

Final Submittal

**CATAWBA EXAM 2003-301
50-413 & 50-414**

**March 31 - April 4 &
April 10, 2003**

1. Reactor Operator Written Examination

**Nuclear Regulatory Commission
Reactor Operator Licensing
Examination**

Catawba Nuclear Station

Answer Key

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Bank Question: 016.2**Answer: B**

1 Pt(s)

Unit 2 is performing a plant startup when a problem occurs in the main feedwater system.

The following events and conditions occur:

- 2A main feedwater pump is running
- 2B main feedwater pump turbine is not reset
- Reactor power is 25%
- The 2A main feedwater pump trips
- The operator manually trips the plant
- All steam generator levels decrease to 20%

Assuming systems operate as designed, when did the turbine driven CA pump receive an auto-start signal (if at all)?

- A. When the 2A main feedwater pump tripped.
- B. When narrow range level decreased below 36%.
- C. When the reactor trip occurred.
- D. The turbine driven CA pump did not receive an auto start signal.

Distracter Analysis:

- A. **Incorrect:** AMSAC is not in service
Plausible: The AMSAC signal to start CA on loss of both MFPs is not in service and only starts the motor driven pumps.
- B. **Correct:** 36.8% is the unit 2 setpoint
- C. **Incorrect:** The TDCA pump started when SGWL reached 36.8%
Plausible: the S/G lo-lo level setpoint is 10.7% for unit 1
- D. **Incorrect:** The TDCA pump starts at <36.8% SGWL.
Plausible: this would be true for unit 1.

Level: RO&SRO

KA: SYS 059 K1.02 (3.4/3.4)

Lesson Plan Objective: CF Obj: 4

Source: Bank

Level of knowledge: analysis

References:

1. OP-CN-CF-CA page 10, 11
2. OP-CN-ADM-UD pages 12, 13

Bank Question: 037**Answer: D**

1 Pt(s)

Unit 1 was conducting a reactor startup following a refueling outage. Given the following conditions:

- N41 – N44 indicate 0%
- N-31 indicates 2.1×10^4 cps
- N-32 indicates 2.0×10^4 cps
- N-35 indicates 8.5×10^{-11} amps
- N-36 indicates 1.5×10^{-9} amps
- Rods are in manual with no rod motion
- SR and IR NIs are slowly increasing
- T_{ave} is holding steady

Which one of the following best explains the indications?

- A. N-35 compensating voltage is set too high
- B. N-35 compensating voltage is set too low
- C. N-36 compensating voltage is set too high
- D. N-36 compensating voltage is set too low

Distracter Analysis:

- A. **Incorrect:** N-35 reads an equivalent power level to SR A and B
Plausible: If the candidate does not know that $P6 = 1 \times 10^{-10}$ IR is about 2×10^4 CPS SR.
- B. **Incorrect:** N-35 reads an equivalent power level to SR A and B
Plausible: If the candidate does not know that $P6 = 1 \times 10^{-10}$ IR is about 2×10^4 CPS SR.
- C. **Incorrect:** N-36 reading too high - not too low
Plausible: If candidate reverses the effect of compensation in IR detector
- D. **Correct answer** N-36 is too high for existing SR level - therefore must be under compensated.

Level: RO&SRO

KA: APE 033 AA2.01 (3.0/3.5)

Lesson Plan Objective: ENB Obj: 3, 7

Source: Bank

Level of knowledge: comprehension

References:

1. OP-CN-IC-ENB pages 11, 40

Bank Question: 039.1**Answer: B**

1 Pt(s)

Unit 1 containment pressure is 4.0 psig. All equipment is operating as designed. Safety injection has been RESET.

Which one of the following action(s) is necessary for the operator to reopen 1KC-425A (Reactor Building Non-Essential Supply Header Isolation)?

- A. **Press the OPEN pushbutton on MC-11.**
- B. **Reset phase B and then press the OPEN pushbutton on MC-11.**
- C. **Wait until containment pressure is less than 3 psig and then press the OPEN pushbutton on MC-11.**
- D. **Wait until containment pressure is less than 0.3 psig and then press the OPEN pushbutton on MC-11.**

Distracter Analysis:

- A. **Incorrect:** must first reset phase B.
Plausible: may not realize valve has closed due to phase B.
- B. **Correct:** valve has closed due to phase B. KC-425 is a train A valve. Phase B can be reset at any time, therefore, to open KC-425, reset phase B train A, then open the valve.
- C. **Incorrect:** Phase B must be reset.
Plausible: candidate believes phase B cannot be reset until below the phase B actuation setpoint.
- D. **Incorrect:** Phase B must be reset
Plausible: if the candidate thinks that the CPCS interlock must be actuated to clear the phase B signal.

Level: RO & SRO

KA: SYS 103 K4.06 (3.1/3.7)

Lesson Plan Objective: CNT-CNT SEQ 17

Source: Bank

Level of knowledge: comprehension

References:

1. OP-CN-ECC-ISE pages 18-19
2. OP-CN-CNT-CNT pages 19-20

Bank Question: 060.1**Answer: B**

1 Pt(s)

Unit 2 was operating at 100% power when an electrical fire started inside the auxiliary building cable room corridor. What type of fire suppression system is installed in this area and what are the hazards to personnel if they enter this room?

- A. **A manual deluge (Mulsifyre) System is installed. An electrical shock hazard exists due to the use of water to combat an electrical fire.**
- B. **An automatic sprinkler system is installed. An electrical shock hazard exists due to the use of water to combat an electrical fire.**
- C. **An automatic Halon system is installed. An asphyxiation hazard exists due to the presence of Halon gas.**
- D. **A manual Cardox system is installed. An asphyxiation hazard exists due to the presence of carbon dioxide gas.**

Distracter Analysis:

- A. **Incorrect:** An automatic sprinkler system is installed
Plausible: an electrical shock hazard exists
- B. **Correct Answer:**
- C. **Incorrect:** An automatic sprinkler system is installed
Plausible: Halon gas is generally used in areas in which electrical fires are the predominant risk because it does not create a shock hazard
- D. **Incorrect:** An automatic sprinkler system is installed
Plausible: CARDOX is a common fire suppressant in the industry

Level: RO&SRO

KA: SYS 086K5.04 (2.9/3.5)

Lesson Plan Objective: SS-RFY Obj: 18

Source: Mod; Ques_060, McGuire NRC 99

Level of knowledge: memory

References:

1. OP-CN-SS-RFY page 15
2. SLC 16-9.2

Bank Question: 260.2**Answer: D**

1 Pt(s)

Unit 2 is responding to a loss of main feedwater event from 100% power.

Given the following events and conditions:

- The reactor has tripped
- The 2A and 2B motor-driven CA pumps started in auto
- The turbine-driven CA pump (CAPT) started in auto
- Train "A" CA has been reset
- Train "B" CA has failed to reset
- The CA pumps are aligned to the CACST

Which one of the following automatic system responses will occur as storage tank and CA pump suction pressures decrease?

- A. 2A CA pump trips.
CAPT #2 pump trips.
2B CA pump shifts to the RN system.
- B. 2A CA pump suction shifts to the RN system.
CAPT #2 suction shifts to the RN system.
2B CA pump trips.
- C. 2A CA pump suction shifts to the RN system.
CAPT #2 pump trips.
2B CA pump trips.
- D. 2A CA pump trips.
CAPT #2 suction shifts to the RN system.
2B CA pump suction shifts to the RN system.

Distracter Analysis:

- A. **Incorrect:** because the CAPT pump swap to RN
Plausible: candidate believes A train controls CAPT pump
- B. **Incorrect:** 2A CA pump trips and 2B CA pump shifts suction to RN
Plausible: if the candidate believes reset allows shift
- C. **Incorrect:** Reverse of what actually happens
Plausible: if the candidate reverses the logic
- D. **Correct:** because train B did not reset, it will shift when pressure decreases below 6 psig.

Level: RO&SRO

KA: SYS 061 K6.02 (2.6/2.7)

Lesson Plan Objective: CA Obj: 12

Source: Mod McGuire NRC 2002

Level of knowledge: comprehension

References:

1. OP-CN-CF-CA page 13, 14

Bank Question: 263**Answer: A**

1 Pt(s)

Unit 1 is shutdown in mode 6 with fuel movement in progress. Given the following events and conditions:

- The new fuel elevator fails to operate in the up direction

Which one of the following statements describes the cause of this problem?

- A. **1EMF-15 (SPENT FUEL BLDG REFUEL BRIDGE) has failed high.**
- B. **1EMF-20 (NEW FUEL STOR 1A) has failed high.**
- C. **The load in the new fuel elevator weighs 1100 lbs.**
- D. **The spent fuel bridge crane is NOT indexed over the new fuel elevator.**

Distracter Analysis:

- A. **Correct answer**
- B. **Incorrect:** does not have an interlock with the new fuel elevator
Plausible: new fuel vault monitor sounds like it "fits" with new fuel monitor if candidate does not know answer
- C. **Incorrect:** If load exceeds 1200 lbs., will prevent movement
Plausible: this is a valid interlock but the weight is insufficient to actuate it
- D. **Incorrect:** there is no interlock to prevent moving the new fuel elevator
Plausible: there is an interlock to prevent moving the spent fuel pool crane

Level: RO&SRO

KA: SYS 034K6.02 (2.6/3.3)

Lesson Plan Objective: FH-FHS SEQ 8

Source: Bank

Level of knowledge: memory

References:

1. OP-CN-FH-FHS page 18

Bank Question: 282.2**Answer: C**

1 Pt(s)

Which one of the following statements correctly describes the **sequence** and **position** of VI system valves in response to a loss of VI header pressure?

- A. VI-500 (VI supply to VS) opens
VS-78 (VS supply to VI) opens
- B. VI-500 (VI supply to VS) opens
VS-78 (VS supply to VI) closes
- C. VI-500 (VI supply to VS) closes
VS-78 (VS supply to VI) opens
- D. VI-500 (VI supply to VS) closes
VS-78 (VS supply to VI) closes

Distracter Analysis:

- A. **Incorrect:** VI-500 closes – not opens
Plausible: partially correct – VS-78 opens
- B. **Incorrect:** valve operations are reversed
Plausible: psychometric balance
- C. **Correct:** This is the correct sequence
- D. **Incorrect:** VS-78 opens – does not close
Plausible: partially correct – VI-500 closes.

Level: RO&SRO

KA: SYS 079 A4.01 (2.7/2.7)

Lesson Plan Objective: VI Obj: 5, 8, 28, 30

Source: Mod

Level of knowledge: memory

References:

1. OP-CN-SS-VI page 19

Bank Question: 300.2**Answer: C**

1 Pt(s)

Unit 1 was responding to a steamline break inside containment on the 1C S/G per E-2 (*Faulted Steam Generator Isolation*). All equipment has operated as designed.

Which one of the following action statements correctly describes the expected method for isolating steam to the CAPT from the faulted S/G?

- A. Manually close the CAPT #1 trip and throttle valve (1SA-145).
- B. Manually close the 1C MSIV and MSIV bypass valve.
- C. Manually close the maintenance isolation valve (1SA-4).
- D. Select "OFF" on the CAPT #1 control switch.

Distracter Analysis:

The key to this question is for the candidate to realize that the manual isolation valve would be preferred to the stop check valve.

- A. **Incorrect:** Will isolate steam from 1B and 1C S/G
Plausible: partially correct – will isolate wrong S/G
- B. **Incorrect:**
Plausible: if candidate doesn't realize the tap for the CAPT is upstream of the MSIV
- C. **Correct:** the manual isolation is the preferred choice in E-2
Plausible:
- D. **Incorrect:**
Plausible: the stop check is closed if the isolation valve cannot be closed.

Level: RO&SRO

KA: APE 040 AK2.01 (2.6/2.5)

Lesson Plan Objective: CA Obj: 11

Source: Mod

Level of knowledge: memory

References:

1. EP-E2 page 12
2. E-2 Background Document page 7

Bank Question: 324**Answer: D**

1 Pt(s)

Unit 2 was operating at 100% power when a design basis LOCA into containment occurred. Given the following conditions:

- 2EMF-53A/B (*Containment TRN A/B (HI Range)*) are both inoperable

Which one of the following indications would most accurately determine the dose rates inside containment for the offsite dose assessment calculations?

- A. 2EMF-38, 39, 40 (*Containment PAR/GAS/IOD*) indications
- B. 2EMF-5 (*LIQ R/W CONT AREA*) indications
- C. 2EMF-54(HH) (*Unit Vent Gamma (HI-HI Range)*) indications
- D. Portable instruments readings taken on the containment wall and appropriately scaled for shielding factors

Distracter Analysis:

- A. **Incorrect:** 2EMF-38, 39, 40 are isolated by a phase A signal
Plausible: They accurately measure radiation levels under normal circumstances
- B. **Incorrect:** This would only measure activity inside the NC system piping
Plausible: This monitor is used to measure NC system activity during normal operations
- C. **Incorrect:** the unit vent path would be isolated during an accident
Plausible: If not isolated, this could be a good measurement of the activity in containment
- D. **Correct:** In the event both Containment High Range Radiation Monitors become inoperable during an accident, alternate measurement of containment radiation may be performed per HP/0/B/1009/006 (Alternative Method for Determining Dose Rate Within the Reactor Building).

Level: RO&SRO

KA: SYS 073 A1.01 (3.2/3.5)

Lesson Plan Objective: CNT Obj: 9

Source: Bank

Level of knowledge: memory

References:

1. OP-CN-CNT-CNT page 13

Bank Question: 331.1**Answer: B**

1 Pt(s)

A technician is performing a calibration procedure, which requires a series of approximately 10 sequential steps to be conducted while standing in a contaminated area. The communicator holds the procedure and reads each step sequentially by radio and the technician performs the step out of sight of the communicator.

If the performer does not have the procedure in hand as he/she performs the steps, what are the requirements of NSD 704 (*Technical Procedure Use and Adherence*) regarding the sign off for each step?

- A. **Only the performer can sign off the steps upon completion of the task after leaving the contaminated area.**
- B. **The communicator signs off each step as the step is completed using his/her own initials and the initials of the performer.**
- C. **The communicator signs off each step as the step is completed using his/her own initials along with the time.**
- D. **The communicator signs off each step as the step is completed using the performer's initials along with the time.**

Distracter Analysis:

- A. **Incorrect:** Both initials must be entered on each step.
Plausible: this is a logical albeit incorrect choice.
- B. **Correct:**
- C. **Incorrect:** Both initials must be entered on each step.
Plausible: this is a logical albeit incorrect choice.
- D. **Incorrect:** Both initials must be entered on each step.
Plausible: this is a logical albeit incorrect choice.

Level: RO&SRO

KA: ADM G 2.1.20(4.3 / 4.2)

Lesson Plan Objective: ADM-OP SEQ 13

Source: Bank

Level of knowledge: memory

References:

1. OP-CN-ADM-OP page 8
2. NSD 704 pages 4, 7

Bank Question: 353.3**Answer: A**

1 Pt(s)

A radiation worker is repairing a valve in a contaminated area, which has the following radiological characteristics:

- The worker's present exposure is 1943 mrem for the year
- General area dose rate = 30 mrem/hr
- Airborne contamination concentration = 10.0 DAC

The job will take 2 hours if the worker wears a full-face respirator. It will only take 1 hour if the worker does NOT wear the respirator.

If the RP Manager grants all applicable dose extensions, which one of the following choices for completing this job would maintain the worker's exposure within the station administrative requirements?

- A. **The worker should NOT wear the respirator because the calculated TEDE dose received will be less than if he wears one.**
- B. **The worker should NOT wear the respirator because the dose received without wearing a respirator will exceed site annual personnel dose limits.**
- C. **The worker should wear the respirator because the calculated TEDE dose received will be less than if he does not wear one.**
- D. **The worker should wear the respirator otherwise he could exceed DAC limits.**

Distracter Analysis:

Radiation exposure comparison:

Without respirator

$$\text{DDE} = 30 \text{ mrem/hr} \times 1 \text{ hr} = 30 \text{ mrem}$$

From airborne contamination:

$$\text{CEDE} = 10 \text{ DAC} \times 1 \text{ hr} \times 2.5 \text{ mrem/DAC-hr} = 25 \text{ mrem}$$

$$\text{TEDE} = 30 + 25 = 55 \text{ mrem from job}$$

$$\text{Total exposure for year} = 1943 + 55 = 1998 \text{ mrem}$$

With respirator

$$\text{DDE} = 30 \text{ mrem/hr} \times 2 \text{ hr} = 60 \text{ mrem}$$

$$\text{CEDE} = 0$$

$$\text{TEDE} = 60 \text{ mrem}$$

$$\text{Total exposure for year} = 1943 + 60 = 2003 \text{ mrem}$$

(With respirator) (Without respirator)
TEDE = 60 mrem > 55 mrem = do not use a respirator

- A. **Correct answer**
- B. **Incorrect:** the dose will exceed the 2000 mrem limit based on calculation.
Plausible: If the candidate miscalculates the dose.
- C. **Incorrect:** The calculated exposure will be greater if you wear the respirator.
Plausible: If the candidate incorrectly computes the exposure - this was the correct answer on a previous exam
- D. **Incorrect:** DAC limits are not direct ALARA controls.
Plausible: If the candidate does not understand the concept of derived airborne concentrations.

