would continue to run HPCI to maintain ACC

CHOICE "D" - Incorrect. HPCI must be secured irrespective of ACC. Under other degraded conditions, such as NPSH limits, you would continue to run HPCI to maintain ACC

206000 HPCI

2.4.18 Knowledge of the specific bases for EOPs. (CFR: 41.10 / 43.1 / 45.13)

IMPORTANCE RO 3.3 SRO 4.0

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-300L, Obj. 13. Explain why HPCI operation is not allowed (irrespective of adequate core cooling) if suppression pool level is below -6.5 feet.

COG LEVEL: High

6. During a small break LOCA with a failure of HPCI to start, ~~ADS automatically initiates.~~

Plant conditions are as follows:

Reactor level	-20 inches
Reactor Pressure	400 psig and lowering
ECCS pumps	2A and 2B Core Spray pumps running
ADS SRV's	7 ADS valves OPEN with control switches in AUTO

A dual unit loss of off-site power occurs and all DGs tie onto their respective E buses to restore E Bus power.

Which one of the following describes the expected ADS valve response?

- A. remain open
- B. close and will not automatically re-open
- C. close then re-open as soon as low pressure ECCS pumps sequence on
- D. close then re-open 83 seconds after low pressure ECCS pumps sequence on

REFERENCE:

SD-20 ADS Section 3.3 Logic, Section 4.3.4 AC Power

EXPLANATION:

ECCS pumps will trip on UV will LOOP. With Control Switches in AUTO, valves will close due to loss of ECCS permissive in ADS logic. Since RPV water level is still below LL3, valves will re-open when ECCS pumps sequence back on and re-satisfy the ECCS permissive. ADS timer stays sealed in (timed out) when ECCS permissive is lost.

CHOICE "A" - Incorrect. Valves will close. If power were not lost, the valves would remain open.

CHOICE "B" - Incorrect. Valves will auto re-open. If level were above LL3 they would not re-open.

CHOICE "C" - Correct Answer

CHOICE "D" - Incorrect. Would be correct if ADS timer needed to be re-satisfied.

209001 Low Pressure Core Spray

K3. Knowledge of the effect that a loss or malfunction of the LOW PRESSURE CORE SPRAY SYSTEM will have on following: (CFR: 41.7 / 45.4)

K3.02 ADS logic 3.8 3.9

SOURCE: Bank LOI-CLS-LP-020-A*007(28)

LESSON PLAN/OBJECTIVE:

CLS-LP-020, Obj. 11. Given plant conditions, determine if an automatic initiation of ADS should occur.

COG LEVEL: High

7. Following a DBA LOCA on Unit Two, plant conditions are as follows:

Reactor water level	55 inches and rising
Reactor pressure	150 psig
Torus temperature	220° F
Suppression Chamber pressure	10.5 psig
Torus level	-4.6 feet
2A Core Spray pump flow	5000 gpm
2B Core Spray pump flow	2000 gpm
2A RHR pump flow	8000 gpm
2B RHR pump flow	6000 gpm

(reference provided)

Which one of the following identifies the ECCS pumps operating within their NPSH limit?

- A. All listed pumps
- B. 2B Core Spray Pump ONLY
- C. 2A Core Spray and 2B Core Spray ONLY
- D. 2B Core Spray, 2A RHR and 2B RHR ONLY

REFERENCE:

Unit Two Core Spray and RHR NPSH limit graphs provided in EOP flow charts

EXPLANATION:

The student will need to plot each point on NPSH limit graph.

Torus pressure must be corrected down 1 psig to obtain the proper restriction line.

The correct torus pressure is $10.5 \text{ psig} - 1.0 \text{ psig} = 9.5 \text{ psig}$.

This correction must be performed for both the RHR and CS graphs.

CHOICE "A" - Incorrect. If student fails to adjust torus pressure on both graphs, this answer would be correct.

CHOICE "B" - Correct Answer

CHOICE "C" - Incorrect. If student fails to adjust torus pressure on CS graph, this answer would be correct.

CHOICE "D" - Incorrect. If student fails to adjust torus pressure on RHR graph, this answer would be correct.

209001 Low Pressure Core Spray

2.2.37 Ability to determine operability and/or availability of safety related equipment. (CFR: 41.7 / 43.5 / 45.12)

IMPORTANCE RO 3.6 SRO 4.6

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-300B, Obj. 17. Given plant condition and the NPSH and vortex limit graphs for the RHR and CS, determine if the NPSH and/or vortex limits have been exceeded for either of the two systems.

COG LEVEL: High

8. Following an ATWS on Unit Two, Standby Liquid Control is manually initiated to assist in reducing reactor power.

Which one of the following describes the operational implications a Loss of Instrument Air will have on the SLC system?

- A. Storage tank sparging will not be available.
- B. SLC storage tank level indication reading lower than actual level.
- C. SLC storage tank level indication reading higher than actual level.
- D. Increased hydraulic pulsations due to depressurized system accumulators.

REFERENCE:

SD-05 Standby Liquid Control System, Section 4.3.2 Instrument Air

EXPLANATION:

The instrument air system provides air to the bubbler tube in the SLC storage tank level instrumentation. Low/loss of air flow will cause the level indication to be lower than actual.

CHOICE "A" - Incorrect. Sparging air is provided from the service air system only.

CHOICE "B" - Correct Answer

CHOICE "C" - Incorrect. Higher than normal air flow would cause indications to be higher than normal.

CHOICE "D" - Incorrect. SLC accumulators are precharged with Nitrogen. They are not supplied from Instrument air.

211000 SLC

K5. Knowledge of the operational implications of the following concepts as they apply to STANDBY LIQUID CONTROL SYSTEM: (CFR: 41.5 / 45.3)

K5.06 Tank level measurement 3.0 3.2

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-05, Obj. 9d. Describe the operation of the following: SLC Tank level measurement system

COG LEVEL: Low

9. OPT-01.1.6, Reactor Protection System Manual Scram Test, is in progress.

Manual Reactor Scram System A pushbutton has been depressed and the following annunciator is in alarm:

Reactor Manual Scram Sys A

Prior to resetting the half scram signal, Drywell Pressure Transmitter PT-N002D (input to RPS) fails upscale.

Which one of the following is the effect this failure will have on RPS?

Auto Trip Channel B2 _____ ,

- A. energizes; full scram occurs.
- B. de-energizes; full scram occurs.
- C. energizes; no full scram occurs since AUTO and MANUAL scram logics act independently.
- D. de-energizes; no full scram occurs since AUTO and MANUAL scram logics act independently.

REFERENCE:

SD-03 Reactor Protection System, Section 1.3

EXPLANATION:

The RPS trip system logics are normally energized. It is a fail safe system such that de-energizing a trip system causes a trip in that system. There are two RPS trip systems. Trip system A and Trip system B. Each trip system contains two auto trip channels and one manual trip channel. (A1/A2/A3 and B1/B2/B3) If any one trip channel in each system de-energizes, a full scram will occur. With the 'A' Scram pushbutton depressed, the A3 trip channel has de-energized the A RPS trip system. When drywell pressure transmitter 'D' fails upscale, the B RPS trip system will de-energize causing a full scram.

CHOICE "A" - Incorrect. RPS de-energizes to actuate. Other plant logics (i.e. ECCS) are energize to actuate.

CHOICE "B" - Correct Answer

CHOICE "C" - Incorrect. RPS de-energizes to actuate. Other plant logics (i.e. ECCS) are energize to actuate.

CHOICE "D" - Incorrect. Auto and Manual RPS trip channels work together to cause a scram. A misconception of the logic would cause a student to pick this answer.

212000 RPS

A4. Ability to manually operate and/or monitor in the control room:
(CFR: 41.7 / 45.5 to 45.8)

A4.02 Perform system functional test(s) 3.6 3.7

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-03, Obj. 14. Given plant conditions and control room indications, determine whether a reactor scram has actuated properly.

COG LEVEL: High

10. Which one of the following parameters is a direct input into the RPS logic?

- A. Main condenser vacuum
- B. Main Steam Line Radiation
- C. PAM (Pressure Averaging Manifold) pressure
- D. RETS (Relayed Emergency Trip Supply) pressure

REFERENCE:
SD-03 Reactor Protection System

EXPLANATION:
RETS pressure is utilized by the RPS system to detect a fast closure of the turbine control valves, for input into the TCV fast closure scram logic.

CHOICE "A" - Incorrect. Main condenser vacuum inputs to the turbine trip logic.

CHOICE "B" - Incorrect. Main steam line radiation used to input to the MSIV closure logic.

CHOICE "C" - Incorrect. PAM pressure inputs EHC logic. Turbine 1st stage pressure inputs to RPS.

CHOICE "D" - Correct Answer

212000 RPS

K1. Knowledge of the physical connections and/or cause effect relationships between REACTOR PROTECTION SYSTEM and the following:
(CFR: 41.2 to 41.9 / 45.7 to 45.8)

K1.12 Reactor/turbine pressure control system: 3.4 3.6

SOURCE: New

LESSON PLAN/OBJECTIVE:
CLS-LP-03, Obj. 8. List the RPS trip signals, including setpoints and how/when each signal is bypassed.

COG LEVEL: Low

11. TIP traces are in progress with the "A" TIP probe at the top core limit.

A small steam leak in containment causes drywell pressure to rise to 2.7 psig.

Which one of the following identifies the expected final position of the TIP ball valves and the available location(s) for verifying this position?

- A. Open; Back Panel ONLY.
- B. Closed; Back Panel ONLY.
- C. Open; Control Room Panel and Back Panel.
- D. Closed; Control Room Panel and Back Panel.

REFERENCE:

SD-09.5 Traversing In-Core Probe (TIP) System, section 3.1 Indications, section 3.2.2 Interlocks

EXPLANATION:

If drywell pressure reaches the PCIS Gp 2 isolation setpoint of 1.7 psig, TIP logic will initiate an automatic probe retract to the in-shield position and the TIP ball valves will auto close.

Indication of TIP ball valve position can be found on the P601 panel in the control room and the TIP back panel.

CHOICE "A" - Incorrect

TIP ball valves will auto close on PCIS Gp 2 isolation signal.

The TIP shear valve remains open. Confusion between these valves would cause a student to select this answer.

CHOICE "B" - incorrect

TIP ball valves will auto close on PCIS Gp 2 isolation signal.

The TIP shear valve remains open. Confusion between these valves would cause a student to select this answer.

CHOICE "C" - Incorrect

TIP valve position verification can be made from the P601 panel in the control room and the TIP back panels.

CHOICE "D" - Correct Answer

215001 Traversing In-Core Probe

2.1.31 Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup.
(CFR: 41.10 / 45.12)

IMPORTANCE RO 4.6 SRO 4.3

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-09, Obj. 5b. explain the effects of the following on the TIP System: High Drywell Pressure

COG LEVEL: High

12. Unit One is commencing a startup with all SRM's fully inserted and reading approximately 1×10^5 cps. The IRM's are reading the following:

IRM A	20 on Range 1	IRM E	21 on Range 1
IRM B	28 on Range 1	IRM F	19 on Range 1
IRM C	21 on Range 2	IRM G	23 on Range 2
IRM D	25 on Range 1	IRM H	20 on Range 1

The operator inadvertently takes the range switch for IRM B from Range 1 to Range 3.

Which one of the following system responses would verify proper IRM system operation?

- A. Rod Out Block alarm only
- B. IRM downscale white light illuminated only
- C. No Rod Block alarm or IRM downscale white light illuminated
- D. Rod Out Block alarm and IRM downscale white light illuminated

REFERENCE:

SD-9.1 Startup Range Monitor System
APP A-05 (2-2) ROD OUT BLOCK

EXPLANATION:

Taking the range switch from Range 1 to Range 3 will cause the IRM reading to drop by a factor of ten. IRM "B" will be reading 2.8 which will cause the IRM downscale light to illuminate. (setpoint of 3.5 cps) A ROD OUT BLOCK will be generated from any downscale IRM not on Range 1.

CHOICE "A" - Incorrect. IRM downscale light will also illuminate for these conditions.

CHOICE "B" - Incorrect. A Rod Out Block alarm will also be received for these conditions

CHOICE "C" - Incorrect. Both responses will occur.

CHOICE "D" - Correct Answer

215003 IRM

A4. Ability to manually operate and/or monitor in the control room:
(CFR: 41.7 / 45.5 to 45.8)

A4.07 Verification of proper functioning / operability 3.6 / 3.6

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-9.1, Obj. 3a. List the SRM/IRM system signals/conditions that will cause the following actions and the conditions under which each is bypassed: Rod Blocks.

COG LEVEL: High

13. A reactor startup is in progress following a refueling outage.

The RPS shorting links are installed.

The operator notes the following SRM readings:

SRM Channel A	6.0×10^5 cps
SRM Channel B	1.0×10^5 cps
SRM Channel C	7.0×10^4 cps
SRM Channel D	8.0×10^4 cps

All IRMs are on Range 4.

Which one of the following design features should have occurred?

- A. SRM Upscale Alarm only
- B. SRM Upscale Alarm and Rod Block only
- C. SRM Upscale Alarm, Rod Block and 1/2 Scram
- D. SRM Upscale Alarm, Rod Block and Full Scram

REFERENCE:

SD-9.1 Neutron Monitoring System (Startup and Intermediate Range)

APP-A-05(2-2) ROD OUT BLOCK

APP-A-05(2-3) SRM UPSCALE/INOP

EXPLANATION:

SRM Upscale alarm setpoint is 2.0×10^5 cps. An SRM Upscale alarm with any IRM below range 8 will also cause a Rod Out Block. With shorting links installed, the SRM RPS function is bypassed. No scram or half scram can occur.

CHOICE "A" - Incorrect. Rod Block will also occur. If IRMs were on range 8 or higher this answer would be correct.

CHOICE "B" - Correct Answer

CHOICE "C" - Incorrect. RPS function bypassed with shorting links installed.

