

RO EXAMINATION

QUESTION # 001

Given:

- Unit 1 is at 100% power, normal at-power alignment.
- A Main Generator TRIP occurs.
- All 6.9 KV bus ABT interlocks fail to actuate.

Following the event, the RCPs RUNNING are:

- a. 1A and 1C
- b. 1B and 1A
- c. 1C and 1D
- d. 1D and 1B

ANSWER:

c.

REFERENCE:

Horse Note AC-3 (for loads)

BGP 100-3 pg 53 and 54 step F.43

HIGHER

BANK

K/A: 003K201: Knowledge of bus power supplies to the following: RCPS

EXPLANATION:

Question meets K/A because it asks RCP Bus power supplies. It also asks when an automatic bus transfer fails. Student must know bus power supplies to the RCPs and assess how they will be affected when an ABT fails to occur, making this High Cog.

The correct answer is based on 1BGP 100-3, Power Ascension, specifically step F.43 page 55 during the alignment of Bus 156 and 157 to the Unit Aux. Transformer. If these buses did not ABT to the Sys. Aux. Transformer, they would lose power. Bus 156 supplies power to the B RCP while Bus 157 supplies the A RCP. All distracters are plausible based on examinee misconceptions of either which buses power which RCPs or what happens when an ABT does not occur.

RO EXAMINATION

QUESTION # 002

Given:

- The unit is at 100% power.
- Rod control is in Manual, with CBD at 221 steps.

If the Moderator Temperature Coefficient (MTC) is $-5.0 \text{ pcm}/^\circ\text{F}$, under which of the following, would the MTC move CLOSEST to a value of $0.0 \text{ pcm}/^\circ\text{F}$?

- 5 step rod INSERTION
- BORATION of 100 gallons
- Load Rejection of 100 MWe
- DILUTION of 100 gallons

ANSWER:

b.

REFERENCE:

BCB-1 Fig 5A and 5B

NEW

FUNDAMENTAL

K/A: 004K515 Knowledge of the operational implications of the following concepts as they apply to the CVCS: Boron and control rod reactivity effects as they relate to MTC

EXPLANATION:

The question meets the K/A because it requires the examinee to understand the effects of boron and control rods on the moderator temperature coefficient. This question is classified as Low cog as it recalls the fact that as boron concentration rise, MTC becomes less negative. It is RO level.

The correct answer is based on when the boron concentration is highest. As boron concentration is raised, MTC becomes less negative or more positive. Inserting control rods causes MTC to become more negative due to buckling. Adding more boron will drive MTC less negative anytime during core life. Inserting control rods anytime during core life will cause MTC to become more negative. A is incorrect because MTC will become more negative as rods are inserted. B is correct from explanation above. C is incorrect because a load rejection with rods in manual will cause RCS temp. to rise, inserting negative reactivity by MTC becoming more negative. The question asks for the change that will bring the value of MTC CLOSEST to 0. Dilution will cause MTC to become more negative anytime during core life.

RO EXAMINATION

QUESTION # 003

Given:

- Unit 2 is performing a cooldown in MODE 4 on A Train RH, preparing to enter Mode 5 in the next hour.
- 2RH606, HX 2A FLOW CONT VLV, has spuriously CLOSED

Answer the following two (2) questions concerning this event.

- 1) The cooldown RATE will ...
 - 2) The procedure used to reestablish control of 2RH606 is an attachment in ...
- a. 1) Rise
2) 2BOA PRI-5, CONTROL ROOM INACCESSIBILITY
 - b. 1) Lower
2) 2BOA ELEC-5, LOCAL EMERGENCY CONTROL OF SAFE SHUTDOWN EQUIPMENT
 - c. 1) Lower
2) 2BOA PRI-5, CONTROL ROOM INACCESSIBILITY
 - d. 1) Rise
2) 2BOA ELEC-5, LOCAL EMERGENCY CONTROL OF SAFE SHUTDOWN EQUIPMENT

ANSWER:

c.

REFERENCE:

BOA PRI-5 page 56

Horse Note RH-1

NEW

FUNDAMENTAL

K/A: 005A204: Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: RHR valve malfunction

EXPLANATION:

Meets the K/A because the stem of the question states there is an RH valve malfunction and asks the examinee to choose the procedure that would be used to correct the problem. In addition, it requires the examinee to know what type of actuator is associated with each valve and how the valves position affects cooldown rate. This is low Cog because it recalls facts. The correct answer is based on the knowledge of which valve is used to pass water through the RH Heat Exchanger (to be cooled) i.e. 2RH606, and that it utilizes a pneumatic actuator. The RH606 valve fails OPEN on a loss of air however it is possible that due to a positioner problem the valve could fail closed The RH606 valve is pneumatically actuated making BOA Pri-5 the correct procedure, specifically attachment C which installs pneumatic jumpers. BOA Elec-5 is a plausible distracter based on Title, Local Emergency Control of Safe Shutdown Equipment, and because many CR operated valves are M.O.V.s and would be operated with electrical jumpers installed in their respective M.C.C.s. Making these distracters plausible.

RO EXAMINATION

QUESTION # 004

Unit 1 is in MODE 5

- The RCS is solid with RH letdown in service
- 1B RHR pump is running in shutdown cooling
- 1PI-615, 1B RH PUMP DISCHARGE pressure indicates 555 psig
- RCS Wide Range pressure is 405 psig
- 1-6-A3 RH SUCT PRESS HIGH
- 1-6-B2 RH PUMP 1B DSCH PRESS HIGH

System pressures are SLOWLY RISING at 10 psig per minute

What is the status of the RH system relief valves 1 minute after receiving the above annunciators?

- ONLY the RH pump discharge relief valve is LIFTING.
- RH pump suction and discharge relief valves are BOTH CLOSED.
- ONLY the RH pump suction relief valve is LIFTING.
- RH suction AND discharge relief valves are BOTH LIFTING.

ANSWER:

b.

REFERENCE:

Horse Note RH-1

NEW

HIGHER

K/A: 005 2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.

EXPLANATION:

Question meets the K/A as it has the examinee assess the conditions based on multiple annunciators and interpret the significance to the plant, in this case an RCS mass loss. It is RO level and it is high cog because of a calculation to assess the correct answer.

The suction pressure and discharge pressure high alarms are 400# and 550# respectively. The lift setpoints for suction relief is 450 and the discharge relief is 600. In 1 minute RCS wide range pressure will be 415 psig. 1B RH pp Discharge Pressure will be 565 psig. Both numbers are less than the relief setpoints. The distracters are plausible based on the alarm setpoints and the suction valve interlocks.

RO EXAMINATION

QUESTION # 005

Given the following plant conditions on Unit 1:

- Reactor power is 25%
- The crew is ramping the unit in accordance with 1BGP 100-3, POWER ASCENSION
- 11 minutes ago SSPS train A ESF relay K626 (CNMT ISOL PHASE B) inadvertently actuates

The following alarms are annunciated on Control Room annunciator panel 1-7:

- A4-D4; RCP 1_, THERM BARR CC WTR FLOW LOW
- A5-D5; RCP 1_, BRNG CC WTR FLOW LOW
- E4; RCP THERM BARR CC WTR FLOW HIGH LOW
- E5; RCP BRNG CC WTR TEMP HIGH

Answer the following two (2) questions:

- 1) Which parameter is expected to RISE?
 - 2) What action is required to protect equipment?
- a. 1) RCP Motor Bearing temperature
2) Reset the Phase B and re-open the valves that closed
 - b. 1) RCP Motor Bearing temperature
2) Trip the Reactor, then trip the RCPs
 - c. 1) RCP Seal Leak-off flow
2) Reset the Phase B and re-open the valves that closed
 - d. 1) RCP Seal Leak-off flow
2) Trip the Reactor, then trip the RCPs

ANSWER:

b.

REFERENCE:

OP-BY-102-106 page 6

NEW

HIGHER

K/A: 003A203 Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Problems associated with RCP motors, including faulty motors and current, and winding and bearing temperature problems

EXPLANATION:

Question meets the K/A as it pertains to an RCP motor bearing temperature problem as a result of a relay actuation and asks which procedural actions will correct or control the malfunction. The question is High Cog as it requires the examinee to assess the information provided to draw the proper conclusion. It is RO level as entry conditions and knowledge of major action steps are required to obtain the correct answer.

RO EXAMINATION

The correct answer is based on the actions contained in BOP RC-1 Startup of a RCP but the stem meets the entry conditions of 1BOA RCP-2, Loss of Seal Cooling. The Trip of the RCP is covered in the BOA however that addresses high seal outlet or high lower radial bearing temperature. The procedure does direct operator action to open the Phase B isolation valves if they are closed. These valves will not open from the control room based on the failed slave relay. The high temp manual trip setpoint is before RCP motor bearing temperature reaches 195°F which will be achieved shortly after CC is lost to the containment from the Phase B actuation. With CC isolated for 11 minutes, motor bearing temperatures are approaching operating limits that require a trip. The reactor administratively must be tripped before the RCPs to prevent an automatic safety system actuation. Per OP-BY-102-106 page 6 or 12, RCPs should be tripped within 10 minutes of loss of CC.

RCP Seal Leak-off flow is considered plausible based on examinee misconception however seal leak-off flow isolation valves close on a Phase A isolation not Phase B, thus seal leak off flow will not change.

RO EXAMINATION

QUESTION # 006

Under which of the following conditions will the running SI pump(s) indicate the HIGHEST amps?

1. Inadvertent SI signal in Mode 1
 2. Filling the SI Accumulators in Mode 2
 3. During LOCA conditions when RCS pressure is 1200 psig
 4. Upon realignment to Cold Leg Recirculation 20 minutes after LOCA initiation
- a. 1
 - b. 2
 - c. 3
 - d. 4

ANSWER:

d.

REFERENCE:

Horse note ECCS-1

NEW

HIGHER

K/A: 006A401 Ability to manually operate and/or monitor in the control room: Pumps

EXPLANATION:

Meets K/A, requires examinee to evaluate/monitor control room indications (amps) associated with the Safety Injection pumps. This is RO level. It is also High Cog based on the detailed knowledge to evaluate the status.

The correct answer is based on when the pump is pumping the greatest mass per unit time. More mass means more work which means greater amps. 20 minutes to attain Low 2 RWST and go on cold leg recirc is indicative of a large break LOCA. The larger the break, the lower the RCS pressure and hence SI pump pressure. The lower the pressure the more mass will be pumped. Even though there are downstream valves that are throttled, the lower the RCS pressure the higher SI pump flow will be and hence the more amps the motor will draw. All distracters are plausible based on examinee misconceptions.

Rating on SI pumps are: Shutoff head- 1500 psid ; 1200 psid- 400 gpm, 800 psid- 650 gpm

RO EXAMINATION

QUESTION # 007

Given:

- Unit 2 is at 100% power with all systems normally aligned for this condition.

Due to a turbine malfunction:

- A large turbine load rejection has occurred resulting in both Pressurizer PORVs OPENING for about 30 seconds, with the Unit remaining on-line.
- The Pressurizer PORVs have subsequently CLOSED.
- PRT pressure indicates 8 psig.
- PRT temperature indicates 120°F.

In regards to the above condition, answer the following two (2) questions concerning the changes to the PRT:

1. What normal function will be PREVENTED under this condition?
2. What procedure(s) will you use to restore the PRT to the original conditions?
 - a. 1) filling the PRT because 2RY-8030, PW to PRT ISOL VLV automatically CLOSES
2) BOP RY-4, DRAINING THE PRT and BOP RY-6, TEMPERATURE CONTROL OF THE PRT
 - b. 1) venting the PRT because 2RY-469, PRT to GW ISOL VLV automatically CLOSES
2) ONLY BOP RY-6, TEMPERATURE CONTROL OF THE PRT
 - c. 1) filling the PRT because 2RY-8030, PW to PRT ISOL VLV automatically CLOSES
2) ONLY BOP RY-6, TEMPERATURE CONTROL OF THE PRT
 - d. 1) venting the PRT because 2RY-469, PRT to GW ISOL VLV, automatically CLOSES
2) BOP RY-4, DRAINING THE PRT and BOP RY-6, TEMPERATURE CONTROL OF THE PRT

ANSWER

d.

REFERENCE:

BAR 2-12-B7(pressure), 2-12-C7 (temperature), 2-12-A7 is level ,
BOP RY-4 and RY-6

NEW

HIGHER

K/A: 007A203 Ability to (a) predict the impacts of the following malfunctions or operations on the P S; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Overpressurization of the PZR

EXPLANATION:

Question meets the KA by postulating a condition when the PZR PORVs would open and asks the examinee what effect the PORV opening will have on PRT operations and what procedures will correct the changed conditions. The question is High Cog and RO level.

When the PORVs open, causing steam admission below the sparger level, pressure and

RO EXAMINATION

temperature will all RISE. 2RY-469, PRT to GW ISOL VLV auto CLOSES at 6 psig. The PRT is usually about 3 psig and controlled via a nitrogen regulator. After a 30 second discharge it is expected that the High Temperature and Pressure alarms will annunciate. The High level will not unless the starting level is high. In order to restore the PRT to the "before conditions", the level will be pumped down to PRT lower pressure. Once the pressure is lowered to less than 6 psig the 2RY-469 can be re-opened, if needed. Temperature will have also RISEN. PRT Temp. is normally at about containment ambient temperature plus a few degrees. As modeled on the simulator, it is about 100°F. The High Temp Alarm setpoint is 115°F. To lower the temperature BOP RY-6 Temp Cont. of the PRT is used which fills the PRT with PW and then uses BOP RY-4, Draining the PRT to lower the PRT level. This can be reperformed if needed.

The correct answer is 2RY-469 will auto close and BOP RY-4 and RY-6 will have to be used together to reestablish initial conditions

The distracter 2RY8030 is plausible as it also is connected to the PRT and based on examinee misconception may be chosen

The distracter that contains only BOP RY-6 is plausible if the examinee does thinks that temperature will be significantly affected but level will not.

RO EXAMINATION

QUESTION # 008

Given:

- Unit 1 experienced a LOCA from full power.
- All systems responded as designed.
- U-0 CC HX is aligned to Unit 1.
- The crew is currently performing 1BEP ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.

The crew is at step 1 of the procedure, Establish CC Flow to the RH Heat Exchangers, and has OPENED 1CC9412A, CC TO RH HX 1A ISOL VLV.

The crew is now OPENING 1CC9412B, CC TO RH HX 1B ISOL VLV.

What happens to CC flowrate through the 1A RH HX when 1CC9412B fully OPENS?

- a. LOWERS from 5000 gpm to just over 3000 gpm.
- b. LOWERS from >6000 gpm to just over 5000 gpm.
- c. RISES from 3000 gpm to just under 5000 gpm.
- d. RISES from 5000 gpm to > 6000 gpm.

ANSWER:

b.

REFERENCE:

1BEP ES-1.3 step 1

NEW

HIGHER

K/A: 008A101 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCWS controls including: CCW flow rate

EXPLANATION:

Question meets the KA by examining the examinee on their ability to predict what happens to CC flowrate during a major evolution on the plant in accident conditions. The question is High Cog and RO level.

The correct answer is contained in 1BEP ES-1.3 step 1 when the operator is to verify CC flow through both RH HXs at >5000 gpm. Following the pump laws as another parallel component is valved into the system, pressure will fall as system flowrate increases. As run on the simulator during the accident situation addressed by the question stem, CC flow was originally approximately 6300 gpm when flow was through 1 HX. Placing the second RH HX on line, the original HX flow dropped to about 5100 gpm, when the second HX flow was just over 5000 gpm.

All distracters are plausible based on examinee knowledge of flowpaths and how the parameters respond in off normal conditions.

RO EXAMINATION

QUESTION # 009

Given:

- Unit 1 is shutting down for a refueling outage.
- Reactor power is 10%.
- The control boards are aligned per 1BGP 100-4, POWER DESCENSION, for this power level.

1PT507, MAIN STEAM HEADER PRESSURE, has FAILED to 100% of span.

The initial response of the Pressurizer Pressure Control system to this transient is to ...

- a. OPEN spray valves and DE-ENERGIZE/ramp off Heaters
- b. OPEN spray valves and ENERGIZE/ramp on Heaters
- c. CLOSE spray valves and ENERGIZE/ramp on Heaters
- d. CLOSE spray valves and DE-ENERGIZE/ramp off Heaters

ANSWER:

c.

REFERENCE:

BGP 100-4 step 16

Steam Dump L-P (S24) page 22 of 51.

NEW

HIGHER

K/A: 010K103 Knowledge of the physical connections and/or cause-effect relationships between the PZR PCS and the following systems: RCS

EXPLANATION:

The question meets the KA by testing on knowledge of the cause/effect relationship of the Pzr Press Cont. system responding to an outsurge from the PZR due to a shrinking RCS volume.

The answer is correct based on when in the steam pressure mode and in auto, as the unit would be per step 16 of 1BGP 100-4 and if the steam pressure input to the steam dump controller fails high, as the question posits, the steam dumps will go full open. This will cause cooldown of the RCS and the accompanying outsurge from the pressurizer will lower RCS pressure. The lowering pressure will cause the spray valves to close and the heaters to turn on (back-ups) or ramp current up (variables). All distracters are plausible based on common misconceptions of how the instrument failure will affect the Steam Dumps and how the RCS and Pzr Press Control system will respond to the steam dump control failure.

RO EXAMINATION

QUESTION # 010

Given:

- Unit 1 is at 100% and in a normal alignment for this power level.
- Pressurizer pressure is 2233 psig and STABLE.
- The following conditions exist for the Pressurizer Pressure and Level controls:
 - Master Pressurizer Pressure Controller, 1PK-455A, is in AUTO with output at 43%
 - Master Pressurizer Level Controller, 1LK-459, is in AUTO with output at 41%
 - BOTH Spray Valve Controllers, 1PK-455B and 1PK-455C, are in AUTO
 - 1 set of Pressurizer Back-up heaters are energized in MANUAL
- The Variable heaters are showing minimum current
- Both Pressurizer Spray valves show dual position indication

The NSO depresses the "MAN" pushbutton of the Master Pressurizer Pressure Controller. Then, the NSO depresses the "increase/raise" pushbutton for 1 second.

In response to these actions, the Pressurizer Spray valves will throttle ___(1)____. Over the next few minutes the indicated Pressurizer level will ___(2)____.

- a. 1) OPEN
2) RISE
- b. 1) OPEN
2) Remain CONSTANT
- c. 1) CLOSE
2) Remain CONSTANT
- d. 1) CLOSE
2) RISE

ANSWER:

b.

REFERENCE:

PZR L-P (s-14) page 49 right hand column

NEW

HIGHER

K/A: 010A401 Ability to manually operate and/or monitor in the control room: PZR spray valve

EXPLANATION:

Question meets the KA because it is manually adjusting the output of the master PZR controller and testing what the response of the spray valves are. This is high cog due to comprehending the result of the actions of going to raise on the master PZR Press Controller which controls the individual spray valve controllers. The question is RO Level.

Going to RAISE, raises the output of the controller which will open the spray valves to control at the new lower setpoint. PZR level will remain unchanged since RCS Temp. has not been affected. If it were thought that the lowering of pressure would cause a rise in charging flow, then the level distracters are plausible.

RO EXAMINATION

QUESTION # 011

Given the following Unit 1 conditions:

- Reactor power is 5%
- An Instrument failure causes Bypass Permissive Light P-7 to EXTINGUISH
- A grid disturbance has resulted in:
 - All 6.9 KV bus voltages drop to 5200 V
 - Grid Frequency remains at 59.9 Hz

In response, ALL RCPs will ___(1)___
AND the Reactor will ___(2)___.

- | | |
|-------------------|-----------------|
| (1) | (2) |
| a. trip | trip |
| b. trip | remain at power |
| c. remain running | remain at power |
| d. remain running | trip |

ANSWER:

d.

REFERENCE:

1-BP-3.5 (P-7) Bypass Permissive BAR

1-11-A5 (BAR)

BANK

HIGHER

K/A: 012K601 Knowledge of the effect of a loss or malfunction of the following will have on the RPS: Bistables and bistable test equipment

EXPLANATION:

Meets K/A because it tests the examinee on what is the impact when the P-7 bistable clears. Also requires examinee to know RPS trip setpoints. This is High Cog as it requires an assessment of conditions to determine the correct answer. This is RO level.

The answer is correct because the failure input to RPS in a way that the RPS thinks the unit is above P-7 and auto unblocks several Rx trips including RCP Bus undervoltage and under frequency (57 Hz). which enables the RCP bus undervoltage Rx trip. The setpoint is <5268 volts for >0.7 seconds on 2 out of 4 RCP busses. The RCPs will remain running because voltage did not drop below the UV trip setpoint of 4920 volts which will strip all loads on the respective 6.9 KV bus(es). All distracters are plausible based on examinee misconceptions.

RO EXAMINATION

QUESTION # 012

Given:

- Unit 2 is at 95% power in a normal alignment for this condition.
- Control Rods are in AUTO.
- With NO Operator action:

If a portion of the B Train ESF system malfunctions such that the following valves go to their ESF Actuation condition, what is the effect on the RCS over the NEXT ten (10) minutes?