Level: RO&SRO

KA: G 2.3.2 (2.5 / 2.9)

Lesson Plan Objective: HP Obj: 2, 4

Source: Bank

Level of knowledge: analysis

References:

1. OP-CN-RAD-HP pages 14-15

Bank Question: 363.2**Answer: A**

1 Pt(s)

Unit 2 is in mode 6 and refueling operations are currently in progress. Given the following events and conditions:

- The Fuel Handling Manipulator Crane Operator (FHMCO) has indexed the mast over the location where fuel assembly H-8 will be inserted.
- All conditions/indications on the fuel handling manipulator crane are satisfied for inserting the fuel assembly located at H-8, in accordance with procedure.

Which one of the following statements describes the responsibility of the "Operator at the Controls", associated with inserting the fuel assembly?

- A. **Receives notification of assembly insertion from the Fuel Handling SRO, and tracks core response to reactivity changes.**
- B. **Specifies the acceptable storage locations per Tech Specs and informs the Fuel Handling SRO.**
- C. **Grants permission to the FHMCO for inserting the fuel assembly from the control room via the engineer communicating with the refueling crew.**
- D. **Verifies proper 1/m plot results and gives permission to the FHMCO to unlatch the assembly.**

Distracter Analysis:

- A. **Correct:**
- B. **Incorrect:** Reactor Engineering specifies the correct storage locations – not the OATC.
Plausible: The RO can be used to relay this information to the Fuel Handling SRO.
- C. **Incorrect:** the FHSRO authorizes inserting the assembly.
Plausible: if the candidate thinks the refueling is controlled from the CR
- D. **Incorrect:** the FHSRO authorizes inserting the assembly - monitor 1/m process periodically.
Plausible: this would be the logical practice if the OATC was in charge.

Level: RO&SRO

KA: G 2.2.27 (2.6 / 3.5)

Lesson Plan Objective: FHS SEQ 11

Source: Bank

Level of knowledge: memory

References:

1. OP-CN-FH-FHS pages 17
2. NSD 304 page 13
3. NSD 414 pages 1-5

Bank Question: 399**Answer: A**

1 Pt(s)

Unit 1 was operating at 100% with the pressurizer level controller in the 1-2 position. Given the following initial response:

- Charging flow reduces to minimum
- Backup heaters immediately energize
- Actual level begins to decrease

Which one of the following failures has occurred to cause this plant response?

- A. **PZR level channel 1 detector reference leg has ruptured**
- B. **PZR level channel 1 detector variable leg has ruptured**
- C. **PZR level channel 2 detector reference leg has ruptured**
- D. **PZR level channel 2 detector variable leg has ruptured**

Distracter Analysis:

- A. **Correct answer** - a leak in the reference leg causes the pressurizer channel to sense a high level condition - which causes the system response as indicated. Actual pressurizer level decreases initially due to charging flow decreasing while letdown remains in service.
- B. **Incorrect:** - variable leg rupture causes channel 1 to sense a low PZR level - actual level will increase not decrease initially
Plausible: - if the candidate thinks that this will cause a high level
- C. **Incorrect:** - will cause channel 2 to sense a high level - will not get heaters deenergizing - only get a high level alarm
Plausible: - if the candidate confuses the plant response for channel 2 - thinks that channel 2 controls
- D. **Incorrect:** - pressurizer level would increase not decrease
Plausible: - if the candidate confuses the direction of the pressurizer level failure or doesn't recognize plant response - this is very similar to a channel 1 high failure only the actual level increase instead of decreases

Level: RO&SRO

KA: APE 028 K1.01 (2.8*/3.1*)

Lesson Plan Objective: ILE Obj: 6

Source: Bank

Level of knowledge: analysis

References:

1. OP-CN-IC-ILE page 15, 16

Bank Question: 436.1**Answer: D**

1 Pt(s)

Unit 1 is responding to a station blackout. Given the following events and conditions:

- A fault occurred on the 1EMXE load center that supplied power to the 1A D/G battery charger. Repairs to this load center have not been made.
- RN was manually lined up to supply the DG KD system
- After two hours, the operators are ready to start the 1A diesel to restore power on 1ETA.

What effect will the loss of power on 1EMXE have on diesel generator 1A?

- A. **The diesel will start and run normally due to backup control power from VADA.**
- B. **The diesel will not start due to loss of control power.**
- C. **The diesel will start but the output breaker will not close due to loss of breaker control power.**
- D. **The diesel will start and the output breaker will close.**

Distracter Analysis:

- A. **Incorrect:** - the diesel will run until the DG battery is exhausted
Plausible: - if the candidate thinks that 120 VAC control power can be restored thru VADA.
- B. **Incorrect:** - DG control power is not lost until 2 hours of DG runtime.
Plausible: - if the candidate thinks that control power is lost due to 2 hours idle drain on the battery or loss of EMXE.
- C. **Incorrect:** - 125 VDC control power provides the needed electrical power to start and load the DG
Plausible: - if the candidate believes that DG output breaker control power is lost either by 2 hours idle drain on the battery or loss of EMXE.
- D. **Correct:** - D/G battery is sized for ~2 hours runtime per Tech Spec Bases 3.8.4. The output breaker will close. However, after the battery is exhausted, the diesel engine will continue to run. The diesel generator will not receive field excitation but it may self excite from residual magnetism.

Level: RO&SRO

KA: APE 055 A1.05 (3.3/3.6)

Lesson Plan Objective: DG-DG1 Obj: 1, 14, 15, 18

Source: Bank

Level of Knowledge: Comprehension

References:

1. OP-CN-DG-DG1, page 13, 14, 26
2. Tech Spec Basis B3.8.4, page 2

Bank Question: 453.3**Answer: C**

1 Pt(s)

Unit 1 was operating at 100% power when a loss of condenser vacuum occurred. Given the following events and conditions:

- The operators initiated AP/09 (*Rapid Downpower*)
- Reactor power dropped to 80%
- Turbine load dropped to 82% based on turbine impulse pressure
- The operator reports that condenser vacuum is 23.8 inches vacuum and is continuing to decrease slowly.

Which one of the following statements correctly describes the required action?

- A. **Manually trip the turbine then trip the reactor and enter E-0 (*Reactor Trip or Safety Injection*) immediately.**
- B. **Manually trip the reactor then trip the turbine and enter AP/2 (*Turbine Generator Trip*) immediately.**
- C. **If vacuum reaches 21.8 inches, manually trip the reactor and enter E-0.**
- D. **If vacuum reaches 21.8 inches, manually trip the turbine and enter AP/2.**

Distracter Analysis: The operators should use AP/23 for a loss of vacuum. The following turbine trip criteria are extracted from AP/23 enclosure (1).

1. Turbine Trip Criteria:

IF condenser vacuum decreases to less than 21.8 in. Hg, **THEN:**

- a. **IF** reactor power is greater than or equal to 69%, **THEN** manually trip reactor.
- b. Ensure turbine - TRIPPED.
- c. **IF** reactor is tripped, **THEN GO TO** EP/1/A/5000/E-0 (*Reactor Trip Or Safety Injection*).
- d. **REFER TO** AP/1/A/5500/02 (*Turbine Generator Trip*).

IF turbine exhaust hood temperature is greater than 225°F **AND** turbine load is less than 60% (based on impulse pressure equal to 370 PSIG), **THEN:**

- a. Ensure turbine - TRIPPED.
- b. **REFER TO** AP/1/A/5500/02 (*Turbine Generator Trip*).

- A. **Incorrect** The turbine has not reached the trip setpoint.

- Plausible:** If the candidate does not know the turbine trip setpoint or confuses condenser vacuum with condenser pressure (absolute)
- B. Incorrect:** The turbine has not reached the trip setpoint.
Plausible: If the candidate does not know the turbine trip setpoint or confuses condenser vacuum with condenser pressure (absolute). Note that the turbine would be tripped instead of the reactor if power were < 69% per AP/23.
- C. Correct:**
- D. Incorrect:** The reactor should be tripped first, not the turbine
Plausible: the turbine would be tripped instead of the reactor if power were < 69% per AP/23.

Level: RO&SRO

KA: G2.4.2

Lesson Plan Objective:

Source: Mod; Ques_453a, Catawba NRC 2001

Level of knowledge: memory

References:

1. AP/23 Encl (1) page 5
2. OP-CN-MT-ZM page 9
3. OMP 1-8 page 4

Bank Question: 460.2**Answer: D**

1 Pt(s)

If a large fire was reported in a vital area inside the RCA, which one of the following responses is correct by station procedures?

- A. **The Fire Brigade must suppress this fire without assistance because the Bethel Volunteer Fire Department is not allowed to access vital areas under the NRC's post-9/11 anti-terrorist orders.**
- B. **The Fire Brigade must suppress this fire because Bethel Volunteer Fire Department is not qualified to fight fire in a radiologically controlled area.**
- C. **The Fire Brigade is initially responsible for fire suppression activities at the scene. Upon arrival, the Bethel Volunteer Fire Department will take over control of the scene.**
- D. **The Fire Brigade is primarily responsible for fire suppression activities at the scene. The Bethel Volunteer Fire Department will respond promptly to the scene and will function under the Site Incident Commander.**

Distracter Analysis:

- A. **Incorrect:** - Offsite Fire Departments are allowed escorted access to vital areas of the plant. Provisions are in place to allow the offsite Fire Department to arrive at the scene promptly.
Plausible: - they have restrictions regarding leaving the site. The NRC's post-9/11 anti-terrorist orders place additional restrictions on vital area access by non-permanent employees.
- B. **Incorrect:** -Offsite Fire Departments are trained to fight fires in radiologically controlled areas of the plant. Provisions are in place to allow the offsite Fire Department to arrive at the scene promptly
Plausible: - If the candidate does not understand that offsite Fire Departments are trained in radiological fires.
- C. **Incorrect:** The Site Incident Commander retains responsibility for the scene of the fire.
Plausible: The offsite Fire Departments are full-time professionals and the candidate may think that the Fire Brigade Leader should turn over the responsibilities to the offsite professionals.
- D. **Correct** **Incorrect:** - The Fire Brigade is primarily responsible to fight fire inside the protected area.

Level: RO&SRO

KA: G 2.4.27 (3.0/3.5)

Lesson Plan Objective: SS-RFY SEQ 38

Source: Mod Ques_460.1 McGuire NRC 2002

Level of knowledge: memory

References:

1. NSD 112 page 1

Bank Question: 482.1**Answer: D**

1 Pt(s)

During an outage, air-operated valves 2NV-122B & 123B (*Loop C To Excess Ltdn HX Isol*) are being used to isolate valve 2NV 124B (*Excess Ltdn Press Cont*) for maintenance.

Which one of the following statements correctly describes the requirements for using 2NV-122/123 as an isolation boundary?

- A. **Tag shut the air supply to the valves and tag open the air regulator petcocks. Tags should also be firmly fixed around the remote operating switch on the main control board.**
- B. **Tag shut the air supply to the valves and tag closed the air regulator petcocks. Tags should also be firmly fixed around the remote operating switch on the main control board.**
- C. **Tag shut the air supply to the valves and tag closed the air regulator petcocks. A switch label should also be firmly fixed around the remote operating switch on the main control board.**
- D. **Tag shut the air supply to the valves and tag open the air regulator petcocks. A switch labels should also be firmly fixed around the remote operating switch on the main control board.**

Distracter Analysis:

- A. **Incorrect:** - switch labels are used on main control boards for tagging remote switches - not red tags.
Plausible: - the position of the components is correct -
- B. **Incorrect:** - the air regulator petcocks must be tagged open not closed
Plausible: - if the candidate does not know the proper position for tagging the regulator petcock
- C. **Incorrect:** - the air regulator petcock must be tagged open not closed - tags are not hung on main control board switches
Plausible: if the candidate does not know the proper tagging for the air operated valves
- D. **Correct answer** - per NSD-500

Level: RO&SRO

KA: G 2.2.13 (3.6 / 3.8)

Lesson Plan Objective: NSO2 Obj: 5

Source: Bank

Level of knowledge: memory

References:

1. OP-CN-ADM-NSO2 page 9
2. NSD-500 page 5, 11
3. OMP 2-33 page 14

Bank Question: 489.1**Answer: A**

1 Pt(s)

Unit 1 was operating at 100% power following a refueling shutdown. Unit 2 was shutdown in mode 6. It was discovered that a spent fuel element from the unit 1 refueling had been incorrectly stored in a filler location in the spent fuel pool. The element had exceeded the burnup (GWD/MTU) requirements to qualify for storage in a filler location.

Which one of the following statements describes the correct action(s) required by Tech Specs to preserve spent fuel pool shutdown margin?

- A. **Immediately initiate action to move the non-complying fuel assembly to an unrestricted storage location.**
- B. **Immediately initiate actions to move the non-complying fuel assembly to a restricted storage location and to shutdown Unit 1 within 1 hour.**
- C. **Initiate action to move the non-complying fuel assembly to a restricted storage location within 1 hour.**
- D. **Initiate actions to move the non-complying fuel assembly to an unrestricted storage location and to shutdown Unit 1 within 1 hour.**

Distracter Analysis: Restricted locations in the spent fuel pool will store spent fuel elements that have lower burnout. Elements that have higher burnout must be stored in unrestricted areas.

- A. **Correct answer:**
- B. **Incorrect:** - moving the spent fuel element to a restricted location would violate Tech Spec 3.7.16. Tech Spec 3.0.3 does not apply – no need to shutdown unit 1.
Plausible: - If the candidate does not know the difference between restricted and unrestricted locations and thinks that Tech Spec 3.0.3 applies to this condition.
- C. **Incorrect:** - must initiate action immediately – not qualified for storage in a restricted location.
Plausible: - 1 hour LCOs for important Tech Specs are common – a “restricted” area may imply more reactive elements should be stored there.
- D. **Incorrect:** - must initiate action immediately - Tech Spec 3.0.3 does not apply.

Plausible: - 1 hour LCOs for important Tech Specs are common
Tech Spec 3.0.3 requires initiating action to shutdown the unit within
1 hour.

Level: RO&SRO

KA: SYS 033 A2.01 (3.0/3.5)

Lesson Plan Objective: KF Obj: 19, 22

Source: Mod McGuire NRC 1999

Level of knowledge: comprehension

References:

1. OP-CN-FH-KF page 13
2. Tech Spec 3.7.16

Bank Question: 493.1**Answer: A**

1 Pt(s)

Unit 1 was holding at 72% power during a load increase to 100% power when one group of control rods in bank D failed to move with the rest of the bank during a Xenon burnout transient. Given the following events and conditions:

- Rod control was in automatic
- Rod control urgent failure alarm had NOT actuated
- Bank D group counter is at 112 steps
- 2 rods in bank D are at 120 steps
- 3 rods in bank D are at 108 steps

Which one of the following statements correctly describes the operator actions prior to attempting rod realignment?

- A. **Place control rods in manual and do not move control rods. Hold rods at present position until realignment.**
- B. **Place control rods in manual and insert the 2 rods in bank D to 108 steps within one hour.**
- C. **Place control rods in manual and withdraw the 3 rods in bank D to 120 steps within one hour.**
- D. **Trip the reactor and enter E-0.**

Distracter Analysis: Tech Spec 3.1.4 LCO B requires rod position to be restored within alignment limits (+ or – 12 steps) within one hour or power reduced < 75%. A Xenon burnout causes positive reactivity to be added and the rods will move IN to compensate. The candidate must determine which rods are stuck if he/she cannot recall that the rods can remain where they are if power is < 75%.

