Final Submittal

(Blue Paper)

OCONEE NUCLEAR STATION

05000269/2006301, 05000270/2006301, AND 05000287/2006301

JUNE 19 - 28, 2006

JUNE 30, 2006 (WRITTEN)

Senior Operator Written Examination

OCONEE 2006-301

FINAL SRO EXAM

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

Applicant Information	
Name:	
Date: June 30, 2006	Facility/Unit: Oconee Nuclear Plant
Region: II	Reactor Type: B&W
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination you must achieve a final grade of at least 80.00 percent overall, with 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require a final grade of 80.00 percent to pass. You have 8 hours to complete the combined examination, and 3 hours if you are only taking the SRO portion.

Applicant Certification

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

_____

Applicant's Signature

Results	
RO/SRO-Only/Total Examination Values:	____ / ____ / ____ Points
Applicant's Scores:	____ / ____ / ____ Points
Applicant's Grade:	____ / ____ / ____ Percent

1. 001AK2.05 001

The following Unit 1 conditions exist:
- Core is at the End-of-Life
- Reactor Power = 95%
- APSRs are at 80% withdrawn
- OP/1/A/1102/004 Enclosure 4.4 End of Cycle APSR withdrawal is in progress
- Plant is in normal configuration for APSR withdrawal

Current events:
- Operators observe APSRs moving out of the core without operator action

Assuming the APSRs continue to withdraw to their full-out position, which one of the following is correct as the rods continue movement out of the core?

A. The CRD Travel Out Light will be LIT.

Group 7 will automatically compensate for the reactivity change.

B. The CRD Travel Out Light will be LIT.

Group 7 will require manual operation to compensate for the reactivity change.

C. The CRD Travel Out Light will NOT be LIT.

Group 7 will automatically compensate for the reactivity change.

D. The CRD Travel Out Light will NOT be LIT.

Group 7 will require manual operation to compensate for the reactivity change.

K/A
Continuous Rod Withdrawal / 1
Knowledge of the interrelations between the Continuous Rod Withdrawal and the following: Rod motion lights.

K/A MATCH ANALYSIS
Rod motions lights do not illuminate for movement of the APSRs. The applicant must know how these rod motion lights behave for APSR movement in order to correctly answer the question. A continuous rod withdrawal event is give in the stem, then the applicant must know how the indications will respond to the continuous rod withdrawal.

ANSWER CHOICE ANALYSIS
A. Incorrect. Travel out light does not light for APSRs. Diamond is in auto. Group 7 rods will automatically compensate for the reactivity change. Also plausible because CRD Travel In/Out Lamps do light for rods other than APSRs.
B. Incorrect. Both pieces are incorrect. See others for plausibility explanation.
C. Correct. See referenced lesson plan Page 31 and 32.
D. Incorrect. Second part is incorrect. See others for plausibility.

REFERENCES
1. Lesson Plan IC-CRI, Control Rod Indication, Rev. 09a.

Changed inches to % withdrawn to agree with ONS instrumentation

Xenon Overlap Fault lamp is not used by the operators. No procedures or actions are associated with this light. Information is in the lesson plan for historical information only. This light is not on the the new digital CRD sytem now on Unit 3. Unit 1 will get this mod this fall.

Modified question.

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Added bullets:
- OP/1/A/1102/004 Enclosure 4.4 End of Cycle APSR Withdrawal is in progress
- Plant is in normal configuration for APSR withdrawal. This indicates the ICS is in full automatic.

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MAB OK

2. 001K6.14 001

The following Unit 2 conditions occur while operating at full power:
- Normal (A) CRD power supply voltage regulator fails high (> 150 V)
- The 'F' contactor opens

Which one of the following correctly describes the condition of the control rods?

A. All safety rods trip. All regulating rods trip.

B. All safety rods trip. No regulating rods trip.

C. No safety rods trip. All regulating rods trip.

D. No safety rods trip. No regulating rods trip.

K/A
Control Rod Drive
Knowledge of the effect of a loss or malfunction on the following CRDS components:
Location and interpretation of reactor trip breaker.

K/A MATCH ANALYSIS
The malfunction on the RTB is the CRD power supply voltage regulator failure, which has an effect on which rods trip. The applicant must have knowledge of where the RTBs are located within the one line circuits in order to know how the control rods will be affected.

ANSWER CHOICE ANALYSIS
A. Incorrect. Plausible because applicant may confuse which RTBs will cause a trip.
B. Incorrect. Plausible - same reason as 'A'.
C. Correct. The "A" and "C" RTBs open due to the voltage regulator failure. This will also open the "E" contactor. Having both the "E" and "F" contacts open will cause the reg rods to trip. The CC phase of safety rods are still holding the rods out of the core.
D. Incorrect. Plausible because if the question stated that the "E" (vice the "F") contactor opens, then this answer would be correct.

REFERENCES
1. Lesson Plan IC-RPS, Reactor Protective System, Rev. 14.
2. Oconee I & C Exam Bank Question 46, IC022503.

Changed stem to read "normal". This is the ONS designation.

Changed stem to Unit 2. This question no longer applies to Unit 3 due to the replacement of the Unit 3 CRD system.

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No additional changes

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Changed to Fundamental level of knowledge

MAB OK

3. 002K3.03 001

Unit 1 was operating at 100% power when the following trends were observed:

- RCS pressure began to lower
- Pressurizer level began to rise
- SCM began to lower
- Quench tank level began to rise
- Quench tank pressure began to rise

Which one of the following correctly describes the initial effect on containment when these trends are observed?

A. Containment pressure rises. Containment radiation levels rise.

B. Containment pressure rises. Containment radiation levels remain constant.

C. Containment pressure remains constant. Containment radiation levels rise.

D. Containment pressure remains constant. Containment radiation levels remain constant.

K/A
Reactor Coolant
Knowledge of the effect that a loss or malfunction of the RCS will have on the following: Containment.

K/A MATCH ANALYSIS
Indications of a vapor space loca are present, which means that discharge from PORV will be contained in PRT, thus having no effect on containment parameters until the rupture disk blows.

ANSWER CHOICE ANALYSIS
A. Incorrect. Initially no discharge to containment to cause ctmt P to rise or rad levels to rise.
B. Incorrect. Initially no discharge to containment to cause ctmt P to rise.
C. Incorrect. Initially no discharge to containment to cause ctmt rad levels to rise.
D. Correct. There will no effect on ctmt until rupture disk blows.

Plausibility based around whether applicant recognizes status of QT rupture disk. If disk is assumed to have blown, then containment pressure would rise. With normal levels of RCS activity an applicant would have to determine what the effects on ctmt radiation would be.

REFERENCES
N/A

No utility comments.

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MAB OK

4. 003AG2.4.10 001

The following Unit 1 conditions exist:
- Diamond is in Auto
- Reactor Power = 50%
- Rod 6 of Group 2 drops fully into the core

Which one of the following correctly lists the two alarms that will annunciate given the above plant conditions?

A. ICS RUNBACK and CRD OUT INHIBIT

B. ICS RUNBACK and QUADRANT POWER TILT

C. CRD POSITION ERROR and CRD OUT INHIBIT

D. CRD POSITION ERROR and QUADRANT POWER TILT

ENSURE THAT THE UTILITY AGREES THAT THE SELECTED ROD WILL CAUSE THE ABOVE INDICATIONS - THEY SAID THEY WOULD LOOK AT IT WHEN THEY GET THE EXAM FOR REVIEW.

K/A
Dropped Control Rod / 1
Knowledge of annunciator response procedures.

K/A MATCH ANALYSIS
K/A is generic in the respect that it only requires knowledge of annunciator response procedures. K/A is matched because this question requires knowledge of whether or not specific annunciators should be in alarm with the given plant conditions - which is knowledge of the ARG.

ANSWER CHOICE ANALYSIS
A. Incorrect. ICS runback will not occur because power is 50%. CRD OUT INHIBIT will not occur because power will not reach 60%. Plausible because both of these would occur if rod was dropped at higher power level.
B. Incorrect. See above.
C. Incorrect. CRD position error will occur, but the CRD OUT INHIBIT will not occur.
D. Correct. Both will occur. Check with utility to be sure, but looking at the COLR and the ARG, along with the SAE-L, it certainly appears that this is the case.

REFERENCES
1. Exercise Guide SAE-L 009, Dropped Rod, 11/21/2005.
2. OP/1/A/6101/002, Alarm Response Guide 1SA-02, Rev. 16.
3. OP/1/A/6101/004, Alarm Response Guide 1SA-04, Rev. 11.

No utility comments.

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MAB OK

5. 003K6.02 001

The following Unit 3 conditions exist:

- Reactor is operating at 70% power
- Instrument air pressure is 85 psig
- Seal Injection Flows to the RCPs are as follows:
  - RCP A1 < 4 gpm for 90 seconds
  - RCP A2 < 4 gpm for 45 seconds
  - RCP B1 < 4 gpm for 45 seconds
  - RCP B2 < 4 gpm for 45 seconds

- Current RCP parameters are as follows:

	3A1	3A2	3B1	3B2
Motor Stator Temp (°F)	300	290	280	280
Seal Return Temp (°F)	255	261	240	245
Seal Inlet Temp (°F)	100	101	100	100
Seal Return Flow (gpm)	0.1	0.1	0.1	0.1
Seal Press Upper Cav (psig)	1054	1046	695	713
Seal Press Lower Cav (psig)	2120	2102	1355	1415

Which one of the following correctly states the required operator actions dictated by the above plant conditions?

A. Immediately trip the reactor, then stop all RCPs.

B. Reactor may remain at 70% power. Stop RCP 3A1.

C. Immediately trip the reactor, then only stop RCPs 3A1 and 3A2.

D. Reactor may remain at 70% power for a maximum of 100 hours with all four RCPs operating.

UTILITY NEEDS TO VERIFY THAT THERE IS AN INDICATION FOR RCP 3A2 MOTOR STATOR TEMPERATURE.

K/A
Reactor Coolant Pump
Knowledge of the effect of a loss or malfunction on the following will have on the RCPS: RCP seals and seal water supply.

K/A MATCH ANALYSIS
A partial loss of seal injection flow (seal water supply) has occurred. Seal parameters have degraded which require RCP A1 and A2 to be tripped. Thus the knowledge being tested is the loss of seal water supply and its affect on RCP A1 operation.

ANSWER CHOICE ANALYSIS
A. Incorrect. Not required to stop all RCPs. Plausible because instrument air pressure is lower than normal. When instrument air pressure is less than 80 psig, then CC flow to the RCPs is lost (or potentially lost). If seal injection flow is lost to each pump for > 1 minute, then seal injection flow is isolated to all RCPs. If the applicant assumes that no CC flow existed coincident with a loss of seal injection flow, then a reactor trip would be (or have been) required.
B. Incorrect. Reactor trip is required because Immediate trip criteria is met for 2/4 RCPs. A2 RCP seal return temp = 261 F, which requires stopping RCP A2. A1 RCP Stator Temp = 300 F, which requires tripping of RCP A1. Plausible because Immediate trip criteria for only one RCP would not require tripping of the reactor
C. Correct. RCP trip criteria met for RCP A1 & A2. A1 on stator temp and A2 on seal return temp.
D. Incorrect. As indicated in analysis for 'B', RCP A1 and A2 parameters require the pumps to be tripped. Plausible because seal return flow is almost zero and RCP operation is limited to 100 hours without seal return flow.

Note: What is normal seal inlet temp? I guessed 160 F.
Normal Seal inlet temp ~ 100 F.

REFERENCES
1. AP/3/A/1700/014, Loss of Normal HPI Makeup and/or RCP Seal Injection, Rev. 010.
2. AP/3/A/1700/016, Abnormal Reactor Coolant Pump Operation, Rev. 016.
3. Lesson Plan PNS-HPI, High Pressure Injection, Rev. 22.
4. Lesson Plan SSS-IA, Instrument Air System, Rev. 16.
5. Lesson Plan PNS-CPM, Reactor Coolant Pump Motor, Rev. 12b.
6. Figure from OP-OC-PNS-CPS, Page 17 of 27, Rev. 12.

The stator temperature indications for the 3A2 RCP have been repaired this outage.

The correct answer is now "C".

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Swapped stator values for A1 and A2
Swapped seal temp values for A1 and A2
- to minimize confusion with impending procedure change after U3 outage.
- added unit designators
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Seal inlet temperatures changed to ~ 100 F to match actual plant data

MAB OK

6. 004A4.15 001

Unit 1 initial plant conditions:
- Reactor power = 90% and stable for the previous week
- '1B' purification IX placed in service for delithiation
- ICS is in auto

Current conditions:
- Neutron error = +1.2 and increasing

Based on the above conditions, which one of the following actions is correct per the associated procedure?

A. Per AP/39 (Unintentional Boration), initiate a power decrease to maintain Control Rods in desired band.

B. Per AP/3 (Boron Dilution), open 1HP-13 (Purification IX Bypass), close 1HP-8 (Purification IX Inlet), Close 1HP-9 & 11 (Spare Purif IX Inlet).

C. Per AP/39 (Unintentional Boration), trip the reactor, GO TO Unit 1 EOP.

D. Per AP/3 (Boron Dilution), place 1HP-14 (LDST Bypass) in NORMAL, close 1HP-16 (LDST Makeup Isolation).

K/A
Chemical and Volume Control
Ability to manually operate and/or monitor in the control room: Boron Concentration.

K/A MATCH ANALYSIS
Neutron error is increasing in the positive direction, which is indication of a boration. The K/A is met because the applicant, in order to choose the correct actions to take, must diagnose that a boroation is in progress, which is causing rods to step out.

NOTE
I added that reactor has been at 90% for a week to rule out xenon as being the cause of the negative reactivity addition.
I also deleted the bullet for control rods moving out. The neutron error is enough for the applicants to know that a boroation is taking place and control rods should be moving.
The utility will have a chance to comment on these changes during their review.

ANSWER CHOICE ANALYSIS
A. Correct. AP/39, Page 3 of 9 supports the correct answer.
B. Incorrect. These are actions for a dilution (AP/3). If applicant does not understand how to interpret the neutron error, then a dilution could be incorrectly assumed, thus adding plausibility to this distractor.
C. Incorrect. This answer would be correct only if power was < 6%, per AP/39. Plausible because these actions are required for boration if plant conditions were different.
D. Incorrect. These are actions for a dilution (AP/3). If applicant does not understand how to interpret the neutron error, then a dilution could be incorrectly assumed, thus adding plausibility to this distractor.

REFERENCES
1. AP/1/A/1700/003, Boron Dilution, Rev. 003.
2. AP/1/A/1700/039, Unintentional Boration, Rev. 000.

No utility comments.

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MAB OK

7. 004G2.4.46 001

The following Unit 1 conditions exist:
- Reactor Power = 60%
- HP RCP SEAL INLET HEADER FLOW HIGH/LOW has annunciated
- LETDOWN TEMPERATURE HIGH Statalarm has annunciated
- Letdown Temperature is 132 °F
- Seal Injection Flow = 7 gpm to each pump
- 1HP-5 (Letdown Isolation Valve) is open and allowing flow to the demins

Which one of the following correctly describes the validity of the two alarms, assuming the provided indications are accurate?

A. HP RCP SEAL INLET HEADER FLOW HIGH/LOW is valid.

LETDOWN TEMPERATURE HIGH is valid.

B. HP RCP SEAL INLET HEADER FLOW HIGH/LOW is valid.

LETDOWN TEMPERATURE HIGH is not valid.

C. HP RCP SEAL INLET HEADER FLOW HIGH/LOW is not valid.

LETDOWN TEMPERATURE HIGH is valid.

D. HP RCP SEAL INLET HEADER FLOW HIGH/LOW is not valid.

LETDOWN TEMPERATURE HIGH is not valid.

K/A
Chemical and Volume Control
Ability to verify that alarms are consistent with the plant conditions.

K/A MATCH ANALYSIS
Question tests whether or not two alarms should have come in with a given set of plant conditions.

ANSWER CHOICE ANALYSIS
A. Incorrect. Total seal injection flow must be less than 22 or higher than 42 for the seal alarm to come in. Plausible because on Units 2 and 3, the alarm would come in at a low flow of 30 gpm.
B. Incorrect. See above. Also plausible because the statalarm comes in at 130F, but the demins do not isolate until 135F. Therefore, an applicant may think that the statalarm is not valid, when in fact it is.
C. Correct. See Page 15 of 51 of referenced lesson plan. Also see 1SA-02, window B-2 of referenced ARP.
D. Incorrect. See (B) above for plausibility.

REFERENCES
1. OP/1/A/6101/002, Alarm Response Guide 1SA-02, Rev. 016.
2. Lesson Plan PNS-HPI, High Pressure Injection System, Rev. 22.

Utility does not require operators to memorize alarm setpoints.

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MAB OK

8. 005A2.04 001

The following Unit 1 conditions exist:

- LPI is in the normal DHR mode
- RCS loops are full
- LPI Pump '1C' is running
- 1LP-6 (1C LPI Pump Suction) has drifted to mid position
- LPI Pump '1C' amps are oscillating

Which one of the following describes a correct course of action as dictated by AP/26 (Loss of Decay Heat Removal)?

A. Throttle 1LP-12&14 (LPI Cooler Outlet) to stabilize amps
Allow 1C LPIP to continue to run
Ensure 1LP-5 open
Start the 1A or 1B LPIP

B. Stop all running LPIPs
Verify Suction flow path
Vent LPIP to be started
Start 1A LPIP

C. Throttle 1LP-17&18 (1A & 1B LP Injection) to stabilize amps
Allow 1C LPIP to continue to run
Ensure 1LP-5 open
Start the 1A or 1B LPIP

D. Stop all running LPIPs
Align alternate Decay Heat Drop Line
Vent LPIP to be started
Start 1A LPIP

REFERENCED PROCEDURE DID NOT USE NOUN NAMES FOR SOME OF THE COMPONENTS. DISCUSS WITH UTILITY IF NOUN NAMES ARE NEEDED IN THE QUESTION. THE UTILITY'S DECISION NOT TO USE NOUN NAMES CONSISTENTLY IN PROCEDURES MAY INDICATE THAT THE APPLICANTS NEED TO HAVE TAG NUMBERS MEMORIZED. - THIS COMMENTS REALLY APPLIES THROUGHOUT THE EXAM.

K/A
Residual Heat Removal
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.

K/A MATCH ANALYSIS
The RHR suction valve drifting to mid position has caused a cavitation issue with the running pump. The AP is used to address the issue - mitigating the consequences.

ANSWER CHOICE ANALYSIS
A. Incorrect. Procedure requires that the 'C' pump to be stopped prior to taking other actions. Plausible because you are asking the operator to secure Decay Heat Removal.
B. Correct. Steps taken from AP. Procedure requires that the 'C' pump to be stopped prior to taking other actions.
C. Incorrect. Procedure requires that the 'C' pump to be stopped prior to taking other actions. Plausible because you are asking the operator to secure Decay Heat Removal.
D. Incorrect. Stopping pumps correct, Alternate decay drop line is NOT aligned.Plausible because alternate decay heat drop line is aligned in section 4B (RCS intact and loops NOT full) Refer to AP-26, pg 23 of 93, step 71 Note

REFERENCES
1. AP/1/A/1700/026, Loss of Decay Heat Removal, Rev. 017.
2. OP/1/A/6101/001, Alarm Response Guide 1SA-01, Rev. 009.

Too detailed for closed reference.
Added unit designators.
Changed question to reflect "Major" Mitigation Stratagies

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Utility to provide explanation of distractor plausibility.

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Added RCS loops full to ensure 'D' incorrect.
Added plausiblity explanations

MAB OK

9. 006A3.02 001

Unit 1 initial conditions:
- 100% power
- LPI Pump '1B' has just developed an electrical fault on the motor and its breaker has been racked out
- LPI Pump '1C' is tagged out for maintenance

Current plant conditions:
- RCS Pressure quickly dropped to 100 psig
- ES-4 failed to actuate
- No operator action has occurred

Which one of the following correctly describes the LPI pump motor current and flow indications that the operator will observe based on the above conditions?

A. The '1A' LPI Pump amps are 14 amps.

Indicated '1A' LPI header flow is 3200 gpm.

B. The '1A' LPI Pump amps are 14 amps.

Indicated LPI flow to the core is approximately zero gpm.

C. The '1A' LPI Pump amps are 54 amps.

Indicated LPI flow to the core is approximately zero gpm.

D. The '1A' LPI Pump amps are 54 amps.

Indicated '1A' LPI header flow is 3200 gpm.

UTILITY TO SUPPLY VALUES FOR AMPS.

K/A
Emergency Core Cooling
Ability to monitor automatic operation of the ECCS, including: Pumps.

K/A MATCH ANALYSIS
The question requires knowledge of what the LPI flow instruments and amps will read with a given plant condition. This is requisite knowledge to effectively monitor ECCS pump automatic operation.

ANSWER CHOICE ANALYSIS
A. Incorrect. Amps will be lower than if pump were pumping fluid. Plausible because applicant may think that amps for deadhead ops may be higher than if pump were moving fluid.
B. Incorrect. Amps will be lower than if pump were pumping fluid. Plausible because if ES-3, vice ES-4, failed then the 'A' Train would also be disabled.
C. Incorrect. Flow from the 'A' pump will reach the core. Amps will indicate higher than deadhead value. Plausible because if ES-3, vice ES-4, failed then the 'A' Train would also be disabled.
D. Correct. Flow from the 'A' pump will reach the core. Amps will indicate higher than deadhead value. The ES-4 failing to actuate will disable the 'B' Train, which also has a pump out. But, the 'A' train should be unaffected.

REFERENCES
1. Lesson Plan PNS-LPI, Low Pressure Injection System, Rev. 21.

Added amps and flow.

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MAB OK

10. 006K2.01 001

Unit 1 plant conditions:
- Reactor power = 100%
- 1TD locks out

Based on the above information, which of the following ECCS pumps are inoperable?

A. 1C HPI pump and 1B LPI Pump.

B. 1C HPI pump and 1C LPI Pump.

C. 1B HPI pump and 1B LPI Pump.

D. 1B HPI pump and 1C LPI Pump.

K/A
Emergency Core Cooling
Knowledge of bus power supplies to the following: ECCS pumps.

K/A MATCH ANALYSIS
Applicant must have knowledge of power supply to ECCS pump motors.

ANSWER CHOICE ANALYSIS
A. Correct. TD supplies B LPIP and C HPIPs
B. Incorrect. TD supplies B LPIP and C HPIPs
C. Incorrect. TD supplies B LPIP and C HPIPs
D. Incorrect. TD supplies B LPIP and C HPIPs

Plausibility is based on the question being a memory level item and the pumps and power supplies not being in alpha-numeric order. For instance, the A HPI pump is powered by 1TC, the B pump is powered by 1TE, and the C pump is powered by 1TD. Therefore, the applicant cannot fall back on a systematic approach to determining the power supply, it simply must be known. The LPIPs do follow the convention (A LPIP-TC, B LPIP-TD, C LPIP-TE)

REFERENCES
1. Lesson Plan PNS-HPI, High Pressure InjectionSystem , Rev. 22.

Control power for a 4160 breaker comes from two DC Buses. Control power sources not required operator knowledge.

Reworded to add LPI pump power.

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NRC to review changes

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MAB OK

11. 007K4.01 001

The following Unit 1 conditions exist:

- Reactor power is 80% after a rapid down power
- PORV acuation occurred during the down power
- Quench Tank Temperature is 175 °F
- Quench Tank level is 84 inches and stable
- Operators desire to lower Quench Tank Temperature

Given the current plant conditions, which one of the following correctly describes pump operation for quench tank cooling?

A. ✓ Either the Quench Tank Drain Pump or the Component Drain Pump may be used with its normal start feature.

B. The Quench Tank Drain Pump may be used with its normal start feature, but the Component Drain Pump requires placing the switch in bypass.

C. The Component Drain Pump may be used with its normal start feature, but the Quench Tank Drain Pump requires placing the switch in bypass.

D. Neither the Quench Tank Drain Pump nor the Component Drain Pump may be used with its respective normal start feature.

K/A
Pressurizer Relief/Quench Tank
Knowledge of PRTS design feature(s) and/or interlock(s) which provide for the following:
Quench tank cooling.

K/A MATCH ANALYSIS
The question tests knowledge of which pumps can be used to cool the QT in its current configuration. This tests knowledge of a design feature to cool the QT. There is also an interlock which auto trips both of the mentioned pumps at 80 inches in the QT when the pumps undergoe a normal start. Therefore, the applicant must also have knowledge of this setpoint (interlock) in order to know that both pumps may be used with normal start feature.

ANSWER CHOICE ANALYSIS
A. Correct. Procedurally both pumps may be operated as long as QT level is above 82 inches. (Also, there is an auto trip for both pumps at a QT level of 80 inches.)
B. Incorrect. The Component Drain Pump may also be used with its normal start feature. Plausible because the QT level is below its nominal level.
C. Incorrect. The Quench Tank Drain Pump may also be used with its normal start feature. Plausible because the QT level is below its nominal level.
D. Incorrect. Both pumps may be used with their normal start feature. Plausible because the QT level is below its nominal level.

REFERENCES
1. Lesson Plan PNS-CS, Coolant Storage, Rev. 15a.
2. OP/1/A/1104/017, Quench Tank Operation, Rev. 033. (60040020)

Modified B and C to include ONS nomenclature.

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Changed B&C to remove "must" and add:
"requires placing the switch in bypass" see OP/1/A/1104/017 (Quench Tank Procedure) Encl 4.1 pg 2/3

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MAB OK

12. 008A3.01 001

The following conditions exist on Unit 1:
- '1A' CC Pump is running
- '1B' CC Pump is in auto and off

The air supply to 1CC-8 completely severs. Operators then manually re-open 1CC-8.

Which one of the following correctly describes CC Pump trips and auto starts when 1CC-8 is cycled?

A.✓ The '1A' CC Pump trips when 1CC-8 closes due to loss of instrument air. When 1CC-8 is manually opened, the '1B' CC Pump will automatically start.

B. The '1A' CC Pump trips when 1CC-8 closes due to loss of instrument air. When 1CC-8 is manually opened, the '1B' CC Pump will NOT automatically start.

C. The '1A' CC Pump remains running when 1CC-8 closes due to loss of instrument air. When 1CC-8 is manually opened, the '1B' CC Pump will automatically start.

D. The '1A' CC Pump remains running when 1CC-8 closes due to loss of instrument air. When 1CC-8 is manually opened, the '1B' CC Pump will NOT automatically start.

K/A
Component Cooling Water
Ability to monitor automatic operation of the CCWS, including: Setpoints on instrument signal levels for normal operations, warnings, and trips that are applicable to the CCWS.

K/A MATCH ANALYSIS
Knowledge of pump trip signal from CC-8 closing is tested.

ANSWER CHOICE ANALYSIS
A. Correct. The 'A' pump trips when CC-8 closes. A standing low flow condition (< 575 gpm) will exist due to CC-8 closing. Therefore, when CC-8 is manually opened both pumps will start. See referenced lesson plan pages 17 and 18.
B. Incorrect. Plausible because 'A' pump will trip and 'B' pump was in standby.
C. Incorrect. Plausible because CC-8 closes on ES signal from channels 5 and 6. This failure mechanism is slightly different in that air to CC-8's actuator has failed. If applicant does not know that the pump trip signal is generated from valve position itself, then they may think this to be a credible choice.
D. Incorrect. See above.

REFERENCES
1. Lesson Plan PNS-CC, Component Cooling System, Rev. 11c.

Removed "W" from CCW. Not used at ONS.
Added unit number.

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MAB OK

13. 008AK2.01 001

The following conditions exist:

- RCS Pressure = 2185 psig
- Quench Tank Pressure = 35 psig
- The PORV is stuck partially open

Which one of the following correctly states the approximate temperature of fluid downstream of the PORV?

A. 649 °F

B. 281 °F

C. 260 °F

D. 235 °F

K/A
Pressurizer Vapor Space Accident / 3
Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: Valves.

K/A MATCH ANALYSIS
The partially stuck open PORV is creating a constant enthalpy throttling process, which is the interrelation between the Pzr Vapor Space LOCA and the valve. Verifying tailpipe temperatures is a diverse means of verification of PORV position, which is the cause of the LOCA.

ANSWER CHOICE ANALYSIS
A. Incorrect. This temperature is saturated for current pzr pressure, but since PORV flow is a constant enthalpy process, the downstream temperature would not be at saturation for the pzr. It would more closely approximate saturation temperature of the downstream Quench Tank.
B. Correct. Using Mollier diagram and using absolute pressure values.
C. Incorrect. This temperature can be obtained if the student uses 35 psig without converting to absolute.
D. Incorrect. This temperature can be obtained if the student subtracts 15 psi from the stem value of Quench Tank pressure (20 psia).

REFERENCES
1. Steam Tables / Mollier Diagram.
2. Crystal River 03-301.

No utility comments.

**
***
MAB OK

14. 008K4.02 001

Which one of the following correctly describes the process for CC system startup in accordance with OP/1/A/1104/008, Component Cooling System?

A. Station an operator at the CC Surge Tank to manually maintain water level between 12 and 18 inches.

   Prior to pump start, open the associated discharge valve 1/4 turn to avoid a water hammer condition.

B. Station an operator at the CC Surge Tank to manually maintain water level between 12 and 18 inches.

   Prior to pump start, open the associated discharge valve 1/4 turn to avoid emptying the Surge Tank.

C. Station an operator at the CC Surge Tank to manually maintain water level between 18 and 30 inches.

   Prior to pump start, open the associated discharge valve 1/4 turn to avoid a water hammer condition.

D. ✓ Station an operator at the CC Surge Tank to manually maintain water level between 18 and 30 inches.

   Prior to pump start, open the associated discharge valve 1/4 turn to avoid emptying the Surge Tank.

K/A
Component Cooling Water
Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: Operation of the surge tank, including the associated valves and controls.

K/A MATCH ANALYSIS
The design features being tested are knowledge of the manual surge tank fill and manual throttling of pump discharge. There are no auto features associated with the surge tank, but these manual features are designed into the system to keep the surge tank at an acceptable level.