If RPS function were active, student may choose this answer since only one SRM channel is above the high setpoint.

CHOICE "D" - Incorrect. This answer would be correct if shorting links were not installed. RPS SRM scram is non-coincident.

215004 Source Range Monitor

K4. Knowledge of SOURCE RANGE MONITOR (SRM) SYSTEM design feature(s) and/or interlocks which provide for the following: (CFR: 41.7)

K4.01 Rod withdrawal blocks 3.7 / 3.7

SOURCE: Bank LOI-CLS-LP-009-A*03A (10)

LESSON PLAN/OBJECTIVE:

CLS-LP-9.1, Obj. 3a. List the SRM/IRM system signals/conditions that will cause the following actions and the conditions under which each is bypassed: Rod Blocks.

COG LEVEL: High

14. Unit Two is operating at 100% rated power.

Which one of the following plant transients will cause the APRM ODA display to automatically shift to the stability screen?

- A. "B" SRV fails full open
- B. Inadvertant RCIC injection
- C✓ "A" Recirculation Pump Trip
- D. Control Rod drifting into the core

REFERENCE:

SD-9.6 Power Range Neutron Monitoring And Rod Block Monitor
APP-A-05(4-8) OPRM TRIP ENABLED

EXPLANATION:

The stability screen will be automatically displayed on the ODA for both APRMs when either APRM enters the power-flow map region where instability can occur as defined by the OPRM trip enabled setpoint. (reactor power greater than or equal to 25% and recirc. flow less than or equal to 60%)
The student must know what causes the APRM ODA to shift to the STABILITY screen.
If they do not, any of the given transients is a plausible selection.

CHOICE "A" - Incorrect. at lower power this would cause instabilities.

CHOICE "B" - Incorrect. cold water injection could damage fuel, but does not cause instabilities.

CHOICE "C" - Correct Answer

CHOICE "D" - Incorrect. a control rod insertion moves power straight down the power to flow map and not toward the OPRM enabled region.

215005 APRM / LPRM

A3. Ability to monitor automatic operations of the AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM including:(CFR: 41.7 / 45.7)

A3.03 Meters and recorders 3.3 / 3.3

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS=LP-9.6, Obj. 28. Given plant conditions and entry into one of the following Power to Flow Map regions, use procedures to determine the actions required to control and/or mitigate the consequences of the event: OPRM Enabled Region.

COG LEVEL: High

15. Unit Two is at rated power when a faulty CST level instrument initiates a false low CST level input to the RCIC logic.

The following annunciator is received:

RCIC Suct Xfer CST Lo Lvl

Which one of the following identifies the correct RCIC system suction valves response?

Suppression Pool Suction Valves, F029 and F031 _____;
CST Suction Valve, F010_____.

- A. auto open;
auto closes when both suppression pool suction valves are not full closed.
- B✓ auto open;
auto closes when both suppression pool suction valves are full open.
- C. auto opens when CST suction valve is not full open;
auto closes.
- D. auto opens when CST suction valve is full closed;
auto closes.

REFERENCE:

SD-16 Reactor Core Isolation Cooling, section 3.2
APP-A-02(3-8) RCIC SUCTION TRANS CST LO LVL

EXPLANATION:

The normal RCIC suction valve configuration is the CST suction (F010) open and the suppression pool suction valves (F029 and 31) closed. If a low CST level is sensed, with reactor pressure above the RCIC isolation setpoint, the F029 and 31 will auto open. When they are both full open, the F010 will auto close. If reactor pressure is below the RCIC isolation setpoint, the valves respond differently.

CHOICE "A" - Incorrect. Has to see both valves full open not when they start to open.

CHOICE "B" - Correct Answer

CHOICE "C" - Incorrect. Suppression pool suction valves open first then the CST valve to make sure that a suction flowpath exists.

CHOICE "D" - Incorrect. Suppression pool suction valves open first then the CST valve to make sure that a suction flowpath exists.

217000 RCIC

K1. Knowledge of the physical connections and/or cause effect relationships between REACTOR CORE ISOLATION COOLING SYSTEM (RCIC) and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8)

K1.01 Condensate storage and transfer system 3.5 / 3.5

SOURCE: Bank LOI-CLS-LP-016-A*010 (6)

LESSON PLAN/OBJECTIVE:

CLS-LP-16, Obj. 10. Given a RCIC system valve, list the interlocks/automatic actions associated with that valve.

COG LEVEL: High

16. Following a small steam line break in the drywell, plant conditions are as follows:

Drywell Pressure	20.8 psig
Drywell Average Air Temp.	292° F
Torus Pressure	19.0 psig
Reactor Pressure	675 psig
Reactor Water Level	100 inches
HPCI System	Unavailable
RCIC System	Started at LL2 and injecting

Given these conditions, what is the impact on the ADS Initiation Timer and what operator action must be taken in accordance with Emergency Operating Procedures?

ADS Initiation Timer _____ started;
Before Drywell Average Air temperature reaches 300° F, _____.

- A. has;
Drywell Spray required
- B. has not;
Drywell Spray required
- C. has;
Emergency Depressurization required
- D. has not;
Emergency Depressurization required

REFERENCE:
SD-20 Automatic Depressurization System, section 3.3 Logic
PCCP

EXPLANATION:
The conditions required to start the ADS timer have not been met. (LL3 / 45 inches)
The conditions listed require entry into PCCP. Per the direction of PCCP, before drywell average air temperature reaches 300F, spray the drywell.

CHOICE "A" - Incorrect. ADS timer has not started

CHOICE "B" - Incorrect. ADS timer has not started

CHOICE "C" - Correct Answer

CHOICE "D" - Incorrect. Per PCCP, emergency depress is required if drywell temp cannot be restored and maintained below 300°F.

218000 ADS

A2. Ability to (a) predict the impacts of the following on the AUTOMATIC DEPRESSURIZATION SYSTEM ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those

abnormal conditions or operations: (CFR: 41.5 / 45.6)

A2.01 Small steam line break L0CA 4.1 / 4.3*

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-020, Obj. 11. Given plant conditions, determine if an automatic initiation of ADS should occur.

COG LEVEL: High

17. Unit Two is operating at full power.

"B" RHR pump and "B" RHR SW pump have been placed in Suppression Pool Cooling to lower torus temperature.

A subsequent LOCA causes reactor water level to drop rapidly.

Plant conditions are as follows:

Drywell Pressure	18.1 psig
Torus Pressure	13.7 psig
Reactor Pressure	885 psig
Reactor water level	36 inches

Which one of the following describes the effect these conditions will have on the status of Suppression Pool Cooling?

- A. Suppression Pool Cooling will remain in service in the current lineup.
- B. HX Bypass Valve E11-F048B will auto open and cannot be closed for 3 minutes.
- C. HX Bypass Valve E11-F048B will auto open and cannot be closed for 5 minutes.
- D. HX Bypass Valve E11-F048B will auto open and cannot be closed for 10 minutes.

REFERENCE:

SD-17 Residual Heat Removal System, section 3.9

EXPLANATION:

The student must first recognize that an RHR initiation signal is present. (LL3) Upon receipt of the initiation signal, the HX bypass valve will receive an auto open signal and will be prevented from closing for 3 minutes.

CHOICE "A" - Incorrect. Would be correct if reactor water level were above LL3.

CHOICE "B" - Correct Answer

CHOICE "C" - Incorrect. 5 minutes is a time delay associated with the RHR injection valve, F017.

CHOICE "D" - Incorrect. 10 minutes is a time mentioned in SD-17, section 4.2.8 associated with equipment condition. 10 seconds is a time associated with the RHR min flow bypass valve.

219000 RHR/LPCI: Torus/Pool Cooling Mode

K1. Knowledge of the physical connections and/or cause effect relationships between RHR/LPCI: TORUS/SUPPRESSION POOL COOLING MODE and the following: CFR: 41.2 to 41.9 / 45.7 to 45.8)

K1.09 Nuclear boiler instrumentation 3.3 / 3.4

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-17, Obj. 9. given an RHR pump or valve, list the interlocks, permissives and/or automatic actions associated with the RHR pump or valve, including setpoints.

COG LEVEL: High

18. In the RC/L leg of Level/Power Control Procedure, circuit alterations are performed on Unit Two per EOP-SEP-10, Circuit Alteration Procedure, to prevent a Group I Isolation from occurring.

Which one of the following Group I Isolation signals is defeated by this circuit alteration?

- A. Main Steam Line Low Pressure
- B. Main Steam Line High Flow
- C. Reactor Water Low Level 3
- D. Low Condenser Vacuum

REFERENCE:
SEP-10 Circuit Alterations

EXPLANATION:
The LL3 Gp 1 Isolation signal is defeated in these conditions to prevent a closure of the MSIVs as reactor water level is intentionally lowered to assist in controlling power.

CHOICE "A" - Incorrect. Gp 1 Isolation signal, but it is not defeated.

CHOICE "B" - Incorrect. Gp 1 Isolation signal, but it is not defeated.

CHOICE "C" - Correct Answer

CHOICE "D" - Incorrect. Gp 1 Isolation signal, but it is not defeated.

223002 PCIS / Nuclear Steam Supply Shutoff

K4. Knowledge of PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF design feature(s) and/or interlocks which provide for the following: (CFR: 41.7)

K4.08 †Manual defeating of selected isolations
during specified emergency conditions 3.3 / 3.7

SOURCE: New

LESSON PLAN/OBJECTIVE:
CLS-LP-300K, Obj. 18e. Explain the reasons for installation of jumpers to defeat/actuate the following: MSIV LL3 Isolation.

COG LEVEL: High

19. Unit Two is operating at full power.

A failure to "self check" during clearance activities results in the feeder breaker to 2A RPS MG set being inadvertently opened.

Which one of the following describes the effects of this mis-operation?

- A. RPS bus "A" remains energized due to flywheel operation and automatic transfer of bus to the alternate power supply.
- B. RPS bus "A" momentarily de-energizes until automatic transfer of bus to alternate power supply is complete.
- C. RPS bus "A" de-energizes; transfer to alternate power supply requires manual actions; Group 1 A/C logic trips; no MSIV movement
- D. RPS bus "A" de-energizes; transfer to alternate power supply requires manual actions; Group 1 A/C logic trips; Inboard MSIV closure

REFERENCE:

SD-3.0 Reactor Protection System, section 4.1.4

EXPLANATION:

Opening the feeder breaker to the 'A' RPS MG set will cause RPS bus 'A' to deenergize. RPS MG Flywheel action will not keep the bus energized. This loss will cause a trip of the GP1 A/C logic, however no MSIV movement will occur.

Re-energization of the RPS bus from the alternate supply requires manual action.

CHOICE "A" - Incorrect. Flywheel maintains voltage and frequency for 1 second only; manual transfer to alternate is required

CHOICE "B" - Incorrect. manual transfer to alternate is required

CHOICE "C" - Correct Answer

CHOICE "D" - Incorrect. No MSIV closure occurs

223002 PCIS / Nuclear Steam Supply Shutoff

K6. Knowledge of the effect that a loss or malfunction of the following will have on the PRIMARY CONTAINMENT ISOLATION SYSTEM/NUCLEAR STEAM SUPPLY SHUT-OFF: CFR: 41.7 / 45.7)

K6.08 Reactor protection system 3.5 / 3.7

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-03, Obj. 18a. State the power supplies for the following: RPS MG Set A.

COG LEVEL: High

20. On Unit Two, the SRO directs the RO to place drywell sprays in service per 0EOP-01-SEP-02, Drywell Spray Procedure.

During the execution of SEP-02, SW-V111, Conv SW to Vital Header Vlv trips on magnetics and remains in the full closed position.

Which one of the following describes the impact this failure will have on RHR/Drywell Spray system and the procedural-actions necessary to mitigate these consequences?

- A. loss of cooling water to RHR Room Coolers only;
Open SW-V117, Nuc SW to Vital Header Vlv.
- B. loss of cooling water to RHR Room Coolers only;
Open SW-V118, Vital Header Crosstie Vlv.
- C. loss of cooling water to RHR Room Coolers and RHR Pump Seal Coolers;
Open SW-V117, Nuc SW to Vital Header Vlv.
- D. loss of cooling water to RHR Room Coolers and RHR Pump Seal Coolers;
Open SW-V118, Vital Header Crosstie Vlv.

REFERENCE:

SEP-02 Drywell Spray Procedure
SD-17 Residual Heat Removal System

EXPLANATION:

SEP-02 directs supplying cooling water to the vital header by opening either the SW-V111 valve or the SW-V117 valve. If one is unavailable or trips, the procedure will direct opening the other valve. Opening the SW-V118 is not an option provided in SEP-02. The loads supplied by the vital header include the RHR Room Coolers and the RHR Pump Seal Coolers.

CHOICE "A" - Incorrect. Cooling is also lost to the RHR Pump seal coolers

CHOICE "B" - Incorrect. Cooling is also lost to the RHR Pump seal coolers;
Opening SW-V118 is not a procedural option.

CHOICE "C" - Correct Answer

CHOICE "D" - Incorrect. Opening SW-V118 is not a procedural option.

226001 RHR/LPCI: CTMT Spray Mode

A2. Ability to (a) predict the impacts of the following on the RHR/LPCI: CONTAINMENT SPRAY SYSTEM MODE ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6)

A2.03 Valve closures 3.1 / 3.1

SOURCE: New

LESSON PLAN/OBJECTIVE:

COG LEVEL: High

21. 0AOP-38.0, Loss of Fuel Pool Cooling, gives direction to maintain fuel pool level between the Fuel Pool Level High and Fuel Pool Level Low annunciators using a variety of makeup sources.

Which one of the following is the preferred makeup source?

- A. Demin water header stations
- B. Fire Protection Hose Stations
- C. Demin water from B Loop RHR keepfill
- D. Demin water makeup via skimmer surge tank makeup valve

REFERENCE:

AOP-38.0 Loss of Fuel Pool Cooling
SD-13 section 4.2.1

EXPLANATION: The preferred order of the makeup sources is from the normal fill, Demin water hose stations, Fire protection hose stations, and then other sources that are not service water.