- A. **Correct:** The rods do not exceed the >12-step alignment spec from group counter – immediate action from AP15.
- B. **Incorrect:** Reactor power is < 75% - not required to restore rod position within one hour
Plausible: If power was > 75%, this would be correct
- C. **Incorrect:** Reactor power is < 75% - not required to restore rod position within one hour. Also, a Xenon burnout transient causes rods to move IN not OUT in auto rod control. Thus the rods that are stuck are at 120 steps not 108 steps. Attempting to insert the stuck rods will not be successful.

- Plausible:** Tech spec 3.1.4 requires rod alignment to be restored in one hour or reduce power below 75%.
- D. Incorrect:** Rods are not > 12 steps misaligned
- Plausible:** If more than one rod is misaligned by > 12 steps, then the immediate action would be to trip the reactor

Level: RO&SRO

KA: APE 005 EK1.03 (3.2/3.6)

Lesson Plan Objective: IRE Obj 18 EDA Obj: 6

Source: Mod Ques_493 Catawba NRC 1999

Level of knowledge: comprehension

References:

1. COLR Figure 2
2. Tech Spec 3.1.4
3. 1AD-2, B3 Comparator P/R Channel Deviation
4. OP-CN-IC-IRE page 22, 23
5. AP14 page 2
6. OP-CN-IC-EDA page 6

Bank Question: 501.1**Answer: B**

1 Pt(s)

Unit 2 was operating at 100% power when a terrorist attack in the control room caused the operators to rapidly evacuate to the Auxiliary Shutdown Panel. The operators were not able to perform AP/17 (Loss of Control Room) actions prior to evacuation at 0200.

The terrorists tripped the turbine but did not operate any other controls. There are no other local operator actions taken. Given the following steam generator narrow range levels:

	<u>0200</u>	<u>0202</u>	<u>0204</u>	<u>0206</u>	<u>0208</u>
2A S/G NR	65%	37%	22%	15%	25%
2B S/G NR	64%	38%	23%	18%	26%
2C S/G NR	63%	39%	25%	16%	24%
2D S/G NR	65%	38%	26%	20%	27%

Which one of the following statements describes the complete list of running feedwater pumps that can be monitored from the Auxiliary Shutdown Complex when the operators first arrive at the panels at 0210 to take local control of the plant?

- A. Both motor driven CA pumps
- B. Both motor driven CA pumps and the turbine driven CA pump
- C. Both motor driven CA pumps and both CF pumps (at minimum speed)
- D. Both motor driven CA pumps, the turbine driven CA pump and both CF pumps (at minimum speed)

Distracter Analysis: The lo-lo setpoint for SGWL is 17% on Unit 2. This causes:

- Reactor trip - on 1 of 4 S/Gs in 2 of 4 channels
- MD CA pumps auto-start - on 1 of 4 S/Gs in 2 of 4 channels
- TD CA pump auto-start - on 2 of 4 S/Gs in 2 of 4 channels

Only the CA pumps can be monitored from the Auxiliary Shutdown Complex. The MD CA pumps are on the ASPs. The CAPT is monitored from the Turbine Drive CA pump panel that is next to the ASPs. These panels are all part of the Auxiliary Shutdown Complex.

- A. **Incorrect:** CF pumps will not trip – this is done by a local operator action in AP-17, TD CA pump auto-starts.
Plausible: MD CA pumps will start when S/G levels < 17% on 1/4 S/Gs
- B. **Correct:** The MD and TD CA pumps auto start. The CF pumps will continue to run until tripped by local operator action in AP-17 but cannot be monitored from the Auxiliary Shutdown Complex.
- C. **Incorrect:** The TD CA pump will auto start.
Plausible: The MD CA pumps auto start and the CF pumps remain running
- D. **Incorrect:** The CF pumps will continue to run at minimum speed but cannot be monitored from the Auxiliary Shutdown Complex.
Plausible: If the candidates do not know that CF pumps do not have a run indication on the Auxiliary Shutdown Complex.

Level: RO&SRO

KA: APE 068 AA1.12 (4.4/4.4)

Lesson Plan Objective: CP-RSS Obj: 4

Source: Mod

Level of Knowledge: Analysis

References:

1. OP-CN-CP-RSS page 9, 16-21
2. OP-CN-IC-IFE page 23
3. OP-CN-CF-CA page 9

Bank Question: 507**Answer: B**

1 Pt(s)

Unit 2 is responding to a LOCA into the Auxiliary Building in ECA-1.2 (*LOCA Outside of Containment*). Upon completion of ECA-1.2, NC system pressure continues to decrease.

Which one of the following statements correctly describes the correct major action to assure proper method of removing decay heat under these conditions?

- A. **Transition back to E-1 (*Loss of Reactor or Secondary Coolant*).**
- B. **Transition to ECA-1.1 (*Loss of Emergency Coolant Recirculation*).**
- C. **Transition to ES-1.2 (*Post LOCA Cooldown and Depressurization*).**
- D. **Transition to ES-1.3 (*Transition to Cold Leg Recirc*).**

Distracter Analysis: This question does not require the candidate to memorize procedure transitions. Instead, the candidate is expected to logically assess conditions (LOCA into the AUX BLD that cannot be isolated – pressure continues to decrease after completion of ECA-1.2) and deduce that the containment sump inventory is still being lost. The only correct procedure would be ECA-1.1 to address this problem. All other procedure transitions do not work.

- A. **Incorrect:** Not the correct procedural transition if the NC system pressure continues to decrease (ie leak path not isolated).
Plausible: This IS the correct procedure if the NC system pressure was stable or increasing.
- B. **Correct:** continuing loss of inventory means that there may be insufficient water in containment for recirculation cooling
- C. **Incorrect:** Transition to ES-1.2 not allowed, as the leak is not isolated.
Plausible: The name of the procedure is appropriate for the situation.
- D. **Incorrect:** Transition to ES-1.3 not in accordance with the major action steps.
Plausible: Although many actions are the same, it is not the correct procedure.

Level: RO&SRO

KA: WE4 EA2.1 (3.4/4.3)

Lesson Plan Objective: EP2 Obj: 6, 13

Source: Bank

Level of knowledge: comprehension

References:

1. OP-CN-EP-EP2 page 12
2. ECA-1.2 page 6

Bank Question: 508.1**Answer: D**

1 Pts

Unit 2 is responding to a main steam line break inside containment. Given the following events and conditions:

- Containment pressure is 0.1 psig
- The pressurizer is solid
- ES-1.1 (*Safety Injection Termination*) has been implemented

Which one of the following statements correctly describes the status of the ECCS systems upon successful completion of ES-1.1?

- A. One NS pump running to provide containment pressure control
- B. One ND pump running to provide adequate heat removal
- C. One NI pump running to provide adequate inventory control
- D. One NV pump running to provide a normal charging lineup

Distracter Analysis:

- A. **Incorrect:** NS pumps are secured in ES-1.1, step 14
Plausible: If candidate does not know major actions of ES-1.1
- B. **Incorrect:** ND pumps are secured in ES-1.1, step 1
Plausible: If candidate does not know major actions of ES-1.1
- C. **Incorrect:** NI pumps are secured in ES-1.1, step 11
Plausible: If candidate does not know major actions of ES-1.1
- D. **Correct:**

Level: RO&SRO

K/A: APE WE01 EK3.3 (3.8/4.0))

Lesson Plan Objective: EP2 Obj: 2, 9

Source: Mod NRC Catawba 1999

Level of Knowledge: memory

References:

1. OP-CN-EP-EP2 page 9
2. ES-1.1 pages 10-12

Bank Question: 511.1**Answer: B**

1 Pt(s)

Unit 2 is responding to a LOCA outside containment. The operators have reached step 22 of E-1 when the STA reports the following critical safety functions (CSFs) status indications on the OAC:

CSF	Status
1. NC INVENTORY	Yellow
2. CORE COOLING	Red
3. CONTAINMENT	Green
4. NC INTEGRITY	Green
5. HEAT SINK	Red
6. SUBCRITICALITY	Yellow

What is the correct order in which these CSFs shall be prioritized for response?

- A. 5, 2, 6, 4, 3, 1
- B. 2, 5, 6, 1, 4, 3
- C. 5, 2, 6, 1, 4, 3
- D. 2, 5, 6, 4, 3, 1

Distracter Analysis:

- A. **Incorrect:** Core cooling has a higher priority than heat sink for red paths, and INVENTORY yellow takes precedence over greens.
Plausible: if the candidate reverses the relative priority of the red paths, and thinks that the priority is the order of relative importance of the CSFs for yellow/green.
- B. **Correct answer**
- C. **Incorrect:** Core cooling has a higher priority than heat sink for red paths.
Plausible: If candidate reverses the relative priority of the red paths.
- D. **Incorrect:** Core cooling and heat sink have higher priority than sub criticality with a yellow path.
Plausible: If candidate does not recall the priority rules; this is the correct order of priority without regard to COLORS.

Level: RO&SRO

KA: G 2.4.21 (3.7/4.3)

Lesson Plan Objective: EP-CSF Obj: 2

Source: Mod; Ques_511, Catawba NRC 1999

Level of knowledge: memory

References:

1. OP-CN-EP-CSF pages 6-7
2. OMP 1-7 page 11

Bank Question: 518.1**Answer: D**

1 Pt(s)

Why do some of the phase A containment isolation valves located in lower containment for the KC system have a separate manual reset on 1MC7?

- A. **The valves use air operators, which are not subject to spurious repositioning should they be submerged during containment flooding therefore they may be reset and repositioned if required by procedure.**
- B. **The valves are all above the containment flooding level and are not subject to spurious repositioning during containment flooding therefore they may be reset and repositioned if required by procedure.**
- C. **A separate reset is required because a containment phase A signal removes power from these valves causing them to fail closed to prevent them from spuriously repositioning due to containment flooding.**
- D. **A separate reset is required because a containment phase A signal disables the open circuits for these valves to prevent them from spuriously repositioning due to containment flooding.**

Distracter Analysis:

- A. **Incorrect:** Valves have MOVs not AOVs
Plausible: Some plants have mainly AOVs in containment for this reason
- B. **Incorrect:** Valves are located below flooding plane
Plausible: This is one way of preventing the problem
- C. **Incorrect:** Valves do not have closing power removed or this would prevent actuation in response to a valid ESF signal
Plausible: This would prevent the valves from spuriously opening. Some ECCS valves are protected this way.
- D. **Correct:**

Level: RO&SRO

KA: WE15 EA1.3 (2.8/3.0)

Lesson Plan Objective: CNT Obj: 16

Source: Bank

Level of knowledge: memory

References:

1. OP-CN-CNT-CNT page 20
2. OP-CN-EP-FRZ pages 6, 7

Bank Question: 521**Answer: C**

1 Pt(s)

Step 9.e of ECA-1.1 (Loss of Emergency Coolant Recirculation) requires operators to initiate NC system cooldown to cold shutdown:

"9.e Dump steam to condenser while maintaining cooldown rate based on NC T-colds as close as possible without exceeding 100 °F in an hour."

Which one of the following statements is in accordance with this step?

- A. **Attention should be paid to maintaining the cooldown rate at 100 °F/hr as an ideal value but not to be overly concerned if the exact value is not achieved. Any previous cooldown that had been conducted within the last hour needs to be considered.**
- B. **Attention should be paid to maintaining the cooldown rate at 100 °F/hr as an ideal value but not to be overly concerned if the exact value is not achieved. Any previous cooldown that had been conducted within the last hour does NOT need to be considered.**
- C. **Considerable attention must be devoted to achieving and maintaining this cooldown rate - OMP 1-4 guidance on setpoints does not apply to this step. Any previous cooldown that had been conducted within the last hour needs to be considered.**
- D. **Considerable attention must be devoted to achieving and maintaining this cooldown rate - OMP 1-4 guidance on setpoints does not apply to this step. Any previous cooldown that had been conducted within the last hour does NOT need to be considered.**

Distracter Analysis:

- A. **Incorrect:** Not in accordance with the background document knowledge/ability for this step.
Plausible: This is the standard OMP guidance for cooldowns.
- B. **Incorrect:** Not in accordance with the background document knowledge/ability for this step. Previous cooldowns need to be considered.
Plausible: This is the standard OMP guidance for managing cooldown rates in most EOPs.
- C. **Correct answer** - per the Background document
- D. **Incorrect:** Must consider previous cooldowns

Plausible: Cooling down is very important under these circumstances.

Level: RO&SRO

KA: WE11 EK3.2 (3.5/4.0)

Lesson Plan Objective: EP2 Obj: 28

Source: Bank

Level of knowledge: memory

References:

1. OP-CN-EP-EP2 page 13
2. 1ECA-1.1 Background document step 9e page 10
3. OMP 1.4 page 6

Bank Question: 531.1**Answer: B**

1 Pt(s)

Unit 2 is operating at 75% power. Given the following events and conditions:

- 2CM-83 is in AUTO
- A load rejection occurs

Which one of the following statements correctly describes the response of 2CM-83, (Generator Load Rejection Bypass valve) during the load rejection?

- A. 2CM-83 opens to provide condensate flow around the hotwell pumps to assure minimum flow requirements.
- B. 2CM-83 opens to provide additional condensate pressure to the condensate booster pumps and bypass portions of the low pressure CM system.
- C. 2CM-83 closes to prevent a loss of water from the "C" heater drain tank to the condensate booster pump suction.
- D. 2CM-83 closes to prevent condensate water from being recirculated to the suction of the condensate booster pumps.

Distracter Analysis:

- A. **Incorrect:** 2CM-83 does not provide a flow path around the hotwell pumps to meet minimum flow requirements
Plausible: 2CM-83 does open but CM-407 performs this function
- B. **Correct:**
- C. **Incorrect:** 2CM-83 opens - does not close
Plausible: 2CM-83 opens to route water from the hotwell pumps to the condensate booster pumps.
- D. **Incorrect:** 2CM-83 opens - does not close. Does not prevent water from being recirculated around the hotwell pumps.
Plausible: 2CM-407 opens to assure minimum flow around the hotwell pumps to prevent water hammer on the CM system during startup.

Level: RO&SRO

KA: SYS 056 K1.03 (2.6/2.6)

Lesson Plan Objective: CM Obj: 6

Source: Bank

Level of knowledge: memory

References:

1. OP-CN-CF-CM page 12, 13

Bank Question: 540.1**Answer: C**

1 Pt(s)

Unit 2 is responding to a LOCA.

Given the following sequence of events and conditions:

- A reactor trip and safety injection occurred
- All NV, NI and ND pumps sequenced on properly
- ECCS was reset
- The 2ETA bus momentarily lost power but was reenergized by the 2A D/G

Which one of the following statements describes the correct restoration process for the train A NV, NI and ND pumps?

- A. 2A NV pump must be restarted by operator action
2A NI pump will automatically restart
2A ND pump will automatically restart
- B. 2A NV pump will automatically restart
2A NI pump will automatically restart
2A ND pump will automatically restart
- C. 2A NV pump will automatically restart
2A NI pump must be restarted by operator action
2A ND pump must be restarted by operator action
- D. 2A NV pump must be restarted by operator action
2A NI pump automatically restart
2A ND pump must be restarted by operator action

Distracter Analysis:

NV pumps are controlled by both the ECCS and blackout sequencers. NI and ND pumps are controlled by the ECCS sequencer only

- A. **Incorrect:** NI and ND pumps do not automatically restart, NV pump will auto restart.
Plausible: Directed for psychometric balance by NRC (?)
- B. **Incorrect:** NI pump does not auto restart
Plausible: NV pump will auto restart and ND pump must be manually restarted
- C. **Correct answer**
- D. **Incorrect:** NV pump will auto restart, the NI pump will NOT auto restart.
Plausible: ND pumps require manual restart.

Level: RO&SRO

KA: SYS 005 K2.01 (3.0/3.2)

Lesson Plan Objective: EQB Obj: 13

Source: Bank

Level of knowledge: comprehension

References:

1. OP-CN-EP-EQB page 25

Bank Question: 571.1**Answer: B**

1 Pt(s)

Unit 2 is responding to a small break LOCA in ES-1.2, (*Post LOCA Cooldown and Depressurization*). Step 16 of ES-1.2 requires the operators to depressurize the NC system.

Which one of the following statements correctly describes the priority and reasons for using the prescribed methods of depressurizing the NC system?

A.

1. Pressurizer spray - preferred method to be used if NC pump is running
2. Auxiliary Spray - alternate method - better control over depressurization rate
3. PORV - method of last resort - lack of control of depressurization rate - results in rupturing the PRT

B.