ANSWER CHOICE ANALYSIS
A. Incorrect. Plausible because water hammer is a concern with starting pumps in many systems. Also plausible because 12 inches is the low level alarm for the surge tank, therefore it may be reasonable for an applicant to think that it would be acceptable to simply keep the alarm from annunciating.
B. Incorrect. See above.
C. Incorrect. See above.
D. Correct. See Enclosure 4.1, Page 4 of 5, of referenced procedure.

REFERENCES
1. OP/1/A/1104/008, Component Cooling System, Rev. 47.

No utility comments.
**
***
MAB OK
****
Changed throttle to "open" to ensure candidate understands the valve is being opened not closed.
Moved "open" in each answer earlier in alternatives to make reading easier.
MAB OK

15. 009EK3.12 001

Unit 1 initial conditions at 09:00 hours:
- KVIA is not energized
- Reactor manually tripped due to small break LOCA

Conditions at 09:30 hours:

	CH. A	CH. B	CH. C
- RCS Analog Channel Pressures (psig)	-------	1615	1610
- RB Analog Channel Pressures (psig)	------	3.1	2.9

Conditions at 09:40 hours:
- KVIA is re-energized

Conditions at 09:45 hours:

	CH. A	CH. B	CH. C
- RCS Analog Channel Pressures (psig)	1605	1600	1595
- RB Analog Channel Pressures (psig)	2.8	3.2	3.1

Which one of the following correctly describes the reason for letdown isolation?

A.✓ Letdown automatically isolates due to RB Pressure at 09:30 hours with a 2/3 analog trip logic for ES channels 1 and 2.

B. Letdown automatically isolates due to RB Pressure at 09:45 hours with a 2/3 analog trip logic for ES channels 1 and 2.

C. Letdown automatically isolates due to RCS Pressure at 09:45 hours with a 2/3 analog trip logic for ES channels 1 and 2.

D. Letdown automatically isolates due to RCS Pressure at 09:45 hours with a 3/3 analog trip logic for ES channels 1 and 2.

K/A
Small Break LOCA / 3
Knowledge of the reasons for the following responses as they apply to the small break LOCA: Letdown isolation.

K/A MATCH ANALYSIS
Knowledge of a SBLOCA and its affect on letdown isolation is required to answer question. The RB and RCS Pressures have input into ES Channels 1 and 2, which causes L/D isolation.

ANSWER CHOICE ANALYSIS
A. Correct. 3.1 psig is above setpoint and CH. A will also yield a trip condition, therefore, 2/3 logic is made up for ES actuation.
B. Incorrect. Letdown does not auto isolate at 0945 hrs because it is already isolated. Plausible because it requires applicant to know if failure of analog channel causes a trip condition when the power is lost. If this misconception exists, then this would be a correct answer.
C. Incorrect. Letdown does not auto isolate at 0945 hrs because it is already isolated. Same logic as 'B' above. Also requires applicant to know the setpoints.
D. Incorrect. Letdown does not auto isolate at 0945 hrs because it is already isolated. Plausible because applicant may think that a standing trip condition would exist when the bus re-energizes.

REFERENCES
1. Lesson Plan IC-ES, Engineered Safeguards, Rev. 13a.

No utility comments.
**
***
MAB OK
****
Added "analog" to each answer for clarification.
MAB OK

16. 010K6.04 001

Unit 1 Initial Conditions:
- Pzr Safety Valve / PORV tailpiece has become partially blocked by debris in the Unit 1 Quench Tank.
- Rx Power = 100%

Current Plant Conditions:
- Loss of Main Feedwater Occurs
- Control Rods Fail to Insert

Which one of the following correctly states the effect that the flow restriction will have based on the above conditions?

A. PORV accumulation will be at a higher value (pressure) due to increased backpressure.

B. Pressurizer pressure will peak at a higher pressure due to the flow restriction in the tailpiece.

C. Safety valve accumulation will be at a lower value (pressure) due to increased backpressure.

D. Pressurizer level will peak at a higher value due to the safety valves being open for a shorter period of time.

UTILITY NEEDS TO VERIFY THAT THE ADDITIONAL BACKPRESSURE ON THE SAFETIES WORKS TO RAISE THE SETPOINT AT WHICH THEY WILL LIFT. IF THE VALVES OPERATE WITH A PILOT (OR SOMETHING) WHERE THE QUENCH TANK PRESSURE WILL HAVE NO EFFECT ON SAFETY PERFORMANCE, THAT WILL BE FINE, IT JUST CHANGES THE CORRECT ANSWER.

K/A
Pressurizer Pressure Control
Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: PRT.

K/A MATCH ANALYSIS
The Pzr Code Safety Relief Valves are part of the PCS, as evidenced by K/A 010K2.04, 010A1.01, etc. They mechanically control pressure in the RCS around a setpoint, which is the pressure at which the safeties are set to lift. The malfunction of the PRT (Quench Tank) is that there is debris in the tailpiece which restricts flow through the PORV & Safeties upon lifting. This changes RCS pressure response.

ANSWER CHOICE ANALYSIS
A. Incorrect. The PORV has a pilot valve which causes the valve to go completely open when setpoint is reached (no accumulation). Plausible because accumulation has to do with pressure setpoint. See text below taken from GFES text.
B. Correct. Due to the restriction in the tailpiece, the PORV & Safeties will not relieve pressure

as quick so system pressure will build up
C. Incorrect. Safety valves at ONS are designed such that back pressure does not affect setpoint. Plausible because accumulation has to do with pressure setpoint. See text below taken from GFES text.
D. Incorrect. first part may be correct. Second part is not correct because valves will be open longer, not shorter. Plausible because of the greater capacity of the Safeties.

The relief valve is held closed by the action of spring tension holding the disk hard against the seat. An overpressure condition will overcome the spring force applied and lift the disk, allowing system pressure to be relieved. ***Relief valve accumulation is that pressure above the preset pressure at which the valve is fully open****. Accumulation is normally expressed in percent of the preset pressure.*

Safety valves (sometimes referred to as safety relief valves) are similar in function to relief valves. Safety valves provide a large volume release path at low overpressure conditions. Safety valves are designed to fully open at the preset pressure setpoint with little or no accumulation. The valves stay full open until the pressure falls to below the preset pressure, then close sharply. The major difference between safety and relief valves is the quick opening action of the safety valve as compared to the accumulation found with the relief valve.

REFERENCES

1. PNS-CS pg 15/21 (Quench Tank)
2. BNT-CP01R4 (Piping & Valves), GFES lesson

Not valid KA due to ONS design. Not operator required knowledge.
TS action determination at ONS is SRO function.
**
***
Re-wrote question to match KA at an RO level. Added distractor analysis.
MAB OK

17. 011EK2.02 001

A LOCA has just occurred on Unit 1 with the following indications:

Time (hrs)	RCS Press	RCS Cold Leg Temp	Rx Power	RCP Amps
22:11:00	1220 psig	569 °F	2 %	stable & normal
22:12:00	1210 psig	571 °F	0.75 %	stable & normal
22:13:00	1200 psig	573 °F	0.50 %	stable & normal
22:14:00	1190 psig	577 °F	0.25 %	oscilating & abnormal

Which one of the following correctly states when Rule 2, Loss of SCM, RCP trip criteria are FIRST met?

A. 22:11:00 hours

B. 22:12:00 hours

C. 22:13:00 hours

D. 22:14:00 hours

K/A
Large Break LOCA / 3
Knowledge of the interrelations between the following and the LBLOCA: Pumps.

K/A MATCH ANALYSIS
Rule 2 is required due to the LOCA and subsequent loss of SCM. When SCM = 0 and power is less than or equal to 1% (with amps stable), then the RCPs must be secured. Therefore, the question tests the interrelation between RCPs and the LOCA.

ANSWER CHOICE ANALYSIS
A. Incorrect. RCS is still subcooled. Plausible because this would be indicative of saturated conditions if pressure is not converted to absolute numbers.
B. Correct. RCS is saturated (actually slightly superheated) / power < or = 1% / amps stable and normal. Therefore Rule 2 RCP trip criteria is met.
C. Incorrect. RCS is now superheated and power is less than 1% with stable amps. Therefore, the trip criteria is still met, but incorrect because this is not when the RCPs trip criteria is first met. Plausible if applicant thinks that superheated conditions are needed.
D. Incorrect. Similar reasoning as stated above. Plausible if applicant thinks that RCPs must exhibit unstable amps prior to tripping.

REFERENCES
1. EP/1/A/1800/001 L, EOP - Rules & Appendix, Rev. 034.
2. Oconee EAP Bank Question 6, EAP010.

Changed 570 to 571 and 1% to 0.9%.
To ensure saturated conditions were verifiable using Steam tables.
Changed power level to ensure conditions were met to trip RCP.
**
Changed from .9% to .75%.
***
MAB OK

18. 011K4.02 001

Unit 3 initial conditions:
- Reactor Power = 100%
- Pressurizer Level Instrument #3 selected
- 3HP-120 (RC Volume Control) in AUTOMATIC
- SASS in AUTOMATIC

Which one of the following correctly describes the response of pressurizer level chart recorder indication/input following a "Data Link Failure" (power failure) displayed on "3B" ICCM Train?

A. Pressurizer level chart recorder indication fails low.

B. Pressurizer level chart recorder indication fails as is.

C. Pressurizer level chart recorder input swaps to Instrument #1.

D. Pressurizer level chart recorder input swaps to Instrument #2.

K/A
Pressurizer Level Control
Knowledge of PZR LCS design feature(s) and / or interlock(s) which provide for the following: PZR level controller.

K/A MATCH ANALYSIS
Knowledge of pzr level control and SASS is needed to correctly answer the question. SASS is a design feature for pzr level control.

ANSWER CHOICE ANALYSIS
A. Incorrect. Plausible because with SASS in manual and a loss of power on ICCM train, this would be correct.
B. Incorrect. Plausible because with SASS in manual and an internal failure of ICCM, this would be correct.
C. Correct. See referenced lesson plan pages 24 - 30. SASS is in AUTO, so a swap will occur. Instrument #1 is always the second input to SASS when Instrument #3 is initially selected.
D. Incorrect. According to the lesson plan, a swap to instrument #1 will also occur. Instrument #2 is never the second SASS input. Plausible because an auto swap will actually occur.

REFERENCES
1. Lesson Plan PNS-PZR, Rev. 15.
2. Lesson Plan IC-RCI Rev 17, pg 63/66
3. Oconee Exam Bank Question 282, PNS143501.

Added "due to a power failure" to stem to identify why the Data Link failure was displayed.
Two types of failure with differing effects.
**
Added: Lesson Plan IC-RCI Rev 17, pg 63/66 to reference section.
***
****
Modified question to ensure only one correct answer. "A" was also correct. Added "chart recorder" to all alternatives.
MAB OK

19. 012A3.06 001

The following Unit 1 events occur sequentially:
- Reactor is at 100% power
- A low RCS Pressure condition momentarily occurs and the 'A' RPS Varible Low RCS Pressure Trip Bistable OUTPUT STATE LIGHT is bright and the OUTPUT MEMORY LIGHT is bright
- 'B', 'C', and 'D' RPS Varible Low RCS Pressure Trip Bistable OUTPUT STATE LIGHTs remained dim
- RCS Pressure returns to normal
- 'A' RPS Varible Low RCS Pressure Trip Bistable OUTPUT STATE LIGHT was reset
- 'A' RPS Varible Low RCS Pressure Trip Bistable OUTPUT MEMORY LIGHT was not reset
- The reactor operator momentarily places the 'B' RPS Channel to SHUTDOWN BYPASS, then takes it back out of SHUTDOWN BYPASS

Which one of the following correctly describes the status of the 'B' RPS Reactor Trip Module and the status of the reactor?

A. 'B' RPS Reactor Trip Module trips when the channel is placed to SHUTDOWN BYPASS, then automatically resets when taken out of SHUTDOWN BYPASS.

The reactor does not trip.

B. 'B' RPS Reactor Trip Module trips when the channel is placed to SHUTDOWN BYPASS, then automatically resets when taken out of SHUTDOWN BYPASS.

The reactor trips.

C. 'B' RPS Reactor Trip Module trips when the channel is placed to SHUTDOWN BYPASS, then is required to be manually reset when taken out of SHUTDOWN BYPASS.

The reactor does not trip.

D. 'B' RPS Reactor Trip Module trips when the channel is placed to SHUTDOWN BYPASS, then is required to be manually reset when taken out of SHUTDOWN BYPASS.

The reactor trips.

UTILITY NEEDS TO MAKE SURE THAT THE OUTPUT MEMORY LIGHT BEING LIT WILL NOT CAUSE A REACTOR TRIP IF THE OUTPUT STATE LIGHT HAS BEEN RESET. (4/5/6 Utility states: The memory light does not signify a trip signal being present) ALSO UTILITY NEEDS TO CONFIRM WHETHER OR NOT A CHANNEL MUST BE RESET WHEN TAKEN OUT OF SHUTDOWN BYPASS. (4/5/6 Utility states: A channel must be reset when taken out of shutdown bypass, otherwise it will have a standing trip signal).

K/A
Reactor Protection
Ability to monitor automatic operation of the RPS, including: Trip logic.

K/A MATCH ANALYSIS
Question requires knowledge of RPS trip logic. The applicant must determine whether or not the appropriate logic will be made up to cause an automatic reactor trip when the 'B' channel is taken to shutdown bypass.

ANSWER CHOICE ANALYSIS
When the low pressure transient occurs, the A RPS variable low pressure trip bistable trips. When RCS pressure returns to normal, the bistable resets but the A RPS channel remains tripped.
When the B RPS channel is placed in Shutdown Bypass, this results in two RPS channels being tripped which causes the reactor to trip.

A. Incorrect. When taken out of S/D B/P, the channel must be reset for the OUTPUT STATE LIGHT to return to a dim condition. Plausible because by transfering back out of S/D B/P, the condition that caused the light to turn bright has been taken away. The reactor does trip.

B. Incorrect. When taken out of S/D B/P, the channel must be reset for the OUTPUT STATE LIGHT to return to a dim condition. Plausible because by transfering back out of S/D B/P, the condition that caused the light to turn bright has been taken away. Second part is correct.

C. Incorrect. The channel must be reset after being taken out of shutdown bypass, otherwise a trip signal will exist on that channel (according to utility on 4/5/6). The reactor will trip. Plausible because the applicant must know the effects of not resetting the A RPS channel .

D. Correct. Both parts are correct. See above

Bistables are discussed on pages 19-21 of Ref and Rx Trip Modules are discussed on page 37 of Ref.

REFERENCES
1. Lesson Plan IC-RPS, Reactor Protection System, Rev. 14.

There are no RPS channel reactor trip bistables. We have reactor trip modules instead. Reactor Trip Modules do not have output state lights or output memory lights. In the question, we replaced 'A' RPS Channel Reactor Trip Bistable with 'A' RPS Varible Low RCS Pressure Trip Bistable.
Changed wording in question to agree with RPS nomenclature.
**
Utility to complete answer analysis.
Call out page number in lesson plan when completing answer analysis
Replaced B RPS OUTPUT STATUS LIGHT with RPS reactor trip module
Updated distractor analysis.
***
Added "automatically" to "A" and "B" alternatives.
Changed "must" to "is required to" for "C" and "D" alternatives.
MAB OK

20. 013G2.4.2 001

Unit 1 initial conditions:
- 100% power
- Building Spray Pump 'B' is tagged out for maintenance
- KVIB is de-energized

Current conditions:
- Reactor Building Pressure = 10.5 psig and increasing
- Subcooled Margin is 15 °F and lowering
- Building Spray Pump '1A' is not operating
- Auto (blue) Lights on RZ Module associated with ES-7 are OFF
- Operators are at the Subsequent Action Step that determines if ES Actuation is required.

Which one of the following correctly describes the required procedural actions?

A.✓ Initiate Enclosure 5.1 (ES Actuation) and manually actuate ES-7 digital channel.

B. Initiate Enclosure 5.1 (ES Actuation). Building Spray Pump '1A' must be manually started and 1BS-1 ('A' BS Pump Outlet) is already open.

C. Remain in Subsequent Actions and monitor Building Spray flow. 1BS-1 ('A' BS Pump Outlet) is already open.

D. Remain in Subsequent Actions and monitor Building Spray flow through the Building Spray Cross-connect flowpath.

K/A
Engineered Safety Features Actuation
Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.

K/A MATCH ANALYSIS
RB Pressure = 10.5 psig initiates ES Channels 7 and 8 for building spray actuation. When ES actuation occurs, this is entry conditions into EOP Enclosure 5.1. Therefore the applicant must have knowledge of the requirement to enter the EOP enclosure and the actions that are required to get a train of building spray to initiate.

ANSWER CHOICE ANALYSIS
A. Correct. If any ES component is not in it's ES position, Enclsoure 5.1 requires that the assocatied digital channel is manually initiated.

B. Incorrect. Enclsoure 5.1 does not required the repositioning of components that fail to go to their ES postion. It requires notification of the SRO who determines correct course of action.

C. Incorrect. BS-1 is not already opened. Plausible if applicant thinks KVIB feeds ES-7, which initiates 'B' Train.

D. Incorrect. Cross connects are not open and no pumps are running.

REFERENCES
1. EP/1/A/1800/001, EOP - IMAs and SAs, Rev. 34.
2. Lesson Plan IC-ES, Engineered Safeguards, Rev. 13a. Pages 25 -27

Modified stem and "B" answer to ensure only one correct answer.
Modified stem to read "Auto (blue) Lights on RZ Module associated with ES-7 are OFF" because all lights would not be off. Refer to Lesson plan IC-ES (Pages 25 -27).
Changed correct answer to "A".
**
Updated answer analysis
***
Added "procedural" and removed "will mitigate" from question in the stem
MAB OK

21. 013K1.12 001

The following conditions exist with all three units initially at full power:

Initial Conditions:
- KHU-1 and 2 are operating supplying the grid
- ACB-4 is closed

Current Conditions:
- Unit 1 RB Pressure is 3.5 psig and rising
- Keowee frequency is 62 cycles and lowering

Which one of the following correctly describes breaker response associated with the above conditions?

A. ACB-1, 2, and 4 remain closed.

B. ACB-1 and 2 open. ACB-4 remains closed.

C. ACB-1, 2, and 4 open. Then, only ACB-4 automatically re-closes.

D. ACB-1, 2, and 4 open. ACB-1, 2, and 4 automatically reclose.

INCORPORATED UTILITY COMMENTS FROM 4/5/6.

K/A
Engineered Safety Features Actuation
Knowledge of the physical connections and/or cause effect relationships between the ESFAS and the following systems: ED/G.

K/A MATCH ANALYSIS
ED/G and KHU are being viewed as inter-changeable. The question is testing knowledge of Keowee breaker operation induced by an ESFAS.

ANSWER CHOICE ANALYSIS
A. Incorrect. Plausible because no electrical problems exist.
B. Incorrect. Plausible because Keowee output bkr to underground was already closed.
C. Correct. See highlighted portions of referenced lesson plans for supporting documentation.
D. Incorrect. Plausible because no electrical problems exist.

See highlighted portions of referenced lesson plans for supporting documentation.

REFERENCES
1. Lesson Plan EL-KHG, Keowee Hydro Generators, Rev. 15.
2. Lesson Plan IC-ES, Engineered Safeguards, Rev. 13a.

No utility comments.

**
***
MAB OK

22. 015/17AG2.1.7 001

The following conditions exist on Unit 1:
- 1TA and 1TB de-energized while the plant was at 100% power
- Operators have diagnosed a small loss of inventory from the RCS
- HPI is currently throttled
- Operators have recently restored power to 1TA and 1TB
- SCM decreases to 0 °F following the first RCP start

Which one of the following correctly describes required operator actions based on the above indications?

A. Rule 2 must be implemented immediately.

B. Rule 2 implementation may be delayed for 5 minutes.

C. Full HPI flow must be established immediately.

D. Full HPI flow may be delayed for 2 minutes.

K/A
RCP Malfunctions / 4
Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.

K/A MATCH ANALYSIS
The loss of power is the RCP malfunction. The operators must have knowledge of the plant conditions and instrument readings to correctly restart and monitor the RCP restart evolution. The question tests knowledge of what actions to take based on the plant conditions.

ANSWER CHOICE ANALYSIS
A. Incorrect. The note at the top of Enc. 5.6, page 7 of 9, states that Rule 2 may be delayed for up to 2 minutes, thus Rule 2 is not immediately required to be immplemented. Plausible because normally, when RCPs are not being started, Rule 2 would be immediately implemented.
B. Incorrect. The note at the top of Enc. 5.6, page 7 of 9, states that Rule 2 may be delayed for up to 2 minutes, not 5 minutes. Plausible because Rule 2 implementation may, in fact, be delayed.
C. Correct. Stem of question states that HPI is throttled. Rule 6 must be implemented immediately per Enc. 5.6, Step 37.
D. Incorrect. Stem of question states that HPI is throttled. Rule 6 must be implemented immediately per Enc. 5.6, Step 37. Plausible because Rule 2 implementation may be delayed for 2 minutes based on the note at the top Enc. 5.6, page 7 of 9.

REFERENCES
1. EP/1/A/1800/001 M, EOP - Encl 5.1 - 5.16, Rev. 34.

No utility comments.
**
***
MAB OK
****
Reworded bullet in stem to read "SCM decreases to 0 °F following the first RCP start" to ensure sequence of the pump start and loss of SCM is clear.
Removed "per Rule 6" from answers C and D. HPI injection is not initiated per Rule 6.
MAB OK

23. 015K2.01 001

The following Unit 1 conditions exist:
- NI-5 has failed high
- RPS Channel "B" +15 volt power supply has deenergized

Which one of the following correctly describes the status of the reactor and the "B" Channel Trip Light and Breaker Trip Light?

A. The reactor does not trip.

Channel Trip Light is OFF. Breaker Trip Light is OFF.

B. The reactor does not trip.

Channel Trip Light is BRIGHT. Breaker Trip Light is BRIGHT.

C. The reactor trips.

Channel Trip Light is OFF. Breaker Trip Light is OFF.

D. The reactor trips.

Channel Trip Light is BRIGHT. Breaker Trip Light is BRIGHT.

K/A
Nuclear Instrumentation
Knowledge of bus power supplies to the following: NIS channels, components, and interconnections.

K/A MATCH ANALYSIS
The 15 V RPS power supply feeds the NIs in that cabinet. The question requires knowledge of how the plant will respond when a power supply that feeds the NIs is lost.

ANSWER CHOICE ANALYSIS
A. Incorrect - Reactor will trip. If the 120 volt A/C power was lost, then the lights would lose power and go out.
B. Incorrect - Reactor will trip. Plausible because the Breaker Trip Light will be BRIGHT.
C. Incorrect - Breaker trip light will be BRIGHT. Plausible for same reason as "A".
D. Correct - The the associated CRD breaker will open (breaker light bright) because of the loss of power to the tripping logic. The reactor will trip on two of four channels due to NI-5 being failed high.

REFERENCES
1. Lesson Plan OP-OC-IC-NI, Nuclear Instrumentation, Rev. 14.

No utility comments.

**
***
MAB OK
****
Modified stem bullet from +15v power supply to " KVIB Bkr #1 - 120VAC Supply to RPS Channel B has tripped" to eliminate confusion.
Went back to original version during review with NRC.
MAB OK

24. 022AK1.03 001

The following Unit 2 initial conditions exist:

- Reactor Power = 50%
- 2HP-31 (RCP SEAL FLOW CONTROL) failed closed

Which one of the following correctly describes the initial plant response due to the above conditions?

A. Pressurizer level will increase

2HP-120 will close in response to Pzr level which will cause makeup flow to decrease

B. Pressurizer level will increase

LDST level will decrease due to increased makeup flow

C. Pressurizer level will decrease

2HP-120 will open in response to Pzr level which will cause makeup flow to increase

D. Pressurizer level will decrease

LDST will decrease due to Seal Return flow isolating

K/A
Loss of Rx Coolant Makeup / 2
Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Pump Makeup: Relationship between charging flow and PZR level.

K/A MATCH ANALYSIS
A loss RCP seal injection occurs due 2HP-31 failing closed. The operational implications are being tested by requiring knowledge makeup flow and PZR level as a result of the failure.

ANSWER CHOICE ANALYSIS
A. Incorrect, answer would be correct if 2HP-31 fails open.
B. Incorrect, answer would be correct if 2HP-31 fails open.
C. Correct With 2HP-31 (RCP SEAL FLOW CONTROL) failed closed PZR level will decrease because 26 gpm of seal injection no longer goes into the RCS with letdown flow constant. When PZR level decreases 2HP-120 will open to maintain PZR level. This will cause makeup flow to increase.
D. Incorrect. plausible becuse seal return will isolate on low seal injection flow under certain conditions. Refer to PNS-HPI page 25. However LDST level will initially increase due to less flow through 2HP-31.

REFERENCES
1. Lesson Plan PNS-PZR, Pressurizer, Rev. 15.
2. Lesson Plan PNS-HPI, High Pressure Injection, Rev. 22

Removed from the stem "HP RCP SEAL INJECTION HEADER FLOW HIGH/LOW annunciates" because this alarm is not related to the failure. 1HP-120 closing will not affect RCP seal injection (slow acting valve).

Wrote new question to add Seal Injection Valve failure to match KA

**

***
Removed reason from first sentence in each alternative. (added no value)
Updated answer analysis
MAB OK

25. 022G2.1.33 001

Unit 1 initial conditions at 10:00 hours:
- RCS Temp = 300 °F
- 'A' train BS Pump breaker is racked out and red tagged

Current conditions 11:00 hours:
- The 'B' train of BS inadvertantly actuated
- Prior to securing the '1B' BS pump, Operators noted that the pump did not indicate any flow
- Operators verified that the proper valve alignment had existed for BS to discharge to the RB
- 1B BS pump declared inoperable

Which one of the following correctly describes entry into LCO 3.6.5, Reactor Building Spray and Cooling Systems and correctly describes the applicability of the LCO?

A. LCO 3.6.5 was required to be entered at 10:00 hours because two trains of BS are required to be operable in Modes 1, 2, 3, and 4.

B. LCO 3.6.5 was required to be entered at 10:00 hours because two trains of BS are required to be operable in Modes 1, 2, 3 (BS not required to be operable in Mode 4 per Tech Specs)

C. LCO 3.6.5 was required to be entered at 11:00 hours because only one train of BS is required to be operable in Modes 3 and 4.

D. LCO 3.6.5 was required to be entered at 11:00 hours because only one train of BS is required to be operable in Mode 3 with RCS temperature below 325 °F, Mode 4, and Mode 5.

K/A
Containment Cooling
Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.

K/A MATCH ANALYSIS
The question requires knowledge of the conditions of the containment cooling LCO and system indications that would result in the LCO not being met. The applicant must recognize that the pump not developing flow when the train inadvertantly actuated would be a plant parameter that would place them in noncompliance with the LCO.

Q is RO knowledge because only the entry conditions are being tested.

ANSWER CHOICE ANALYSIS
A. Incorrect. Current plant conditions are Mode 3, therefore LCO is not required to be entered at 1000 hrs. Plausible because two trains are in fact required in Modes 1 and 2 as stated in the LCO (although the Note modifies this).
B. Incorrect. Current plant conditions are Mode 3, therefore LCO is not required to be entered at 1000 hrs. Plausible because two trains are required in Modes 1 and 2.
C. Correct. See TS Note.
D. Incorrect. Applicability does not have a temperature stipulation for Mode 3. Mode 5 is also incorrect. Plausible because it makes sense to require only one train at lower modes and lower temperatures.

Plausibility of distractors are due to the memory level of the question and that the applicability does, in fact, change with respect to Mode.

REFERENCES
1. Tech Spec 3.5.5, Reactor Building Spray and Cooling System.

Question required operability determination and knowledge beyond entry conditions.

Wrote new question that meets the K/A at RO level.

**
Open item
Removed "and its handswitch lights go dark" from the stem. Indication on RZ module remains with breaker open.
Reverted back to origional question.
Added bullet to indicate that 1B BS pump is inoperable

***
added "and correctly describes the applicability of the LCO" to question stem.
added "racked out and red tagged" to stem to describe "A" BS pump condition.
MAB OK

26. 022K3.02 001

Unit 1 inital conditions:
- Rx Power = 100%
- LCO 3.6.5, Reactor Building Spray and Cooling Systems, has been entered due to not having the required trains of cooling operable
- Containment Temperature = 105ºF

Current Conditions
- Small steam leak occurs in containment
- Containment Temp = 135ºF

Assuming all plant parameters have stabilized after the effect of the containment temperature change, which one of the following is correct concerning Pzr level and how Pzr level will be controlled if the reactor trips?

A. Indicated Pzr level will be higher than actual

Place 1HP-120 in manual and maintain indicated level at approximately 180 inches

B. ✓ Indicated Pzr level will be higher than actual

Leave 1HP-120 in auto and adjust the setpoint to maintain indicated level at approximately 100 inches

C. Indicated Pzr level will be lower than actual

Place 1HP-120 in manual and maintain indicated level at approximately 180 inches

D. Indicated Pzr level will be lower than actual

Leave 1HP-120 in auto and adjust the setpoint to maintain indicated level at approximately 100 inches

K/A
Containment Cooling
Knowledge of the effect that a loss or malfunction of the CCS will have on the following: Containment instrumentation readings.

K/A MATCH ANALYSIS
The loss of containment cooling is resulting in containment temperature increasing. This increased temperature has an effect on Pzr level because the reference leg will heat up, thus causing indicated level to read higher than actual level .

ANSWER CHOICE ANALYSIS

Once the normal post trip shrinkage of the RCS has been compensated for (PZR level >100"), letdown should be reestablished (if isolated) in order to help control and stabilize RCS pressure. PZR level should be maintained constant at about 100 inches by adjusting HP-120 (RC VOLUME CONTROL) setpoint to approx. 25% on the controller bias.

A. Incorrect. Pzr level will be maintained ~ 100 inches after trip. Plausible because 180" is used for "Degraded Containment Conditions".

B. Correct. See A.

C. Incorrect. Indicated level will read greater than actual level. Plausible because 180" is used for "Degraded Containment Conditions".

D. Incorrect. Indicated level will read greater than actual level. Plausible because level will be maintained at 100" post trip.