2CV112B, VCT OUTLET ISOL VLV.
2CV112D, RWST TO CHG PMPS SUCT VLV.
2SI8801B, CHG PMPS TO COLD LEGS INJ ISOL VLV.

RCS Tave change is driving rods ...

- a. IN and PZR level is RISING
- b. OUT and PZR level is RISING
- c. IN and Letdown is ISOLATED
- d. OUT and Letdown is ISOLATED

ANSWER:

b.

REFERENCE:

BAR 2-14-E1

BAR 2-9-A1

NEW

HIGHER

K/A: 013K302 Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: RCS

EXPLANATION:

Question meets the KA by requiring the examinee to diagnose the effects on the RCS from an ESFAS malfunction. The question is High Cog and at the RO level

The 2CV112D valve will open and an RCS boration will commence. This addition of negative reactivity will be partially offset by control rods stepping out due to the RCS temperature lowering. The rods will step out until they reach 223 steps and then will stop movement by the C-11 interlock, CBD Withdrawal Limit. As the boration continues past the point of where rods will counteract the temperature change RCS temperature will drop. 2SI8801B opening will have two effects: first will be overall charging into the RCS Rising, the second will be less charging going through the letdown system causing a Rise in LTDN HX outlet temp and REGN HX outlet temp. Letdown flow will remain unchanged. If the examinee thinks that letdown will be isolated on rising letdown temperatures, it would make these distracters plausible. When run on the simulator, actual PZR level did Rise. This is challenging for the examinee to arrive at though because, RCS temp lowering will result in less liquid volume in the RCS. In the simulation, the

RO EXAMINATION

net mass addition caused by increased charging flow overcame the cooldown effects along with the resultant density change of the fluid. All distracters are plausible based on examinee misconceptions.

The effects of 1CV112B closing (ESF position) will be the VCT is isolated from the charging pump suction, therefore the RWST will be on only suction source to the CV pumps.

RO EXAMINATION

QUESTION # 013

During an SI, the Containment Chilled Water System aligns such that:

the SX flow to the Containment Chillers ___(1)___, and
the Containment Chilled Water Pump ___(2)___.

- | (1) | (2) |
|-----------------------|-----------------|
| a. is bypassed | remains running |
| b. is bypassed | trips |
| c. remains in service | trips |
| d. remains in service | remains running |

ANSWER:

b.

REFERENCE:

BANK

FUNDAMENTAL

K/A: 022K104 Knowledge of the physical connections and/or cause effect relationships between the CCS and the following systems: Chilled water

EXPLANATION:

Question meets the K/A requiring examinee knowledge of how the Containment Cooling system is affected, specifically the chilled water system, during a Safety Injection signal. This is Low Cog and RO level.

On an SI signal, which initiates a Phase A containment isolation, WO will be isolated to the containment by closing the WO 56, 6 and 20 valves. When both trains of valves close the WO pump will automatically trip. This is found on 6E-1-4030 WO03. 6E-1-4030 SX15 and 16 show that SX flow is isolated to the containment chillers by closing the SX 112 and 114 valves while opening the bypass valve 1SX147.

All distracters are plausible based on examinee misconception.

RO EXAMINATION

QUESTION # 014

Given:

- 1B DG is out of service.
- A Loss of All AC power has occurred on Unit 1, due to a series of electrical faults, coincident with a Loss of Coolant Accident
- Unit 1 has implemented 1BCA 0.0, LOSS OF ALL AC POWER
- ACB 1413, DG 1A FEED TO 4KV, indicating lights are extinguished

- Unit 2 is UNAFFECTED by the event
- At Unit 1's request, Unit 2 has made crosstie power available

What will power the 1A CS pump?

- a. 1A Diesel Generator
- b. 2A Diesel Generator
- c. SAT 242-1
- d. SAT 242-2

ANSWER:

c.

REFERENCE:

BCA 0.0 step 7 (pg7) Limited crosstie is on step 14 page 19 when U-2 bus is powered from it's respective EDG.

NEW

HIGHER

K/A: 026K201 Knowledge of bus power supplies to the following: Containment spray pumps

EXPLANATION:

Meets K/A by requiring the examinee to know the power supply of the 1A CS pump during a loss of all ac power evolution while implementing 2BCA 0.3 without a limited crosstie condition

The correct answer is from the SAT 242-1.

2A EDG is plausible but not correct because it is the "limited" cross-tie.

SAT 242-2 is plausible but is not the correct train

1A EDG is plausible based on the examinee's misconception of limited cross-tie and the interpretation of the loss of dc control power to the breaker

RO EXAMINATION

QUESTION # 015

In MODE 3 how many Containment Spray (CS) and Containment Cooling Trains (CCT) are required to be OPERABLE to meet Tech. Spec. LCO 3.6.6, CONTAINMENT SPRAY AND COOLING SYSTEMS?

	CS	CCT
a.	1	1
b.	1	2
c.	2	1
d.	2	2

ANSWER:

d.

REFERENCE:

Tech Spec

NEW

FUNDAMENTAL

K/A: 026 2.2.22 Equipment Control Knowledge of limiting conditions for operations and safety limits.

EXPLANATION:

Question meets the K/A because it requires the examinee to recall the mode of applicability of the Containment Spray and Cooling Tech. Spec. The question is RO level because all required information is "above the line" in Tech. Specs. and is Low cog

The correct answer is based on T/S 3.6.6 LCO and APPLICABILITY. All distracters are considered plausible based on examinee misconception. Since Both CS and Cont. Cooling limit Containment Pressure and temperature it is plausible that an examinee may think that both trains of each are not required.

There are no safety limits associated with this KA only the knowledge of the limiting conditions for operations were tested.

RO EXAMINATION

QUESTION # 016

Given:

Unit 1 is MOL at 75% power steady state conditions, with the following:

- Main Generator MW output is 901MWe.
- DEH is in "MW IN".
- RCS average temperature is at 579.5°F.
- Rods are in Manual.

Average Reactor Coolant Temperature has just DROPPED 0.7°F to 578.8°F, but Megawatts have remained CONSTANT.

Which ONE of the following could have caused this to occur?

- a. A single S/G PORV inadvertently OPENED.
- b. An EO just swapped the Aux. Steam header supply from Unit 1 to Unit 2.
- c. A single S/G Safety inadvertently OPENED.
- d. Letdown temperature dropped by 2°F.

ANSWER:

a.

REFERENCE:

Main Steam Lesson plan s23 page 66 of 72

BANK

HIGHER

K/A: 039K508 Knowledge of the operational implications of the following concepts as they apply to the MRSS: Effect of steam removal on reactivity

EXPLANATION:

Question meets the KA by requiring the examinee to have knowledge of the operational implications on the reactor and RCS by failure of a Main Steam PORV, or in this case an increase in steam removal, when it inadvertently opened.

The question is high cog as it requires an evaluation and is at the RO level.

Reasons: Letdown temperature dropping by 2°F is plausible if the examinee is confused about the effect of L/D temp on the de-borating ability of the demins.

A single S/G Safety is worth 5.95% reactor power or about a 1.8 °F temperature decrease since rods are in manual. ($587^{\circ}\text{F} - 557^{\circ}\text{F} = 30^{\circ}\text{F} = 0$ to 100% power temperature change, $30^{\circ}\text{F} \times .0595 = 1.78^{\circ}\text{F}$ change).

A swap of AS from Unit 1 to Unit 2 would decrease reactor load. The reactor would heatup to add (-r) since reactor power decreased (which added +r due to power defect).

A single S/G PORV opening would cause an increase in reactor power of 2.75% or about 0.7 °F temperature decrease. ($587^{\circ}\text{F} - 557^{\circ}\text{F} = 30^{\circ}\text{F} = 0$ to 100% power temperature change, $30^{\circ}\text{F} \times .0275 = 0.825^{\circ}\text{F}$ change).

RO EXAMINATION

QUESTION # 017

Given:

Unit 2 is at 100% power, in a normal alignment.

- The Unit experienced a Loss of DC bus 211.
- The Reactor is manually TRIPPED on LOWERING SG levels.
- An SI has just ACTUATED.

Of the following, as SG levels LOWER, when will the 2A AFW pump START?

- a. At the time of the SI Signal
- b. When manually started from 2PM06J
- c. At the time when SG levels reach the Lo-2 setpoint
- d. Only when locally started

ANSWER:

d.

REFERENCE:

2BOA ELEC-1 step 6 where is states to LOCALLY operate equipment. Note: the local operation will be performed IAW 2BOA ELEC-5 local emergency control of safe shutdown equipment.

NEW

HIGHER

K/A: 059K302 Knowledge of the effect that a loss or malfunction of the MFW will have on the following: AFW system

EXPLANATION:

Question meets the KA as it posits a loss of feedwater (due to a loss of DC bus 211) and the accompanying effect on AFW. The question is High cog due to analysis requirement from loss of MFW AND Loss of DC Control power. The question is RO level.

When the loss of DC bus occurs, DC control power is not available to start or stop any A-Train equipment. The only option is to locally start the equipment by closing the ACB. The distracters are all plausible because they can all start an AFW pump, but only when DC control power is available.

RO EXAMINATION

QUESTION # 018

Given:

- Unit 1 is at 55% power
- Control Rods are in MANUAL
- All other systems are normally aligned for the current power level
- 1B and 1C Feedwater pumps are operating in AUTO
- An inadvertent AMS signal actuation has caused both U-1 AF pumps to start and deliver flow to the U-1 SGs
- ALL U-1 SG NR levels begin to RISE
- NO other actuations occur as a result of the inadvertent AMS signal

With NO operator actions, FW system conditions stabilize in 10 minutes. Compared to BEFORE the AF pumps started, the CURRENT conditions are...

- a. LOWER demand on 1SK-509A, MASTER FW PUMP SPEED CONTROLLER, and HIGHER Feedwater Pump Suction Pressure on 1PI-CB014
- b. LOWER RPM on 1SI-285, FW PUMP 1C SPEED INDICATION, and HIGHER demand on 1FK540, FW REG VLV 1FW540, controller.
- c. HIGHER demand on 1SK-509B, FW PUMP 1B SPEED CONTROLLER, and HIGHER MS/FW HDR DP on 1PI-509
- d. HIGHER demand on 1C FW Pump Low Pressure governor Valve Indication and HIGHER SG HDR PRESS on 1PI-507

ANSWER:

a.

REFERENCE:

Main FWpp speed control (S37b) L-P pgs 23, 47 and 73,74

BANK

HIGHER

K/A: 059A304 Ability to monitor automatic operation of the MFW, including: Turbine driven feed pump

EXPLANATION:

Question meets K/A as it requires the examinee analyze control board indication changes as affected by an additional FW source to the SGs. The question is High Cog and RO level. As SG levels rise, the FRVs will throttle closed to restore SG level to program. As SG pressure drops, due to colder FW entering the SGs, the FW/SG dP rises. Feedpump speed is controlled to maintain dP between the the feedwater header pressure and steam header pressure. The program dP is calculated from total steam flow input, which hasn't changed. So, as the FRV close and feedwater header pressure rises, the dP between feed and steam will rise. With program dP constant in this event a signal change will result in lowering FW Pump speed. Lower main feedwater flow without a change in CD/CB discharge will raise FW pump suction pressure.

All distracters are plausible based on examinee misconceptions of how the system responds to this event.

RO EXAMINATION

QUESTION # 019

Given:

- Unit 1 is at 100% power in a normal alignment
- A Reactor TRIP has occurred simultaneously with the LOSS of Instrument Bus 111
- ALL SG levels are 17% NR

With NO operator action what is the status of the Aux Feed system?

- a. 1A AF pump is running but is NOT delivering flow to ANY SG
1B AF pump is running and delivering flow to ALL SGs
- b. BOTH AF pumps are running and delivering flow to ALL SGs
- c. 1A AF pump is NOT running
1B AF pump is running and delivering flow to ALL SGs
- d. NEITHER AF pump is currently running

ANSWER:

c.

REFERENCE:

1BOA Elec-2 Table A (pgs 1 through 4)

NEW

HIGHER

K/A: 061K601 Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Controllers and positioners

EXPLANATION:

Meets K/A requires knowledge of loss of control power to AF005 valve positioners. This question is High Cog and RO level.

The correct answer is based on knowledge of a loss of I.B. Bus 111 will prevent actuation of A train ESF equipment. In addition the 1AF005 A train valves will lose control from the control room as the flow sensing to the valve control circuitry will fail to 0, not allowing the valves to open. The question is low cog.

All distracters are plausible based on the misconceptions of what NR level in the SGs will cause an auto start of the system combined with the effects of loss of the Inst. Bus.

Distracter D is plausible based on the combination of a loss of power on Unit 2 and the AMS setpoints (AMS on Unit 2 is 33.3 and AMS on U-1 is 15%)

RO EXAMINATION

QUESTION # 020

Given:

- Unit 2 is at full power.
- The Inverter for Instrument Bus 214 failed two hours ago.
- Operators responded per 2BOA ELEC-2, LOSS OF INSTRUMENT BUS Unit 2
- Instrument Bus 214 has been reenergized via the Constant Voltage Transformer (CVT).
- Troubleshooting of the 214 Inverter is now in progress with the appropriate LCOARs entered.
- During the troubleshooting Unit 2 experienced a loss of offsite power (LOOP).
- 2A Diesel Generator (DG) started and energized Bus 241.

Assuming all components function correctly, which of the following describes the plant response for the 2B DG?

2B DG will...

- a. START, ENERGIZE Bus 242, and START all required loads on the Sequencer
- b. START, ENERGIZE Bus 242, but NOT START loads on the Sequencer
- c. START but NOT ENERGIZE Bus 242
- d. NOT START

ANSWER:

a.

REFERENCE:

Horse Note AC-3

BANK

HIGHER

K/A: 062K410 Knowledge of ac distribution system design feature(s) and/or interlock(s) which provide for the following: Uninterruptable ac power sources

EXPLANATION:

Question meets the KA. Requires examinee knowledge of uninterruptable power normally powered from either of the 2 sources of power to the instrument inverter(AC or DC). In this case the uninterruptable power supply has been swapped out with the self regulated transformer to power the instrument bus. This power is lost on the loss of off site power and the instrument bus goes dead. The DG is started when the undervoltage relay contacts close on bus 242 causing the closure of the contacts in the DG start circuit, which is supplied by DC control power. The Diesel will hence receive a start signal and run. When Bkr 2423 closes, the self regulating transformer is reenergized, powering instrument bus 214 allowing for safeguards actuation relays to commence.

The question is High Cog based on the complicated sequence of events that take place that the examinee must comprehend to obtain the correct answer.

All distracters are plausible based on the examinees' understanding of what control power AC from the instrument bus for sequencing relays or DC for breaker and DG start circuit) is supplied to which components.

RO EXAMINATION

QUESTION # 021

Given:

- Unit 1 is at 100% power in a normal alignment for this power level.
- Annunciator 1-20-C5, BUS 157 CONT PWR FAILURE, just alarmed.

What is the significance of this alarm?

Bus 157 has LOST Normal Control Power but Reserve Control Power ...

- a. may be available through a NO-BLOW Link by MANUALLY placing it in service from the OPPOSITE train DC Bus.
- b. will AUTOMATICALLY transfer through a NO-BLOW Link fed from the OPPOSITE train DC Bus.
- c. may be available through a NO-BLOW Link by MANUALLY placing it in service from the SAME DC Bus.
- d. will AUTOMATICALLY transfer through a NO-BLOW Link fed from the SAME DC Bus.

ANSWER:

c.

REFERENCE:

BAR 1-20-C5

BOP DC-6 (pg 3)

NEW

FUNDAMENTAL

K/A: 063K401 Knowledge of DC electrical system design feature(s) and/or interlock(s) which provide for the following: Manual/automatic transfers of control

EXPLANATION:

Question meets the K/A requiring the examinee to know what happens on a loss of DC power to a major AC bus and what action is required to restore said power.

Each 4 and 6.9 KV Bus has DC control power supplied by 2 circuits but only 1 NO-BLOW Link. Each circuit is run to the bus. As an example, the 2 DC feeds to bus 141 come from DC Bus 111. One circuit is fed from a front side panel breaker and the back-up supply is from the back side panel breaker. If the front side panel feed is lost the backside is made available by swapping the NO-BLO link from the front side supply to the backside supply, which will restore DC to the entire bus.

All distracters are plausible because several power sources do have back-up power supplies that automatically transfer to an alternate source (i.e. Instrument inverters). The examinee must understand that in this case the back-up power supply is from the same DC bus and there are no automatic features associated with this supply.

RO EXAMINATION

QUESTION # 022

Given:

- Unit 1 is at 100% power in a normal full power alignment.
- Annunciator 1-4-A5, BUS 111 INVERTER TROUBLE, has just alarmed.
- NO other annunciators are lit in the Unit 1 Control Room.
- An Equipment Operator (EO) has been dispatched to investigate this alarm.

With these conditions, you would expect the EO to report that Instrument Inverter 111 ...

- a. AC input breaker is OPEN and DC current output of Battery Charger 111 has RISEN.
- b. DC input breaker is OPEN and DC current output of Battery Charger 111 has DROPPED.
- c. AC input breaker is OPEN and DC current output of Battery Charger 111 has remained CONSTANT.
- d. DC input breaker is OPEN and AC current output of Inverter 111 has RISEN.

ANSWER:

a.

REFERENCE:

BAR 1-4-A5

NEW

HIGHER

K/A: 063A01 D.C. Electrical Distribution: Ability to monitor automatic operation of the DC electrical system, including: Meters, annunciators, dials, recorders, and indicating lights

EXPLANATION:

Question meets the KA by testing the examinee on a "backup" DC Load when the AC input is lost. It further meets the KA by having the examinee analyze this condition via the control room annunciators. This is high cog due to analysis and at the RO level.

If the Instrument inverter AC output failed, more annunciators would be lit than just the inverter trouble. As an example annunciator 1-4-A2 would also be LIT due to loss of 120V AC power to 1PA27J. With this information the examinee can diagnose the problem is NOT a loss of AC output. There are 3 other inputs to this alarm, they are; Loss of 125VDC input as depicted by 2 distracters starting off with DC input brkr is open. If that were the case #1 DC output current from the 111 battery charger would not drop because normally DC does not supply the inverter, making that distracter incorrect. The second distracter which states the DC input breaker is open, goes on to say that the AC output current from the instrument inverter has risen. This is not the case as the inverter is normally supplied with AC which is stepped down and rectified. Therefore if load has not changed on the I.B. AC output will not Rise. This is plausible based on examinee misconceptions.

The AC input breaker has opened and DC current from the 111 Battery Charger has risen is the correct answer. When the normal AC is removed power is supplied from the battery charger, therefore battery charger current will rise.

The distracter that states the AC breaker open and DC111 battery charger has remained constant is plausible if the examinee thinks DC supplies the Instrument inverter continuously.

RO EXAMINATION

QUESTION # 023

Given:

You have started the 1A DG from the control room in accordance with BOP DG-11, DIESEL GENERATOR STARTUP. Actions are being taken to parallel the 1A DG to Bus 141.

Your control board indications are as follows:

- Incoming Voltage: 122 volts
- Running Voltage: 124 volts
- Sync Scope is rotating Slowly in the SLOW direction

If the DG Output Breaker were CLOSED, which of the following would occur/be observed on the two (2) 1PM01J Control Board meters below?

DG 1A Output VARs	DG 1A Output Watts
a. OUT	at/near 0
b. IN	goes UP
c. OUT	goes UP
d. IN	at/near 0

ANSWER:

d.

REFERENCE:

DG L-P s09

NEW

HIGHER

K/A: 064A108 Emergency Diesel Generator (ED/G) System: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ED/G system controls including: Maintaining minimum load on ED/G (to prevent reverse power)

EXPLANATION:

Question meets the KA by having examinee predict under the postulated conditions how the DG will respond to load and VAR conditions when the output breaker is closed. Operating the EDG in the manner described in the question is different than the procedure states. The procedure (BOP DG-11, DG S/U) has the sync scope rotating slowly in the fast direction. If the machine were operated as described in the stem the potential for reverse powering the EDG is more likely because KW stays at or near 0, as opposed to rising to 1000 kw and further from the reverse power trip.

The question is High Cog and RO Level.

The question stem requires the examinee to assess that the DG is running "slower" than the grid, hence it will not pick up load. This is determined by the sync scope running in the slow direction. The machine is also "under excited" because incoming voltage is less than running voltage. Under these conditions the machine will become a VAR load, or VARs will be negative on the control board indicator, and it will not pick up load as previously stated.

RO EXAMINATION

QUESTION # 024

Given:

- Unit 1 is at 100% power
- 1A and 1B CW pumps are operating
- 1C CW pump is shutdown
- Unit 1 is supplying CW blowdown
- A release of 0WX01T, Liquid Radwaste Release Tank, is in progress with 0PR01J, LIQUID RELEASE EFFLUENT RAD MON, online

The following occurs:

- A problem with 1CW018, U-1 CW B/D ISOL VLV, causes total station CW blowdown flow to drop to 5800 gpm.

With the above condition, the AUTOMATIC plant response will be....