CHOICE "A" - Incorrect. although this is a makeup source it is not the preferred source.

CHOICE "B" - Incorrect. although this is a makeup source it is not the preferred source.

CHOICE "C" - Incorrect. although this is a makeup source it is not the preferred source.

CHOICE "D" - Correct answer.

233000 Fuel Pool Cooling / Cleanup

2.4.6 Knowledge of EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)

IMPORTANCE RO 3.7 SRO 4.7

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-13, Obj. 11. State the sources of makeup water for the Fuel Pool in order of preference.

COG LEVEL: Low

22. Lowering condenser vacuum results in the Unit SRO directing a reactor scram.

A subsequent ATWS occurs.

Plant conditions are as follows:

Reactor Power	12%
Reactor Pressure	1100 psig
Reactor Water Level	100 inches and lowering
Condenser Vacuum	8 inches Hg
SLC Pumps	Injecting Boron
Torus Temperature	98° F
Torus Level	-2.2 feet

In accordance with the Level Power Control Procedure, which one of the following means of pressure control is currently available to stabilize pressure below 1050 psig?

- A. HPCI
- B. SRV's
- C. Steam Jet Air Ejectors
- D. Main Turbine Bypass Valves

REFERENCE:
Level Power Control Procedure

EXPLANATION:
From the choices given for pressure control, SRVs are the only available option for the given conditions.

CHOICE "A" - Incorrect. With level below LL2 HPCI cannot be placed in pressure control mode.

CHOICE "B" - Correct Answer

CHOICE "C" - Incorrect. MSIV closure on low vacuum prevents using SJAE for pressure control

CHOICE "D" - Incorrect. With MSIVs closed on low vacuum, bypass valves are not available

239001 Main and Reheat Steam

K3. Knowledge of the effect that a loss or malfunction of the MAIN AND REHEAT STEAM SYSTEM will have on following: (CFR: 41.7 / 45.4)

K3.09 Steam bypass capability 3.6 / 3.7

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-300E, Obj. 11. Given plant conditions and the LPC procedure determine the operator actions required to stabilize or reduce reactor pressure.

COG LEVEL: High

23. Which one of the following describes the effect that a loss of E8 will have on the Unit Two Safety Relief Valve system?

A. Inability to manually operate SRV's from the RTGB

B. Inability to manually operate SRV's from the RSDP

C✓ Loss of SRV position indication on the RTGB

D. Loss of SRV position indication on the RSDP

REFERENCE:

SD-20 Automatic Depressurization System, section 4.3.4/4.3.5

EXPLANATION:

SRV position indication on the RTGB is powered thru the acoustic sensors which are powered from E6/E8.

CHOICE "A" - Incorrect. powered from 125 VDC

CHOICE "B" - Incorrect. powered from 125 VDC

CHOICE "C" - Correct Answer

CHOICE "D" - Incorrect. powered from 125 VDC

239002 SRVs

K6. Knowledge of the effect that a loss or malfunction of the following will have on the RELIEF/SAFETY VALVES : (CFR: 41.7 / 45.7)

K6.03 A.C. power: Plant-Specific 2.7* / 2.9*

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-20, Obj. 15c. Given plant conditions, predict how ADS/SRVs will be affected by the following:
Loss of AC power.

COG LEVEL: Low

24. Unit Two is in power ascension following a refueling outage.

Reactor power is currently 22%.

The generator has been synchronized with the grid.

GP-04, Increasing Turbine Load to Rated Power, directs increasing turbine Load Set to 100%.

The RO inadvertently sets Load Set to 90% and continues with power ascension. All other turbine controls are normal.

As reactor power is raised to full power, which one of the following describes the expected plant response?

- A. When turbine load reaches 90%, reactor pressure will increase and cause a reactor scram.
- B. With the 110% Load Limit Set in effect, reactor power and turbine load can be raised to 100%.
- C✓ When turbine load reaches 90%, bypass valves will open to control turbine inlet pressure.
- D. When turbine load reaches 95%, Turbine Supervisory will sense a load imbalance causing a turbine trip to occur.

REFERENCE:

SD-26.3 EHC Electrical System

EXPLANATION:

Load Set is a reference signal set from the RTGB. When sensed turbine load reaches the Load Set setting, additional turbine load is restricted. Any additional steam produced as a result of continuing to raise reactor power is diverted to the condenser via bypass valves.

CHOICE "A" - Incorrect. Bypass valves will open and control reactor pressure.

CHOICE "B" - Incorrect. Load limit set is used to limit how far the turbine control valves could actually open, especially during abnormal operation and testing. Load Set will still control load.

CHOICE "C" - Correct Answer

CHOICE "D" - Incorrect. Incorrect interpretation of power/load imbalance

241000 Reactor/Turbine Pressure Regulator (EHC)

K5. Knowledge of the operational Implications of the following concepts as they apply to REACTOR/TURBINE PRESSURE REGULATING SYSTEM:
(CFR: 41.5 / 45.3)

K5.05 Turbine inlet pressure vs. Turbine load 2.8* 2.9*

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-26.3, Obj. 9a. Given plant conditions, including manipulation of one of the following EHC control or parameter changes, predict the expected response of the main turbine and/or reactor protection system: Load Limit Set potentiometer.

COG LEVEL: High

25. A failed Feedwater Heater level control valve has caused level in the 2A Feedwater Heater to reach the Hi Hi Level setpoint.

Which one of the following describes the automatic system response and the effect on feedwater temperature?

Moisture Removal Valves will open to drain extraction steam lines to the _____ and feedwater temperature will _____.

- A. Condenser;
Increase
- B. Condenser;
Decrease
- C. Heater Drain Deaerator;
Increase
- D. Heater Drain Deaerator;
Decrease

REFERENCE:
SD-34 Extraction Steam, section 3.1.1

EXPLANATION:
A high-high level condition in the 2A FW Heater will cause the associated MRVs to open, directing 11th stage extraction steam to the condenser, and allowing the extraction line check valves to close. Feedwater heating is lost for this heater causing overall feedwater temperature to decrease.

CHOICE "A" - Incorrect. FW temperature will decrease

CHOICE "B" - Correct Answer

CHOICE "C" - Incorrect. MRVs open to the condenser; other FW heaters direct flow to the HDD

CHOICE "D" - Incorrect. MRVs open to the condenser; other FW heaters direct flow to the HDD

256000 Reactor Condensate

A3. Ability to monitor automatic operations of the REACTOR CONDENSATE SYSTEM including:(CFR: 41.7 / 45.7)

A3.08 Feedwater temperature 3.1 / 3.1

SOURCE: New

LESSON PLAN/OBJECTIVE:
CLS-LP-34, Obj. 6a. Describe the effects of the following on the feedwater heater operation and feedwater temperature: High feedwater heater level.

COG LEVEL: High

26. Reactor pressurization is in progress per 0GP-02, Approach to Criticality and Pressurization of the Reactor.

The feedwater system is aligned as follows:

A RFP in Service
SULCV in Auto
Feedwater Heater 4A and 4B inlet isolation valves are closed
FW-FV-177, Feedwater Recirc Valve, throttled open

Which one of the following describes the effect of throttling the FW-V177 in the OPEN direction?

If the operator throttles FW-FV-177 in the open direction, the SULCV will throttle in the _____ direction. Opening the FW-FV-177 too far could result in voiding of the feedwater system piping _____ of the SULCV.

- A. open
upstream
- B. closed
upstream
- C. open
downstream
- D. closed
downstream

REFERENCE:

GP-02 Approach to Criticality and Pressurization of the Reactor
SD-32 Condensate and Feedwater System

EXPLANATION:

Throttling open the FW-V177 will divert flow from the reactor back to the condenser. This will require the SULCV to open further to provide the needed flow to maintain set reactor water level. A Caution in GP-02 warns against opening FW-V117 too far, causing voiding of the piping downstream of the SULCV.

CHOICE "A" - Incorrect. concern is for downstream piping

CHOICE "B" - Incorrect. SULCV will open to maintain level; concern is for downstream piping

CHOICE "C" - Correct Answer

CHOICE "D" - Incorrect. SULCV will open to maintain level;

259002 Reactor Water Level Control

A1. Ability to predict and/or monitor changes in parameters associated with operating the REACTOR WATER LEVEL CONTROL SYSTEM controls including:
(CFR: 41.5 / 45.5)

A1.05 FWRV/startup level control position: Plant-Specific 2.9 / 2.9

SOURCE: Bank LOI-CLS-LP-32* (22B)

LESSON PLAN/OBJECTIVE:

CLS-LP-32, Obj. 29e. Given plant conditions predict the changes in the Condensate and FW system parameters associated with operating the following equipment or controls: FW recirc to condenser valve, FW-FV-177.

COG LEVEL: High

27. Unit Two is operating at rated power with the following containment parameters:

Drywell Pressure	0.8 psig
Torus Pressure	1.2 psig

Torus venting is placed in service per 2OP-10, Standby Gas Treatment System Operating Procedure, to lower torus pressure.

Which one of the following describes the response of drywell pressure to the torus venting operation?

Drywell Pressure will _____.

- A. remain steady
- B. rise and equalize with torus pressure
- C. lower at the same rate as torus pressure
- D. lower at a faster rate than torus pressure

REFERENCE:
2OP-10 Standby Gas Treatment System

EXPLANATION:
This is an evolution that is periodically performed on shift. There are independent lineup's for venting the torus vs. the drywell air space. Venting the torus will have no effect on drywell air space pressure. Student misconceptions of the different venting flowpaths make all the options plausible.

CHOICE "A" - Correct

CHOICE "B" - Incorrect

CHOICE "C" - Incorrect

CHOICE "D" - Incorrect

261000 SGTS

A1. Ability to predict and/or monitor changes in parameters associated with operating the STANDBY GAS TREATMENT SYSTEM controls including:
(CFR: 41.5 / 45.5)

A1.02 Primary containment pressure 3.1 / 3.2

SOURCE: New

LESSON PLAN/OBJECTIVE:
CLS-LP-04, Obj. 8. Describe the operation of the Suppression Chamber to Drywell Vacuum breakers.

COG LEVEL: High

28. Unit Two has lost off-site power with DG3 and DG4 unavailable.

No electrical buses have been cross-tied.

Assuming normal alignment of UPS prior to the station blackout, the UPS primary inverter is currently being fed from DC Switchboard _____.
If the primary inverter fails, _____.

A. 2A.

UPS loads will be de-energized.

B. 2B.

UPS loads will be de-energized.

C. 2A.

UPS will auto transfer to an alternate source.

D. 2B.

UPS will auto transfer to an alternate source.

REFERENCE:

SD-52 120 VAC Distribution and UPS

EXPLANATION:

DC input to primary inverter is from Div. I DC (2A). With the STBY unit in Bypass Test (normal), if the primary inverter fails UPS loads will be de-energized. Multiple UPS lineups are available dependent upon plant condition, making any of the answer options plausible.

CHOICE "A" - Correct Answer

CHOICE "B" - Incorrect

CHOICE "C" - Incorrect

CHOICE "D" - Incorrect

262001 AC Electrical Distribution

K3. Knowledge of the effect that a loss or malfunction of the A.C. ELECTRICAL DISTRIBUTION will have on following: (CFR: 41.7 / 45.4)

K3.04 Uninterruptible power supply 3.1 / 3.3

SOURCE: Bank LOI-CLS-LP-052-B*005 (1)

LESSON PLAN/OBJECTIVE:

CLS-LP-52, Obj. 9. Describe the effect that a loss or malfunction of the following will have on the UPS system: AC / DC Electrical distribution.

COG LEVEL: High

29. Unit One is operating at full power with the following plant conditions:

DG2	Under clearance
Suppression Pool	96° F due to HPCI Surveillance
RHR	B Loop in SPC (maximized cooling)
RHR SW	B Loop in service
NSW	B pump in service
CSW	B and C pumps in service

A Loss of Offsite Power (LOOP) occurs on both Units.

Which one of the following is the impact of the LOOP on B Loop of RHR, and what action should the RO take in accordance with 0AOP-36.1, Loss of any 4160V Buses or 480V E-Buses?

- A. RHR and RHR SW pumps have lost power.
Crosstie E1 to E2.
- B. RHR SW has lost its suction source.
Crosstie E5 to E6.
- C. Torus Cooling Valves, B RHR pump and B RHR SW pump have lost power.
Crosstie E2 to E4.
- D. Torus Cooling Valves, D RHR pump and D RHR SW pump have lost power.
Crosstie E6 to E8.

REFERENCE:

0AOP-36.1 Loss of Any 4160V Buses or 480V E-Buses
SD-43 Service Water
SD-17 Residual Heat Removal
SD-50.1 4KV Distribution

EXPLANATION: With DG2 under clearance it will de-energize on the loss of offsite power. both RHR and RHR SW pumps D lose power. B NSW pump loses power and the A pump will auto start. CSW pumps lose power due to the LOOP. RHR Loop B valves lose power.

CHOICE "A" Incorrect. Not all pumps have lost power, E1 and E2 cannot be crosstied procedurally.

CHOICE "B" Incorrect. B loop is normally cooled by NSW, 480 V busses are not crosstied unless unable to crosstie 4 kV.

CHOICE "C" correct answer.

CHOICE "D" Incorrect. 480 V busses are not crosstied unless unable to crosstie 4 kV.

262001 AC Electrical Distribution

A2. Ability to (a) predict the impacts of the following on the A.C. ELECTRICAL DISTRIBUTION ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: (CFR: 41.5 / 45.6)

A2.03 Loss of off-site power 3.9 / 4.3*

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-50.1, Obj. 9. List the major equipment/loads on each of the 4160 VAC buses.

COG LEVEL: High

30. Unit Two is operating at 30% reactor power when a complete loss of UPS occurs?

Which one of the following describes how this loss will affect RFPT operation?