REFERENCES
EAP-SA pg 19/36

Based on information given in the question the direction of level error can be determined. The absolute value of this error can not be determined from the available information. Multiple answers could be correct.

Modified distrators to ensure only one correct.

**
Utility to provide replacement question

***
Changed question to reflect changes in Indicated Pzr level
Removed "pressurizer level at setpoint" from stem. no useful information.
Removed "All plant controls are in Automatic & working properly" bullet from stem. No useful information.

MAB OK

27. 025AK2.02 001

Unit 1 initial conditions:
- The plant tripped from 100% power due to a trip of all RCPs
- Operators subsequently began a cooldown
- LPI high pressure mode was aligned

Current conditions:
- All LPI pumps have lost power
- Operators have entered AP/26 (Loss of Decay Heat Removal), Section 4A (RCS Intact and RC Loops Full)
- RCS Temperature = 250 °F and increasing
- RCS Pressure = 295 psig and increasing
- Condenser is still available

Which one of the following correctly describes status of 1LP-3 (LPI HOTLEG SUCTION) and steam generator feedwater supply based on the given plant conditions?

A. The 1LP-3 is required to be closed.

SGs shall be fed via MFW nozzles.

B.✓ The 1LP-3 is required to be closed.

SGs shall be fed via AFW nozzles.

C. The 1LP-3 is NOT required to be closed.

SGs shall be fed via MFW nozzles.

D. The 1LP-3 is NOT required to be closed.

SGs shall be fed via AFW nozzles.

K/A
Loss of RHR System / 4
Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following: LPI or Decay Heat Removal / RHR pumps.

K/A MATCH ANALYSIS
The loss of RHR/LPI pumps creates a loss of RHR System. This question tests knowledge of required operator actions when the RHR/LPI pumps are lost. These actions are required to mitigate the consequences of losing the pumps and losing RHR.

ANSWER CHOICE ANALYSIS
A. Incorrect. RCPs must be operating to feed via MFW nozzles. Plausible because SGs are required to be fed.
B. Correct. LP-3 is required to be closed based on Section 4A, Step 5. Based on RCPs not running, the AFW nozzles must be used (Encl 5.9 Step 5)
C. Incorrect. RCPs must be operating to feed via MFW nozzles. Plausible because SGs are required to be fed. Also plausible because applicant may not know the closure requirements for 1LP-3.
D. Incorrect. LP-3 is required to be closed based on Section 4A, Step 5. Plausible because applicant may not know the closure requirements for 1LP-3.

REFERENCES
1. AP/1/A/1700/026, Loss of Decay Heat Removal, Rev. 017.
2. Lesson Plan PNS-LPI; Low Pressure Injection System, Rev. 21.

Replace 1LP-3 with "decay heat drop line" in the stem and answers to remove confusion about a loss of power to the LPI pumps or to the Unit.

**

Added 1LP-3 and noun name to stem and alternatives. Removed decay heat drop line in question. Utility to review to ensure OK to have specific valve ID in question.

Valve name not in AP. Removed from question stem and answers.

***

Added LP-3 noun name to stem.
MAB OK
****

Added "and increasing" to RCS pressure and temperature.
MAB OK

28. 026AG2.4.24 001

The following Unit 1 conditions exist:
- Reactor Power = 100% with all RCPs operating
- CC degradation has been caused by leakage identified by an operator
- CC Surge Tank level is 10 inches and decreasing at 0.5 inches per minute
- One CC Pump is operating
- CC TOTAL FLOW is 675 gpm

Which one of the following correctly describes the AP/20 (Loss of Component Cooling) strategy for mitigating the conditions as described above?

A. Secure the operating CC Pump. Then isolate the leak and make-up to the CC Surge Tank. When Surge Tank level returns to normal, then restart the CC Pump.

B. Start the standby CC Pump. Then attempt to isolate the leak and make-up to the CC Surge Tank.

C. Isolate the leak. Then make-up to the CC Surge Tank and notify RW of the CC spill. Verify RCP seal injection flow is within normal limits.

D. Start the standby CC Pump. Then attempt to isolate the leak and make-up to the CC Surge Tank. Isolate letdown and concurrently perform steps of AP/32 (Loss of Letdown).

K/A
Loss of Component Cooling Water / 8
Knowledge of loss of cooling water procedures.

K/A MATCH ANALYSIS
Question tests knowledge of AP/20 (Loss of CC).

ANSWER CHOICE ANALYSIS
A. Incorrect. No guidance exists for securing the operating pump. Enough time exists for filling the CC Surge Tank and leak isolation prior to securing the CC pump. Plausible because applicant may find it logical to secure the pump to reduce the leak, isolate the leak, fill the tank, then restart the pump. RCPs are OK without CC, thus adding more plausibility to this distractor.
B. Incorrect. No guidance exists for starting the standby pump when CC Total Flow is above 575 gpm). Plausible for an applicant to think that cooling could be enhanced by starting another pump.
C. Correct. Strategy is stated on Page 5 of AP/20.
D. Incorrect. No guidance exists for starting the standby pump when CC Total Flow is above 575 gpm. Plausible for an applicant to think that cooling could be enhanced by starting another pump. Also plausible because procedure gives them steps to isolate L/D, but only when no CC flow exists.

REFERENCES
1. AP/1/A/1700/020, Loss of Component Cooling, Rev. 9.

No utility comments.

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MAB OK

29. 026G2.4.31 001

Unit 1 initial conditions:
- Reactor power = 100%
- 1SA-7/D3, ES RB SPRAY, POWER SUPPLY FAILURE OR CHANNEL 'A' MODULE REMOVED, is in alarm
- I&E has determined the cause of the alarm to be Analog Channel 'A' power supply failure and is investigating the cause

Current conditions:
- A LBLOCA has occurred
- RCS pressure is 485 psig and decreasing
- RB pressure is 10.5 psig and increasing
- ES Channels 1-6 have actuated

Which one of the answer choices correctly completes the following sentences?

Reactor Building Spray initiation circuitry is currently in a _____ initiation logic. Based on current plant conditions, manual initiation of ES Channels 7 and 8 _____ required.

A. one out of two
is

B. two out of two
is not

C. one out of two
is not

D. two out of two
is

K/A
Containment Spray
Knowledge of annunciators, alarms, and indications, and use of response instructions.

K/A MATCH ANALYSIS
Actions being tested are directed by the alarm response guides, based on indications, when failures occur in the Reactor Building Spray System, therefore, the K/A is met.

ANSWER CHOICE ANALYSIS
A. Incorrect. ES Channels 7 & 8 Logic is 2 / 2 with one channel de-energized. Plausible because ES-Channels 1-6 would be in 1 / 2 logic.
B. Incorrect. Plausible because applicant would need to know the RBS setpoint to know if it would need to be manually initiated. Also plausible because the 2 / 2 logic is correct.
C. Incorrect. ES Channels 7 & 8 Logic is 2 / 2 with one channel de-energized and ES Channels 7 and 8 must be manually initiated. Plausible because ES-Channels 1-6 would be in 1 / 2 logic. Also plausible because applicant would need to know the RBS setpoint to know if it would need to be manually initiated.
D. Correct. See Window A-4 and D-3 of 1SA-07.

REFERENCES
1. OP/1/A/6101/007, Alarm Response Guide, 1SA-07, Rev. 006.

No utility comments.

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MAB OK

30. 027AK1.02 001

Initial Unit 1 plant conditions:
- Reactor power = 100%
- A transient occurs

Current conditions:
- Reactor power = 93%
- RCS pressure = 2120 psig
- Pressurizer temperature = 635 degrees F
- Pressurizer heaters fail ON
- Tave = 579 ºF and constant

Assume 1HP-120 in MANUAL and makeup and letdown are balanced

Which ONE of the following describes the inital response of RCS pressure and Pressurizer level associated with the above events?

(Assume no operator actions.)

A. RCS pressure increases

Pressurizer level increases

B. RCS pressure decreases

Pressurizer level decreases

C. RCS pressure increases

Pressurizer level decreases

D. RCS pressure decreases

Pressurizer level increases

K/A
Pressurizer Pressure Control System Malfunction / 3
Knowledge of the operational implications of the following concepts as they apply to Pressurizer Pressure Control Malfunctions: Expansion of liquids as temperature increases.

K/A MATCH ANALYSIS
The K/A requires the testing of knowledge of operational implications of a PCS malfunction, which is accomplished with the Pzr heaters failing ON. The K/A also requires testing the implications of expansion of liquids as temperature increases. Therefore, the K/A is met because Pzr temperaure goes up, causing the liquid volume to expand. Candidate must also understand the implications of a subcooled pressurizer.

ANSWER CHOICE ANALYSIS:

After the transient, the Pzr is subcooled. The Pzr heaters failing ON will cause Pzr level to increase slightly due to expansion of the liquid. Although Pzr heater are on, RCS pressure will decrease while the Pzr is subcooled. Refer to PNS-PZR pg 12/41

A. Incorrect. First part incorrect, Second part correct. See analysis above. Plausible because if the Pzr was saturated, it would be correct.
B. Incorrect. First part correct, Second part incorrect. See analysis above. Plausible if candidate believes Pzr level decreases on a power decrease.
C. Incorrect. Both parts incorrect. See analysis above.
D. Correct. Both parts correct. See analysis above.

REFERENCES
1. PNS-PZR pg 12/41

Xenon effects will be offset by control systems.
Wrote new question better match K/A.

**

Updated references and answer analysis.

***

MAB OK
Typo on bolded assumption (1HPI-120 to 1HP-120)

31. 028AA2.03 001

Unit 1 initial conditions:
- Reactor Power = 100%
- Pressurizer Level = 220 inches and stable
- SASS in manual
- Pzr Level 2 is selected for pressurizer level control

Current conditions:
- Pzr Level 2 develops a leak on its reference leg

Which one of the following correctly describes the effect on makeup flow indication, as well as correctly describes the effect on the SSF?

A. HP-120 throttles in the CLOSE direction.

The SSF pressurizer level indication is NOT affected.

B. HP-120 throttles in the OPEN direction.

The SSF pressurizer level indication is NOT affected.

C. HP-120 throttles in the CLOSE direction.

The SSF pressurizer level indication is affected.

D. HP-120 throttles in the OPEN direction.

The SSF pressurizer level indication is affected.

K/A
Pressurizer Level Malfunction / 2
Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: Charging subsystem flow indicator and controller.

K/A MATCH ANALYSIS
Applicant must apply knowledge of a pressurizer level malfunction and determine its effects on the level indication, and subsequently the level indication's effect on charging and the SSF.

ANSWER CHOICE ANALYSIS
A. Incorrect. See "B" and "C".
B. Incorrect. Plausible because applicant must know how the ref leg leak will affect indicated level and if it will also affect the SSF. Only one of the level channels feeds the SSF, so an applicant may not remember which one performs this function. Also an applicant must work through in his head how the reference leg failure will impact the indicated level in order to know how HP-120 will move.
C. Correct. The designated LT shares a reference leg with the LT that feeds the SSF. A leak in the reference leg will cause indicated level to rise and charging flow (HP-120) will throttle down to reduce level.
D. Incorrect. See "B" and "C".

REFERENCES
1. Lesson Plan PNS-PZR, Pressurizer, Rev. 15.

Added PZR level in stem. Removed on program and stable. Not used at ONS.

Removed transmitter number from stem. OPS does not use.

**
***
MAB OK

32. 028G2.1.8 001

Unit 1 plant conditions:

Initial conditions:
- Reactor power =100%
- Post Accident Gaseous Sample Panel in service for testing

Current Conditions:
- RCS Pressure = 1075 psig
- RB Pressure = 12 psig

Based on the above conditions, which one of the following is correct with respect to the isolation of the Post Accident Gaseous Sample Panel and the operation of the Hydrogen Analyzer?

A.✓ Immediately isolate the Post Accident Gaseous Sample Panel and place the RB Hydrogen Analyzer in service at the remote panel.

B. Immediately isolate the Post Accident Gaseous Sample Panel and place the RB Hydrogen Analyzer in service at the local panel.

C. Immediately notify Chemistry to isolate the Post Accident Gaseous Sample Panel and place the RB Hydrogen Analyzer in service at the remote panel.

D. Immediately notify Chemistry to isolate the Post Accident Gaseous Sample Panel and place the RB Hydrogen Analyzer in service at the local panel.

K/A
Hydrogen Recombiner and Purge Control
Ability to coordinate personnel activities outside the control room.

K/A MATCH ANALYSIS
This is a generic K/A for section 028. The K/A catalog states typical tasks that are associated with system 028. One of the tasks listed is, "Operate the hydrogen analyzer." This question tests knowledge of tasks that are required to be performed outside of the control room.

ANSWER CHOICE ANALYSIS
A. Correct. The hydrogen analyzer containment isolation valve controls are located in the control room. The remote H2 Anal Panel must be used because there is no Op Proc to place the local panel in service.
B. Incorrect. There is no procedural guidance for placing the local panal I/S. Plausible because the first part of the answer choice is correct and the second part is correct except for which panel.
C. Incorrect. Containment isolation valves are controlled from the control room and must be immediately closed by the RO. Plausible because the second part of the answer choice is correct.
D. Incorrect. Containment isolation valves are controlled from the control room and must be immediately closed by the RO. Plausible because the H2 Anal is required to be placed I/S on an ES signal and the local panel is actually located in the same vicinity as the remote panel (according to utility rep).

REFERENCES
1. OP/1/A/1102/022, RB Hydrogen Anyzer System, Rev. 015.
2. Oconee PNS Exam Bank Question Question 150, PNS101201.

No utility comments.

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MAB OK

33. 029EK1.03 001

Unit 2 conditions:

Initial conditions:
- Reactor power = 70%
- ICS is in automatic

Current conditions:
- Main turbine has tripped
- CRD breakers have opened
- Control rods have partially inserted
- Reactor power = 7% and stable by Wide Range NIs
- Rule 1 has just been entered

Which one of the following procedural steps performed in Rule 1 will mitigate the problem?

A. Dispatch an operator to open 600 V CRD breakers on 2X9-5C (U-2 CRD NORM FDR BKR) and 1X1-5B (U-2 CRD ALT POWER SUPPLY).

B. Open 2HP-24 and 2HP-25. Ensure all three HPI Pumps operating. Open 2HP-26 and 2HP-27.

C. Open 2HP-24 and 2HP-25. Ensure 'A' or 'B' HPI Pump operating and start 'C' HPI Pump. Open 2HP-26 and 2HP-27.

D. Manually drive the stuck control rods to the in-limit.

K/A
ATWS / 1
Knowledge of the operational implications of the following concepts as they apply to the ATWS: Effects of boron on reactivity.

K/A MATCH ANALYSIS
ATWS has occurred due to rods sticking and power stabilizing at 7%. The question tests knowledge of actions to take to add negative reactivity to mitigate the ATWS. Therefore, the K/A implicitly tests the knowledge of boron's effect on reactivity.

ANSWER CHOICE ANALYSIS
A. Incorrect. Incorrect. Incorrect because rods have already tried to trip into the core, so de-energizing CRD breakers will do nothing further to mitigate. Plausible because it is a step in the procedure.
B. Incorrect. Three pumps are not needed or required. Plausible because applicant may think that more pumps are required to give them more boration capability.
C. Correct. Steps 4-6 of Rule 1.
D. Incorrect. CRDS has no power due to the reactor trip. (Ensure the facility agrees with this, because in some CE plants this would be a correct answer)
Utility agrees with "D".

REFERENCES
1. Oconee Exam Bank Question 223, EAP111003.
2. EP/2/A/1800/001, EOP - IMAs and SAs, Rev. 036.
3. EP/2/A/1800/001 L, EOP - Rules & Appendix, Rev. 036.

Underlined the word "mitigate" to clarify the question.

**
***
MAB OK
****
Modified the middle of B and C to ensure a correct answer.(Used nomenclature that matches Rule 1: "ensure")

Strengthened stem to ensure B not correct.

34. 033A1.01 001

Unit 3 is at 100% power with the "A" spent fuel pool cooling pump operating.

Which one of the following correctly states the minimum spent fuel pool level which will automatically trip the operating spent fuel pool cooling pump at the time that level is reached?

A. - 0.1 feet

B. - 0.5 feet

C. - 2.0 feet

D. - 2.5 feet

K/A
Spent Fuel Pool Cooling
Ability to predict and / or monitor changes in parameters (to prevent exceeding design limits) associated with Spent Fuel Pool Cooling System operating the controls including: Spent Fuel Pool Water Level.

K/A MATCH ANALYSIS
Question tests knowledge of SFP Level interlock that will trip cooling pumps. Therefore, question tests knowledge that will allow applicant to predict SFP Level's impact on SFP cooling (specifically the pumps).

ANSWER CHOICE ANALYSIS
A. Incorrect. Plausible because this is the minimum level required to run 1 pump.
B. Incorrect. Plausible because this is the minimum level to start the SFC system.
C. Incorrect. Plausible because this is the admin limit to ensure TS 3.7.11 is met.
D. Correct. See referenced lesson plan page 11.

REFERENCES
1. Lesson Plan FH-SFC, Spent Fuel Cooling System, Rev 12c.
2. OP/3/A/1104/006, SF Cooling System, Rev. 68.
3. Oconee Fuel Handling Exam Bank Question 42, FH050301.

No utilility comments.

**
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MAB OK

35. 035K1.02 001

Unit 1 startup and power ascention is about to commence.
- All systems are in their normal alignments.
- Main Turbine is on line

Which one of the following correctly describes the MSR response to increased steam flow from the steam generators as the power ascention progresses to full power?

A. ✓ The first stage reheater will, by design, adjust its tube side steam demand from the high pressure turbine as the cross-around steam flow increases. The second stage reheaters are controlled by an automatic control system which increases second stage tube side steam supply pressure as High Pressure Turbine Exhaust Pressure increases during power escalation.

B. Operators must manually adjust first stage reheater tube side steam demand from the high pressure turbine as the cross-around steam flow increases. The second stage reheaters are controlled by an automatic control system which increases second stage tube side steam supply pressure as High Pressure Turbine Exhaust Pressure increases during power escalation.

C. The first stage reheater will, by design, adjust its tube side steam demand from the high pressure turbine as the cross-around steam flow increases. The second stage reheaters are controlled by an automatic control system which increases second stage tube side temperature at a rate of 90 degress per hour.

D. Operators must manually adjust first stage reheater tube side steam demand from the high pressure turbine as the cross-around steam flow increases. The second stage reheaters are controlled by an automatic control system which increases second stage tube side temperature at a rate of 90 degress per hour.

K/A
Steam Generator
Knowledge of the physical connections and/or cause-effect relationship between the S/GS and the following systems: MRSS.

K/A MATCH ANALYSIS
The question requires knowledge of how the steam production rate in the steam generators will ultimately affect the MSRs.

ANSWER CHOICE ANALYSIS
A. Correct. See pages 11 and 12 of lesson plan STG-MSR & Encl 4.9 of OP/1/A/1106/014 (Automatic operation with turbine on line.).

B. Incorrect. First stage reheaters may be left in service and the tube side steam demand is auto adjusted. Plausible because second part of answer choice is correct.

C. Incorrect. Plausible because first half of answer choice is correct. Second part is plausible because it is true with the turbine off line. See STG-MSR & Encl 4.9 of OP/1/A/1106/014 (Automatic pre-warming with turbine off line.).

D. Incorrect. See B & C above.

REFERENCES
1. Lesson Plan STG-MSR, Moisture Separator Reheaters, Rev. 11.
2. OP/1/A/1106/14 Moisture Separator Reheater
   -Encl 4.8 (MSRH operating limits)
   -Encl 4.9 (MSRH valve logic)

Modified question to make correct answer. First stage control is a design feature rather than a control function. The values given in the second part of the answers is not totally correct. The number varies. See Encl 4.8 (MSRH operating limits).

Changed to ensure only one correct answer. Added turbine on line to make second part about heatup rate plausible. See Encl 4.9 (MSRH valve logic).

**

OK. Utility to provide supporting references.
Updated references and answer analysis.

***

MAB OK

36. 038EA2.02 001

Unit 1 plant conditions:
- Reactor Power = 100%
- 1RIA-17 = 18 mr/hr
- 1RIA-40 in alarm
- Pressurizer Level = 210 inches and slowly lowering
- '1A' HPI Pump operating
- 1HP-5 closed
- 1HP-120 is fully open
- RC Makeup Flow = 160 gpm

Which one of the following describes the correct operator action and the reason for the action?

Increase HPI and ....

A. trip the reactor to minimize the amount of RCS leakage.

B. trip the reactor to minimize the amount of secondary side contamination.

C. perform a controlled shutdown and cooldown to $\leq$ 532 °F to avoid lifting the main steam safety valves.

D. perform a controlled shutdown and cooldown to $\leq$ 532 °F to stop the primary to secondary leakage across the tubes by isolating the affected SG.

K/A
Steam Gen. Tube Rupture / 3
Ability to determine or interpret the following as they apply to a SGTR: Existence of an S/G tube rupture and its potential consequences.

K/A MATCH ANALYSIS
Question tests knowledge of operator actions, which are driven by potential consequences. Procedures give direction to shudown & cooldown to avoid lifting SG Safeties, which is important to minimize radiological releases if a safety were to stick open.

ANSWER CHOICE ANALYSIS
A. Incorrect. Reactor trip would increase likelihood of SG safeties lifting. Plausible because this is an AP/2 (Excessive RCS Leakage) action, but not an action in SGTR EOP. If the applicant misdiagnoses the event as a LOCA, rather than a SGTR, then this could be a correct answer. This answer choice also helps provide a solid match to the K/A, because it requires the applicant to correctly determine the existence of a SGTR based on plant parameters.
B. Incorrect. Reactor trip would increase likelihood of SG safeties lifting. Plausible because this is an AP/2 (Excessive RCS Leakage) action, but not an action in SGTR EOP. Also plausible because this is an action that would help to minimize secondary side contamination.
C. Correct.
D. Incorrect. The leak will not stop when the SG is isolated. The bank question verbiage was modifed to more explicitly state primary to secondary leakage. I had a concern of an applicant being able to argue that the leakage was stopped at the point of the SG. Plausible because the leakage will continue to decrease as RCS pressure decreases.

REFERENCES
1. EP/1/A/1800/001 G, EOP - SGTR, Rev. 034.
2. AP/1/A/1700/002, Excessive RCS Leakage, Rev. 10.
3. Oconee Emergency and Abnormal Procedures Exam Bank Question 165, EAP090101.

Changed label on 1HP-120 to match the plant.

**

Removed noun names from HP-5 and HP-120.

***

MAB OK
****

Added "1RIA-40 in alarm" to stem of question. This RIA will be in alarm in this situation.
MAB OK

37. 039K5.01 001

The following Unit 1 conditions exist:
- Operators are in the process of starting up the plant
- Turbine heatup is in progress
- Unit 1 Turbine Bypass Lines Pumping Trap has malfunctioned and cannot empty to the condenser

If the malfunctioning pumping trap is not addressed, which one of the following correctly describes the impact of the malfunctioning pumping trap and the operator's ability to monitor the pumping trap's condition?

A.✓ Water could accumulate in the Turbine Bypass Lines and in the Main Steam Lines. Operators can monitor using the Hi Level Indication for the Turbine Bypass Lines Pumping Trap.

B. Water could accumulate in the Turbine Bypass Lines and in the Main Steam Lines. No Hi Level Indication for the Turbine Bypass Lines Pumping Trap exists.

C. Water could accumulate in the Turbine Bypass Lines, but not the Main Steam Lines. Operators can monitor using the Hi Level Indication for the Turbine Bypass Lines Pumping Trap.

D. Water could accumulate in the Turbine Bypass Lines, but not in the Main Steam Lines. No Hi Level Indication for the Turbine Bypass Lines Pumping Trap exists.

K/A
Main and Reheat Steam
Knowledge of the operational implications of the following concepts as they apply to the MRSS: Definition and causes of steam/water hammer.

K/A MATCH ANALYSIS
These steam traps are designed to prevent water hammer, as stated in the lesson plan. A malfunction of the trap will introduce a cause for the water hammer, therefore the K/A is met.

ANSWER CHOICE ANALYSIS
A. Correct. On Unit 1 only, the MSL traps feed to the Turb B/P Lines Pumping Traps. Water could accumulate in both areas for Unit 1. Also, Unit 1 only has Hi Level Indication.
B. Incorrect. See above.
C. Incorrect. See above.
D. Incorrect. See above.

Plausibility of distractors is based on each part of each answer being correct depending on which unit is being referenced.

REFERENCES
1. Lesson Plan STG-MSR, Moisture Separator Reheaters, Rev. 11.
2. Lesson Plan STG-MS, Main Steam, Rev. 9.

No utility comments.

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MAB OK

38. 041A3.01 001

Unit 1 initial conditions at 18:00 hrs:
- Power = 100 %
- TBVs are in automatic control

Conditions at 18:15 hours:
- WR RCS ICCM Train 'A' Pressure = 2455 psig
- WR RCS ICCM Train 'B' Pressure = 2455 psig

Current conditions at 18:16 hours:
- Main Steam Relief Valves fail to reseat properly
- RCS Tavg = 550 °F and trending down
- No operator action has taken place

Which one of the following correctly states the status of the turbine bypass valve?

A. TBV will control at setpoint + 125 psig. TBV should be open or throttling in the open direction.

B.✓ TBV will control at setpoint + 125 psig. TBV should be closed or throttling in the closed direction.

C. TBV will control at setpoint + 0 psig. TBV should be open or throttling in the open direction.

D. TBV will control at setpoint + 0 psig. TBV should be closed or throttling in the closed direction.

K/A
Steam Dump/Turbine Bypass Control
Ability to monitor automatic operation of the SDS, including: RCS T-ave. meter (cooldown rate).

K/A MATCH ANALYSIS
Question tests the ability to monitor RCS Tavg, notice a cooldown that was in excess of what was expected, and understand how TBV is designed to automatically bring temp back to setpoint, thereby bringing RCS Tavg back to where it should be.

ANSWER CHOICE ANALYSIS
A. Incorrect. See explanation below - TBV should be shutting, not opening. Plausible because if TBV were controlling at setpoint + 0 psig, then opening would be correct.
B. Correct. The DSS feeds ICS and tells it to control SG pressure at setpoint + 125psig. Setpoint + 125 = 1010 psig, which corresponds to a SG temp of 548F. The lesson plan states that this will maintain about 555 F for an approximate RCS Tavg. Therefore, with an RCS Tavg at 550 F, the SG Temps and Pressures will also be low and the TBV will need to close to bring pressure back to 1010 psig.
C. Incorrect. Plausible because with just a turbine trip, the TBV would control at setpoint + 0 psig. Applicant would need to have a misunderstanding about the status of the ICS control of TBV, but this could be possible.
D. Incorrect. Plausible because with just a turbine trip, the TBV would control at setpoint + 0 psig. Applicant would need to have a misunderstanding about the status of the ICS control of TBV, but this could be possible.

REFERENCES
1. ICS Lesson Plan, Integrated Master, Chapter 3, Rev. 8.
2. Lesson Plan IC-CRI, Control Rod Indication, Rev. 9a

Changed RCS Tavg = 550 °F due to the ONS units controlling at a slightly lower temperature due to our new SGs.

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MAB OK
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Added "Main Steam Relief Valves fail to reseat" to stem of question to ensure only one correct answer.
'A' could have been correct as written if you deduce that the turbine bypass valve being open is what is causing RCS temperatrue to decrease.
MAB OK

39. 054AA1.04 001

Unit 1 plant conditions:
Initial conditions:
- 1C HPI pump OOS

Current conditions:
- Total loss of Main and EFDW
- RCS pressure = 2317 psig

Which one of the following correctly describes the correct operator action per the EOP?

A. Establish SSF ASW flow to the SG and establish SG levels at 240 inches.

B. Establish SSF ASW flow to the SG and do not establish a level in the SGs.

C. Establish HPI forced cooling, evaluate flow in the "B" HPI header and open 1HP-410.

D. Establish HPI forced cooling, evaluate flow in the "B" HPI header and open 1HP-409.

K/A
Loss of Main Feedwater / 4
Ability to operate and / or monitor the following as they apply to the Loss of Main Feedwater (MFW): HPI, under total feedwater loss conditions.

K/A MATCH ANALYSIS
Identifying correct answer requires applicant to understand that during a loss of all feedwater , HPI forced cooling will be established and with the C HPIP out of service, the flow in the B HPI header will be inadequate and the procedure directs opening HP-409 to establish flow.

ANSWER CHOICE ANALYSIS
A. Incorrect. Will not be required with adequate HPI flow. Plausible because it would be correct if HPI is considered degraded. Refer to LOHT tab, pg 1, step 5
B. Incorrect. Will not be required with adequate HPI flow Plausible because it would be correct if HPI is considered degraded. Refer to LOHT tab, pg 1, step 5
C. Incorrect. HP-410 will not establish flow in the B header. Plausible because HP-410 is the cross over valve for the A HPI header and valve sequence is reversed.
D. Correct. With the C HPIP inoperable, flow in the B HPI header will be inadequate which will require the operator to open HP-409.

REFERENCES
1. EP/1/A/1800/001 E, EOP-LOHT & Rule 4, Rev. 034.
2. Lesson Plan, EAP-LOHT and EAP-LOHT att 4 (Rule 4).

Changed AFW to EFW to match ONS system designations.

Rewrote question to ensure a correct answer.

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Removed noun names for HP-409 & HP-410.

Updated answer analysis and references.

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MAB OK

40. 055AG2.1.32 001

Unit 1 initial plant conditions:
- Reactor has tripped
- CT-1 Lockout received
- Keowee Unit 1 Emergency Locked Out
- Keowee Unit 2 Emergency Locked Out
- Blackout Tab of EOP in progress

Current conditions:
- Central Switchyard is energizing the Main Feeder Buses

Which one of the following actions is required per the Limits and Precautions of OP/0/A/1106/019 (Keowee Hydro At Oconee)?

A. Within one hour align the emergency startup bus to share Unit 2's startup transformer.

B. Within 24 hours align the emergency startup bus to share Unit 2's startup transformer.

C. Within one hour BOTH Standby Buses must be energized from a Lee Combustion Turbine.

D. Within 24 hours EITHER Standby Bus must be energized from a Lee Combustion Turbine.

K/A
Station Blackout / 6
Ability to explain and apply all system limits and precautions.

