U.S. Nuclear Regulatory Commission

Site-Specific RO Written Examination

Applicant Information	
Name:	
Date: **10/26/2011**	Facility/Unit: **Oconee**
Region: I ☐ II ☒ III ☐ IV ☐	Reactor Type: W ☐ CE ☐ BW ☒ GE ☐
Start Time:	Finish Time:

Instructions

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

Applicant Certification

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

_____
Applicant's Signature

Results		
Examination Value	75	Points
Applicant's Score	_____	Points
Applicant's Grade	_____	Percent

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2011B ONS SRO NRC Examination QUESTION 1

1

C

EPE007 EA2.06 - Reactor Trip

Ability to determine or interpret the following as they apply to a reactor trip: (CFR 41.7 / 45.5 / 45.6)

Occurrence of a reactor trip .....

Given the following Unit 1 conditions:

- Reactor power = 75%
- Main Feedwater transient is in progress

Which ONE of the following combinations of statalarms from 1SA-1 could indicate an AUTOMATIC reactor trip has occurred due to LOW RCS PRESSURE?

A.

CRD TRIP BKR A TRIP	CRD TRIP BKR B TRIP	CRD TRIP BKR C TRIP	CRD TRIP BKR D TRIP	CRD ELECTRONIC TRIP E	CRD ELECTRONIC TRIP F

B.

CRD TRIP BKR A TRIP	CRD TRIP BKR B TRIP	CRD TRIP BKR C TRIP	CRD TRIP BKR D TRIP	CRD ELECTRONIC TRIP E	CRD ELECTRONIC TRIP F

C.

CRD TRIP BKR A TRIP	CRD TRIP BKR B TRIP	CRD TRIP BKR C TRIP	CRD TRIP BKR D TRIP	CRD ELECTRONIC TRIP E	CRD ELECTRONIC TRIP F

D.

CRD TRIP BKR A TRIP	CRD TRIP BKR B TRIP	CRD TRIP BKR C TRIP	CRD TRIP BKR D TRIP	CRD ELECTRONIC TRIP E	CRD ELECTRONIC TRIP F

2011B ONS SRO NRC Examination QUESTION 1

1

C

General Discussion

Answer A Discussion

Incorrect. Plausible since only two CRD breakers opening will result in a Reactor trip however it is specific combinations of breakers and A & C are not two of the pair that result in de-energizing CRD's.

Answer B Discussion

Incorrect. Plausible since only two CRD breakers opening will result in a Reactor trip however it is specific combinations of breakers and B & D are not two of the pair that result in de-energizing CRD's.

Answer C Discussion

Correct. A low RCS pressure RPS trip would attempt to open all CRD breakers. It does not take all CRD breakers opening to de-energize the CRD's. There are several pairs of CRD breakers where only two breakers are required to de-energize the CRD's. A & B are one of the pairs.

Answer D Discussion

Incorrect. Plausible since the E & F contactors would result in all CRD's being inserted and would not open any of the CRD breakers however the E & F contacts are actuated from AMSAC/DSS due to high RCS pressure.

Basis for meeting the KA

KA requires the ability to determine the occurrence of a Rx trip. Interpreting statalarms to determine which combinations would indicate a Rx trip has occurred meets the KA.

Basis for Hi Cog

Requires analyzing various statalarm combinations to determine if the correct breaker combination for a Rx trip has occurred. Also requires specifically differentiating between indications of a high pressure trip resulting in DSS vs low pressure trip.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
IC-CRI R20, IC-RPS R17 IC-CRI IC-Digital RPS	

EPE007 EA2.06 - Reactor Trip

Ability to determine or interpret the following as they apply to a reactor trip: (CFR 41.7 / 45.5 / 45.6)

Occurrence of a reactor trip .....

401-9 Comments:	Remarks/Status

C

2011B ONS SRO NRC Examination QUESTION 2

2

APE008 AK2.02 - Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)
Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: (CFR 41.7 / 45.7)
Sensors and detectors .....

Given the following Unit 1 conditions:

- Reactor power = 100%
- 1RC-66 (PORV) is leaking past its seat
- Pressurizer temperature = 648°F
- Quench tank pressure = 5 psig

Based on the above conditions, which ONE of the following describes the expected tailpipe temperature (°F) downstream of 1RC-66?

A. 648

B. 272

C. 228

D. 162

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2011B ONS SRO NRC Examination QUESTION 2

2

C

General Discussion

Re-arranged answers to make different letter the correct answer.

Answer A Discussion

Incorrect: Plausible with the same misconception made at TMI which was assuming constant temperature across the valve due to throttling process

Answer B Discussion

Incorrect: Plausible if one thinks that the throttling process is a constant entropy process and looks for the same entropy as at 648 degrees F - 1.27 BTU/R/lb

Answer C Discussion

CORRECT: The enthalpy for the steam leaving the pressurizer at 648 degreesF will be the same at 5 psig (20psia) - 1124 BTU/lb. This enthalpy at 20 psia constitutes a wet vapor with a temperature of 228 degrees F. Throttling processes are constant enthalpy processes and energy remains approximately the same on both sides of a throttling process.

Answer D Discussion

Incorrect: Plausible because this will be the answer if 5 psig is not converted to psia.

Basis for meeting the KA

Requires knowledge of Pressurizer vapor space accident (leaking PORV) on tailpipe temp by applying thermodynamic flow characteristics of a leaking valve

Basis for Hi Cog

Requires applying thermodynamic knowledge and demonstrating the ability to use the Mollier diagram.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2009A NRC exam Question #1

Development References	Student References Provided
PNS-PZR R34	

APE008 AK2.02 - Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)
Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: (CFR 41.7 / 45.7)
Sensors and detectors .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 3

3

D

APE015/017 AK2.08 - Reactor Coolant Pump (RCP) Malfunctions
Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following: (CFR 41.7 / 45.7)
CCWS .....

Given the following Unit 2 conditions:

- Reactor power = 100%
- 2HP-31 (RCP Seal Flow Control) failed CLOSED
- 2CC-8 failed CLOSED
- ALL individual RCP seal return valves CLOSED

Which ONE of the following describes the response of 2HP-21 (if any) AND the required Operator actions that will be performed?

A.
- 2HP-21 will remain OPEN
- RCP's will be secured ONLY if Immediate Trip Criteria of AP/16 (Abnormal RCP Operation) are exceeded.

B.
- 2HP-21 will close automatically
- RCP's will be secured ONLY if Immediate Trip Criteria of AP/16 (Abnormal RCP Operation) are exceeded.

C.
- 2HP-21 will remain OPEN
- AP/14 (Loss of HPI Normal Makeup and/or Seal Injection) will direct tripping the reactor then securing ALL RCP's immediately.

D.
- 2HP-21 will close automatically
- AP/14 (Loss of HPI Normal Makeup and/or Seal Injection) will direct tripping the reactor then securing ALL RCP's immediately..

2011B ONS SRO NRC Examination QUESTION 3

3

D

General Discussion

Answer A Discussion

Incorrect. This distracter is plausible since HP-21 does not automatically close on Unit 1. Additionally, leaving the RCP's running unless Immediate Trip Criteria of AP/16 is exceeded would be correct in the case where either CC or Seal Injection were lost as long as both CC and Seal Injection were not lost simultaneously.

Answer B Discussion

Incorrect. Plausible since leaving the RCP's running unless Immediate Trip Criteria of AP/16 is exceeded would be correct in the case where either CC or Seal Injection were lost as long as both CC and Seal Injection were not lost simultaneously.

Answer C Discussion

Incorrect. This distracter is plausible since HP-21 does not automatically close on Unit 1.

Answer D Discussion

Correct. On Unit 2, the individual seal return valve will close when that pumps seal injection is < 4 gpm and CC flow is < 575 gpm. In this case, 2HP-31 is closed which means all pumps seal injection are < 4 gpm and CC-8 going closed will trip all running CC pumps therefore all individual seal return valves have closed. When all Unit 2 seal return valves close, 2HP-21 will close. One of the IMA's of AP/14 (Loss of HPI Normal Makeup and/or Seal Injection) is to trip the Rx and stop all RCP's if BOTH RCP seal injection and CC are lost.

Basis for meeting the KA

This question requires knowledge of how a loss of component cooling can result in a loss of RC Flow based on Malfunctions that impact RCP operation.

Basis for Hi Cog

Requires analyzing the impact of a valve failure and applying the analysis to actions directed by AP's.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
EAP-APG R9 2AP/14 1AP/14	

APE015/017 AK2.08 - Reactor Coolant Pump (RCP) Malfunctions

Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following: (CFR 41.7 / 45.7)

CCWS .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 4

4

B

APE022 AA2.01 - Loss of Reactor Coolant Makeup
Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup: (CFR 43.5/ 45.13)
Whether charging line leak exists .....

Given the following Unit 1 conditions:

Initial conditions:
- Reactor power = 100%

Current conditions:
- Pressurizer level = 195" decreasing
- LDST level = 78" decreasing

Which ONE of the following has occurred?

A. Line break downstream of 1HP-7

B. Line break downstream of 1HP-120

C. 1HP-14 has failed in the "bleed" position

D. Loss of Instrument Air and Auxiliary Instrument Air to 1HP-5

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2011B ONS SRO NRC Examination QUESTION 4

4

B

General Discussion

Answer A Discussion

Incorrect. This answer is plausible since a line break downstream of HP-7 would give many of the same indication as a line break downstream of HP-120 (Sump rates, RIA alarms, etc.). This break would result in a loss of makeup to the LDST and would therefore cause a decrease in LDST level. This answer is incorrect since 1HP-120 would still control Pzr level therefore it would remain unchanged.

Answer B Discussion

Correct. With a line break downstream of HP-120, makeup to the pressurizer would be lost and pressurizer level would decrease. HP-120 would see the decrease in Pzr level and try to provide additional makeup by opening further. As HP-120 opened further, LDST level would begin to decrease since the amount of water entering the LDST would be unaffected by the failure.

Answer C Discussion

Incorrect. Plausible since HP-14 failing in bleed would cause an overall loss of inventory and LDST level would be decreasing however 1HP-120 would still maintain Pzr level constant.

Answer D Discussion

Incorrect. Plausible since the candidate must determine that a loss of air supply to HP-5 will result in the valve failing closed and then determine that HP-5 failing closed would result in a decrease in the water being added to the LDST and would therefore result in a decrease in LDST level. HP-120 would still control Pzr level therefore Pzr level would remain unchanged. Changing one bullet in stem (Pzr level) could make this a correct answer.

Basis for meeting the KA

Requires diagnosing a line break downstream of the normal makeup valve.

Basis for Hi Cog

HI cog since the candidate must analyze various component failures to determine the impact on both LDST and Pzr levels.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
PNS-HPI R2,426	

APE022 AA2.01 - Loss of Reactor Coolant Makeup

Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup: (CFR 43.5/ 45.13)

Whether charging line leak exists .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 5

5

D

APE025 AK2.03 - Loss of Residual Heat Removal System (RHRS)
Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following: (CFR 41.7 / 45.7)
Service water or closed cooling water pumps .....

Given the following Unit 3 conditions:

- Reactor in MODE 5
- RCS heatup in progress
- LPI cooler outlet temperature = 162°F increasing
- 3A and 3B LPSW Pump operating
- 3C LPI Pump operating

Which ONE of the following will result in a complete Loss of Decay Heat Removal capability?