- a. an EQUIPMENT FAILURE of the 0PR01J, due to a loss of process flow but NOT a termination of the liquid release.
- b. termination of the liquid release by an OPERATE FAILURE of the 0PR01J, due to a loss of sample flow.
- c. termination of the liquid release by a DIRECT low blowdown flow signal to the Release Tank Discharge Isolation Valves.
- d. a CIRC WTR BLOWDOWN FLOW LOW alarm at 0PL01J panel but NOT a termination of the liquid release.

ANSWER:

c.

REFERENCE:

BAR 0PL01J-7-B6

BANK

FUNDAMENTAL

K/A: 073K301 Knowledge of the effect that a loss or malfunction of the PRM system will have on the following: Radioactive effluent releases

EXPLANATION:

Question meets the K/A- requiring examinee knowledge of the cause/effect relationship between the PRM system and the CW blowdown system.

The correct answer is based on the auto termination of the liquid release when CW blowdown flow lowers to less than 10,000 gpm.

A loss of sample flow is not experienced by the process rad. monitor but is considered plausible based on the examinee misconception

An equipment operate failure will cause the rad monitor to go into "interlock" and the release will be terminated

The B/D flow low alarm at 0PL01J will automatically terminate the release.

RO EXAMINATION

QUESTION # 025

Given:

Both units were at 100% power in a normal alignment for this power and have just experienced a Loss of All AC Power. Both units have entered the appropriate procedures.

Currently:

- The 1B DG is the ONLY power source available for BOTH Units
- Busses 142 and 242 are energized
- The 1B SX pump has tripped on a motor fault

Which of the following valves will be manipulated to allow SX cooling for the 1B DG's continued operation?

- a. 0SX146 CC HX 0 OUTLT VLV
- b. 1SX034, PP 1B XTIE VLV
- c. 1SX005 and 2SX005, CC HX 0 INLT VLVs.
- d. 2SX005, CC HX 0 INLT VLV, and 0SX007, U-0 CC HX OUTLT VLV

ANSWER:

c.

REFERENCE:

BAR 1-2-A1, Subsequent Operator Actions section

NEW

HIGHER

K/A: 076K406 Knowledge of SWS design feature(s) and/or interlock(s) which provide for the following: Service water train separation

EXPLANATION:

Question meets the K/A by requiring examinee knowledge of SX system design and how SX would be supplied to both units from 1 pump. It is High Cog because of the analysis required to obtain the correct answer.

The correct answer is correct based on Alarm Response procedure associated with a loss of SX cooling on a unit, requiring the units to be crosstied through 1 and 2 SX005 valves, each units supply to the Unit 0 CC Heat Exchanger. The 0SX007 valve is in series with an SX return valve for each unit (0SX146 and 0SX147) and as such may not provide a cross-connect between units. but is/are considered plausible. If the examinee fails to realize the inability to operate the 1A SX pump they may choose to crosstie between trains via the 1SX033 and 34 valves.

RO EXAMINATION

QUESTION # 026

Given the following plant conditions:

- Both Units are at 100%, with all systems in normal alignment.
- 1A and 2B SX pumps are currently running, with 140 amps running current indicated for each pump.
- 1A SX discharge pressure is 100 PSIG.

The NSO notes the following changes to the SX system:

- 1A SX pump current LOWERS to 130 amps then stabilizes.
- 1A SX pump discharge pressure on 1PM06J RISES to 110 PSIG then stabilizes.

The cause of this change to SX is that...

- a. 1SX001A, PP 1A SUCT VLV, was CLOSED.
- b. 1SX143A, 1A SX PP DSCH DWST OF STRNR ISOL VLV, was CLOSED.
- c. 1SX033, PP 1A SX XTIE VLV, was CLOSED.
- d. 1SX150A, 1A SX STRN BKWH OUTLET TO TR SYS ISOL VLV, was OPENED.

ANSWER:

c.

REFERENCE:

Provide Ref: M-42 Sheet 1B

BANK

HIGHER

K/A: 076 Service Water System (SWS) 2.2.15 Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tag-outs, etc.

EXPLANATION:

Question meets the KA by having the examinee use a mechanical print (M-42 sheets 1B) to determine the cause of the change in control board indications. The question is High Cog and RO level.

Closing the crosstie valve removes train B SX loads on U-1, so pump amps lower and discharge pressure rises.

Closing the discharge valve would dramatically lower pump amps and drop discharge pressure to 0.

Closing the suction valve would cause fluctuating pump amps and drop discharge pressure to nearly 0.

Opening the strainer discharge valve would add load, raising amps and lowering pressure.

RO EXAMINATION

QUESTION # 027

Given:

A 4 inch line break in the...

- a. IA header will result in BOTH IA and SA depressurizing at approximately the same rate.
- b. SA header will result in ONLY SA depressurizing.
- c. SA header will result in BOTH IA and SA depressurizing at approximately the same rate.
- d. IA header will result in ONLY IA depressurizing.

ANSWER:

a.

REFERENCE:

0BOA SEC-4 page 10

NEW

HIGHER

K/A: 078K102 Instrument Air System: Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Service air

EXPLANATION:

Question meets the K/A as it requires knowledge of the physical connections between the SA and IA systems. It is high cog as it requires the examinee to assess the affect (compare depressurization rates) of a break in each system and determine how all systems will be affected. The question is RO level.

The correct answer is correct based on the check valves that are located in the flowpath of Service air as it enters the Instrument air subsystem. See 0BOA SEC-4 page 10 for diagram. A break in the IA system will be felt throughout the IA and SA systems because SA supplies IA. If the break were in the SA subsystem both systems would depressurize at different rates. This is because the check valves will prevent IA from depressurizing during the large break. These valves will close limiting the pressure drop to just the demand on the IA system which will cause IA pressure to remain higher than SA pressure, therefore the pressure drops rates will not be similar.

RO EXAMINATION

QUESTION # 028

Given:

- Unit 2 is in Mode 1.
- The 2A, 2C, and 2D RCFCs are operating in high speed.
- The 2B RCFC is in standby.

The following indications are observed on the Unit 2 RCFC Dry Bulb temperatures:

- 2A RCFC Inlet Temperature 119°F
- 2B RCFC Inlet Temperature 126°F
- 2C RCFC Inlet Temperature 124°F
- 2D RCFC Inlet Temperature 119°F

Per Tech Spec 3.6.5, Containment Air Temperature, ...

- a. NO action is necessary because the average of ALL OPERATING RCFC temperatures are within the appropriate LCO limit(s).
- b. the action requirement must be applied because the average of ALL OPERATING RCFC temperatures EXCEEDS the LCO upper limit.
- c. the action requirement must be applied because the average of ALL RCFC temperatures EXCEEDS the LCO upper limit.
- d. NO action is necessary because ALL the RCFC temperatures are within the appropriate LCO limit(s).

ANSWER:

b.

REFERENCE:

T/S 3.6.5, not included with submittal package.

BANK

HIGHER

K/A: 103A101 Containment System: Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the containment system controls including: Containment pressure, temperature, and humidity

EXPLANATION:

The question meets the K/A, requires examinee ability to monitor system parameters to prevent exceeding design limits (Technical Specifications).

2BOSR 0.1-1,2,3, Modes 1,2,3 Shiftly Daily Operating Surv. step F.8 (pg. 12) describes the method for calculating containment temperature for tech spec limit comparison. This method is to calculate the average of the inlet temperatures on the running RCFCs. (pg. 47)

The average temp. of all running RCFC is 120.6°F is has exceeded the TS limit of 120°F.

All distracters are plausible based on examinee knowledge.

The question is High Cog as it requires a calculation

The question is RO level as it asks for information contained "above the line".

RO EXAMINATION

QUESTION # 029

Concerning BEP-0, REACTOR TRIP OR SAFETY INJECTION, Step 3, which states; Verify Power To 4KV ESF Busses.

Answer the following:

1. The primary function of this step is to ensure ...
2. The reason for this step is to ...
 - a. 1) electric power to at least one 4KV ESF Bus.
2) determine if the EDGs are supplying any ESF busses.
 - b. 1) electric power to BOTH 4KV ESF Busses.
2) ensure power to operate ALL safeguards equipment.
 - c. 1) electric power to at least one 4KV ESF Bus.
2) ensure adequate power to operate REQUIRED safeguards equipment.
 - d. 1) electric power to BOTH 4KV ESF Busses.
2) determine if the EDGs are supplying any ESF busses.

ANSWER:

c.

REFERENCE:

BD-EP-0 pg 8

NEW

FUNDAMENTAL

K/A: EPE007EK301 Reactor Trip: Knowledge of the reasons for the following as they apply to a reactor trip: Actions contained in EOP for reactor trip

EXPLANATION:

The Question meets the KA by testing the examinee on the reason for performing step 3 of BEP 0. This question is low cog and at the RO level.

The answer is contained in the background document for E-0 step 3 located on page 8 of 66.

Both ESF busses is considered plausible because the step has you take corrective action if only 1 bus is available. The purpose however is to ensure 1 bus is available.

The reason is also stated in the background document: adequate power to operate safeguards equipment. To determine if the EDGs are supplying any ESF busses is plausible as it is in the background documents for a different step, however it is not the correct answer.

RO EXAMINATION

QUESTION # 030

Given:

- Unit 1 is at 100% power
- All systems are normally aligned
- 1RY456, PZR PORV, fails to 10% open and CANNOT be closed or isolated.
- PRT pressure is currently 15 psig
- PRT temperature is 170°F.
- RCS pressure is currently 2000 psig

Based on the above indications, 1TI-463, PORV TEMP, would currently be indicating...
(choose closest answer)

- a. 170°F
- b. 212°F
- c. 250°F
- d. 635°F

ANSWER:

c.

REFERENCE:

Steam Tables

BANK

HIGHER

K/A: APE008AK202: Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open): Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: Sensors and detectors

EXPLANATION:

Question meets K/A by requiring examinee knowledge of the interrelationship between a vapor space accident (PZR PORV stuck OPEN) and the temperature sensor by determining expected control room indications. The question is high cog as it requires a calculation. It is also RO level

The correct answer is based on an isenthalpic process from 2000 psig to 15 psig. This results in saturated steam. From there the temperature can be estimated using the Mollier diagram to be 250°F or look it up on Table 2 for 30 psia.

All distracters are plausible based on examinee knowledge. 635°F is plausible for a saturation temp of 2000 psig. 212°F is plausible is the examinee fails to differentiate between psig and psia. 170° is plausible if the examinee suspects the PORV discharge will be the same temp as the PRT.

RO EXAMINATION

QUESTION # 031

Given:

- A LOCA has occurred, with SI actuated.
- The crew has transitioned from 1BEP-0, REACTOR TRIP OR SAFETY INJECTION, to 1BEP-1, LOSS OF REACTOR OR SECONDARY COOLANT.
- Current conditions are:
 - RCPs have been tripped
 - CETC temperature is 580°F and STABLE
 - RCS pressure is 1310 psig and STABLE
- SI has been RESET
- BOTH RH pumps have been stopped and placed in STBY.

- A SAT fault occurs that DE-ENERGIZES both 4KV ESF busses
- The DGs load as designed

What ECCS pump control switch or ESF switch manipulations will you perform based on the conditions above?

- a. BOTH RH and BOTH SI pumps must be restarted using the MCB control switches.
- b. Place ONLY the RH pump control switches in PULL OUT
- c. ONLY the SI pumps must be restarted using the MCB control switches.
- d. Manually initiate a Safety Injection

ANSWER:

c.

REFERENCE:

1bep-1 pg 11

NEW

HIGHER

K/A: EPE009 Small Break LOCA 2.1.31 Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup.

EXPLANATION:

Question meets the KA by requiring the examinee to assess ECCS component operation following a loss of voltage to the ESF Busses where the DG will then supply the loads. The stem of the question indicates a small break LOCA has impacted the unit based on ECCS sufficient from CV and SI pumps to maintain RCS pressure stable. Question continues to meet the KA by asking the examinee what control switches will have to be manipulated after the busses are restored. This is High Cog based on an assessment and is RO Level.

The correct answer is based on both, a note and a caution contained in 1BEP-1 pg 11 that states after SI has been reset, if off-site power is lost manual action may be required to restart the SI and RH pumps. In this condition, there is no reason to restart the RH pumps. The SI pumps however must be restarted to maintain RCS inventory/pressure and cooling.

All distracters are plausible based on examinees misconceptions.

RO EXAMINATION

QUESTION # 032

Given:

- A Design Bases LOCA occurs.
- ALL ECCS systems FAIL in addition to the CS system.

During the transition from Natural Circulation cooling to Reflux Boiling, which of the following parameters STOPS lowering?

- a. SG Pressure
- b. Containment Pressure
- c. RCS T_h
- d. RCS T_c

ANSWER:

d.

REFERENCE:

1BEP ES-0.1 att. B (pg.22)

NEW

HIGHER

K/A: EPE011EK101 Large Break LOCA: Knowledge of the operational implications of the following concepts as they apply to the Large Break LOCA: Natural circulation and cooling, including reflux boiling.

EXPLANATION:

The Question meets the KA by testing the examinee on what indications will change based on the reflux boiling. The question is High Cog and at the RO level.

For reflux boiling to occur, there is still liquid water in the reactor core. The decay heat is being removed by this water (steam) and transported to the hot leg side of the SG tubes where the heat is removed by secondary side of the SGs. As decay heat is being reduced over time the temperature of the hot leg will lower making this distracter plausible but not correct. Since the heat is being removed by the secondary side of the SG, SG pressure will also lower with RCS temperature, making this selection plausible but also incorrect. Containment pressure will continue to lower based on heat rejection from the RCFCs, even though CS did not function. This is plausible but again not correct. The correct answer is based on minimum inventory needed for reflux boiling to occur and the RCS cold legs can no longer cool down based on no heat transfer medium.

All parameters are plausible as they are assessed to determine the effectiveness of natural circulation cooling. Containment Pressure is plausible based on assessment of "adverse containment" for determination of natural circulation. SG pressure and T_c are plausible based on determination of natural circulation per att. B of 1BEP ES-0.1, Reactor Trip Response

RO EXAMINATION

QUESTION # 033

Given:

- Unit 1 is at 35% power in a normal alignment for this condition.
- Annunciator 1-13-E5, RCP TRIP, has just LIT due to a trip of the 1A RCP.

Based on 1PM05J indications:

1. Which 1A RCP control switch lights will be LIT?
2. Compared to BEFORE the event, five minutes later, indicated loop DELTA Temp for loops 1B, 1C and 1D are ...
 - a. 1) stop ONLY
2) lower.
 - b. 1) stop AND disagreement
2) lower.
 - c. 1) stop AND disagreement
2) higher.
 - d. 1) stop ONLY
2) higher.

ANSWER:

b.

REFERENCE:

BAR Annunciator 1-13 E3
6E-1-4030RC01

NEW

HIGHER

K/A: APE015/017AK210: Reactor Coolant Pump (RCP) Malfunctions: Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following: RCP indicators and controls

EXPLANATION:

Question meets the KA by testing the examinee on RCP indications along with RCS indications based on a trip of a Reactor Coolant Pump. The question is high cog due to analysis and is written at the RO Level.

The correct answer is correct based on obtaining a reactor trip on a single loop loss of flow since the reactor is greater than P-8. When the Reactor trips loop delta T's will drop to about 0°F.

This will be different than the calculated $60^{\circ}\text{F} \times .35 = 21^{\circ}\text{F}$ delta T when the unit was operating.

The rise distracters are plausible if the examinee does not think the reactor will automatically trip and thus will cause the remaining loop delta T's rise. This is because each of the remaining operating S/G would be supplying more steam.

RO EXAMINATION

When the RCP breaker trips (opens), as caused by an RCP protective relay operation, the stop light will be lit, as sensed by breaker position, and the disagreement light will be lit as sensed by breaker position and control switch position. The Stop light only distracter is considered plausible based on examinee misconceptions of the disagreement light.

RO EXAMINATION

QUESTION # 034

Given the following plant conditions on Unit 1:

- The reactor is at full power with the plant in a normal lineup.
- Letdown is 120 gpm
- VCT level is 50%.
- 1LT-112, VCT level transmitter, develops an erroneous signal with a constant output of 95%.

If NO Operator action is taken for 10 minutes:

VCT level will drop until the VCT __ (1) __. The running CV pump ammeter will indicate __ (2) __.

_____ (1) _____ (2) _____

- | | |
|-----------------------|--------------------|
| a. level reaches 37%. | NO change in amps. |
| b. level reaches 20%. | LOWERING amps. |
| c. level reaches 5%. | LOWERING amps. |
| d. is empty. | FLUCTUATING amps. |

ANSWER:

d.

REFERENCE:

BOP CV-33, Makeup to the RCS with the Reactor Makeup System Unavailable

NEW

HIGHER

K/A: APE022A106: Loss of Reactor Coolant Makeup: Ability to operate and / or monitor the following as they apply to the Loss of Reactor Coolant Makeup: CVCS charging pump ammeters and running indicators

EXPLANATION:

This meets the K/A because it tests the examinee on the results of a loss of RCS Makeup and the effect that will have on CV pump amps.

With 1LT-112 failed at 95%, letdown will fully divert to the HUT. VCT level is currently at 50%. The capacity of the VCT is 20 gallons per percent. Total CV flow is 132 gpm. 12 gpm will return to the VCT from RCP Seal leakoff, leaving a net 120 gpm difference. This equate to 6% VCT level change per minute. From 50% level, the VCT will empty in a little over 8 minutes. The control functions for normal make-up to the VCT come from 1LT-112. 1LT185 also monitors this level but normal make-up does not come from 1LT-185. Auto make-up auto starts at 37% VCT level. 20% is the low VCT level alarm when in auto on the make-up control switch. 5% level is the setpoint that the charging pump suction swaps over to the RWST but this will only happen automatically if both 1LT112 and 185 both sense the 5% level.

The correct answer is the VCT will empty and the CV pp will cavitate based on loss of M/U.

RO EXAMINATION

The 5% is plausible based on the above setpoint explanation and the examinee may believe at this low level the CV pp will reduce pump work but as long as the flowrate remains the same the pump amps will remain unaffected.. 5% is also wrong because of the 2 out of 2 coincidence is not made up..

20% and lowering amps is plausible if the examinee feels this is when auto make-up will occur versus the lo level alarm, if in auto. Pump flowrate should not change so amps will remain the same.

37% is normally where auto make-up occurs and if the examinee has misconceptions about the transmitters involved, makes this plausible.

RO EXAMINATION

QUESTION # 035

Given:

- Unit 2 is in MODE 5 with LSIVs open
- All loops are filled.
- NO RCPs are running but enough are available to satisfy Tech. Specs.
- 2B RH pump is aligned in Shutdown Cooling Mode and operating.
 - 2RH607, HX 2B FLOW CONT VLV, has failed OPEN.

Which of the following RCS Temperature instruments would react to this failure FIRST?

- A - Loop narrow range T_{cold}
- B - Loop wide range T_{cold}
- Core Exit Thermocouples
- D - Loop wide range T_{hot}

ANSWER:

c.

REFERENCE:

Horse Notes RC-1 and RH-1

NEW

HIGHER

K/A: APE:025A112: Loss of Residual Heat Removal System (RHRS) Ability to operate and / or monitor the following as they apply to the Loss of Residual Heat Removal System: RCS temperature indicators

EXPLANATION:

Question meets the KA by testing the examinee on how the RCS wide range temperature indicators respond to an RH malfunction, in this case a valve failure which will cause an increased cooldown. The question is High cog and RO level.

The correct answer is based on the RH connections which are adjacent to the Rx. Vessel inlet. The discharged RH will enter the vessel before any loop temperature instruments. The flow will mix at the inlet plenum and the CETCs will be the first instruments to see the change. The narrow range instrument will be off-scale low but is deemed plausible based on examinee misconceptions.

All distracters are plausible based on examinee misconceptions.

RO EXAMINATION

QUESTION # 036

Given:

- Unit 1 has been in Shutdown Cooling for 2 hours in preparation for a refuel outage.
- BOTH U-1 CC pumps are operating.
- Current CC HX Outlet Temperature is 100°F

Then:

- CC flow is reduced by 50% due to a loss of a CC pump
- the above temperature starts RISING by 1°F per minute

How long will it take to reach CC HX Outlet Temperature HIGH operating limit?

- a. 5 minutes
- b. 18 minutes
- c. 20 minutes
- d. 25 minutes

ANSWER:

c.

REFERENCE:

BAR: 1-2-C5

NEW

HIGHER

K/A: 026A204: Loss of Component Cooling Water (CCW): Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: The normal values and upper limits for the temperatures of the components cooled by CCW

EXPLANATION:

Question meets the KA by testing the examinee on the temperature limits of the CCW system and cooled components based on a loss of 1 CCW pump while in SDC mode when 2 are running. The question is High Cog and RO level.

The answer is based on the 120°F limit of the CC HX outlet temperature within the first 3 hours of SDC operations. 5 minutes is plausible as that is the normal temperature limit that would be applied after the first 3 hours. 18 minutes is plausible based on CC HX outlet temp alarm (118°F). 25 minutes is plausible as it is a limit associated with a system that is cooled by CC: Ltdwn HX outlet temp high alarm at 125°F.