1. Pressurizer spray - preferred method to be used if NC pump is running
2. PORV - alternate method - better than auxiliary spray
3. Auxiliary Spray - method of last resort - too slow and may thermal shock the spray nozzles and degrade regenerative heat exchanger

C.

1. PORV - preferred method - rapid depressurization rate
2. Pressurizer spray - alternative method - next most rapid depressurization rate
3. Auxiliary spray - method of last resort - too slow and may thermal shock the spray nozzles

D.

1. Auxiliary spray - preferred method - does not degrade containment
2. Pressurizer spray - alternative method - will not work if NC pump is not running
3. PORV - method of last resort - will rupture PRT and degrade containment environment

Distracter Analysis:

- A. Incorrect:** PORV is the alternative method - aux spray is the last resort
Plausible: Pressurizer spray is the priority

- B. Correct answer**
C. Incorrect: Pressurizer spray preferred over PORV
Plausible: Aux spray is last resort
D. Plausible: Aux spray is the last resort
Plausible: Pressurizer spray preferred over PORV

Level: RO&SRO

KA: WE03 EK2.2 (3.7 /4.0)

Lesson Plan Objective: EP2 Obj: 24

Source: Bank

Level of knowledge: memory

References:

1. OP-CN-EP-EP2 pages 10-11
2. ERG Background Document ES-1.2 step 14 page 17

Bank Question: 592.1**Answer: C**

1 Pt(s)

Unit 1 is in mode 3. NC pressure is 1940 psig. CA auto start defeat "Defeated" lights are lit

The following sequence of events occur on unit 1 while in mode 3:

1. CF isolation and the running CFPT trips on S/G Hi-Hi level
2. The S/G Hi-Hi level clears
3. CF isolation is reset
4. T-ave increases and NC pressure increases to 1960 psig

Which of the following correctly explains when (if at all) any CA pump(s) should have automatically started?

- A. **Following the CF isolation reset.**
- B. **When the S/G Hi-Hi level cleared.**
- C. **When pressure increased above P-11.**
- D. **The CA pumps have remained off for these events.**

Distracter Analysis:

Tests the candidates' knowledge of the low suction pressure protection circuitry when the CA has been reset.

- A. **Incorrect:** defeated by CA auto start defeat
Plausible: could result in a CA pump start
- B. **Incorrect:** defeated by CA auto start defeat
Plausible: normally true
- C. **Correct answer** The auto start defeat will Auto RESET when above P-11 and can be manually RESET at any time.
- D. **Incorrect:** auto resets
Plausible: candidate does not recall the signal auto resets above P-11

Level: RO&SRO

KA: SYS 061 A2.05 (3.1*/3.4*)

Lesson Plan Objective: CA Obj: 9

Source: Mod Ques_592 McGuire NRC 2000

Level of knowledge: analysis

References:

1. OP-CN-CF-CA pages 10 and 11

Bank Question: 600**Answer: C**

1 Pt(s)

Unit 1 is at 4% power, conducting a plant startup. Given the following events and conditions:

- A control bank "A" rod drops
- NCS temperature decreases to 550°F

Which one of the following statements correctly describes the required actions (if any)?

- A. **No technical specification action is required, however, the plant must be shutdown to mode 3 to recover the rod.**
- B. **Within 30 minutes, adjust power range N/Is to increase reactor power so that reactor power and thermal power best estimate are equal.**
- C. **Within 30 minutes be in mode 2 with K_{eff} less than 1.0.**
- D. **Immediately trip the reactor and enter E-0 (Reactor Trip or Safety Injection).**

Distracter Analysis:

- A. **Incorrect:** Tech Spec 3.4.2 is applicable in mode 2 when critical.
Plausible: The change from mode 2 to mode 1 occurs when power exceeds 5%. If the candidate thinks that ITS 3.4.2 only applies in mode 1, this would be a plausible mistake.
- B. **Incorrect:** Thermal power would indicate lower, not higher than reactor power due to increased thermalization of the neutrons. While NI adjustment is a problem, this action does not comply with tech spec 3.4.2.
Plausible: This was a recent event (July 1, 1998) at McGuire – but the temperature remained under 551 °F for only 4 minutes. The concern expressed in the lessons learned report was for the NI power to thermal power mismatch.
- C. **Correct answer**
- D. **Incorrect:** An immediate reactor trip is NOT required. AP/14 requires a controlled shutdown to mode 3 - but with temp only 1 °F below minimum required for criticality, the best choice is C. Shutting down to mode 3 is not a distracter.
Plausible: Seems like an appropriate response to finding yourself below the minimum temperature for criticality – an overly conservative response.

Level: RO&SRO

KA: G 2.1.11 (3.0/3.8)

Lesson Plan Objective: NC SEQ 10

Source: Bank

Level of knowledge: comprehension

References:

1. OP-CN-PS-NC page 33
2. Tech Spec 3.4.2 page 1

Bank Question: 602.1**Answer: A**

1 Pt(s)

Unit 2 is responding to a LOCA. The crew has entered ES-1.2, Post LOCA Cooldown and Depressurization.

Given the following events and conditions:

- NCPs tripped
- Pressurizer level is steady
- Only one train of ECCS is injecting
- Loop A temperatures are representative of all 4 loops
- MSIVs and steam dumps are open

Which one of the following sets of plant parameters is indicative of fully established natural circulation as outlined in Enclosure 3, Natural Circulation Monitoring Parameters?

REFERENCES PROVIDED: Steam Tables

	<u>Time</u>	<u>0200</u>	<u>0205</u>	<u>0210</u>	<u>0215</u>
A. Steam Header Pressure (psig)		742	715	676	645
	NC System Pressure (psig)	968	964	960	958
	Loop A T-hot (°F)	544	536	535	527
	Loop A T-cold (°F)	512	510	502	497
B. Steam Header Pressure (psig)		742	709	676	645
	NC System Pressure (psig)	968	972	975	981
	Loop A T-hot (°F)	547	552	555	563
	Loop A T-cold (°F)	548	544	540	536
C. Steam Header Pressure (psig)		742	747	750	762
	NC System Pressure (psig)	968	964	960	958
	Loop A T-hot (°F)	544	536	535	527
	Loop A T-cold (°F)	512	514	515	517
D. Steam Header Pressure (psig)		742	737	740	732
	NC System Pressure (psig)	938	942	945	941
	Loop A T-hot (°F)	539	542	545	545
	Loop A T-cold (°F)	513	510	510	506

Distracter Analysis: The following conditions support natural circulation:

- S/G pressure stable or decreasing
- T-hot stable or decreasing
- T-cold stable or decreasing
- NC subcooling > 0 - NC pressure may trend up or down.

- A. **Correct:** This shows indication of natural circulation flow occurring - decreasing S/G pressure, T-cold at S/G saturation conditions and decreasing, T-hot decreasing.
- B. **Incorrect:** T-hot is increasing while steam pressure is decreasing
Plausible: Steam pressure and T-cold are both decreasing
- C. **Incorrect:** Steam pressure is increasing and T-cold is tracking along with this trend. Temperature difference is decreasing indicating that heat removal rate is decreasing. This is a classic case of gas binding
Plausible: T-hot is decreasing.
- D. **Incorrect:** No subcooling.
Plausible: T-cold is decreasing

Level: RO&SRO

KA: EPE 011 EA2.09 (4.3/4.5)

Lesson Plan Objective: HT Obj: 15

Source: Bank

Level of knowledge: analysis

1. EP/1/A/5000/ES-1.2 enclosure 3
2. steam tables
3. OP-CN-THF-HT page 8-10

Bank Question: 605.1**Answer: A**

1 Pt(s)

Unit 1 trips from 100% power due to an electrical fault.

- 5 minutes later, 1EMF-33 (Condenser Air Ejector Exhaust) alarms in trip 2.

Which one of the following indications will provide the best indication (most sensitive and timely) to confirm that a S/G tube leak has just occurred?

- A. Observing 1EMF-26, 27, 28 and 29 (*Steamline 1A – 1D*)
- B. Comparing S/G feed flow to steam flow mismatch
- C. Observing 1EMF-34(L) (*S/G sample (lo range)*)
- D. Observing 1EMF-71, 72, 73, 74 (*S/G A-D leakage*)

Distracter Analysis:

- A. **Correct answer:** normally, EMF-71-74 are the most sensitive monitors. But these monitors detect $N^{16} \gamma$ radiation that has a high energy (7 MeV) γ that only is generated when the reactor is operating at power (requires a neutron flux).
- B. **Incorrect:** Not a sensitive method of comparison – requires large gpm leak rates before this is noticeable.
Plausible: This method will show gross SGTRs
- C. **Incorrect:** S/G sample line will isolate at EMF-33 trip 2 – the sample line can only be lined up to 1 S/G at a time. If the leak is not in that S/G, there will be no indication of anything after isolation. Prior to isolation, it may show an increasing trend due to a general build up of activity in the feedwater.
Plausible: This would be a good answer if the automatic isolation did not occur
- D. **Incorrect:** most sensitive method as it detects $N^{16} \gamma$ radiation
Plausible: This was the correct answer for the 1997 NRC exam – when the premise of the question had the reactor was operating at 100% power. In this question, the reactor has tripped and neutron flux has decreased – causing the $N^{16} \gamma$ to decay off ($T_{1/2}$ is 7 seconds) so that by the time that the steam line monitors see the contents of the S/G, the $N^{16} \gamma$ has decayed away.

Level: RO&SRO

KA: SYS 039 A2.03 (3.4/3.7)

Lesson Plan Objective: SM Obj: 28

Source: Bank

Level of knowledge: comprehension

References:

1. OP-CN-STM-SM page 12, 13

Bank Question: 731**Answer: A**

1 Pt(s)

Federal Regulations require the emergency core cooling system to be designed to maintain peak cladding temperature below 2200 °F.

Which one of the following statements correctly describes the basis for this design criterion?

- A. To prevent acceleration of the zircalloy-water reaction.
- B. To prevent exceeding the zircalloy clad melting point.
- C. To prevent exceeding the fuel melting point.
- D. To prevent the onset of full film boiling and DNB.

Distracter Analysis:

- A. **Correct:** The zirconium-water reaction is described by the following chemical equation: $Zr + 2H_2O \rightarrow ZrO_2 + 2H_2 + HEAT$. The rate of this reaction is highly dependent upon clad temperature, such that above approximately 1800°F the reaction becomes significant. It becomes accelerated at 2200°F and auto-catalytic (self-sustaining) at 4800°F.
- B. **Incorrect:** Zircalloy will melt at approximately 3316°F.
Plausible: its approximately 900 degrees below the melting point.
- C. **Incorrect:** fuel melt is a much higher temperature, 5100°F.
Plausible: a logical answer if the candidate doesn't know the answer
- D. **Incorrect:** these are event specific mechanisms rather analysis criteria.
Plausible: If the candidate confuses heat transfer mechanisms with ECCS criteria.

Level: RO&SRO

KA: SYS 006 K3.02 (4.3/4.4)

Lesson Plan Objective: TA-AM SEQ 10

Source: Bank

Level of knowledge: memory

References:

1. OP-CN-IC-ISE page 5

2. OP-CN-TA-AM pages 7-9
3. 10CFR50.46

Bank Question: 736.1**Answer: D**

1 Pt(s)

Unit 2 is in the process of conducting a plant startup.

Power range channels indicate the following:

- PR N41 = 8%
- PR N42 = 8%
- PR N43 = 10%
- PR N44 = 8%

Assuming no operator action, which of the following conditions would result in an automatic reactor trip?

- A. All four RCPs trip.
- B. One turbine impulse pressure channel fails high.
- C. NCS controlling pressurizer level channel fails low.
- D. NCS controlling pressurizer pressure channel fails high.

Distracter Analysis:

- A. **Incorrect:** all loop flow trips are automatically blocked below P-7
Plausible: if the candidate does not recall that the NCP trip is blocked by P-7. The operators would manually trip the reactor in AP/08 for this condition.
- B. **Incorrect:** P-7 would be enabled, but this does not cause a trip
Plausible: if the candidate is confused over the effect of turbine impulse on main generator trip
- C. **Incorrect:** Pressurizer High Level, Pressurizer Low Pressure, blocked by P-7
Plausible: an old horse is that if Pzr level fails low, eventually the reactor will trip on high Pzr level.
- D. **Correct:** As pressure decreases to 1845 psig, SI is actuated. The SI signal generates a Reactor Trip Signal. The failure of the NCS controlling pressure channel will cause spray actuation to reduce pressure to the S/I setpoint.

Level: RO&SRO

KA: SYS 010 K3.03 (4.0/4.2)

Lesson Plan Objective: ISE Obj: 4

Source: Mod Catawba NRC 2000

Level of knowledge: comprehension

References:

1. OP-CN-ECCS-ISE page 14

Bank Question: 757**Answer: B**

1 Pt(s)

Units 1 and 2 are operating at 100% power with a normal service water line-up and RN pump 2A running. Given the following conditions and indications:

- RN pumps 1A, 1B and 2B start.
- 1 and 2 RN-48B (*RN SUPPLY X-OVER ISOL*) close
- 1 and 2 RN-47A (*RN SUPPLY X-OVER ISOL*) remain open
- RN suction and discharge valves swap to the SNSWP.

Which one of the following conditions correctly describes the cause of this condition?

- A. The Lake Wylie dam failed.
- B. RN pump intake pit "A" screens are clogged.
- C. RN pump intake pit "A" level indicator (*RN INTAKE PIT LVL "A"*) failed low.
- D. There was a spurious containment phase "B" actuation on Unit 1.

Distracter Analysis:

- A. **Incorrect:** low lake level would cause a low level in both RN pump pits A and B, which would close valves 1/2RN-47A
Plausible: Partially correct – all other actuations would occur
- B. **Correct:**
- C. **Incorrect:** requires 2 of 3 level instruments to fail to get the actions.
Plausible: if the candidate does not know the coincidence logic.
- D. **Incorrect:** would not cause RN suction valves to swap to the SNSWP – would cause 1RN-47A to close and would not cause 2RN-48B to close
Plausible: partially correct – would cause all other conditions

Level: RO&SRO

KA: APE 062 AA1.02 (3.2/3.3)

Lesson Plan Objective: PSS-RN Obj: 12

Source: Bank

Level of knowledge: comprehension

References:

1. OP-CN-PSS-RN pages 14, 15, 32-33
2. AP-29 Encl 14 page 110

Bank Question: 769.1**Answer: C**

1 Pt(s)

Unit 1 is recovering from a loss of secondary coolant accident. Safety injection initiated properly. A total loss of feedwater has caused the operators to implement FR-H.1, (*Loss of Secondary Heat Sink*). Given the following plant conditions:

• NCS Pressure	2335psig
• NCS Temperature	565°F
• S/G 1A, 1B, 1C Pressure	1180psig
• S/G 1A, 1B, 1C Level (WR)	12%
• S/G 1D Pressure	100psig
• S/G 1D Level (WR)	35%
• VI system pressure	10psig
• Containment pressure	3.4psig

Which one of the following actions is initially required to assure the maintenance of adequate core cooling?

- A. Depressurize S/G 1A, 1B, and 1C to allow feeding the S/G using the condensate system.
- B. Reset the CAPT and align it to feed S/G's 1A, 1B and 1C.
- C. Open 1NC-32B (*PZR PORV*) and 1NC-34A (*PZR PORV*) using nitrogen pressure.
- D. Reset safety injection and containment phase "A" isolation signals to re-establish instrument air pressure to open 1NC-32B and 1NC-34A.

Distracter Analysis: The FR-H.1 values for dry S/G level is < 12% (ACC < 21%). Because containment pressure is 3.4 psig, ACC values are in effect.

- A. **Incorrect:** Can't feed dry S/G's
Plausible: if the candidate does not recognize dry S/G criteria met, this is one FR-Z.1 recovery method.
- B. **Incorrect:** Can't feed dry S/G's
Plausible: if the candidate does not recognize dry S/G criteria met, this is one FR-Z.1 recovery method.
- C. **Correct:**
- D. **Incorrect:** Must reset S_p to reopen VI valves.
Plausible: if the candidate thinks that VI is a phase "A" isolated system.