K/A MATCH ANALYSIS
Question tests knowledge of Limits/Precuations that apply during a Station Blackout.

ANSWER CHOICE ANALYSIS
A. Incorrect. Time requirements from TS 3.8.1, Condition A are incorrect. Per TS 3.8.1, Condition A, this would be correct for inoperable startup transformer. Plausible because this action would be correct for inoperable startup transformer.
B. Incorrect. Time requirements from TS 3.8.1, Condition A are incorrect. Plausible because this action would be correct for inoperable startup transformer and the time is the same as if only the Keowee underground was OOS.
C. Correct. Limits and Precautions of OP/0/A/1106/019 (Keowee Hydro At Oconee) states: If both Power Paths become inoperable, within one hour, the Standby Buses must be energized from the Lee Combustion Turbine per OP/0/A/1107/003 (100 KV Power Supply).
D. Incorrect. Per TS 3.8.1, if only the Keowee underground was OOS, this would be correct.

Plausibility is based on actions and time requirements from Tech Specs, but many of the Precautions/Limitations are rooted in Tech Specs also. Therefore, the under prepared applicant may choose one of the distractors.

REFERENCES
1. Tech Spec 3.8.1, AC Sources - Operating.
2. OP/0/A/1106/019, Keowee Hydro at Oconee, Rev. 072.

No utility comments.

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MAB OK

41. 056AK3.02 001

Unit 1 conditions:
- Blackout tab has just been entered
- Blackout is expected to last 4 hours
- RCS T_{cold} = 548 °F
- Operators have just completed the step where they have verified 100 gpm EFDW is being fed to each SG

Which one of the following states how the RCS T_{cold} is required to be controlled per the EOP and why it is controlled in that manner?

A. The RCS is required to be cooled at a rate of ≤ 50 °F/½ hour as indicated by T_{cold}.

Cooldown at higher rate could void the hot legs and reactor vessel head.

B. The RCS is required to be cooled at a rate of ≤ 50 °F/½ hour as indicated by T_{cold}.

Doing a natural circulation cooldown at a higher rate would require opening reactor vessel head vents, which do not have power during a blackout event

C. Stabilize RCS T_{cold} at approximately 548 °F.

Cooldown could void the hot legs and reactor vessel head.

D. Stabilize RCS T_{cold} at approximately 548 °F.

Cooldown should be halted for 1 hour to allow the reactor vessel head temperature to equalize with the RCS temperature and then a NC cooldown should continue.

K/A
Loss of Off-site Power / 6
Knowledge of the reasons for the following responses as they apply to the Loss of Offsite Power: Actions contained in EOP for loss of offsite power.

K/A MATCH ANALYSIS
Knowledge of the reasons for stabilizing RCS temp during a station blackout event are being tested. The said actions are part of the Blackout Tab in the EOPs.

ANSWER CHOICE ANALYSIS
A. Incorrect. Cooldown is not initiated if Tc is < 550 ºF. Plausible because you have a more restrictive cooldown rate during natural circulation. Also plausible because RV head voiding is something that can happen when cooling down via natural circulation.

B. Inorrect. First part incorrect. See above. Second part is incorrect. Plausible because this is a reason NC is not performed during a Blackout.

C. Correct. RCS is required to be stabilized ≤ to 550 ºF iaw Blackout procedure. Plausible because a correct reason is provided. See Page 10 of referenced lesson plan and Page 1 of referenced procedure. Second part is also correct. Cooldown could void the hot legs and reactor vessel head because no HPI injection is available to makeup for RCS shrinkage.

D. Incorrect. First part is correct. Second part is incorrect. Plausible because stabilization is required by the procedure. Also plausible because head voiding is something that does happen when cooling down via natural circulation. With the blackout lasting four hours cooling down after 1 hour would be incorrect.

REFERENCES
1. EP/1/A/1800/001 B, EOP - Blackout, Rev. 034.
2. Lesson Plan BO, Blackout/Encl 5.38 Rev. 06.
3. EOP Rule 8, Pressurized Themal Shock

Re-wrote question to ensure only one correct answer and at the RO level.
Orginal question at SRO level.

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Come back to question..tabled for NRC provided question or utility replacement
Modifed orginal question

Updated answer anylsis.

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Added "approximately" to "C" and "D" alternatives.
Changed second part of "D" to improve plausiblity. This is from original question "A" distractor. Updated "D" answer explanation.
MAB OK

Modified the stem and answer D to ensure D incorrect.

42. 058AK3.01 001

Initial conditions:
- All three units at 50% power
- 1TC is de-energized
- KHU-1 is not running
- KHU-1 is aligned to the underground

Current conditions:
- PCB 8 and 9 trip open and do not reclose (locked out)
- ES channel 1 and 2 Keowee Emergency Start Signal has been received

Which one of the following correctly describes the status of KHU-1 five minutes from now? (Assume no operator actions)

A. ✓ KHU-1 is operating. KHU-1 control power will be supplied by Battery #1.

B. KHU-1 is operating. KHU-1 control power will be supplied by Battery Charger #1 energized via KHU-1.

C. KHU-1 is operating. KHU-1 control power will be supplied by Battery Charger #1 energized via 4160v safety bus.

D. KHU-1 is NOT operating. KHU-1 control power not available due to PCB 8 and 9 open.

K/A
Loss of DC Power / 6
Knowledge of the reasons for the following responses as they apply to the loss of DC Power: Use of dc control power by D/Gs.

K/A MATCH ANALYSIS
Normal supply to the DC Bus for the KHU is via a Battery Charger. The battery charger can get power from three sources. The stem takes all three power sources away and tests knowledge of dc control power supply. The reasons for the responses are tested implicitly by testing if the applicants understand that there is an uninteruptable power supply provided by the battery.

ANSWER CHOICE ANALYSIS
The three sources of [power to the charger is:
1. The Keowee unit if operating and output ACB closed
2. Switchyard via PCB-8 and 9
3. 1TC (4160 v Switchgear at ONS)
Refer to AP/0/A/2000/002 (Keowee Hydro Station emergency Start) Encl. 6.4 (KHS One-line Diagram)

A. Correct. KHU will start. Because power to 1X is not available. The only source of control power is the battery.
B. Incorrect. First part correct. Second part palusible because it would be true if the unit was not connected to the underground feeder and a Switchyard Isolation had occured.
C. Incorrect. First part correct. Second part palusible becaue it would be true if 1TC was energized.
D. Incorrect. First part incorrect. Plausible if applicant thinks that control power is not available. Second part is plausible because the Switchyard via PCB-8 and 9 is a source of power to the Battery charger.

REFERENCES
1. Lesson Plan EL-KHG, Keowee Hydro Generators, Rev. 15.
2. Lesson Plan EL-DCD, DC Power Distribution, Rev. 11c.
3. AP/0/A/2000/002 (Keowee Hydro Station emergency Start) Encl. 6.4 (KHS One-line Diagram)

Re-wrote question to remove Keowee operating ambiguity.

**

Removed third part in "A" (Battery Charger #1 can be manually aligned to ONS 4160V bus).
Revised distractors "B", "C", "D" to improve plausiblity and discriminatory value.
Updated question analysis and references.

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MAB OK
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Current conditions modified to clarify plant status. Added ES 1&2 as emergency start source.
Added KHU-1 to answers for clarification.
MAB OK

43. 059A4.01 001

The following Unit 3 conditions exist:
- Reactor power = 45%
- 3A Main FDW pump operating

	FWP Suction Pressures (psig)			'A' FWP Brg Oil Pressure (psig)		
Time	P1	P2	P3	P1	P2	P3
10:00:00	236 lowering	235 lowering	236 lowering	3.9	5.1	5.2
10:00:01	235 lowering	234 lowering	234 lowering	3.8	4.9	5.1
10:00:16	230 stable	231 stable	229 stable	3.7	4.8	5.0
10:00:31	234 rising	235 rising	234 rising	3.7	4.8	5.0
10:00:32	236 rising	236 rising	236 rising	3.7	4.7	4.9

- FWPT A BEARING OIL PRESSURE LOW alarm actuated at 10:00:01.

Which one of the following correctly describes the response of the Main FDW pump HP and LP Stop Valve light indications for the above sequence of events?

A. The 3A Main FDW pump HP and LP Stop Valve Green light would illuminate at 10:00:01 due to Brg Oil Pressure.

B. The 3A Main FDW pump HP and LP Stop Valve Green light would illuminate at 10:00:01 due to FWP Suction Pressure.

C. The 3A Main FDW pump HP and LP Stop Valve Green light would illuminate at 10:00:31 due to Brg Oil Pressure.

D. The 3A Main FDW pump HP and LP Stop Valve Green light would illuminate at 10:00:31 due to FWP Suction Pressure.

K/A
Main Feedwater
Ability to manually operate and monitor in the control room: MFW turbine trip indication.

K/A MATCH ANALYSIS
The conditions given in the question are adequate indications for the operator to determine that a FWPT trip will occur as indicated by the FWPT stop valve postion lights.

ANSWER CHOICE ANALYSIS
FWPT will trip on low suction pressure: 2 out of 3 @ < 235 psig decreasing for 30 seconds.
FWPT will trip on low bearing oil pressure: 2 out of 3 @ < 4 psig. See CF-FPT, Page 25/36.

A. Incorrect. FWPT will not trip. Plausible because BRG OIL LO Press alarm will annunciate on 2/3 channels less than 5 psig.
B. Incorrect. FDWPT will not trip at this time due to suction pressure. Plausible if you don't know the 30 second time delay.
C. Incorrect. FWPT will not trip. Plausible because BRG OIL LO Press alarm will annunciate on 2/3 channels less than 5 psig. Candidate may think this trip has a 30 second delay.
D. Correct. FWPT will trip on low suction pressure: 2 out of 3 @ < 235 psig decreasing for 30 seconds. See CF-FDW, Page 12 of 39

REFERENCES
1. OP/3/A/6103/008, Alarm Response Guide 3SA-08, Windows A3, A6, & B5, Rev. 015.
2. Lesson Plan CF-FPT, Main Feedwater Pump Turbines, Rev. 14a.
3. Lesson Plan, CF-FDW, Feedwater System, Rev. 14.

Rewrote question to remove requirement to know SA setpoints.

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Added bullet to stem: FWPT A BEARING OIL PRESSURE LOW alarm actuated at 10:00:01.
Modified "P2" brg pressures to cause alarm to actuate a 10:00:01.

Updated answer analysis.

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MAB OK
Typo: changed unit in stem from "1" to "3".

Changed 10:00:31 P1 to 234 to ensure trip still present.

44. 059AK2.01 001

The following events and actions occur:
- TBS pumps are running
- 1RIA-54 (TBS) HIGH alarms
- AP/1/A/1700/018, Abnormal Release of Radioactivity, has just been entered

Per AP/1/A/1700/018, which one of the following correctly describes the automatic or procedurally directed actions for TBS pumps and other radioactive releases that may be in progress?

A.✓ TBS pumps will automatically trip.

All LWRs must be stopped.

B. TBS pumps will automatically trip.

Other LWRs may continue until RP validates the RIA alarm.

C. TBS pumps will not automatically trip. Their breakers must be manually opened and white tags hung.

All LWRs must be stopped.

D. TBS pumps will not automatically trip. Their breakers must be manually opened and white tags hung.

Other LWRs may continue until RP validates the RIA alarm.

K/A
Accidental Liquid Radwaste Rel. / 9
Knowledge of the interrelations between the Accidental Liquid Radwaste Release and the following: Radioactive-liquid monitors.

K/A MATCH ANALYSIS
RIA-54 would not be an expected alarm. Therefore, upon an unexpected radioactive contaminant situation in the TBS, the TBS pumps will receive a trip signal from RIA-54. This question tests the applicant's knowledge of this interrelation between the RIA and the tripping of the TBS pumps.

ANSWER CHOICE ANALYSIS
A. Correct. See referenced lesson plan and AP. The pumps will trip on RIA-54 high alarm.
B. Incorrect. First part is correct. Second part is not correct but is plausible because RP is required to validate all other LWRs in progress to ensure station release rates are within limites.
C. Incorrect. Plausible that the pumps will not auto trip because the AP gives instruction to manually open the breakers.
D. Incorrect. See above distractor analyses.

REFERENCES
1. Lesson Plan RAD-RIA, Radiation Indicating Alarms, Rev 08a.
2. AP/1/A/1700/018, Abnormal Release of Radioactivity, Rev. 14.

No utility comments.

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MAB OK
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Added "HIGH" to alarm. Alert alarm will not cause pumps to trip.
Modified second part of each answer because GWRs are not addressed in the AP-18 section 4K for RIA-54 and are not related to RIA-54 alarms.
MAB OK

45. 060AA1.01 001

The following Unit 1 conditions exist:
- An accidental gaseous release is in progress
- 1RIA-13 (Waste Disposal Control Area Monitor) ALERT LED (RM 80) annunciates.

Which one of the following correctly describes the indications that the operators will observe in the control room?

A.✓ The associated computer point turns yellow.

1SA-8/A-9, RM AREA MONITOR RADIATION HIGH annunciates.

B. The associated computer point turns yellow.

1SA-8/A-9, RM AREA MONITOR RADIATION HIGH does not annunciate.

C. The associated computer point turns red.

1SA-8/A-9, RM AREA MONITOR RADIATION HIGH annunciates.

D. The associated computer point turns red.

1SA-8/A-9, RM AREA MONITOR RADIATION HIGH does not annunciate.

UTILITY NEEDS TO SUPPLY REFERENCES TO SUPPORT QUESTION.

THIS QUESTION SHOULD WORK, BUT I DO NOT HAVE ENOUGH INFORMATION TO DETERMINE WHICH ANSWER IS CORRECT. I MAY NEED TO CHANGE red TO yellow, BASED ON WHAT THE UTILITY TELLS ME AFTER THEY RUN IT ON SIMULATOR.

K/A
Accidental Gaseous Radwaste Rel. / 9
Ability to operate and / or monitor the following as they apply to the Accidental Gaseous Radwaste: Area radiation monitors.

K/A MATCH ANALYSIS
The accidental release is indicated by the Area Rad Monitor statalarm annunciating and computer point color change from green to yellow on the area monitor view node for ALERT on RM-80. Applicants must have knowledge of the inputs to their indications in order to have the ability to effectively monitor.

ANSWER CHOICE ANALYSIS
A. Correct. RIA computer point turns yellow upon ALERT alarm on RM-80. 1SA-8/A-9, RM AREA MONITOR RADIATION HIGH annunciates when the RIA reaches the ALERT setpoint.

B. Incorrect. First part correct. Second part plausible because that Statalarm name indicates that the RIA is HIGH. Must know it alarms on the ALERT.

C. Incorrect. Does not turn red. Plausible because when the HIGH alarm setpoint is reached it does turn red. Second part correct.

D. Incorrect. Does not turn red. Plausible because when the HIGH alarm setpoint is reached it does turn red. See B above for reasons of incorrectness and plausibility of second part.

REFERENCES
1. Lesson Plan RAD-RIA, Radiation Indicating Alarms, Rev. 08a.
2. PT/0/A/0230/001, Rev. 141.
3. OP/1/A/6101/008, Alarm Response Guide 1SA-08; Window A-9; AREA MONITOR RADIATION HIGH, Rev. 16.
4. OP/1/A/6101/008, Alarm Response Guide 1SA-08; Window B-9; PROCESS MONITOR RADIATION HIGH, Rev. 16.
5. Validated actual color of alarm in Oconee Control Room.

Added RM 80 to stem. There is no ALERT LED in the control room.
Changed color to Yellow.

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Modified "C" and "D" distractors to state "red" color.
Updated answer analysis.

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MAB OK

Added "Accidental release in progress" to the stem to better match KA.

46. 061A1.05 001

After a 200 day production run the following Unit 2 conditions are present:
- A reactor trip has just occurred due to loss of both Main Feedwater pumps
- ALL EFDW pumps are operating
- The '2A' Motor Driven EFW Pump (MDEFW) Automatic Recirc Control Valve (ARC) has failed open
- Steam Generator Pressures in both SGs are approximately 1010 psig and stable
- 2FDW-315 and 2FDW-316 are full open due to an indicated low SG level in both SGs

Which one of the following correctly states the observable changes that will occur on the EFW flow transmitters and correctly states the pump flow condition with respect to maximum design flow? (Assume no operator actions)

A. TOTAL EFDW FLOW 2A will be lower than TOTAL EFDW FLOW 2B.

'2A' MDEFW Pump runout conditions will occur.

B. TOTAL EFDW FLOW 2A will be lower than TOTAL EFDW FLOW 2B.

'2A' MDEFW Pump runout conditions will not occur.

C. MDEFDWP DISCH FLOW LOOP A will be lower than MDEFDWP DISCH FLOW LOOP B

'2A' MDEFW Pump runout conditions will occur.

D. MDEFDWP DISCH FLOW LOOP A will be lower than MDEFDWP DISCH FLOW LOOP B

'2A' MDEFW Pump runout conditions will not occur.

K/A
Auxiliary/Emergency Feedwater
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the AFW controls including: AFW flow/motor amps.

K/A MATCH ANALYSIS
AFW flow will change with a failure in the recirc line. The applicant must be able to correctly predict the change in EFW flow when the recirc fails. This is requisite knowledge to correctly monitor AFW. Pump runout is a design consideration that is being tested. If the TDEFW pump were not running and SG pressures were < 800 #, then runout could become a concern.

ANSWER CHOICE ANALYSIS
A. Incorrect. First part is incorrect. This flow difference will be seen on the MDEFWP discharge flow gages but will not be seen on the Total EFDW flow gages because the TDEFWP is running. Plausible because applicant may not think that the recirc valve would have much of an impact on discharge flow and total flwo includes MDEFWP AND TDEFWP flows. Pump runout could occur if TDEFW pump trips and SG pressures lower.
B. Incorrect. First part is incorrect. This flow difference will be seen on the MDEFWP discharge flow gages but will not be seen on the Total EFDW flow gages because the TDEFWP is running. Second part is correct.
C. Incorrect. First part is correct. Second part is not correct. See analysis for 'A' and 'B'. SG pressure being >800 psig will prevent runout.
D. Correct. According to the lesson plan, the 'A' SG will not get robbed of flow with the TDEFWP running. This flow difference will be seen on the MDEFWP discharge flow gages but will not be seen on the total EFDW flow gages because the TDEFWP is running. Also according to the lesson plan, the pump flow will not approach runout conditions with a SG pressure above 800 psig.

REFERENCES
1. Lesson Plan CF-EF, Emergency Feedwater, Rev. 21.

Added unit designators.

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MAB OK
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Modified first part of answers to match stem.
Modified second part of each answer to remove the affect of the loss of the TDEFDW pump.
MAB OK

47. 061A3.03 001

The following Unit 3 conditions exists following operation at 100% power:
- Operators are running the plant back due to Main Feedwater problems
- The 3FDW-315 and 3FDW-316 Hand/Auto Control Stations are in their normal configuration
- All EFW Pumps in normal alignment
- All RCPs are running
- '3A' MFW Pump Discharge Pressure = 768 psig
- '3B' MFW Pump Discharge Pressure = 755 psig
- '3A' SG Level drops to 20 inches for 35 seconds on two XSUR channels
- '3B' SG Level drops to 15 inches for 30 seconds on one XSUR channel
- Primary power is lost to the 3FDW-315 Hand/Auto Control Station
- Operators have just completed IMAs following a reactor trip

Which one of the following correctly states the EFW pump status and SG level control status?

A. All three EFW Pumps will be running. SG level will be controlled at 30 inches XSUR for both SGs.

B. All three EFW Pumps will be running. SG level will be controlled at 30 inches XSUR for the 'B' SG only.

C. Both Motor Driven EFW Pumps will be runnning and the Turbine Driven EFW Pump will be off. SG level will be controlled at 30 inches XSUR for both SGs.

D. Both Motor Driven EFW Pumps will be runnning and the Turbine Driven EFW Pump will be off. SG level will be controlled at 30 inches XSUR for the 'B' SG only.

K/A
Auxiliary/Emergency Feedwater
Ability to monitor automatic operation of the AFW, including: AFW S/G level control on automatic start.

K/A MATCH ANALYSIS
Applicant must have knowledge of auto AFW operation to know which pumps auto start and how the level controllers respond to the given plant conditions.

ANSWER CHOICE ANALYSIS
A. Correct. AMSAC will start all three EFWPs when both trains of FW reach 770 psig. Also, when primary power is lost to the Moore controller, the power supply will automatically swap to the backup. Therefore, both SGs will be controlled at 30 inches XSUR because RCPs are running.
B. Incorrect. As stated above, the 'A' SG will also be controlled at 30 inches. Plausible if applicant does not know how controller responds to power failure.
C. Incorrect. All three EFW pumps will start on AMSAC signal. Plausible because low SG levels will only start the MDEFWPs and the second part of the answer choice is correct.
D. Incorrect. When primary power is lost to the Moore controller, the power supply will automatically swap to the backup and allow control at 30 inches for both SGs. Plausible if applicant does not know how controller responds to power failure.

REFERENCES
1. Lesson Plan Feedwater System, Rev. 14.
2. Lesson Plan CF-EF, Emergency Feedwater, Rev. 21.

Added unit designators.
Changed Moore controller designation to valve names for FDW-315 & 316.
Changed 'A' MFW Pump Discharge Pressure to 768 psig to ensure a correct answer.

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MAB OK

48. 062A2.07 001

The following Oconee conditions exist:
- Unit 1 is at 102 MWe
- An operator inadvertantly opened the electrical disconnect feeding Startup Transformer CT-1

Which one of the following correctly describes the plant response and operator required actions?

ASSUME NO SYSTEM FAILURES

A. The reactor trips followed by IMAs and Symptom Check.

AP-11, Recovery From Loss of Offsite Power must be performed to restore secondary systems to normal alignment.

B. The reactor does not trip.

Use of OP/1/A/1107/004, Operation of the Vital Bus, Computer, ICS, and Auxiliary Inverters to restore auxiliary transformer to service.

C. The reactor trips followed by IMAs and Symptom Check.

EOP Enclosure 5.38, Restoration of Power must be performed to restore power to the Main Feeder Buses.

D. The reactor does not trip.

AP-11, Recovery From Loss of Offsite Power, shall be utilized in conjunction with OP/1/A/1107/004, Operation of the Vital Bus, Computer, ICS, and Auxiliary Inverters.

K/A
AC Electrical Distribution
Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Consequences of opening a disconnect under load.

K/A MATCH ANALYSIS
Consequences of opening an MOD underload (CT-1 S/U XFRM FEED) is that it trips the reactor.

ANSWER CHOICE ANALYSIS
A. Correct. The reactor will trip because the SU transformer is being used when the generator is putting out only 102 MWe. They do not swap power supplies until ~200 MWe. AP-11 would be used to restore secondary systems because power automatically is restored.
B. Incorrect. The reactor will trip.
C. Incorrect. The reactor will trip, but EOP Enclosure 5.38 would only be used if power did not automatically come back. Enc 5.38 would be needed only when power must be manually restored.
D. Incorrect. The reactor does trip.

Distractors are plausible because Enc. 5.38 would be used if power did not automatically restore and the OP is used in conjucnction with the AP, but in answer choice D - the reactor trip portion is incorrect.

REFERENCES
1. AP/1/A/1700/011, Recovery From Loss of Power, Rev. 38.
2. EOP Enclosure 5.38, Rev. 34.

No utility comments.
Higher than knowledge.

**

Changed MWe to 102 from 100 to prevent error in interpretting stem.

***

MAB OK
****

Modified A & C to ensure only one correct answer.
Added "ASSUME NO SYSTEM FAILURES".
Removed AP-11 from "B" distractor.
MAB OK

Underlined "must" in A and C.

49. 062A4.03 001

Operators are preparing to parallel KHU-1 to the grid. The operator notes the following indications:

- Keowee 1 Line Volts = 13.8 kV
- Keowee 1 Output Volts = 13.0 kV
- Grid Frequency = 60 cycles
- Keowee Frequency = 59 cycles

Based on the above conditions, which one of the following correctly describes the synchroscope indication and trip signals to ACB 1?

A. The synchroscope will be rotating in the clockwise direction. ACB 1 will NOT receive a trip signal as a direct result of the line voltage differential.

B. The synchroscope will be rotating in the clockwise direction. After 5 seconds ACB 1 will receive a trip signal as a direct result of the line voltage differential.

C. The synchroscope will be rotating in the counterclockwise direction. ACB 1 will NOT receive a trip signal as a direct result of the line voltage differential.

D. The synchroscope will be rotating in the counterclockwise direction. After 5 seconds ACB 1 will receive a trip signal as a direct result of the line voltage differential.

UTILITY NEEDS TO VERIFY THAT VOLTAGES GIVEN IN THE STEM WILL ACTUALLY CAUSE THE BREAKER TRIP SIGNAL TO BE GENERATED.

K/A
AC Electrical Distribution
Ability to manually operate and/or monitor in the control room: Synchroscope, including an understanding or running and incoming voltages.

K/A MATCH ANALYSIS
Question requires knowledge of incoming and running voltages and synch scope indication.

ANSWER CHOICE ANALYSIS
Out of tolerance circuit protection is only active for Emergency Starts.

A. Incorrect. Synch scope would rotate in CCW direction. ACB 1 would actually trip as a result of Voltage being > 10% lower than normal (13.8 Kv).
B. Incorrect. Synch scope would rotate in CCW direction. ACB 1 would actually trip as a result of Voltage being > 10% lower than normal (13.8 Kv).
C. Correct. Out of tolerance circuit protection will not trip ACB 1 after 5 seconds because the out of tolerance circuit protection is only active for Emergency Starts.
D. Incorrect. Keowee frequency is lower than grid so synchscope will be spinning backwards (CCW). Out of tolerance circuit protection will not trip ACB 1.

Plausibility is based on memorizing the ACB auto trip feature and correctly calculating less than 10% normal voltage. Also, plausibility is hinged on the applicant knowing how the synch scope will respond to the frequency differential.

REFERENCES
1. Lesson Plan EL-KHG, Keowee Hydro Generators, Rev. 15.
2. OP/0/A/1106/019, Keowee Hydro At Oconee, Rev. 72.

The "out of tolerance circuit" which will trip ACB-1 or ACB-2 works only on an Emergency start signal. During an emergency start the operator cannot see the sync scope operate and thus cannot met the KA.

Wrote new question to meet the KA.

**

Returned to original question
Modified KHU values in stem to reduce deltas between line and unit.
Changed correct answer to "C"
Added "direct" to "B" and "D" distractors and underlined.

Removed ACB-2 from question. Question is refering to Keowee unit 1 only.

Updated answer anlysis.

***

MAB OK

50. 063K2.01 001

Plant conditions:
Unit 1, 2, & 3 Vital DC systems are aligned normally
- 1CA Battery charger fails - voltage output 0 vdc
- 1CA Battery voltage - 120 vdc
- 1DCB Bus voltage - 123 vdc
- Unit 2 DC Bus voltage - 125 vdc
- Unit 3 DC Bus voltage - 127 vdc

Which ONE of the following will supply power to 1DIA panelboard?

Assume NO operator actions

A. 1CA battery

B. Unit 3 DC bus

C. 1DCB bus

D. Unit 2 DC bus

K/A
DC Electrical Distribution
Knowledge of bus power supplies to the following: Major DC loads.

K/A MATCH ANALYSIS
1DIA panelboard is a major DC load. Question requires knowledge of how 1DIA can be supplied.

ANSWER CHOICE ANALYSIS
A. Incorrect. Unit 2 supplies power to the alternate isolating diodes for 1DIA panelboard. The voltage from Unit 2 is higher than the 1CA battery voltage since Unit 2 is being supplied from the charger, so Unit 2 will supply power.
B. Incorrect. Unit 3's DC Bus is not connected to Unit 1.
C. Incorrect. For the Vital DC system, the 1DCB bus is not aligned to the 1DCA bus.
D. Correct, The voltage from Unit 2 is higher than the 1CA battery voltage since Unit 2 is being supplied from the charger, so Unit 2 will supply power.

REFERENCES
1. Lesson Plan EL-DCD, DC Power Distribution, Rev. 11c. Page 21 of 51.
   - Drawing DCDSet.vsd
2. Oconee Electrical Exam Bank Question, EL020402.

New EHC has redundant power supplies and turbine would not trip on this failure. All three units now have the new EHC system. Refer to LP STG-EHC, Page 61 of 73.

Selected bank question EL020402 which meets the KA.

**

Utility to supply reference material to support new question.

Updated answer analysis and references.

***

MAB OK

51. 064A1.03 001

Unit 1 plant initial conditions:
- Reactor power = 90%
- Keowee Unit 1 suppling the grid at 50 MWe
- Keowee Unit 2 suppling the grid at 50 MWe
- ACB-3 is closed

Current conditions:
- Switchyard Isolation occurs

Based on the above conditions, which one of the following is correct?

A. ACB-1 will close after 9 seconds if Keowee voltage and frequency are within ± 10% of normal to supply ONS Unit 1's MFBs.

B. ACB-2 will close after 11 seconds if Keowee voltage and frequency are within ± 10% of normal to supply ONS Unit 1's MFBs.

C. ACB-1 will close after 11 seconds if Keowee voltage and frequency are within ± 5% of normal to supply ONS Unit 1's MFBs.

D. ACB-2 will close after 9 seconds if Keowee voltage and frequency are within ± 5% of normal to supply ONS Unit 1's MFBs.

K/A
Emergency Diesel Generator
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ED/G system controls including: Operating voltages, currents, and temperatures.

K/A MATCH ANALYSIS
Keowee Unit 1 will provide power to Unit 1s MFBs via the overhead and CT-1. The"Out of Tolerance Circuit" (OOTC) has recently been added to the Keowee Units. This mod ensures Keowee supplies ONS at the proper voltage and frequency. This ensures proper operation of ES equipment.

ANSWER CHOICE ANALYSIS
A switchyard isolation from 90% power will result in a reactor trip (high RCS pressure). The KHU not tied to the underground (KHU-2) will supply Unit 1s MFBs via ACB-2 and the overhead path. The out of tolerance circuit requires frequency and voltage are within 10% of normal values. The out of tolerance circuit also has an 11 second time delay to allow time for frequency and voltage to stabilize within the band.
The 9 second time delay is plausible because there is a 9 second time delay on ACB 1&2 to ensure RCPs trip on a switchyard isolate.