RO EXAMINATION

QUESTION # 037

Which ONE of the following selections is used as verification that the reactor is subcritical prior to exiting 2BFR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS, following an ATWS event?

- a. Negative Startup Rate on the IR channels AND PR channels less than 5%
- b. Startup Rate MORE NEGATIVE than -0.2 DPM on the IR channels AND PR channels less than 5%.
- c. Reactor Trip and Bypass breakers are OPEN AND all rod bottom lights are LIT
- d. Negative Startup Rate on the SR channels AND PR channels less than 5%.

ANSWER:

a.

REFERENCE:

2BFR S.1 step 7 on page 7

BANK

FUNDAMENTAL

K/A: 029EA201 Anticipated Transient Without Scram (ATWS) Ability to determine or interpret the following as they apply to a ATWS: Reactor nuclear instrumentation.

EXPLANATION:

Question meets the KA by requiring the examinee to assess responses which allow a transition out of BFR S.1, ATWS based on Nuclear Instrument response. The question is low cog and RO level.

The correct answer is based on Step 7 of 2BFR S.1 stating PR channels less than 5% and IR channels exhibiting a negative SUR

All distracters are plausible based on BEP-0 which calls out, for a reactor trip, all rod bottom lights lit and reactor trip and bypass breakers are open.

RO EXAMINATION

QUESTION # 038

Given:

Unit 2 has tripped from 100% power
Annunciator 2-11-D1, STEAM LINE LOW PRESS SI/RX TRIP, is LIT

The following procedure transitions have been performed:

- 2BEP-0, REACTOR TRIP OR SAFETY INJECTION to
- 2BEP-2, FAULTED STEAM GENERATOR ISOLATION to
- 2BCA 2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS

The crew is currently at Step 2 of 2BCA 2.1, CONTROL FEED FLOW TO MINIMIZE RCS COOLDOWN

Steam generator pressures are as follows:

- 2A 240 psig and LOWERING
- 2B 230 psig and LOWERING
- 2C 280 psig and RISING
- 2D 240 psig and LOWERING

With the above conditions, the U2 Operators will...

- a. transition directly to 2BEP-2.
- b. transition to 2BEP ES-0.0, REDIAGNOSIS, then transition to 2BEP-1, LOSS OF REACTOR OR SECONDARY COOLANT.
- c. continue in the present procedure until completed.
- d. complete the SI Termination steps, then transition to 2BEP-2.

ANSWER:

a.

REFERENCE:

2BCA 2.1 OAS (page 45 of 46)

BANK

HIGHER

K/A: E12EK1.3 Uncontrolled Depressurization of all Steam Generators: Knowledge of the operational implications of the following concepts as they apply to the (Uncontrolled Depressurization of all Steam Generators): Annunciators and conditions indicating signals, and remedial actions associated with the (Uncontrolled Depressurization of all Steam Generators).

EXPLANATION:

Question meets the KA by requiring the examinee to assess annunciator and control board indications associated with an uncontrolled depressurization of all steam generators and to have knowledge of the remedial actions associated with this procedure in case any SG shows a

RO EXAMINATION

pressure rise. The question is low cog and RO level because it tests actions contained in the Operator Action Summary.

All distracters are plausible as they either (1) continue on with the procedure or (2) since conditions changed the examinee may feel Rediagnosis may be in order or (3) may think that the statement about performing SI termination criteria should be completed prior to exiting this procedure as contained in the OAS about going to BEP-2.

RO EXAMINATION

QUESTION # 039

On a Loss of Heat Sink, if the criteria for initiating Bleed and Feed are met, why are the PZR PORVs both manually OPENED instead of being allowed to cycle?

- a. To prevent exceeding the DP pressure limit across the SG U-tubes.
- b. To permit adequate feed of subcooled ECCS flow.
- c. To minimize RCS Subcooling.
- d. To raise PZR level high enough to compensate for any Reactor Vessel void collapse.

ANSWER:

b.

REFERENCE:

BD-FR-H.1 background document page 33

NEW

FUNDAMENTAL

K/A: 054AK305: Loss of Main Feedwater (MFW): . Knowledge of the reasons for the following responses as they apply to the Loss of Main Feedwater (MFW): HPI/PORV cycling upon total feedwater loss

EXPLANATION:

Question meets the KA by placing the examinee in a situation in which a loss of heat sink has occurred and is testing on the operation of the PZR PORV. The question is Low Cog and RO level.

The correct answer is obtained by referencing the FR series Background document which states the PORVs are manually opened to ensure sufficient RCS bleed flow exists to permit RCS heat removal. I intentionally left out the heat removal portion of the explanation to prevent the examinee from obtaining a clue to answer the question by. All distracters are plausible based on reasons for action contained in other emergency procedures.

RO EXAMINATION

QUESTION # 040

Given:

- Unit 1 is at 100% power in a normal alignment, when a Loss of Offsite Power (LOOP) occurs.
- Operators have started ramping the Unit offline.
- When power reaches 27%, the Main Generator TRIPS.

Of the following, which procedure is entered next?

- a. 1BEP 0, REACTOR TRIP OR SAFETY INJECTION
- b. 1BOA TG-8, TURBINE TRIP BELOW P8
- c. 1BOA ELEC-4, LOSS OF OFFSITE POWER
- d. 1BCA 0.0, LOSS OF ALL AC POWER

ANSWER:

a.

REFERENCE:

1BEP-0 entry conditions, page 1

NEW

HIGHER

K/A: APE: 056 2.4.2 Loss of Offsite Power: Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.

EXPLANATION:

Question meets the KA by testing the examinees on entry conditions to 1BEP-0 due to a loss of off-site power. The question is high cog and RO level.

The correct answer is based on the following: When off-site power was lost, all Non-ESF busses powered from the SAT (off site) ABT'd over to the UAT. The DGs started on loss of voltage and powered the 2 ESF busses. When the generator trips at 27% power, all power is lost to the Non-ESF busses which will trip the Reactor on 2/4 RCP bus UV or UF after about a 0.4 to 0.7 second time delay. 1BEP-0 is the proper procedure entry.

BOA TG-8 is plausible if the examinee does not believe the reactor will trip

BCA 0.0 is plausible if the examinee believes ALL AC power will be lost during the Rx Trip.

1BOA Elect-4 is plausible as that is the procedure that is normally entered in this situation.

RO EXAMINATION

QUESTION # 041

Given:

- Unit 2 is at 100% power in a normal line up for this condition
- Instrument Bus 212 has just DE-ENERGIZED

Which of the following automatic features is LOST?

- a. 2RY455A Automatic OPENING on High pressure
- b. Automatic Rod WITHDRAWAL
- c. Automatic Rod INSERTION
- d. P-10 Permissive "Nuclear at Power"

ANSWER:

b.

REFERENCE:

2BOA ELEC-2 correct answer is found in Table B (pg 17)

NEW

FUNDAMENTAL

K/A: APE: 057AA219: Loss of Vital AC Electrical Instrument Bus: Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: The plant automatic actions that will occur on the loss of a vital ac electrical instrument bus

EXPLANATION:

Question meets the KA by requiring examinee to determine what automatic actions will (or will not) occur as a result of a loss of an ESF 120 VAC Instrument Bus. This is Low Cog and RO level.

Each of the distracters is listed in Tables of 2BOA ELEC-2 as functions that are affected by a loss of IB bus 212. A loss of either 211 or 214 would effect the 2RY455A valve from operating in auto.

Automatic rod insertion is plausible because automatic rod withdrawal occurs.

Losing P-10 is plausible based on misconceptions of what causes the permissive to light.

RO EXAMINATION

QUESTION # 042

Given:

- Unit 2 is at 75% power, normal alignment.
- The 2A Regen HX is in service with 120 gpm letdown flow.

The following sequence of events occurs:

- A control power fuse for 2IA065, INSTRUMENT AIR INSIDE CNMT ISOL VLV, blows in 2PM11J.
- Instrument Air to Unit 2 containment is isolated and ALL air operated valves in containment are in their FAIL position.
- Five (5) minutes later, the defective fuse is replaced and 2IA065 is re-opened.
- Instrument Air is fully restored to Unit 2 containment.

- NO other operator actions have been taken (i.e. assume all CVCS valve control switches have NOT been moved from their normal at power alignment).

With the above conditions, the NSO monitoring 2PM05J will note which of the following letdown valves has AUTOMATICALLY RE-OPENED?

- a. 2CV8149A, 45 GPM LTDWN ORIF 2A ISOL VLV
- b. 2CV8160, LTDWN LINE CONT ISOL VLV
- c. 2CV459, LTDWN LINE ISO VLV
- d. 2CV8389A, LTDWN TO REGEN HX 2A ISOL VLV

ANSWER:

d.

REFERENCE:

6E-2-4030CV27

BANK

HIGHER

K/A: APE: 065AA103: Loss of Instrument Air. Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air: Restoration of systems served by instrument air when pressure is regained 2.9 3.1

EXPLANATION:

The question meets the KA by requiring the examinee to monitor letdown system as IA is restored to the system.

All of the choices fail closed on a loss of IA to containment however, only 2CV8389A C/S is normally in the open position. The 3 distracters all have C/S's that spring return to the auto position (because they have auto close features of either Phase A or Low PZR level). 2CV8389A interlock to open is that the corresponding charging isol valve to the regen hx (2CV8324A) must also be open. 2CV8324A has no interlocks and it's CS also maintains in the open position, Therefore when air is restored 2CV8324A opens first, then 2CV8389 opens. The 3 distracters must all have their C/S re-positioned to open before the valves will re-open.

RO EXAMINATION

QUESTION # 043

Given:

- U-1 was at 100% power, normally aligned
- A LOCA has occurred that has resulted in a Reactor Trip and Safety Injection.

The crew entered:

- 1BEP-0, REACTOR TRIP OR SAFETY INJECTION and at step 32 based on abnormal radiation in the Aux. Bldg transitioned to:
- 1BCA-1.2, LOCA OUTSIDE CONTAINMENT
- The crew is currently at Step 2, Try to Identify and Isolate Break
- 1SI8835, SI PUMP TO COLD LEG ISOLATION VALVE, has just been CLOSED.

At the completion of step 2, 1SI8835 would be left CLOSED if:

- a. CETC temperatures begin LOWERING.
- b. SI pump discharge pressure begins RISING.
- c. RCS pressure begins RISING.
- d. Pressurizer level begins RISING.

ANSWER:

c.

REFERENCE:

BCA 1.2 note on top of page 5

BANK

HIGHER

K/A: E04EK1.2 LOCA Outside Containment: Knowledge of the operational implications of the following concepts as they apply to the (LOCA Outside Containment): Normal, abnormal and emergency operating procedures associated with (LOCA Outside Containment).

EXPLANATION:

The question meets the KA because it queries the examinee about procedure step actions based on control board indication/response to actions contained in BCA 1.2 LOCA Outside of Containment. The question is high cog (due to analysis) and RO Level based on knowledge of mitigating strategies associated with the procedures.

The correct answer is correct per the note just before step 2, if a valve is closed and RCS pressure rises, the same valve should not be re-opened.

The distracters are plausible based on:

SI pump pressure is expected to rise after closing 1SI8835 but that is the incorrect criteria

CETC temperature lowering is plausible, as indication of increased core cooling, however that is the incorrect criteria

Pzr level rising is plausible based on leak isolation but again, this is not the criteria.

RO EXAMINATION

QUESTION # 044

Given:

- An event occurred on Unit-1 which resulted in a LOCA with Containment Spray Actuation.
- The crew has transitioned to 1BCA-1.1 LOSS OF EMERGENCY COOLANT RECIRCULATION, when cold leg recirculation capability could not be verified in 1BEP-1, LOSS OF REACTOR OR SECONDARY COOLANT.

The current conditions are:

- One Trains of CS is running
- The crew has just completed step 12 in BCA-1.1 to Establish One Train of ECCS Flow.
- RWST level has just reached 8%.

What must be done next?

- a. STOP ONLY the CS pump aligned to the RWST.
- b. Go to 1BCA-1.3, SUMP BLOCKAGE CONTROL ROOM GUIDELINE
- c. Place switches for pumps taking suction from the RWST in PULL-OUT.
- d. Go to 1BEP-ES1.3, TRANSFER TO COLD LEG RECIRCULATION.

ANSWER:

c.

REFERENCE:

CAS step 28 on page 22 of 43

CAS on page 43 of 43

NEW

FUNDAMENTAL

K/A: E11 2.4.13 Loss of Emergency Coolant Recirculation: Knowledge of crew roles and responsibilities during EOP usage.

EXPLANATION:

Question meets the KA by testing the examinee on the continuous action summary steps of Loss of Emergency Coolant Recirculation. The question is RO level based on the CAS steps and is Low Cog.

Stopping all pumps aligned to the RWST is correct per procedure direction in Step 5, 28 and the CAS of BCA 1.1.

Stopping only the CS pump is plausible but not correct because this action will reduce RWST outflow by 4700 gpm

Transferring to ES1.3 is plausible because that is performed at an RWST level of 46.7%, not 8%

Transferring to CA 1.3 is plausible because it is a CAS action but is incorrect as there is no indication of pump cavitation

RO EXAMINATION

QUESTION # 045

The basis for stopping the RCPs in BFR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, is that it allows the operator...

- a. more control over cooldown via natural circulation when feedwater is established.
- b. to reduce the heat addition to the RCS and extend the inventory in the steam generators.
- c. time to establish a higher flow rate for high pressure SI thus raising the RCS cooldown rate.
- d. time to depressurize the intact steam generators in order to reduce RCS pressure and inject accumulators.

ANSWER:

b.

REFERENCE:

pg 7 of FR-H.1 background document

BANK

FUNDAMENTAL

K/A: E05EK2.1: Loss of Secondary Heat Sink: . Knowledge of the interrelations between the (Loss of Secondary Heat Sink) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

EXPLANATION:

Question meets the KA by testing the examinee on the Loss of Heat Sink procedure and specifically the reason for the need to manually operate the main control board switches, specifically the RCP controls. The question is Low Cog and at the RO level.

The correct answer is based on the Background Document of BFR H-1 for step 2 basis contained on page 7 which states the RCPs are tripped to extend the effectiveness of the remaining water inventory in the SGs.

Injecting accumulators is plausible as this is an action in other EOP/FR procedures.

Increasing the cooldown rate is considered plausible from a thermodynamic standpoint however not the correct reason.

Natural circulation will occur when the RCPs are tripped making this distracter plausible.

RO EXAMINATION

QUESTION # 046

The following plant conditions exist:

	Unit 1	Unit 2
-Power	90%	100%
-Voltage Regulator	ON	ON
-Generator Field Amps	110 and RISING	75 and LOWERING
-Generator Field Forcing alarm	LIT	NOT LIT
-ComEd Grid status	Stable	
-345kV bus 7 voltage	356kV increasing	

Complete the two statements below:

1. Your action is to...
2. and the reason for taking the action is:
 - a. 1) place the Voltage Regulator to OFF and LOWER the field amps to <100 using the BASE ADJUSTER.
2) to prevent over-exciting the Main Power Transformers.
 - b. 1) place the Voltage Regulator to OFF and LOWER the field amps to <100 using the BASE ADJUSTER.
2) to prevent a Main Generator TRIP.
 - c. 1) place the Voltage Regulator to OFF and LOWER the field amps to <109 using the VOLT ADJUSTER.
2) to prevent a Main Generator TRIP.
 - d. 1) place the Voltage Regulator to OFF and LOWER the field amps to <109 using the VOLTAGE ADJUSTER.
2) to prevent over-exciting the Main Power Transformers.

ANSWER:

b.

REFERENCE:

BAR 1-19-B6

NEW

FUNDAMENTAL

K/A: APE: 077AK302: Generator Voltage and Electric Grid Disturbances: Knowledge of the reasons for the following responses as they apply to Generator Voltage and Electric Grid Disturbances: Actions contained in abnormal operating procedure for voltage and grid disturbances

EXPLANATION:

Question meets the KA by requiring the examinee to know the actions and the reasons for the actions contained in Byron Alarm Response Procedure 1-19-B6, Generator Field Forcing Alarm. The question is low cog and RO level.

RO EXAMINATION

The correct answer is contained in BAR 1-19-B6 which states to shift the auto voltage regulator to off and then use the Base Adjuster to reduce field current to <100 amps. The reason for this is to prevent a turbine/generator/reactor trip if >P-8 or turbine/generator if <P-8. Over excitation of the MPT is plausible but is not the reason for reducing the excitation current. 109 amps is a plausible distracter as this is the setpoint the alarm comes in. Switching the voltage regulator out of auto and lowering the excitation voltage using the voltage adjust C/S is considered plausible however the BAR stipulates to use Base adjuster.

RO EXAMINATION

QUESTION # 047

Given:

- Reactor power is 99% and STABLE.
- All systems are in automatic, operating normally.
- T_{ave} is 586°F.
- T_{ref} is 586°F.
- The secondary plant is STABLE.

- Control Bank D rods have just started stepping OUT at 8 steps per minute.
- Annunciator 1-10-D5, BANK DELTA ROD STOP C-11, just alarmed.
- Control Bank D rods are continuing to step OUT at 8 steps per minute.

Your FIRST actions as the Unit NSO, based on these indications, will be to...

- a. TRIP the reactor.
- b. place the Rod Bank Select Switch to the SHUTDOWN BANK D position and exercise rods by stepping the rods in 7 steps and out 7 steps.
- c. place the Rod Bank Select Switch to the CONTROL BANK D position and adjust turbine load and/or boron concentration to match T_{ave} to T_{ref} .
- d. place the Rod Bank Select Switch to the MANUAL position and if rod motion continues, cycle the IN-OUT switch.

ANSWER:

d.

REFERENCE:

1BOA ROD-1, step 2, page 3

NEW

HIGHER

K/A: APE001A203: Continuous Rod Withdrawal: Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal: Proper actions to be taken if automatic safety functions have not taken place

EXPLANATION:

Question meets the KA by requiring the examinee to know the proper actions to take if the C-11 rod stop did not stop outward rod movement per BOA ROD-1, Uncontrolled Rod motion. Question is High cog as it requires analysis and is at the RO level.

The correct answer is correct per step 2 of 1BOA ROD-1

The reactor trip distracter is plausible as it is an action in the BOA, but not the first action
Placing the Rod Bank selector switch in SD Bank D is plausible as it is an action in the BOA, but not the first action

Placing the Rod Bank selector switch in Control Bank D and adjusting turbine load or boron concentration is plausible because it is a recovery action for T_{ave} T_{ref} mismatches.

RO EXAMINATION

QUESTION # 048

Given:

- Unit 1 has just ramped down to 80%.
- ROD DEV POWER RNG TILTS, (1-10-A7), annunciates.
- The NSO observed a rod ratcheting into the core and placed rods in MANUAL.
- Control bank D is at 185 steps and rod D4 in control bank D is at 60 steps.

The problem is repaired 2 hours later.

- NO rod motion has occurred.
- The shutdown margin surveillance acceptance criteria is satisfied.
- The operators are ready to realign the rods

During the realignment, reactor power is restricted to less than __ (1) __ % and the LARGEST Tave to Tref mismatch is limited to __ (2) __ °F.

- a. 1) 50
2) 3
- b. 1) 70
2) 3
- c. 1) 50
2) 1
- d. 1) 70
2) 1

ANSWER:

b.

REFERENCE:

BOA Rod-3, step 10, page 9

BANK

FUNDAMENTAL

K/A: APE: 005 2.1.37: Inoperable/Stuck Control Rod: Conduct of Operations (continued): Knowledge of procedures, guidelines, or limitations associated with reactivity management.

EXPLANATION:

Question meets the KA because it queries the examinee on an inoperable rod (based on falling partially into the core) and the knowledge of procedures (1BOA ROD-3, Dropped or misaligned rod) and the restriction on reactor power and temperature during the recovery of the rod. The question is low cog because 1 part of the 2 part question is recall and the question is at the RO level.

The correct answer is contained in the BOA at step 10, which states if the rod has been misaligned for less than 4 hours, the rod can be realigned if power is reduced to less than 70%. If the rod misalignment was greater than 4 hours, the procedure directs to lower power to less

RO EXAMINATION

than 50%, making these distracters plausible. The procedure also states that during rod recovery Tave to Tref shall be maintained within 3 °F. The 1°F is plausible as it is in the procedure for normal Tave-Tref prior to returning rods to auto.

RO EXAMINATION

QUESTION # 049

Which of the listed Rad Monitors will (1) start a fan AND (2) place a filter unit on line due to High Area radiation?

- a. 0AR055/56, FHB INCIDENT
- b. 2AR11/12, CONT FUEL HANDLING INCIDENT
- c. 0AR039, FHB CRANE
- d. 2AR020/21, CONT HI RANGE AREA MONITOR

ANSWER:

a.

REFERENCE:

BAR RM11-4-0AR55J

NEW

FUNDAMENTAL

K/A: APE 036K202: Fuel Handling Incidents: Knowledge of the interrelations between the Fuel Handling Incidents and the following: Radiation monitoring equipment (portable and installed)

EXPLANATION:

Question meets the KA by testing the examinee which rad monitor would cause an auto ventilation actuation based on a high rad condition cause by a fuel handling incident. The question is Low cog and RO Level.