ASSUME NO OPERATOR ACTIONS

A. 3LP-11 (3A LPI Cooler Inlet) fails closed

B. 3LP-13 (3B LPI Cooler Inlet) fails closed

C. 3A LPSW Pump trips concurrent with a 3TC switchgear Lockout

D. 3A LPSW Pump trips concurrent with a 3TD switchgear Lockout

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2011B ONS SRO NRC Examination QUESTION 5

5

D

General Discussion

Answer A Discussion

Incorrect. Plausible since this would be a correct answer if asked regarding Unit 1 or Unit 2 while they are in the High Pressure Mode of LPI alignment. Additionally plausible since the High Pressure Mode is one of the LPI Modes that are available to be used during periods where RCS pressure is at the upper end of the range of pressures where LPI is available to be used for Decay Heat Removal.

Answer B Discussion

Incorrect. Plausible since this would be a correct answer if asked regarding Unit 1 or Unit 2 while they are in the Switchover Mode of LPI alignment. Additionally plausible since the Switchover Mode is one of the LPI Modes that are available to be used during periods where RCS pressure is at the upper end of the range of pressures where LPI is available to be used for Decay Heat Removal.

Answer C Discussion

incorrect. Plausible since the LPSW pumps are 4160V pumps. While the LPSW pumps follow the standard TC feeds the A pump and TD feeds the B pump standard, not all safety related pumps follow that standard. Two specific examples are the Motor Driven EFDW pumps where the A MDEFWP is fed from TD and the B MDEFWP is fed from TE. The Component Cooling pumps are also fed from the TD and TE power strings. Other components that do not follow the standard are RBCU's & HPSW Pumps. Since all pumps do not follow the TC-TD-TE standard it is plausible to believe that the 3B LPSWP is fed from 3TC (like the B HPSW Pump is fed from MFB1). Additionally, since it is plausible that the LPSW pumps do not follow the standard power supply arrangement it is also plausible that neither C nor D are correct since 3TE is still available to supply power to the B LPSW Pump (similar to the MDEFWP power supply arrangement).

Answer D Discussion

Correct. The 3B LPSW pump is fed from the 3TD switchgear. If the 3A pump trips and 3TD locks out there is no LPSW to provide cooling to the LPI coolers which results in a complete loss of DHR capability.

Basis for meeting the KA

Requires knowledge of the relationship between having LPSW pumps available as a heat sink for DHR and the ability to provide Decay Heat Removal with the LPI system.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

Obj. IC-ES R20
ES Power Supplies
U1 HP Mode drawing
U1 Switchover Mode drawing

Student References Provided

APE025 AK2.03 - Loss of Residual Heat Removal System (RHRS)
Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following: (CFR 41.7 / 45.7)
Service water or closed cooling water pumps .....

401-9 Comments:

Remarks/Status

B

2011B ONS SRO NRC Examination QUESTION 6

6

APE026 AA1.01 - Loss of Component Cooling Water (CCW)

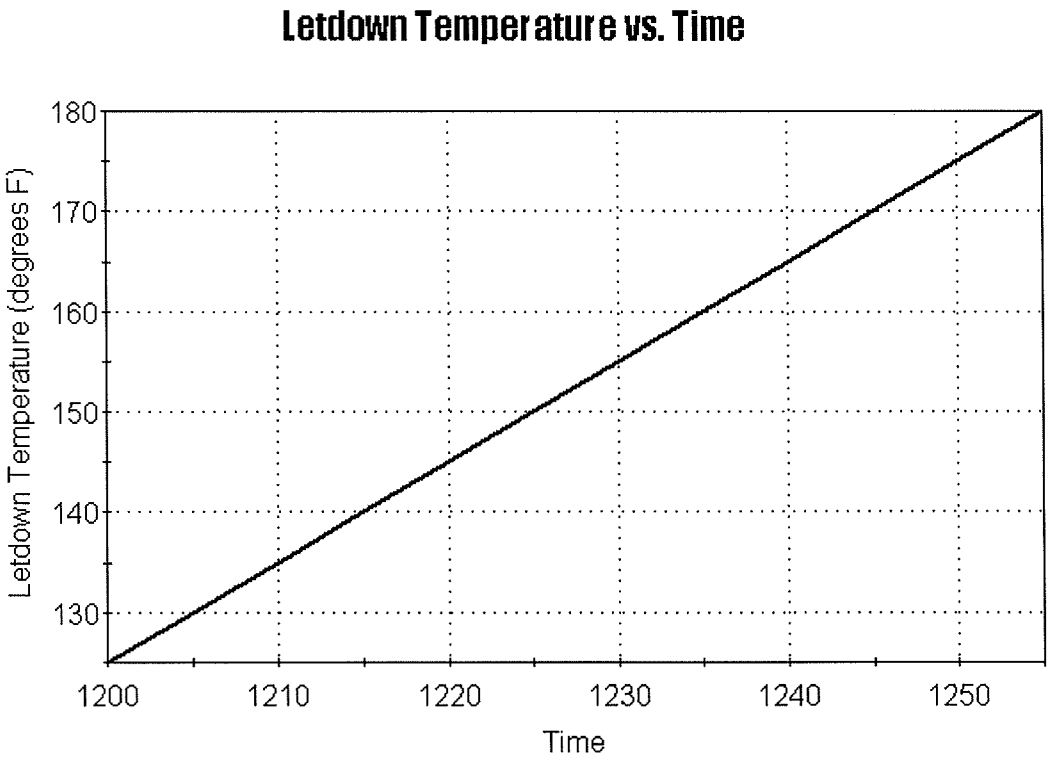
Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: (CFR 41.7 / 45.5 / 45.6)

CCW temperature indications .....

Given the following Unit 2 conditions:

- Reactor power = 100%
- LPSW to CC coolers is lost
- CP O2A0068 (CC Cooler Outlet Temp) = 145°F increasing
- Letdown temperature = 115°F increasing

Which ONE of the following is the EARLIEST time that AUTOMATIC isolation of letdown will occur?



A. 1205

B. 1210

C. 1215

D. 1220

2011B ONS SRO NRC Examination QUESTION 6

6

B

General Discussion

O2A0068 CC COOLER OUTLET TEMP 91 degrees F normal temperature at power

Answer A Discussion

Incorrect. Plausible since 130 degrees is the setpoint for the high letdown temperature statalarm.

Answer B Discussion

Correct. If the letdown temperature reaches 130°F a high temperature stat-alarm will sound and at 135°F the letdown isolation valve, HP-5, will be interlocked closed to protect the demineralizer resin.

Answer C Discussion

Incorrect. 140 degrees is plausible since it is the high temperature alarm setpoint for the OAC point monitoring CRD temps and CRD's are cooled by CC,

Answer D Discussion

Incorrect. Plausible since this is the maximum LDST temperature allowed by the limits and precautions of the HPI procedure.

Basis for meeting the KA

Discussed this KA with Chief Examiner. Determined it acceptable to ask about temperature indication of components/systems cooled by CC since we take no actions based on actual CC outlet temp. This question requires the ability to monitor automatic actions that occur as a result of a loss of CC and its impact on letdown temperature.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj PNS-HPI R5, R8 PNS-HPI	

APE026 AA1.01 - Loss of Component Cooling Water (CCW)

Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: (CFR 41.7 / 45.5 / 45.6)

CCW temperature indications .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 7

7

B

APE027 2.2.3 - Pressurizer Pressure Control System (PZR PCS) Malfunction
APE027 GENERIC
(multi-unit license) Knowledge of the design, procedural, and operational differences between units. (CFR: 41.5 / 41.6 / 41.7 / 41.10 / 45.12)

Given the following Unit 3 conditions:

- Reactor power = 100%
- 3RC-1 has failed OPEN
- 3RC-3 will NOT close

Which ONE of the following describes the Reactor Coolant Pump(s) that will be INITIALLY secured after the Reactor has been Manually tripped in accordance with AP/3/A/1700/044 (Abnormal Pressurizer Pressure Control)?

A. 3B1 ONLY

B. 3B1 AND 3B2

C. 3A1 ONLY

D. 3A1 AND 3A2

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2011B ONS SRO NRC Examination QUESTION 7 [7] B

General Discussion

Answer A Discussion

Incorrect. Plausible since on Unit 3 the Pzr spray line is located on the discharge of the 3B1 RCP and therefore securing this pump alone would significantly decrease the amount of Pzr spray through the failed open valves. Since the question asks which pumps will be "initially" secured it is plausible to believe that the AP would direct securing the spray pump only and then only securing other pumps if this were not sufficient. Additionally plausible due to the process used to choose what pump to leave running and why. It is common practice to always leave the spray pump running when possible. In that context, leaving both pumps on in the loop with Pzr spray is not considered (as a function of ensuring Pzr spray available) therefore it would be plausible to believe that you only need to secure the RCP in the loop with the Pzr spray tap.

Answer B Discussion

Correct. AP/44 directs tripping the Rx and securing both the 3B1 and the 3B2 RCP's if RCS pressure cannot be controlled using 3RC-1 and 3RC-3.

Answer C Discussion

Incorrect. Plausible since the Pzr spray line is located on the discharge of the 1A1 RCP on unit 1 therefore securing the 3A1 RCP only is plausible based on the misconception that the Pzr spray line is on the A loop on Unit 3 as well. Under that misconception, securing the 3A1 RCP would significantly reduce spray flow through the failed valves and therefore make this choice plausible. since the question asks which pumps will be "initially" secured it is plausible to believe that the AP would direct securing the spray pump only and then only securing other pumps if this were not sufficient. Additionally plausible due to the process used to choose what pump to leave running and why. It is common practice to always leave the spray pump running when possible. In that context, leaving both pumps on in the loop with Pzr spray is not considered (as a function of ensuring Pzr spray available) therefore it would be plausible to believe that you only need to secure the RCP in the loop with the Pzr spray tap.

Answer D Discussion

Incorrect. Plausible since this would be correct if the event occurred on Unit 1.

Basis for meeting the KA

Knowing the difference in Unit 1 vs. Unit 2&3 with regards to location of the Pzr spray line and differences in direction provided in AP/44 in relation to failed open spray valve and associated block valve meet the KA.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References
PNS-RCS R8 PNS-RCS 3AP/44 1AP/44

Student References Provided

APE027 2.2.3 - Pressurizer Pressure Control System (PZR PCS) Malfunction
APE027 GENERIC
(multi-unit license) Knowledge of the design, procedural, and operational differences between units. (CFR: 41.5 / 41.6 / 41.7 / 41.10 / 45.12)

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 8

8

C

EPE029 EA1.13 - Anticipated Transient Without Scram (ATWS)
Ability to operate and monitor the following as they apply to a ATWS: (CFR 41.7 / 45.5 / 45.6)
Manual trip of main turbine .....

Given the following Unit 1 conditions:

Initial conditions:
- Time = 1200:00
- Reactor power = 100%
- BOTH Main Feedwater pumps trip

Current conditions:
- Time = 1201:30
- Reactor power = 10% slowly decreasing
- SCM's = 0°F

Which ONE of the following describes actions required (if any) in accordance with Rule 1 (ATWS/UNPP), Rule 2 (Loss of SCM) AND the UNPP tab?

A. Trip RCP's and trip the Main Turbine

B. Trip RCP's but do NOT trip the Main Turbine

C. Do NOT trip RCP's but do trip the Main Turbine

D. Do NOT trip RCP's and do NOT trip the Main Turbine

2011B ONS SRO NRC Examination QUESTION 8

8

C

General Discussion

Answer A Discussion

Incorrect. Tripping the RCP's is plausible since SCM's are 0 and it has been less than 2 minutes. If Rx power were < 1%, Rule 2 would direct these actions. Tripping the Main Turbine is correct.