Level: RO&SRO

KA: WE05 G2.1.32 (3.4/3.8)

Lesson Plan Objective: FRH Obj: 2

Source: Bank

Level of knowledge: analysis

References:

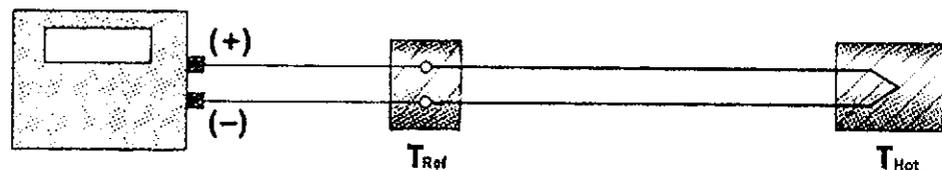
1. OP-CN-EP-FRH page 6
2. FR-H.1 background document step 17, page 18

Bank Question: 793.2**Answer: D**

1 Pt(s)

Unit 2 is operating at 100% power with all rods out.

- An operator notices that one core exit thermocouple (T/C) for quadrant II on the plasma display was 620°F but suddenly spiked to 670°F.
- Other nearby T/Cs indicate a steady 620°F with no change in indicated temperature.
- The reference junction effective temperature is designed to be controlled at 165°F for all T/Cs.
- The following instrument diagram represents the T/C measuring circuit.



Which one of the following statements correctly describes the reason for this thermocouple to read much higher than the other thermocouples?

- The thermocouple measuring junction has been shorted.
- The thermocouple measuring junction has an open circuit.
- The thermocouple reference junction effective temperature has increased by 50°F.
- The thermocouple reference junction effective temperature has decreased by 50°F.

Distracter Analysis: The voltage across any thermocouple junction increases as the temperature of that junction increases. The temperature measuring instrument measures the difference between the reference junction emf (at T_{ref}) and the T/C (at T_{hot}). If the effective temperature of the reference junction decreases, the EMF of the reference junction decreases and the apparent measured temperature increases.

- Incorrect:** a short across the T_{hot} thermocouple causes the removal of the difference in EMF; the T/C will read low as the EMF is shorted.
Plausible: If the candidate thinks that the T_{ref} emf nominal value is greater than then T_{hot} emf value.

- B. Incorrect:** an open measuring junction causes a removal of the measured emf and the temperature indication will indicate the value of Tref.
Plausible: if candidate believes that, like an RTD and open, causes a high reading
- C. Incorrect:** the temperature measured is based on the difference on voltage between the reference junction (at a lower temperature) and the T/C. If the reference junction is heated above the nominal Tref value, then the voltage difference will decrease and the temperature signal will decrease.
Plausible: if the candidate reverses the effects
- D. Correct:** the temperature measured is based on the difference on voltage between the reference junction at a lower temperature (Tref) and the T/C at Thot. If the reference junction is cooled below the nominal Tref value, then the voltage difference will increase and the temperature signal will increase.

Level: RO&SRO

KA: SYS 017 K6.01 (2.7/3.0)

Lesson Plan Objective: IG Obj: 2

Source: Mod Catawba NRC 2000

Level of knowledge: comprehension

References:

1. OP-CN-SS-IG page 10
2. OP-CN-PS-CCM page 15

Bank Question: 796**Answer: C**

1 Pt(s)

Unit 1 was operating at 100% power. Given the following events and conditions:

- 1 AD-6 F/10, (*PRT HI TEMP*) in alarm
- 1 AD-6 F/11 (*PRT HI PRESS*) in alarm
- Lower containment temperature = 124 °F
- The NC system is at normal operating temperature
- Letdown is in service

Which one of the following statements correctly describes a condition that could cause these alarms?

- A. **The PRT has heated up due to ambient containment temperature.**
- B. **1 ND-3 or 1ND-38, (*ND SUCTION RELIEF VALVEs*) have lifted.**
- C. **1 NV-15B (*LETDN CONT ISOL*) has spuriously closed.**
- D. **The reactor vessel inner O-ring has leaked.**

Distracter Analysis: The symptoms should cause the operators to enter AP/10 for NC system leakage.

- A. **Incorrect:** Containment temperature is less than PRT temperature.
Plausible: Heat up from containment ambient conditions can cause this to occur if containment temperature is high enough.
- B. **Incorrect:** the ND system is too low in temperature and isolated from the NC system, to cause this to occur even if the ND suction relief were to lift.
Plausible: the ND suction relief line goes to the PRT.
- C. **Correct:** if 1NV-15B closes, the letdown relief valve 1NV-14 will lift and relieve to the PRT.
- D. **Incorrect:** the reactor vessel inner O-ring leaks to the NCDT.
Plausible: if the candidate thinks that this leaks to the PRT

Level: RO&SRO

KA: SYS 007 G2.4.4 (4.0/4.3)

Lesson Plan Objective: NC Obj: 3

Source: Bank

Level of knowledge: comprehension

References:

1. OP-CN-PS-NC pages 12, 21-22, 25-26, 31
2. OP-CN-PS-NV pages 11-13
3. OP/1/B/6100/010G F/10, F/11

Bank Question: 828**Answer: B**

1 Pt(s)

Unit 1 was operating at 7% power when an electrical problem causes the loss of 1T1B. Given the following events and conditions in chronological sequence:

- Voltage on short buses 1TB and 1TD drops to 75%
- Frequency on short buses 1TB and 1TD decreases to 55 hertz.
- The 1TB-to-1TD fast bus transfer fails to occur
- All equipment operates as designed.
- No operator action

What is the current status of the unit?

- A. The reactor does not trip, B and D NCPs trip.
- B. The reactor does not trip, all NCPs trip.
- C. The reactor trips, B and D NCPs trip.
- D. The reactor trips, all NCPs trip.

Distracter Analysis:

- A. **Incorrect:** all NCPs are tripped
Plausible: partially correct - power is below P-7, candidate may not know UF will trip all NCPs.
- B. **Correct:** UF (56 hertz) will trip all NCP breakers, because power is less than P-7, the reactor will not trip.
- C. **Incorrect:** the reactor does not trip if below P7 – all NCPs are tripped
Plausible: partially correct – B& D NCPs do trip - candidate may think UF trips only B and D NCPs and because it is always in effect, may trip the reactor.
- D. **Incorrect:** the reactor does not trip if below P7
Plausible: candidate may think UF trips all NCPs and because it is always in effect, may trip the reactor.

Level: RO&SRO

KA: SYS 062 K4.03 (2.8/3.1)

Lesson Plan Objective: NCP Obj: 8 EP Obj: 12

Source: Bank

Level of knowledge: comprehension

References:

1. OP-CN-PS-NCP page 20, 21, 22, 23
2. OP-CN-EL-EP page 29, 30

Bank Question: 829**Answer: A**

1 Pt(s)

Unit 1 was operating at 100% power when the crew detects indications of a loss of NC inventory. Given the following events and conditions:

- All systems are in automatic
- Indicated letdown flow is 62 gpm
- 1NV-13A (*LTDN ORIF 1A OTLT CONT ISOL*) is open
- Letdown pressure is 350 psig
- Seal return – 3.5 gpm per NCP
- Indicated charging flow – 90 gpm
- Indicated seal injection flow – 35 gpm
- VCT level is decreasing
- Pressurizer pressure and level are constant
- Containment humidity is increasing

Which one of the following statements correctly describes the location of the leak?

- A. **Letdown line, between the letdown orifice and the containment isolation valve.**
- B. **Charging line between 1NV-309 (*Seal Water Injection Flow*) and 1NV-294 (*NV Pumps A&B Disch Flow CTRL*).**
- C. **Charging line inside containment.**
- D. **One of the RCS loops.**

Distracter Analysis:

- A. **Correct:** if the leak is on the letdown line, VCT level will drop, charging and letdown will be matched and pressurizer level will remain constant.
- B. **Incorrect:**
Plausible: operator misses that these valves are outside containment.
- C. **Incorrect:** charging leak would be indicated by increased charging.
Plausible: candidate misinterprets indications.
- D. **Incorrect:** Charging flow would have to increase.
Plausible: candidate assumes it's a small leak and misinterprets the indications.

Level: RO&SRO

KA: SYS 004 A1.11 (3.0/3.0)

Lesson Plan Objective: none

Source: Bank

Level of knowledge: analysis

References:

1. OP-CN-PS-NV page 20-25
2. K/A EPE 009 EA2.02 (3.5/3.8)

Bank Question: 834**Answer: B**

1 Pt(s)

Unit 1 was operating at 100% when a design basis LOCA occurred. Radiation monitoring teams at the site boundary report that projected Iodine 131 dose is 25 rem.

Which one of the following statements correctly describes the cause of this problem on the VE filter trains?

- A. The HEPA filters are saturated
- B. The charcoal filters are saturated
- C. The prefilter/demisters are saturated
- D. The VE filter unit preheaters are energized

Distracter Analysis:

- A. **Incorrect:** HEPA filters do not remove radioactive Iodine
Plausible: HEPA filter remove small particulates
- B. **Correct:**
- C. **Incorrect:** Prefilter/demister do not remove Iodine.
Plausible: If the candidate does not know the prefilter function.
- D. **Incorrect:** Heaters are supposed to be energized.
Plausible: If the candidate does not know the heater function.

Level: RO&SRO

KA: SYS 027 K5.01 (3.1/3.4)

Lesson Plan Objective: CNT-VE Obj: 2, 3

Source: Bank

Level of knowledge: memory

References:

1. OP-CN-CNT-VE pages 5-6

Bank Question: 843.1**Answer: A**

1 Pt(s)

Unit 1 is operating at 75% power and Unit 2 is at 100% power. Given the following events and conditions:

- Switchyard breakers PCB 20 and 21 open.

Which one of the following statements correctly describes the effect on units 1 and 2?

- A. Unit 1 will remain at 75% power and unit 2 will runback to approximately 56%.
- B. Unit 1 will runback to approximately 30% and unit 2 will remain at 100%.
- C. Unit 1 will runback to approximately 56% and unit 2 will remain at 100%.
- D. Both units 1 and 2 will runback to approximately 56%.

Distracter Analysis:

- A. **Correct:** Unit 2 is affected, unit 1 is not.
- B. **Incorrect:** Unit 1 will not runback
Plausible: answer transposed – if candidate believes unit 1 affected and will runback for 3 minutes at 15%/minute.
- C. **Incorrect:** Unit 1 will not runback
Plausible: previous correct answer on earlier test.
- D. **Incorrect:** Unit 1 will not runback
Plausible: partially correct – if candidate believes both units affected.

Level: RO&SRO

KA: SYS 062 A4.01 (3.3/3.1)

Lesson Plan Objective: EP Obj: 39

Source: Mod Catawba Audit Exam 2000

Level of knowledge: comprehension

References:

1. OP-CN-EP-EP pages 11 and 12

Bank Question: 857.2**Answer: C**

1 Pt(s)

Unit 2 is operating at 100% power. Pressurizer level is on program, and normal charging is in service and letdown flow is through a 75 gpm orifice.

Given the following events and conditions:

- 2NV-314B (*CHARGING LINE CONT OUTSIDE ISOL*) spuriously closes due a relay failure
- Flashing in the letdown line reduces letdown flow to 5 gpm

Without operator action, approximately how long before a pressurizer level deviation alarm actuates?

Assume 135 gallons = 1% pressurizer level

- A. A low-level deviation alarm will occur in less than one hour.
- B. A low-level deviation alarm will occur in greater than one hour.
- C. A high-level deviation alarm will occur in less than one hour.
- D. A high-level deviation alarm will occur in greater than one hour.

Distracter Analysis:

Charging flow is reduced to the minimum value – goes to 32 gpm to the NCP seals. 12 gpm seal flow goes to the VCT.

PZR level starts on program (55%) and must change by 5% to actuate a deviation alarm. 5% x 135 gallons is 665 gallons.

The reduction in charging flow into the NCS causes charging flow to reduce to minimum (32 gpm) as the PZR fills up. NCP Seal flow continues (12 gpm). Letdown flow drops to 5 gpm because of high regen HX outlet temperature (flashing at the orifices). Net charging flow drops to +15 gpm (32 – 12 – 5)

665 gallons/15 gpm = 44.3 minutes.

- A. **Incorrect:** level will increase not decrease
Plausible: If candidate miscalculates and believes level will decrease because NC is supplying seal injection.
- B. **Incorrect:** level will increase not decrease
Plausible: If the candidate believes only the 5 gpm letdown is causing level to decrease.
- C. **Correct:** Alarm should occur in 44 – 45 minutes
- D. **Incorrect:** Alarm should occur in 44 – 45 minutes
Plausible: If the candidate miscalculates or does not know the deviation is 5%, or neglects the 12 gpm loss due to the seal leakoff.

Level: RO&SRO

KA:APE 022 AA2.04 (2.9/3.8)

Lesson Plan Objective: NV Obj: 2,3,4

Source: Mod Ques_857.1 McGuire NRC 2002

Level of knowledge: analysis

References:

1. OP-CN-PS-NV pages 12
2. OP-CN-PS-ILE page 19

Bank Question: 865.2**Answer: A**

1 Pt(s)

Unit 2 is at full power when the following events occur:

- Reactor power is approximately 98%
- NCS T_{ave} is increasing
- Main turbine load is 1150 MWe
- Feedwater flow continues to operate as designed
- The RO is manually inserting rods

Which one of the following statements correctly describes the EOP basis in FR-S.1 (*Response to Nuclear Power Generation / ATWS*) for immediately tripping the turbine?

- A. **Prevent an uncontrolled cooldown and positive reactivity addition.**
- B. **Maintain or extend steam generator inventory.**
- C. **Prevent turbine overspeed when the main generator trips.**
- D. **Minimize the peak pressure transient for the event.**

Distracter Analysis:

- A. **Correct:** The basis in the EOPs is to prevent an uncontrolled cooldown and causing a positive reactivity addition
- B. **Incorrect:** if the main feedwater pumps continue to operate, the S/G inventory will not be a problem
Plausible: This is the EOP basis for an ATWS with a loss of feedwater
- C. **Incorrect:** The basis in the EOPs is to prevent an uncontrolled cooldown and causing a positive reactivity addition
Plausible: concern for the operation of the turbine
- D. **Incorrect:** The basis in the EOPs is to prevent an uncontrolled cooldown and causing a positive reactivity addition. The peak pressure will actually be greater if the turbine is tripped early in the transient.
Plausible: minimizing the peak pressure is always a good thing for an accident.

Level: RO&SRO

KA: EPE 029 EK1.02 (2.6/2.8)

Lesson Plan Objective: FRS Obj: 5

Source: Mod McGuire NRC 2002

Level of knowledge: memory

References:

1. OP-CN-EP-FRS pages 5-7
2. FR-S.1 page 2
3. FR-S.1 Background Step 2 page 2

Bank Question: 870**Answer: A**

1 Pt(s)

Unit 1 was operating at 100% power. Given the following trends on the 1A NCP:

<u>Time</u>	<u>0200</u>	<u>0205</u>	<u>0210</u>	<u>0215</u>
Motor bearing temp (°F)	180	184	186	195
Lower pump bearing temp (°F)	221	225	228	231
#1 seal outlet temp (°F)	205	227	235	251
Motor winding temp (°F)	312	314	316	323

What is the earliest time at which the 1A NCP must be secured?

- A. 0200
- B. 0205
- C. 0210
- D. 0215

Distracter Analysis:

NCP Trip criteria:

Any motor bearing temperature > 195°F

Seal Outlet temperature > 235°F

Motor winding temperature > 311°F

(Any bearing water exit temperature > 225°F)

- A. **Correct:** NCP must be stopped if motor winding temperature reaches 311 degrees at 0200
- B. **Incorrect:** NCP must be stopped at 0200
Plausible: reaches the temperature for securing NCP on lower bearing.
- C. **Incorrect:** NCP must be stopped at 0200
Plausible: reach the limit for securing NCP on seal outlet temp at 0210
- D. **Incorrect:** NCP must be stopped at 0200
Plausible: reach the temperature for stopping NCP on motor bearing at 0215

Level: RO&SRO

KA: APE 015 AK2.10 (2.8*/2.8)

Lesson Plan Objective: NCP Obj: 12

Source: Bank

Level of knowledge: memory

References:

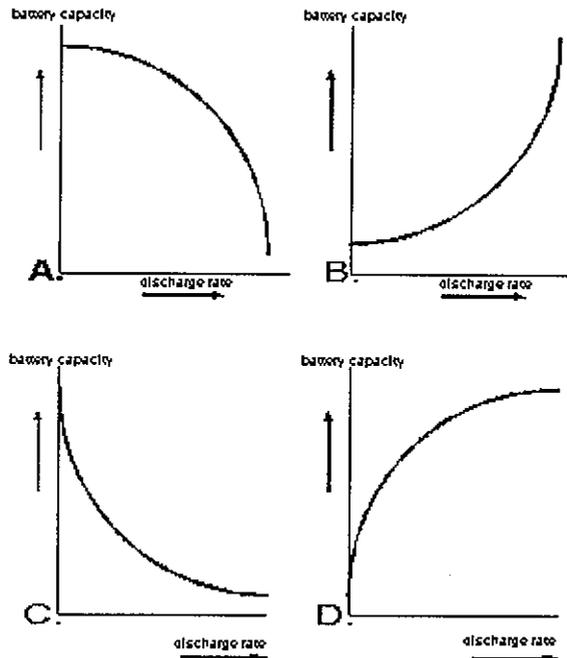
1. OP-CN-PS-NCP pages 7, 10, 14, 15

Bank Question: 906.1 Answer: A

1 Pt(s)

A station emergency battery is supplying DC bus loads without a battery charger on line.