A high rad condition in the Fuel Handling Bldg caused by a fuel handling incident may cause the FHB area rad alarms to actuate. When the high alarm setpoint is reached, the monitor will auto start a FHB Booster fan and realign ventilation dampers to place a charcoal filter unit on line. The Cont. FH Incident causes a containment ventilation isolation signal to close associated VQ valves

The cont. Hi Range monitors perform no interlock functions but is considered plausible based on examinee misconceptions

The FHB Crane monitor cause no further upward movement of the FHB Crane but is considered plausible based on examinee misconceptions

RO EXAMINATION

QUESTION # 50

Given:

- A liquid release is in progress from Release Tank 0WX01T.
- 0PR01J, LIQUID RADWASTE EFFLUENT RAD MONITOR, has ALARMED on the RM-11 with a DARK BLUE Color.

Answer the following concerning this condition:

1. What monitor condition does the color represent?
2. The Liquid Release has...
 - a. 1) Equipment Failure
2) terminated.
 - b. 1) Operate Failure
2) terminated.
 - c. 1) Equipment Failure
2) continued.
 - d. 1) Operate Failure
2) continued.

ANSWER:

b.

REFERENCE:

AR/PR Lesson plan (S-49) pg. 20 for operate failure and pg 27 for actions on interlock

NEW

FUNDAMENTAL

K/A: APE: 059A101: Accidental Liquid Radioactive-Waste Release: Ability to operate and / or monitor the following as they apply to the Accidental Liquid Radwaste Release: Radioactive-liquid monitor

EXPLANATION:

Question meets the KA by testing the examinee on a liquid radioactive release and the indications of a monitor condition which would be observed on the RM-11. The question is Low Cog and RO Level.

The correct answer is based on when an Operate Failure occurs the monitor responds as if in an alarm condition and any auto features associated with it will be activated. In this case the release will be terminated.

All distracter are plausible based on examinee misconceptions

RO EXAMINATION

QUESTION # 051

Why does the annunciator response procedure for an Alert condition on 1AR022A, 1A Main Steamline, require you to notify Chemistry?

Chemistry is notified to ...

- a. sample the 1A SG for rising activity.
- b. prepare for a conductivity excursion from a leaking main condenser tube.
- c. raise the rate of blowdown flow from the 1A SG.
- d. determine high temperature effects on the monitor.

ANSWER:

a.

REFERENCE:

BAR RM11-1-1AR22J

NEW

FUNDAMENTAL

K/A: APE: 061K302: Area Radiation Monitoring (ARM) System Alarms: Knowledge of the reasons for the following responses as they apply to the Area Radiation Monitoring (ARM) System Alarms: Guidance contained in alarm response for ARM system

EXPLANATION:

Question meets the KA by examining the candidates on the reason chemistry is notified when a main steam line monitor goes into the alert status. The question is low cog and at the RO level.

The correct answer is based on the Byron Alarm Response procedure to this event. Contacting chemistry to sample for activity.

Raising the rate of blowdown flow is plausible because chemistry sets the target values for this activity and the candidate may feel the blow down target will be adjusted under these conditions.

A conductivity excursion is plausible based on the examinees misconceptions

To determine high temperature effects on the monitor is also plausible however this is incorrect per the BAR.

RO EXAMINATION

QUESTION # 052

Given:

The unit is in an accident condition.

The STA is monitoring the Status Trees and reports that:

- CETC Temperature is 568°F and RISING
- RCS Pressure is 1150 psig and LOWERING

The condition of the RCS Coolant at the Core Exit is ...

- a. supersaturated vapor.
- b. subcooled liquid.
- c. superheated steam.
- d. saturated steam.

ANSWER:

c.

REFERENCE:

Steam Table (provided)

NEW

HIGHER

K/A: EPE: 074K106: Inadequate Core Cooling: Knowledge of the operational implications of the following concepts as they apply to the Inadequate Core Cooling: Definition of superheated steam

EXPLANATION:

Question meets the KA by requiring the examinee to determine the superheated condition of the fluid in the core. To do that the examinee must know the definition of superheated steam. The question is High Cog, due to the calculation/evaluation and is at the RO Level.

The correct answer is based on the saturation pressure for 568° which is 1207.0 psia. Subtract 15 psi to convert to psig results in 1192 psig. Actual pressure is less than saturation pressure, therefore the fluid is superheated. Saturation temperature for 1150 psig is about 564° therefore the fluid is about 4°F superheated. The distracters are plausible based on examinee misconceptions. Supersaturated is a term that is used to describe a condition that a subcooled liquid undergoes during a rapid depressurization making this term plausible but incorrect because the fluid is not saturated.

RO EXAMINATION

QUESTION # 053

Given:

- The plant is at 100% power.
- All control systems are in a normal/automatic line-up.
- The controlling PZR level transmitter, LT-459 sticks at the full power value.

Then a ramp has started to 80% power.

Which of the following describes the subsequent charging flow and Master PZR Level controller response? (Assume NO operator action is taken aside from initiating the ramp)

Charging Flow	Master PZR Level Controller Demand
a. lowers	lowers
b. lowers	rises
c. unchanged	lowers
d. unchanged	rises

ANSWER:

a.

REFERENCE:

Pressurizer L-P section C-Abnormal Operations 3.
Level Control Failures. L-P pg 50

BANK

HIGHER

K/A: APE: 028A203 Pressurizer (PZR) Level Control Malfunction Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: Charging subsystem flow indicator and controller

EXPLANATION:

Meets K/A, as this tests the examinee on a PZR level control malfunction and the resulting affect on charging flow. The question further examines the examinee on the inputs and coincidences to RPS that cause a reactor trip..

When controlling channel fails at 60% level and power is ramped back to a lower level the PZR level program calculates a new lower setpoint based on Tave which lowers with the ramp down. Since the sensed level from the failed channel is above this new setpoint, charging flow lowers to minimum. All distracters are plausible based on examinees knowledge of system.

RO EXAMINATION

QUESTION # 054

Given:

- The unit is at 100% power, in a normal alignment.
- The CNMT VENT ISOLATION (_-5-C7) annunciator alarms.
- The reactor does NOT TRIP, and power operation continues uninterrupted.

Which of the following is the likely cause of this annunciator?

- a. CNMT Hi Range Area Monitor RE-AR21 failed HIGH
- b. CNMT Fuel Handling Incident Monitor RE-AR11 failed HIGH.
- c. One of the two CNMT Spray Actuation switches on PM06J taken to ACTUATE.
- d. CNMT Purge Exhaust Monitor RE-PR001 failed HIGH.

ANSWER:

b.

REFERENCE:

BAR 1-5-C7

BANK

FUNDAMENTAL

K/A: E16EK2.1: High Containment Radiation: Knowledge of the interrelations between the (High Containment Radiation) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

EXPLANATION:

Question meets the KA by testing the examinee on the interlock functions for the Containment Fuel Handling Incident rad monitor during a failure mode. The question is Low Cog and RO level.

The correct answer is contained in BAR 1-5-C7, CNMT VENT ISOLATION which states a High Radiation alarm on 1RE-AR11 or 12 will annunciate the alarm.

1 RE-PR001 has an interlock function associated with it to isolate a containment vent (purge) on Hi Rads. making this plausible

1RE-AR21 also monitors the containment atmosphere making this plausible

Taking one of 2 CS switches to actuate is plausible if the examinee feels that CS will be actuated in this condition, which also performs a cont. vent isolation. Both switches are required to actuate CS.

RO EXAMINATION

QUESTION # 055

Given the following sequence of events:

- Unit 1 is at 100% power with Pressurizer pressure channel 1PT-455 bistables TRIPPED
- All other equipment is in a normal alignment

- Subsequently, Pressurizer pressure transmitter 1PT-458 FAILS LOW causing a low Pressurizer pressure SI.
- 5 minutes later the crew has transitioned to 1BEP ES-1.1, SI TERMINATION
- The NSO depresses BOTH SI RESET pushbuttons
- The BYPASS-PERMISSIVE PANEL silence, acknowledge, and reset pushbuttons are depressed.

With the above conditions, which of the following BYPASS-PERMISSIVE LIGHTS will be LIT?

- a. AUTO SI BLOCKED
- b. PZR SI BLOCK TRN A
- c. SI ACTUATED
- d. PZR LOW PRESS SI BLOCK PERMISSIVE P11

ANSWER:

a.

REFERENCE:

BAR 1-BP-5.1

BANK

FUNDAMENTAL

K/A: E02 2.4.46 SI Termination: Ability to verify that the alarms are consistent with the plant conditions.

EXPLANATION:

The question meets the KA by testing the examinee on the ability to verify alarms that are consistent with plant conditions during an SI termination. The question is at the RO level and is Low Cog based on recalling a fact. That fact being: > 1 minute after SI actuates, if Reset P.B.s are depressed, Auto SI Block will light if both RTBs are open.

SI ACTUATED will go dark after the reset pushbuttons are depressed

PZR PRESS LOW SI BLOCK PERMISSIVE P11 will light when 2 of 3 pressurizer pressure channels is below 1930 psig, however channel 458 does not input to P11

PZR SI BLOCKED TRN A lights when pressure is <p11 and the SI Low pressure SI Block switches are taken to block.

AUTO SI BLOCKED is correct. Resetting SI later than 1 minute after an auto SI will block auto SI and light the AUTO SI BLOCKED alarm.

RO EXAMINATION

QUESTION # 056

Given:

- Reactor Power - 33%
- Gen MW - 342 MWe
- Rod Control - Automatic with CBD at 144 steps
- PZR level - on program
- RCS Tave - on program

Answer the following:

If Turbine Impulse Pressure Transmitter, PT-505, fails LOW, over the next few minutes the ...

1. RCS temperature will...
 2. PZR level will...
-
- a. rise
rise
 - b. rise
remain the same
 - c. lower
remain the same
 - d. lower
lower

ANSWER:

d.

REFERENCE:

Rod Control L-P (s-28) pg. 44

NEW

HIGHER

K/A: 001K302: Control Rod Drive System: Knowledge of the effect that a loss or malfunction of the CRDS will have on the following: RCS

EXPLANATION:

Question meets the KA by testing the examinee on an instrument failure input to Rod Control and the resulting effect on RCS temperature and PZR level. The question is high cog and at the RO level.

The correct answer is based on sensed turbine load failing low will cause rods to drive in, to match reactor power to turbine power. Since turbine power has remained unchanged driving rods in will lower RCS temperature. Lowering RCS temp will cause a lower PZR level due to contraction of the RCS and a corresponding reduction in the PZR level program, which is a function of RCS Tave.

The rise-rise distracter is considered plausible if the examinee has a misconception on how the

RO EXAMINATION

rods will move.

The remain the same distracter concerning PZR level is plausible if the examinee fails to understand the inputs to the PZR Level program.

RO EXAMINATION

QUESTION # 057

Implementation of 2BFR C.1, RESPONSE TO INADEQUATE CORE COOLING, is safety significant when CETCs are $> 1200^{\circ}\text{F}$ because additional operator action is required to ...

- a. limit containment pressure to less than the design pressure.
- b. prevent core uncover.
- c. maintain coolable core geometry.
- d. ensure adequate heat removal capability of the Steam Generators.

ANSWER:

c.

REFERENCE:

ERG pg. 6

BANK

FUNDAMENTAL

K/A: 017K501: In-Core Temperature Monitor (ITM) System: Knowledge of the operational implications of the following concepts as they apply to the ITM system: Temperature at which cladding and fuel melt

EXPLANATION:

Question meets the KA by testing the examinee on the reason for the significance of 1200°F temperature on the CETC system.

This is the express purpose of the BFR C-series, protect the first barrier (clad).

Prevention of core uncover is incorrect because it has already occurred to achieve CETC temperatures $> 1200^{\circ}\text{F}$.

Restoring Heat Sink capability is a function of 2BFR H-1 not the C-series.

Clad breach is the concern.

Limiting containment pressure is the function of BFR Z-series procedures.

RO EXAMINATION

QUESTION # 058

Given:

- Unit 1 is at 100% power.
- All systems are normally aligned.

Which of the following components will LOSE power if 480V MCC 133X4 is DE-ENERGIZED?

- a. 1VP02CA, 1A Containment Charcoal Filter Unit Fan
- b. 1CV8324A, Charging to Regen HX 1A Isolation Valve.
- c. 1IP07E, Instrument Inverter 113
- d. 1CV460 Letdown Line Isolation Valve

ANSWER:

a.

REFERENCE:

6E-1-4030VP09

BANK

FUNDAMENTAL

K/A: 027K201: Containment Iodine Removal System (CIRS): Knowledge of bus power supplies to the following: Fans

EXPLANATION:

Question meets the KA by requiring the examinee to know the power supply of the Cnmt Charcoal Filter Fan. The question is low cog and RO level.

1CV460 is plausible if the examinee feels this is a MOV, it is actually an AOV power by non-safety DC bus 114.

Instrument inverter 113 is plausible if the examinee feels this is non-safety related based on last number ending in 3.

11CV8324A is plausible as it is non-safety related, if the examinee feels it is an MOV. It is a AOV with power from DC113.

RO EXAMINATION

QUESTION # 059

Given:

- 5 minutes ago, Unit 1 reactor was manually tripped from 5% power during a normal shutdown.
- All systems operated as designed.
- Current SG Narrow Range levels are ALL 50% and stable.
- ALL alarms at 1PM05J have been acknowledged, but NOT reset.

With the above conditions, if the NSO momentarily places the ROD CONT STARTUP switch on 1PM05J, to the START UP position ...

- a. all control rod group step counters will reset to zero.
- b. alarm 1-11-A1, MANUAL RX TRIP, will clear (slow flash).
- c. alarm 1-10-E6, ROD AT BOTTOM, will clear (slow flash).
- d. the Rod Drive M-G set input breakers will close.

ANSWER:

a.

REFERENCE:

L-P S29 page 8 right hand column

BANK

FUNDAMENTAL

K/A: 014A404: Rod Position Indication System (RPIS): Ability to manually operate and/or monitor in the control room: Re-zeroing of rod position prior to startup

EXPLANATION:

The question meets the KA, by requiring the examinee's ability to monitor the result of the reset switch that is used for re-zeroing rod position in the MCR. The question is Low Cog and at the RO level.

The Rod Control S/U switch re-zero's the following: Bank overlap unit, P/A converter, slave cyclers, step counters, rod control internal memory, and the master cycler. Only the step counters can be monitored from the Control Room. Ref. L-P S29, pg 8.

The rod at bottom alarm will not clear until control bank A is withdrawn during a startup. The rod drive M-G set input breakers closing is considered plausible based on examinee misconceptions

The first out annunciator is incorrect because it has a separate keyed reset switch on 1PM05J.

RO EXAMINATION

QUESTION # 060

Given:

- The Unit is in MODE 6 performing fuel moves.
 - Answer the following two (2) questions concerning radiation monitor 0RE-AR039, FUEL HANDLING BUILDING CRANE, and the effects it will have on FHB fuel movement.
1. In which color coded monitor condition will communication between the monitor and the RM-11 be lost?
 2. How will fuel movement be restricted if the RM-11 cursor is RED?
 - a. 1) Yellow
2) Prevents UPWARD motion ONLY
 - b. 1) Yellow
2) Prevents ALL crane motion
 - c. 1) Magenta
2) Prevents ALL crane motion
 - d. 1) Magenta
2) Prevents UPWARD motion ONLY

ANSWER:

d.

REFERENCE:

L-P S49 pages 46, 21 and 20

NEW

FUNDAMENTAL

K/A: 034K602: Fuel Handling Equipment System (FHES): Knowledge of the effect of a loss or malfunction on the following will have on the Fuel Handling System: Radiation monitoring systems

EXPLANATION:

Question meets the KA by testing the examinee on RM-11 cursor color indicators and the affects to the fuel handling equipment by an associated rad monitor going into an alarm condition. The question is low cog as the examinee has to recall 2 memory level facts. The question is RO level.

The correct answer is based on information contained in the AR/PR L-P. Page 46 states 0RE-AR will prevent upward motion of the hoist. The interlock to prevent that is either Alarm on page 21 or Operate failure on page 20.

Yellow is the alert condition

Magenta is the designation for a communications failure per the L-P

RO EXAMINATION

QUESTION # 061

During a cooldown on Unit 1, the following conditions exist:

- RCS loop Tave indications - 550°F (1A), 548°F (1B), 551°F (1C), 548°F (1D)
- Steam header pressure - 1030 psig
- Steam Dump Mode Selector switch - STM PRESS MODE
- The operator bypasses P-12 in accordance with 1BGP 100-5, PLANT SHUTDOWN AND COOLDOWN
- Steam Dump Controller - MAN set at 30% demand

What is the status of the Steam Dump valves following the operator's actions?
(Assume NO jumpers have been installed that would impact normal steam dump operation)

- ONLY THREE valves in group 1 are fully OPEN. ALL other valves are CLOSED.
- THREE valves in group 1 are fully OPEN and THREE valves in group 2 are partially OPEN.
- ALL valves are CLOSED.
- THREE valves in group 1 are partially OPEN.

ANSWER:

a.

REFERENCE:

Steam Dump L-P (S-24) pg.6 and p12

BANK

HIGHER

K/A: 041K409: Steam Dump System (SDS)/Turbine Bypass Control: Knowledge of SDS design feature(s) and/or interlock(s) which provide for the following: Relationship of low/low T-ave. setpoint in SDS to primary cooldown

EXPLANATION:

Question meets the KA by testing the examinee on Lo-2 Tave setpoint effects on the SDS and hence how many valves are available to cooldown the RCS. The question is High Cog and at the RO Level.

At the Lo-2 Tave setpoint only 3 valves are available to cooldown the RCS. Since the controller output is 25% or greater, these 3 valves will be full open.

All valves are closed is plausible if the examinee has a misconception of the bypass function contained in the stem.

3 valves being partially opened if the examinee has a misconception between controller output and valve position

3Valves full open and another group of 3 partially open is plausible if the examinee has a misconception on the Lo-2 Tave setpoint or coincidence.

THREE valves in group 1 are fully OPEN.

The plant has 2 of 4 Taves < 550 so P-12 is in effect. Only Group 1 dumps are now available. Once > 25% demand they will be full open.

RO EXAMINATION

QUESTION # 062

Given:

- A release of the 0A Gas Decay Tank (GDT) is in progress per BCP 400-TWASTE GAS, Gaseous Effluent Release Form Type: Waste Gas Decay Tank.
- Subsequently, the 0B (on line) GDT relief valve fails (sticks) open.
- The rise in flow past OPR02J, GDT EFFLUENT, rad monitor causes the skid to exceed the high radiation ALARM setpoint.

With the above conditions, ...

- a. the 0A GDT effluent will be AUTOMATICALLY isolated, but the 0B GDT effluent can NOT be isolated.
- b. BOTH the 0A and 0B GDT effluents will be AUTOMATICALLY isolated.
- c. the 0A GDT effluent must be MANUALLY isolated, but the 0B GDT effluent can NOT be isolated.
- d. BOTH the 0A and 0B GDT effluents must be MANUALLY isolated by CLOSING 0GW014,WASTE GAS DISCH VLV.

ANSWER:

a.

REFERENCE:

Byron Horse Note RW 2, Gaseous rad waste

BANK

FUNDAMENTAL

K/A: 071A303 Waste Gas Disposal System (WGDS): Ability to monitor automatic operation of the Waste Gas Disposal System including: Radiation monitoring system alarm and actuating signals

EXPLANATION:

The question meets the KA by requiring the examinee to know not only the physical layout of the isolation and relief valves for each tank but also the automatic response to a high rad alarm signal on a specified rad monitor. This meets the KA by requiring the examinee to not only be able to determine a release can be automatically terminated but that if a faulty relief valve lifts the release can still be monitored even if it cannot be terminated, as the question poses. This is low Cog because you have to recall the interlock function and where the relief valve is in relation to the isolation valve. The question is at the RO level.

The waste gas system is configured such that the relief valves discharge header intersects the waste gas release header upstream of OPR02J rad monitor sample line. The rad monitor will detect the rise in flow and subsequent rise in radiation levels when the relief valve opens. However, the waste gas release valve 0GW014, is upstream of the relief valves intersection point. The high rad signal that will close 0GW014 to terminate the release from the 0A Tank will not isolate the flow from the 0B tank lifting release valve.

All distracters are plausible based on examinee misconceptions.

RO EXAMINATION

QUESTION # 063

Unit 2 is at 100% power with:

- All systems are in a normal alignment for this power, with
- 2B and 2C MFW pumps operating.
- 2A, B, and C CD/CB pumps operating
- 2D CD/CB pump is in standby

The 2C CD/CB pump trips on overcurrent. All systems/components respond as designed.

This event causes the following annunciators:

- 2-17-A9 CD/CB PUMP TRIP
- 2-16-E1 FW PUMP NPSH LOW
- 2-17-B9 CD/CB PUMP AUTO START

You have entered 2BOA SEC-1, SECONDARY PUMP TRIP- Unit 2.

Which of the below actions is specified per 2BOA SEC-1?