Answer B Discussion

Incorrect. Tripping the RCP's is plausible since SCM's are 0 and it has been less than 2 minutes. If Rx power were < 1%, Rule 2 would direct these actions. . Not Tripping the Turbine is plausible since it would be correct if Main FDW were operating.

Answer C Discussion

Correct. In accordance with Rule 2, RCP's are left on since power is > 1%. The UNPP tab will direct tripping the Main Turbine if Main FDW is lost.

Answer D Discussion

Incorrect. Not tripping the RCP's is correct however not Tripping the Turbine is incorrect but plausible since it would be correct if Main FDW were operating.

Basis for meeting the KA

Requires the ability to determine if the Main Turbine must be manually tripped during an ATWS.

Basis for Hi Cog

Requires analyzing plant conditions and applying mitigation strategy of procedures to the analysis.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

EAP-UNPP R5, R11
EAP-UNPP
Rule 1 & 2
UNPP tab

Student References Provided

EPE029 EA1.13 - Anticipated Transient Without Scram (ATWS)
Ability to operate and monitor the following as they apply to a ATWS: (CFR 41.7 / 45.5 / 45.6)
Manual trip of main turbine .....

401-9 Comments:

Remarks/Status

2011B ONS SRO NRC Examination QUESTION 9

9

A

BWE05 EK3.4 - Excessive Heat Transfer

Knowledge of the reasons for the following responses as they apply to the (Excessive Heat Transfer)

(CFR: 41.5 / 41.10, 45.6, 45.13)

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.

Given the following Unit 1 conditions:

- Reactor power = 100%
- 1A Main Steam Line Break occurs outside the Reactor Building

Which ONE of the following:

1) is the LOWER Pressurizer level that will allow HPI to be throttled in accordance with Rule 5 (Main Steam Line Break)?

2) describes the reason HPI must be throttled as soon as conditions allow?

A. 1. 24" increasing
   2. Pressurized Thermal Shock conditions may develop as a result of repressurization.

B. 1. 110" increasing
   2. Pressurized Thermal Shock conditions may develop as a result of repressurization.

C. 1. 24" increasing
   2. Terminate the cold BWST water being injected to prevent exceeding Tech Spec Cooldown rates

D. 1. 110" increasing
   2. Terminate the cold BWST water being injected to prevent exceeding Tech Spec Cooldown rates

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2011B ONS SRO NRC Examination QUESTION 9

9

A

General Discussion

Answer A Discussion

Correct. HPI is throttled when Pzr level is on scale and increasing. Throttling HPI is required to prevent PTS concerns from rapid pressure increases created as Pzr level rapidly increases towards being water solid.

Answer B Discussion

Incorrect. First part is plausible since it is > 100" and the other option is < 100". 100" is a common post trip pressurizer level. Controlling Pzr level > 100" is the level requirements established for this event per Rule 5 and it is therefore plausible to believe that the 100" threshold must be met prior to throttling HPI. Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is plausible for 3 reasons. 1) HPI cooling can be a significant cooling medium responsible for a major portion of RCS cooling when HPI injection is occurring during certain Small Break Loca scenarios therefore the misconception that HPI cooling could result in exceeding cooldown rates and is the bases for throttling during a MSLB is plausible. 2.) Since terminating the cooldown is a big concern during a MSLB, and cold water injection from the BWST does contribute some to the RCS cooling it is plausible to believe that the reason HPI must be throttled ASAP is due to the contribution to the cooldown being made by the HPI injection. 3) Following a MSLB, Rule 8 may require a 1 hour hold of RCS pressure and temperature. Since HPI does contribute to the cooldown, it is plausible to have the misconception that HPI must be trrottled to control cooldown rates since Rule 8 directs a 1 hour hold of PCS pressure and temperature.

Answer D Discussion

Incorrect. First part is plausible since it is > 100" and the other option is < 100". 100" is a common post trip pressurizer level. Controlling Pzr level > 100" is the level requirements established for this event per Rule 5 and it is therefore plausible to believe that the 100" threshold must be met prior to throttling HPI. Second part is plausible for 3 reasons. 1) HPI cooling can be a significant cooling medium responsible for a major portion of RCS cooling when HPI injection is occurring during certain Small Break Loca scenarios therefore the misconception that HPI cooling could result in exceeding cooldown rates and is the bases for throttling during a MSLB is plausible. 2.) Since terminating the cooldown is a big concern during a MSLB, and cold water injection from the BWST does contribute some to the RCS cooling it is plausible to believe that the reason HPI must be throttled ASAP is due to the contribution to the cooldown being made by the HPI injection. 3) Following a MSLB, Rule 8 may require a 1 hour hold of RCS pressure and temperature. Since HPI does contribute to the cooldown, it is plausible to have the misconception that HPI must be throttled to control cooldown rates since Rule 8 directs a 1 hour hold of PCS pressure and temperature.

Basis for meeting the KA

The question requires knowledge of the reason for actions performed by an RO during an EHT event that ensure adherence to procedures and limitations in the facility license.

Basis for Hi Cog

HI Cog since question requires an understanding of the reason behind actions taken during an EHT event.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj. EAP-EHT R2, R14 EAP-EHT	

BWE05 EK3.4 - Excessive Heat Transfer

Knowledge of the reasons for the following responses as they apply to the (Excessive Heat Transfer)

(CFR: 41.5 / 41.10, 45.6, 45.13)

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.

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 9

9

A

2011B ONS SRO NRC Examination QUESTION 10

10

A

APE054 AK3.04 - Loss of Main Feedwater (MFW)

Knowledge of the reasons for the following responses as they apply to the Loss of Main Feedwater (MFW): (CFR 41.5,41.10 / 45.6 / 45.13)

Actions contained in EOPs for loss of MFW .....

Given the following Unit 1 conditions:

- Reactor trip due to loss of Main Feedwater
- Emergency Feedwater is NOT available
- Condensate Booster Pump feed has been established
- RCS leak = 80 gpm slowly increasing

Which ONE of the following describes actions required and the reason for the actions in accordance with the LOHT tab:

A. Reduce running RCP's to <u>one pump per loop</u> to reduce heat input to RCS

B. Reduce running RCP's to <u>one pump per loop</u> to reduce inventory lost from the RCS leak

C. Reduce running RCP's to <u>one</u> to reduce heat input to RCS

D. Reduce running RCP's to <u>one</u> to reduce inventory lost from the RCS leak

---

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2011B ONS SRO NRC Examination QUESTION 10

10

A

General Discussion

Answer A Discussion

Correct. With CBP feed established, the LOHT tab will direct reducing number of running RCP's to one/loop while waiting on a source of feedwater. The reason is to reduce heat input to the RCS.

Answer B Discussion

Incorrect. The number of RCP's is correct. The reason is plausible since there is a large RCS leak present and one of the reason that RCP's are secured during a loss of SCM event is to reduce the inventory lost out of the break.

Answer C Discussion

Incorrect. Number of pumps is plausible since it would be correct if CBP feed were not available and HPI forced cooling had been established. The reason is correct even for going to one pump in HPI FC.

Answer D Discussion

Incorrect. Number of pumps is plausible since it would be correct if CBP feed were not available and HPI forced cooling had been established. The reason is plausible since there is a large RCS leak present and one of the reason that RCP's are secured during a loss of SCM event is to reduce the inventory lost out of the break.

Basis for meeting the KA

Requires knowledge of the reason reducing the number of RCP's to one/loop during a loss of heat transfer.

Basis for Hi Cog

Requires analysis of conditions to determine appropriate actions that need to be taken.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
EAP-LOHT R2 EAP-LOHT	

APE054 AK3.04 - Loss of Main Feedwater (MFW)

Knowledge of the reasons for the following responses as they apply to the Loss of Main Feedwater (MFW): (CFR 41.5,41.10 / 45.6 / 45.13)

Actions contained in EOPs for loss of MFW .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 11

11

B

EPE055 EA1.01 - Loss of Offsite and Onsite Power (Station Blackout)
Ability to operate and monitor the following as they apply to a Station Blackout: (CFR 41.7 / 45.5 / 45.6)
In-core thermocouple temperatures .....

Given the following Unit 1 conditions:

Initial conditions:

- Reactor power = 100%

Current conditions:

- Station Blackout (power has NOT been restored)
- RCS Temperatures 2 minutes after trip
  - Tc = 550°F
  - Th = 556°F
  - CETCs = 558°F
- SG Pressures = 1010 psig stable

Which ONE of the following describes the response of RCS temperature indications during the transition but prior to establishing natural circulation flow?

	RCS Tcold	CETCs
A.	Stable	Stable
B.	Stable	Increasing
C.	Decreasing	Stable
D.	Decreasing	Increasing

2011B ONS SRO NRC Examination QUESTION 11

11

B

General Discussion

Re-arranged answers

Answer A Discussion

Incorrect: Plausible in that Tc would be stable and CETC response could be correct if at low decay heat levels however this is a Rx trip from 100% therefore Decay heat would be high. Additionally, CETC's would be stable once Natural Circ had been established and stable.

Answer B Discussion

Correct: In the time period following the trip natural circulation conditions will be developing. Thot and CETC will be increasing with Tcold being held constant by SG pressures in order to build in an adequate thermal driving head to establish flow. After flow is established CETC & Thot will stabilize and eventually decrease as either decay heat level drops off or SG pressures are reduced

Answer C Discussion

Incorrect: Tcold is plausible based on assuming CETC's remain constant and Tc decreases tp establish the required delta T to ensure Natural Circulation flow occurs. CETC response could be correct if at low decay heat levels however this is a Rx trip from 100% therefore Decay heat would be high. Additionally, CETC's would be stable once Natural Circ had been established and stable.

Answer D Discussion

Incorrect: Prior to stable Natural Circulation being established it is plausible to believe that Tc decreases since there is no flow in the loops and CETC's increase as part of the process of establishing the Delta T required for Natural Circ flow.

Basis for meeting the KA

Requires the ability to determine the status of RCS heat removal based on the relationship between RCS Loop Temperatures and CETC temperature. The ability to monitor CETC for correct response requires the ability to predict the response of the CETCs during the blackout.

Basis for Hi Cog

Requires analyzing plant conditions to determine response of temperature indications while establishing natural circulation.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2009 NRC Q12

Development References	Student References Provided
Obj. TA-AM1 R3 TA-AM1	

EPE055 EA1.01 - Loss of Offsite and Onsite Power (Station Blackout)

Ability to operate and monitor the following as they apply to a Station Blackout: (CFR 41.7 / 45.5 / 45.6)

In-core thermocouple temperatures .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 12

12

C

APE056 AK1.03 - Loss of Offsite Power
Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: CFR 41.8 / 41.10 / 45.3)
Definition of subcooling: use of steam tables to determine it .....

Given the following Unit 2 conditions:

- Loss of Off Site power has occurred
- Main Feeder Busses have been re-energized from CT-4
- 2A and 2B MDEFWP's will NOT start
- RCS pressure = 1285 psig stable
- RCS temperature = 577°F stable

Which ONE of the following EOP tabs will be used to direct plant activities?

REFERENCE PROVIDED

A. Subsequent Actions

B. Blackout

C. LOSCM

D. LOHT

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2011B ONS SRO NRC Examination QUESTION 12

12

C

General Discussion

Answer A Discussion

Incorrect. Plausible since this would be the tab used to stabilize the plant if the RCS remained subcooled.

Answer B Discussion

Incorrect. Plausible since this would be correct if the MFB's were de-energized. It is plausible to believe that you could still be in the Blackout tab even with Main Feeder Buses energized since simply fixing the entry condition for a tab is not necessarily a transfer point out of the tab. As an example, if you entered the LOHT tab you would not transfer out of it once CBP feed were established even though a loss of heat transfer no longer exists.