A. Incorrect. ACB-1 will not close because KHU-1 is tied to the underground and time delay is incorrect. Plausible, see above
B. Correct. ACB-2 two will close after the OOTC is met.
C. Incorrect. ACB-1 will not close because KHU-1 is tied to the underground and time delay is incorrect. Plausible because time delay is correct. The tolerance is plausible because 5% is where the out of tolerance stat alarm actuates.
D. Incorrect. 9 seconds and 5% is not correct. 9 seconds in plausable because this delay is on ACB-1/2 to ensure RCP trip after a Swyd Isolation. 5% is when the Statalarm actuates.

REFERENCES
1. Lesson Plan EL-KHG, Keowee Hydro Generators, Rev. 15. page 19 of 34.

We do not expect an RO to memorize a number out of a PTs L&P.

Wrote new question to that matches KA.

**
Needs further review
Possible overlap with 062A4.03.
Utility to provide supporting reference and justification on replacing quesiton.

Question was replaced because;
1. We do not expect an RO to memorize a number out of a PTs L&P.(Answer A & B)
2. Answers C&D are not correct as written and would require a curve (attachment). Also, the gauge used in the correct answer would only be used if the instrumentation used in C&D were unavailable. Refer to OP/0/A/1106/019 enclosure 4.19 (CT4 overload limits).

Updated answer analysis and references.

***
MAB OK

52. 065AA1.05 001

Unit 1 initial conditions:
- 100% power
- Instrument Air Pressure lowering
- Operators entered AP/1/A/1700/022, Loss of Instrument Air

Current conditions:
- FDW Pump Δ P OAC alarms actuate

Which one of the following correctly describes the actions required by AP/1/A/1700/022, based on the provided plant conditions?

A. Commence a plant shutdown. If at any time two or more CRD temperatures are > 180 °F, then trip the reactor.

B. Commence a plant shutdown. If at any time SG level approaches main FDW pump trip criteria, then trip the reactor.

C. Manually trip the reactor. Manually trip both main FDW pumps.

D. Manually trip the reactor. Manual trip of both main FDW pumps is not needed because each pump will trip on high SG level.

K/A
Loss of Instrument Air / 8
Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air:
RPS

K/A MATCH ANALYSIS
Question tests knowledge of when to trip the reactor during a loss of IA event. Therefore, the question tests knowledge of the ability to operate the RPS, via tripping reactor, when a loss of instrument air occurs.

ANSWER CHOICE ANALYSIS
A. Incorrect. See "B" analysis below.
B. Incorrect. AP requires reactor to be tripped when FDW is not controllable. The OAC alarm actuates at about 30 psig, well below the ~70 psig where FDW valves stop responding to control signals. Therefore, the reactor must be tripped at this point - actually the reactor should probably have been tripped well before this point. Plausible because the applicants need to know when the OAC alarm actuates. Also plausible because the second piece of the answer choice is correct.
C. Correct. See referenced SAEL and Page 3 of the AP. The OAC alarm provided in the stem will annunciate at about 30 psig IA header pressure. This is well below the point where instrument air is able to control FW valves. Therefore, the AP rquires that the reactor be tripped and the MFDW pumps to be tripped.
D. Incorrect. AP requires MFDW pumps to be tripped immediately after the reactor is tripped. Plausible because the MFDW pumps will auto trip on high SG level.

REFERENCES
1. AP/1/A/1700/022, Loss of Instrument Air, Rev. 021.
2. Lesson Plan SSS-IA, Instrument Air System, Rev. 16.
3. Simulator Guide, SAE-L 035, Loss of Instrument Air, Rev. 8.

No utility comments.

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MAB OK

53. 072K5.01 001

The following unit 1 conditions exist:
- Power is 15% and slowly increasing to 100%
- The '1A' steam generator has a small tube leak which is not growing (size is constant)
- A fuel cladding failure has just occurred in the reactor and is growing in size

Which one of the following correctly describes radiation monitoring of the main steam lines in the presence of the above plant conditions?

A.✓ 1RIA-16 and 17 (Main Steam Line Monitors) indication will continue to rise.

B. 1RIA-59 and 60 (N-16 monitors) will indicate a constant valid leak size as power is raised.

C. 1RIA-59 and 60 (N-16 monitors) tube leak size will match the OAC calculated tube leak size of RIA-40 (CSAE Offgas) during the entire power increase.

D. 1RIA-59 and 60 (N-16 monitors) tube leak size will match the OAC calculated tube leak size of 1RIA-40 (CSAE Offgas) once power is raised 5%.

K/A
Area Radiation Monitoring (ARM) System
Knowledge of the operational implications of the following concepts as they apply to the ARM System: Radiation theory, including sources, types, units, and effects.

K/A MATCH ANALYSIS
The applicant must have knowledge of the theory of how the various rad monitors work to detect the SGTL. RIA-16 and 17 are Area Monitors which are sensitive to all radiation, even that from a fuel failure, so they will respond as the fuel leak keeps getting bigger, whereas the N-16s will not. Therefore theory, types, sources, and effects of Area Monitors are all being tested (almost all aspects of K/A).

ANSWER CHOICE ANALYSIS
A. Correct. Page 35 of 48 of referenced lesson plan states that RIA-16 and 17 will respond to all activity, even a change in RCS activity, which the stem provides with a degrading fuel failure.
B. Incorrect. From 15% to 20% the OAC will display an invalid leakrate.
C. Incorrect. RIA-40 will be affected by the fuel failure, whereas N-16s will not.
D. Incorrect. RIA-40 will be affected by the fuel failure, whereas N-16s will not.

Plausibility is based on knowing how these detectors will respond and under what conditions they will provide valid indication.

REFERENCES
1. Lesson Plan RAD-RIA, Radiation Indicating Alarms, Rev. 08a.

Added unit designators.
No utility comments.

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MAB OK

Added "the OAC calculated" to C and D.

54. 073A1.01 001

The following Unit 1 conditions exist:
- Reactor Building Monitor 1RIA-49 (Normal Gas) indicates in the middle of its indicating range and the indication is steadily rising.

Which one of the following correctly describes the process radiation monitor response as a result of a steadily increasing indication on 1RIA-49?

A. ✓ **1RIA-49A** (High Gas) will indicate zero until **1RIA-49** switchover criteria is met. After switchover **1RIA-49A** output will control the 1LWD-2 (RB Normal Sump Isolation) interlock.

B. **1RIA-49A** (High Gas) will indicate zero until **1RIA-49** switchover criteria is met. After switchover **1RIA-49** output will control the 1LWD-2 (RB Normal Sump Isolation) interlock.

C. **1RIA-49A** (High Gas) will track with **1RIA-49** until switchover criteria is met. After switchover **1RIA-49A** output will control the 1LWD-2 (RB Normal Sump Isolation) interlock.

D. **1RIA-49A** (High Gas) will track with **1RIA-49** until switchover criteria is met. After switchover **1RIA-49** output will control the 1LWD-2 (RB Normal Sump Isolation) interlock.

K/A
Process Radiation Monitoring
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRM system controls including: Radiation levels.

K/A MATCH ANALYSIS
Radiation levels are rising and about to exceed the limit which will cause RB sump auto isolation. PRM indication between RIA-49 and 49A will change as the rad levels continue to go up. Knowledge of how these indications change is necessary in order to correctly answer the question.

ANSWER CHOICE ANALYSIS
A. Correct. See lesson plan.
B. Incorrect. RIA-49 will indicate zero after switchover criteria is met.
C. Incorrect. RIA-49A does not track with RIA-49.
D. Incorrect. RIA-49 will indicate zero after switchover criteria is met.

Plausibility is based on knowing how these PRMs will respond to increasing rad levels and how the control auto close features receive their input signal when the PRM limit is reached.

REFERENCES
1. Lesson Plan RAD-RIA, Radiation Indicating Alarms, Rev. 08a.

Added unit designators.
No utility comments.

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MAB OK

55. 076K1.08 001

Unit 1 is in normal decay heat removal mode with 5700 gpm LPSW flow through the operating LPI Cooler. In order to raise the RCS cooldown rate, the operator begins raising LPSW flow.

Which one of the following correctly states how cooldown rate is affected by continuing to raise LPSW flow from 5700 gpm?

A. RCS cooldown rate can be increased until LPSW flow through the LPI Cooler reaches 5900 gpm, at which time installed travel stops prevent the LPSW flow control valves from opening any further.

B. RCS cooldown rate can be increased until LPSW flow through the LPI Cooler reaches 6000 gpm, at which time installed travel stops prevent the LPSW flow control valves from opening any further.

C. RCS cooldown rate can be increased until LPSW flow to the LPI coolers reaches 5900 gpm, at which time LPSW flow automatically runs back to 5200 gpm.

D. RCS cooldown rate can be increased until LPSW flow to the LPI coolers reaches 6000 gpm, at which time LPSW flow automatically runs back to 5200 gpm.

K/A
Service Water
Knowledge of the physical connections and/or cause-effect relationships between the SWS and the following systems: RHR system.

K/A MATCH ANALYSIS
The LPSW flow control valves will automatically reduce LPSW flow through the LPI Cooler to prevent exceeding the LPI cooler shell design flow. Therefore, the question requires the applicant to have knowledge of LPI Cooler constraints associated with attempting to raise LPSW flow to raise RCS cooldown rate.

ANSWER CHOICE ANALYSIS
A. Incorrect. Travel stops prevent exceeding operability limit of 7500 gpm (see page 15 of Lesson Plan SSS-LPW). Plausible because travel stops do exist and 5900 gpm is associated with the auto runback.
B. Incorrect. Travel stops prevent exceeding operability limit of 7500 gpm (see page 15 of Lesson Plan SSS-LPW). Plausible because travel stops do exist and 6000 gpm is associated with design flow limit.
C. Correct. See OP/1/A/1104/004B Precaution and Limitation 2.15 and Lesson Plan SSS-LPW, Pages 14 and 15.
D. Incorrect. Auto runback will occur at 5900 gpm. Plausible because shell design flow is 6000 gpm.

REFERENCES
1. Lesson Plan SSS-LPW, Low Pressure Service Water, Rev. 16.
2. OP/1/A/1104/004B, LPI System Fill and Startup, Rev. 15.

No utility comments.

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MAB OK

56. 078K3.02 001

Unit 2 initial conditions: 0900
- Rx Power = 100%
- IA pressure = 95 psig decreasing rapidly
- AIA pressure = 95 psig decreasing rapidly
- AP22 (Loss of Instrument Air) has been entered

Current conditions: 0945
- IA pressure = 0 psig
- AIA pressure = 0 psig

Based on the above conditions, which one of the following valves will be failed OPEN at this time?

A. 2HP-5 (LETDOWN ISOLATION)

B. 2C-10 (HWP'S DISCH CONTROL)

C. 2MS-87 (MS TO TDEFDWP CONTROL VALVE)

D. 2FDW-316 (1B EFDW CONTROL VALVE)

K/A
Instrument Air
Knowledge of the effect that a loss or malfunction of the IAS will have on the following:
Systems having pneumatic valves and controls.

K/A MATCH ANALYSIS
All systems in the answers have pneumatic valves and controls. The applicant must have knowledge of failure modes for the listed valves and whether each valve has Nitrogen backup. The question was written 'as is' to keep it memory level.

ANSWER CHOICE ANALYSIS
A. Incorrect. Backup bu AIA but fails closed.
B. Correct. Fails open.
C. Incorrect. Fails open but is backed up by nitrogen. Nitrogen supply is available for >1 hour.
D. Incorrect. Fails open but is backed up by nitrogen. Nitrogen supply is available for >1 hour.

Plausibility of distractors is based on the fact that all of these vaves are fed by Inst Air. Distractors are incorrect because they either fail closed or are backed up by Nitrogen.

REFERENCES
1. AP/1/A/1700/022, Loss of Instrument Air, Rev. 21.

Replaced with bank question to better match K/A and is more operationally significant.

**

Returned to original question
Added bullet to stem to identify AIA status
Changed "D" to increase operator significance of question.

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MAB OK

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Modified question from indications available on loss of IA to components to make more significant.
Added a time span of 45 minutes to stem.
MAB OK

57. 079A2.01 001

The following Unit 2 conditions exist:

Initial Conditions:
- The Primary Instrument Air compressor is electrically and mechanically isolated for maintenance
- All other compressed air components are properly aligned

Current conditions:
- Instrument Air Pressure is 80 psig and decreasing slowly (approximately one pound per minute)
- Station Air Pressure is 100 psig and stable
- Auxiliary Instrument Air pressure is 100 psig and stable
- The Control Room Supervisor has just entered AP/2/A/1700/022, Loss of Instrument Air

Which one of the following correctly describes the next procedurally required actions, if any, in accordance with AP/2/A/1700/022?

A. Immediately dispatch an operator to perform Enclosure 5.4 (Emergency Start of the Diesel Air Compressor). Immediately trip the Reactor and then trip all Main FDW pumps.

B. Immediately dispatch an operator to perform Enclosure 5.4 (Emergency Start of the Diesel Air Compressor). Do not trip the Reactor.

C. Immediately trip the Reactor and then trip all Main FDW pumps.

D. Do not immediately dispatch an operator to perform Enclosure 5.4 (Emergency Start of the Diesel Air Compressor). Do not trip the Reactor.

K/A
Station Air
Ability to (a) predict the impacts of the following malfunctions or operations on the SAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Cross-connection with IAS.

K/A MATCH ANALYSIS
SAS P is 100 psig and IA P is 80 psig. Therefore SA-141 (SA to IA) has failed to open at 85 psig in the IA system. The question then requires the applicant to have knowledge of what procedural actions to take. Perfoming Enc 5.4 will provide direction to open the bypass around SA-141, thus helping to mitigate the problem.

ANSWER CHOICE ANALYSIS
A. Incorrect. No Rx trip is required. Plausible because Encl 5.4 performance is required and if IA pressure reaches 70 psig, then MFW Reg valves may start to fail as-is, which could present a rx trip condition.
B. Correct. Entry conditions for the AOP are met. The IA step has them dispatch an operator to do Enc 5.4. A note above the step states that Enc 5.4 should be done even if the Diesel Air Comp are running due to needed valve alignments. One of the valves that this enclosure directs to open is the bypass around SA-141. Also, Encl 5.2 states that MFW control valves may begin to fail as is at about 70 psig, which would be a Rx trip criteria. Current IA pressure is 80 psig, which is not a reason to trip, especially when station air will soon be available to help maintain IA pressure.
C. Incorrect. Diesel Air Comp have started based on plant conditions, but the note in the AP states that important valve alignments will be accomplished with the performance of Encl 5.4. No Rx trip is required. Plausible because the Diesel Air Comp are running and there is Rx trip criteria is IA pressure continues to decrease.
D. Incorrect. Diesel Air Comp have started based on plant conditions, but the note in the AP states that important valve alignments will be accomplished with the performance of Encl 5.4. Plausible because the Diesel Air Comp have started and a Rx trip is not required.

REFERENCES
1. AP/2/A/1700/022, Loss of Instrument Air, Rev. 031.

Added AIA status to insure only one correct answer. (CC-8 closed on 80 psig requiring a manual reactor trip in about 4 minutes).

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MAB OK

58. 103K1.02 001

Unit 1 Reactor Building Purge is in operation.

Which one of the following correctly states the condition that will initiate automatic closure of Containment Purge System Isolation Valves 1PR-1 through 1PR-6?

A.✓ Reactor Building Pressure rising to 3.5 psig.

B. 1RIA-45 HIGH Alarm actuates.

C. ES Channel 1 inadvertantly actuates.

D. ES Channel 2 inadvertantly actuates.

K/A
Containment
Knowledge of the physical connections and/or cause-effect relationships between the containment system and the following systems: Containment Isolation / Containment Integrity.

K/A MATCH ANALYSIS
Applicant must have knowledge of how containment system internal pressure rise will affect closure of containment isolation valves.

ANSWER CHOICE ANALYSIS
A. Correct. See lesson plan PNS-RBP, Page 17 of 21.
B. Incorrect. See lesson plan PNS-RBP, Page 18 of 21.
C. Incorrect. ES Channel 1 closes only PR-1 and 6. See lesson plan PNS-RBP, Page 17 of 21.
D. Incorrect. ES Channel 2 closes only PR-2, 3, 4, and 5. See lesson plan PNS-RBP, Page 17 of 21.

REFERENCES
1. Oconee PNS Exam Bank Question 312, PNS160701.
2. Lesson Plan IC-ES, Engineered Safeguards, Rev. 13a.
3. Lesson Plan PNS-RBP, Reactor Building Purge System, Rev. 09a.

No utility comments.

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MAB OK
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Provided unit designators
MAB OK

59. BW/A04AK1.1 001

Initial conditions at 14:45 hrs:
- Unit 1 Reactor Power = 100%
- Unit 2 Reactor Power = 25% (Turbine Generator on-line waiting for Dispatcher)
- Unit 3 Reactor Power = 100%

Conditions at 15:00 hrs:
- OAC alarm GEN COLD GAS TEMP "HIGH HIGH" received for all three units
- NEO reports "MACHINE GAS TEMP HIGH" in alarm on H2 PANEL for all three units
- Total loss of Unit 1 and 2 RCW system

Which one of the following correctly describes the minimum actions to be taken to mitigate the given plant conditions?

A. All three reactors are required to be immediately tripped.

B. Unit 1 reactor is required to be immediately tripped. Unit 2 and 3 may remain on-line.

C. Unit 1 reactor and Unit 2 main turbine are required to be immediately tripped. Unit 3 may remain on-line.

D. ✓ Unit 1 and 3 reactors and Unit 2 main turbine are required to be immediately tripped.

K/A
Turbine Trip / 4
Knowledge of the operational implications of the following concepts as they apply to the (Turbine Trip): Components, capacity, and function of emergency systems.

K/A MATCH ANALYSIS
Tripping the turbine above 28% power has operational implications on the RPS (emergency system). In other words, the function of the RPS (an emergency system) to automatically trip the turbine when above 28% is being tested. Turbine trip vs. Rx Trip is based on heat removal capacity available when the secondary side is taken offline. A turbine trip will function to create a rx trip signal if power is above 28%, which is why Unit 2 turbine is tripped and the other two units require a rx trip.

ANSWER CHOICE ANALYSIS
Alarm Response Guide (H Monitoring Panel) A3 (Machine Gas Temp High) states if RCW system is lost, to trip the Turbine Generator.

A. Incorrect.
B. Incorrect.
C. Incorrect.
D. Correct. See explanation in attached Bank Question. Also see attached figure which shows that Unit 1 and 2 RCW system supplies Unit 3 secondary loads. Thus losing RCW to Unit 1 and 2 will affect all three units. Having reactor power above 28% requires tripping of reactor on Units 1 and 3, whereas tripping of the main turbine is allowable on Unit 2.

REFERENCES
1. Oconee Bank Question #16, SSS061901.
2. OP/1/A/6101/003, Alarm Response Guide 1SA-03, Rev. 032.
3. OP/2/A/6101/003, Alarm Response Guide 1SA-03, Rev. 023.
4. OP/3/A/6101/003, Alarm Response Guide 1SA-03, Rev. 025.

Changed Statalrm to GEN COLD GAS TEMP "HIGH HIGH" OAC alarm. The SA was removed.

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Added 1SA-3/A4 (GN H2 PANEL TROUBLE) to question stem

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Added "NEO reports "Machine Gas Temp High" in alarm on H2 PANEL for all three units"
MAB OK

60. BW/A06AK3.2 001

Unit 2 initial conditions:
- Reactor power = 100%
- 2C HPI Pump is OOS

Current conditions:
- AP/08, Loss of Control Room, is in progress
- The following indications are observed on the ASDP:
  - Turbine header pressure = 820 psi and slowly decreasing
  - TBV's demand is 0% and stable
  - RCS T Hot = 559 °F and slowly increasing
  - RCS pressure = 2285 psig and slowly increasing
  - Pzr level = 200 inches and slowly increasing
  - SG SU levels = 14 inches and slowly decreasing
  - SU valves demand = 100%

Which one of the following correctly describes the required action in accordance with AP/08 and the reasons for the action?

A. Activate the Standby Shutdown Facility because of abnormal post trip conditions.

B. Activate the Standby Shutdown Facility because when Forced HPI Cooling is initiated it will not be adequate to cool the core.

C. Take manual control of HP-120 and adjust Pzr level because it is outside of the desired band.

D. Take manual control of the TBVs to reduce RCS temperature and pressure because they are higher than expected.

K/A
Shutdown Outside Control Room
Knowledge of the reasons for the following responses as they apply to the (Shutdown Outside Control Room): Normal, abnormal and emergency operating procedures associated with (Shutdown Outside Control Room).

K/A MATCH ANALYSIS
The reasons for activating the Standby Shutdown Facility, AP actions, are being tested.

ANSWER CHOICE ANALYSIS
A. Correct. Post trip conditions are not being maintained. Activating the SSF is required to maintain the Plant in Mode 3. See Step 4.19 of AP/08.
B. Incorrect. Loss of 1C HPIP does not constitute "degraded HPI". HPI would be degraded in HPI Forced Cooling Mode with the 1C HPIP off and 1HP-409 failed. Plausible because activation of the SSF is required if in Forced HPI Cooling and HPI is degraded.
C. Incorrect. Pzr level is currently in the desired band. Plausible because these are correct actions to take if outside of the desired band. See AP/08, Step 4.32.
D. Incorrect. The only direction given in AP/08 for adjusting TBVs is to maintain Turbine Header Pressure at about 1010 psig. Current THP is 820 psig and the TBV should be closed. Plausible because under more norma circumstances, opening the TBV would be a means of cooling the RCS. In this instance, due to loss of feed, the SGs are virtually empty and have no energy removing capability.

REFERENCES
1. AP/1/A/1700/008, Loss of Control Room, Rev. 011.
2. Lesson Plan EAP-LOHT, Loss of Heat Transfer, Rev. 12.

No utility comments.

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MAB OK

61. BW/E02EA2.1 001

The following conditions exist on Unit 1:
- The reactor tripped a few minutes ago and the BOP is currently performing a Symptom Check
- 'A' SG Feedwater Line break develops downstream of 1FDW-32, located between the check valve and containment
- 'A' SG Pressure = 500 psig and rapidly decreasing
- 'B' SG Pressure = 800 psig and slowly decreasing
- EFDW to both SGs did not automatically actuate
- EOP Rules have not yet been performed

Which one of the following correctly states which procedure should be performed in accordance with OMP 1-18 (Implementation Standard During Abnormal and Emergency Events) Symptom Check Guidelines, and actions that are directed by those procedures?

A. OATC performs Rule 3, Loss of Main or Emergency Feedwater. Select OFF for both digital channels on AFIS on AFIS HEADER A.

B. BOP performs Rule 3, Loss of Main or Emergency Feedwater. Depress CH. 1 INIT and CH. 2 INIT for AFIS HEADER A.

C. BOP performs Rule 5, Main Steam Line Break. Select OFF for both digital channels on AFIS on AFIS HEADER A.

D. ✓ OATC performs Rule 5, Main Steam Line Break. Depress CH. 1 INIT and CH. 2 INIT for AFIS HEADER A.

K/A
Reactor Trip - Stabilization - Recovery / 1
Ability to determine and interpret the following as they apply to the (Vital System Status Verification): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

K/A MATCH ANALYSIS
Question tests knowledge of parameters required to be analyzed during Symptom Checks. These parameters are entry conditions to EOP Rules. Applicant must analyze plant conditions and determine which Rule to implement and which actions are associated with that rule.

ANSWER CHOICE ANALYSIS

In the stem, a feedwater line break occurs which actuates AFIS on the A SG. This trips both MFW pumps and EFDW pumps do not start. Rule 3 must be performed due to a loss of Main and Emergency Feedwater. Rule 5 must be performed due to symptoms of a MSLB on the A SG. After the reactor trips, the OATC will perform IMAs. The BOP will perform a symptom check and perform the highest priority Rule which is Rule 3. After the OATC completes IMAs, he will perform a symptom check and perform rule 5.

A. Incorrect. Rule 3 will be performed by the BOP. Second part is correct if path is taken for CBP feed from Rule 3. Plausible because there is a Main Feedwater break and EFW has yet to be established.
B. Incorrect. First part correct. The second part of the answer choice is plausible because it is a correct action in accordance with Rule 5.
C. Incorrect. First and second parts are incorrect. The stated actions are from Rule 3.
D. Correct. Both parts correct. Uncontrolled SG depressurization on the 'A' SG has occurred, as indicated by SA Step 4.21 (SG P < 550 psig). Therefore Rule 5 entry criteria is met. Step 1 of Rule 5 contains the actions listed in this answer choice.

REFERENCES
1. OMP 1-18, Implementation Standard During Abnormal and Emergency Events, Rev. 024.
2. EP/1/A/1800/001 L, EOP - Rules and Appendix, Rev. 034.
3. EP/1/A/1800/001 L, EOP - Subsequent Actions, Rev. 034.

Both Rules will be performed in this situation.
Added who would perform each rule to ensure only one correct answer.

**

Added answer analysis

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MAB OK

62. BW/E04EK3.4 001

Unit 1 conditions are as follows:
- LOHT has occurred
- RCS temperature = 585°F and increasing slowly
- Core SCM = 27°F and slowly decreasing
- Rule 3 (Loss of Main and Emergency Feedwater) is in progress
- CBPs are available
- 1A SG level is 14" XSUR and stable
- 1B SG level is 13" XSUR and stable

Which one of the following steps and reasons are correct per Rule 3 regarding CBP feed based on the above conditions?

A. Lower SG pressure slowly until SG level = 0" XSUR

Until SGs are dry, reducing SG pressure quickly can cause excessive RCS cooldown.

B. ✓ Lower SG pressure in available SGs to ~ 500 psig

Reduces SG pressure to below shutoff head for CBPs which allows flow

C. Establish CBP feed and align FDW flow to the SG Aux FDW Nozzles

This raises the thermal center in the RCS for enhancing the in progress Natural Circulation flow.

D. Establish CBP feed and raise SG level to ~ 25" per Rule 7

This increases SG level to its normal shutdown level when using Startup Control valves

K/A
Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4
Knowledge of the reasons for the following responses as they apply to the (Inadequate Heat Transfer): RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.

K/A MATCH ANALYSIS
Knowledge of the reasons for performing steps in the LOHT Tab are being tested. EOPs are required by the facility license.

ANSWER CHOICE ANALYSIS
A. Incorrect. SG level on the XSUR is considered dry when < 15". XSUR will decrease to ~ 14" with SG pressure ~ 1000 psig. Plausible because a caution in Rule 3 states that until SGs are dry, pressure should be reduced slowly to prevent overcooling.
B. Correct. Per Rule 3
C. Incorrect. Will not be in Natural Circulation flow. Plausible because FDW is aligned to the Aux FDW header
D. Incorrect. SG level is not established during CBP feed. Plausible because if feeding with the Main Feedwater Pumps, we would establish level at 25".

REFERENCES
1. EP/1/A/1800/001 E, Loss of Heat Transfer Tab, Rev. 034.
2. EP/1/A/1800/001 M, Rule 3, Rev. 034.
3. Lesson Plan, EAP-LOHT, Rev. 12.
SRO only. Revised question to test KA at the RO level.

**

Utility to provide supporting reference and answer explanation.
Re-wrote question because;
Question requires detailed knowledge of LOHT tab. RO is not required to have this knowledge.
Re-wrote question to test knowledge of Rule 3 which is performed by the RO.
Added answer analysis and references.

***

Modified "C" and "D" alternatives to add "Establish CBP feed and " to begining of each for wording improvement.
MAB OK

63. BW/E05EA2.2 001

The Unit 1 operators are preparing to establish trickle feed in accordance with the EHT Tab with the following plant conditions:
- Both SGs are faulted and have blown dry
- 1TD and 1TE 4160 V buses are de-energized
- Both SG faults have been identified as not being detrimental to personnel or equipment
- Unit 3 is supplying the Auxiliary steam header.

Which one of the following correctly states how feed should be established in accordance with the EHT Tab of the EOPs?

A. Establish trickle feed to one SG with a MDEFDW Pump to stabilize RCS temperature and pressure.

B. Establish 100 gpm feed to both SGs with a MDEFDW Pump and verify CETCs decreasing

C. Establish trickle feed to one SG with the TDEFDW Pump to stabilize RCS temperature and pressure.

D. Establish 100 gpm feed to both SGs with the TDEFDW Pump and verify CETCs decreasing.

K/A
Steam Line Rupture - Excessive Heat Transfer / 4
Ability to determine and interpret the following as they apply to the (Excessive Heat Transfer): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

K/A MATCH ANALYSIS
Question tests knowledge of trickle feed in the EHT Tab of the EOPs. The EOPs are required by the facility license and the question is testing knowledge that allows for compliance with the EOPs.

ANSWER CHOICE ANALYSIS
A. Incorrect. No power to MDEFDW Pump. Plausible because applicant must decide whether 1TC 4160 volt bus feeds one of the EFDW Pumps. This contains reasonable plausibility because they have buses 1TC, 1TD, and 1TE to choose from.
B. Incorrect. No power to MDEFDW Pump. See above for plausibility.
C. Correct. Buses 1TD and 1TE supply power to the MDEFDW Pumps, therefore the only pump available is the TDEFDW Pump. Procedure direction is to trickle feed only one SG to stabilize RCSP/T.
D. Incorrect. Procedure direction is to trickle feed only one SG and CETCs should not be decreasing.

REFERENCES
1. EP/1/A/1800/001 F, EOP - EHT, Rev. 034.
2. Lesson Plan EAP-EHT, Excessive Heat Transfer, Rev. 14.
3. Lesson Plan CF-EF, Emergency Feedwater, Rev. 21.
SRO only. Rewrote to match KA at an RO level.

**

Modified stem to add 1TE to add plausibility to "D".
Replaced "A" with Rule 8. Original "A" was not plausible.
NRC reviewing original question to determine RO applicability based on utility comments. (open)
Updated answer analysis.