- a. Initiate a CD/FW Runback
- b. Verify 2CD152, CONDENSATE PUMPS RECIRC VLV CLOSES automatically
- c. Verify 2CB113C, CB PP RECIRC VLV CLOSES 30 seconds after the pump tripped.
- d. Verify 2CD157A/B, GLAND STEAM CONDENSER BYPASS VLV CLOSE automatically

ANSWER:

b.

REFERENCE:

BAR 2-16-E1

2BOA SEC-1 attachment B

Condensate/FW L-P (S25) pg 15 or 76

NEW

FUNDAMENTAL

K/A: 056A204: Condensate System: Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps

EXPLANATION:

Question meets KA by testing the examinee on actions contained in BOA SEC1 during a loss of a condensate pump at full power. The question is low cog and at a RO level.

The automatic actions that will occur are contained in annunciator response 2-16-E1. The manual action is contained in 2BOA SEC-1 attachment B, Condensate pump trip (pg 5 of 10) A description of valve operation in this configuration is contained in Condensate/FW L-P (S25) pg

RO EXAMINATION

15 or 76.

Turbine runback is improper action but plausible as some actions within this BOA contain that action.

The tripped condensate pump recirc valve will be manually closed (not automatically after 30 seconds).

Verify 2CD157A/B, Gland Steam condenser bypass valves, they should OPEN AUTOMATICALLY not close.

RO EXAMINATION

QUESTION # 064

If the NORMAL source of make-up water to the Mechanical Draft Cooling Towers is LOST, which system provides the automatic EMERGENCY water source?

- a. Circ. Water
- b. CW Makeup
- c. Well Water
- d. SX Makeup

ANSWER:

d.

REFERENCE:

SX system L-P (S-20) page 10 of 88

NEW

FUNDAMENTAL

K/A: 075K101: Circulating Water System: Knowledge of the physical connections and/or cause effect relationships between the circulating water system and the following systems: SWS

EXPLANATION:

Question meets the KA because CW makeup provides the normal source of makeup to the MDCTs. The question is low cog (memory) and at the RO level.

CW makeup is the normal source of makeup to the MDCTs which makes this choice plausible
CW is considered plausible based on examinee misconceptions

Filtered water is considered plausible because the source is well water which is the alternate makeup source to the MDCTs

RO EXAMINATION

QUESTION # 065

Given:

- Both units are operating normally at 100% power.
- A hydrant valve was opened and fire protection system header pressure LOWERED to 130 psig.
- All fire protection system components operate as designed.
- The hydrant valve has been CLOSED and system pressure is now 160 psig.

What, if any, control switch manipulations will be performed to restore the system to a normal alignment?

- a. NO action required to restore the system to normal.
- b. LOCALLY place the 0A Motor Driven Fire Pump control switch in TRIP then release.
- c. Place the 0A Motor Driven Fire Pump control switch in the MCR in TRIP then release.
- d. LOCALLY place the 0A Motor Driven Fire Pump control switch in STOP then release AND 0B Diesel Driven Fire Pump control switch in OFF.

ANSWER:

b.

REFERENCE:

6E-0-4030FP01

FP L-P (S57) pgs. 6 and 7

NEW

HIGHER

K/A: 086A101: Fire Protection System (FPS): Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with Fire Protection System operating the controls including: Fire header pressure

EXPLANATION:

Question meets the KA by testing the examinee on what control switches will have to be manipulated to restore the FP system to a normal alignment after pumps auto started on low Fire Header pressure. The question is High Cog and RO Level.

The correct answer is based on the motor driven fire pump auto starting at a header pressure of 135 psig. The pump has auto start feature but NOT an auto stop feature, therefore manual action is necessary. The only location where the control switch exists is locally at the pump motor, in the CWPH. The jockey pumps are equipped with auto start and stop features. The pressure which starts the diesel driven pump is 125 psig but is considered plausible based on examinee misconception. Since the jockey pumps cycle on pressure, it is plausible that the trainee think that no action is necessary to stop the MD FP pp making this distracter plausible. The Diesel Driven FP pp distracter is considered plausible based on the examinees misconception of auto start setpoints.

RO EXAMINATION

QUESTION # 066

Given:

- The U-1 Unit Supervisor (US) is currently behind the control boards attending a brief.
- Subsequently a transient occurs on U-1 requiring an immediate operator action step from an approved procedure to stabilize the plant.

In accordance with OP-AA-101-111, ROLES AND RESPONSIBILITIES OF ON-SHIFT PERSONNEL, the Reactor Operator will perform the action ...

- a. promptly after receiving a peer check.
- b. promptly from memory without waiting for the US to confirm the action.
- c. only after the procedure is in hand and the RO has read the step.
- d. only after the US is at the Unit desk and agrees with verbalization of the action.

ANSWER:

b.

REFERENCE:

OP-AA-101-111 section 4.7.2 (pg 7 of 9)

BANK

FUNDAMENTAL

K/A: 2.1.6: Ability to manage the control room crew during plant transients.

EXPLANATION:

The question meets the KA by testing the examinee knowledge to manage crew actions during plant transients.

The correct answer is correct per OP-AA-101-111 section 4.7.2 (pg 7 of 9) where it states it is the ROs responsibility to perform immediate operator actions of an abnormal procedure from memory. It is also preceded by a note that says immediate operator actions to stabilize the plant during transients take priority over verbalization of the action to the Unit Supervisor.

All distracters are plausible based on examinee knowledge.

Note that the question stem states "an approved procedure" and the explanation states an "abnormal procedure". Since the question stem states immediate actions, the immediate actions are pertaining to actions contained in either abnormal or emergency type procedures.

RO EXAMINATION

QUESTION # 067

In accordance with 1BGP 100-6 REFUELING OUTAGE, which of the following requires suspension of fuel assembly movements in the containment?

- a. One Fuel Building Exhaust Ventilation system Inoperable
- b. Loss of communications between the Control Room and Refueling Station personnel in containment
- c. Loss of one Source Range Post Accident Neutron Monitor
- d. Refueling cavity level is 23'6" above the top of the Reactor Vessel Flange

ANSWER:

b.

REFERENCE:

BGP 100-6 section E.4

NEW

FUNDAMENTAL

K/A: 2.1.40 Knowledge of refueling administrative requirements.

EXPLANATION:

The question meets the KA by testing examinee knowledge of refueling administrative requirements. The question is low cog and at the RO level.

The correct answer is based on 1BGP 100-6 section E.4 which states communication is required between the control room and refueling station personnel. All distracters are plausible as they are routinely monitored or reported by the NSO. The loss of a gamma metrics source range post accident monitor does not meet the criteria because 2 monitors are required and based on this SR channels 31 and 32 are available along with the other gamma metrics source range post accident monitor.

Loss of 1 FHB ventilation system requires entry to the TRM but NOT to suspend core alts.
Minimum level limit is 23 feet

RO EXAMINATION

QUESTION # 068

Considering the Feedwater system and SG differences between the Units:

- Which unit has a Feedwater pump delta-P program of 80 to 218 psid?
- Which unit has a Lo-2 SG Level Reactor Trip setpoint of 36.3% narrow range level?

Unit that has:

	Delta-P program of 80 to 218 psid	Lo-2 SG Level Reactor Trip setpoint of 36.3%
a.	1	1
b.	1	2
c.	2	1
d.	2	2

ANSWER:

d.

REFERENCE:

BAR 1-11-A8

BAR 2-11-A8

LP S37 (FWpp speed control) page 3

NEW

FUNDAMENTAL

K/A: 2.2.4 (multi-unit license) Ability to explain the variations in control board/control room layouts, systems, instrumentation, and procedural actions between units at a facility.

EXPLANATION:

Meets K/A by testing the examinee on knowing differences between each unit regards the Lo-2 SG Level Reactor Trip setpoint and FW pump D/P program. This is Low Cog and at the RO level.

Unit 1 Lo-2 SG Level set point is 18%- U2 is 36.3%

Unit 1 FW pp D/P program is 85 to 215- U2 is 80 to 218 psid

All distracters are plausible if the examinee does not know the differences between feedwater operation or Reactor Trip setpoints on each unit.

RO EXAMINATION

QUESTION # 069

Given:

- Unit 1 is at 100% power, normal alignment.
- Maintenance is needed on 480V Unit Sub Station (U.S.S.) (rackable) breakers.

Which one of the below cases would require entry into LCO 3.8.9, DISTRIBUTION SYSTEMS OPERATING?

Racking out ...

- a. load breaker on Bus 132X for 1VP01CD, RCFC FAN 1D HIGH SPEED BKR.
- b. load breaker on Bus 133X for 1WO01PA, PRI. CONT. CHILLED WATER PP.
- c. feed breaker to Bus 132X to remove stuck breaker for 1TO06P, TURBINE BEARING OIL PP.
- d. feed breaker to Bus 133X to remove stuck breaker for 1VQ01CA, CONT PURGE SUPPLY FAN.

ANSWER:

c.

REFERENCE:

Key diagrams 6E-1-4007D and G

NEW

HIGHER

K/A: 2.2.36 Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.

EXPLANATION:

Question meets KA by testing examinee on breaker maintenance effects and the implications to Tech. Specs. based on the maintenance activity. The question is High Cog and RO level. All info tested is "above the line".

The correct answer is based on opening the feed breaker, or power supply, to bus 132X. This action places the unit in 3.8.9 per Division 12 subsystem. Opening the load breaker to the 1D RCFC will place the unit in an action statement however not 3.8.9. The other distracters are plausible based on examinee misconceptions. Additionally, the difficulty of this question is increased listing a non-safety related load being supplied by the safety related bus.

RO EXAMINATION

QUESTION # 070

Given:

- Unit 1 is performing a refueling outage.
- The following conditions existed at turnover:

RCS Temp	190°F
1A RH Train	Operating in shutdown cooling mode.
1B RH Train	INOPERABLE due to stuck closed suction valve.
1A and 1C RCS Loops	ISOLATED and DRAINED for Steam Generator Inspection.
1B and 1D RCS Loops	LSIVs OPEN with RCPs secured.

During the shift, draining of the 1B and 1D SGs is commenced. Level is currently ~10% NR Level.

Which ONE of the following is an ACTION that is REQUIRED to be performed per Technical Specifications?

- Within 1 hour start either 1B or 1D RCP.
- IMMEDIATELY suspend all operations involving a reduction in RCS boron concentration.
- Within 1 hour initiate action to place the 1B RH Train in operation.
- IMMEDIATELY initiate action to restore 1B and 1D SG level above required value.

ANSWER:

d.

REFERENCE:

LCO 3.4.7 Provided during the exam

BANK

HIGH

K/A: 2.2.39 Knowledge of less than or equal to one hour Technical Specification action statements for systems.

EXPLANATION:

Question meets the KA by requiring the examinee to have knowledge of the action statement for a tech spec. with action of less than or equal to 1 hour. The Tech Spec examined is 3.4.7 which has immediate actions. This is High Cog as the examinee must determine that 2 trains of RH are not available and that 2 SG are also inoperable and 2 SG are not available because the LSIVs are closed. The question is RO level

Solution: Immediately initiate action to restore 1B and 1D SG level above required value. Restoring another RH Train within 1 hour is plausible but would be incorrect in this situation. Starting an RCP is plausible based on the Note contained within the LCO. Immediately suspending all activities that would result in a boron reduction is plausible as this is contained within the Action Statement however not for this condition.

RO EXAMINATION

QUESTION # 071

You are assigned a task in a tank room in the Auxiliary Building. The room was recently surveyed and the following radiological conditions are listed on the RWP survey map:

- General area radiation levels: 110 mR/Hr.
- Airborne radiation is 0.25 DAC.
- Contamination levels of 250dpm/100cm² beta/gamma and 25 dpm/100cm² alpha.

When you arrive at the room, there are 2 posted signs as follows:

- Caution- Radiation Area
- Caution- Contamination Area

What actions (if any) are required/allowed and why?

- a. Do NOT proceed; notify RP Department because the Radiation Area posting is INCORRECT.
- b. Do NOT proceed; notify RP Department because the Contaminated Area posting is INCORRECT.
- c. Do NOT proceed; notify RP Department because the room also requires a posting of Caution- Airborne Radioactivity Area.
- d. Proceed with the assigned task because ALL postings ARE correct and complete.

ANSWER:

a.

REFERENCE:

RP-AA-376 pages 4 and 5

BANK

FUNDAMENTAL

K/A: 2.3.7 Ability to comply with radiation work permit requirements during normal or abnormal conditions.

EXPLANATION:

Question meets the KA by testing examinee knowledge of radiological safety principles pertaining to licensed operator duties. The question is Low Cog and at the RO level.

The correct answer is per RP-AA-376. The area meets the posting requirement of High Radiation area (>100 mR/Hr) and Contamination area (> 1000 dpm/100cm² beta/gamma or 20 dpm/100cm² alpha) but not for Airborne Radioactivity (<.3 DAC)

RO EXAMINATION

QUESTION # 072

When people have entered containment, in accordance with BAP 1450-1, ACCESS TO CONTAINMENT, each of the following activities are allowed EXCEPT...

- a. changing reactor power by 1%.
- b. a Control Rod position adjustment while in MODE 1.
- c. a reactor startup.
- d. RCS dilution.

ANSWER:

c.

REFERENCE:

BAP 1450-1 pages 3 and 4

BANK

FUNDAMENTAL

K/A: 2.3.13 Knowledge of radiological safety procedures pertaining to licensed operator | duties, such as response to radiation monitor alarms, containment entry|requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.

EXPLANATION:

Question meets the KA by testing the examinee on personnel in the containment and what evolutions are allowed with the reactor at power based on radiological safety. The question is Low Cog and at the RO level.

BAP 1450-1, section 4.3.1 (pgs. 3 and 4) states that a reactor startup is NOT considered maintaining the reactor power stable even though power limits may not be exceeded. Distracters are plausible because each will have an impact on reactor power.

RO EXAMINATION

QUESTION # 073

Given the following plant conditions:

- Unit 1 is in MODE 4 with A Train RH providing Shutdown Cooling.
- RCS pressure is 300 psig.

If 100 GPM leaks develop in both the 1A CC Heat Exchanger and the 1A RH Heat Exchanger, the SX system __ (1) __ become contaminated, because __ (2) __.

__ (1) __ __ (2) __

- a. will NOT RH pressure is LESS than CC pressure, which is LESS than SX pressure
- b. will RH pressure is GREATER than CC pressure, which is GREATER than SX pressure
- c. will NOT RH pressure is GREATER than CC pressure, which is LESS than SX pressure
- d. will NOT RH pressure is LESS than CC pressure, which is GREATER than SX pressure

ANSWER:

b.

REFERENCE:

Horsenotes CC-1 and SX-2

BANK

HIGHER

K/A: 2.3.14 Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.

EXPLANATION:

This meets the K/A because the candidate must evaluate the leakage path that will result in radioactive contamination of a system in contact with the environment. The question is Level 2 (comprehension) because the candidate must determine that RH pressure will be higher than CC pressure in this situation. If RH were aligned for injection, or for MODE 6 refueling operations, RH pressure would be lower than CC pressure. The candidate must then use that information, and recognize the relationships between the 3 systems, and how the systems interact, including the consequences of leaks. This determination of cognitive level was made after referring to Appendix B, page 5.

RH system will leak into the CC system because RH pressure at the CC HX is about 400 psig. The CC system pressure is about 130 psig, and SX pressure is 100 psig, so CC will leak into the SX system.

All other distracters are plausible based on examinee misconceptions.

RO EXAMINATION

QUESTION # 074

Given:

- A LOCA has occurred on Unit 1.
- 1BEP-0, RX TRIP OR SAFETY INJECTION, was entered and a transition was made to
- 1BEP-1 LOSS OF REACTOR OR SECONDARY COOLANT,

The STA has identified an ORANGE path for one of the Critical Safety Function Status Trees. There are still two (2) Status Trees left to evaluate, to complete the "pass".

Procedure usage rules require the crew to ...

- a. implement the applicable BFR at the discretion of the Shift Manager
- b. complete the actions of 1BEP-1, then implement the applicable BFR.
- c. immediately implement the applicable BFR, then continue the current pass through the Status Trees.
- d. continue current pass through the Status Trees. If NO red path condition is encountered, then implement the applicable BFR.

ANSWER:

d.

REFERENCE:

BAP 1310-10 pg 20

BANK

FUNDAMENTAL

K/A: 2.4.16 Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines.

EXPLANATION:

Question meets the KA by testing the examinee on the knowledge of EOP hierarchy in conjunction with the Functional Restoration procedures. The question is Low Cog and at the RO level.

Per BAP 1310-10, pg 20 An orange path condition does not require immediate action. The current pass through the status trees is to be completed, with the status of each CSF noted. If no red path exists then the highest priority orange path is addressed, requiring departure from the procedure in affect.

All distracters are plausible based on examinee misconceptions.

RO EXAMINATION

QUESTION # 075

Given:

A problem with DC Bus 113 has resulted in the LOSS of ALL Unit 1 annunciator windows. Regarding the annunciator loss, per 1BOA ELEC-7, LOSS OF ANNUNCIATORS, the operators are directed to monitor ...

- a. changes in Unit 1 load.
- b. the Unit 1 SER for all changes of alarm status.
- c. Unit 1 local panels and equipment at 15 minute intervals.
- d. the process computer for points automatically removed from scan because of the failure.

ANSWER:

b.

REFERENCE:

1BOA ELEC-7 page 4

BANK

FUNDAMENTAL

K/A: 2.4.32 Knowledge of operator response to loss of all annunciators.

EXPLANATION:

Question meets KA because it tests the examinee on operator response to a loss of annunciators and what actions would be performed. The question is Low cog and at the RO Level

The correct answer is based on the NOTE just before step 3 of 1BOA Elec-7, which states that if ONLY the alarm windows are lost, then close monitoring of the SER is required.

The distracters are all plausible as statement contained within the procedure reflect these conditions

Monitoring turbine load changes per procedure would be stop load changes

Local panel monitoring intervals is 30 minutes per procedure

Process computer points are added to scan if operable versus monitoring the points removed.

SRO EXAMINATION

QUESTION # 076

Given:

Unit 1 is at 100% power in a normal full power alignment.

An instrumentation malfunction has resulted in RCS Pressure lowering to 2150 psig. The failed instrumentation channel is currently being addressed by Byron procedures. RCS pressure remains stable at 2150 psig.

How long can the unit remain in this present condition until ACTION must be taken?

- a. 2 hours
- b. 4 hours
- c. 6 hours
- d. 8 hours

ANSWER:

a.

REFERENCE:

Core Operating Limits Report section 2.12.1 (provided)

LCO 3.4.1 (provided)

NEW

FUNDAMENTAL

K/A: APE: 027A204S: Pressurizer Pressure Control System (PZR PCS) Malfunction: Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Tech-Spec limits for RCS pressure

EXPLANATION:

Question meets the KA by testing the examinee on an instrumentation malfunction that has caused RCS pressure to LOWER and given the present value, assess which tech spec we have currently entered and how long of a completion time is associated with the Action Statement. The question is SRO level because it asks for action statements that are >1hour. The question is Low Cog-recall

Per the COLR RCS pressure limit is 2209 psig. The value given in the stem is lower than 2209 so therefore we are in this action statement. Per the actions contained in 3.4.1 (mode 1 condition) RCS pressure has to be restored to within limits within 2 hours.

The distracters are plausible based on other TS actions of 4, 6 or 8 hour time clocks. ALL Action times are plausible because they are contained within the Tech. Specs.

SRO EXAMINATION

QUESTION # 077

Operating within Tech Spec limiting conditions, ensures that during a steam generator tube rupture the dose limits of 10 CFR 50.67 are NOT exceeded. These limits are ___(1)___ Rem TEDE for an individual at the boundary of the exclusion area for 2 hours OR ___(2)___ Rem TEDE for an individual in the Main Control Room for the duration of the event.

- a. 1) 50
2) 25
- b. 1) 10
2) 15
- c. 1) 15
2) 10
- d. 1) 25
2) 5

ANSWER:

d.

REFERENCE:

There are no references provided

BANK

FUNDAMENTAL

K/A: EPE: 038 2.2.22: Steam Generator Tube Rupture (SGTR): Equipment Control: Knowledge of limiting conditions for operations and safety limits.

EXPLANATION:

The question meets the KA by testing the examinee on knowledge of safety limits found in the bases for LCO 3.4.16, RCS specific activity. The question is SRO level because it requires knowledge of Tech Spec bases of LCO 3.4.16. The question is Low cog.

The correct answer is based on 10 CRF 50.67 limits of 25 Rem TEDE to any individual at the boundary of the exclusion area and 5 Rem TEDE for an occupancy of the MCR.

The distracter of 10 Rem is plausible but this is for protecting Property

The distracter of 15 Rem is plausible but this is the limit for the lens of the eyes.

The distracter of 50 Rem is plausible but this is the TODE Federal limit.

SRO EXAMINATION

QUESTION # 078

Given:

The crew took conservative action to TRIP the reactor and manually initiate a Safety Injection due to RISING Containment Pressure. All Safety Systems responded as designed, except as noted below. 1BEP-0, REACTOR TRIP OR SAFETY INJECTION has been implemented by your crew.