Answer C Discussion

Correct. Using Attachment 5.18 provided as a reference, the RCS is in the "saturated conditions" area of the curve. With a loss of SCM, the entry conditions for LOSCM tab are met and a transfer to this tab would be appropriate.

Answer D Discussion

Incorrect. Plausible since there has been a loss of off site power which means both Main Feedwater pumps will have tripped. With the failure of both MDEFWP's it is plausible to believe that the LOHT tab would be appropriate.

Basis for meeting the KA

Received approval for the use of EOP Encl. 5.18 instead of steam tables with Chief Examiner. Question requires using Encl. 5.18 and plotting temperature vs. pressure to determine that you are in the Saturated Conditions section of the curve and therefore the operational implications of that would be to recognize that it meets the entry conditions for the LOSCM tab.

Basis for Hi Cog

Requires plotting points on a graph and analyzing the results.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
EAP-SAR R20, R21 EOP Encl. 5.18 EAP-SAR	EOP Encl. 5.18

APE056 AK1.03 - Loss of Offsite Power

Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: CFR 41.8 / 41.10 / 45.3)

Definition of subcooling: use of steam tables to determine it .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 13

13

A

APE057 2.4.46 - Loss of Vital AC Electrical Instrument Bus
APE057 GENERIC
Ability to verify that the alarms are consistent with the plant conditions. (CFR: 41.10 / 43.5 / 45.3 / 45.12)

Which ONE of the following represents the conditions of the statalarms on 1SA-1 for ES Actuation Logic channels one and two that will occur if the 1DIB inverter input breaker trips open?

A.

ES 1 TRIP
ES 2 TRIP

B.

ES 1 TRIP
ES 2 TRIP

C.

ES 1 TRIP
ES 2 TRIP

D.

ES 1 TRIP
ES 2 TRIP

2011B ONS SRO NRC Examination QUESTION 13

13

A

General Discussion

Answer A Discussion

Correct: If the Digital ES channels lose power, they fail in the untripped state. 1DIB feeds KVIB. Since there is no auto backup to the vital panelboards and since 1KVIB feeds the EVEN digital channels, a loss of power to the 1KVIB panelboard would not result in actuation of any of the digital ES channels.

Answer B Discussion

Incorrect: KVIA panelboard provides power to the odd digital ES channels and KVIB feeds power to the even ES digital channels therefore reversing which panelboard feeds which channels is an easy misconception. RPS channels trip when they lose power and ES channels fail untripped when they lose power therefore reversing which ones trip and which ones do not trip is also a plausible misconception.

Answer C Discussion

Incorrect. Plausible since KVIB panelboard (fed from 1DIB) feeds the even ES channels therefore this would be correct under the misconception that the digital ES channels actuate when they lose power (like the RPS channels do).

Answer D Discussion

Incorrect: That both ES 1 and 2 are affected is plausible since KVIA feeds one half of the ES digital channels and KVIB feeds the other half therefore it is plausible to have a misconception about which specific channels are fed from which panelboard. Specifically, since there are 4 ES functions (Lo RCS pressure, Lo Lo RCS, Hi RB Pressure and HI HI RB pressure) and there are 4 Vital panelboards feeding the ES channels it would be plausible to believe that a single panelboard feeds each ES function.Since RPS channels trip when they lose power, it is plausible to believe that the ES channels affected would trip.

Basis for meeting the KA

Requires the ability to interpret plant conditions based on a loss of a vital instrument panelboard and determine what alarms are consistent with those conditions.

Basis for Hi Cog

Requires the ability to analyze impact of loss of inverter to ES digital channel alarms.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj. IC-ES R5, R12	

APE057 2.4.46 - Loss of Vital AC Electrical Instrument Bus

APE057 GENERIC

Ability to verify that the alarms are consistent with the plant conditions. (CFR: 41.10 / 43.5 / 45.3 / 45.12)

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 14

14

A

APE058 AA2.02 - Loss of DC Power

Ability to determine and interpret the following as they apply to the Loss of DC Power: (CFR: 43.5 / 45.13)

125V dc bus voltage, low/critical low, alarm .....

Unit 1 initial conditions:

- Reactor power = 100%
- 1SA6/B2 INVERTER 1DID SYSTEM TROUBLE actuated

Current conditions:

- NEO reports:
  - 1SA13/A8 INVERTER 1DID INPUT VOLTAGE LOW actuated
  - Inverter 1DID output voltage low

Based on the above conditions, which ONE of the following describes:

1) the plant response to the indications above?

2) actions directed by 1SA13/A8 if the inverter output voltage remains low?

A. 1. 1D RPS channel trips
   2. Transfer power for 1KVID to Regulated Power Panel Board (1KRA)

B. 1. 1D RPS channel trips
   2. Transfer DC bus 1DID power to alternate unit (Unit 2 DCB)

C. 1. ICS Auto Power is lost
   2. Transfer power for 1KVID to Regulated Power Panel Board (1KRA)

D. 1. ICS Auto Power is lost
   2. Transfer DC bus 1DID power to alternate unit (Unit 2 DCB)

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2011B ONS SRO NRC Examination QUESTION 14

14

A

General Discussion

Re-arranged answers

Answer A Discussion

Correct: 1DID feeds KVID which supplies power to the 1D RPS channel. Loss of power to an RPS channel will result in the RPS channel tripping. There is no auto backup to the vital power panelboards therefore the ARG will direct transferring power to its backup source which is Regulated Power from 1KRA.

Answer B Discussion

Incorrect: First part is correct. Second part is plausible since 2DCB is the backup or alternate source for the 1DID inverter however it is an automatic backup via isolating diodes and would therefore automatically occur based on voltage from the normal source.

Answer C Discussion

Incorrect: First part is plausbile since it would be correct for a loss of the "Essential" KI inverter instead of the "Vital" 1DID inverter. Second part is correct.

Answer D Discussion

Incorrect: First part is plausbile since it would be correct for a loss of the "Essential" KI inverter instead of the "Vital" 1DID inverter. Second part is plausible since 2DCB is the backup or alternate source for the 1DID inverter however it is an automatic backup via isolating diodes and would therefore automatically occur based on voltage from the normal source.

Basis for meeting the KA

Requires the ability to interprete the consequences of low bus voltage statalarms that occur as a result of problems with Vital Inverters.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	NRC 2007 RO retest Q14

Development References	Student References Provided
Obj. EL-VPC R2, R5 EL-VPC	

APE058 AA2.02 - Loss of DC Power

Ability to determine and interpret the following as they apply to the Loss of DC Power: (CFR: 43.5 / 45.13)

125V dc bus voltage, low/critical low, alarm .....

401-9 Comments:	Remarks/Status

D

2011B ONS SRO NRC Examination QUESTION 15

15

APE062 AK3.03 - Loss of Nuclear Service Water

Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: (CFR 41.4, 41.8 / 45.7)

Guidance actions contained in EOP for Loss of nuclear service water ....

Given the following Unit 1 conditions:

- Turbine Building Flood tab initiated
- Main and Emergency Feedwater have been lost

Which ONE of the following describes:

1) how RCS decay heat will be removed in accordance with the TBF tab?

2) the reason for the guidance provided regarding how decay heat is removed?

A. 1. Using HPI Forced Cooling
   2. "Raw" lake water will damage the SG's

B. 1. Using HPI Forced Cooling
   2. SSF-ASW suction source is CCW and CCW will be isolated to stop the flooding

C. 1. Using SSF-ASW
   2. In anticipation of losing power source to HPI pumps

D. 1. Using SSF-ASW
   2. In anticipation of losing LPSW due to water in Turbine Building

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2011B ONS SRO NRC Examination QUESTION 15

15

D

General Discussion

Answer A Discussion

Incorrect. First part is plausible since it would be correct in all other conditions regarding loss of main and emergency feedwater. Second part is plausible since it is a valid reason for using HPI FC before SSF-ASW.

Answer B Discussion

Incorrect. First part is plausible since it would be correct in all other conditions regarding loss of main and emergency feedwater. Second part is plausible since CCW is the suction source for SSF-ASW and CCW is the most likely source of the flooding. There are actions taken to minimuze CCW water that can get to the Turbine Building since it is the most probable source of flooding however these action do not isolate the SSF-ASWP from its suction source in the CCW inlet piping.

Answer C Discussion

First part is correct. Second part is plausible since there is flooding occurring the turbine building therefore it is plausible to believe that there would be a concern over electrical shorts causing a loss of some or all electrical power sources located or connected to the turbine building. These faults could feed back to the 4160V swgr and lock it out.

Answer D Discussion

Correct. For this event, feeding SGs with raw water from SSF ASW or Station ASW is preferred over HPI forced cooling. HPI F/C is not preferred since once the BWST is depleted, water in the RBES is not expected to be available due to unavailability of LPSW for cooling. A plant cooldown will not be performed with Station ASW.

Basis for meeting the KA

Discussed this KA with Chief Examiner on 5/31/11. Agreed using the LPI coolers will satisfy intent of KA. Requires knowledge of reasons for guidance contained in the EOP that are a result of loss of LPSW.

Basis for Hi Cog

Requires knowledge of procedural guidance and the reasons behind the guidance.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj EAP-TBF R5, R6 EAP-TBF	

APE062 AK3.03 - Loss of Nuclear Service Water

Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: (CFR 41.4, 41.8 / 45.7)

Guidance actions contained in EOP for Loss of nuclear service water ....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 16

16

C

APE065 2.4.6 - Loss of Instrument Air
APE065 GENERIC
Knowledge of EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)

Given the following Unit 1 Conditions:

- Time = 1200
- Reactor power = 100%
- Instrument Air pressure = 87 psig slowly decreasing
- Aux IA pressure = 78 psig decreasing
- AP/1/A/1700/022 (Loss of Instrument Air) initiated

Which ONE of the following describes the actions required in accordance with AP/22 at Time = 1200?

A. Isolate RB Aux Coolers

B. Bypass HPI Demineralizers

C. Dispatch an operator to manually open 1CC-8

D. MANUALLY Trip the Reactor then trip BOTH Main FDW pumps

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2011B ONS SRO NRC Examination QUESTION 16

16

C

General Discussion

The IC's of this question represent a large leak on the AIA system such that AI is feeding AIA but is not quite able to maintain pressure. This could be due to mulitple leaks or problems with compressors feeding the IA system.

Answer A Discussion

Incorrect. Plausible since this would be correct if Instrument Air pressure were < 80 psig.

Answer B Discussion

Incorrect. Plausible since this would be correct if Instrument Air pressure were < 80 psig.

Answer C Discussion

Correct. Once Auxiliary Instrument Air goes below 80 psig, AP/22 directs dispatching an operator to manually open CC-8.

Answer D Discussion

Incorrect. Plausible since this is an action directed by AP/22 based on IA pressure however the pressure threshold for this actions is 65 psig.

Basis for meeting the KA

Requires knowledge of mitigation strategy used in AP/22 for decreasing IA pressure.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj EAP-APG R9 AP/22	

APE065 2.4.6 - Loss of Instrument Air
APE065 GENERIC
Knowledge of EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 17

17

A

APE077 AK1.02 - Generator Voltage and Electric Grid Disturbances

Knowledge of the operational implications of the following concepts as they apply to Generator Voltage and Electric Grid Disturbances: (CFR: 41.4, 41.5, 41.7, 41.10 / 45.8)

Over-excitation.....