***

Returned to original question.
Utility comment: SRO only. Beyond RO knowledge.
MAB OK
****

Modified answers to meet the KA at an RO level.
MAB OK

64. BW/E08EK3.2 001

The following Unit 1 conditions exist:
- LOCA occurred 9 hours ago
- LOCA CD is in progress
- Operators are performing steps to:
  - Close CFT outlets
  - Open 1LP-1, 1LP-2, and 1LP-105

Which one of the following correctly describes the reason for performing these actions?

A. CFTs are isolated to prevent raising the boron concentration in the core.
1LP-1, 1LP-2, and 1LP-105 are opened to create sufficient flow through the core to prevent any further increase in boric acid concentration in the core.

B. CFTs are isolated to prevent adding nitrogen to the core.
1LP-1, 1LP-2, and 1LP-105 are opened to create sufficient flow through the core to prevent any further increase in boric acid concentration in the core.

C. CFTs are isolated to prevent raising the boron concentration in the core.
1LP-1, 1LP-2, and 1LP-105 are opened to prevent any further increase in boric acid concentration in the emergency sump.

D. CFTs are isolated to prevent adding nitrogen to the core.
1LP-1, 1LP-2, and 1LP-105 are opened to prevent any further increase in boric acid concentration in the emergency sump.

K/A
LOCA Cooldown - Depress. / 4
Knowledge of the reasons for the following responses as they apply to the (LOCA Cooldown): Normal, abnormal and emergency operating procedures associated with (LOCA Cooldown).

K/A MATCH ANALYSIS
Applicant must have knowledge of reasons for performing actions to isolate CFTs and align for boron dilution, which are actions in the LOCA Cooldown procedure.

ANSWER CHOICE ANALYSIS
A. Incorrect. Plausible because the second part of the choice is correct and the reason for the first part, although incorrect, is similar to the reason for the second choice. Therefore, it appears that both of these actions might be performed to accomplish the same thing.
B. Correct. See Page 31 and 32 of reference.
C. Incorrect. Plausible because the concern is with boron concentration being too high, although this is not why CFTs are isolated and the concern is in the core, not the sump. The sump is actually seeing a boron concenration decrease due to boil off.
D. Incorrect. Plausible because the first part is correct and the second part deals with preventing boron concentration increase, but the concern is with the core and not the sump. The sump in this situation would actually be decreasing in boron concentration because the boron is accumulating in the core as water boils off.

REFERENCES
1. Oconee Nuclear Station Emergency Operating Procedure Reference Document, Rev. 0.

No utility comments.

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MAB OK

65. BW/E13EK1.2 001

The following Unit 1 conditions exist:
- SBLOCA in progress
- Core SCM = 0 °F
- All RCPs tripped
- All EFDWPs are inoperable
- '1A' Main FDWP is operating
- '1A' OTSG pressure = 630 psig and stable
- '1B' OTSG pressure = 705 psig and stable
- Rx Bldg pressure = 10 psig and slowly increasing
- Rx Bldg dome temperature = 200 °F and stable

Which one of the following correctly describes the required SG level per Rule 7?

A. 'A' XSUR = 320"; 'B' XSUR = 315"

B. 'A' XSUR = 315"; 'B' XSUR = 310"

C. 50% Operating Range (acc)

D. 95% Operating Range (acc)

K/A
EOP Rules and Enclosures
Knowledge of the operational implications of the following concepts as they apply to the (EOP Rules): Normal, abnormal and emergency operating procedures associated with (EOP Rules).

K/A MATCH ANALYSIS
Operational implications are being tested because with given plant conditions a higher steam generator level is required by Rule 7. The SG level is needed to ensure the SGs will be able to act in a boiler-condenser mode of heat transfer.

Question was designated at the memory level because the applicant only needs to recognize what SG level is required to be maintained when SCM = 0 °F.

ANSWER CHOICE ANALYSIS
A. Incorrect: Uses EFDW/XSUR table 5, wrong RB temp column (>200 to 250). Table 5 not used with MFDW feeding.
B. Incorrect: Uses EFDW/XSUR table 5, correct values if using EFDW. Table 5 not used with MFDW feeding.
C. Incorrect: 50% used if SCM > 0
D. Correct: EOP Rule 7, SG Feed Control SG levels are raised to 95% Operating Range (acc) if using Main FWPs when EFWPs are not available. This is the LOSCM setpoint level with Main FWPs. XSUR levels are only used with EFDW.

REFERENCES
1. EP/1/A/1800/001, Emergency Operating Procedure - Rule 7, Rev. 34.
2. Oconee Emergency and Abnormal Procedure Bank Question # 101, EAP060903.
3. Oconee Nuclear Station Emergency Operating Procedure Reference Document, Rev. 0.

Need Rule 7 Table 5 only as attachment. Needed to improve plausibility of A&B

**
Added (REFERENCE PROVIDED) to stem.

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MAB OK

Made question closed book. No reference provided. This ensures question remains at the memory level.

66. G2.1.2 001

Initial conditions at 04:00 hrs:
- Units 1, 2, and 3 are at 100% reactor power
- All Units are at minimum station staffing for ROs
- Unit 1 BOP leaves the Control Room (with a radio) for the station canteen

Current conditions at 04:02 hrs:
- Loss of Offsite Power occurs on Units 1 and 2
- Both Unit 1 and 2 SROs direct activation of SSF for each Unit

Which one of the following correctly describes, in accordance with OMP 2-01 (Duties and Responsibilities of On-Shift Operations Personnel), which operator should perform the SSF AP Subsequent Actions in the Unit 1 and 2 Control Rooms AND which operator should perform the most time limiting SSF actions in the Unit 1 and 2 Control Rooms until Unit 1 BOP arrives at the SSF?

A. The Unit 1 OATC should perform the SSF AP Subsequent Actions in the Unit 1 Control Room and perform the most time limiting Unit 1 SSF actions until Unit 1 BOP arrives at the SSF.
The Unit 2 BOP should perform the SSF AP Subsequent Actions in the Unit 2 Control Room and perform the most time limiting SSF actions until Unit 1 BOP arrives at the SSF.

B. The Unit 1 OATC should perform the SSF AP Subsequent Actions in the Unit 1 Control Room.
The Unit 2 BOP should perform the SSF AP Subsequent Actions in the Unit 2 Control Room
The Unit 2 BOP should perform the most time limiting SSF actions for both Units until Unit 1 BOP arrives at the SSF.

C. The Unit 1 OATC should perform the most time limiting SSF actions for Unit 1 until Unit 1 BOP arrives at the SSF.
The Unit 2 BOP should perform the most time limiting SSF actions for Unit 2 until Unit 1 BOP arrives at the SSF.
The Unit 2 BOP should perform the SSF AP Subsequent Actions in both the Unit 1 and 2 Control Rooms.

D. ✓ The Unit 2 BOP should perform the SSF AP Subsequent Actions in Unit 1 and 2 Control Rooms.
The Unit 2 BOP should perform the most time limiting SSF actions in Unit 1 and 2 Control Rooms until Unit 1 BOP arrives at the SSF.

K/A
Knowledge of operator responsibilities during all modes of plant operation.

K/A MATCH ANALYSIS
Question tests RO responsibilities as stated in the OMPs.

ANSWER CHOICE ANALYSIS
D. Correct. See Attachment D of OMP 2-01.
A, B, C. Incorrect. See Attachment D of OMP 2-01. They are plausible due to the memory nature of the question.

REFERENCES
1. OMP 2-01, Duties and Responsibilities of On-Shift Operations Personnel, Rev. 65.
2. Oconee Admin Bank Question 65, ADM040503.

No utility comments.

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MAB OK

67. G2.1.22 001

The following Unit 2 conditions exist:

- The reactor has just tripped from full power
- One control rod did not trip (one rod remained fully withdrawn)
- All other systems worked according to design

Which one of the following correctly describes the reactor mode when all rods (except the one that did not insert) have fully inserted?

A. Mode 1 (Power Operation)

B. Mode 2 (Startup)

C. Mode 3 (Hot Standby)

D. Mode 4 (Hot Shutdown)

K/A
Ability to determine Mode of Operation.

K/A MATCH ANALYSIS
Applicant must have Tech Spec knowledge of reactor mode in order to arrive at the answer.

ANSWER CHOICE ANALYSIS
A. Incorrect. Decay heat is not taken into account iaw Tech Spec Table 1.1-1. Plausible because immediately after reactor trip decay heat is high enough to produce more than 5% power, but Keff should be less than 0.99.
B. Incorrect. See "A" above.
C. Correct because Tave is > 250F and per Tech Spec Def of SDM, the control rods are required to instantaneously shutdown the reactor by the SDM required by the COLR, excluding decay heat (Tech Spec Table 1.1-1, Note 'a').
D. Incorrect because Tave is greater than 250F. Not quite as plausible as "A" and "B", but the name (Hot Shutdown) adds a little plausibility because the RCS is still at Hot, No Load Conditions.

REFERENCES
1. ONEI-0400-51, Oconee Unit 2 COLR, Miscellaneous Setpoints, Page 5 of 33, Rev. 25.
2. Oconee Technical Specifications Section 1.1, Definitions: SDM Definition & Table 1.1-1.

No utility comments.

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MAB OK
****
Removed "all rods fully withdrawn condition" for stem. May assume all rods still out after trip.
MAB OK

68. G2.1.30 001

The following Unit 1 conditions exist:
- The unit is in Mode 5
- The equipment hatch is installed
- Mini-Purge is in operation
- Main Purge is unavailable

The crew has been instructed to remove the equipment hatch. Which one of the following correctly describes OP/1/A/1102/014, RB Purge System, Limits and Precautions that are applicable prior to opening the hatch?

A.✓ Containment should be vented to the vent stack AND secure the mini purge fan from its panel in the Purge Exhaust Room.

B. Containment should be vented to the vent stack AND secure the mini purge fan from its panel in the Control Room.

C. Containment should NOT be vented to the vent stack AND secure the mini purge fan from its panel in the Purge Exhaust Room.

D. Containment should NOT be vented to the vent stack AND secure the mini purge fan from its panel in the Control Room.

K/A
Ability to locate and operate components, including local controls.

K/A MATCH ANALYSIS
The mini purge fan only has local controls in the purge exhaust room. The main purge fan only has controls in the control room. Therefore, the applicant must have knowledge of the location of the mini purge fan controls in order to correctly answer the question.

ANSWER CHOICE ANALYSIS
A. Correct. See OP/1/A/1102/014, Page 2 of 4, Limits and Precautions 2.4. Also see lesson plan PNS-RBP, page 11 of 21.
B. Incorrect. Mini purge fan cannot be controlled from control room. Plausible because main purge fan can be controlled from control room.
C. Incorrect. Containment should be vented when main purge not available. Plausible because even though main purge is not available, mini purge is available and the location of the mini purge fan controls is correct.
D. Incorrect. Containment should be vented when main purge not available. Plausible because even though main purge is not available, mini purge is available. Also plausible because even though mini purge fan cannot be controlled from control room, the main exhaust fan can be controlled from control room.

REFERENCES
1. Lesson Plan PNS-RBP, Reactor Building Purge System, Rev. 09a.
2. OP/1/A/1102/014, RB Purge System, Rev. 021.

No utility comments.

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MAB OK

69. G2.2.12 001

Unit 1 initial conditions:
- Rx Power = 95%
- RPS Channel A has a DUMMY BISTABLE installed for Thot and the channel is reset

Current conditions :
- Time = 0900, 6/13/06
- PT/1/A/0600/001 (Periodic Instrument Surveillance) is in progress
- RPS Channel B Thot does not meet surviellence requirement of PT/1/A/0600/001

Which one of the following correctly describes the required actions of PT/1/A/0600/001 and T.S. 3.3.1 (RPS Instrumentation) and the status of the B RPS channel after required actions are completed.

A. Place the B RPS channel in "Test-Operate" by 1000, 6/13/06

   The B RPS channel is considered Operable

B. Do **NOT** trip the B RPS channel. Initiate action to have the channel repaired by 1100, 6/13/06.

   The B RPS channel is considered Operable

C. Place the B RPS channel in "Test-Operate" by 1000, 6/13/06

   The B RPS channel is considered Inoperable

D. Do **NOT** trip the B RPS channel. Initiate action to have the channel repaired by 1100, 6/13/06.

   The B RPS channel is considered Inoperable

K/A
Knowledge of surveillance procedures.

K/A MATCH ANALYSIS
Applicant must have knowledge of Instrument Surveillance procedure and one-hour Tech Specs.

ANSWER CHOICE ANALYSIS
A. Incorrect. First part is correct, PT/1/A/0600/001 states that a tripped RPS channel is considered inoperable.Plausible because the function of the RPS channel (tripped) is complete.

B. Incorrect. First part Incorrect. Plausible because if the RPS channel A were tripped, First part would be correct (per Caution on page 6/15 of PT/1/A/0600/001). PT/1/A/0600/001 states that a tripped RPS channel is considered inoperable.Plausible because the function of the RPS channel (tripped) is complete.

C. Correct. Per PT/1/A/0600/001 states to placed affected channel in Test-Operate if desired. & TS 3.3.1 (RPS Instrumentation) requires the channel to be tripped within 1 hour

D. Incorrect. First part correct. Second part incorrect. See above.

REFERENCES
1. PT/1/A/0600/001 (Periodic Instrument Surveillance) pg 6/15
2. TS 3.3.1 (RPS Instrumentation)

SRO only. Not required RO knowledge.

**
Utility to provide replacement question at the knowledge level for RO.

Updated distractor analysis & references.
This particular operability determination is RO knowledge because it is specifically stated in the PT. This PT is performed by the RO.

***
MAB OK
****
Added "and the channel is reset" to stem to indicate status of the RPS channel.
MAB OK

Removed the word "immediate" and added a specfic time to answer B and D to ensure D is incorrect.

70. G2.2.13 001

Unit 1 is at 100% power and maintenance has just been completed on an LPI pump repair. The motor and the pump are currently uncoupled. Maintenance has requested Operations support to perform rotational checks on the pump motor prior to coupling. (MORT Tags were not used)

Which one of the following correctly describes the requirements for who is responsible for evaluating a tag lift and which group can temporarily lift the tags in accordance with NSD-500, Red Tags/Configuration Control Tags?

A. The OCG Supervisor and the Work Group Supervisor both are required to approve a tag lift. Tags are then required to be temporarily lifted by the Work Group.

B.✓ The OCG Supervisor and the Work Group Supervisor both are required to approve a tag lift. Tags are then required to be temporarily lifted by the OCG.

C. Only the Work Group Supervisor is required to approve the temporary tag lift. Tags are then required to be temporarily lifted by the Work Group.

D. Only the Work Group Supervisor is required to approve the temporary tag lift. Tags are then required to be temporarily lifted by the OCG.

K/A
Knowledge of tagging and clearance procedures.

K/A MATCH ANALYSIS
Question requires applicants to have knowledge of the tagging process.

ANSWER CHOICE ANALYSIS
A. Incorrect. Maintenance personnel are not considered "authorized employees" per NSD-500. Plausible because it would appear to be safe for the work group to remove and rehang a tag while the motor is bumped. When MORT tags are used, then Maintenance would be allowed to perform motor equipment operations.
B. Correct. Per NSD-500, the Work Group Supv must approve the tag lift and document in the Safety Tagging II program, then the OCG Supv can approve and fill out appropriate paperwork. Also per NSD-500, an authorized person may only perform tagout activities and this person must be a member of the OCG.
C. Incorrect. See above.
D. Incorrect. See above.

REFERENCES
1. NSD-500, Red Tags/Configuration Control Tags, Rev. 21.
2. Oconee Administative Bank Question 125, ADM060906

No utility comments.

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MAB OK

71. G2.3.1 001

Which one of the following correctly defines a HIGH RADIATION AREA and a VERY HIGH RADIATION AREA, in accordance with 10 CFR: 20?

A. ✓ A High Radiation Area is an area accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent of 0.1 rem in 1 hour at 30 centimeters from the radiation source.

A Very High Radiation Area is an area accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving an absorbed dose in excess of 500 rads in 1 hour at 1 meter from the source.

B. A High Radiation Area is an area accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent of 0.1 rem in 1 hour at 1 meter from the radiation source.

A Very High Radiation Area is an area accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving an absorbed dose in excess of 500 rads in 1 hour at 1 meter from the source.

C. A High Radiation Area is an area accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent of 0.1 rem in 1 hour at 30 centimeters from the radiation source.

A Very High Radiation Area is an area accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving an absorbed dose in excess of 500 rads in 1 hour at 30 centimeters from the source.

D. A High Radiation Area is an area accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent of 0.1 rem in 1 hour at 1 meter from the radiation source.

A Very High Radiation Area is an area accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving an absorbed dose in excess of 500 rads in 1 hour at 30 centimeters from the source.

K/A
Knowledge of 10 CFR: 20 and related facility radiation control requirements.

K/A MATCH ANALYSIS
Requires knowledge of 10 CFR: 20 radiation limits.

ANSWER CHOICE ANALYSIS
See definitions in 10 CFR: 20 to support correct answer. Distractors are plausible primarily due to the question being memory level and the iteration on the 1 meter and 30 centimeters, which both have specific meaning in the CFR defintions.

REFERENCES
1. 10 CFR: 20, Definitions Section.

No utility comments.

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MAB OK

72. G2.3.10 001

Unit 1 plant conditions:
- MSLB in the reactor building
- EHT tab of the EOP is in progress
- NEO "A" has not accumulated any TEDE for the year
- NEO "A" has been directed to place the Hydrogen Analyzer in service

Which one of the following correctly describes the maximum dose the NEO may receive and what action he should take if his ED dose alarms while performing this task?

ASSUME NO EXTENSIONS ARE APPROVED

A. 2.0 R

Immediately leave the area and contact RP.

B. 5.0 R

Immediately leave the area and contact RP.

C. 2.0 R

Continue to work through the alarm while continuously monitoring dose and dose rate.

D. 5.0 R

Continue to work through the alarm while continuously monitoring dose and dose rate.

K/A
Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.

K/A MATCH ANALYSIS
The question requires the applicant to have knowledge of emergency dose limits and when they are applicable as well as administrative dose limits. This procedural guidance is given in OMP 1-18

ANSWER CHOICE ANALYSIS
A. Correct. Emergency Dose Limits are NOT in effect, therefore the exposure limit is the Duke Adminstrative limit of 2 Rem. Likewise, with EDLs not in effect, the proper response to an Electronic Dosimeter "Dose" Alarm is to immediately leave the area and notify RP.
B. Incorrect. See A. Plausible because if the candidate determined that Emergency Dose Limits were in effect, the limit stated in OMP 1-18 would be 5 Rem
C. Incorrect. See A. Plausible because if the candidate determined that Emergency Dose Limits were in effect, they would be directed to work though Electronic Dosimeter Alarms
D. Incorrect. See B & C

REFERENCES

1. OMP 1-18 5.4 (Emergency Worker Exposure Limits) pg 19/20
2. RAD-RPP pg 47/74 Dose & Dose Rate Alarms

Need new question.

**

**
Utility to review basic RWT information to determine if this is a required knowledge item for Rad workers.
Point source calculations are not in GET materials.
Preferably at the fundamental level of knowledge.
Wrote new question that matches KA.
Updated answer analysis and references.

***
Removed previous dose from stem. Indicated NO dose accumulated to date.
Changed "A" and "C" to 2.0R.
MAB OK
****
Added "ASSUME NO EXTENSIONS ARE APPROVED" to stem to eliminate B as a correct answer.
MAB OK

73. G2.3.4 001

An operator began work at Oconee in July 2005. The current date is June 2006. The operator has the following Oconee dose history (TEDE):

- Year 2005 = 3000 mrem
- Year 2006 = 1427 mrem (Accumulated through June 2006)

The worker is directed to perform a job with an estimated dose of 1156 mrem. The work is not considered a Planned Special Exposure and no emergency situation exists.

Which one of the following correctly states the required approval needed prior to beginning the work?

A. Section Manager only

B. Radiation Protection Manager only

C. Section Manager and Radiation Protection Manager

D. NRC

K/A
Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.

K/A MATCH ANALYSIS
Question test knowledge of plant admin requirements and what level of approval is required to perform the work due to exceeding authorized limits.

ANSWER CHOICE ANALYSIS
A. Incorrect. Section Mgr is responsible for dose targets under 2 rem.
B. Incorrect. The Section Mrg also needs to approve the exposure. Plausible because the Rad Pro Mgr's approval is required.
C. Correct. Rad Pro Policy Manual, Policy II-01, Section 3.4.1.2.B, states that Dose received between 2 rem and 4.5 rem in a year requires the approval of the Rad Pro Mgr and the Section Mgr. 1427 mrem + 1156 mrem = 2583 mrem, which is between 2 rem and 4.5 mrem.
D. Incorrect. If the previous year's dose is added, then the total exceeds 5 rem, which is above the 10 CFR:20 limits. This may lead an applicant to believe that the NRC must approve the dose.

REFERENCES
1. Radiation Protection Policy Manual, Policy II-01, Section 3.4.1.2.B, Page 4 of 8, Rev. 0.
2. Vogtle 2005-301 Question, G2.3.1.

No utility comments.

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MAB OK

74. G2.4.16 001

The following events have occurred on Unit 1 while operating a 100% FP:

Initial conditions:
- A loss of RCP seal injection has occurred
- AP/14, Loss of Normal HPI Makeup and/or RCP Seal Injection is in progress

Current conditions:
- A loss of CC occurs
- The OATC informs the SRO that IAAT Step 3.1 of IMAs now applies
  - The SRO directs the OATC to manually trip the reactor per IAAT Step 3.1
- SCM = 0 ºF

Per OMP 1-18 (Implementation Standards During Abnormal and Emergency Events) which one of the following correctly describes the priority of actions required to be taken by the OATC and BOP given the above conditions?

A. BOP: First perform EOP Symptom Check, then secure ALL RCPs, followed by initiation of AP/25 (SSF EOP).

OATC: Perform EOP Immediate Manual Actions, Symptom Check, followed by Rule 2.

B. BOP: First perform EOP Symptom Check, then secure ALL RCPs, followed by initiation of AP/25 (SSF EOP).

OATC: Perform EOP Immediate Manual Actions followed by an EOP Symptom Check and implementation of EOP enclosure 5.1 ES Actuation.

C. BOP: Complete AP/14 IAAT Step by securing ALL RCPS and initiating AP/25 (SSF EOP).

OATC: Perform EOP Immediate Manual Actions, Symptom Check, followed by Rule 2.

D. BOP: Complete AP/14 IAAT Step by securing ALL RCPS and initiating AP/25 (SSF EOP).

OATC: Perform EOP Immediate Manual Actions followed by an EOP Symptom Check and implementation of EOP enclosure 5.1 ES Actuation.

K/A
Knowledge of EOP implementation hierarchy and coordination with other support procedures.

K/A MATCH ANALYSIS
Knowledge prioritization of AP and EOP immediate actions is required to answer the question correctly.

ANSWER CHOICE ANALYSIS

The IAAT step in AP-14 Immediate actions for losing CC when seal injection is already lost will direct tripping of the reactor, tripping all RCPs and initiating AP-25. In accordance with OMP 1-18 guidance, once the reactor is tripped, the BOP is to perform the remainder of that step (tripping of RCPs and initiating AP-25) prior to performing a symptom check. AP-25 will direct the BOP to go to the SSF. The OATC will perform IMAs, then perform a symptom check at which time they will perform Rule 2 due to a loss of subcooling margin.

A. Incorrect because the BOP is required to perform the AP IMAs prior to symptom checks. Plausible because typically EOP actions have priority over AP actions.
B. Incorrect because the BOP is required to perform the AP IMAs prior to symptom checks. Plausible because typically EOP actions have priority over AP actions.
C. Correct. OMP 1-18 Section 5.2 states that the BOP shall perform AP IMAs prior to performing symptom checks. EOP IMAs take priority over everything else per OMP 1-18 Section 5.2.
D. Incorrect because the OATC will perform Rule 2 with a loss of SCM when the BOP is occuppied. OMP 1-18, Section 5.2 states that EOP Symptoms shall have priority over all EOP actions except IMAs. Plausible because Encl. 5.1 is directed to be performed from the parallel action page.

REFERENCES
1. OMP 1-18, Implementation Standard During Abnormal and Emergency Events, Rev 24.

The stem and answers were rewritten to ensure a correct answer.
Wrote new question because as the question was written, the AP was not entered prior to EOP entry therefore, no steps in the AP would be performed.
In the new question, the AP is entered prior to the EOP. This gives the opportunity to test OMP guidance of performing AP IMAs prior to EOP symptom check.

**

Modified "B" and "D" distractors to state: "by an EOP Symptom Check and implementation of EOP enclosure 5.1 ES Actuation."
Updated answer analysis.

***

MAB OK
****

Added "Complete AP/14 IMAs by" to C and D. This eliminates confusion about whether the actions are being taken because of the EOP or AP IMAs.
Changed "implementing" to "initiating" to match procedure guidance. Also another unit's BOP may complete AP/25.
Added sequencing of steps to "A" and "B" alternatives to ensure not correct.
MAB OK

Based on a comment from the final validation, the 2nd bullet under Current Conditions was revised to make the first part of answer choices 'C' and 'D' more correct. The IAAT step of the IMA will technically be the only IMA step which is completed. 'C' and 'D' BOP actions were also revised to address this concern.

75. G2.4.35 001

Unit 3 plant conditions:
- ATWS is in progress

Which one of the following will result in a reactor trip?

An NEO performs the following actions:

A. ✓ Opens Unit 3's CRD Normal Power Supply Breaker located on the 3x9 in Unit 3's Equipment Room
-AND-
Opens Unit 3's CRD Alternate Power Supply Breaker located on the 2x2 in Unit 2's Turbine Building 3rd floor.

B. Opens Unit 3's CRD Normal Power Supply Breaker located on the 3x9 in Unit 3's Cable Room
-OR-
Opens Unit 3's CRD Alternate Power Supply Breaker located on the 2x2 in Unit 2's Turbine Building 3rd floor.

C. Opens Unit 3's CRD Normal Power Supply Breaker located on the 3x9 in Unit 3's Equipment Room
-AND-
Opens Unit 3's CRD Alternate Power Supply Breaker located on the 2x1 in Unit 2's Turbine Building 3rd floor.

D. Opens Unit 3's CRD Normal Power Supply Breaker located on the 3x9 in Unit 3's Cable Room
-OR-
Opens Unit 3's CRD Alternate Power Supply Breaker located on the 2x1 in Unit 2's Turbine Building 3rd floor.

QUESTION WAS SUPPLIED BY UTILITY AND THEY HAVE VERIFIED SPECIFICS OF EQUIPMENT LOCATION.

K/A
Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications.

K/A MATCH ANALYSIS
Question requires knowledge of equipment required to be manipulated to cause a rx trip (system implications) and the location of that equipment (geography).

A reactor trip requires BOTH the normal power supply breaker located on the 3x9 in the Unit 3's Equipment Room AND the CRD Alternate Supply Breaker located on the 2x2 in the Unit 2's Turbine Building 3rd floor to be opened.

ANSWER CHOICE ANALYSIS
A. Correct. A rx trip requires BOTH the Normal Power Supply Breaker located on the 3x9 in the Unit 3's Equipment Room AND the CRD Alternate Power Supply Breaker located on the 2x2 in the Unit 2's Turbine Building 3rd Floor to be opened.
B. Incorrect. The 3x9 is not located in the Cable Spreading Room and both breakers are required to cause a rx trip. Plausible because other CRD breakers that are opened when the rx fails to trip are in the Cable Room. They are Opened on a Loss of Control Room.
C. Incorrect. Answer is correct with the exception of Unit 3's CRD Alternate Power Supply Breaker located on the 2x2 not the 2x1. Plausible because Unit 1's Alternate breaker is located on the 2x1.
D. Incorrect. Both parts are incorrect. 3x9 is not in the Cable Room and both breakers are required to cause a reactor trip. Plausible because other CRD breakers that are opened when the reactor fails to trip are in the Cable Room. They are opened on a Loss of Control Room. Also Plausible because Unit 3's CRD Alternate Power Supply Breaker located on the 2x2 not the 2x1.

REFERENCES
1. EP/3/A/1800/003 L, EOP - Rules & Appendix, Rev. 034.

No utility comments.

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MAB OK

76. 008AA2.03 001

Unit 1 initial conditions:
- Reactor power = 100%

Current conditions:
- Actual RCS pressure = 2100 psig and decreasing
- 1SA-2/D-3 (RC PRESS HIGH/LOW) in alarm
- 1RC-1 (Pzr Spray) open
- 1RC-66 red light LIT
- Three LEDs on the PORV Acoustic Monitors LIT
- Reactor power = 95% and decreasing

Which one of the following describes the cause of the above indications and the correct actions which will mitigate the event?

A. RCS Narrow Range Pressure failed high

Perform Immediate Manual Actions, initiate EOP Encl. 5.5 (PZR and LDST Level Control)

B. RCS Narrow Range Pressure failed high

Perform Plant Transient Response, close 1RC-4 and 1RC-1 per OMP 1-18, Actions Outside EOP/APs

C. RCS Wide Range Pressure failed high

Perform Plant Transient Response, close 1RC-4 and 1RC-1 per OMP 1-18, Actions Outside EOP/APs

D. RCS Wide Range Pressure failed high

Perform Immediate Manual Actions, initiate EOP Encl. 5.5 (PZR and LDST Level Control)

K/A
Pressurizer Vapor Space Accident / 3
Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: PORV position indicators and acoustic monitors.

K/A MATCH ANALYSIS
Acoustic monitor's ability to detect the vapor space loca is being tested. First the applicant must determine that the red indicating light is indicative of an open PORV, then the applicant must determined if the acoustic mntrs can corroborate the PORV indication.

SRO-ONLY ANALYSIS
The decision to isolate the leak without procedure guidance using OMP 1-18 is an SRO determination.

ANSWER CHOICE ANALYSIS
When the RCS NR pressure insturment fails high the PORV and PZR spray will open. The crew should perform PTR to stabilize the unit (it may trip). If 5 leds on the acoustic monitor are LIT the PORV flow stat alarm will actuate. The ARG gives guidance to close 1RC-4 and close the PZR spray valve. If the SA does not actuate the SRO must decide to take the correct actions per OMP 1-18 Attachment G. If these actions are not taken, ES will actuate and eventually the RCS will satuate.