- A. RTGB trip pushbutton function is lost.
- B. overspeed trip circuit will lose power causing RFPT Trip.
- C. vibration instrumentation will lose power causing RFPT Trip.
- D. RFPT electrical trip circuits will be powered from their redundant power supplies.

REFERENCE:
AOP-12 Loss of UPS
OI-50.5

EXPLANATION:
RFPT trip circuits are powered from UPS with redundant power supplies from non-UPS 120VAC supplies. The RFPT trip pushbutton is powered from 125 VDC.

CHOICE "A" - Incorrect. RFPT rip pushbutton powered from 125 VDC

CHOICE "B" - Incorrect - Trip circuit will be powered from redundant source; no RFPT trip will occur

CHOICE "C" - Incorrect. Trip circuit will be powered from redundant source; no RFPT trip will occur

CHOICE "D" - Correct Answer

262002 UPS (AC/DC)

K1. Knowledge of the physical connections and/or cause effect relationships between UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) and the following:
(CFR: 41.2 to 41.9 / 45.7 to 45.8)

K1.02 RFPT Control 2.8 / 3.0

SOURCE: New

LESSON PLAN/OBJECTIVE:
CLS-LP-32.3, Obj. 2. State the electrical power supplies for the RFPT DCS.

COG LEVEL: Low

31. Which one of the following describes the effect that a complete loss of UPS will have on the Level Setpoint Adjustment and Level Setdown functions of the Digital Feedwater Level Control System controllers?

Level Setpoint adjustment is _____.
Level Setdown _____ occur following a reactor scram.

- A. available;
will
- B. available;
will not
- C. not available;
will
- D. not available;
will not

REFERENCE:
SD-52 Section 4.2.1 Vital UPS Failure

EXPLANATION:
A Loss of UPS will cause the RFPT controller screens to go blank. The backup DC power supplies will allow continued operation however, the operator will be unable to adjust level setpoint. Reactor Water level setdown will not occur in the event of a reactor scram.

CHOICE "A" - Incorrect. level setpoint adjustment is not available; level setdown will not occur

CHOICE "B" - Incorrect. level setpoint adjustment is not available;

CHOICE "C" - Incorrect. level setdown will not occur

CHOICE "D" - Correct Answer

262002 UPS (AC/DC)

K3. Knowledge of the effect that a loss or malfunction of the UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.) will have on following:
(CFR: 41.7 / 45.4)

K3.01 Water Level Control3.1 / 3.3

SOURCE: New

LESSON PLAN/OBJECTIVE:
CLS-LP-52, Obj. 8e. describe the effect that a loss or malfunction of the UPS system will have on plant operations, including the following: Feedwater level control.

COG LEVEL: Low

32. Which one of the following is the power supply to the Outboard MSIV's DC solenoids on Unit One?

- A. Div 1 Switchboard 21A.
- B. Div 2 Switchboard 22B.
- C. Div 1 Switchboard 1A.
- D. Div 2 Switchboard 1B.

REFERENCE:

OI-50.0 DC Load List, page 44

EXPLANATION:

Unit 1 Outboard MSIV DC solenoids are powered from Div.2 Switchboard 1B

CHOICE "A" - Incorrect. Wrong Division of DC

CHOICE "B" - Incorrect. Wrong switchboard, however 22B is a Unit 1 panel

CHOICE "C" - Incorrect. Wrong Division of DC

CHOICE "D" - Correct Answer

263000 DC Electrical Distribution

K2. Knowledge of electrical power supplies to the following: (CFR: 41.7)

K2.01 Major D.C. loads 3.1 / 3.4

SOURCE: Bank

LESSON PLAN/OBJECTIVE:

CLS-LP-25, Obj. 5. List the power supplies (division and voltage) for the MSIV solenoids.

COG LEVEL: Low

33. Unit Two experiences a Loss of Off-Site Power (LOOP) with DG4 under clearance.

Which one of the following describes how the Nuclear Service Water (NSW) and Conventional Service Water (CSW) pumps will respond as DG3 output breaker closes and energizes bus E3?

- A. NSW pump 2A and CSW pump 2A start immediately.
- B. NSW pump 2A and CSW pump 2A start after a 5 second time delay.
- C. NSW pump 2A starts immediately and CSW pump 2A does not start.
- D. NSW pump 2A starts after a 5 second time delay and CSW pump 2A does not start.

REFERENCE:

SD-43 Service Water, section 3.2.1 / 3.2.2

EXPLANATION:

2A NSW pump and 2A CSW pump are both powered from emergency bus E3. On a LOOP they will lose power until bus E3 is reenergized from DG3. Immediately following reenergization of E3, 2A NSW will start. With a concurrent LOCA, a 5 second time delay exists. 2A CSW will remain off.

CHOICE "A" - Incorrect. CSW pump remains OFF

CHOICE "B" - Correct Answer

CHOICE "C" - Incorrect. CSW pump remains OFF, NSW pump starts immediately

CHOICE "D" - Incorrect. NSW pump starts immediately

264000 EDGs

K5. Knowledge of the operational implications of the following concepts as they apply to EMERGENCY GENERATORS (DIESEL/JET) : (CFR: 41.5 / 45.3)

K5.06 Load sequencing 3.4 / 3.5

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-39, Obj 8. Describe how an EBus will sequence load if the unit has a LOCA signal.

COG LEVEL: High

34. Unit Two is operating at rated power with the A SJAE train in service at Full Load.

A clearance tagging error results in the closure of the SJE-V15, Recombiner Preheater Steam Supply Valve followed by the following alarm:

Recombiner Inlet Temperature Low

Which one of the following describes the effect these conditions will have on Main Condenser vacuum and downstream Hydrogen concentrations?

Main Condenser vacuum will _____;
Hydrogen concentrations will _____.

A. remain steady;
increase

B. remain steady;
decrease

C. degrade;
increase

D. degrade;
decrease

REFERENCE:

SD-30 Condenser Air Removal and Off-Gas Recombiner System, fig. 30-4
APP-UA-44 (3-2) RECOMBINER INLET TEMP LOW

EXPLANATION:

The closure of SJE-V15 will have no effect on operation of the SJAEs and no effect on condenser vacuum. The loss of the recombinder Preheater steam source and resultant low recombinder temperature will cause recombinder efficiency to drop, causing downstream hydrogen concentrations to rise.

CHOICE "A" - Correct Answer

CHOICE "B" - Incorrect. H₂ concentrations will increase

CHOICE "C" - Incorrect. vacuum will remain steady

CHOICE "D" - Incorrect. vacuum will remain steady; H₂ concentrations will increase

271000 Offgas

K3. Knowledge of the effect that a loss or malfunction of the OFFGAS SYSTEM will have on following:
(CFR: 41.5 / 45.3)

K3.01 Condenser vacuum 3.5 / 3.5

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-30, Obj. 11. Given the necessary plant conditions, describe the effect that a malfunction or loss of the CAR/AOG system would have on the following: Main condenser Vacuum.

COG LEVEL: High

35. Which one of the following identifies the power supplies for the Electric Driven Fire Pump?

The normal power supply is from:

- A. E2, with an automatic transfer to E4 on loss of power
- B. E4, with an automatic transfer to E2 on loss of power
- C. E2, must be manually transferred to E4 on loss of power
- D. E4, must be manually transferred to E2 on loss of power

REFERENCE:

SD-41 Fire Protection System, section 2.1.3 Electric Fire Pump

EXPLANATION:

The electric fire pump is normal powered from E2 with a manual transfer capability to E4. the transfer was designed to be an automatic transfer, but is disabled so that it has to be performed manually.

CHOICE "A" - Incorrect, see explanation.

CHOICE "B" - Incorrect, see explanation.

CHOICE "C" - Correct Answer

CHOICE "D" - Incorrect, see explanation.

286000 Fire Protection

K2. Knowledge of electrical power supplies to the following: (CFR: 41.7)

K2.02 Pumps 2.9 / 3.1

SOURCE: Bank LOI-CLS-LP-041*11B

LESSON PLAN/OBJECTIVE:

CLS-LP-41, Obj. 11b. Identify the distribution system which supplies power for the following components: Motor driven fire pump.

COG LEVEL: Low

36. A plant transient and subsequent safety relief valve malfunction results in reactor steam dome pressure reaching 1300 psig.

Which one of the following describes the effect of the pressurization transient on the reactor pressure vessel?

- A. Reactor pressure vessel design pressure has not been exceeded, and the Reactor Coolant System Safety Limit has been exceeded.
- B. Reactor pressure vessel design pressure and the Reactor Coolant System Safety Limit have both been exceeded.
- C. Neither reactor pressure vessel design pressure nor the Reactor Coolant System Safety Limit have been exceeded.
- D. Reactor pressure vessel design pressure has been exceeded, and the Reactor Coolant System Safety Limit has not been exceeded.

REFERENCE:

Tech Spec bases for Safety Limits

EXPLANATION:

Per TS Bases, the RCL pressure safety limit is 1325 psig steam dome pressure and the reactor vessel design pressure is 1250 psig. 1325 psig steam dome corresponds to 1375 psig bottom head pressure which is 110% of the reactor design pressure. 110% of design pressure is the maximum pressure allowed by ASME standards.

CHOICE "A" - Incorrect, see explanation.

CHOICE "B" - Incorrect, see explanation.

CHOICE "C" - Correct Answer

CHOICE "D" - Incorrect, see explanation.

290002 Reactor Vessel Internals

K6. Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR VESSEL INTERNALS : (CFR: 41.7 / 45.7)

K6.06 Relief/safety valves 3.0 / 3.2

SOURCE: New

LESSON PLAN/OBJECTIVE:

COG LEVEL: Low

37. Unit Two is operating at full power when the following indications are observed:

SJAE Trains
AOG System Outlet Flow

Both in half load
80 scfm and slowly rising

Which one of the following is an action that needs to be taken based on the increasing off gas flow?

- A. Reduce power to maintain condenser vacuum.
- B. Start the mechanical vacuum pump to increase condenser vacuum.
- C. Place one SJAE Train in full load to handle the increased off gas flow.
- D. Throttle open the SJAE Condensate Recirculation Valve, CO-FV-49, to increase SJAE efficiency.

REFERENCE:
SD-30 pages 28-29
2APP-UA-48 5-3

EXPLANATION:
Increase in off gas flow is an indication of a loss of vacuum condition. So power should be reduced to maintain vacuum greater than 25 inches HG.

CHOICE "A" correct answer

CHOICE "B" Starting a mechanical vacuum pump would help in removing air from the condenser except it is not allowed to be put into service with the unit at power.

CHOICE "C" Placing a SJAE train in full load would not help with the loss of condenser vacuum. This is an action in the AOP if a train is thought to be malfunctioning. High off gas flow is not a malfunction of the train.

CHOICE "D" At low power this is an option to increase the efficiency. At greater than 50% power this is manually isolated so as to have no effect on the system under these conditions. Action from the AOP.

295002 Loss of Main Condenser Vacuum

AK1. Knowledge of the operational implications of the following concepts as they apply to LOSS OF MAIN CONDENSER VACUUM: (CFR: 41.8 TO 41.10)

AK1.04 Increased Offgas Flow 3.0 / 3.3

SOURCE: New

LESSON PLAN/OBJECTIVE:
CLS-LP-30, Obj. 11. Given the necessary plant conditions, describe the effect that a malfunction or loss of the CAR/AOG system would have on the following: Main condenser Vacuum.

COG LEVEL: Higher order

38. A DBA LOCA occurs on Unit One concurrent with a Loss of Offsite Power on both Units.

A 4160 VAC bus E3 lockout occurs due to protective relay actuation.

What is the response of the Unit One Low Pressure ECCS systems?

- A ✓ Injection from both loops of Core Spray and 2 RHR pumps running and injecting in only one loop.
- B. Injection of only one loop of Core Spray and 2 RHR pumps running and injection in only one loop.
- C. Injection from both loops of Core Spray and 3 RHR pumps running and injection in both loops.
- D. Injection of only one loop of Core Spray and 3 RHR pumps running and injection in both loops.

REFERENCE:
Station Load Lists

EXPLANATION:
4 KV Bus E3 supplies power to bus E7 which supplies power to RHR Loop A injection valve F017A. With this valve de-energized only loop B will inject. Both Core Spray loops are powered from Unit 1 buses E1 and E2.

CHOICE "A" Is incorrect because both loops of core spray have power from buses E1 and E2. Possible distractor if the examinee is thinking Unit Two.

CHOICE "B" Is incorrect because both loops of core spray have power from buses E1 and E2 and the Unit 1 A side RHR injection valve is closed with a loss of power. Possible distractor if the examinee is thinking Unit Two and does not apply the power supply to the injection valve.

CHOICE "C" Correct Answer.

CHOICE "D" Is incorrect because the Unit 1 A side RHR injection valve is closed with a loss of power.

295003 Partial or Complete Loss of A.C. Power

AK1. Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER : (CFR: 41.8 to 41.10)

AK1.03 Under voltage/degraded voltage effects on electrical loads..... 2.9 / 3.2

SOURCE: Bank

LESSON PLAN/OBJECTIVE:
CLS-LP-17 Obj. 18. Given plant conditions, determine how the following will affect the RHR system: Loss of AC Power.

COG LEVEL: High

39. Unit Two is operating at rated power when a loss of DC Distribution panel 12A occurs.

Which one of the following is the effect of a loss of DC Distribution Panel 12A?

The Alternate Rod Insertion System (ARI) will:

- A. not auto initiate but can be manually initiated.
- B. not auto initiate and cannot be manually initiated.
- C. initiate automatically or can be initiated manually.
- D. initiate automatically but cannot be manually initiated.

REFERENCE:

0AOP-39, Attachment 3.

EXPLANATION:

As stated in Attachment 3 of 0AOP-39, for a loss of 12A ARI will have no manual or auto initiation.

CHOICE "A" ARI will not operate manually.

CHOICE "B" Correct answer.