Immediately following the reactor trip the following conditions are noted:

- PZR Level Lowering RAPIDLY
- PZR Pressure Lowering RAPIDLY
- Tave is 535 °F and continuing to Lower
- All S/G Levels Lowering RAPIDLY
- All SG Pressures Lowering RAPIDLY
- Containment pressure is 9.2 psig and RISING
- All MSIVs are currently OPEN
- The diagnostic steps are complete and the appropriate transition HAS BEEN MADE.

From the following selections, which procedure transition will be made NEXT?

- a. 1BEP ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION.
- b. 1BCA-2.1, UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS.
- c. 1BEP ES-1.1, SI TERMINATION.
- d. 1BEP-2, FAULTED STEAM GENERATOR ISOLATION.

ANSWER:

b.

REFERENCE:

1BEP-2, step 2, page 2

NEW

HIGHER

K/A: 040A203: Steam Line Rupture: Ability to determine and interpret the following as they apply to the Steam Line Rupture: Difference between steam line rupture and LOCA

EXPLANATION:

Meets K/A. Requires examinee to distinguish between a Stm line break and a LOCA. SRO question due to detailed knowledge of the parameters that are required to make the transition to the appropriate recovery procedure. Question is High Cog due to analysis.

With the diagnostics completed a transition to E-2 will occur. The question asks for the NEXT Transition. The next procedure entered will be 1BCA-2.1 based on all S/G depressurizing. This is the correct answer based on the kick-out from E-2 to BCA 2.1 at step 2 RNO of E-2. All distracters are plausible if the examinee misdiagnoses the event and goes to E-1 Loss of Reactor or Secondary Coolant. The next transition from that procedure are the other distracters.

SRO EXAMINATION

QUESTION # 079

Given:

- Unit 1 has experienced a reactor trip and SI from 100% power.
- All equipment operated as designed.
- The crew has transitioned to 1BEP ES-1.1, SI TERMINATION, from 1BEP-1, Loss of Reactor or Secondary coolant.
- At step 4 of 1BEP ES-1.1, the crew secures all but one charging pump as directed.
- After one charging pump is secured, RCS pressure begins to slowly and steadily LOWER.

With the above conditions, the Unit Supervisor will direct the crew to ...

- a. manually re-initiate SI and transition to 1BEP-0, REACTOR TRIP OR SAFETY INJECTION
- b. re-start the charging pump to stabilize RCS pressure and return to 1BEP-1
- c. transition to 1BEP ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION
- d. re-start the charging pump to stabilize RCS pressure and continue with 1BEP ES-1.1

ANSWER:

c.

REFERENCE:

1BEP ES-1.1 step 5, page 3

BANK

HIGHER

K/A: EPE: 009EA215: Small Break LOCA: Ability to determine or interpret the following as they apply to a small break LOCA: RCS parameters

EXPLANATION:

Question meets the KA because it tests the examinee on the ability to interpret RCS parameters as they apply to a small break LOCA. The question is SRO level because it requires assessment of conditions and the selecting of procedures.

In 1BEP ES-1.1, step 5 checks RCS pressure following the securing of one charging pump. If pressure is lowering, the RNO column transitions the crew to 1BEP ES-1.2
All distracters are plausible based on examinee misconceptions

SRO EXAMINATION

QUESTION # 080

Which of the following events must be reported to the Illinois Emergency Management Agency?

- a. Unit 2 is in MODE 5 AND ALL MCR annunciators have been unavailable for the last 20 minutes.
- b. Unit 2 is in MODE 1 following a LOSS of offsite power AND the U-2 DGs have been energizing the ESF buses for the past 30 minutes.
- c. Unit 1 is in MODE 3 AND DC Bus 112 has been DEENERGIZED for the last 30 minutes.
- d. Unit1 is in MODE 3 and RCS UNIDENTIFIED leakrate is 7.5 gpm.

ANSWER:

b.

REFERENCE:

EP-AA-1002 page BY-14 for the correct answer (page 24 of 179)

PROVIDE THE HOT AND COLD MATRIX TO THE EXAMINEE'S AS A REFERENCE (EP-AA-1002)

NEW

HIGHER

K/A: 2.4.30 Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.

EXPLANATION:

Meets the KA as it tests the examinee on events related to system operation/status that must be reported to external agencies, such as the State, the NRC , or the transmission provider. This is SRO level because the examinee must assess conditions and provide specific protective actions for the public, including making the decision to notify off site organizations, which is an SRO function.

Loss of offsite power to ESF buses for 30 minutes exceeds EAL MU1 threshold value (>15 minutes MODES1-6) and requires 15 minute notification to IEMA.

B does not meet any EAL. Need both DC buses deenergized . 15 minutes to meet EAL MS4 or DC bus 111 deenergized in Mode 1, which may cause loss of safety system annunciators (due to los of bus 143) with a significant transient in progress (reactor trip) which may meet the threshold for EAL MA4.

C is incorrect, does not meet the threshold for MU5 (>10 gpm in mode 1-4)

D is incorrect, does not meet EAL MU4 threshold due to MODE 5 (applicable in MODES 1-4)

SRO EXAMINATION

QUESTION # 081

Given the following sequence of events on Units 1 & 2:

- BOTH units were at full power.
- Flooding was reported in the Auxiliary Building on the Unit 1 side.
- Annunciator 1-2-A2, SX PUMP DSCH HDR PRESS LOW, is LIT
- 0BOA PRI-8, AUX BUILDING FLOODING has been entered.
- It has been determined that an SX pipe break is the source of the flooding and it is currently NOT isolated.

Answer the following concerning this event.

1. 0BOA PRI-8, AUX BUILDING FLOODING, directs entry into ...
2. This is done to REDUCE ...
 - a. 1) 1/2 BOA PRI-7, Attachment B, ALIGNING EMERGENCY FP COOLING TO CENT CHG PUMP OIL COOLER, then 1/ 2 BOA PRI-7, ESSENTIAL SERVICE WATER MALFUNCTION.
2) damage from flooding.
 - b. 1) 1/2 BOA PRI-7, Attachment B, ALIGNING EMERGENCY FP COOLING TO CENT CHG PUMP OIL COOLER, then 1/ 2 BOA PRI-7, ESSENTIAL SERVICE WATER MALFUNCTION.
2) Core Damage Frequency
 - c. 1) 0BOA PRI-7, LOSS OF ULTIMATE HEAT SINK then 1/2 BOA PRI-7, ESSENTIAL SERVICE WATER MALFUNCTION.
2) damage from flooding.
 - d. 1) 0BOA PRI-7, LOSS OF ULTIMATE HEAT SINK then 1/2 BOA PRI-7, ESSENTIAL SERVICE WATER MALFUNCTION.
2) Core Damage Frequency

ANSWER:

b.

REFERENCE:

BOA PRI-8 L-P pg 16 which is only the right hand portion but it aligns with 0BOA Pri-8
0BOA PRI-8

NEW

HIGHER

K/A: 062 2.4.23: Loss of Nuclear Service Water: Emergency Procedures / Plan: Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations.

EXPLANATION:

Question meets the KA by testing the examinee on a SX system loss or malfunction and the reason for the implementation of those procedures. The question is SRO level based on detailed knowledge of the procedures and the bases for that procedure transition. This is Hi Cog

SRO EXAMINATION

due to the analysis needed to ascertain where you are in 0BOA PRI-8.

The correct answer is based on the procedural steps/transitions and the 0BOA PRI-8 Lesson Plan pg 16 which states; to reduce core damage frequency install F-P cooling to the CV pump oil coolers IAW 1BOA PRI-7 attachment B.

The distracter that states core damage frequency is incorrect because 0BOA PRI-8 states to go to 1/2BOA PRI-7 Attachment B (@step 5) and then 1/2BOA PRI-7 (@step 6) not 0BOA PRI-7, LOSS OF ULTIMATE HEAT SINK.

The distracters that mention, reducing damage of flooding is plausible because that is the event being experienced however that is not the correct procedure transition.

SRO EXAMINATION

QUESTION # 082

Given:

- Unit 1 was initially at 100% power
- The crew noted rising trends on ALL Main Steamline radiation monitors

The following leak rate estimates were just confirmed via sample:

<u>Steam Generator</u>	<u>Primary to Secondary LEAKAGE</u>
1A	0.15 gpm
1B	0.12 gpm
1C	0.04 gpm
1D	0.10 gpm

NO other RCS Operational Leakage is present.

In accordance with Technical Specifications ...

- a. the Unit Supervisor will direct the crew to place Unit 1 in MODE 3 within 6 hours and MODE 5 within 36 hours.
- b. the Unit Supervisor will direct entry into LCO 3.0.3.
- c. the Unit Supervisor will direct the crew to place Unit 1 in MODE 3 within 6 hours where it may remain indefinitely.
- d. unit one may remain in MODE 1 indefinitely.

ANSWER:

a.

REFERENCE:

T/S 3.4.13 (Provided)

NEW

HIGHER

K/A: APE: 037A210: Steam Generator (S/G) Tube Leak: Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: Tech-Spec limits for RCS leakage

EXPLANATION:

The question meets the KA by testing the examinee on the Tech Spec Limit for RCS leakage associated with a SG Tube Leak. It is SRO level as it examines on the bases and below the line material of the tech spec. This is a high cog question due to the analysis of the leak rate.

LCO 3.4.13 places limits of 10 gpm identified leakage and 150 gpd of primary to secondary leakage through any one SG. 150 gpd equates to .104 gpm, so 2 SGs exceed this limit. According to LCO 3.4.13 bases, the UFSAR assumes total primary to sec. leakage of 1 gpm on intact SGs. . Because the pri-sec leakage is exceeded in TWO SGs, condition B of 3.4.13

SRO EXAMINATION

applies (Mode 3 in 6 hours and Mode 5 in 36) per the bases.

Staying in Mode 1 is plausible since the student may think that primary to secondary leakage is part of identified leakage which has a limit of 10gpm.

Staying in Mode 3 indefinitely is plausible because it contains the first part of the required action but does not contain the AND statement, making this selection wrong.

Going to 3.0.3 is plausible if the examinee feels No conditions apply because a specific SG tube leak is not discussed as a condition. You must go to the bases document to extract this information.

SRO EXAMINATION

QUESTION # 083

Given:

- Unit 1 was at 100% power.
- All systems were normally aligned.
- A reactor trip occurred.
- 1BEP ES-0.1, REACTOR TRIP RESPONSE, has been implemented.
- Intermediate Range SUR is -0.3 dpm.
- RCS temperature is 550°F and DROPPING uncontrollably.
- RCS pressure is 2200 psig and STEADY.
- ALL other systems are normally aligned.
- BA Transfer pumps will NOT run.

Based on the above conditions, the SRO will direct a/an...

- a. Safety Injection Actuation and transition to 1BEP-0, REACTOR TRIP OR SAFETY INJECTION.
- b. emergency boration from the RWST per 1BOA PRI-2, EMERGENCY BORATION, while continuing in 1BEP ES-0.1.
- c. transition to 1BFR-S.2, RESPONSE TO LOSS OF CORE SHUTDOWN.
- d. transition to 1BOA PRI-2, EMERGENCY BORATION, while suspending actions of 1BEP ES-0.1.

ANSWER:

b.

REFERENCE:

1BEP ES-0.1 page 2 RNO

MODIFIED

HIGHER

K/A: 2.4.8 Knowledge of how abnormal operating procedures are used in conjunction with EOPs.

EXPLANATION:

Question meets KA - question requires examinee knowledge of bases for emergency boration. The question is High cog based on assessment and at the SRO level.

Emergency boration per 1BOA PRI-2 is required per 1BEP ES-0.1 step 2 for an uncontrolled cooldown.

Continuation of ES 0.1 only is plausible if examinee feels there are no problems with either temperature.

1BFR -S.2 is plausible but does not meet the requirements for entry because SUR is below entry conditions

Modified distracters from original question to make one of the previous distracters the correct answer.

SRO EXAMINATION

QUESTION # 084

Step 1 of BFR-C.3, RESPONSE TO SATURATED CORE COOLING, checks if the RH system has been placed in the Shutdown Cooling Mode of operation.

Which ONE (1) of the following describes the basis for this step?

- a. To ensure an ORANGE or RED condition in Core Cooling will NOT arise while performing this procedure.
- b. If RH is in shutdown cooling mode, the saturated core cooling condition is a problem with RH and this procedure will identify and isolate the affected train.
- c. To Verify RH is aligned for long term cooling if the appropriate conditions are met.
- d. If RH is in Shutdown Cooling Mode, the saturated core cooling condition is a problem with RH and this procedure will NOT address this.

ANSWER:

d.

REFERENCE:

Background Document for 1BFR-C.3 page 6 of 9

BANK

FUNDAMENTAL

K/A: E07 2.4.21: Saturated Core Cooling: Emergency Procedures / Plan: Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.

EXPLANATION:

Question meets the KA by testing the examinee on Saturated Core Cooling, 1BFR-C.-3, RESPONSE TO SATURATED CORE COOLING, specifically the logic used to address the condition. It is an SRO Only question as information is needed from the background document to obtain the correct answer about a NON RED or ORANGE Functional Restoration Procedure. Per the Westinghouse Background document, page 6 of 9, the reason for check RH in operation is to direct the crew another procedure if in shutdown cooling because 1BFR-C-3 will not address that condition.

To assess a Red or Orange condition in core cooling is a plausible distracter as the C-3 procedure is yellow however that is not the correct answer.

The RH problem being addresses by C-3 is another plausible distracter based on examinee misconceptions

To verify that it is aligned for long term cooling is also another plausible response concerning RH however it is not the correct answer.

SRO EXAMINATION

QUESTION # 085

Given:

- Unit U-1 is at 100% power in a normal full power alignment
- The Gross Failed Fuel Monitor, 1PR006, has just gone into High Alarm.
- There has been NO change in the Unit 1 full power alignment.

Per 1BOA PRI-4, ABNORMAL PRIMARY CHEMISTRY, you will direct Chemistry to perform each of the following EXCEPT ...

- a. sample for RCS Cobalt-60
- b. sample for RCS Dose Equivalent I-131
- c. calculate a decontamination factor for the Letdown Mixed Bed Demineralizer
- d. sample for RCS Xenon-133

ANSWER:

a.

REFERENCE:

1BOA PRI-4 page 2, step 2

NEW

FUNDAMENTAL

K/A: APE: 076A203: High Reactor Coolant Activity: Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: RCS radioactivity level meter

EXPLANATION:

Question meets the KA by testing the examinee on SRO actions to a 1PR006J alarm indicating high activity in the RCS. In addition it tests the examinee on actions contained within this procedure that are at a SRO Level. This question is Low Cog and SRO level.

The correct answer is based on actions contained in 1BOA PRI-4, Abnormal Primary Chemistry which is to have Chemistry perform a DF and to sample for I-131 and Xe-133. Cobalt 60 is a contributor to overall RCS activity, making this a plausible distracter however 1BOA PRI-4 does not direct the sampling of this isotope.

SRO EXAMINATION

QUESTION # 086

Given:

- Unit 2 is at 100% power, normal alignment.
- An INADVERTENT SI occurs.
- One minute later, the ECCS high head injection header ruptures BETWEEN 2SI8801A, CHG PMPs TO COLD LEG INJ ISOL VLV, and containment.
- NO other leaks exist.

Current plant conditions are:

- 2FI-917, HIGH HEAD SI FLOW, is pegged HIGH.
- Pressurizer level is 28% and STABLE.
- Pressurizer pressure is 2100 psig and slowly RISING.
- RCS temperature is 557 °F and STABLE.
- The crew has just completed the Immediate Actions of 2BEP-0, REACTOR TRIP OR SAFETY INJECTION.

With the above conditions and in accordance with proper procedure usage, the leak will be isolated by MCR actions performed in ...

- a. 2BCA-1.2, LOCA OUTSIDE CONTAINMENT
- b. 2BEP ES-1.1, SI TERMINATION
- c. 2BEP-1 LOSS OF REACTOR OR SECONDARY COOLANT
- d. 2BOA PRI-1, EXCESSIVE PRIMARY PLANT LEAKAGE

ANSWER:

b.

REFERENCE:

Horsenote CV-1

2BEP-0 transition at step 24 to ES1.1

2BEP ES-1.1 SI termination, the first 6 steps

BANK

HIGHER

K/A: 006A211: Emergency Core Cooling System (ECCS): Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Rupture of ECCS header

EXPLANATION:

The question meets the KA by testing the examinee's ability to use procedures to mitigate consequences of ECCS header rupture. The question is SRO level based on the required assessment of conditions and selection of the appropriate procedure.

SRO EXAMINATION

With the given plant parameters, the first procedural directed transition from 2BEP-0 is to 2BEP ES1.1. Steps 1 through 6 of ES1.1 will terminate hi head SI flow and close 2SI8801A and B which will isolate the leak. The leak will be isolated from the RCS side by a check valve. See Horse Note CV-1.

2BOA PRI-1, is incorrect as that assumes operation is in mode 1,2 or 3 with greater than P-11 and no SI occurred. The procedure diagnostic steps do not work properly with an active SI. Additionally there is no procedure transitions from E-0 to Pri-1.

2BEP-1 is incorrect. Transition from E0 to E1 is based on containment rads, cnmt pressure, or sump level. All 3 of these parameters are given as normal here as there are no other leaks inside the containment.

Transition to 2BCA1.2 is plausible as it is contained as step 32 however, it is based upon high aux. building rads and an evaluation that the RCS is leaking outside containment. With given conditions, only RWST water is being leaked into the A.B. therefore, rads should be normal and leakage cannot be evaluated as RCS due to normal RCS parameters.

SRO EXAMINATION

QUESTION # 087

Given:

- Unit 2 is in MODE 5 having just completed a core reload.
- The System Engineer and an NSO are executing a planned activity and are currently re-energizing the 7300 cabinets in accordance with BOP RP-11, 7300 CABINET POWER SUPPLY ENERGIZATION/DE-ENERGIZATION.
- The System Engineer believes a breaker may have been inadvertently mispositioned.

Per OP-AA-108-101, CONTROL OF EQUIPMENT AND SYSTEM STATUS, who is responsible for completion of Mispositioned Plant Components Requirements in accordance with OP-AA-108-112, PLANT STATUS AND CONFIGURATION?

- a. Outage Planning
- b. System Engineering
- c. Shift Management
- d. Work Control

ANSWER:

c.

REFERENCE:

OP-AA-108-101, pages 2 and 3

NEW

FUNDAMENTAL

K/A: 012 2.2.14: Reactor Protection System (RPS): Equipment Control: Knowledge of the process for controlling equipment configuration or status.

EXPLANATION:

Question meets the KA by testing the examinee on the process for controlling equipment configuration, in this case, specifically on the reactor protection system.

The question is Low Cog

The question is at the SRO level, as Shift Management would be performing this function

The correct answer is based on section 3.4 of OP-AA-108-101

The distracters are plausible because the question places the examinee in a situation where the System Engineer is present (system engineer), the unit is in an outage (outage planning) performing a planned activity (work control).

SRO EXAMINATION

QUESTION # 088

Given:

- Unit 1 is at 60% power and in a normal alignment for this power level.
- The 1A, 1B, and 1C RCFCs are ALL running in fast speed. 1D is in STBY.
- Annunciator 1-3-C5, RCFC VIBRATION HIGH, has just alarmed on the 1C RCFC.

Per the Annunciator Response procedure and the Technical Specifications, answer the following:

1. You will direct the NSO to ...
2. IF the RCFC is determined to be INOPERABLE what is the MAXIMUM completion time to restore it to OPERABLE status per Tech Specs.?
 - a. 1) START 1D RCFC and STOP 1C RCFC
2) 3 Days
 - b. 1) START 1D RCFC and STOP 1C RCFC
2) 7 Days
 - c. 1) SHIFT 1C RCFC to low speed
2) 3 Days
 - d. 1) SHIFT 1C RCFC to low speed
2) 7 Days

ANSWER:

b.

REFERENCE:

BAR 1-3-C5

NEW

FUNDAMENTAL

K/A: 022A202: Containment Cooling System (CCS): Ability to (a) predict the impacts of the following malfunctions or operations on the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Fan motor vibration

EXPLANATION:

Question meets the KA by testing the examinee on RCFC High Vibration and the mitigating strategy as delineated in the BAR response. The question is SRO level based on knowledge of the applicable Tech Spec "below the line" information. The question is Low cog based on recalling facts to obtain the correct answer. The impact on the CCS system is that Tech Specs may have to be entered and to prevent fan damage the fan is stopped not shifted to low speed. Per T/S this places us on a 7 day clock not to exceed 14 days from the time it was discovered not to meet the LCO.

Per the BAR the fan with high vibrations is stopped and the standby fan is started.

SRO EXAMINATION

All distracters are plausible based on examinee knowledge.

SRO EXAMINATION

QUESTION # 089

Given:

- Both units are at 100% power
- The operating crew is performing BOP AP-53, ISOLATING SYSTEM AUX TRANSFORMER 242-1 AND 242-2 WHILE UNIT IS AT POWER, for a scheduled maintenance SAT outage.