If the equipment load on the DC bus does not change, which one of the following battery discharge curves describes the battery capacity as a function of the battery discharge rate?

**Distracter Analysis:**

- A. Correct:** As battery voltage drops, discharge current will increase to maintain power to the same load
- B. Incorrect:** Battery capacity decreases as discharge rate increases
Plausible: If the candidate does not apply $E=IR$ and $P=IE$ correctly
- C. Incorrect:** Battery voltage decreases slowly initially
Plausible: If the candidate does not apply $E=IR$ and $P=IE$ correctly
- D. Incorrect:** Battery capacity decreases as discharge rate increases
Plausible: If the candidate does not apply $E=IR$ and $P=IE$ correctly

Level: RO&SRO

KA:SYS 063 A1.01 (2.5/3.3)

Lesson Plan Objective: EPL Obj: 4, 21

Source: Mod Ques_906 McGuire NRC 2002

Level of knowledge: comprehension

References:

1. OP-CN-EP-EPL page 7,8

Bank Question: 907.1**Answer: A**

1 Pt(s)

Unit 1 is responding to a S/G tube rupture in E-3 (*Steam Generator Tube Rupture*). Given the following events and conditions:

- The target temperature has been determined.
- P-11 has been reached and the operators have blocked main steam isolation signal.
- Operators are preparing to open the steam dumps to cooldown to the target temperature at step 19f of E-3.

What is the applicable limit for the operator opening the steam dumps?

- A. **The steam dumps should be opened as far as possible to dump steam at a maximum rate while attempting to avoid a main steam isolation.**
- B. **Steam dumps should be opened to limit the cooldown rate to less than 100 degrees/hour to prevent exceeding Tech Spec limits.**
- C. **Steam dumps should be opened to limit the cooldown rate to less than 25 degrees/hour to prevent pressurized thermal shock concerns.**
- D. **All steam dumps should be fully opened to depressurize the S/Gs as quickly as possible.**

Distracter Analysis:

- A. **Correct:** E-3 requires depressurizing at the maximum rate while avoiding a main steam isolation signal at 100 psig/sec (setpoint is rate dependent) when below P-11. The steam pressure rate is swapped for low steam pressure main steam isolation when below P-11.
- B. **Incorrect:** E-3 requires depressurizing at the maximum rate while avoiding a main steam isolation signal at 100 psig/sec
Plausible: While TS limits apply, the dumps will be isolated long before that limit is approached. This is the TS cooldown limit.
- C. **Incorrect:** E-3 requires depressurizing at the maximum rate while avoiding a main steam isolation signal at 100 psig/sec
Plausible: PTS and limiting cooldown are reasonable concerns for other events.
- D. **Incorrect:** E-3 requires depressurizing at the maximum rate while avoiding a main steam isolation signal at 100 psig/sec – The steam pressure rate is swapped for low steam pressure main steam isolation when below P-11.

Plausible: if the operator does not recognize that blocking P-11 swaps the main steam isolation signal from low steam pressure to steam pressure rate of 100 psig/sec.

Level: RO&SRO

KA: EPE 038 A1.05 (4.1/4.3)

Lesson Plan Objective: EP4 Obj: 19

Source: Mod McGuire NRC 2002

Level of knowledge: memory

References:

1. OP-CN-EP-EP4 page 8
2. E-3 page 20
3. E-3 Background Document step 19 pages 23-28

Bank Question: 911.1**Answer: B**

1 Pt(s)

Unit 1 was operating at 100% power when a loss of offsite power caused a reactor trip. The crew has verified natural circulation in ES-0.1 (*Reactor Trip Response*). Ten minutes later, the operator notes that the thermocouple input to both plasma displays is malfunctioning.

Which one of the following correctly describes a valid indication that natural circulation is continuing?

- A. S/G saturation temperatures are decreasing and *REACTOR VESSEL UR LEVEL* indication is greater than 100 %.
- B. S/G pressures are decreasing and T_{cold} is at S/G saturation temperature.
- C. S/G pressures are decreasing and *REACTOR VESSEL D/P* indication is greater than 100%.
- D. S/G pressure is at saturation pressure for T_{cold} and *REACTOR VESSEL D/P* indication is greater than 100 %.

Distracter Analysis:

- A. **Incorrect:** There is no indication of coupling between primary and secondary.
Plausible: These are important indications during natural circulation.
- B. **Correct:**
- C. **Incorrect:** RVLIS is unavailable during natural circulation.
Plausible: S/G pressure decreases during natural circulation and RVLIS is one of the other plasma display indications.
- D. **Incorrect:** RVLIS is unavailable during natural circulation.
Plausible: S/G pressure will remain close to saturation for T_{cold} during natural circulation and RVLIS is one of the other plasma display indications.

Level: RO&SRO

KA: APE 056 AK1.01 (3.7/4.2)

Lesson Plan Objective: HT Obj: 15

Source: Bank

Level of knowledge: memory

References:

1. ES-0.1 page 12
2. ES-0.1 Enclosure 2 page 21

Bank Question: 957.1 Answer: D

1 Pt(s)

Unit 1 is operating at full power. Given the following containment ventilation lineup:

- 3 Lower Containment Ventilation Units (LCVUs)
- 1 Pipe Tunnel Booster Fan (PTBF)
- 3 Control Rod Drive Mechanism (CRDM) Vent Fans
- 1 Incore Instrument Room Air Handling Units (IIRAHUs)
- 3 Upper Containment Ventilation Units (UCVUs)
- Both Containment Auxiliary Charcoal Filter Units (CACFUs) are shutdown

A loss of offsite power occurs on Unit 1. Both diesel generators start and energize ETA and ETB. Sequencing is complete. No operator action has been taken regarding the electric plant.

What is the expected Containment Ventilation lineup?

- A. LCVUs, UCVUs and CRDM fans will be running; all other equipment will be shutdown.
- B. LCVUs, UCVUs, CACFUs and CRDM fans will be running; all other equipment will be shutdown.
- C. LCVUs, UCVUs, CACFUs, PTBFs and CRDM fans will be running; all other equipment will be shutdown.
- D. LCVUs, UCVUs, PTBFs, IIRAHUs and CRDM fans will be running; all other equipment will be shutdown.

Distracter Analysis:

- A. **Incorrect:** Each train starts their respective fans, even those not running previously, except for the CACFUs.
Plausible: Partially correct – LCVUS, UCVUs and CRDM fans will start - if candidate believes that just the ventilation fans inside containment except CACFUs start.
- B. **Incorrect:** Each train starts their respective fans, even those not running previously, except for the CACFUs.
Plausible: partially correct - true except for the CACFUs do not start and the PTBF and IIRAHU start. If the candidate believe that ALL ventilation fans inside containment will start.
- C. **Incorrect:** Each train starts their respective fans, even those not running previously, except for the CACFUs.
Plausible: partially correct – UCVUs start and CACFUs do not start.

- D. Correct:** Each train starts their respective fans, even those not running previously, except for the CACFUs.

Level: RO&SRO

KA: SYS 022 A3.01 (4.1/4.3)

Lesson Plan Objective: VV Obj: 12

Source: Bank

Level of knowledge: comprehension

References:

1. OP-CN-VV pages 12 and 13

Bank Question: 963**Answer: C**

1 Pt(s)

Which one of the following statements correctly describes how a severe axial flux imbalance that is outside of the normal limits (as defined in the ROD Book section 3.9 (*OAC Manual Input Data*)) could affect automatic and manual rod withdrawal at 100% power?

- A. **AFD inputs to OTDT cause the OTDT setpoint to increase, which could actuate a C3 rod stop to prevent automatic rod withdrawal. Operator would manually insert rods to restore AFD within the target band and clear the rod stop.**
- B. **AFD inputs to OPDT cause the OPDT setpoint to decrease, which could actuate a C3 rod stop to prevent automatic or manual rod withdrawal. Operator would manually insert rods to restore AFD within the target band and clear the rod stop.**
- C. **AFD inputs to OPDT and OTDT cause both setpoints to decrease, which could actuate a C3 or C4 rod stop to prevent automatic or manual rod withdrawal. A turbine runback would automatically reduce NC temperature below the OPDT or OTDT setpoints to clear the rod stop.**
- D. **AFD inputs to OPDT and OTDT cause both setpoints to increase, which would actuate a C3 or C4 rod stop to prevent automatic rod withdrawal. Manual rod withdrawal would still operate and a turbine runback would not occur. Operators would manually insert or withdraw rods to restore AFD within the target band and clear the rod stop.**

Distracter Analysis: AFD being outside the penalty box causes OTDT and OPDT setpoints to decrease which will cause the C3 and C4 rod stops to actuate at 100% power

- A. **Incorrect:** An automatic turbine runback will reduce delta-t below C3 setpoint.
Plausible: answer is partially correct – auto rod withdrawal will be inhibited
- B. **Incorrect:** OPDT causes a C4 rod stop – not C3. An automatic turbine runback will reduce delta-t below C4 setpoint.
Plausible: confuses with OTDT – answer is partially correct
- C. **Correct:**
- D. **Incorrect:** Manual rod withdrawal is inhibited and an automatic turbine runback will reduce delta-t below C3 or C4 setpoint.
Plausible: answer is partially correct – moving rods to restore AFD directly counters the AFD problem.

Level: RO&SRO

KA: SYS 001 A3.03 (3.6/3.8)

Lesson Plan Objective: IPX SEQ 9

Source: New

Level of knowledge: comprehension

References:

1. OP-CN-IC-IPX page 14, 15
2. Tech Spec 3.3.1 pages 18-20

Bank Question: 964**Answer: D**

1 Pt(s)

Unit 1 is operating at 100% power. Given the following events and conditions:

- Train "A" equipment is in service.
- 1ETA is deenergized due to a bus fault and power cannot be restored.
- All plant safety equipment operates automatically as designed.
- No operator action has been taken.

What would be the immediate impact (if any) of the loss of 1ETA on the NCPs?

- A. All NCPs would continue to be cooled.
- B. Only A and D NCPs would lose cooling.
- C. Only B and C NCPs would lose cooling.
- D. All NCPs would lose cooling.

Distracter Analysis:

- A. **Incorrect:** all NCPs are affected – the bus fault precludes reenergizing 1ETA and prevents restarting "A" train KC pumps from the D/G.
Plausible: candidate believes the B train KC pumps would auto-start.
- B. **Incorrect:** all NCPs are affected – the bus fault precludes reenergizing 1ETA and prevents restarting "A" train KC pumps from the D/G.
Plausible: One header supplies A and D NCPs
- C. **Incorrect:** all NCPs are affected – the bus fault precludes reenergizing 1ETA and prevents restarting "A" train KC pumps from the D/G.
Plausible: one header supplies B and C NCPs
- D. **Correct:** all NCPs are affected.

Level: RO&SRO

KA: SYS 003 K2.02 (2.5*/2.6*)

Lesson Plan Objective: KC Obj: 4

Source: New

Level of knowledge: memory

References:

1. OP-CN-PSS-KC page 7

Bank Question: 965 Answer: B

1 Pt(s)

Unit 2 was operating at 100% when a large-break LOCA occurred inside containment at 0200. Given the following events and conditions:

- 0201 – containment pressure = 1.0 psig
- 0205 – containment pressure = 3.0 psig
- 0210 – containment pressure = 0.5 psig
- 0215 – containment pressure = 0.1 psig

What should be the status of the Containment Air Return dampers and fans at time 0210?

- A. **Dampers open; fans running.**
- B. **Dampers open; the fans never started.**
- C. **Dampers opened but have closed; fans started but have stopped.**
- D. **Dampers opened but have closed; the fans never started.**

Distracter Analysis: from the VX lesson plan:

Dampers are automatically opened if the following conditions are met: (Obj. #4, 5)

- 10 seconds have elapsed from receipt of Sp signal.
- Greater than or equal to 0.4 psig signal from Containment Pressure Control System (CPCS).
- Less than or equal to 0.5 psid across the damper.
- Load Group #1 from D/G sequencer has permission to start

Air return fans (ARF) automatically start if the following conditions are met: (Obj. #4,5)

- 9 minutes have elapsed from receipt of Sp (phase B) signal.
- Greater than or equal to 0.4 psig signal from CPCS.
- Load Group #11 from D/G sequencer has permission to start.

- A. **Incorrect:** fans are not running until 0210 - because 9 minutes have not elapsed since reaching Sp setpoint (3.0 psig).
Plausible: Candidate believes the ARF starts 9 minutes after phase "A" (St) signal
- B. **Correct:** dampers open 10 seconds after the Sp signal. Fans start nine minutes later if CPCS present. CPCS is not present until 0215.
- C. **Incorrect:** dampers remain open; fans start nine minutes after the Sp signal and would shutdown, however, they never started.
Plausible: candidate does not know time delay – fans stop on CPCS interlock at 0.3 psig.
- D. **Incorrect:** dampers remain open

Plausible: candidate believes the dampers close – partially correct.

Level: RO&SRO

KA: SYS 025 A4.02 (2.7*/2.5*)

Lesson Plan Objective: VX Obj: 4, 5

Source: New

Level of knowledge: analysis

References:

1. OP-CN-CNT-VX pages 7 and 8

Bank Question: 966**Answer: A**

1 Pt(s)

During a reactor start-up, the following conditions are noted:

- The reactor is at normal operating pressure and temperature.
- Four NCPs are running.
- NCS temperature is being controlled using the steam dumps.
- The reactor power is 5%.

Which of the following describes the change in actual[BCH1] plant parameters if the controlling steam header pressure transmitter fails high?

- A. **Steam dump demand increases. Steam header pressure decreases, and NCS temperature decreases.**
- B. **Steam dump demand decreases. Steam header pressure increases, and NCS temperature increases.**
- C. **Steam dump demand increases, Steam header pressure increases, and NCS temperature decreases.**
- D. **Steam dump demand decreases. Steam header pressure decreases, and NCS temperature decreases.**

Distracter Analysis:

- A. **Correct:**
- B. **Incorrect:** Steam dump demand increases.
Plausible: Parameter changes are consistent with error in steam dump change.
- C. **Incorrect:** Steam pressure change is not consistent with increased demand.
Plausible: reflects indicated rather than actual pressure.
- D. **Incorrect:** Steam dump demand does not go down.
Plausible: psychometrically balanced.

Level: RO&SRO

KA: SYS 041K3.02 (3.8/3.9)

Lesson Plan Objective: STM-IDE SEQ 9

Source: New

Level of knowledge: comprehension

References:

1. OP-CN-STM-IDE page 13

Bank Question: 968.3**Answer: C**

1 Pt(s)

A unit 1 containment purge is in progress using OP/1/A6450/015. Given the following events and conditions:

- 1EMF-39(L) (*Containment Gas (Lo Range)*) spiked to a trip 2 condition then cleared

Which one of the following statements correctly describes the action required?

- A. **The VP release may not be reinitiated until RP draws a new containment air activity sample.**
- B. **The VP release may be reinitiated after the spike clears. If 1EMF-39 spikes a second time, the release cannot be reinitiated without RP sampling containment air for activity.**
- C. **The VP release may be reinitiated after the spike clears. If 1EMF-39 spikes a second time, the release may also be reinitiated.**
- D. **The VP release may be reinitiated if grab samples are taken of Unit vent activity during subsequent reinitiation.**

Distracter Analysis:

- A. **Incorrect:** the OP allows the VP release to be reset twice if due to EMF spike.
Plausible: This is a conservative answer.
- B. **Incorrect:** the OP allows the VP release to be reset twice if due to EMF spike.
Plausible: a new sample may be required if the EMF actuates prior to initiating the release.
- C. **Correct:** the OP allows the VP release to be reset twice if due to EMF spike.
- D. **Incorrect:** the OP allows the VP release to be reset twice if due to EMF spike.
Plausible: grab samples are required if EMF-39 is inoperable when the release occurs.