CHOICE "C" ARI will not auto initiate.

CHOICE "D" ARI will not operate manually.

295004 Partial or Complete Loss of D.C. Power

AK1. Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER : (CFR: 41.8 to 41.10)

AK1.02 Redundant D.C. power supplies: Plant-Specific..... 3.2 / 3.4

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-302-G Obj. 2, List the automatic actions expected to occur in accordance with the following AOP's: 0AOP-39, Loss of DC Power.

COG LEVEL: Higher Order

40. Unit Two is operating at full power.

Which one of the following state the reason that the Turbine Bypass Valves will open following a main turbine trip signal?

- A. Prevent overspeeding of the main turbine during coastdown.
- B. Prevent over pressurization of the MSR cross-over piping.
- C. Prevent over pressurization of the reactor vessel.
- D. Prevent damage to the Non-Return valves.

REFERENCE:
SD-26

EXPLANATION:
Bypass valves open to prevent overpressurization of the reactor when the turbine control valves close on a turbine trip signal.

CHOICE "A" The intermediate stop valves close on a turbine trip to prevent overspeeding the main turbine. Extraction steam will be lost following a turbine trip and bypass steam is directed to the main condenser.

CHOICE "B" over pressurization is a function of the cross over relief valves.

CHOICE "C" correct answer

CHOICE "D" Non-returns will close to prevent flashing of steam to cause overspeeding of the turbine.
295005 Main Turbine Trip

AK3. Knowledge of the reasons for the following responses as they apply to MAIN TURBINE GENERATOR TRIP: (CFR: 41.5 / 45.6)

AK3.07 Bypass valve operation..... 3.8 / 3.8

SOURCE: New

LESSON PLAN/OBJECTIVE:
CLS-LP-26 Obj. 4f, Describe the operation of the following Main Turbine related components: Bypass Valves.

COG LEVEL: low/Fund

41. The EOP Users Guide defines what the Control Operator Immediate Operator Actions are and the setpoints for each of the actions.

Which one of the following Control Operator Immediate Actions have different setpoints between Unit One and Unit Two?

- A. Tripping of the main turbine.
- B. Tripping of the first feed pump.
- C. Master level controller setpoint setdown.
- D✓ Placing the reactor mode switch to Shutdown.

REFERENCE:
0EOP-01-UG (pg. 22)

EXPLANATION:
The mode switch on Unit Two is not placed to shutdown until steam flow is less than 3 Mlbs/hr. This requirement does not exist on Unit One.

CHOICE "A" When APRM's are downscale (<2%) the main turbine is tripped. (Same on both units)

CHOICE "B" If two feed pumps are running, and reactor water level is above +160 inches, then trip one feed pump. (Same on both units)

CHOICE "C" Ensure the master reactor level controller setpoint is +170 inches. (Same on both units)

CHOICE "D" Unit One - Place the reactor mode switch to Shutdown. Unit Two - After steam flow is less than 3 Mlbs/hr, place the reactor mode switch to Shutdown.

295006 SCRAM

2.2.3 (multi-unit license) Knowledge of the design, procedural, and operational differences between units. (CFR: 41.5 / 41.6 / 41.7 / 41.10 / 45.12)

IMPORTANCE RO 3.8 SRO 3.9

SOURCE: new

LESSON PLAN/OBJECTIVE:
CLS-LP-300-C Obj. 2, List the immediate operator actions for a reactor scram.

COG LEVEL: fund

42. Unit One was operating at full power when a scram occurred due to a loss of drywell cooling with the following plant conditions.

Reactor water level	155 inches (slowly lowering)
Drywell pressure	2.1 psig (slowly rising)
High water Trip A amber light	Out
High water Trip B amber light	Lit
High water Trip C amber light	Lit

Which one of the following is the status of the reactor feed pumps and HPCI system?

The Reactor feed pump turbines:

- A. are running and HPCI is injecting to the vessel.
- B. are tripped but HPCI is injecting to the vessel.
- C. are running but HPCI is tripped.
- D. and HPCI are both tripped.

REFERENCE:
SD-19 page 33 / SD-32

EXPLANATION:

The reactor feed pumps and HPCI will trip on a two out of three logic. The high water trip amber lights feed into the RFP trip logic and provide indication that a high level condition exists. With drywell pressure greater than 2 psig HPCI should have auto started, but it had tripped on high level and will not restart automatically until LL2, with level lowering is also an indication that it is tripped. These must be manually reset to restart the pumps with the exception of HPCI which will auto restart if level is below LL2.

CHOICE "A" Feed pumps and HPCI would be tripped on the two out of three logic. Hi DW pressure does not auto reset the trip logic, LL2 would.

CHOICE "B" HPCI would be tripped. Hi DW pressure does not auto reset the trip logic, LL2 would.

CHOICE "C" Reactor feed pumps would be tripped on the two out of three logic.

CHOICE "D" Correct answer.

295008 High Reactor Water Level

AK2. Knowledge of the interrelations between HIGH REACTOR WATER LEVEL and the following: (CFR: 41.7 / 45.8)

AK2.03 Reactor water level control..... 3.6 / 3.7

SOURCE: new

LESSON PLAN/OBJECTIVE:

CLS-LP-19 Obj 16a, Given plant conditions, determine if the following actions should occur: HPCI Turbine automatic trip.

COG LEVEL: Higher Order

43. Unit One is at rated power when a scram signal is received.

Reactor water level drops and RWCU isolates.

Which one of the following listed RTGB level indicators will be available for the RO to use to verify that water level is now rising?

- A. Fuel Zone instruments only
- B. Wide range instruments only
- C✓ Fuel Zone and Wide Range instruments
- D. Fuel zone and Wide Range instruments are not on scale.

REFERENCE:
SD-01.2

EXPLANATION:
RWCU isolates at LL2 (105 inches) with the Wide Range (N026A & B) indications from 0-210 inches and the Fuel Zone (N036 & 37) indicators onscale due to the Recirc pumps tripping at LL2.

CHOICE "A" Wide range indicators have a scale from 0-210.

CHOICE "B" Fuel Zone indicators are on scale since the Recirc pumps have tripped.

CHOICE "C" Correct answer.

CHOICE "D" both indicators are on scale.

295009 Low Reactor Water Level

AK2. Knowledge of the interrelations between LOW REACTOR WATER LEVEL and the following: (CFR: 41.7 / 45.8)

AK2.01 Reactor water level indication..... 3.9 / 4.0

SOURCE: Bank

LESSON PLAN/OBJECTIVE:
CLS-LP-01.2 Obj. 4a, List the systems which receive input from the Vessel Instrumentation system for the following: Level signal.

COG LEVEL: Higher Order

44. Unit Two was operating at 100% power when a large break LOCA occurred in containment.

Which one of the following describes what will happen with the vessel level instrument legs?

- A. The compensated level instrument legs are at a higher temperature than the uncompensated legs, the compensated level instrument legs will boil first.
- B. The uncompensated level instrument legs are at a higher temperature than the compensated legs, the uncompensated level instrument legs will boil first.
- C. Both instrument legs are at the same temperature. There is a thermal time constant of approximately 4 to 6 minutes for the uncompensated legs, the compensated level instrument legs will boil first.
- D. Both instrument legs are at the same temperature. There is a thermal time constant of approximately 4 to 6 minutes for the compensated legs, the uncompensated level instrument legs will boil first.

REFERENCE:
SD-01.2 page 11-12

EXPLANATION:

If an accident should occur that causes drywell temperature to increase and reactor pressure to decrease, boiling can take place in the level instrument legs. The question is; which arrangement, compensated or uncompensated, will boiling most likely occur in first? Since the compensated level instrument legs are at a higher temperature than the uncompensated legs, they will reach a higher temperature first. It should be pointed out that the legs do not heat up to drywell temperature immediately, as there is a thermal time constant that can be 4 to 6 minutes. A time constant is the amount of time required for a signal or a parameter to reach 63.21% of the final value. After 5 time constants the signal is > 99% of the final value. A 4 to 6 minute time constant means that it can take from 20 to 30 minutes for the reference legs to heat up to drywell temperature.

CHOICE "A" Correct answer.

CHOICE "B" The compensated legs are at a higher temperature than the uncompensated legs.

CHOICE "C" Both instrument legs are not at the same temperature.

CHOICE "D" Both instrument legs are not at the same temperature.

295010 High Drywell Pressure

AK1. Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL PRESSURE : (CFR: 41.8 to 41.10)

AK1.03 Temperature increases..... 3.2 / 3.4

SOURCE: Bank

LESSON PLAN/OBJECTIVE:

CLS-LP-01.2 Obj. 5C, Explain the effect that the following will have on reactor vessel and/or pressure indications: High containment (primary and secondary) temperatures.

COG LEVEL: Fund

45. A turbine trip and reactor scram occurs on Unit One. After completing the immediate operator actions associated with the scram the RO notes that the RWM Confirm Shutdown screen is reading:

All Rods In:	NO
Shutdown:	YES
Rods Not Full In:	005

Based on the RWM Shutdown confirmation criteria, which one of the following was determined to be the position of the control rods that were not fully inserted?

The control rods are inserted at or beyond position:

- A✓ 02.
- B. 04.
- C. 02, with not more than one rod withdrawn past position 02.
- D. 04, with not more than one rod withdrawn past position 04.

REFERENCE:

SD-07.1 page 53 Criteria for reactor shutdown is defined as: No rod is withdrawn beyond position N, where N is selectable as a set parameter variable. The value of N is defined in the current Cycle Management Report. (This value is 02).

EXPLANATION:

The RWM screen indicated that all rods are not inserted (5 rods) but does indicate that the unit is shutdown. This signifies that all of the rods are not past the position of 02, otherwise the screen would indicate the the unit was not shutdown.

CHOICE "A" Correct answer

CHOICE "B" If any of the rods were at position 04 then the shutdown criteria would be NO. Recent change with power uprate from 04 to 02 for shutdown.

CHOICE "C" One rod could be at any position based on SDM, but not if 4 rods were at position 02 would you meet the shutdown criteria.

CHOICE "D" One rod could be at any position based on SDM, but not if 4 rods were at position 04 or 02 would you meet the shutdown criteria.

295015 Incomplete SCRAM

AA2. Ability to determine and/or interpret the following as they apply to INCOMPLETE SCRAM : (CFR: 41.10 / 43.5 / 45.13)

AA2.02 Control rod position..... 4.1* / 4.2*

SOURCE: Bank

LESSON PLAN/OBJECTIVE:

CLS-LP-07.1 Obj. 12, Describe the conditions necessary to cause the Shutdown Confirmation screen to display YES for All Rods In.

COG LEVEL: fund

46. While performing 0AOP-32.0, Plant Shutdown from Outside Control Room, the following reactor pressure readings were recorded at the indicated times:

1200	1000 psig
1300	425 psig
1400	100 psig
1500	25 psig

Based on the information given, which one of the following statements is correct concerning the reactor cooldown rate?

Technical Specification limits:

- A. have not been exceeded.
- B. were exceeded between 1200 and 1300.
- C. were exceeded between 1300 and 1400.
- D. were exceeded between 1400 and 1500.

REFERENCE:

0AOP-32

Steam Tables can be used as reference.

EXPLANATION:

Tech Spec requires cooldown at <100 deg F , cooldown from 1000-425 is 95 deg, from 425-100 is 115 deg and 100-25 is 90 deg per RPV saturation curve of 0AOP-32.0.

CHOICE "A" The 100°F cooldown limit was exceeded between 1300 and 1400 hours.

CHOICE "B" The cooldown between this time period is 95°F.

CHOICE "C" The cooldown between this time period is 115°F.

CHOICE "D" The cooldown between this time period is 90°F.

295016 Control Room Abandonment

AA1. Ability to operate and/or monitor the following as they apply to CONTROL ROOM ABANDONMENT :
(CFR: 41.7 / 45.6)

AA1.08 Reactor pressure..... 4.0 / 4.0

SOURCE: Bank

LESSON PLAN/OBJECTIVE:

CLS-LP-302-E Obj. 4, Given plant conditions (past and present) and 0AOP-32, Plant Shutdown from Outside the Control Room, plot cooldown rate.

COG LEVEL: Higher order

47. Unit Two is operating at rated power when a loss of TBCCW occurs to the Recirculation MG Sets.

Which one of the following describes how this loss of cooling will affect the Recirculation MG Sets?

High lube oil temperature of:

- A. 190° F will lock the scoop tube only.
- B. 190° F will trip the drive motor breaker and lock the scoop tube.
- C. 210° F will lock the scoop tube only.
- D. 210° F will trip the drive motor breaker and lock the scoop tube.

REFERENCE:

SD-02 page 33-34 Breaker trip
SD-02 page 35 scoop tube lock

EXPLANATION:

Loss of cooling to the Recirculation MG Set will cause the temperature to rise and the drive motor breaker to trip and the scoop tube will lock at 210° F. The 190° F is the hi temperature alarm setpoint.

CHOICE "A" The scoop tube will not lock until 210° F. 190° F is the hi temperature alarm setpoint.

CHOICE "B" The scoop tube will not lock and the drive motor will not trip until 210° F. 190° F is the hi temperature alarm setpoint.

CHOICE "C" At 210° F the drive motor breaker will also trip.

CHOICE "D" Correct answer.

295018 Partial or Complete Loss of Component Cooling Water

AK1. Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER :
(CFR: 41.8 to 41.10)

AK1.01 Effects on component/system operations..... 3.5 / 3.6

SOURCE: Bank

LESSON PLAN/OBJECTIVE:

CLS-LP-44 Obj 8a, Describe the effects that a loss or malfunction to the TBCCW system would have on the following: Reactor Recirculation System.

COG LEVEL: memory

48. Which one of the following is the reason that Backup Nitrogen System would initiate?

To supply an independent, safety-related pneumatic source to the _____ during conditions when the PNS is isolated from the Drywell.