Given the following Unit 1 conditions:

- Reactor power = 100%
- Generator output = 900 MWe stable
- Generator Hydrogen pressure = 60 psig stable
- MVARS oscillating between 200 MVARS and 300 MVARS due to Grid Disturbance
- AP/34 (Degraded Grid) in progress

Which ONE of the following describes the:

1) MAXIMUM MVARS allowed in accordance with AP/34 Encl. 5.1 (Generator Capability Curve)?

2) potential consequences of a grid disturbance that resulted in increasing MVARs above the limit?

REFERENCE PROVIDED

A. 1. approximately 470
   2. Excessive field heating

B. 1. approximately 470
   2. Excessive armature core end heating

C. 1. approximately 350
   2. Excessive field heating

D. 1. approximately 350
   2. Excessive armature core end heating

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2011B ONS SRO NRC Examination QUESTION 17

17

A

General Discussion

Answer A Discussion

Correct. Using the curve provided and conditions in the stem, 470 MVARS is the limit. This point on the curve is on the AB segment of the curve. The legend at the bottom of the curve explains that the AB segment is limited by field heating.

Answer B Discussion

Incorrect. First part is correct. Second part is plausible since it is one of the options for the limiting factor of the capacity curve and if the 470 MVAR number were platted on the leading PF side of the curve it would result in being outside of the CD segment of the curve which means that the Armature core end heating limit would be being exceeded.

Answer C Discussion

Incorrect. First part is plausible since it would be correct for a leading power factor. Second part is plausible since if would be correct if you mistakingly plotted 350 MW vs the 60 psig curve on the lagging PF side of the curve.

Answer D Discussion

Incorrect. Plausible since this is correct if plotted on the leading PF side of the curve.

Basis for meeting the KA

Requires knowledge of the operational implication of overexciting the T/G to the point the capability curve limits are exceeded. Additionally plausible since exceeding the MVAR limit on the lagging side of the curve is by definition over-exciting the generator.

Basis for Hi Cog

Requires using the T/G capability curve and understanding the consequences of exceeding limits.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj STG015 R26,27 STG015 AP/34 Cap Curve	OP 1106 01 Encl 4.5 Cap Curve

APE077 AK1.02 - Generator Voltage and Electric Grid Disturbances

Knowledge of the operational implications of the following concepts as they apply to Generator Voltage and Electric Grid Disturbances: (CFR: 41.4, 41.5, 41.7, 41.10 / 45.8)

Over-excitation.....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 18

18

A

BWE04 EK1.3 - Inadequate Heat Transfer
Knowledge of the operational implications of the following concepts as they apply to the (Inadequate Heat Transfer):
(CFR: 41.8 / 41.10 / 45.3)
Annunciators and conditions indicating signals, and remedial actions associated with the (Inadequate Heat Transfer)

Given the following Unit 1 conditions:

Initial conditions:
- Reactor power = 100%
- TDEFWP isolated for repair

Current conditions:
- BOTH Main Feedwater pumps trip
- 1A and 1B MDEFWP's fail
- 1SA2/D3 (RC Press High/Low) actuated

Assuming NO Feedwater is restored to the SG's (Main, Emergency, CBP) which ONE of the following describes:

1) the next method of decay heat removal directed by the EOP?

2) a criteria used to determine when the method of Decay Heat Removal above is required?

A. 1. Initiate HPI forced cooling
   2. RCS pressure = 2300 psig

B. 1. Initiate HPI forced cooling
   2. BOTH SG's = $\leq$ 15" SU level

C. 1. Feed SG's with SSF ASW
   2. RCS pressure = 2300 psig

D. 1. Feed SG's with SSF ASW
   2. BOTH SG's = $\leq$ 15" SU level

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2011B ONS SRO NRC Examination QUESTION 18

18

A

General Discussion

Answer A Discussion

Correct. HPI FC is used if NO main or emergency feedwater is available to feed the SG's and it is initiated at 2300 psig RCS pressure.

Answer B Discussion

Incorrect. First part is correct. Second part is plausible since 15" SG level is indicative of a "dry" SG and is therefore a logical place for proceeding to the next available source of decay heat removal. Additionally plausible since there is special considerations given for feeding dry SG's and 15" is the threshold value used during implementation of Rule 7 to determine acceptable feed rate. Additionally plausible since the concept of initiating HPI forced cooling is based on a loss of heat transfer and once there is no level in either SG, that is actually the point at which a loss of heat transfer occurs. Additionally plausible since some plants do use the condition of having dry SG's as the place where a transfer to the Loss of Heat transfer tab (or equivalent) should occur.

Answer C Discussion

Incorrect. First part is plausible since it would be correct if main and emergency feedwater were lost due to flooding of the Turbine Building. Second part is correct.

Answer D Discussion

Incorrect. First part is plausible since it would be correct if main and emergency feedwater were lost due to flooding of the Turbine Building. Second part is plausible since 15" SG level is indicative of a "dry" SG and is therefore a logical place for proceeding to the next available source of decay heat removal. Additionally plausible since there is special considerations given for feeding dry SG's and 15" is the threshold value used during implementation of Rule 7 to determine acceptable feed rate.. Additionally plausible since the concept of initiating HPI forced cooling is based on a loss of heat transfer and once there is no level in either SG, that is actually the point at which a loss of heat transfer occurs. Additionally plausible since some plants do use the condition of having dry SG's as the place where a transfer to the Loss of Heat transfer tab (or equivalent) should occur.

Basis for meeting the KA

Requires knowledge of the operational implications of a conditions indicating signal (RCS pressure) in the context of a complete loss of main and emergency feedwater.

Basis for Hi Cog

Requires analyzing plant conditions and determining the correct procedural guidance based on the analysis.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj. EAP-LOHT R1 EAP-LOHT	

BWE04 EK1.3 - Inadequate Heat Transfer

Knowledge of the operational implications of the following concepts as they apply to the (Inadequate Heat Transfer):
(CFR: 41.8 / 41.10 / 45.3)

Annunciators and conditions indicating signals, and remedial actions associated with the (Inadequate Heat Transfer)

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 19

19

C

APE001 2.4.45 - Continuous Rod Withdrawal
APE001 GENERIC
Ability to prioritize and interpret the significance of each annunciator or alarm. (CFR: 41.10 / 43.5 / 45.3 / 45.12)

Given the following Unit 1 conditions:

Initial conditions:
- Reactor power = 75%

Current conditions:
- 1SA2/A12 (ICS Tracking) in alarm
- Neutron error = -5% (full scale low)
- Reactor power = 80% increasing
- "BY REACTOR" load limit on CTPD station illuminated
- Feedwater flow increasing

Which ONE of the following describes the event in progress?

A. Tave failed low

B. Controlling NI failed low

C. Continuous Rod Withdrawal

D. Turbine Header Pressure failed high

2011B ONS SRO NRC Examination QUESTION 19

19

C

General Discussion

Answer A Discussion

Incorrect. Plausible since it is plausible that with Tave failed low, rods would be pulling to increase Tave resulting in an increase in Rx power however the Tave error would modify feedwater to decrease to correct the perceived low Tave.

Answer B Discussion

Incorrect. Plausible since these indications could be correct for a controlling NI failing high however if the controlling NI fails low the Diamond trips to hand therefore Feedwater would be decreasing as a result of the unit tracking NI power.

Answer C Discussion

Correct. As rods pull, Rx power increases which results in neutron error decreasing since core thermal power demand does not change. At -5% neutron error ICS goes to Track and Feedwater flow tracks Rx power to prevent a large mismatch which means that feedwater flow will also increase as power increases.

Answer D Discussion

Incorrect. Plausible since with THP failed high, Rx power will initially increase and Neutron error will be on the negative side however Rx power would turn and begin to decrase since FDW flow will begin to decrease and rods will begin to insert due to the modifications to their demands from THP error.

Basis for meeting the KA

Chief examiner said OK to diagnose a Continuous Rod Withdrawal from plant conditions including alarms. Question requires analyzing alarms and plant parameters to diagnose a continuous rod withdrawal.

Basis for Hi Cog

Requires analyzing plant conditions to diagnose a malfunction.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj ICS R24,25	

APE001 2.4.45 - Continuous Rod Withdrawal

APE001 GENERIC

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

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 20

20

B

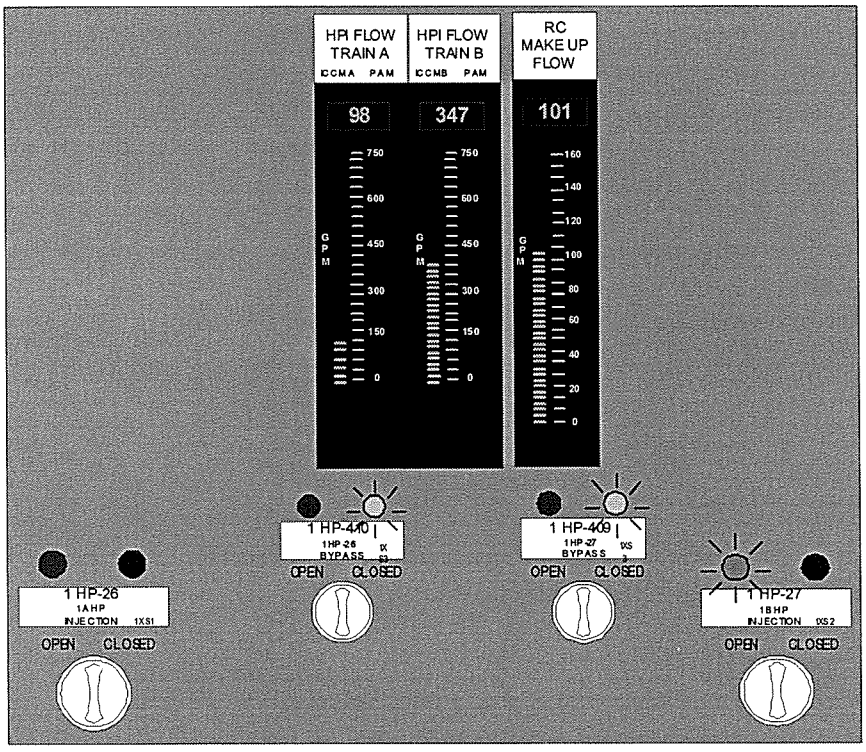
APE024 AA2.01 - Emergency Boration

Ability to determine and interpret the following as they apply to the Emergency Boration: (CFR: 43.5 / 45.13)

Whether boron flow and/or MOVs are malfunctioning, from plant conditions .....

Given the following Unit 1 conditions:

- Reactor power = 40% slowly decreasing
- Rule 1 (ATWS/UNPP) in progress
- 1HP-24 and 1HP-25 are OPEN
- 1A and 1C HPI pumps operating
- When 1HP-26 switch was rotated to the OPEN position, both of its position indicator lights went dark
- HPI flow and valve indications are as indicated below



Which ONE of the following actions is directed next by Rule 1?

A. Open 1HP-409

B. Open 1HP-410

C. Start the 1B HPI pump

D. Dispatch operator to open CRD Breakers

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2011B ONS SRO NRC Examination QUESTION 20

20

B

General Discussion

Answer A Discussion

Incorrect. Plausible since this would be correct if the candidate had backwards which trains HP-409/410 fed or if 1HP-27 was not open.

Answer B Discussion

Correct. Although the position indication for 1HP-26 indicates that the breaker or thermals may have tripped, HPI flow gage indicates that 1HP-26 is closed. OMP 1-2 requires using diverse indications to verify valve position. With RC Makeup flow approximately equal to Train flow, you can deduce that the HPI Train flow is because makeup flow is above the 60 gpm cutoff for HPI train flow gage and what you see on train flow is actually makeup flow and therefore 1HP-26 is actually closed requiring opening 1HP-410.