Level: RO&SRO

KA: G2.3.9 (2.5/3.4)

Lesson Plan Objective: VP Obj: 8, 9

Source: New

Level of knowledge: memory

References:

1. OP/1/A/6450/015, limits and precautions page 2
2. OP-CN-CNT-VP page 15

Bank Question: 970**Answer: B**

1 Pt(s) Unit 1 is at 75% power when a plant trip occurs due to P-14 actuation. Given the following events and conditions:

- The plant is currently stable.
- The steam dumps have just closed at no-load Tave.
- Steam generator levels are 35% in unaffected steam generators and 80% in the affected steam generator.

What action must the operator take to reset CF isolation?

- A. Cycle the reactor trip breakers only.
- B. Cycle the reactor trip breakers and depress the CF isolation reset pushbuttons.
- C. Lower the affected steam generator level and cycle the reactor trip breakers.
- D. Lower the affected steam generator level, cycle the reactor trip breakers and depress the CF isolation reset pushbuttons.

Distracter Analysis:

- A. **Incorrect:** must also depress FWI pushbuttons
Plausible: would be true if P-4/Low Tave FWI had not occurred.
- B. **Correct:** to clear the P-14, the trip breakers must be cycled. To clear the low tave/p-4 FWI, it must be reset.
- C. **Incorrect:** not need to reduce S/G level on Unit 1 – must reset FWI
Plausible: partially correct - would be true on Unit 2 and Low Tave/P-4 FWI had not occurred.
- D. **Incorrect:** no need to reduce S/G level
Plausible: would be true on unit 2.

Level: RO&SRO

KA: SYS 059 K4.17 (2.5*/2.8*)

Lesson Plan Objective: ISE Obj: 5

Source: New

Level of knowledge: comprehension

References:

1. OP-CN-ECCS-ISE page 21, 22, 23

Bank Question: 971**Answer: A**

1 Pt(s)

Unit 1 was operating at 100% power when a small break LOCA occurred. Given the following events and conditions:

- 1EMF-53A/B (*Containment TRN A/B (Hi Range)*) = 36 R/hr
- Containment pressure = 0.5 psig
- The operators enter FR-Z.3 (*Response to Containment High Radiation Level*)

Which one of the following statements correctly describes the proper (major action) response in FR-Z.3 to reduce airborne radiation levels inside containment?

- A. **Place containment auxiliary charcoal filter units (CACFUs) in service.**
- B. **Place containment purge (VP) system in service.**
- C. **Place the containment spray (NS) system in operation.**
- D. **Place the containment air return fans (ARFs) in service.**

Distracter Analysis:

- A. **Correct:** This is a major action category for this event in FR-Z.3
- B. **Incorrect:** VP is not used for accident response
Plausible: VP is used to reduce the airborne activity prior to entering containment for maintenance, inspections and testing – VP is the “normal” path for reducing airborne contamination
- C. **Incorrect:** Containment spray is only used when there is a high pressure in containment
Plausible: Containment spray is used to reduce the airborne fission products during accident conditions
- D. **Incorrect:** ARFs will not operate until CPCS actuates at 0.3 psig.
Plausible: ARFs force containment air through the ice condenser during accident conditions, which will reduce airborne radiation levels

Level: RO&SRO

KA: WE 16 EK1.1 (2.7/3.0)

Lesson Plan Objective: EP-FRZ Obj: 3

Source: New

Level of knowledge: memory

References:

1. OP-CN-EP-FRZ page 7
2. OP-CN-CNT-VP page 5
3. Background document FR-Z.3 page 3

Bank Question: 974**Answer: D**

1 Pt(s)

Unit 1 was operating at 100% power when a loss of vital power occurs. Given the following events and conditions:

- 1AD-11, H/2 "125 VDC ESS PWR CHANNEL B TROUBLE" Alarm – is lit
- The operators dispatch an NLO to investigate the cause of the alarm
- The control room supervisor implements AP-29 (*Loss of Vital or Aux Control Power*).

Which one of the following actions shall be performed immediately?

- A. Close the breaker to 1EBB
- B. Open the tie breaker to 1EDB
- C. Verify ND - ALIGNED IN RHR MODE
- D. Verify TURB IMP PRESS CH 1 - NORMAL

Distracter Analysis:

- A. **Incorrect:** This is not an immediate action for AP-29
Plausible: This is a supplementary action for the annunciator 1AD-11 H/2 and this could clear the condition if the cause of the annunciator was the breaker to 1EBB had tripped open
- B. **Incorrect:** This is not an immediate action for AP-29
Plausible: This action would clear the alarm if the tie breaker had closed for some reason. This is a supplementary action for the annunciator response.
- C. **Incorrect:** This is not an immediate action for AP-29
Plausible: This is the first supplementary action in AP-29
- D. **Correct:** This is the only immediate action in AP-29.

Level: RO&SRO

KA: APE 058 G4.49 (4.0/4.0)

Lesson Plan Objective: EPL Obj: 8

Source: New

Level of knowledge: memory

References:

1. OP-CN-EP-EPL page 15
2. AP-29 page 3
4. OP/1/B/6100/10L 1AD-11 H/2

Bank Question: 977**Answer: C**

1 Pt(s) Unit 1 was operating at 100% power.

Which one of the following conditions requires a reactor trip and turbine trip?

- A. Exhaust hood temperature channel = 226 °F
- B. Turbine bearing oil pressure = 13 psig
- C. Condenser vacuum = 21.5 inches Hg Vacuum
- D. Generator frequency = 65 Hz

Distracter Analysis:

- A. **Incorrect:** Exhaust hood high temperature trip is blocked / not required above 60% power
Plausible: This would be correct is below 60% power
- B. **Incorrect:** Turbine bearing oil pressure must be < 12 psig in 1 of 3 channels to cause / require a reactor/turbine trip
Plausible: If the candidate does not know the setpoint
- C. **Correct:** low vacuum < 21.8 inches of Hg vacuum in 2 of 3 channels will cause / require a turbine and reactor trip
- D. **Incorrect:** Generator frequency > 66 Hz will cause or require a reactor trip
Plausible: 65 Hz is an extremely abnormal condition.

Level: RO&SRO

KA: APE 051 A2.02 (3.9/4.1)

Lesson Plan Objective: MT3 Obj: 6

Source: New

Level of knowledge: memory

References:

1. OP-CN-MT-MT3 page 11

Bank Question: 978**Answer: C**

1 Pt(s)

Unit 1 is preparing to conduct a vacuum fill of the NC system at the end of a refueling outage. The NC system is in a mid loop condition.

Which one of the following reactor vessel level instruments will provide the greatest accuracy for this condition?

- A. NC level loop indication
- B. Sight glass loop indication
- C. Ultrasonic level indication
- D. RVLIS lower range indication

Distracter Analysis: During vacuum fill operations, the NC system is evacuated to a condition of negative pressure. This affects any level indicator that relies on pressure differences such as the loop level indications or sight glasses. RVLIS indication will also not function during this process. Ultrasonic sensors are not affected by vacuum conditions because they do not measure pressure differentials.

- A. **Incorrect:** The ultrasonic level indicators should be used during vacuum fill to provide the greatest accuracy
Plausible: this is one source of Rx vessel level indication during reduced inventory operations
- B. **Incorrect:** The ultrasonic level indicators should be used during vacuum fill to provide the greatest accuracy
Plausible: this is one source of Rx vessel level indication during reduced inventory operations
- C. **Correct:** The ultrasonic level indicators should be used during vacuum fill to provide the greatest accuracy
- D. **Incorrect:** The ultrasonic level indicators should be used during vacuum fill to provide the greatest accuracy
Plausible: this is one source of Rx vessel level indication during reduced inventory operations

Level: RO&SRO

KA: SYS 002 K6.03 (3.1/3.6)

Lesson Plan Objective: NC Obj: 9

Source: New

Level of knowledge: memory

References:

1. OP-CN-PC-NC page 28-30

Bank Question: 980**Answer: C**

1 Pt(s)

Unit 1 was shutdown in mode 6, in mid loop operations when a loss of ND cooling occurred. Given the following events and conditions:

- The operators implemented CASE IV of AP-19 (*Loss of Residual Heat Removal System*) and have reached step 23.
- The ND system has been refilled and properly vented
- Step 23 requires restart of one ND pump to restore cooling.
- A caution warns the operator that restarting an ND pump can cause NC system level to decrease rapidly.

What is reason for this caution?

- A. NC system level will drop due to the contraction of the water from the cooldown.
- B. NC system level will drop due to the suction of water from the NC system into the ND pump.
- C. NC system level will drop due to the collapse of system voids.
- D. NC system level will drop due to increased system pressure.

Distracter Analysis:

- A. **Incorrect:** Cooldown is insufficient to cause a level drop at representative temperatures
Plausible: sufficient cooldown will cause volumetric contraction and level drop
- B. **Incorrect:** The suction surge is accompanied by discharge back into the system so the mass balance remains the same.
Plausible: initially the suction will withdraw water from the NC system
- C. **Correct:** system voids can occur if the loss of ND is severe
- D. **Incorrect:** system pressure will not increase – mid loop operations require an open vent path to atmosphere
Plausible: if the vent path were not open, pressure could increase and cause level to drop if there were gas pockets

Level: RO&SRO

KA: APE 025 G2.1.32 (3.4/3.8)

Lesson Plan Objective: none

Source: New

Level of knowledge: comprehension

References:

1. AP-19 Case IV step 23 page 42

Bank Question: 981**Answer: D**

1 Pt(s) What sub-group of pressurizer heaters can be powered from SLXG?

- A. Backup heater Group A
- B. Backup heater Group B
- C. Control Group C
- D. Backup heater Group D

Distracter Analysis:

- A. **Incorrect:** Backup heater group D is powered from SLXG
Plausible: may feel the A group is logical for control
- B. **Incorrect:** Backup heater group D is powered from SLXG
Plausible: may feel B is logical for control
- C. **Incorrect:** Backup heater group D is powered from SLXG
Plausible: may feel the control group makes sense to be used for control
- D. **Correct:** Group D can be powered from SLXG for pressurizer pressure control during plant control from the Safe Shutdown Facility

Level: RO&SRO

KA: SYS 011 K2.02 (3.1/3.2)

Lesson Plan Objective: IPE Obj: 6

Source: New

Level of knowledge: memory

References:

1. OP-CN-PS-IPE page 19, 20
2. OP-CN-CP-AD page 12

Bank Question: 982**Answer: C**

1 Pt(s)

Unit 2 is at 100% power following a refueling. Given the following events and conditions:

- Reviews of surveillances reveals that all 3 channels on the flow instruments for NC loops 1C and 1D were not calibrated properly and are out of specification.
- Repairs cannot be made for 12 hours due to parts availability.

What is the maximum power level allowed by Tech Specs at the time of repair?

REFERENCES PROVIDED: Tech Spec 3.3.1

- A. Reduce power to less than 69%
- B. Reduce power to less than 48%
- C. Reduce power to less than 10%
- D. Reduce power to mode 3

Distracter Analysis:

With 3 of 3 NC flow channels OOC in two loops, Tech Spec 3.3.1 Table 3.3.1-1 function 10.a requires action statement L when power is > P-10 (10%). Action statement L requires placing the channel in trip within 6 hours (unable to do this due to failure) or reducing power below P10 in 10 hours.

- A. **Incorrect:** Must get below P10 in 10 hours
Plausible: If candidate cannot locate the proper section of Table 3.3.1-1.
- B. **Incorrect:** Must get below P10 in 10 hours
Plausible: If candidate reads action for loss of 1 loop flow instruments
- C. **Correct:** Tech Spec 3.3.1 Action L applies
- D. **Incorrect:** Must get below P10 in 10 hours
Plausible: If the candidate miss-reads note g in Table 3.3.1-1.

Level: RO&SRO

KA: SYS 012 A2.01 (3.1/3.6)

Lesson Plan Objective: IPX Obj: 12

Source: New

Level of knowledge: comprehension

References:

1. Tech Spec 3.3.1, table 3.3.1-1 - PROVIDED

Bank Question: 985**Answer: D**

1 Pt(s)

Unit 2 was operating at 100% power when a LOCA occurred.

Which one of the following statements correctly describes the operation of the NS/VX reset during the LOCA and what is the reason for this operation?

- A. NS/VX is reset to allow the operator to take manual control of NS pumps.
- B. NS/VX is reset to terminate spray flow after pressure is reduced to prevent a vacuum in containment.
- C. NS/VX is NOT reset to prevent excessive cycling of NS spray pumps and VX fans.
- D. NS/VX is NOT reset to allow NS components to continue to operate when transferring to recirculation.

Distracter Analysis:

- A. **Incorrect:** NS/VX is not reset
Plausible: this is a reason for resetting sequencers.
- B. **Incorrect:** NS/VX is not reset
Plausible: this is why CPCS turns off spray when pressure is less than 0.3
- C. **Incorrect:** Resetting NS/VX does not prevent excessive cycling of NS pumps and VX fans – these pumps and fans will continue to cycle and must be manually secured later in the accident.
Plausible: partially correct – NS/VX is reset – but the reason is incorrect. This is the correct reason for manually securing NS pumps later in the procedure.
- D. **Correct:** NS/VX Reset is not reset in order for NS components to continue operating after transferring to the recirculation mode

Level: RO&SRO

KA: SYS 026 A4.05 (3.5/3.5)

Lesson Plan Objective: NS Obj: 10

Source: New

Level of knowledge: memory

References:

1. OP-CN-CNT-NS page 10

Bank Question: 986**Answer: B**

1 Pt(s)

Unit 2 is operating at 100% power. Given the following events and conditions:

- The plant operator reports the following annunciator is received on D/G panel 2A: "LOW VG AIR TANK PRESS"
- VG receivers starting air pressure is 149 psig.

Which one of the following statements correctly describes the 2A D/G?

- A. **The D/G cannot be manually or automatically started until the VG receiver is repressurized.**
- B. **The D/G can be manually started and is capable of one or two starts.**
- C. **The D/G can be automatically started and is capable of one or two starts.**
- D. **The D/G can be automatically started and is capable of five starts.**

Distracter Analysis:

If VG Pressure decreases to less than 150 psig, all automatic start signals are blocked. This conserves enough air for one or two manual start attempts after the cause of the start failure is corrected.

- A. **Incorrect:** Can be started manually started
Plausible: psychometric balance
- B. **Correct:** Can be started manually one or two times
- C. **Incorrect:** With starting air receiver pressure < 150 psig, auto starts are blocked.
Plausible: partially correct – capable of one or two manual starts.
- D. **Incorrect:** Auto starts are blocked below 150 psig – can't make 5 starts at 150 psig.
Plausible: This is the FSAR requirement for the number of starts on a D/G

Level: RO&SRO

KA: SYS 064 A3.04 (3.1/3.5)

Lesson Plan Objective: DG1 Obj: 10

Source: New

Level of knowledge: comprehension

References:

1. OP-CN-DG-DG1 page 11, 12
2. Tech Spec Bases 3.8.3 E1

Bank Question: 987**Answer: D**

1 Pt(s)

Which one of the following statements correctly explains the reason for E-0, *Reactor Trip or Safety Injection*, step 8 "Verify all Feedwater Isolation status lights (1SI-5) - LIT."?

- A. Prevent unnecessary depletion of condensate inventory due to excessive CF pump discharge flow.
- B. Prevent dead-heading the CA pumps due to excessive CF pump discharge pressure.
- C. Prevent water from entering the steam lines due to uncontrolled CA flow.
- D. Prevent excessive NC system cooldown due to uncontrolled CF flow.