- A. Inboard MSIV's, the SRV Accumulators, and the Hardened Wetwell Vent Isolation Valves
- B. Inboard MSIV's, the Suppression Chamber to Drywell Vacuum Breaker Isolation Valves, and the Hardened Wetwell Vent Isolation Valves
- C✓ SRV Accumulators, the Reactor Building to Suppression Chamber Vacuum Breaker Isolation Valves, and the Hardened Wetwell Vent Isolation Valves
- D. SRV Accumulators, the Reactor Building to Suppression Chamber Vacuum Breaker Isolation Valves, and the Suppression Chamber to Drywell Vacuum Breaker Isolation Valves

REFERENCE:
SD-46 page 8

EXPLANATION:

Following a core Spray LOCA and containment isolation signal the PNS supply to the DW will be isolated. The Backup Nitrogen System would supply pneumatics to SRV Accumulators, the Reactor Building to Suppression Chamber Vacuum Breaker Isolation Valves, and the Hardened Wetwell Vent Isolation Valves

CHOICE "A" does not supply the inboard MSIV's

CHOICE "B" does not supply the inboard MSIV's or the Suppression Chamber to Drywell Vacuum Breaker Isolation Valves

CHOICE "C" Correct answer.

CHOICE "D" does not supply the Suppression Chamber to Drywell Vacuum Breaker Isolation Valves

295019 Partial or Complete Loss of Instrument Air

AK3. Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : (CFR: 41.5 / 45.6)

AK3.01 Backup air system supply: Plant-Specific..... 3.3 / 3.4

SOURCE: new

LESSON PLAN/OBJECTIVE:

CLS-LP-46 Obj. 6, List the pneumatic loads supplied by the Nitrogen Backup System.

COG LEVEL: memory

49. Unit One shutdown is in progress with the following plant conditions:

- RWCU is in service.
- Recirc Pumps are tripped.
- SDC has been lost.
- Natural circulation has been established.
- Feed and bleed has been established.
- Reactor Coolant Temperature is 190° F and lowering slowly.

Under the above conditions, in accordance with 1PT-01.7, Heatup/Cooldown Monitoring, which one of the following is the preferred indication to use to determine vessel metal temperature response?

- A. Recirc Suction Temperature
- B. Bottom Head Metal Temperature
- C. Reactor Steam Dome Temperature
- D. Vessel Bottom Drain Coolant Temperature

REFERENCE:
1PT-01.7, Heatup/Cooldown Monitoring

EXPLANATION:
During cooldown, Bottom Head coolant temperature is the preferred source due to coolant temperature response leading vessel metal temperature response. If RWCU flow exists then use vessel bottom drain coolant temperature. If RWCU does not exist and recirc pumps are running then use recirc pump suction temperature. If RWCU and Recirc are not running then use bottom head metal temperature. Steam dome temperature would be used to determine coolant temperature if psat >212° F.

CHOICE "A" If RWCU does not exist and recirc pumps are running then use recirc pump suction temperature

CHOICE "B" If RWCU and Recirc are not running then use bottom head metal temperature.

CHOICE "C" Steam dome temperature would be used to determine coolant temperature if psat >212° F.

CHOICE "D" Correct answer

295021 Loss of Shutdown Cooling

AA2. Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING : (CFR: 41.10 / 43.5 / 45.13)

AA2.05 Reactor vessel metal temperature 3.4 / 3.5

SOURCE: New

LESSON PLAN/OBJECTIVE:
CLS-LP-307-B, Obj. 1G - Given plant conditions, monitor cooldown rate per PT-01.7.

COG LEVEL: Higher Order

50. Unit One has entered the EOP's due to a LOCA with the following primary containment conditions:

Drywell Pressure 5 psig and rising

What is the first Drywell pressure that Drywell Integrity can not be assured?

- A. 11.5 psig
- B. 30 psig
- C. 49.4 psig
- D✓ 62 psig

REFERENCE:
SD-04 page 7/8

EXPLANATION: The calculated peak containment pressure is 49.4 psig which is increased by 25% to establish the drywell design pressure of 62 psig.

CHOICE "A" Incorrect. this is the pressure that sprays are to be initiated by .

CHOICE "B" Incorrect. this is the pressure that is required to isolate CAC-4409 and 4410 in accordance with PCCP.

CHOICE "C" Incorrect. This is the calculated maximum drywell pressure.

CHOICE "D" Correct answer.
295024 High Drywell Pressure

EK1. Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL PRESSURE : (CFR: 41.8 to 41.10)

EK1.01 Drywell integrity: Plant-Specific..... 4.1 / 4.2*

SOURCE: new

LESSON PLAN/OBJECTIVE:

CLS-LP-04, Obj. 2. State the PC design bases, including temperature and pressure limits for the DE and Suppression Chamber, as given in the FSAR.

COG LEVEL: low

51. Unit Two is operating at rated power with EHC in the following alignment:

PAM Pressure	956 psig
Pressure Regulator A	In control
Pressure Regulator B	In standby (3 psig bias)
Max Combined Flow Limiter	100%
Load Limit	100%

An operator realizes that the Max Combined Flow Limiter setpoint should be at 110%. The operator turns the setpoint dial the wrong direction. The Max Combined Flow Limiter is set for 90%.

Which one of the following is the expected plant response?

- A. Bypass valves will open and Pressure Regulator B will control pressure at 959 psig.
- B. Bypass valves will open and Pressure Regulator A will control pressure at 953 psig.
- C. Reactor pressure will decrease and a scram will occur on a Group I Isolation.
- D. Reactor pressure will increase and a scram will occur on high pressure.

REFERENCE:
SD-26.3 page 38

EXPLANATION:

The Max combined flow limiter will limit the total steam flow. This will cause steam flow to be restricted, reactor pressure to increase, and reactor power to increase due to void concentration. The result will be a reactor scram on either high pressure or high flux.

CHOICE "A" This would be correct for a failure of Pressure Regulator A.

CHOICE "B" A reduction of 10% steam flow would be the equivalent of a 3# drop in pressure as the pressure gain unit converts 1 psid to 3.33% steam flow.

CHOICE "C" This would be correct response for a failure of the pressure regulator in the high direction.

CHOICE "D" Correct Answer.

295025 High Reactor Pressure

EK2. Knowledge of the interrelations between HIGH REACTOR PRESSURE and the following: (CFR: 41.7 / 45.8)

EK2.08 Reactor/turbine pressure regulating system: Plant- Specific..... 3.7 / 3.7

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-26.3 Obj. 9b - Given plant conditions, including manipulation of one of the following EHC control or parameter changes, predict the expected response of the main turbine and/or reactor protection system: max Combined Flow Limit potentiometer.

COG LEVEL: Higher Order

52. Unit One failed to scram with the following plant conditions:

Reactor Power	3%
RPV Water Level	-55 inches (N036)
RPV Pressure	800 psig
Suppression Pool	115° F

Which one of the following actions is required to place suppression pool cooling in service?

- A. By overriding the RHR SW Pump LOCA trip signal and then placing the Think Switch to Manual only.
- B. By bypassing the 2/3rd core height interlock and then overriding the RHR SW Pump LOCA trip signal only.
- C. By overriding the RHR SW Pump LOCA trip signal, placing the Think Switch to Manual, and then bypassing the 2/3rd core height interlock.
- D. By bypassing the 2/3rd core height interlock, overriding the RHR SW Pump LOCA trip signal, and then placing the Think Switch to Manual.

REFERENCE:
SD-17 page 53 and figure 12 (page 112)

EXPLANATION:
LOCA signal is sealed in due to being less than LL3 (45 inches) RPV water level is less than 2/3rd core height (-47 inches) therefore the keylock switch and then the Think switch is required (sequencing is essential). The RHR SW pumps tripped on LL3 and can be overridden anytime (no sequence required).

CHOICE "A" The 2/3rd core height must also be overridden.

CHOICE "B" The Think Switch must also be placed in Manual.

CHOICE "C" The sequence of the Think switch has to be after the 2/3rd core height interlock.

CHOICE "D" Correct answer.

295026 Suppression Pool High Water Temperature

EA1. Ability to operate and/or monitor the following as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: (CFR: 41.7 / 45.6)

EA1.01 Suppression pool cooling..... 4.1 / 4.1

SOURCE: bank

LESSON PLAN/OBJECTIVE:
CLS-LP-17 Obj 9, Given an RHR pump or valve, list the interlocks, permissives and/or automatic actions associated with the RHR pump or valve, including setpoints.

COG LEVEL: higher order

53. Which one of the following colors on the SPDS display for Suppression Pool Temperature would indicate that the Primary Containment Control Procedure would need to be entered?

- A. Red
- B. Cyan
- C. Yellow
- D. Magenta

REFERENCE:
SD-60 pg 20 / 101

EXPLANATION:
SPDS display will typically be green, when the temperature is >92 and <95 the indication will turn yellow and when it is >95 it will turn red which is an entry condition to PCCP.

CHOICE "A" Correct answer. (SD-60 page 101)

CHOICE "B" Cyan is used to indicate that the data is not validated.

CHOICE "C" Torus temperature changes to yellow when the temperature is between 92 and 95, which is not an entry condition for PCCP. At 95 it turns red. (SD-60 page 101)

CHOICE "D" Magenta indicates that the data is bad or not measured.

295027 High Containment Temperature (Mark III Containment Only)

EK2. Knowledge of the interrelations between HIGH CONTAINMENT TEMPERATURE (MARK III CONTAINMENT ONLY) and the following: (CFR: 41.7 / 45.8)

EK2.04 SPDS/ERIS/CRIDS/GDS: Mark-III..... 2.6 / 3.2

SOURCE: new

LESSON PLAN/OBJECTIVE:
CLS-LP-60 Obj. 4a, Describe the methods used to do the following on the ERFIS/SPDS Computer:
Evaluate EOP entry conditions.

COG LEVEL: memory

54. Conditions on Unit Two have degraded to where the Drywell Air Temperature is 340° F.

Which one of the following identifies the component that is affected and the concern with this temperature?

- A. Inboard MSIV's
Inability to fully seat the valves
- B✓ SRV solenoids
equipment environmental qualification
- C. Torus to Drywell Vacuum Breakers
downcomer pipe chugging is likely to occur
- D. CAC 4409 and 4410 Hydrogen Analyzers
preclude damage to pumps and subsequent release to secondary containment

REFERENCE:
OOI-37.8 page 22

EXPLANATION:
From the Bases document: Temperature should not be allowed to exceed the SRV maximum qualification temperature of 340° F.

CHOICE "A" MSIV's are not a zero leakage isolation point, so even without the high temperature there will be leakage.

CHOICE "B" Correct answer

CHOICE "C" chugging is not based on temperature.

CHOICE "D" this is the operating philosophy to transfer the heat to the torus so as not to challenge the containment.

295028 High Drywell Temperature

EK1. Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL TEMPERATURE : (CFR: 41.8 to 41.10)

EK1.02 Equipment environmental qualification..... 2.9 / 3.1

SOURCE: new

LESSON PLAN/OBJECTIVE:
CLS-LP-302L Obj. 4h, State the effect on Primary Containment if the following limits are exceeded:
Drywell Design Temperature Limit.

COG LEVEL: higher order

55. The level in the suppression pool is -30 inches and lowering.

Which one of the following is the highest suppression pool level that a manual reactor scram must be inserted if suppression pool level continues to lower in accordance with the Primary Containment Control Procedure?

A. -31 inches

B. -5.5 feet

C. -6.5 feet

D. -7.16 feet

REFERENCE:
OI-37.8 page 46

EXPLANATION:

A manual scram has to be inserted before level drops below the downcomer vent openings. The reactor is not permitted to remain at pressure if suppression of steam discharged from the reactor cannot be assured.

CHOICE "A" This is the enter condition for PCCP.

CHOICE "B" correct answer

CHOICE "C" Must secure HPCI irrespective of adequate core cooling at this level.

CHOICE "D" Actual level of the HPCI discharge sparger.

295030 Low Suppression Pool Water Level

2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.
(CFR: 41.5 / 43.5 / 45.12 / 45.13)

IMPORTANCE RO 4.4 SRO 4.7

SOURCE: new

LESSON PLAN/OBJECTIVE:

CLS-LP-300L Obj 8a, Given the PCCP and plant conditions, determine if the following actions are required: Manual Reactor Scram

COG LEVEL: memory

56. During a low reactor water level emergency on Unit One, the Reactor Vessel Control Procedure directs the operator to enter the Steam Cooling Procedure.

Which one of the following describes the reason Steam Cooling Procedure is performed?

The Steam Cooling Procedure utilizes steam cooling heat transfer:

- A. with injection to maximize the time peak clad temperatures in the uncovered portion of the core do not exceed 1500°F.
- B. with injection to maximize the time peak clad temperatures in the uncovered portion of the core do not exceed 1800°F.
- C. without injection to maximize the time peak clad temperatures in the uncovered portion of the core do not exceed 1500°F.
- D. without injection to maximize the time peak clad temperatures in the uncovered portion of the core do not exceed 1800°F.

Reference: 00I-37.7 Section 2.0 overview and step 017 basis

Explanation: Steam Cooling is entered when level drops below the minimum steam cooling reactor water level (LL4) and no injection sources are available. LL4 calculations are based on peak clad temperature of 1500°F. Steam cooling is meant to delay emergency depressurization with no injection sources until peak clad temperature reaches 1800°F, the basis for the minimum zero injection reactor water level or LL5. Note that if entry into steam cooling is required, peak clad temperature has already reached 1500°F by definition of LL4

Choice A is incorrect but plausible since this would be correct for LL4 providing adequate core cooling. LL4 is defined as steam cooling with injection

Choice B is incorrect because steam cooling is without injection but plausible since LL5 allows peak clad temperature to rise to 1800°F

Choice C is incorrect because peak clad temperature can rise to 1800°F but plausible since LL5 calculations are based on zero injection sources

Choice D is correct

295031 Reactor Low Water Level

EK3. Knowledge of the reasons for the following responses as they apply to REACTOR LOW WATER LEVEL : (CFR: 41.5 / 45.6)

EK3.04 Steam cooling..... 4.0 / 4.3*

SOURCE: 08 NRC Exam

LESSON PLAN/OBJECTIVE:
CLS-LP-300-G /Objective 1,11

COG LEVEL: LOW

57. Secondary Containment Control Procedure requires Emergency Depressurization if two or more areas exceed the Maximum Safe Operating Temperature and a primary system is discharging reactor coolant into secondary containment.