Answer C Discussion

Incorrect. Plausible since A Train flow is low and the B HPI pump feeds the A train. Starting the B pump would actually increase flow under conditions that HP-26 was open or partially open.

Answer D Discussion

Incorrect. Plausible since this would be correct if you determined that 1HP-26 was performing correctly which is plausible since there is some indication of flow in the A train.

Basis for meeting the KA

Requires using plant indications to determine that 1HP-26 has malfunctioned and is closed.

Basis for Hi Cog

Requires analyzing plant conditions to determine a malfunction using diverse indications.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj ADM-OMP R6 EAP-UNPP R8 ADM-OMP Rule 1 Attach.	

APE024 AA2.01 - Emergency Boration

Ability to determine and interpret the following as they apply to the Emergency Boration: (CFR: 43.5 / 45.13)

Whether boron flow and/or MOVs are malfunctioning, from plant conditions .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 21

21

A

APE033 AA1.03 - Loss of Intermediate Range Nuclear Instrumentation

Ability to operate and / or monitor the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: (CFR 41.7 / 45.5 / 45.6)

Manual restoration of power .....

Which ONE of the following would require MANUAL restoration of power if the normal power supply is lost?

A. Wide Range 1NI-3

B. Turbine Bypass Valves

C. Turbine Supervisory Instrumentation

D. Main Feedwater Pump Motor Gear Unit

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2011B ONS SRO NRC Examination QUESTION 21

21

A

General Discussion

Answer A Discussion

Correct. NI-3 is in the B RPS cabinet and is powered from KVIB. KVIB is powered from the DIB inverter and the panelboard has no auto backup power supply.

Answer B Discussion

Incorrect. Plausible sinceTBV's are powered from an AC panelboard that is fed directly from an inverter similar to NI-3 however it is powered from either KI or KU which are powered from essential inverters and have an auto backup from regulated power.

Answer C Discussion

Incorrect. Plausible since TSI equipment is powered from one of the essential panelboards (KI/KU/KX panelboards). The essential panelboards are backed up from Regulated power however it is an auto swap and does not require manual alignment. Plausibility comes from a misconception that TSI is powered from a vital panelboard OR from the misconception that the essential panelboards have no automatic backup. TSI is powered from the KX panelboard.

Answer D Discussion

Incorrect. Plausible sinceMGU's are powered from an AC panelboard that is fed directly from an inverter similar to NI-3 however it is powered from either KI which is powered from an essential inverter and has an auto backup from regulated power.

Basis for meeting the KA

Discussed with chief examiner who agreed a power supply question could be used to meet intent of new KA. Question requires knowledge of the power supply to the Wide Range NIs.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj Digiatl RPS R18 EL-VPC R7 Digital RPS EL-VPC	

APE033 AA1.03 - Loss of Intermediate Range Nuclear Instrumentation

Ability to operate and / or monitor the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: (CFR 41.7 / 45.5 / 45.6)

Manual restoration of power .....

401-9 Comments:	Remarks/Status

C

2011B ONS SRO NRC Examination QUESTION 22

22

APE036 AK2.01 - Fuel Handling Incidents
Knowledge of the interrelations between the Fuel Handling Incidents and the following: (CFR 41.7 / 45.7)
Fuel handling equipment .....

Unit 1 initial conditions:

- Reactor in MODE 6
- Core reload in progress

Current conditions:

- Fuel Transfer Canal level decreasing
- East fuel carriage is positioned in the RB and contains a spent fuel assembly in the upender
- West fuel carriage is in the SFP and empty
- Reactor Building Main Fuel Bridge in transit to the East Upender to retrieve the Fuel Assembly
- Section 4D (Fuel Transfer Canal Flooded) of AP/26 (Loss of Decay Heat Removal) initiated

Based on the conditions above, which ONE of the following describes the first action(s) required to be taken in accordance with Section 4D (Fuel Transfer Canal Flooded)?

A. Retrieve assembly from the East Upender with the Main Fuel Bridge then position the East carriage in the Spent Fuel Pool

B. Verify SF system aligned for refueling cooling mode and stop 2B SF cooling pump

C. Immediately position the East carriage in the Spent Fuel Pool

D. Close 1SF-1 and 1SF-2 (East/West Transfer Tube Isolations)

2011B ONS SRO NRC Examination QUESTION 22

22

C

General Discussion

Re-arranged answers

Answer A Discussion

Incorrect. Plausible since it would be a reasonable misconception to believe that one of the upenders was designed to move assemblies from the RB and to the SFP and the other moves assemblies from the SFP to the RB. Under that misconception it would be required to retrieve the assembly in the upender prior to moving the carriage to the SFP. Additionally, the candidate may determine the assembly needs to be placed in its designated core location (one of the options listed in the AP if the assembly is in transient).

Answer B Discussion

Incorrect: Plausible since these actions are directed by the AP and must be done prior to closing SF-1&2 however they are not done prior to positioning carriages in the SFP..

Answer C Discussion

Correct: Since there is no fuel assembly in transient the first actions directed would be to position both fuel carriages in the SFP in preparation for closing 1SF-1 & 2.

Answer D Discussion

Incorrect: Plausible because these actions will be taken later to isolate the SFP and RB however both carriages must be placed in the SFP prior to closing SF-1/2.

Basis for meeting the KA

Requires knowledge of the relationship between a fuel handling incident resulting in a decreasing fuel transfer canal water level and its impact on the operation of fuel handling equipment (Upenders and Fuel Carriage).

Basis for Hi Cog

Requires analyzing plant conditions and equipment status to determine a correct course of action.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	NRC 2009A Q20

Development References

Obj. EAP=APG R9, FH-FHS R7
2009A NRC Q20
AP/26 (Not Available Electronically)

Student References Provided

APE036 AK2.01 - Fuel Handling Incidents
Knowledge of the interrelations between the Fuel Handling Incidents and the following: (CFR 41.7 / 45.7)
Fuel handling equipment .....

401-9 Comments:

Remarks/Status

2011B ONS SRO NRC Examination QUESTION 23

23

D

APE061 AA2.04 - Area Radiation Monitoring (ARM) System Alarms

Ability to determine and interpret the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: (CFR: 43.5 / 45.13)

Whether an alarm channel is functioning properly .....

Which ONE of the following describes ALL automatic actions that will occur as a result of a HIGH alarm on 1RIA-4 (Reactor Building Hatch Monitor)?

A. Statalarm ONLY

B. Statalarm AND a Local Alarm ONLY

C. Statalarm AND the RB Evacuation alarm ONLY

D. Statalarm, Local Alarm, AND the RB Evacuation alarm

2011B ONS SRO NRC Examination QUESTION 23

23

D

General Discussion

Answer A Discussion

Incorrect. The H IGH alarm will actuate a Statalarm but will also result in a local alarm and the RB Evacuation alarm.

Answer B Discussion

Incorrect. The H IGH alarm will actuate a Statalarm and a local alarm but will also result in the RB Evacuation alarm.

Answer C Discussion

Incorrect. The H IGH alarm will actuate a Statalarm and the RB Evacuation alarm but will also actuate a local alarm.

Answer D Discussion

Correct, the HIGH alarm will result in a statalarm, a local audible horn will sound, and the RB evacuation alarm will be activated.

Basis for meeting the KA

Requires the ability to interpret the response of RIA-4 to determine if the alarm channel is functioning properly (i.e. does the monitor actuate the RB evacuation alarm and since it does, is it actuated by the ALERT alarm or the HIGH alarm).

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj RAD-RIA R2 RAD-RIA	

APE061 AA2.04 - Area Radiation Monitoring (ARM) System Alarms

Ability to determine and interpret the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: (CFR: 43.5 / 45.13)

Whether an alarm channel is functioning properly .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 24

24

A

APE067 AK3.04 - Plant Fire On Site

Knowledge of the reasons for the following responses as they apply to the Plant Fire on Site: (CFR 41.5,41.10 / 45.6 / 45.13)

Actions contained in EOP for plant fire on site .....

Given the following Unit 1 conditions:

- Fire in the turbine building
- Reactor has been manually tripped
- All Main and Emergency feedwater has been rendered NOT available
- SSF-ASW aligned per AP/0/A/1700/025 (SSF Operating Procedure)

Which ONE of the following:

1) states the MAXIMUM RCS pressure (psig) maintained in accordance with AP/25?

2) describes the reason for the maximum RCS pressure?

A. 1. 2250
   2. Minimize RCS inventory loss via the PORV and Code relief valves

B. 1. 2250
   2. Maximize Delta P across RCP seals to increase RCMUP seal injection

C. 1. 2450
   2. Minimize RCS inventory loss via the PORV and Code relief valves

D. 1. 2450
   2. Maximize Delta P across RCP seals to increase RCMUP seal injection

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2011B ONS SRO NRC Examination QUESTION 24

24

A

General Discussion

Per Chief Examiner, AOP actions accepted.

Answer A Discussion

Correct.

If RCS pressure is not ≤ 2250 psig within 20 minutes, RCS inventory loss from the PORV/Codes (due to high pressure and lack of heat transfer) could create enough voiding to inhibit natural circulation, once the RCS is cooled to ≈ 555°F (TC).

Answer B Discussion

Incorrect. First part is correct. Second part is plausible since there is a specific concern related to RCP seals and the RCMUP as described below:

RCS pressure is decreased below 2250 psig to ensure that the pressurizer code safety valves do not lift and to ensure that RCS pressure is below the pressure where the RCMU Pump discharge relief valve could weep or leak flow. RCS pressure must be decreased < 2250 psig to ensure that RCMU flow is not diverted from the RC pump seals.

Answer C Discussion

Incorrect. First part is plausible since 2450 psig is the actuation setpoint of the PORV. Second part is correct.

Answer D Discussion

Incorrect. First part is plausible since 2450 psig is the actuation setpoint of the PORV. Second part is plausible since there is a specific concern related to RCP seals and the RCMUP as described below:

RCS pressure is decreased below 2250 psig to ensure that the pressurizer code safety valves do not lift and to ensure that RCS pressure is below the pressure where the RCMU Pump discharge relief valve could weep or leak flow. RCS pressure must be decreased < 2250 psig to ensure that RCMU flow is not diverted from the RC pump seals.

Basis for meeting the KA

Per Chief Examiner, AOP actions accepted. Requires knowledge of the reason that RCS pressure is reduced to < 2250 when using SSF-ASW via AP/25 following a plant fire.

Basis for Hi Cog

Requires knowlede of the reason for actions directed by a procedure,

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj. EAP-SSF R29 EAP-SSF AP/25	

APE067 AK3.04 - Plant Fire On Site

Knowledge of the reasons for the following responses as they apply to the Plant Fire on Site: (CFR 41.5,41.10 / 45.6 / 45.13)

Actions contained in EOP for plant fire on site .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 25

25

B

BWA04 AK2.1 - Turbine Trip
Knowledge of the interrelations between the (Turbine Trip) and the following:
(CFR: 41.7 / 45.7)
Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

Given the following Unit 1 conditions:

- Reactor power = 100%

Which ONE of the following is an AUTOMATIC trip of the Main Turbine?

A. Condenser vacuum = 22 inches Hg

B. AMSAC actuation

C. Turbine Oil Fire

D. AFIS actuation

2011B ONS SRO NRC Examination QUESTION 25

25

B

General Discussion

Answer A Discussion

Incorrect. Plausible since there is a low vacuum trip of the main turbine and 22 in HG is the point at which AP/27 (loss of condenser vacuum) requires a manual trip of the Main Turbine.