A. Incorrect. Plauible because first part is correct. Second part is plausible because if the candidate assumes a reactor trip IMAs and initiating EOP Encl. 5.5 (PZR and LDST Level Control) would be performed. Although these action will be taken after the reactor trip they do not mitigate the event.
B. Correct. Both parts correct. See above.
C. Incorrect. First part incorrect but plausible because the candidate must know that the PORV is from NR not WR RCS pressure. WR pressure feeds ES channels. Second part correct. See above.
D. Incorrect. Both parts incorrect. See above.

REFERENCES
1. Lesson Plan PNS-PZR, Pressurizer, Rev. 15.
2. OMP 1-18 (Implementation Standards During Abnormal And Emergency Events) Attachment G (Actions Outside EOP/APs)

SRO not required to know items NOT addressed by safety analysis associated with this question.
Wrote new question that matches the KA at an SRO level.

**

Needs work. Still open on issue of monitor power supplies significance.
Wrote question without power supply. Question still at SRO level.
Updated answer analysis and references.

***

Utility does not require monitor power supplies from memory. Two lesson plans have different power supplies listed for the monitor. IC-RCI, Reactor Coolant Instrumentation page 42 of 66 states that KVIB is power source. Lesson plan PNS-PZR, Pressurizer, page 22 of 41 states that KVIA is the power supply. Utility will initiate corrective action to modify the lesson plans to the correct power supply (KVIA) following the exam administration.

Returned to original question
Modified stem to add SSF operability
Modified the second part of the alternatives to identify SSF operability.
Changed KVIB to KVIC to illiminate confusion on the two power sources listed in utility references. See note above.
Modified alternatives.
MAB OK

77. 010G2.2.22 001

The following Unit 1 conditions exist:
- RCS pressure = 300 psig
- RCS temperature = 200 °F
- No RCS vent paths are open

Which one of the following correctly states Administrative Controls that are required per Tech Spec 3.4.12, LTOP System, Bases and what compensotory actions are required if Pzr level is above the limit?

(REFERENCE PROVIDED)

A.✓ Maximum allowable RCS pressure limit is < 375 psig and the maximum allowable pressurizer level is ≤ 220 inches.

Establish an LTOP operator or LTOP vent path.

B. Maximum allowable RCS pressure limit is < 525 psig and the maximum allowable pressurizer level is ≤ 220 inches.

Establish an LTOP operator or LTOP vent path.

C. Maximum allowable RCS pressure limit is < 375 psig and the maximum allowable pressurizer level is ≤ 310 inches.

Install 1HP-120 travel stops.

D. Maximum allowable RCS pressure limit is < 525 psig and the maximum allowable pressurizer level is ≤ 310 inches.

Install 1HP-120 travel stops.

PROVIDE ONLY OP/0/A/1108/001, Enclosure 3.31 page 4 of 5 (Unit 1 Low Range CD Curve)

K/A
Pressurizer Pressure Control
Knowledge of limiting conditions for operations and safety limits.

K/A MATCH ANALYSIS
LTOP is RCS pressure protection. KA is matched because the Pzr is part of the RCS and it is used to control pressure in the pzr, which in turn, controls pressure in the RCS.

SRO-ONLY ANALYSIS
Knowledge for requirements on meeting admin controls to assure > 10 minutes for operators to mitigate an LTOP event. Compensatory action for meeting LTOP requirements is SRO knowledge.

ANSWER CHOICE ANALYSIS

Analysis of attachment (OP/0/A/1108/001 (Curves and general information) Encl. 3.31pg 4/5 (Unit 1 Low Range Cooldown Curve)) provides applicant with limit of 375 psig and 220" Pzr level. Maintaining Pzr Level within the prescribed band is an LTOP "Administrative Limit". If any of the administrative limits are not met, either an LTOP operator is required to be established or a vent path (≥ PORV throat diameter) per Encl 4.13 of OP/1/A/1104/049 (Low Temperature Overpressure Protection).

A. Correct.

B. Incorrect. First part incorrect based on curve. Plausible because of interpolation of curve. see above.

C. Incorrect. First part incorrect based on curve. Plausible because of interpolation of curve. Second part incorrect. Plausible becasue travel stop is an administrative control. See above

D. Incorrect. Both parts incorrect. First part incorrect based on curve. Plausible because of interpolation of curve. Second part incorrect. Plausible becasue travel stop is an administrative control. See above

REFERENCES
1. Tech Spec 3.4.12, LTOP System, and Basis.
2. OP/1/A/1104/049 (Low Temperature Overpressure Protection)
3. OP/0/A/1108/001 (Curves and general information) Encl. 3.31pg 4/5 (Unit 1 Low Range Cooldown Curve)

Attachment needed. LTOP setpoints are not required to be committed to memory.
Recommend higher than memory level.
OP/0/A/1108/001, Enclosure 3.31 page 4 of 5 (Unit 1 Low Range CD Curve)

**

Curve makes question direct lookup.
Utility to:
1. Add to original question (possible compensatory actions)
OR
2. Submit new question to match K/A

Modified question to include curve for applicant to interpret data and require a course of action if LTOP requirements are not met.
Updated answer analysis and references.
Added (REFERENCE PROVIDED) to question.

***

MAB OK

78. 011EA2.01 001

Unit 1 initial conditions at 11:00 hrs:
- Reactor has tripped from full power due to a LBLOCA

Conditions at 12:00 hrs:
- 5 highest CETC average = 800 °F

Current plant conditions at 12:10 hrs:
- 5 Highest CETC average = 850 °F
- 1RIA-57 = 40 R/hr
- 1RIA-58 = 20 R/hr
- All RCPs are secured
- LPI pumps failed to start and attempts to start them have been unsuccessful
- Letdown is isolated
- HPI throttled to avoid runout conditions

Which one of the following correctly describes the SRO's declaration of Fission Product Barrier status in accordance with RP/0/B/1000/001, Emergency Classification, Enclosure 4.1, Fission Product Barrier Matrix?

(REFERENCE PROVIDED)

A. Declare a potential Loss of Fuel Clad Barrier AND a potential Loss of Containment Barrier.

B. Declare an actual Loss of Fuel Clad Barrier AND a potential Loss of Containment Barrier.

C. Declare a potential Loss of Fuel Clad Barrier AND an actual of Loss of RCS Barrier.

D. Declare an actual Loss of Fuel Clad Barrier AND an actual Loss of RCS Barrier.

PROVIDE ONLY RP/0/B/1000/001, Enc. 4.1, Page 1 of 1.

K/A
Large Break LOCA / 3
Ability to determine or interpret the following as they apply to a Large Break LOCA: Actions to be taken, based on RCS temperature and pressure – saturated and superheated.

K/A MATCH ANALYSIS
The SRO must evaluate, using the point system, the status of the fission product barrier. Therefore, the question is testing knowledge of actions asociated with RCS temp and press during a LBLOCA. Adding up the points correctly is part of the actions that are necessary to correctly classify the event.

SRO-ONLY ANALYSIS
E-Plan and classification-related material is SRO-only function.

ANSWER CHOICE ANALYSIS
A. Incorrect. Plausible if applicant applies only HPI criteria to RCS barrier.
B. Incorrect. Plausible if applicant does not pick up on valid RVLIS indication.
C. Correct. See Enclosure 4.1.
D. Incorrect. Plausible if applicant confuses RIA indication.

REFERENCES
1. RP/0/B/1000/001, Emergency Classification, Rev. 18.

Added "C" to CET to meet ONS designation.
Changed current time to 1210 to ensure a correct answer.
With CETCs reading 700 degrees Reactor Vessel level could be assumed to be 0".
This would result in no correct answer.

Because if the CETCs are > 700 F for > 15 minutes with a valid RVLS reading of 0", it would result in a potential loss of the Containment barrier per RP/0/B/1000/001, Emergency Classification. This would result in no correct answer.
Changed current time to ensure elapsed time is < 15 min.

Revised question to fix.
Typo change to enclosure "4.1" from "1"

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NRC to review for plausiblity

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MAB OK

79. 013A2.03 001

The following Unit 1 conditions exist:

Initial Conditions:
- Reactor Power = 100%
- '1B' HPI Pump is tagged out for maintenance
- RCP Seal Supply Flow is being supplied by the '1A' HPI Pump

Current conditions:
- Reactor has just tripped
- RCS Pressure = 25 psig
- The '1A' and '1C' HPI pumps are running
- 'A' HPI Header Flow = 475 gpm
- 'B' HPI Header Flow = 500 gpm

Which one of the following correctly describes Rule 6 throttling criteria and the basis of the criteria?

A. Throttle both trains of HPI to less than or equal to 475 gpm (including seal supply flow). There is no total HPI flow limit.

   HPI must be throttled within 5 minutes, which is based on the BWST's ability to provide sufficient net positive suction head.

B. Throttle both trains of HPI to less than or equal to 475 gpm (including seal supply flow). There is no total HPI flow limit.

   HPI must be throttled within 10 minutes, which is based on preventing HPI pump damage due to runout.

C. Throttle both HPI trains to less than or equal to 475 gpm (including seal supply flow) and total HPI flow to less than or equal to 750 gpm (including seal supply flow).

   HPI must be throttled within 5 minutes, which is based on the BWST's ability to provide sufficient net positive suction head.

D. Throttle both HPI trains to less than or equal to 475 gpm (including seal supply flow) and total HPI flow to less than or equal to 750 gpm (including seal supply flow).

   HPI must be throttled within 10 minutes, which is based on preventing HPI pump damage due to runout.

K/A
Engineered Safety Features Actuation
Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Rapid depressurization.

K/A MATCH ANALYSIS
The rapid depressurization causes an ESFAS, which cause HPI pumps to start, which causes them to be in a runout condition, which requires HPI to be throttled. Therefore, the consequences of rapid depress are being tested, as well as how to mitigate those consequences.

SRO-ONLY ANALYSIS
SRO-only level because the basis behind the throttling criteria is being tested.

ANSWER CHOICE ANALYSIS
A. Incorrect. Plausible because BWSTs ability to provide NPSH is part of the basis. Incorrect due to the 5 minutes.
B. Correct. See referenced lesson plan Page 32 and Rule 6.
C. Incorrect. There is no 750 limit under current plant conditions. Plausible because 750 is an actual throttling limit, but under different plant conditions. Also plausible because BWSTs ability to provide NPSH is part of the basis. Incorrect due to the 5 minutes.
D. Incorrect. There is no 750 limit under current plant conditions. Plausible because 750 is an actual throttling limit, but under different plant conditions. Also plausible because second part is correct.

REFERENCES
1. Lesson Plan EAP-TCA, Time Critical Action, Rev. 01.
2. EP/1/A/1800/001, EOP - Rule 6, Rev. 34.

Changed to read "supplied by the 'A' HPI Pump" to clarify.
Added "Assume no operator action have been taken" to ensure candidates do not assume HPI suction from the RB emergency sump.

**

Removed the added statement about no operator action. Not needed in stem.

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MAB OK

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Changed the second part of B and D to read "which is based on preventing HPI pump damage due to runout." The time limit is not based on operation of HP-26/27 but assumes that they work correctly.

80. 014A2.04 001

Unit 1 initial conditions:
- Reactor Power = 70%
- Diamond is in auto
- Three RCPs are operating

Current conditions:
- Group 5 rod drops fully into the core
- A 9 inch Asymmetric Fault exists
- An auto runback occurred

Which one of the following correctly describes how absolute and relative rod position indications are aligned and the operability status of the dropped control rod?

A.✓ "PI Reset raise/lower" switch manipulation is required to match absolute and relative rod indications.

With the control rod on the bottom of the core, it is inoperable until it is realigned with its group and can respond to positioning signals.

B. Withdrawing the dropped rod to the average height of the other group 5 rods will align its absolute and relative rod indications.

With the control rod on the bottom of the core, it is inoperable until it is realigned with its group and can respond to positioning signals.

C. "PI Reset raise/lower" switch manipulation is required to match absolute and relative rod indications.

With the control rod on the bottom of the core, it is operable because it is trippable, even though it cannot respond to positioning signals.

D. Withdrawing the dropped rod to the average height of the other group 5 rods will align its absolute and relative rod indications.

With the control rod on the bottom of the core, it is operable because it is trippable, even though it cannot respond to positioning signals.

K/A
Rod Position Indication
Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Misaligned rod.

K/A MATCH ANALYSIS
The dropped rod will cause a deviation between absolute and relative rod position indication. This deviation will not be aleviated by simply withdrawing the dropped rod. The PI reset must be used to match the absolute and relative rod indications. This action is detailed in the OP for rod recovery. Therefore, the misaligned rod affects the position indication and the procedure actions to rectify the devaition are all being tested.

SRO-ONLY ANALYSIS
Operability is an SRO function.

ANSWER CHOICE ANALYSIS
A. Correct. See OP Enclosure 4.9, Step 2.8. Tech Spec 3.1.4 Bases states that a rod must be able to respond to positioning signals to be operable, therefore the dropped rod would be inoperable.
B. Incorrect. API will be accurate, but RPI will still read what it did prior to the rod drop. Plausible because second part is correct. Also plausible if applicant does not understand that the RPI will no longer indicate current position.
C. Incorrect. Control rod is not operable. Plausible because the rod is trippable as evidenced by falling into the core.
D. Incorrect. See analysis for above answer choices.

REFERENCES
1. Lesson Plan IC-CRI, Control Rod Indication, Rev. 09a.
2. OP/1/A/1105/019, Control Rod Drive System, Rev. 006.
3. Tech Spec LCO 3.1.4, Control Rod Group Alignment Limits, Basis.

No utility comments.

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MAB OK

81. 017G2.4.4 001

The following Unit 1 conditions exist:
- OAC alarm indicates saturated conditions in the core
- EFDW is operating
- '1A' SG Pressure = 800 psig
- '1B' SG Pressure = 800 psig
- 'A' Train LPI flow = 1500 gpm
- 'B' Train LPI is tagged out for maintenance
- 'A' Train HPI = 450 gpm
- 'B' Train HPI = 0 gpm
- RCS Pressure = 100 psig
- Average of five highest CETCs = 338 °F

The Control Room SRO has completed Immediate Manual Action verification. The SRO has just directed the BOP to begin performing Rule 2.

Which one of the following correctly describes the next major procedure transition required for mitigating the above plant conditions?

A. Go to ICC.

B. Go to LOCA C/D.

C. Go to HPI C/D.

D. Go to LOSCM.

K/A
In-core Temperature Monitor
Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.

K/A MATCH ANALYSIS
The CET indication, along with RCS P, provides indication of a saturated core. CETCs reading this high is abnormal for that pressure. This is an entry condition to perform LOSCM, which is part of the EOP network.

SRO-ONLY ANALYSIS
Procedure transition takes place in the middle of an EOP, which requires knowledge beyond simple EOP/AOP entry conditions.

ANSWER CHOICE ANALYSIS
A. Incorrect. Parallel action step to go to ICC is for superheated core conditions. The RCS pressure and CET Temp are indicating a saturated core. Plausible because core cooling is indeed challenged.
B. Incorrect. There is not enough LPI flow to go to LOCA cooldown. Plausible because a LOCA is in progress and the typical success path for a LOCA is to cool the plant.
C. Incorrect. Before any cooldown can be accomplished, LOSCM must first be performed. Plausible because HPI flow is in the acceptable region and LPI is not adequate to go to LOCA C/D.
D. Correct. The question places the applicant at step 4.26 to verify SCM > 0 F. Since SCM = 0, the procedure directs the performance of LOSCM.

REFERENCES
1. EP/1/A/1800/001, Emergency Operating Procedure, Rev. 034.

Added unit designators.
Corrected RCS temperature to indicate saturated.
Added "C" to CET.
Reworded stem to agree with ONS EOP flowpath.

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MAB OK

82. 026A2.04 001

Unit 1 initial conditions:
- A Design Basis LOCA has occurred inside the RB
- RBS actuated as designed

Unit 1 current conditions:
- BS "A" HEADER FLOW HIGH/LOW has annunciated
- Operators note that amps on the 'A' RBS Pump are oscillating
- All indications on the 'B' Train RBS appear normal for the plant conditions

Which one of the following correctly describes the actions required by the ARG and the effect of those actions on the plant's design basis?

A. Allow the '1A' RBS Pump to run, throttle the discharge valve (1BS-1), and vent the pump.

   RBS is necessary to maintain RB pressure and temperature within their design values.

B. Allow the '1A' RBS Pump to run, throttle the discharge valve (1BS-1), and vent the pump.

   RBS is necessary to maintain RB pressure within its design values. No design value exists for RB temperature.

C. Secure the '1A' RBS Pump.

   RBS is necessary to maintain RB pressure and temperature within their design values.

D. Secure the '1A' RBS Pump.

   RBS is necessary to maintain RB pressure within its design values. No design value exists for RB temperature.

K/A
Containment Spray
Ability to (a) predict the impacts of the following malfunctions or operations on the CSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of spray pump.

K/A MATCH ANALYSIS
The impacts of losing the spray pump are that the plant is still within the P-T design basis limits. The procedure usage to correct, control, or mitigate is covered by the Alarm Response Guide, which states in a CAUTION that the BS Pump must be secured if showing signs of loss of suction.

SRO-ONLY ANALYSIS
Plant design basis is SRO-only knowledge.

ANSWER CHOICE ANALYSIS
A. Incorrect. Throttling is contrary to the guidance in the ARG. Plausible because throttling the discharge valve would be a method to raise suction pressure, which can be a cause of cavitation.
B. Incorrect. According to TS Basis, a design value for RB Temperature exists. Throttling is contrary to the guidance in the ARG. Plausible because throttling the discharge valve would be a method to raise suction pressure, which can be a cause of cavitation. Also plausible because ES actuation is triggered by containment pressure, not temperature.
C. Correct. CAUTION in the ARG states that RBS is to be secured if loss of suction is causing the low flow. Loss of suction is indicated by the oscilating amps in conjunction with the alarm. Tech Spec Bases states RB spray is required to keep post-accident pressure and temperature within design values.
D. Incorrect. According to TS Basis, a design value for RB Temperature exists. Plausible because ES actuation is triggered by containment pressure, not temperature.

REFERENCES
1. OP/1/A/6101/008, Alarm Response Guide 1SA-08, Rev. 016.
2. Tech Spec 3.6.5, Reactor Building Spray and Cooling System, Basis

Added "R" to BS to match ONS nomenclature.
Added unit designators.

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MAB OK

83. 037AA2.10 001

The following Unit 2 conditions exist:

- The reactor is at 4 % power
- 'A' SG Primary to Secondary Leakage = 0.2 gpm
- 'B' SG Primary to Secondary Leakage = 0.1 gpm

Which one of the following correctly states the status of Technical Specification LCO 3.4.13, RCS Operational LEAKAGE, and the basis?

A. Primary to Secondary Leakage limit is exceeded for leakage through any one SG, but not for total leakage through all SGs.

   Primary to Secondary Leakage limits are based on Steam Line Break and Loss of Load Analysis.

B. ✓ Primary to Secondary Leakage limit is exceeded for total leakage through all SGs.

   Primary to Secondary Leakage limits are based on Steam Line Break and Loss of Load Analysis.

C. Primary to Secondary Leakage limit is exceeded for leakage through any one SG, but not for total leakage through all SGs.

   Primary to Secondary Leakage limits are based on ensuring 10 CFR Part 20 - Standards for Protection Against Radiation, requirements are not violated.

D. Primary to Secondary Leakage limit is exceeded for total leakage through all SGs.

   Primary to Secondary Leakage limits are based on ensuring 10 CFR Part 20 - Standards for Protection Against Radiation, requirements are not violated.

K/A
Steam Generator Tube Leak
Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: Tech Spec Limits for RCS leakage.

K/A MATCH ANALYSIS
Question tests knowledge of the TS Limits by providing leakage amounts and asking applicant if LCO requirements have been violated. Applicant must have knowledge of the LCO requirements in order to correctly answer the question.

SRO-ONLY ANALYSIS
Tech Spec basis info makes it SRO-only.

ANSWER CHOICE ANALYSIS
A. Incorrect. Leakage limits are exceeded for both "any one SG" and "total SG" Primary to Secondary Leakage. Plausible because applicant may not have correctly memorized the LCO leakage limits.
B. Correct. 0.3 gpm = 432 gpd, which is greater than 300 gpd limit in Tech Specs. Also basis is correct per TS Basis Pg. B3.4.13-1 (bottom of page).
C. Incorrect. Leakage limits are exceeded for both "any one SG" and "total SG" Primary to Secondary Leakage. Safety Analysis is concerned with Part 100 limits to the public, not Part 20 limits. Plausible because applicant may not know the difference between Part 20 and Part 100. Also plausible because applicant may not have correctly memorized the LCO leakage limits.
D. Incorrect. Safety Analysis is concerned with Part 100 limits to the public, not Part 20 limits.

REFERENCES
1. Tech Spec 3.4.13, RCS Operational LEAKAGE, and Basis.
2. Vogtle 2005-301, 035G2.1.20.

No utility comments.

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MAB OK

84. 038AG2.4.48 001

Unit 1 operators are performing steps in EP/1/A/1800/001, Steam Generator Tube Rupture, to steam the ruptured SG.

- RCS Temperatures were as follows:

Time	Temp
10:00 hrs	575 °F (pre-trip)
10:10 hrs	550 °F
10:25 hrs	525 °F

Current Indications at 10:25 hrs:
- SG "A" Pressure = 835 psig; SG "A" Level = 290 " XSUR
- SG "B" Pressure = 815 psig; SG "B" Level = 30" XSUR
- SG "A" isolated per the EOP
- RCS is still subcooled
- Containment Conditions are normal

Which one of the following correctly states the direction that the procedure director should provided to the OATC?

A. ✓ Manually steam only the "A" SG.

B. Manually steam only the "B" SG.

C. Manually steam both SGs.

D. Do not manually steam either SG.

K/A
Steam Gen. Tube Rupture / 3
Ability to interpret control room indications to verify the status and operation of the system, and understand how operator actions and directives affect plant and system conditions.

K/A MATCH ANALYSIS
Diagnosis of control room indications(SG P & Level, RCS T) is used to determine which SG should be steamed. The SGTR EOP gives guidance to steam a ruptured SG to prevent overfill. Therefore, the SRO must give direction that affects the status of the SGs.

SRO-ONLY ANALYSIS
SRO-only level because the TS cooldown rates will be violated if direction is given to steam the ruptured SG. The requirement is in a note, but the note is on step 57 of the procedure, thus placing it into the realm of responsibility of the procedure director (SRO).

ANSWER CHOICE ANALYSIS
A. Correct. Overfill criteria is met for the "A" SG and procedures direct steaming of the SG to prevent overfill. Furthermore, TS cooldown rates may be violated if the SG is steamed, but the procedure states that the SG should be steamed any way. The "B" SG should not be steamed because it is already lower in pressure and overfill is not a concern.
B. Incorrect. "B" SG pressure is lower than "A" and it is not an overfill concern with level at 30 inches. Plausible because it may make sense to steam the intact steam generator.
C. Incorrect. Plausible because it may make sense to steam both steam generators if an applicant gets confused on how much to steam prior to isolation.
D. Incorrect. Plausible because TS cooldown rates may be violated.

REFERENCES
1. EP/1/A/1800/001, SGTR, Rev 34.
2. Tech Spec Table 3.4.3-2.

Added "and increasing" to "A" SG levels to indicate the leak is increasing level.

Changed "B" SG level to 30". This is correct for the plants condition. "B" SG would not be at 200".

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Added the word "manually" to all distractors to ensure only one correct answer.
Removed "and increasing" to "A" SG levels, not required.

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MAB OK

85. 064G2.4.30 001

The following Unit 1 conditions exist with the plant at 180 °F:

Time	Plant Status / Condition
9:55	Unit 1 Normal Transformer, Unit 2 S/U Transformer, and CT-4 become unavailable
10:10	MFB 1 and 2 de-energize (they were energized prior to this time)
10:25	MFB 1 and 2 are still de-energized

Which one of the following correctly states the time requirements for notifying state and local agencies and the NRC based on RP/0/B/1000/001 (Emergency Classification) for the loss of power event? - assume that the event is declared as soon as conditions are met to make the declaration - (REFERENCE PROVIDED)

A. County and State must be notified by 10:25. NRC must be notified by 11:10.

B. County and State must be notified by 10:25. NRC must be notified by 11:25.

C. County and State must be notified by 10:40. NRC must be notified by 11:25.

D. County and State must be notified by 10:40. NRC must be notified by 11:40.

PROVIDE ONLY RP/0/B/1000/001, ENCLOSURE 4.5, PAGE 1 of 1.

K/A
Emergency Diesel Generator
Knowledge of which events related to system operations/status should be reported to outside agencies.

K/A MATCH ANALYSIS
The knowledge of "which" events require notifications is captured by providing a condition at 09:55 hrs that does not require notification. If the applicant thinks that this will require notification iaw E-Plan, then one of the distractors would be correct. The Keowee units are not supplying the MFBs, thus requiring an emergency classification, which requires notifications to outside agencies.

SRO-ONLY ANALYSIS
E-Plan Classifications is an SRO-only (ED) function.

ANSWER CHOICE ANALYSIS
A. Incorrect. Plausible because 10:25 is 15 minutes after losing power and 11:10 is 1 hour after losing power.
B. Incorrect. Plausible because 10:25 is 15 minutes after losing power and 11:25 is 1 hours after 10:25.
C. Correct. At 10:25 the condition to enter an alert exists. State and Local authorities must be notified within 15 minutes of declaring an event, which would be 10:40. The NRC must be notified by 11:25, which is 1 hour after meeting the conditions to declare an alert.
D. Incorrect. Plausible because 10:40 is correct and 11:40 is 1 hour after 10:40.

REFERENCES
1. RP/0/B/1000/001, Emergency Classification, Rev. 18.

No utility comments.

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MAB OK

86. 065AG2.1.20 001

Unit 1 initial plant conditions:
- All plant parameters are normal for full power operation
- All system configurations are normal

Current conditions at 14:00 hours:
- Instrument Air and Auxiliary Instrument Air Pressure = 90 psig and steadily lowering at 2 psig per minute.

Which one of the following correctly describes requirements for manually opening 1CC-8 (CC RETURN PENT OUTSIDE BLOCK) and administrative requirements?

A.✓ 1CC-8 must be manually opened by approximately 14:09 hours to maintain CRDM temperatures below its reactor trip criteria.

An operator must be stationed at 1CC-8 and be in constant communication with the control room for valve closure.

B. 1CC-8 must be manually opened by approximately 14:19 hours to maintain CRDM temperatures below its reactor trip criteria.

An operator must be stationed at 1CC-8 and be in constant communication with the control room for valve closure.

C. 1CC-8 must be manually opened by approximately 14:09 hours to maintain CRDM temperatures below its reactor trip criteria.

An operator must be stationed at 1CC-8, but is NOT required to be in constant communication with the control room for valve closure.

D. 1CC-8 must be manually opened by approximately 14:19 hours to maintain CRDM temperatures below its reactor trip criteria.

An operator must be stationed at 1CC-8, but is NOT required to be in constant communication with the control room for valve closure.

K/A
Loss of Instrument Air / 8
Ability to execute procedure steps.

K/A MATCH ANALYSIS
CC-8 must be manually opened as directed by procedure to avoid getting to rx trip criteria. The time requirement will be met in approximately 4 minutes. It is knowledge of the time requirement that is being tested, which is requisite knowledge to having the ability to execute the step. This is a time sensitive task.

SRO-ONLY ANALYSIS
SRO-only because the time requirement is being tested, which is not provided in the procedure. Also the administrative requirement for containment closure is being tested.

ANSWER CHOICE ANALYSIS
A. Correct. CC-8 will fail closed at about 80 psig and lowering. 4 minutes is the approximate rule of thumb for reaching the reactor trip criteria. And an operator must be positioned in constant communication.
B. Incorrect. Plausible because 14 minutes is still a short period of time, which portrays a time sensitivity to the task.
C. Incorrect. An operator does need to be in constant communication with CR. Plausible because it is reasonable to think that being available locally to perform the action should suffice, as long as communication is possible.
D. Incorrect. Plausible because 14 minutes is still a short period of time, which portrays a time sensitivity to the task.

REFERENCES
1. AP/1/A/1700/022, Loss of Instrument Air, Rev. 021.
2. Lesson Plan SSS-IA, Instrument Air System, Rev. 16.

Added unit designators.
Added "Instrument Air" to stem because both systems supply air to 1CC-8.
Refer to Lesson Plan SSS-IA, Instrument Air System, Rev. 16. pg 33/51

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Added reference material

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MAB OK
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Removed "containment closure" from stem and alternatives and added "valve closure" for clarity.
MAB OK

87. 067AG2.4.27 001

The following events have taken place on Unit 1:
- A confirmed active fire has been identified in the Turbine Building
- AP/0/A/1700/025, Standby Shutdown Facility Emergency Operating Procedure, is being implemented
- Operators are at the point in the procedure where they have just opened 1XSF-F5A (1XSF NORM FDR BKR FROM 1X8) and closed 1XSF-F3A (1XSF EMERG FDR BKR FROM OXSF)

Which one of the following correctly describes the starting requirements for the Diesel Generator and SSF isolation manipulations; and reasons supporting the requirements?

A. ✓ The Diesel Generator is required to be started AND SSF is required to be electrically isolated.

These actions are required to be performed because a DC control circuit on OTS1 that is exposed to the turbine building may prevent the operator from closing required SSF breakers on OTS1 if a short occurs.

B. The Diesel Generator is required to be started AND SSF is required to be electrically isolated.

These actions are required to be performed because physical access to the area may not be possible at a later time.

C. The Diesel Generator is not required to be started AND SSF is not required to be electrically isolated.

These actions are not required to be performed unless an active fire in the Control Room, or Cable Spreading Room is in progress or a security event is in progress.

D. The Diesel Generator is not required to be started AND SSF is not required to be electrically isolated.

These actions are not required to be performed unless an active fire in the Control Room, Cable Spreading Room, or Equipment Room is in progress.

K/A
Plant Fire On-site / 8
Knowledge of fire in plant procedure.