Which one of the following statements explain the reason for this action?

- A. The rise in secondary containment parameters indicate a wide-spread problem which may pose a potential threat to secondary containment integrity or preclude personnel access required for the safe operation of the plant.
- B. The rise in secondary containment parameters indicate substantial degradation of the primary system and may lead to fuel failure if the leaks are not isolated.
- C✓ The rise in secondary containment parameters indicate a wide-spread problem which may pose a direct and immediate threat to secondary containment integrity or equipment located in secondary containment.
- D. The rise in secondary containment parameters indicate substantial degradation of the primary system and emergency depressurization effectively isolates the leak.

REFERENCE:
00I-37.9 page 6, 37

EXPLANATION:
The MSOT values are the area temperatures above which equipment necessary for the safe shutdown of the plant will fail. These area temperatures are utilized in establishing the conditions which reactor depressurization is required. The criteria of more than one area specified in this step identifies the rise in reactor building parameters as a wide spread problem which may pose a direct and immediate threat to secondary containment integrity, equipment located in the RB, and continued safe operation of the plant.

CHOICE "A" Incorrect since condition pose a DIRECT threat to containment, not an INDIRECT threat.

CHOICE "B" Incorrect since this condition does not indicate substantial primary system degradation.

CHOICE "C" Correct answer

CHOICE "D" Incorrect since this condition does not indicate substantial primary system degradation.

295032 High Secondary Containment Area Temperature

EK3. Knowledge of the reasons for the following responses as they apply to HIGH SECONDARY CONTAINMENT AREA TEMPERATURE : (CFR: 41.5 / 45.6)

EK3.01 Emergency/normal depressurization..... 3.5 / 3.8

SOURCE: bank

LESSON PLAN/OBJECTIVE:
CLS-LP-300-M Obj. 13a, Given plant conditions and the SCCP, determine the required actions if the following limits are exceeded: Maximum Safe operating values with a primary system discharging into secondary containment.

COG LEVEL: memory

58. Unit Two is in Mode 1 with preparations in progress for a refueling outage.

Refuel bridge testing in progress
Drywell purge is in progress

A test weight is dropped onto the Spent Fuel Pool which resulted in the following conditions:

Refuel Floor Area Radiation Monitors	in alarm
Refueling Platform Radiation Monitor	120 mr/hr
RB Ventilation Exhaust Plenum Radiation Monitor	3 mr/hr

Which one of the following describes the status of the RB Ventilation System?

- A. RB Ventilation has isolated.
Drywell Purge and Vent valves are open.
- B. RB Ventilation has isolated.
Drywell Purge and Vent valves are closed.
- C. RB Ventilation has not isolated.
Drywell Purge and Vent valves are open.
- D. RB Ventilation has not isolated.
Drywell Purge and Vent valves are closed.

REFERENCE:

APP UA-3 3-5, Process Rx Bldg Vent Rad Hi Hi
3-7, Area Rad Refuel Floor High
4-5, Process Rx Bldg Vent Rad Hi

EXPLANATION:

RB Vent will trip and isolate at 4 mr/hr in the RB and will also close the DW vent and purge valves. Hi Refuel floor rad does not result in an isolation signal.

CHOICE "A" RB vent has not isolated yet.

CHOICE "B" RB ventilation has not isolated and DW purge and vent valves are open.

CHOICE "C" correct answer

CHOICE "D" DW purge and vent valves are open.

295034 Secondary Containment Ventilation High Radiation

EA1. Ability to operate and/or monitor the following as they apply to SECONDARY CONTAINMENT VENTILATION HIGH RADIATION : (CFR: 41.7 / 45.6)

EA1.03 Secondary containment ventilation..... 4.0 / 3.9

SOURCE: bank

LESSON PLAN/OBJECTIVE:

CLS-LP-37.1 Obj. 8h, State how the RB Ventilation is affected by the following: High Area Radiation.

COG LEVEL: higher order

59. An ATWS has occurred on Unit One with the following plant conditions:

Both SLC pumps have been started.
Instrument/Service Air system has failed.

Which one of the following methods is available to determine level in the SLC Tank?

- A. Direct the AO to valve in the local sight glass to obtain the level.
- B. Have the AO read the level gauge on the local instrument rack.
- C. Use the indication on the Level / Power Control ERFIS Screen.
- D. Direct the AO to measure the distance from the surface of the liquid to the top of the SLC Tank.

REFERENCE:

10P-05 Section 8.6, Manual Volume Determination

EXPLANATION:

Without the instrument air system the level indicator will fail downscale, no dp to measure. The operating procedure has a section to determine the volume by measuring the air gap in the tank and comparing that to a graph to determine how much volume is left in the tank.

CHOICE "A" The main tank does not have a local sight glass, but the test tank does.

CHOICE "B" The local guage will also be failed downscale.

CHOICE "C" The input to ERFIS is from the control room indicator which is failed downscale.

CHOICE "D" correct answer

295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or unknown

EA2. Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN : (CFR: 41.10 / 43.5 / 45.13)

EA2.03 SBLC tank level..... 4.3* / 4.4*

SOURCE: new

LESSON PLAN/OBJECTIVE:

CLS-LP-05 Obj 8g, Given plant conditions determine the effect that the following will have on the SLC System: Loss of plant air system.

COG LEVEL: higher order

60. Unit Two is operating under accident conditions with the following plant conditions due to a steam leak on HPCI:

Reactor Water Level	-20 inches
Reactor Pressure	900 psig
Injection sources available	HPCI only
Offsite Release	Alert declared
HPCI Area Temperatures	All <140° F
Suppression Pool Temperature	130° F

Concerning HPCI operation in accordance with RRCP, which one of the following is the action that should be taken and why?

- A✓ HPCI should be left running
It is required to be operated by the EOP's
- B. HPCI should be isolated
It should have isolated on area high temperature
- C. HPCI should be isolated
To isolate the primary system that is discharging
- D. HPCI should be isolated
To prevent damage to the HPCI pump due to high suppression pool temperatures

REFERENCE:
OOI-37.10 page16

EXPLANATION:
RRCP normally has the operators isolate a primary system discharging except if it is needed to maintain adequate core cooling. with level below top of active fuel and required for EOP's this is the case. If there was a valid PCIS signal then this should not prevent the operator from making sure that the isolation occurs.

CHOICE "A" correct answer

CHOICE "B" area temperature isolation would be at 165° F

CHOICE "C" IF HPCI was not needed for adequate core cooling this would be correct

CHOICE "D" pump damage could occur at greater than 140° F

295038 High Off-Site Release Rate

EK3. Knowledge of the reasons for the following responses as they apply to HIGH OFF-SITE RELEASE RATE: (CFR: 41.5 / 45.6)

EK3.02 System isolations..... 3.9 / 4.2

SOURCE: Bank

LESSON PLAN/OBJECTIVE:

CLS-LP-300N, Obj. 3. describe the conditions under which a system that is the source of a radioactive release is not permitted to be isolated.

COG LEVEL: high

61. During normal full power operation of Unit Two the following alarms and indications are noted:

Air Compressor D Trip alarm	Sealed In
Air Compressor 2B	Under Clearance
Service Air Press Low alarm	Sealed In
Instrument Air header pressure	100 psig

Per the direction of 0AOP-20, Pneumatic System Failures, which one of the following actions should be taken?

The operator should verify:

- A. Reactor building standby air compressors have started.
- B. Backup nitrogen rack isolation valves PV-5481 and 5482, have automatically opened.
- C✓ Service air isolation valves, PV-706-1 and PV-706-2, have automatically closed.
- D. Service air dryer bypass pressure control valve, PV-5067 has automatically opened.

REFERENCE:
AOP-20 Pneumatic System Failures

EXPLANATION:
As service/instrument air pressures lower, a series of events occurs.
105# SA - Service Air Isolation Vlvs 706-1&2 auto close.
98# SA - Service Air Dryer Bypass PCV 5067 begins to open.
95# IA - Backup N2 rack Isolation Valves auto open.
95# IA - RB Stby air compressors start.

CHOICE "A" - Incorrect, see explanation.

CHOICE "B" - Correct Answer

CHOICE "C" - Incorrect, see explanation.

CHOICE "D" - Incorrect, see explanation.

300000 Instrument Air

2.1.20 Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)

IMPORTANCE RO 4.6 SRO 4.6

SOURCE: Bank LOI-CLS-LP-046.0*08A

LESSON PLAN/OBJECTIVE:

CLS-LP-302K, Obj. 4. Given plant conditions and AOP-20, determine the required supplementary actions.

COG LEVEL: Low

62. Which one of the following identifies the sample location of the RBCCW liquid process radiation monitor and the protective function(s) it provides?

- A. RBCCW return header;
alarm function only
- B. RBCCW return header;
alarm and isolation function
- C. RBCCW head tank;
alarm function only
- D. RBCCW head tank;
alarm and isolation function

REFERENCE:
SD-21 RBCCW System

EXPLANATION:
The RBCCW system is continuously monitored by a process radiation monitor. The monitor is located in the RBCCW return header. The monitor provides indication and alarm response. No isolation functions are provided.

CHOICE "A" - Correct Answer

CHOICE "B" - Incorrect. No isolation function provided. Other plant rad monitors (ie Radwaste Effluent) do provide isolation functions.

CHOICE "C" - Incorrect. wrong location.

CHOICE "D" - Incorrect. No isolation function provided.

400000 Component Cooling Water

K1. Knowledge of the physical connections and / or cause-effect relationships between CCWS and the following:
(CFR: 41.2 to 41.9 / 45.7 to 45.8)

K1.03 Radiation monitoring systems 2.7 / 3.0

SOURCE: new

LESSON PLAN/OBJECTIVE:
CLS-LP-11, Obj. 4g. Describe the interrelationship between the PRM and the following systems: Closed Cooling Water.

COG LEVEL: high

63. The SS has determined that the control room personnel must don SCBA's due to smoke in the control room from a plant fire on site.

Which one of the following is an indication that a SCBA is low on air?

- A. Air regulator bypass valve auto opens.
- B. Air leakage out past the face piece seals.
- C. Audible high pitched beep emitting from face piece.
- D✓ Vibralert alarm in the regulator that vibrates the face piece.

REFERENCE:

EXPLANATION:

Low pressure will activate Vibralert, heads up display and bell if installed.

CHOICE "A" this is a manual action for failure of a regulator

CHOICE "B" this is indication of an improper seal of the face piece

CHOICE "C" Some of the SCBA's have an audible bell but do not have a beeping device. the bell is not mounted in the face piece.

CHOICE "D" correct answer, some also have a HUD (heads up display) with indicating lights for tank pressure.

600000 Plant Fire On Site

AA1 Ability to operate and/or monitor the following as they apply to PLANT FIRE ON SITE:

AA1.01 Respirator air pack 3.0 / 2.9

SOURCE: new

LESSON PLAN/OBJECTIVE:

COG LEVEL: Memory

64. Due to grid disturbances the generator is operating in an under-excitation condition when the following alarm is received:

Gen Loss of Exc

Which one of the following is the operational implication of operating the Main Generator without a field?

- A✓ Excessive heating of the rotor.
- B. Induced vibrations in the low pressure turbine blades.
- C. Overheating of the last stage buckets and exhaust hood.
- D. Overheating of the Main Transformer and/or Unit Auxiliary Transformer.

REFERENCE:
SD-27

EXPLANATION:
when the field excitation is lost, the generator tends to overspeed and operates as an induction motor. Induction motoring will produce slip frequency currents in the rotor. the rotor currents will cause extremely high temperatures in a very short time, particularly where the currents flow across the wedges at the ends of the rotor body.

CHOICE "A" correct answer

CHOICE "B" this is a cause from under frequency conditions.

CHOICE "C" this is caused from reverse power conditions

CHOICE "D" This is caused from static over excitation of the generator stator conditions due to the core iron saturation from the magnetic field overfluxing within a very short time

700000 Generator Voltage and Electric Grid Disturbances

AK1. Knowledge of the operational implications of the following concepts as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES:
(CFR: 41.4, 41.5, 41.7, 41.10 / 45.8)

AK1.03 Under-excitation 3.3 / 3.4

SOURCE: New

LESSON PLAN/OBJECTIVE:
CLS-LP-27, Obj. 11f. Given plant conditions, describe the effect that a loss or malfunction of the following may have on the Main Generator: Voltage Regulation (including Under and Over excitation).

COG LEVEL: Low

65. A grid disturbance occurs with the following Unit Two plant parameters:

Generator Load	940 MWe
Generator Reactive Load	260 MVARs, out
Generator Gas Pressure	55 psig

(Reference provided)

Which one of the following is the operator action that is required to maintain the Unit within the Estimated Capability Curve?:

- A. Lower Gas Pressure.
- B. Lower MVARs.
- C. Raise MVARs.
- D. Raise MWe.

REFERENCE:

10P-27 Figure 1 (provided to the examinee)

EXPLANATION:

Based on the conditions the student should plot the current location on the graph. Based on 55 psig gas pressure have to use the 50# line. This puts the operation outside of the safe area. would have to lower MWe, raise gas pressure, or Lower MVARs.

CHOICE "A" By lowering gas pressure you would be getting farther away from being within the spider graph. Pressure would have to be raised.

CHOICE "B" Correct Answer

CHOICE "C" raising MVARs moves you up on the spider graph which moves you away from the safe area. Lowering MVARs would be correct.

CHOICE "D" raising MWe would move you to the right on the graph, need to move to the left to be in the safe area. Lower output would be a correct action.