Answer B Discussion

Correct. AMSAC will trip the Main Turbine and start all operable EFWPs
need both channels of AMSAC/DSS to be enabled (2/2 logic) AND:
either
Both MFPs have low hydraulic oil pressure (<75 psig)
□Or
Both MFPs have low discharge pressure (<770 psig)

Answer C Discussion

Incorrect. Plausible since a Turbine Oil Fire is listed in the lesson plan as a turbine trip. There is a special trip mechanism that is activated during a Turbine Oil Fire that will trip the turbine and shutdown the Oil Pumps. Since it is a unique design, it is plausible to believe that it would be an automatic trip however the Turbine Oil Fire trip must be manually activated.

Answer D Discussion

Incorrect. Plausible since AFIS is a system that is easily confused with AMSAC. AFIS does directly impact both Main and Emergency feedwater however it actuates from SG pressure and not Main Feedwater pump discharge pressure. The similarities in the systems impacted as well as the acronym make it plausible to confuse AFIS and AMSAC responses.

Basis for meeting the KA

Requires knowledge of the interrelation between a safety system (AMSAC) and a Main Turbine trip.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj STG-EHC R23,10 STG-EHC	

BWA04 AK2.1 - Turbine Trip
Knowledge of the interrelations between the (Turbine Trip) and the following:
(CFR: 41.7 / 45.7)
Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 26

26

A

BWA07 AK1.2 - Flooding
Knowledge of the operational implications of the following concepts as
Normal, abnormal and emergency operating procedures associated with (Flooding).

Given the following Unit 1 condition:

- Reactor power = 100%
- Large CCW leak occurs in Turbine Building Basement

Which ONE of the following states the MAXIMUM Steam Generator level to be achieved in accordance with the Turbine Building Flood tab?

A. 95% O.R.

B. 50% O.R.

C. 240" XSUR

D. 285" XSUR

2011B ONS SRO NRC Examination QUESTION 26

26

A

General Discussion

Answer A Discussion

Correct. TBF tab directs increasing level to 95% OR at max allowable rate and specifies that this guidance supersedes Rule 7 Table 4 guidance.

Answer B Discussion

Incorrect. Plausible since 50% OR is the level directed to be maintained when establishing Natural Circulation using Main Feedwater. Additionally plausible since the IC's do not indicate a loss of main Feedwater.

Answer C Discussion

Incorrect. Plausible since240" XSUR is the level used for Natural Circulation when on EFDW. Additionally plausible since the TBF tab takes actions based on the probability of losing pumps located in the TBB due to flooding.

Answer D Discussion

Incorrect. Plausible since 285" XSUR is a threshold SG level used in the EOP to determine a course of action however it is the level at which SG blowdown is aligned during a SGTR.

Basis for meeting the KA

Requires knowledge of the SG level requirements directed by the EOP associated with a Turbine Building Flood event. This matches the "operational implications" portion of the KA since the level must be achieved by manually controlling the feedwater valves during the SG level increase to 95%.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj. EAP-TBF R4 EAP-TBF	

BWA07 AK1.2 - Flooding
Knowledge of the operational implications of the following concepts as
Normal, abnormal and emergency operating procedures associated with (Flooding).

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 27

27

C

BWE08 EK1.1 - LOCA Cooldown
Knowledge of the operational implications of the following concepts as they apply to the (LOCA Cooldown)
(CFR: 41.8 / 41.10 / 45.3)
Components, capacity, and function of emergency systems.

Which ONE of the following is the most complete list of Unit 3 conditions that ALL require 3LP-3 to be OPEN?

A. Normal LPI Decay Heat Removal

B. Normal LPI Decay Heat Removal
Post LOCA Boron Dilute flowpath aligned per the LOCA CD tab

C. Normal LPI Decay Heat Removal
Alternate Post LOCA Boron Dilute flowpath aligned per the LOCA CD tab

D. Normal LPI Decay Heat Removal
Post LOCA Boron Dilute flowpath aligned per the LOCA CD tab
Alternate Post LOCA Boron Dilute flowpath aligned per the LOCA CD tab

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2011B ONS SRO NRC Examination QUESTION 27

27

C

General Discussion

Answer A Discussion

Incorrect. Plausible since this would be correct for Unit 1,

Answer B Discussion

Incorrect. Plausible since the first part is correct and the second part would be correct concerning the Alternate path but not the normal flowpath.

Answer C Discussion

Correct, 3LP-3 is in the DHR drop line and is required to be open for DHR alignment as well as for the alternate post loca boron dilution flowpath.

Answer D Discussion

Incorrect. Plausible since 2 of the 3 conditions are correct and it is plausible to believe that both the normal and alternate boron dilution flowpaths need 3LP-3 to be opened since both flowpaths (normal and alternate) originate from the DHR drop line.

Basis for meeting the KA

Requires knowledge of the functions of components necessary to align the Alternate Post Loca Boron Dilution flowpath (used only in emergency) per the LOCA CD tab of the EOP.

Basis for Hi Cog

Requires analyzing system alignments and comparing the alignments to identify common components.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj PNS-LPI R27 PNS-LPI Boron Dilution Flowpath drawings	

BWE08 EK1.1 - LOCA Cooldown

Knowledge of the operational implications of the following concepts as they apply to the (LOCA Cooldown)
(CFR: 41.8 / 41.10 / 45.3)

Components, capacity, and function of emergency systems.

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 28

28

A

SYS003 K3.03 - Reactor Coolant Pump System (RCPS)
Knowledge of the effect that a loss or malfunction of the RCPS will have on the following: (CFR: 41.7 / 45.6)
Feedwater and emergency feedwater .....

Given the following Unit 3 conditions:

Initial conditions:

- 3A & 3B Main FDW pumps tripped
- ALL EFDWPs have started with 200 gpm EFW flow to each SG
- 3FDW-315 & 316 (3A and 3B OTSG EFW Flow Control Valves) in MANUAL
- 3A and 3B SG levels = 38" XSUR and stable
- Unit 3 auxiliaries being provided by CT-5

Current conditions:

- 3FDW-315 & 316 are placed in Automatic

Which ONE of the following describes the response of 3FDW-315 & 316?

A. Travel open to increases SG levels to 240" XSUR.

B. Travel open to increases SG levels to 50% on Operating level.

C. Travel closed to decrease SG level to 30" on XSUR.

D. Travel closed to decrease SG level to 25" on SU level.

2011B ONS SRO NRC Examination QUESTION 28

28

A

General Discussion

Answer A Discussion

Correct:. With RCP's off the and the valves in automatic - setpoint is 240" XSUR. Since level is below that setpoint the valves will open to increase level to 240".

Answer B Discussion

Incorrect:. Plausible since it would be correct if on Main FDW.

Answer C Discussion

Incorrect: Plausible since it would be correct if a RCP were operating however with CT-5 supplying auxiliaries, TA and TB are de-energized therefore no RCP's are operating.

Answer D Discussion

Incorrect: Plausible since it would be correct if a RCP were operating and main feedwater were still available however with CT-5 supplying auxiliaries, TA and TB are de-energized therefore no RCP's are operating.

Basis for meeting the KA

Requires knowledge of how a loss of RCP's affects FDW-315 and 316 when Emergency FDW is supplying the SG's.

Basis for Hi Cog

Requires analyzing plant conditions to determine the setpoint that will be used for SG level control.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	CF023709

Development References	Student References Provided
Obj CF-EF R37 CF-EF	

SYS003 K3.03 - Reactor Coolant Pump System (RCPS)

Knowledge of the effect that a loss or malfunction of the RCPS will have on the following: (CFR: 41.7 / 45.6)

Feedwater and emergency feedwater .....

401-9 Comments:	Remarks/Status

C

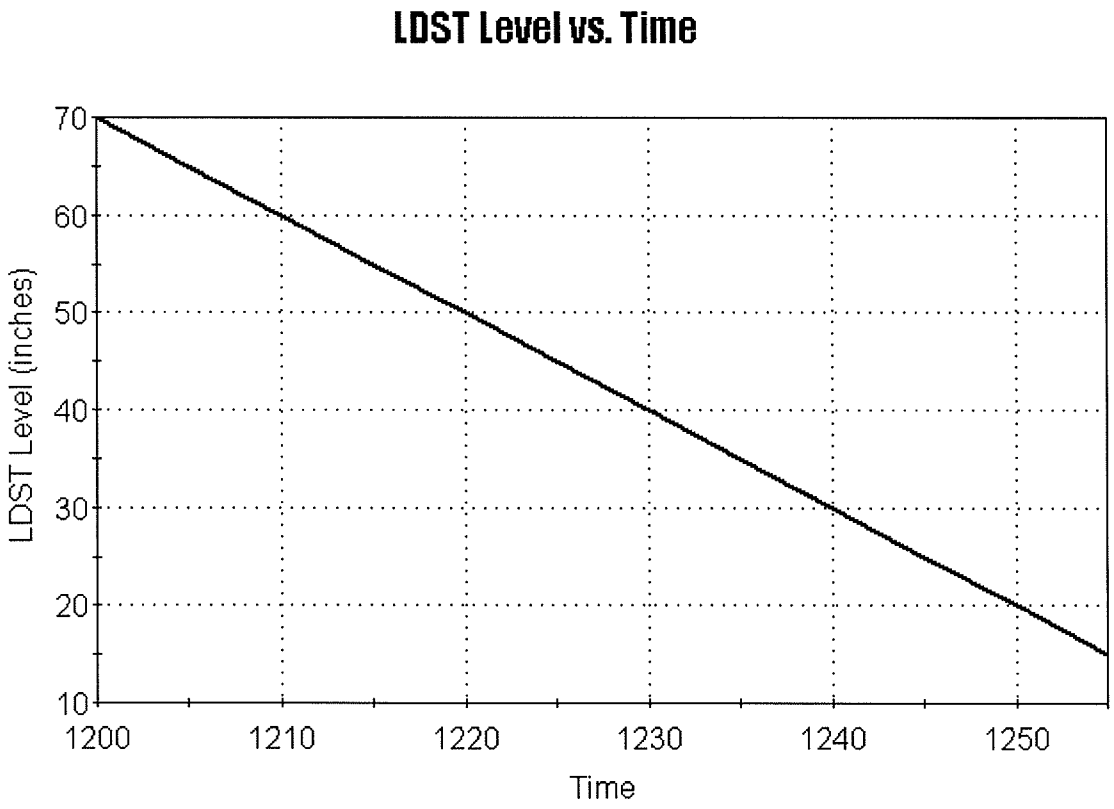
2011B ONS SRO NRC Examination QUESTION 29

29

SYS004 A3.01 - Chemical and Volume Control System
Ability to monitor automatic operation of the CVCS, including: (CFR: 41.7 / 45.5)
Water and boron inventory .....

Given the following Unit 1 conditions:

- LDST level trend is as described below



Which ONE of the following states the EARLIEST time that 1HP-24 and 1HP-25 will automatically open?

A. 1210

B. 1215

C. 1230

D. 1255

2011B ONS SRO NRC Examination QUESTION 29

29

C

General Discussion

Answer A Discussion

Incorrect. Plausible since this time represents 60" LDST level which is the lo level alarm point.

Answer B Discussion

Incorrect. Plausible since this time represents 55" LDST level which is the lo-lo level alarm point.

Answer C Discussion

Correct. At 40" in LDST level, HP-24 & 25 will open to ensure adequate suction to the HPI pumps.

Answer D Discussion

Incorrect. Plausible since this time represents 15" in the LDST. If 18" were assumed to be the setpoint for the interlock then this would be the correct answer. 18" is plausible since it is the lo level alarm point for the CC surge tank. It is plausible to confuse the CC surge tank and the LDST level setpoints.