Unit 1 is in a normal alignment EXCEPT:

- ACB 1414, BUS 241 FEED TO 4KV BUS 141 is CLOSED
- ACB 1424, BUS 242 FEED TO 4KV BUS 142 is CLOSED

Unit 2 has the following ESF electrical alignment:

- ACB 2412, SAT 242-1 FEED TO 4KV BUS 241, is OPEN and RACKED OUT
- ACB 2422, SAT 242-2 FEED TO 4KV BUS 242, is OPEN and RACKED OUT
- ACB 2414, BUS 141 FEED TO 4KV BUS 241 is CLOSED
- ACB 2424, BUS 142 FEED TO 4KV BUS 242 is CLOSED

BOTH units DGs are in standby with ALL output breakers OPEN in NAT

Answer the following:

1. Currently, Tech Spec 3.8.1- AC SOURCES OPERATING, Condition A, One or More Busses with One Required Qualified Circuit Inoperable is required to be entered for ...
2. The MAXIMUM time allowed in this configuration is ____ .
 - a. 1) BOTH units
2) 14 days
 - b. 1) BOTH units
2) 72 hours
 - c. 1) Unit 2 ONLY
2) 14 days
 - d. 1) Unit 2 ONLY
2) 72 hours

ANSWER:

b.

REFERENCE:

T S 3.8.1 LCO and Bases

NEW

HIGHER

K/A: 062 2.2.42: A.C. Electrical Distribution: Equipment Control: Ability to recognize system parameters that are entry-level conditions for Technical Specifications.

SRO EXAMINATION

EXPLANATION:

Question meets the KA by testing the examinee on the recognition of system parameters that are entry level conditions for Tech Specs on the Electrical Distribution system. The question is SRO level because of knowledge of the bases of TS 3.8.1 is needed to answer the question. Question is high cog due to the analysis of the current unit condition and assessment of the TS.

TS 3.8.1 LCO requires 2 qualified sources per bus between offsite transmission network and onsite Class 1E AC Elec. Power Dist. Sys. The bases describes the NORMAL and RESERVE circuits for each unit. Both units are in the action statement since the U-2 SAT feed breakers to the U-2 ESF busses is in NORMAL path for U-2 and the RESERVE path for U-1. Unit 2 and Both units are plausible distracters. The second part of the question refers to "below the line" detail, making the second part of the question SRO level also. The correct answer is 72 hours (3 days). 14 days is plausible. The examinee may mistake the time clocks because this is the time used as the time used for Condition B to be met, not condition A.

SRO EXAMINATION

QUESTION # 090

Given:

- You are the WEC Supervisor
- Unit 1 is at 78% power in "coastdown" prior to the start of the next refueling outage
- Contract personnel are in the containment performing preparation work
- Containment Access is through the Containment Access Facility (CAF)

The Access Control Guard reports to you that the CAF entrance inner door CANNOT be opened from INSIDE containment.

With this condition, your action, per BAP 1450-1, ACCESS TO CONTAINMENT, is to ...

- a. continue to enter containment through the CAF but exit through 426' elevation of the FHB.
- b. redirect ALL containment entry/exit activities to be performed at 426' elevation of the Fuel Handling Building.
- c. contact the Containment Coordinator for direction.
- d. evacuate the containment.

ANSWER:

d.

REFERENCE:

BAP 1450-1, page 1

NEW

FUNDAMENTAL

K/A: 103A202: Containment System: Ability to (a) predict the impacts of the following malfunctions or operations on the containment system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Necessary plant conditions for work in containment

EXPLANATION:

Question meets the KA by testing the examinee on a containment airlock malfunction while the containment is manned and use BAP 1450-1 in order to mitigate the consequences of the hatch malfunction. The question is Low Cog and of the SRO Level. IT is the SROs job to make containment evacuation "calls".

The correct answer is based on step 3.2.3.2 (pg. 1) of BAP 1450-1.

All distracters are plausible based on the examinee's misconceptions, as they are actions that could be taken to keep the work going.

SRO EXAMINATION

QUESTION # 091

Given:

Unit 1 is at 100% power in a normal full power alignment EXCEPT:

- ALL bistables associated with Pressurizer pressure channel 1PT-458 are TRIPPED per 1BOA INST-2 , OPERATION WITH A FAILED INSTRUMENT CHANNEL

Which of the following will be the procedure flowpath you will direct your crew to follow WHEN 1A T_{ave} channel fails HIGH?

- a. 1BGP 100-4, POWER DESCENSION and shutdown the unit within 7 hours.
- b. 1BEP-0, REACTOR TRIP OR SAFETY INJECTION, then to 1BEP ES-1.1, SI TERMINATION.
- c. 1BOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL, Attachment A, RCS NARROW RANGE RTD CHANNEL
- d. 1BEP-0, REACTOR TRIP OR SAFETY INJECTION, then to 1BEP ES-0.1, REACTOR TRIP RESPONSE.

ANSWER:

d.

REFERENCE:

Bistable trips of 1BOA Inst-2, attachment A and B

NEW

HIGHER

K/A: 016A201: Non-Nuclear Instrumentation System (NNIS): Ability to (a) predict the impacts of the following malfunctions or operations on the NNIS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Detector failure

EXPLANATION:

Question meets the KA by testing the examinee on a non-nuclear instrumentation failure, specifically a detector failure, and the examinee must predict the impact of the failure along with selecting the proper procedure to mitigate the effects from said failure. The question is High Cog and at the SRO level, as the SRO will direct the crew procedure transitions.

The failed PT-458, with the associated tripped bistables places the unit in a half tripped condition for LO PZR Press SI, LO PZR Press Rx trip, HIGH Pzr Press Rx Trip and OT-delta T Rx trip on 1 channel (loop D). When the Tave instrument failed High on loop 1A, a 2 out of 4 coincidence is made up on OT-delta T Rx trip. This results in a reactor trip. When the reactor trips, the crew will enter 1 BEP-0 and then transition to 1BEP ES-0.1 to stabilize/recover the plant.

Transitioning to ES1.1 is plausible if the examinee feels an SI signal will be generated with the Reactor Trip

Entering 1BOA INST-2 is plausible if the examinee feels a reactor trip will not occur

Entering 1BGP 100-4 to perform a shutdown is plausible if the examinee feels we have entered

SRO EXAMINATION

TS 3.0.3

SRO EXAMINATION

QUESTION # 092

Given:

- You are the Unit 1 Unit Supervisor.
- The unit is at 100% power and in a normal full power alignment

The follow annunciators have just ALARMED:

- 0-37-A4, UNIT 1 AREA FIRE
- 1PM09J, 1S-29, AUTOMATIC SUPPRESSION TURB BRNG

The Turbine 1 Equipment Operator has just reported the existence of a fire at the number 7 main turbine/generator bearing.

Your response, as the Unit Supervisor, to this event per BAP 1100-10, RESPONSE PROCEDURE FOR FIRE is to notify the ...

- a. Fire Marshall and begin E-Plan evaluation.
- b. Shift Manager and begin E-Plan evaluation.
- c. Shift Manager and begin Reportability Manual evaluation.
- d. Fire Marshall and begin Reportability Manual evaluation.

ANSWER:

b.

REFERENCE:

BAP 1100-10 pg 3

BAR 1PM09J-B20

NEW

FUNDAMENTAL

K/A: 045 2.4.27: Main Turbine Generator (MT/G) System: Emergency Procedures / Plan: Knowledge of "fire in the plant" procedures.

EXPLANATION:

Question meets the KA by testing the examinee on knowledge of the Byron Response Procedure for Fire procedure due to a main turbine generator bearing fire. The question is low cog and at the SRO level.

Note: The direction to go to BAP 1100-10 is found the annunciator response procedure for suppression zone 1S-29 (1PM09J-B20)

The correct answer is found in BAP 1100-10, step 1.b 1) on page 3 of 11. The US is to notify the SM and evaluate for e-plan.

The distracters are all plausible but incorrect per the procedure. It is plausible that the US would contact the Fire Marshall and it is also plausible that the US would evaluate the reportability manual.

SRO EXAMINATION

QUESTION # 093

Given:

A LOCA has occurred on Unit 1

During the initial performance of 1BEP-0, REACTOR TRIP OR SAFETY INJECTION, at step 15, the following plant conditions are noted:

- Containment pressure is 6 psig and RISING
- CETCs indicate 820°F
- RCS pressure is 1750 psig and STABLE
- SG pressures are 1175 psig
- BOTH AF pumps failed to start and CANNOT be manually started

SG Levels (NR)are:

1A - 25%

1B - 24%

1C - 26%

1D - 30%

Based on the above conditions, the NEXT procedure the US will transition to is ...

- a. 1BFR-C.2, RESPONSE TO DEGRADED CORE COOLING, because core cooling is the highest priority safety function NOT being met.
- b. 1BEP-1 LOSS OF REACTOR OR SECONDARY COOLANT, because SG levels are currently adequate.
- c. 1BFR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, and 1BFR-H.1 will be performed because a secondary heat sink is necessary.
- d. 1BFR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, then immediately transition to 1BFR-C.2, RESPONSE TO DEGRADED CORE COOLING, because a secondary heat sink is NOT required.

ANSWER:

c.

REFERENCE:

1BEP-0 step 15 RNO located on page 13

BANK

HIGHER

K/A: 035A206: Steam Generator System (S/GS): Ability to (a) predict the impacts of the following malfunctions or operations on the GS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Small break LOCA

EXPLANATION:

Question meets the KA by testing the examinee on the ability to predict the impact on SG operations of a small break LOCA and use procedures to mitigate the consequences. The question is High Cog because of the assessment and it is at the SRO level for the procedure

SRO EXAMINATION

transitions which is the responsibility of the SRO.

1BEP-1 is incorrect because SG levels are not adequate based on adverse containment but it is plausible

1BFR-C.2 is plausible because this safety function comes before heat sink, over is incorrect because HS is red and CC is orange

H.1 to C.2 is plausible because some procedures transition this way making it plausible, but this one doesn't.

With No AF flow and Lo SG level transitioning to H-1 is the correct answer.

SRO EXAMINATION

QUESTION # 094

Given:

A NSO has the following 2 week schedule.

- This is during a NON-outage period and all work to be performed is covered by work hour rules.
- The starting time for each shift FALLS ON THE LISTED DAY: i.e. the first shift listed starts at 7 pm on Sunday night.
- Today's date is 1/5.
- An emergent activity needs to be performed requiring an extra NSO to be called out to work on 1/5 from 3 to 11pm to complete this activity.

Would you call this NSO to work the 1/5 3-11pm shift? If the answer is no, the reason is ...

Sunday	1/1	7pm - 7am
Monday	1/2	7pm - 7am
Tuesday	1/3	7pm - 7am
Wednesday	1/4	OFF
Thursday	1/5	OFF
Friday	1/6	11am - 7pm
Saturday	1/7	7am - 7pm
Sunday	1/8	11pm - 7am
Monday	1/9	11pm - 7am
Tuesday	1/10	7pm - 7am
Wednesday	1/11	7pm - 7am
Thursday	1/12	OFF
Friday	1/13	OFF
Saturday	1/14	OFF

- a. Yes, no work hour limits have been exceeded.
- b. No, greater than 72 hours worked in a 7 day period.
- c. No, less than a 10 hour break between successive work periods.
- d. No, no 34 hour break in a nine (9) day period.

ANSWER:

d.

REFERENCE:

LS-AA-119 page 10

NEW

HIGHER

K/A: 2.1.5: Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.

EXPLANATION:

SRO EXAMINATION

Question meets the KA as it tests the examinee on the application of the administrative aspects of overtime limitations. The question is High cog due to the calculations and it is at the SRO level, as the SRO performs the callouts for emergent O.T.

All procedural requirements are currently met. If the individual works the callout shift, it would violate the work hour rules contained in LS-AA-119 pg 10 section 5.1.1. In this case the 34 hour break in any 9 day period. Between the first Tuesday (actually, Weds. morning at 7 am, and Thursday at 3 pm , there is only a 32 hour break. There is no 34 hour break in a nine day period.

All distracters are plausible because these are violations of 10 CFR26 rules.

SRO EXAMINATION

QUESTION # 095

Given:

- An operating surveillance is commenced on a Monday morning that is expected to take several days to complete.
- On Wednesday afternoon of the same week, an RO assigned to continue work on the surveillance discovers that the procedure revision being used was superseded with an editorial change just that Wednesday morning.
- The RO comes to you with this information and asks you to determine how to proceed.

What is your action/decision, as SRO, in accordance with HU-AA-104-101, PROCEDURE USE AND ADHERENCE?

- a. Initiate a temporary procedure change to the old revision, to match the current revision, then the surveillance can be completed using the superseded (old) revision.
- b. Transfer data and placekeeping from the superseded revision to the new revision. NO provision exists for using the superseded revision.
- c. After reviewing the old revision ensuring that it can be performed as written, the surveillance can be completed using the superseded (old) revision.
- d. The surveillance must be re-performed from the beginning with the latest revision. NO provision exists for using the superseded revision.

ANSWER:

c.

REFERENCE:

HU-AA-104-101, pg 11

BANK

FUNDAMENTAL

K/A: 2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation.

EXPLANATION:

Question meets the KA as it tests the examinee to perform plant procedures during all modes of operation (i.e. under different situations as they arise). It is Low Cog and is at the SRO level as the question posits what is the SRO to perform. This determination is made by the SRO.

The correct answer is based on procedure step 4.9 (page 11 of 14) of HU-AA-104-101, which states the if the supervisor determines that the activity is not impacted by the change, then he can authorize the continuation of the procedure using the old rev. based on work that is already in progress.

Section 3.1.3 states that only current revisions may be used making these distracters plausible. Temp procedure changes are also used at the station making this distracter plausible.

SRO EXAMINATION

SRO EXAMINATION

QUESTION # 096

Given:

- During a routine swap of condensate pumps, the 1C pump did NOT start.
- An IR was written and work package prepared to troubleshoot the cause of the pump NOT starting.
- The pump is currently NOT out of service.
- The maintenance crew has just arrived to begin troubleshooting.

Your responsibility as the Unit Supervisor for this activity, in accordance with MA-AA-716-004, CONDUCT OF TROUBLESHOOTING, is ...

- a. develop the troubleshooting plan AND approve the troubleshooting plan
- b. approve the troubleshooting plan AND execute the troubleshooting plan
- c. re-assess unit risk based on the troubleshooting plan AND execute the troubleshooting plan
- d. re-assess unit risk based on the troubleshooting plan AND authorize the work

ANSWER:

d.

REFERENCE:

MA-AA-716-004 page 5

NEW

FUNDAMENTAL

K/A: 2.2.20: Knowledge of the process for managing troubleshooting activities.

EXPLANATION:

Question meets the KA by testing the examinee on the process for managing troubleshooting activities. Question is low cog and SRO Level. Question asks for SRO responsibilities concerning the execution of troubleshooting.

Correct answer is based on step 3.3.5 (pg 5) of MA-AA-716-004 for reassessment of risk and based on Shifts authorization to begin work as defined by the Work Control Process.

Re-assessing risk is correct (a shift function) but executing the troubleshooting plan is a maintenance function.

Developing the T/S plan is a maintenance function (making this distracter incorrect) and executing the work is also a maintenance function

Approving the T/S plan is sometimes a shift function but executing is a maintenance function, making this distracter incorrect.

Developing a T/S plan is plausible based on Operations department knowledge of these components.

SRO EXAMINATION

QUESTION # 097

Given:

- The unit has been operating at 100% power for 30 days.
- The unit tripped during a Loss Of Off-Site Power event.
- CST level is at Tech Spec MINIMUM level.
- Both AF pumps are running.
- S/G PORVs are being used to dump steam to control the RCS at NOT and NOP.

Discussion is ongoing as to whether to place the Unit in MODE 4 on shutdown cooling to allow plant repairs and surveillance testing.

According to the Tech Spec Bases, what is the MAXIMUM time, IN HOURS, the plant may remain in the present condition before commencing a cooldown, and still be assured there is an adequate water supply from the CST to the AF pumps?

- a. 2
- b. 4
- c. 6
- d. 8

ANSWER:

a.

REFERENCE:

TS 3.7.6

BANK

FUNDAMENTAL

K/A: 2.2.25: Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.

EXPLANATION:

Question meets the KA by testing the examinee on the basis of a Tech Spec. LCO. It is SRO knowledge based on the basis of an LCO that is NOT a Safety Limit. The question is Low Cog level.

IAW TS 3.7.6 (CST) bases, 212,000 gallons is based on 2 hours in the HSB @ NOT, NOP condition followed by a cooldown of 50°F/hr to shutdown cooling conditions, followed by a period of not longer than 1 hour to warm up the RH system prior to placing in service in the SDC mode.

All distracters are plausible based on the examinees misconceptions.

SRO EXAMINATION

QUESTION # 098

Given:

- Unit 1 has experienced an event requiring Emergency Plan implementation.
- Personnel are preparing to enter Area 5 Penetration Area to rescue an injured worker.
- The rescuers are expected to receive 10 Rem exposure during the rescue.
- Command and Control has been transferred to the EOF.

Which of the following is the HIGHEST level of authority required to authorize this exposure?

- a. Corporate Emergency Director
- b. OSC Director
- c. Station Emergency Director
- d. Radiation Protection Manager

ANSWER:

c.

REFERENCE:

EP-AA-113-F-02

BANK

FUNDAMENTAL

K/A: 2.3.4 Knowledge of radiation exposure limits under normal or emergency conditions.

EXPLANATION:

Question meets the KA because it tests the examinee on the knowledge of who will authorize an emergency exposure. The authorization of that emergency exposure is the Station Emergency Director responsibility which may be filled by an on-shift SRO. It may be the SRO's responsibility to fill out and authorize the 10 Rem Emergency Exposure.

Per Form EP-AA-113-F-02, it is the Station Emergency Director that approves the authorization. The Shift Manager (Shift Emergency Director) may approve this exposure prior to transferring C & C to the Station Emergency Director.

The Rad Protection Manager review the form but does not approve it.

The OSC Director and Corporate Emergency Director is an EP position but does not authorize the exposure, but may be considered plausible based on examinee misconceptions.

SRO EXAMINATION

QUESTION # 099

Given the following plant conditions:

- 0C and 0D VA Exhaust Fans are OOS.
- A Unit 2 Containment gaseous release is pending.

In addition to the Radiation Protection Department, which position holds the responsibility to waive the requirement for VA fans to be in operation, to perform a Containment release?

- a. Operations Director
- b. Unit Supervisor
- c. Station Duty Officer
- d. Shift Manager

ANSWER:

d.

REFERENCE:

BCP 400-TCNMT/ROUTINE, Page 12

BANK

FUNDAMENTAL

K/A: 2.3.11 Ability to control radiation releases.

EXPLANATION:

Question meets the KA by testing the examinee on the controls necessary to commence a containment release. The question is low cog. The question is SRO Level because the SRO approves the release permit/release.

The Shift Manager and RP Department may waive the requirement for VA exhaust fans in operation for releases. BCP 400-TCNMT/ROUTINE, Revision 23, Page 12, Section 4.2 Positions used as distracters are all responsible for reviews or approvals of other administrative items.

The Plant Manager may have signature authority for the Shift Manager, but they are signing FOR the Shift Manager position. It would be the same for a SM qualified Unit Supervisor. The Shift Manager position has the authority to waive the requirement for fans in operation.

SRO EXAMINATION

QUESTION # 100

Given the following plant conditions on Unit 1:

- The reactor is at 50% power.
- Annunciator 1-7-B3 "RCP SEAL LEAKOFF FLOW HIGH" is in alarm.
- 1A RCP #1 seal leakoff flowrate indicates 8.1 gpm.
- 1A RCP #2 SEAL LEAKOFF FLOW HIGH alarm is printed.
- 1A RCP #1 seal DP indicates > 400 psid.
- ALL RCP temperatures are stable in their normal range.
- ALL RCP seal injection flows are 10-12 gpm.
- There are no RCP instrument failures.

Based on plant conditions, the actions the crew will take include which of the following actions?

Enter 1BOA RCP-1, REACTOR COOLANT PUMP FAILURE and ...

- a. TRIP the reactor, TRIP the 1A RCP, and enter 1BEP-0 "REACTOR TRIP OR SAFETY INJECTION.
- b. take the unit off-line in accordance with 1BGP 100-4 POWER DESCENSION, and TRIP the 1A RCP within 8 hours.
- c. monitor RCP parameters contained within 1BOA RCP-1 AND return to procedure in effect.
- d. maintain AT LEAST 9 gpm seal injection flow to the 1A RCP, and monitor RCP parameters contained within 1BOA RCP-1.

ANSWER:

a.

REFERENCE:

1BOA RCP-1 step 8, page 10

NEW

HIGHER

K/A: 2.4.11 Knowledge of abnormal condition procedures.

EXPLANATION:

Question meets the KA by testing the examinee on actions contained in BOA RCP-1. The question is high cog based on detailed analysis of conditions contained within the stem. The question is SRO level based on knowing detailed procedure flowpaths contained within the procedure it self. The entering of the procedure is given, in the stem.

All distracters are plausible as they are contained within the procedure.