Distracter Analysis:

- A. **Incorrect:** This is not the correct EOP basis for this step.
Plausible: excessive CF flow would deplete the condensate inventory.
- B. **Incorrect:** CA pump discharge pressure is higher than CF pump discharge pressure – CA pumps would not be deadheaded.
Plausible: If the candidate does not recognize that CA pump discharge pressure is higher than CF pump discharge pressure.
- C. **Incorrect:** CA flow is not affected by feedwater isolation.
Plausible: Partially correct – the EOP basis for this step is to prevent S/G overfill (and to prevent excessive NC system cooldown) due to uncontrolled CF flow.
- D. **Correct:** This is the correct EOP basis for this step

Level: RO&SRO

KA: EPE 007 EK301 (4.0/4.6)

Lesson Plan Objective: EP1 Obj: 18

Source: New

Level of Knowledge: Memory

References:

1. Background Document for E-0, page 10

Bank Question: 990**Answer: B**

1 Pt(s)

Which one of the following statements correctly describes the analog and digital portions of the Engineered Safety Features Actuation System?

- A. **There are 2 analog input channels.
There are 3 to 4 digital output logic trains.**
- B. **There are 3 to 4 analog input channels.
There are 2 digital output logic trains.**
- C. **There are 3 to 4 analog input channels.
There are 4 digital output logic trains.**
- D. **There are 4 analog input channels.
There are 4 digital output logic trains.**

Distracter Analysis:

- B. The system circuitry consists of an analog portion and a digital portion.
 - 1. The analog portion consists of three to four redundant channels per parameter to monitor such variables as the reactor coolant system and steam system pressures, temperatures, flows, and containment pressure.
 - 2. The digital portion consists of two redundant logic trains, which receive inputs from the analog protection channels and perform the needed logic to actuate the engineered safety features.
- A. **Incorrect:** There are 3 or 4 analogue channels
Plausible: reverse of actual
- B. **Correct:**
- C. **Incorrect:** Only 2 digital logic trains, not 4.
Plausible: partially correct - relates 4 digital channels to the 4 ESF channels.
- D. **Incorrect:** There are 2 digital logic trains
Plausible: partially correct - believes there is a 1 to 1 correlation

Level: RO&SRO

KA: SYS 013 K5.01 (2.8/3.2)

Lesson Plan Objective: ISE Obj: 4

Source: New

Level of knowledge: memory

References:

1. OP-CN-ICCS-ISE page 6

Bank Question: 991**Answer: B**

1 Pt(s)

Unit 1 was operating at 50% power. Instrument air pressure is reading 80 psig in the control room.

Which one of the following actions should have just occurred?

- A. Quick start of the standby air compressor
- B. VI-670 'VI Dryer Auto Bypass' opened
- C. CF control valves failed closed
- D. VS-78 'VS supply to VI' opened

Distracter Analysis:

- A. **Incorrect:** wrong setpoint
Plausible: starts at 94 psig
- B. **Correct:** VI-670 opens
- C. **Incorrect:** wrong setpoint
Plausible: occurs around 50 psig.
- D. **Incorrect:** wrong setpoint
Plausible: occurs at 76 psig.

Level: RO&SRO

KA: SYS 078 A4.01 (3.1/3.1)

Lesson Plan Objective: VI SEQ 5, 11

Source: New

Level of knowledge: memory

References:

1. OP-CN-SS-VI page 20

Bank Question: 992**Answer: A**

1 Pt(s) Unit 1 was operating at 100% power. Given the following events and conditions:

- 3 control rod drive mechanism (CRDM) vent fans are running.
- CRDM vent fan 1D is out of service.
- Lower containment temperature is 105 F and steady.
- 1B pipe tunnel booster fan (PTBF) is running in LOW.
- Lower containment ventilation units (LCVUs) 1B, 1C and 1D are running in LOW speed and NORM cooling.
- C1A1081 (Reactor Vessel Head Area Temp) is 110 F
- C1A1087 (Reactor Vessel Head Area Temp) is 110 F
- C1A1093 (Digital Rod Pos Ind Cabinet Area Temp) is 97 F.

If one of the running CRDM fans trips on over-current, what is the first action (if any) that needs to be taken by the crew?

REFERENCES PROVIDED: OP/1/A/6450/001

- A. Start a second PTBF.
- B. Place all LCVUs to MAX cooling and shift LCVUs to high speed.
- C. Place LCVU 1D and 1B only in MAX cooling and secure LCVU 1C.
- D. Generate a work request to determine CRDM shroud leaving air temperature.

Distracter Analysis:

See attachment 4.16 of the procedure (Abnormal Operation With Two Control Rod Drive Ventilation Fans Available). When the CRDM fan trips, the containment temperature (which has been 105°F and steady) will increase.

- A. **Correct:** this is correct since air temperature is greater than 100 °F and DRPI area temperature is above 95F.
- B. **Incorrect:** Not required by procedure – must start a second PTBF
Plausible: this distracter is a subset of distracter C and would provide more cooling. Directed by NRC during exam review.
- C. **Incorrect:** Containment temperature is not below 100 °F
Plausible: correct if containment temperature is below 100 °F
- D. **Incorrect:** DRPI air temp > 95 °F
Plausible: correct if DRPI air temperature is below 95F

Level: RO&SRO

KA: SYS 022 A2.01 (2.5/2.7)

Lesson Plan Objective: none

Source: New

Level of knowledge: comprehension

References:

1. OP/1/A/6450/001/ Encl 4.16 pages 1-4

Bank Question: 993**Answer: A**

1 Pt(s)

When does the CPCS shutdown signal actuate and what is the purpose of this automatic protection?

- A. CPCS actuates at 0.3 psig to prevent drawing a negative pressure in containment.
- B. CPCS actuates at 0.3 psig to prevent NS pump runout caused by decreasing backpressure.
- C. CPCS actuates at 0.5 psig to conserve FWST inventory.
- D. CPCS actuates at 0.5 psig to reduce RN heat load.

Distracter Analysis:

- A. **Correct:** Trips at 0.4 psig and resets at 0.3 psig to stop the NS pumps. The shutdown signal prevents negative pressure from an inadvertent spray down in containment.
- B. **Incorrect:** Does not prevent NS pump runout
Plausible: lower containment pressure leads to increased S pump flow.
- C. **Incorrect:** CPCS actuates at 0.3 psig
Plausible: NS draws from the FWST before recirculation but this is not the purpose of the system
- D. **Incorrect:** CPCS actuates at 0.3 psig
Plausible: RN cools the NS heat exchangers so securing the NS pumps would reduce the heat load on RN.

Level: RO&SRO

KA: SYS 026 G2.1.27 (2.8/2.9)

Lesson Plan Objective: NS Obj: 2

Source: New

Level of knowledge: memory

References:

1. OP-CN-ECCS-NS page 7

Bank Question: 994**Answer: D**

1 Pt(s)

Unit 1 is operating at 100% power when a main steam line break occurs on the 1B steam generator. Given the following plant events and conditions:

- The operators have entered EP/1/A/5000/E-0 (*Reactor Trip or Safety Injection*)
- Maximum containment pressure was 1.5 psig
- 1A and 2A RN pumps are RUNNING
- 1RN36A (RN PUMP INJ FILT INLT X-OVER) OPEN
- 1RN37B (RN PUMP INJ FILT OTLT X-OVER) OPEN
- 1RN232A (D/G 1A HX INLET ISOL) OPEN
- 1RN292B (D/G 1B HX INLET ISOL) OPEN
- 1RN47A (RN SUPPLY X-OVER ISOL) CLOSED
- 1RN48B (RN SUPPLY X-OVER ISOL) CLOSED
- All other ECCS systems operate properly

Which one of the following actions is required to place the RN system in the correct configuration for the given conditions?

- A. Close 1RN36A and open 1RN47A, 1B and 2B RN pumps are not operating.
- B. Close 1RN37B and OPEN 1RN48B, 1B and 2B RN pumps are not operating.
- C. Start 1B and 2B RN pumps, open 1RN47A & 1RN48B and close 1RN232A & 1RN292B.
- D. Start 1B and 2B RN pumps, close 1RN36A & 1RN37B and open 1RN47A & 1RN48B.

Distracter Analysis: All 4 RN pumps start on a safety injection signal. 1RN36A & 1RN37B close on a safety injection signal. 1RN232A & 1RN292B open when the diesel engine starts. 1RN47A & 1RN48B close on a Phase B signal.

- A. **Incorrect:** The 1B and 2B RN pumps should start on a safety injection signal
Plausible: 1RN36A closes on a safety injection signal and 1RN47A closes on a Phase B signal
- B. **Incorrect:** The 1B and 2B RN pumps should start on a safety injection signal
Plausible: 1RN37B closes on a safety injection signal

- C.** **Incorrect:** 1RN292B must be open when D/G 1B is operating
Plausible: The 1B and 2B RN pumps should start on a safety injection signal
- D.** **Correct answer**

Level: RO&SRO

KA: SYS 076 A4.01 (2.9/2.9)

Lesson Plan Objective: RN Obj: 12

Source: New

Level of knowledge: analysis

References:

1. OP-CN-PSS-RN pages 10, 11, 18-20, 33

Bank Question: 995**Answer: C**

1 Pt(s)

Unit 2 is operating at 100% power. Given the following events and conditions:

- Normal letdown alignment exists
- Controlling pressurizer pressure channel fails low.
- Operator immediately transfers control to an alternate operable channel.

Assuming no additional operator action, which one of the following statements correctly describes how letdown flow responds?

- A. Letdown will isolate.
- B. Letdown flow will indicate approximately 45 gpm.
- C. Letdown flow will indicate approximately 75 gpm.
- D. Letdown flow will indicate approximately 120 gpm

Distracter Analysis:

- A. **Incorrect:** Letdown remains in service
Plausible: Operator incorrectly determines that letdown will isolate on low pressurizer pressure and/or reactor trip will occur when the spray valves and PORV NC-34A open
- B. **Incorrect:** Normal letdown alignment has 75 gpm orifice in service
Plausible: Operator incorrectly determines that 45 gpm orifice is in service for normal letdown alignment
- C. **Correct:**
- D. **Incorrect:** Normal letdown alignment has only the 75 gpm orifice in service
Plausible: Both the 45 gpm and 75 gpm orifice are in service if pressurizer level is being reduced.

Level: RO&SRO

KA: APE 027 AA2.08 (3.2/3.2)

Level of knowledge: comprehension

Lesson Plan Objective: IPE Obj: 14

Source: New

References:

1. OP-CN-PS-IPE page 14
2. OP-CN-PS-NV page 12

Bank Question: 997**Answer: D**

1 Pt(s)

AP-21 (*Loss Of Component Cooling*) Foldout Page directs the operators to align alternate cooling to the 1A NV pump. Enclosure 4, Step 7 directs the operators to reduce motor cooler and oil cooler flow.

Why is YD flow to the 1A NV pump motor cooler and oil cooler flow reduced?

- A. To preserve the YD storage tank inventory and to minimize chloride contamination of the KC system.
- B. To maintain motor bearing temperature less than 160°F and stator temperature less than 240°F.
- C. To minimize chloride contamination of the KC system only.
- D. To reduce drainage to ND/NS sump, which minimizes radwaste.

Distracter Analysis:

- A. **Incorrect:** YD flow is reduced to minimize radwaste
Plausible: this would minimize tank inventory loss but the tank can be easily refilled from city water.
- B. **Incorrect:** YD flow is reduced to minimize radwaste
Plausible: 160°F and 240°F are valid maximum allowed temperature limits.
- C. **Incorrect:** YD flow is reduced to minimize radwaste.
Plausible: YD water is purged to the ND/NS sump to minimize Chloride contamination of the KC system.
- D. **Correct:** Per note prior to step 7, enclosure 4.

Level: RO&SRO

KA: APE 026 AK303 (4.0/4.2)

Level of Knowledge: comprehension

Lesson Plan Objective: KC SEQ 10 & 14

Source: new

References:

1. AP/1/A/5500/21 Enclosure 4, page 2, 4

Bank Question: 998**Answer: D**

1 Pts

Unit 1 was operating at 100% power.

Which one of the following malfunctions could occur and still have KC train "A" remain operable?

REFERENCES PROVIDED: Tech Spec 3.7.7 and Bases

- A. 1A2 KC pump has failed
- B. 1A KC surge tank has been drained
- C. 1A KC heat exchanger is being cleaned
- D. 1A ND heat exchanger KC side has a flow blockage

Distracter Analysis: Tech Spec 3.7.7 bases states:

A CCW train is considered OPERABLE when:

- a. Both pumps and associated surge tank are OPERABLE; and
- b. The associated piping, valves, heat exchanger, and instrumentation and controls required to perform the safety related function are OPERABLE. The isolation of CCW from other components or systems not required for safety may render those components or systems inoperable but does not affect the OPERABILITY of the CCW System

- A. **Incorrect:** Required to have BOTH KC pumps operable – each pump has 50% capacity
Plausible: the 1B KC pump remains operable
- B. **Incorrect:** Required to have the associated surge tank operable
Plausible: The pumps have sufficient NPSHA with the surge tank empty provided the piping up to the tank is filled (per Tech Spec Bases 3.7.7)
- C. **Incorrect:** when cleaning the Hx, the HX is drained
Plausible: KC flow is routed through the 1B Hx to maintain KC system flow while cleaning
- D. **Correct:** Although the 1A ND HX would be inoperable, the 1A KC train remains operable.

Level: RO&SRO

K/A: SYS 008 G2.2.25 (2.5/3.7)

Lesson Plan Objective: KC Obj: 13

Source: New

Level of Knowledge: comprehension

References:

1. OP-CN-PSS-KC pages 13, 19
2. Tech Spec 3.7.7 bases

Bank Question: 999**Answer: A**

1 Pt(s) Unit 2 is operating at 23% power. Given the following events and conditions:

- 120VAC panel 2ERPA fails

Which of the following statements is correct?

REFERENCES PROVIDED: AP-29 Encl 14 Only

- A. D/G 2A cannot be run in manual and it will run in auto due to an emergency start signal.
- B. D/G 2A cannot be run in manual and it will not run in auto due to an emergency start signal.
- C. D/G 2A can be run in manual and it will not run in auto due to an emergency start signal.
- D. D/G 2A can be run in manual and it will run in auto due to an emergency start signal.

Distracter Analysis:

- A. **Correct:**
- B. **Incorrect:** D/G 2A will run in auto due to an emergency start signal
Plausible: D/G 2A cannot be run in manual
- C. **Incorrect:** D/G 2A cannot be run in manual and will run in auto due to an emergency start signal
Plausible: D/G2A cannot be run in manual and will run in auto due to an emergency start signal
- D. **Incorrect:** D/G 2A cannot be run in manual
Plausible: D/G 2A will run in auto due to an emergency start signal

Level: SRO&RO

KA: APE 057 AA106 (3.5/3.5)

Level of Knowledge: comprehension

Lesson Plan Objective: EPL Obj: 15

Source: new

Resources:

1. AP-29 Page 108-111 -PROVIDED

Bank Question: 1024**Answer: C**

1 Pt(s)

IAE technicians are performing IP/0/B/3260/001 (*Maintenance and Troubleshooting Procedure for Making changes to 1.47 Bypass System*) at the local panel in the cable spreading room. They need the BOP to verify plant process information in the control room.

Which one of the following statements correctly describes how these communications should be conducted from the control room?

- A. **Communication should be over hand-held radios. Three-way communication procedures are required.**
- B. **Communication should be over hand-held radios. Three-way communication procedures are NOT required.**
- C. **Communication should be over plant telephones. Three-way communication procedures are required.**
- D. **Communication should be over plant telephones. Three-way communication procedures are NOT required.**

Distracter Analysis:

- A. **Incorrect:** Radios should not be used from the cable spreading room.
Plausible: Partially correct – three-way communications are required when taking action effecting vital equipment.
- B. **Incorrect:** Radios should not be used from the cable spreading room. Three-way communications are required when taking an action affecting installed plant equipment.
Plausible: Radios are generally used by maintenance for many routine communications. Some candidates might think that three-way communications are not required for routine maintenance actions (as opposed to plant operations).
- C. **Correct:** Plant phones are used because radios may cause inadvertent actuation of plant equipment.
- D. **Incorrect:** Three way communication must be used for any action affecting plant equipment.
Plausible: Partially correct - Some candidates might think that three-way communications are not required for routine maintenance actions (as opposed to plant operations).

Level: RO&SRO

KA: G2.1.17 (3.5/3.6) Ability to make accurate, clear and concise verbal reports. (CFR: 45.12 / 45.13)

Lesson Plan Objective: ADM NS-01 Obj: 14

Source: New

Level of knowledge: memory

References:

1. NSD 509 pages 2, 7
2. OMP 2-22 page 3