700000 Generator Voltage and Electric Grid Disturbances

AA2. Ability to determine and/or interpret the following as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES:

(CFR: 41.5 and 43.5 / 45.5, 45.7, and 45.8)

AA2.04 VARs outside capability curve 3.6 3/ .6

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-27, Obj. 9. Given the Generator estimated capability curves, hydrogen pressure and either MVARs, MW, or power factor, determine the limit for MW and MVARs.

COG LEVEL: High

66. Which one of the following is not a situation where two-handed operations are approved in accordance with the conduct of operations manual.

- A. As directed by the Unit SCO.
- B. As directed by the procedure.
- C✓ When performing steps in an AOP.
- D. When required for proper system operation.

REFERENCE:
OOI-01.02 page 27

EXPLANATION:
manipulations of control switches by the use of both hands at the same time is normally not permitted because it challenges the operators ability to effectively perform STAR or Touch STAR. However, two-handed switch operation is sometimes necessary for proper operation or time constraints associated with multiple switch operations. Therefore, two-handed switch operation should only be used in the following circumstances: 1) As directed by procedure. 2) When required for proper system operation. 3) As directed by the SCO.

CHOICE "A" Incorrect. See Explanation.

CHOICE "B" Incorrect. See Explanation.

CHOICE "C" Correct. See Explanation.

CHOICE "D" Incorrect. See Explanation.

2.1.1 Knowledge of conduct of operations requirements. (CFR: 41.10 / 45.13)

IMPORTANCE RO 3.8 SRO 4.2

SOURCE:
new

LESSON PLAN/OBJECTIVE:
GNF0001B, Obj. 3. Identify Error prevention tools.

COG LEVEL:
memory

67. Which one of the following is the correct first leg of a control room three way communication of initial reactor water level from Bob (the RO) to Tony (the SCO) in accordance with OAP-50, Site Command, Control and Communications Procedure?

- A. Tony, this is Bob, Reactor water level is 100 inches.
- B. Reactor water level on the N026 Alpha is 100 inches.
- C✓ Tony, Reactor water level is 100 inches and slowly lowering.
- D. Reactor water level on the N026 Alpha is slowly lowering, Tony.

REFERENCE:

AP-50 Section 6.3.2 page 16

EXPLANATION:

In the control room would be a face to face communication. This requires the first name first, the parameter, the value, and the trend.

CHOICE "A" The senders name is not required for face to face communications (it is required for non face to face communications). Trend is not used.

CHOICE "B" First name is not used. Trend is not used. The channel is not required.

CHOICE "C" correct answer

CHOICE "D" First name first is not used. The channel is not required.

2.1.17 Ability to make accurate, clear, and concise verbal reports.
(CFR: 41.10 / 45.12 / 45.13)

IMPORTANCE RO 3.9 SRO 4.0

SOURCE: new

LESSON PLAN/OBJECTIVE:

CLS-LP-401-A Obj 8e, State the AP-50 guidelines for: Face to face communications.

COG LEVEL: memory

68. While demanding a Core Mon, the Reactor Operator notes that one of the flow inputs from the Feedwater system is cyan (blue).

Which one of the following does this color coding indicate?

The process parameter:

- A. is displaying bad data.
- B. is displaying safe data.
- C. is exceeding a high alarm limit.
- D. has a substitute value inserted.

REFERENCE:
OI-72 page 59/68

EXPLANATION:
If inputs to a composed or calculated value are substituted, the computer point for the value may appear in Cyan. This will indicate to the operator that an input has been substituted to that point.

CHOICE "A" Bad data is displayed in magenta.

CHOICE "B" safe data is displayed in green.

CHOICE "C" alarm or unsafe conditions are displayed in red.

CHOICE "D" correct answer.
2.1.19 Ability to use plant computers to evaluate system or component status.
(CFR: 41.10 / 45.12)

IMPORTANCE RO 3.9 SRO 3.8

SOURCE: Bank

LESSON PLAN/OBJECTIVE:
CLS-LP-055 Obj 2e, Describe the basic operation of the Process Computer, including the use of the following: Monitor Display Color Code.

COG LEVEL: Memory

69. A small break LOCA with an ATWS has occurred on Unit Two with the following plant conditions:

Reactor Water Level	130 inches (stable)
Injection Systems	CRD
Reactor Power	APRM downscapes (19 rods not full in)
SRV's	All closed
Suppression Pool Temp.	92° F (very slow rise)

In accordance with the Q (power) leg of Level Power Control Procedure which one of the following mitigation strategies should be implemented?

- A. Initiate ARI, Inject SLC, and inhibit ADS.
- B. Initiate ARI, trip both recirc pumps, and inhibit ADS.
- C. Place the mode switch to shutdown, trip both recirc pumps, and perform OEOP-01-LEP-02, Alternate Control Rod Insertion.
- D. Place the mode switch to shutdown, initiate ARI, and perform OEOP-01-LEP-02, Alternate Control Rod Insertion.

REFERENCE:
LPC (Q Leg)

EXPLANATION:

Per the Q leg of LPC the mode switch is placed to shutdown, ARI is initiated, If injection is from RFP, HPCI, or RCIC then recirc speed controllers are placed to 10%, If power is > than 2% then both recirc pumps are tripped, If the reactor cannot be shutdown before the torus reaches 110° then SLC is initiated, and ADS is inhibited (although this is done in the level leg anyway), then perform LEP-02. For the conditions given, the mode switch and ARI would have to be performed along with LEP-02.

CHOICE "A" ADS is not inhibited and SLC is not injected per the Q leg if torus will not reach 110° F.

CHOICE "B" Recirc pumps are only tripped if power is >2% (APRM downscapes) ADS is not inhibited per the Q leg if torus will not reach 110° F.

CHOICE "C" Recirc pumps are only tripped if power is >2% (APRM downscapes)

CHOICE "D" correct answer

2.4.9 Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.
(CFR: 41.10 / 43.5 / 45.13)

IMPORTANCE RO 3.8 SRO 4.2

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-300E, Obj. 19. Given plant conditions and a copy of the LPC procedure determine the required operator actions.

COG LEVEL: High

70. A transient has occurred on Unit Two in which "B" Loop of RHR has been placed into Suppression Pool Cooling mode of operation.
The following annunciators are received:

RHR Hx B Outlet Hi Conductivity
Service Wtr Effluent Rad High

Which one of these annunciators should receive the highest priority and why?

- A. Service Wtr Effluent Rad High
This indicates a radiation release.
- B. RHR Hx B Outlet Hi Conductivity
This indicates there is a fuel failure.
- C. RHR Hx B Outlet Hi Conductivity
This indicates tube leak in either RHR "B" or "D" pump seal cooler.
- D. Service Wtr Effluent Rad High
This indicates leak in either RHR SW "B" or "D" Booster Pump Motor Cooler.

REFERENCE:

2APP-UA-03 5-5 Service Wtr Effluent Rad High
2APP-A-03 2-10 RHR Hx B Outlet Hi Conductivity

EXPLANATION:

RHR Hi conductivity would be from a tube leak into RHR from CSW. Service water hi rad is monitoring the release path, this would be from a leak into SW from RHR Hx, RHR Pump cooler or RBCCW.

CHOICE "A" correct answer

CHOICE "B" A tube leak would be into the heat exchanger, hi conductivity would not be an indication of fuel failure.

CHOICE "C" fuel pool cooling would not leak into SW.

CHOICE "D" pump seal coolers would not leak into the heat exchanger outlet.

2.4.45 Ability to prioritize and interpret the significance of each annunciator or alarm.
(CFR: 41.10 / 43.5 / 45.3 / 45.12)

IMPORTANCE RO 4.1 SRO 4.3

SOURCE: Bank

LESSON PLAN/OBJECTIVE:

CLS-LP-300N, Obj 19. Given plant conditions and RRCPP, determine the following: Release path.

COG LEVEL: higher order

71. Which one of the following identifies the differences between Unit One and Unit Two Main Steam Systems?

Unit One has _____ bypass steam chest(s) containing _____ bypass valves, while Unit Two has _____ bypass steam chest(s) containing _____ bypass valves.

A. two, ten
one, four

B. one, four
two, ten

C. one, seven
two, eleven

D. two, eleven
one, seven

REFERENCE:

0EOP-01-LEP-02 Section 4 page 19/20

EXPLANATION:

Unit 1 has one bypass steam chest with 4 bypass valves providing 20.6% capacity while Unit 2 has two bypass steam chests with 5 bypass valves on each for a total of 10 bypass valves with a capacity of 69.6%.

CHOICE "A" this is the opposite of the correct answer.

CHOICE "B" correct answer.

CHOICE "C" this is correct for the number of bypass steam chests. 7 is the number of ADS valves and eleven is the number of SRV's.

CHOICE "D" The bypass steam chests numbers are the opposite of the correct answer while seven is the number of ADS valves and eleven is the number of SRV's.

2.2.4 (multi-unit license) Ability to explain the variations in control board/control room layouts, systems, instrumentation, and procedural actions between units at a facility.
(CFR: 41.6 / 41.7 / 41.10 / 45.1 / 45.13)

IMPORTANCE RO 3.6 SRO 3.6

SOURCE: new

LESSON PLAN/OBJECTIVE:

COG LEVEL: Memory

72. Considering a monthly surveillance, which one of the following is last day that the surveillance can be performed and meet the requirements of SR 3.0.2?

The last day the surveillance must be performed by is within _____ of the previous performance of the surveillance.

A. 31 days

B. 34 days

C. 38 days

D. 45 days

REFERENCE:

TS SR 3.0.2, Surv. is met if performed within 1.25 times the interval specified in the frequency

EXPLANATION:

Have to know that a monthly surveillance is 31 days (TS 5.5.6) and then from SR 3.0.2 that the surv. requirement times 1.25 is when the surveillance has to be performed. This equals 38.75 days.

CHOICE "A" This is the monthly

CHOICE "B" this uses a standard of 10% greater than the 31 days.

CHOICE "C" correct answer

CHOICE "D" This uses 1.5 times the requirement of 31 days.

2.2.12 Knowledge of surveillance procedures. (CFR: 41.10 / 45.13)

IMPORTANCE RO 3.7 SRO 4.1

SOURCE: New

LESSON PLAN/OBJECTIVE:

CLS-LP-200B, Obj. 8. Explain the frequency rules for periodic actions and apply these rules to determine when a periodic action must be performed.

COG LEVEL: Low

73. During outage conditions, an operator may use hand tools to perform specific simple maintenance tasks, provided the necessary skills are possessed to do the job.

Which one of the following is a maintenance activity that is not allowed?

- A. Addition of lubricating oil.
- B. Changing of lubricating oil.
- C. Adjustment of packing on non-automatic, manually operated valves.
- D. Adjustment of operating parameters specified in operating procedures.

REFERENCE:

OOI-01.02 page 41

EXPLANATION:

Operator Performance of Minor Maintenance

1. An operator may use hand tools to perform the simple maintenance tasks described below, providing the necessary skills are possessed to do the job:
 - a. Adjustment of packing on non-automatic, manually operated valves.
 - b. Addition of lubricating oil.
 - c. Adjustment of operating parameters within or to within the range specified in operating procedures or instructions.

CHOICE "A" Incorrect, see explanation.

CHOICE "B" Correct answer.

CHOICE "C" Incorrect, see explanation.

CHOICE "D" Incorrect, see explanation.

2.2.18 Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.
(CFR: 41.10 / 43.5 / 45.13)

IMPORTANCE RO 2.6 SRO 3.9

SOURCE: New

LESSON PLAN/OBJECTIVE:

COG LEVEL: Low

74. A valve lineup is to be performed in a locked high radiation area that has the following conditions:

Area temperature	110° F
Area radiation	40 mr/hr

Independent verification of this valve lineup is expected to take 0.5 hour.

Which one of the following is correct per OPS-NGGC-1303, Independent Verification, for this evolution?

Independent verification of this lineup:

- A. shall not be waived.
- B. may be waived due to excessive radiation dose only.
- C. may be waived due to the presence of extreme temperature only.
- D. may be waived due to the presence of extreme temperature or due to excessive dose.

REFERENCE:
NGGC-1303

EXPLANATION:

IV may be waived if the dose will be excessive (as a guideline 10 mrem is excessive) or if personnel safety issues exists (e.g. temperature is above 120° F). IV of this lineup would result in a dose of 20 mrem.

CHOICE "A" Incorrect. Would be allowed to be waived based on dose.

CHOICE "B" Correct answer.

CHOICE "C" Incorrect. Would be allowed to be waived based on dose not temperature.

CHOICE "D" Incorrect. Would be allowed to be waived based on dose only.

2.3.12 Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (CFR: 41.12 / 45.9 / 45.10)

IMPORTANCE RO 3.2 SRO 3.7

SOURCE: Bank

LESSON PLAN/OBJECTIVE:

CLS-LP-201C, Obj. 10b. Describe the following regarding OPS-NGGC-1303: Exemptions from Independent Verification.

COG LEVEL: High

75. Which one of the following is the basis for the Maximum Safe Radiation Levels specified in Secondary Containment Control Procedure?

Maximum Safe Radiation Level is the:

- A. radiation level at which installed radiation monitors peg upscale.
- B. highest radiation level expected to occur during normal plant operation.
- C. radiation level above which equipment necessary for safe shutdown will fail.
- D✓ radiation level above which personnel access necessary for safe shutdown will be precluded.

REFERENCE:

EOP User Guide definition of max safe radiation level

EXPLANATION:

CHOICE "A"

CHOICE "B"

CHOICE "C"

CHOICE "D"

~~2.3.12~~ Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities. (CFR: 41.12 / 43.4 / 45.10)

IMPORTANCE RO 3.4 SRO 3.8

SOURCE: Bank

LESSON PLAN/OBJECTIVE:

CLS-LP-300M, Obj. 4c. Define the following: Maximum safe operating.

COG LEVEL: mem