K/A MATCH ANALYSIS
Knowledge of the requirements of AP-25 for a fire in turbine building are required to answer question.

SRO-ONLY ANALYSIS
SRO-only because basis for the steps is also being tested. Basis comes from Appendix in AP.

ANSWER CHOICE ANALYSIS
A. Correct.See page 7 and 8 of referenced procedure. Also see Appendix of referenced procedure, Items 2 and 15.
B. Incorrect. The reason is wrong, but plausible. The basis for doing these steps when they are done is due to potential control circuit short, not physical access. Physical access to the area would appear to be plausible on important actions.
C. Incorrect. Actions are required to be performed. Plausible because CR and CSR typically have more important equipment. And actions would be required during a security event.
D. Incorrect. Actions are required to be performed. Plausible because CR, CSR, and ER typically have more important equipment.

NOTE
I am assuming that the below steps are those necessary to isolate SSF:
OTS1-1 (SSF NORMAL POWER SUPPLY BREAKER B2T) must be opened.
OTS1-4 (DIESEL GEN BREAKER) and OTS1-3 (SSF 600V OXSF FDR BKR CONTROL) must both be closed.
OXSF-4B (SSF LC OXSF 600V INC BKR) must be closed.

REFERENCES
1. AP/0/A/1700/025, Standby Shutdown Facility Emergency Operating Procedure, Rev. 033.

Added "Electrically" to answers as described in AP/0/A/1700/025, Standby Shutdown Facility Emergency Operating Procedure (Note on pg 3/21)

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MAB OK

88. 076G2.1.12 001

The following conditions exist:
- Units 1 and 2 are in mode 1 at 100% power
- A, B, and C LPSW pumps are operating
- Unit 1&2 LPSW Standby Pump auto-start circuitry is inoperable

Which one of the following correctly describes the applicability of LCO 3.3.28 (LPSW Standby Pump Auto-Start Circuitry) and why?

A. LCO 3.3.28 is met because the LPSW pumps can be manually restarted following a LOOP without resetting Load Shed.

B.✓ LCO 3.3.28 is met because a running LPSW pump will automatically restart following a LOOP.

C. LCO 3.3.28 is NOT met because the auto-start function is required for MODES 1, 2, 3, and 4.

D. LCO 3.3.28 is NOT met because a running LPSW pump will NOT automatically restart following a LOOP.

K/A
Service Water
Ability to apply technical specifications for a system.

K/A MATCH ANALYSIS
SWS Tech Spec knowledge is required.

SRO-ONLY ANALYSIS
This is a more in-depth TS question that requires bases knowledge to answer.

ANSWER CHOICE ANALYSIS
A. Incorrect. First part correct. Second part is incorrect. Plausible because statement is true but not the reason the LCO is not entered.
B. Correct. TS Basis 3.3.28 - See section on LCO page B3.3.28-2.
C. Incorrect. First part incorrect. Plausible because all modes listed are required by the spec. Candidate must know the note in the spec.
D. Incorrect. First part incorrect. Plausible because other important pump will not start after a LOOP ie CCW pumps.

REFERENCES
1. Tech Spec 3.3.28, LPSW Standby Pump Auto-Start Circuitry and Basis.

No utility comments.

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MAB OK

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Wrote new question. Orginal question was beyond the scope of a closed reference
MAB OK

89. 076G2.2.25 001

Which one of the following correctly describes the basis for Tech Spec LCO 3.4.11, RCS Specific Activity?

A. The LCO limits on specific activity of the reactor coolant ensure that the resulting 1 hour doses at the site boundary will not exceed the 10 CFR 100 dose guideline limits following an SGTR or a steam line break accident.

B. The LCO limits on specific activity of the reactor coolant ensure that the resulting 2 hour doses at the site boundary will not exceed the 10 CFR 100 dose guideline limits following an SGTR or a steam line break accident.

C. The LCO limits on specific activity of the reactor coolant ensure that the resulting 1 hour doses at the site boundary will not exceed the 10 CFR 100 dose guideline limits following a LOCA or SGTR accident.

D. The LCO limits on specific activity of the reactor coolant ensure that the resulting 2 hour doses at the site boundary will not exceed the 10 CFR 100 dose guideline limits following a LOCA or SGTR accident.

K/A
High Reactor Coolant Activity
Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.

K/A MATCH ANALYSIS
Applicant must have knowledge of TS bases to correctly answer the question.

SRO-ONLY ANALYSIS
TS Basis knowledge is being tested.

ANSWER CHOICE ANALYSIS
A. Incorrect. The correct basis is a 2 hour dose.
B. Correct. See TS Bases Page B 3.4.11-1.
C. Incorrect. The correct basis is a 2 hour dose. Also, LOCA is incorrect.
D. Incorrect.

Plausibility is based on the idea that to the uninformed, one hour appears to be just as reasonable as two hours. Plausibility also based on the idea that LOCA and SGTR are both breaches in the RCS.

REFERENCES
1. Tech Spec 3.4.11 and Bases.

No utility comments.

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MAB OK

90. 086G2.1.14 001

Unit 1 conditions:
- 1SA-03 B-6, FIRE ALARM, annunciates
- The BOP addresses the alarm and notes that there is a fire in the back of the control room and it appears to be spreading rapidly.

As the SRO, you have determined that the control room requires evacuation and entry into AP/1/A/1700/008, Loss of Control Room, is required. In addition to tripping the reactor and performing IMAs, which one of the following correctly describes the procedural directives required by AP/1/A/1700/008 prior to exiting the control room?

A. Proceed to Unit 1's ASD Panel. Notify an operator to locally close 1FDW-315 and 1FDW-316. Notify Unit 3 to activate the Fire Brigade. Notify the OSM to reference RP/0/B/1000/001, Emergency Classification.

B. Notify an operator to initiate AP/25, SSF EOP. Notify an operator to locally open 1FDW-315 and 1FDW-316. Notify an operator to emergency start both Keowee units. Notify Unit 3 to activate the Fire Brigade. Make a PA announcement of required evacuation of the CR.

C. Notify an operator to initiate AP/25, SSF EOP. Notify an operator to locally close 1FDW-315 and 1FDW-316. Make a PA announcement of required evacuation of the CR. Notify Unit 3 to activate the Fire Brigade. Notify the OSM to reference RP/0/B/1000/001, Emergency Classification.

D. Proceed to Unit 1's ASD Panel. Notify an operator to locally open 1FDW-315 and 1FDW-316. Notify Unit 3 to make a PA announcement of required evacuation of the CR. Notify Unit 3 to activate the Fire Brigade. Notify the OSM to make OMP 1-14, Notifications.

K/A
Fire Protection
Knowledge of system status criteria which require the notification of plant personnel.

K/A MATCH ANALYSIS
The equipment status of the FPS is initially indicated by the FIRE ALARM. Notifications are required based on the situation.

SRO-ONLY ANALYSIS
Question tests SRO notification responsibilities.

ANSWER CHOICE ANALYSIS
A. Incorrect. ASD panel is used when NO fire is present in CR during evacuation. Plausible because if CR evacuation is not due to a fire, then this would be a correct answer.
B. Incorrect. first prt is correct, AP/25 will be initiated. In an immediate evacuation scenario, Keowee units are not required to be started from the Unit 1 control room. Plausible because if CR evacuation is not due to a fire, then this would be a correct answer. Also, 1FDW-315 and 316 are required to be closed not opened.
C. Correct. See AP/1/A/1700/008.
D. Incorrect. ASD panel is used when NO fire is present in CR during evacuation. Plausible because if CR evacuation is not due to a fire, then this would be a correct answer. Also, 1FDW-315 and 316 are required to be closed not opened. Plausible because the PA announcement, Fire Brigade announcement, and OSM notification are all correct.

REFERENCES
1. AP/1/A/1700/008, Loss of Control Room, Rev. 11.

Removed the word "immediate" from stem. If the CR is evacuated right now these actions would not be done from the CR.

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MAB OK
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Added actions to alternatives that require specific knowledge of mitigation strategy.
MAB OK

91. BW/A08G2.2.29 001

The following Unit 1 conditions exist:
- Refueling is in progress
- Containment penetration testing is in progress
- Reactor has been subcritical for 96 hours
- A fuel handling accident has just occurred in the reactor building

Which one of the following correctly describes containment closure requirements and outside air booster fan starting requirements, in accordance with AP/1/A/1700/009, Spent Fuel Damage?

A. ✓ Containment closure must be established within 30 minutes of fuel damage.

Control Room Outside Air Booster Fans must be started within 30 minutes of the fuel handling accident to remain within the assumptions of the Control Room Habitability Submittal.

B. Containment closure must be established within 30 minutes of fuel damage.

Control Room Outside Air Booster Fans must be started within 1 hour of the fuel handling accident to remain within the assumptions of the Control Room Habitability Submittal.

C. Containment closure must be established within 1 hour of fuel damage.

Control Room Outside Air Booster Fans must be started within 30 minutes of the fuel handling accident to remain within the assumptions of the Control Room Habitability Submittal.

D. Containment closure must be established within 1 hour of fuel damage.

Control Room Outside Air Booster Fans must be started within 1 hour of the fuel handling accident to remain within the assumptions of the Control Room Habitability Submittal.

K/A
Fuel Handling Accident
Knowledge of SRO fuel handling responsibilities

K/A MATCH ANALYSIS
Containment closure and CR ventilation are both SRO responsibilities during the fuel handling accident.

SRO-ONLY ANALYSIS
Time requirement for containment closure is an SRO-only responsibility and time requirement for starting Outside Air Booster Fans is SRO-only because the time requirement is part of the Habitability Analysis.

ANSWER CHOICE ANALYSIS
A. Correct. See referenced procedure.
B. Incorrect.
C. Incorrect.
D. Incorrect.

Plausibility of distractors is based on memory level of question and the fact that all times provided are 1 hour or less.

REFERENCES
1. AP/1/A/1700/009, Spent Fuel Damage, Rev. 05.

No utility comments.

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MAB OK

92. BW/E02EA2.2 001

Unit 1 conditions:
- Reactor has tripped
- Primary to Secondary leak rate is 150 gpm
- Operators have just entered EP/1/A/1800/001, SGTR

Which one of the following correctly describes EP/1/A/1800/001 pressurizer level control requirements and the reasons for those requirements?

A.✓ Maintain pressurizer level between 140 and 180 inches. This pressurizer level band is necessary to prepare for subsequent RCS cooldown.

B. Maintain pressurizer level between 140 and 180 inches. This pressurizer level band is necessary to allow the RCPs to be secured to reduce forced flow through the ruptured steam generator.

C. Maintain pressurizer level greater than 220 inches. This pressurizer level band is necessary to prepare for subsequent RCS cooldown.

D. Maintain pressurizer level greater than 220 inches. This pressurizer level band is necessary to allow the RCPs to be secured to reduce forced flow through the ruptured steam generator.

K/A
Reactor Trip - Stabilization - Recovery / 1
Ability to determine and interpret the following as they apply to the (Vital System Status Verification): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

K/A MATCH ANALYSIS
Proper maintenance of pressurizer level is necessary to maintain the plant within procedures after the reactor has tripped. Pressurizer level affects core cooling and will aid with subcooling if pzr heaters can be maintained energized. Adherence to EOPs is incorporated in the license via the Admin Section of Tech Specs.

SRO-ONLY ANALYSIS
Basis information is being tested for the reason why the level band must be maintained.

ANSWER CHOICE ANALYSIS
A. Correct. With the reactor tripped the level band is 140 to 180 inches per EP/1/A/1800/001, Page 1 of 69. The lesson plan (Page 14) states that the higher than normal pzr level band is needed for subsequent cooldown and inventory loss.
B. Incorrect. It is actually good to maintain RCPs running to provide for a more controlled cooldown. Plausible because it is logical to believe that forcing water through the SG and increasing the leak rate would be an adverse action, therefore securing RCPs would help.
C. Incorrect. 220 inches is wrong. Plausible because 220 inches is correct when the reactor has not tripped. Also plausible because the reason is correct.
D. Incorrect. 220 inches is wrong. Plausible because 220 inches is correct when the reactor has not tripped. Also plausible as stated in "B".

REFERENCES
1. Lesson Plan EAP-SGTR, SG Tube Rupture, Rev. 15a.
2. EP/1/A/1800/001 G, EOP - SGTR, Rev. 34.

No utility comments.

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MAB OK

93. BW/E04AG2.4.48 001

The following Unit 1 conditions exist:
- Operators just entered the LOHT tab
- SRO has given direction for Rule 3 to be commenced
- SCM = 25 °F and decreasing slowly
- Pressurizer level = 300 inches
- RCS pressure = 2100 psig
- Main Feedwater is not available
- Emergency Feedwater is not available
- All RCP control indications show the RED light ON

Which one of the following correctly describes which RCPs should be secured, allowing for the best possible pressurizer spray, as stated in the the LOHT tab and the reason for the action?

A. Secure RCP 1A1 and 1B2.

One RCP in each loop should be running since it is unknown which steam generator will be fed once feedwater is recovered.

B. Secure RCP 1A2 and 1B1.

One RCP in each loop is required to be secured due potential loss of RCP support conditions.

C. Secure 1A2, 1B1 and 1B2.

Three RCPs should be secured to reduce heat input to the RCS.

D. Secure RCP 1A2 and 1B1.

One RCP in each loop should be secured to reduce heat input to the RCS.

K/A
Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4
Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions.

K/A MATCH ANALYSIS
Applicants must evaluate plant conditions to determine how many RCPs should be secured. Two RCPs must be secured to reduce heat load and allow for recover of FW to either SG. If the operator choses to secure 3 RCPs and FW is able to be restored to the SG with no FW, then his actions would adversely affect the RCS.

SRO-ONLY ANALYSIS
Applicant must know basis behind leaving one RCP running in each loop.

ANSWER CHOICE ANALYSIS
A. Incorrect. Securing the '1A1' RCP would be contrary to the Note in the referenced procedure. Plausible because the reason is correct and the applicant may confuse which loop provides the best pzr spray.
B. Incorrect. Lesson plan does not mention that loss of RCP support conditions would be a reason for going to one operating pump in each loop. Plausible because RCPs do have specific conditions for operation. Also plausible because the pump combination is correct.
C. Incorrect. Plausible because securing three RCPs lowers the heat load more than secureing two RCPs.
D. Correct. LOHT Step 3 RNO gives requirement to go to one RCP in each loop. The note states that RCP 1A1 should be left running. The basis is as stated (see referenced lesson plan Page 11 of 31.

REFERENCES
1. EP/1/A/1800/001 E, LOHT, Rev. 34.
2. Lesson Plan EAP-LOHT, Loss of Heat Transfer, Rev. 12.
3. OC03301, BW/E04EK3.3

Pump combinations changed to match expected operator action due to pump power supplies.

Modified "D" second part. Answer was incorrect.

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MAB OK

94. G2.1.10 001

Unit 1 is cooling down to enter a refueling outage with the following conditions:

- RCS Average Temperature = 300 °F
- CFTs are properly isolated
- LTOP is operable
- PORV is operable with proper setpoints
- HPI Pump '1B' is tagged out for maintenance

- Train 'A' HPI Status
  - 1HP-26 shut with breaker closed and switch tagged
  - 1HP-410 shut with breaker closed and switch tagged
  - 1HP-120 is open

- Train 'B' HPI status
  - HPI Pump '1C' has its motor breaker opened and tagged
  - 1HP-27 shut with breaker closed and switch tagged
  - 1HP-409 shut with breaker closed and switch tagged

Given the above plant conditions, which one of the following correctly describes actions, if any, required to be taken in accordance with LCO 3.4.12, Low Temperature Overpressure Protection (LTOP) System?

A. The LCO is not applicable in Mode 3. No action statements are required to be performed.

B. The LCO applicability statement is met. The conditions of the LCO are met, therefore no action statements are required to be performed.

C. The conditions of the LCO are not met. The LCO requires that 1HP-409 and 1HP-410 have their breakers opened and tagged.

D. The conditions of the LCO are not met. The LCO requires 1HP-26 to have its breaker opened and tagged and its handwheel closed and tagged.

K/A
Knowledge of conditions and limitations in the facility license.

K/A MATCH ANALYSIS
Tech Specs are part of the license.

SRO-ONLY ANALYSIS
Deactivation of HPI SI flowpaths are described in the TS Bases.

ANSWER CHOICE ANALYSIS
A. Incorrect. LCO is applicable in Mode 3 with Temp < 325F. Plausible because this would be correct if at higher Temp in Mode 3.
B. Incorrect. LCO conditions are not met because HPI train 'A' is not deactivated iaw TS Bases (Page B 3.4.12-7). Plausible because HPI valves are closed on 'A' Train and 'B' Train pump motor bkr is open and tagged.
C. Incorrect. The TS Basis states that 409 and 410 are required to be closed and handswitch tagged, but does not require that their breakers to be tagged opened.
D. Correct. See TS Bases Page 3.4.12-7.

REFERENCES
1. Tech Spec 3.4.12 and Bases.

Added unit designators.

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MAB OK

95. G2.1.6 001

Unit 1 and 2 are at 100% power. Currently each Unit has an SRO, a BOP, and an OATC operator in their respective stations in the control room. The Unit 1 SRO needs to step out of the control room to address an issue in the plant.

Which one of the following correctly describes OMP 2-01, Duties and Responsibilities of On-shift Operations Personnel, requirements for the Unit 1 SRO leaving the Control Room?

A. The Unit 1 SRO is not permitted to leave the control room for any amount of time unless properly relieved by another SRO.

B. The Unit 1 SRO can leave the Control Room for up to five minutes without conducting a proper turnover to another SRO. The Unit 2 SRO is required to assume the role of procedure reader if Unit 1 trips until a proper turnover can be completed with the Unit 1 SRO.

C. The Unit 1 SRO can leave the Control Room for up to five minutes without conducting a proper turnover to another SRO. The Unit 1 SRO must return to his position as procedure reader if Unit 1 trips.

D. The Unit 1 SRO can leave the Control Room for up to 10 minutes without conducting a proper turnover to another SRO. The Unit 1 SRO must return to his position as procedure reader if Unit 1 trips.

K/A
Ability to supervise and assume a management role during plant transients and upset conditions.

K/A MATCH ANALYSIS
Abnormal plant conditions exist and knowledge of who is procedurally required to take role of procedure reader is being tested.

SRO-ONLY ANALYSIS
Procedure reader responsibilities are an SRO-only function.

ANSWER CHOICE ANALYSIS
A. Incorrect. Per OMP 2-1 SRO can leave for up to 5 minutes. Plausibility based on standard requirement in OMP 2-1 that SRO shall be in CR within audible range of alarms and ROs.
B. Incorrect. The Unit 1 SRO is still responsible for Proc Reader duties. Plausibility based on it being a reasonable assumption that the SRO left in the Control Room would assume the procedure reading responsibility. However, this is not required by OMP 2-1.
C. Correct. See OMP 2-1 Page 16 and 18.
D. Incorrect. 10 minutes is beyond the 5 minute requirement. Plausible because SRO may know that they can step out for a moment, but they may not remember the specific time requirement.

REFERENCES
1. OMP 2-01, Duties and Responsibilities of On-shift Operations Personnel, Rev. 065.

Added "is required " to "B" to ensure answer incorrect.

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MAB OK

96. G2.2.11 001

Which one of the following correctly describes the approval requirements for performing steps out of order in an OPS Test procedure, in accordance with OMP 1-28, Procedure Use and Adherence?

A. Only the OSM may approve performance of steps out of sequence.

B. Only the Ops Test Supervisor may approve performance of steps out of sequence.

C. The OSM OR Ops Test Supervisor may approve performance of steps out of sequence.

D. The OSM AND Ops Test Supervisor are required to approve performance of steps out of sequence.

K/A
Knowledge of the process for controlling temporary changes.

K/A MATCH ANALYSIS
Question requires knowledge of who must approve steps being performed out of order for an Ops Test Procedure. This is a means of temporarily changing a procedure when steps were written to be performed in a specific order.

SRO-ONLY ANALYSIS
Approving the out-of-order performance of the steps is an SRO (OSM) function.

ANSWER CHOICE ANALYSIS
A. Incorrect because Ops Test Supv can also approve performance of steps out of order. Plausible because the OSM can approve performance of steps out of order.
B. Incorrect because OSM can also approve performance of steps out of order. Plausible because the Ops Test Supv can approve performance of steps out of order.
C. Correct. Per OMP 1-28, Section 8.
D. Incorrect because both are not required to approve performance of steps out of order. Plausible because either one or the other is required to approve.

REFERENCES
1. OMP 1-28, Procedure Use and Adherence, Rev. 6.

No utility comments.

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MAB OK

97. G2.2.23 001

Unit 1 is in Mode 1 with the following conditions and activities taking place:

- The 'A' Train HPI Safety Grade Flow Indicator was removed from service for replacement at 0800 hours on Monday
- On Tuesday at 1200 hours the Control Room Supervisor was informed that the 'B' Train HPI Safety Grade Flow Indicator was inoperable
- On Tuesday at 1230 hours the 'A' Train HPI Safety Grade Flow Indicator was declared operable

Which one of the following correctly states the latest time when the 'B' HPI Train is required to be operable per LCO 3.5.2?

(REFERENCE PROVIDED)

A. Thursday at 0800 hours.

B. ✓ Friday at 0800 hours.

C. Friday at 1200 hours.

D. Friday at 1230 hours.

Provide only: LCO 3.5.2, Pages 3.5.2-1 through 3.5.2-4.

K/A
Ability to track limiting conditions for operations.

K/A MATCH ANALYSIS
The applicant must have knowledge of tracking LCO completion times in order to arrive at the correct answer.

SRO-ONLY ANALYSIS
Question tests completion time extension knowledge. This is in-depth knowledge typically only applied at the SRO level.

ANSWER CHOICE ANALYSIS
A. Incorrect. Plausible because this is 72 hours after the LCO was initially entered.
B. Correct. The inoperabilities existed at same time AND subsequent inoperability remained after the first was resolved. The more restrictive of the completion time extension options applies.
C. Incorrect. Plausible because this is 72 hours after the 'B' HPI Train was declared inoperable.
D. Incorrect. Plausible because this is 72 hours after the 'A' HPI Train was declared operable, leaving only the one train of HPI in an inoperable status.

REFERENCES
1. Question modified from a Vogtle 2005-301 RO exam draft submittal.
2. Oconee Technical Specifications, Section 1.3, Completion Times.
3. Oconee Technical Specifications, Section 3.5.2, ECCS & Bases B3.5.2.

No utility comments.

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MAB OK
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Removed bullet statement " The new 'A' Train HPI Safety Grade Flow Indicator was installed at 1100 hours on Tuesday" from stem to clarify when flow indicator becomes "operable".
Underlined "latest".
MAB OK

98. G2.3.8 001

The station is preparing to release two GWD Tanks in accordance with OP/1-2, 3/A/1104/018 (GWD System) .

The plan is to start the GWD Tank "1C" release and once it is in progress, then start releasing GWD Tank "3A", so that they will both be released simultaneously.

Which one of the following correctly describes the minimum level of approval that is required in accordance with OP/1-2,3/A/1104/018 for the release of GWD Tank "1C" and "3A", if they can be released?

Assume GWD Tank "1C" is released at 2/3 the station limit and GWD Tank "3A" is released at 1/3 the station limit.

A. The OSM is required to approve the release of both tanks.

B. ✓ The OSM is permitted to approve the release of GWD Tank "1C", but GWD Tank "3A" is not permitted to be released as planned.

C. The OSM is permitted to approve the release of GWD Tank "1C", but the Operations Superintendent is required to approve the release of GWD Tank "3A".

D. The CRSRO is permitted to approve the release of GWD Tank "1C", but the OSM is required to approve the release of GWD Tank "3A".

K/A
Knowledge of the process for performing a planned gaseous radioactive release.

K/A MATCH ANALYSIS
The process has OSM approve the release of the first tank and the question tests knowledge of this.

SRO-ONLY ANALYSIS
This is an SRO function as designated by procedure.

ANSWER CHOICE ANALYSIS
A. Incorrect. The OSM is only permitted to approve the release of the first tank (OP/1-2/A/1104/018, Step 2.7). Plausible because both releases could be made iaw the referenced lesson plan, but the Ops Sup, not the OSM would have to approve the release of the second tank.
B. Correct. OSM approval required for levels up to 2/3 Station Limit with one tank being released. Procedure does not make any allowance for release of two tanks at a total of 3/3 the station limit.
C. Incorrect. The OSM is only permitted to approve the release of the first tank (OP/1-2/A/1104/018, Step 2.7). The Ops Sup is not permitted to approve the release of the second tank. Procedure does not make any allowance for release of two tanks at a total of 3/3 the station limit. Plausible because the referenced lesson plan (Page 15) states that the Ops Sup may approve one tank at 1/3 limit and a second tank at 2/3 limit.
D. Incorrect. Only the OSM is permitted to approve the release of the first tank (OP/1-2/A/1104/018, Step 2.7). Plausible because as stated by the procedure and SRO may approve one tank at 1/3 the limit, and then the OSM may approve the release of other tanks under specified conditions.

REFERENCES
1. SLC 16.11.2, Radioactive Gaseous Effluents.
2. OP/1-2/A/1104/018, GWD System, Rev. 59.
3. Lesson Plan WE-GWD, Gaseous Waste Disposal System, Rev. 11a.

Changed one tank to 3A because cannot release two tanks from unit 1 at a time. Added **"Assume each tank is being released at 1/3 the station limit."** to establish the release limit for each release.

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Modified stem and distractors to remove tank dose projections.

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MAB OK

Additional change made to reduce the ability to appeal on the fact that Step 2.7 of the referenced procedure does not specify the situation where two tanks are being released, each at 1/3 the station limit (All Releases In Progress totalling 2/3 the station limit).

Added Unit 3 to procedures in the stem. Changed CRS to CRSRO.

99. G2.4.38 001

Unit 1 plant conditions:
- General Emergency has been declared
- Initial Emergency Notification Form is being completed

Per Enclosure 4.1 (General Emergency) of RP/0/B/1000/002 (Control Room Emergency Coordinator Procedure), which one of the following correctly describes the protective action recommendations to the public?

A. Evacuate 2 mile radius only. Shelter any sectors not evacuated.

B. ✓ Evacuate 5 mile radius only. Shelter any sectors not evacuated.

C. Evacuate 2 mile radius and 5 miles downwind unless conditions make evacuation dangerous. Shelter any sectors not evacuated.

D. Evacuate 5 mile radius and 10 miles downwind unless conditions make evacuation dangerous. Shelter any sectors not evacuated.

K/A
Ability to take actions called for in the facility emergency plan, including (if required) supporting or acting as emergency coordinator.

K/A MATCH ANALYSIS
The question requires knowledge of PAR, which is a function of the emergency coordinator.

SRO-ONLY ANALYSIS
OSM will be the initial emergency coordinator during the event. It could be his responsibility to make the initial PAR. An RO would not be required to know this.

ANSWER CHOICE ANALYSIS
A. Incorrect. Plausible because areas evacuated are similar to the subsequent evacuation guidance contained in RP/0/B/1000/024.

B. Correct. Per RP/0/B/1000/002, Encl 4.1 (General Emergency) Step 1.5

C. Inorrect. Plausible due to being the guidance RP/0/B/1000/024 for a General Emergency.

D. Incorrect. Plausible because this is an actual protective action in RP/0/B/1000/024, but not the initial protective action.

REFERENCES
1. Vogtle 2003-301, G2.4.44.
2. RP/0/B/1000/024, Protective Action Recommendations, Rev. 4.
3. RP/0/B/1000/002, Control Room Emergency Coordinator Procedure, Rev 13
4. EAP-SEP (Emergency Plan), pg 34/56

RP/1000/024 is not performed by the OSM. Changed question to use guidance the OSM would use in Encl. 4.1.

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Updated answer analysis and references.

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MAB OK

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Changed A and B to read "any sectors not evacuated". The miles listed is A and B are not in the procedure. The procedure details the the actual sectors evacuated.
MAB OK

100. G2.4.6 001

Unit 1 has experienced a Reactor Trip. The crew is performing EP/1/A/1800/001, Loss of Heat Transfer.

The following conditions exist:
- No source of feedwater is available
- Pressurizer level = 300 inches and rising
- Pressurizer pressure = 2200 psig and rising
- No HPI flow is available
- No RCPs are operating

Which one of the following correctly describes the reason for cycling the PORV as necessary to maintain pressure between 2300 psig and minimum SCM?

A. To ensure the maximum amount of energy is removed while minimizing RCS inventory loss.

B. To prevent the pressurizer safety valves from lifting and maximize HPI flow when HPI is restored.

C. To prevent PTS conditions when HPI flow is restored.

D. To allow natural circulation to develop when feedwater is restored.

K/A
Knowledge of symptom based EOP mitigation strategies.

K/A MATCH ANALYSIS
Question tests knowledge of why the PORV is cycled. This is testing a reason for an EOP mitigation strategy, which is employed based on symptoms exhibited by the plant.

SRO-ONLY ANALYSIS
SRO-only level because it involves procedure basis knowledge.

ANSWER CHOICE ANALYSIS
A. Correct. Per referenced lesson plan, page 14 of 31, Step 2.13.
B. Incorrect. Plausible because first part of distractor is correct.
C. Incorrect. Plausible because Rule 8, PTS, is invoked when HPI is injecting with no RCPs operating.
D. Incorrect. Plausible because RCS must be pressurized for natural circ when feedwater is restored; however, this is not the reason for manually cycling the PORV.

NOTE:
Initially my distractor for "B" was as follows:
To prevent the pressurizer safety valves from lifting and RCS pressure approaching on the SCM limit.
(My fear was that it may be correct. My initial thinking was that the most urgent problem with sticking a safety valve open would be the inventory loss and not the encroachment on SCM limits. - As the reviewer, think about whether this would be a correct answer because I like it better as a distractor if, in fact, it is clearly an incorrect answer choice.)

REFERENCES
1. EP/1/A/1800/001, Loss of Heat Transfer.
2. Crystal River 2003-301 SRO question, G2.4.6.
3. Lesson Plan EAP-LOHT, Loss of Heat Transfer, Rev. 12.

No utility comments.

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MAB OK