Basis for meeting the KA

Requires the ability to monitor the automatic swap of the HPI pump suction from its normal source of the LDST to the Borated Water Storage Tank based on available water inventory.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj PNS-HPI R8 PNS-HPI	

SYS004 A3.01 - Chemical and Volume Control System

Ability to monitor automatic operation of the CVCS, including: (CFR: 41.7 / 45.5)

Water and boron inventory .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 30

30

A

SYS004 A4.04 - Chemical and Volume Control System
Ability to manually operate and/or monitor in the control room: (CFR: 41/7 / 45.5 to 45.8)
Calculation of boron concentration changes .....

Given the following Unit 1 conditions:

- Reactor power = 100%
- RCS = 625 ppmb
- 1A BHUT = 975 ppmb
- 1B BHUT = <10 ppmb
- LDST level = 75" stable

Which ONE of the following describes the water addition required (gallons) to raise LDST level to 90" and maintain RCS boron concentration approximately 625 ppmb?

A. 1A BHUT = 298
1B BHUT = 167

B. 1A BHUT = 231
1B BHUT = 129

C. 1A BHUT = 167
1B BHUT = 298

D. 1A BHUT = 129
1B BHUT = 231

2011B ONS SRO NRC Examination QUESTION 30

30

A

General Discussion

A and B represent answers calculated using the hot and cold volumes. Answers C and D use a common math error using each volume. Since the approximate volume of water required to change RCS boron concentration does not have a thumb rule or other obvious methods that allow an operator to estimate the amount of water needed, the fact that A/B and C/D are significantly different volumes does not make C/D not plausible since there is no way to determine an approximate volume other than performing the correct calculation.

Answer A Discussion

Correct

C1V1 + C2V2 = CfVf
C1 = 975 ppmb
V1 = X
C2 = 0 ppmb
V2 = Vf - V1
Cf = 625 ppmb
Vf = 31 gal/in X 15 inches = 465 gal.

975X = 625(465)

V1 = 298 gal
V2 = 465 - 298 = 167 gal

Answer B Discussion

Incorrect. Plausible since this number uses the gal/in of the Pressurizer (24 gal/in) instead of the gal/in of the LDST (31 gal/in) to calculate the volume of water needed to increase LDST level to 90 inches.

Answer C Discussion

Incorrect. Plausible since this number reverses A BHUT and B BHUT requirments

Answer D Discussion

Incorrect. Plausible since this number reverses A BHUT and B BHUT requirments while using the Pzr gal/in to calculate the needed volume.

Basis for meeting the KA

Requires the ability to calculate a batch addition to the LDST

Basis for Hi Cog

Requires performing algebraic calculations

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj OP-CP016 R1 OP-CP016	

SYS004 A4.04 - Chemical and Volume Control System
Ability to manually operate and/or monitor in the control room: (CFR: 41/7 / 45.5 to 45.8)
Calculation of boron concentration changes .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 31

31

A

SYS005 2.4.9 - Residual Heat Removal System (RHRS)
SYS005 GENERIC
Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.
(CFR: 41.10 / 43.5 / 45.13)

Given the following Unit 1 conditions:

Initial conditions:
- Time = 1200
- Reactor in MODE 5
- Loops are full
- Pzr level = 200" stable
- HPI in operation
- RC Makeup flow = 22 gpm
- LPI aligned in High Pressure Mode

Current conditions:
- Time = 1205
- RC Makeup flow = 80 gpm increasing
- Pzr level 140" decreasing

Which ONE of the following describes the:

1) Abnormal Procedure that will be entered FIRST?

2) actions required at Time = 1205 by the Abnormal Procedure that was entered first?

A. 1. AP/2 (Excessive RCS Leakage)
   2. Initiate EOP Enclosure 5.5 (Pzr and LDST Level Control)

B. 1. AP/2
   2. Close 1HP-5

C. 1. AP/26 (Loss of Decay Heat Removal)
   2. Stop ALL LPI Pumps and close either 1LP-1 or 1LP-2

D. 1. AP/26
   2. Start all available HPI pumps AND remove White Tags then open 1HP-409 and 1HP-410

2011B ONS SRO NRC Examination QUESTION 31

31

A

General Discussion

Answer A Discussion

Correct. Entry conditions for AP/2 are met. For these conditions, AP/26 is entered when directed by AP/2. Prior to AP/2 directing to Go To AP/26, direction is given to initiate Encl. 5.5.

Answer B Discussion

Incorrect. First part is correct. Second part is plausible since it would be correct if the leak were > 100 gpm per IMA of AP/2.

Answer C Discussion

Incorrect. First part is plausible since AP/26 is entered and provides strategy for leak identification and isolation as well has strategy for LPI system manipulations. It has specific sections for loss of RCS inventory in this conditions which adds to plausibility. Second part is plausible since it is the actions taken if "all available" HPI cannot maintain Pzr level.

Answer D Discussion

Incorrect. First part is plausible since AP/26 is entered and provides strategy for leak identification and isolation as well has strategy for LPI system manipulations. It has specific sections for loss of RCS inventory in this conditions which adds to plausibility. Second part is plausible since there is a NOTE in IMA's that defines all available HPI as using HP-409 and 410. The Note is actually a precursor to an IAAT for stopping LPI pumps

Basis for meeting the KA

Requires knowledge of actions required when shutdown and on DHR to mitigate a loss of coolant event.

Basis for Hi Cog

Requires analyzing plant conditions and applying that analysis to procedural guidance for the event.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj. EAP-APG R9 AP/26 IMA's AP/2	

SYS005 2.4.9 - Residual Heat Removal System (RHRS)

SYS005 GENERIC

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

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 32

32

B

SYS006 A3.06 - Emergency Core Cooling System (ECCS)
Ability to monitor automatic operation of the ECCS, including: (CFR: 41.7 / 45.5)
Valve lineups .....

Given the following Unit 1 conditions:

Initial conditions:
- Time = 1200
- Reactor power = 20% stable
- SBLOCA occurs

Current conditions:
- Time = 1210
- RCS pressure = 410 psig slowly decreasing
- RB pressure = 2.7 psig slowly increasing

Which ONE of the following contains ONLY valves that received an Engineered Safeguards signal to OPEN at Time = 1210?

A. 1HP-24 AND 1HP-5

B. 1HP-24 AND 1LP-17

C. 1LP-18 AND 1BS-1

D. 1LP-18 AND 1LPSW-15

2011B ONS SRO NRC Examination QUESTION 32

32

B

General Discussion

Answer A Discussion

Incorrect. While both components are on ES-1&2, HP-5 gets a signal to Close for containement isolation.

Answer B Discussion

Correct. With RCS pressure below 550 psig ES 1-4 have actuated. Since RB pressure is below 3 psig, ES 5-8 have not actuated. 1HP-24 opens on ES-1 and 1LP-17 opens on ES-3 therefore they have both received a signal to open.

Answer C Discussion

Incorrect. 1LP-18 would be open since it is on ES-4 however 1BS-1 is on ES-7 and would therefore not have received a signal to open,

Answer D Discussion

Incorrect, 1LP-18 would be open since it is on ES-4. Although 1LPSW-15 is on both ES-5 and ES-5, the setpoint for ES-5&6 is 3 pisg and therefore they would not have actuated,

Basis for meeting the KA

Requires the ability to monitor proper vavle alignment based on auto actuation of ECCS systems.

Basis for Hi Cog

Requires analyzing plant conditions to determine appropriate ES channel actuation and applying knowledge of what actuates from each channel.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj. IC-ES R18, R14 IC-ES RZ module drawing	

SYS006 A3.06 - Emergency Core Cooling System (ECCS)
Ability to monitor automatic operation of the ECCS, including: (CFR: 41.7 / 45.5)
Valve lineups .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 33

33

B

SYS006 K2.04 - Emergency Core Cooling System (ECCS)
Knowledge of bus power supplies to the following: (CFR: 41.7)
ESFAS-operated valves .....

Which ONE of the following states the power supply for 3LP-18?

A. 3XS-1

B. 3XS-2

C. 3XS-4

D. 3XS-5

2011B ONS SRO NRC Examination QUESTION 33

33

B

General Discussion

Answer A Discussion

Incorrect. Plausible since it would be correct for 1LP-17

Answer B Discussion

Correct. 1LP-18 is powered from 3XS-2.

Answer C Discussion

Incorrect. Plausible since it would be correct for 1LP-19

Answer D Discussion

Incorrect. Plausible since it would be correct for 1LP-20

Basis for meeting the KA

Requires knowledge of bus power supply's for ESFAS valves.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj. IC-ES R20 IC-ES	

SYS006 K2.04 - Emergency Core Cooling System (ECCS)
Knowledge of bus power supplies to the following: (CFR: 41.7)
ESFAS-operated valves .....

401-9 Comments:	Remarks/Status

C

2011B ONS SRO NRC Examination QUESTION 34

34

SYS007 K5.02 - Pressurizer Relief Tank/Quench Tank System (PRTS)
Knowledge of the operational implications of the following concepts as they apply to PRTS: (CFR: 41.5 / 45.7)
Method of forming a steam bubble in the PZR .....

Unit 1 plant conditions:

- OP/1/A/1103/002, (Filling and Venting RCS) Enclosure 4.14 (Establishing Pzr Steam Bubble And RCS Final Vent) in progress
- Quench Tank level = 84 inches
- Quench Tank pressure = 0.5 psig
- The Pressurizer is vented to the Quench Tank for 30 minutes

Based on the above conditions, which ONE of the following describes QT parameters that would indicate that Pzr Steam Bubble Formation is complete?

	QT level (inches)	QT pressure (psig)
A.	84.1	0.6
B.	84.1	2.5
C.	86.1	0.6
D.	86.1	2.5

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2011B ONS SRO NRC Examination QUESTION 34

34

C

General Discussion

Answer A Discussion

Incorrect: Plausible if you have the misconception that the Pzr vent line is above the water level in the QT and therefore both QT pressure and level increase only slightly as some but not all of the steam would condense as it was vented to the QT

Answer B Discussion

Incorrect: Plausible if you have the misconception that the Pzr vent line is above the water level in the QT and therefore the steam being vented to the QT would cause pressure to increase with little impact on level.

Answer C Discussion

CORRECT: Per OP/1103/002, Pzr steam bubble formation is complete (i.e., all the N2 gas is vented out of the Pzr) when a change (rise) in QT pressure of less than 0.2 psig occurs and QT level increases by 2 inches. Since the Pzr vent is underwater in the QT, when N2 is being vented it will rise to the surface and cause a corresponding increase in QT pressure therefore minimal pressure response is a sign that all of the N2 has been vented. Additionally, as water is vented it is condensed under the water level of the QT therefore minimal QT pressure change in conjunction with increasing QT level is indicative of all N2 being out of Pzr.

Answer D Discussion

Incorrect: Plausible if you have the misconception that the Pzr vent line is above the water level in the QT and therefore both QT pressure and level increase as some but not all of the steam would condense as it was vented to the QT.

Basis for meeting the KA

Requires knowledge of the QT operational parameters (pressure and level changes) that indicate Pzr steam bubble formation is complete

Basis for Hi Cog

Requires analyzing plant data and applying procedural guidance to determine if steam bubble exists.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	Modified NRC 2009A Q34

Development References	Student References Provided
Obj PNS-PZR R17 OP/1/A/1103/002, Encl. 4.14	

SYS007 K5.02 - Pressurizer Relief Tank/Quench Tank System (PRTS)
Knowledge of the operational implications of the following concepts as they apply to PRTS: (CFR: 41.5 / 45.7)
Method of forming a steam bubble in the PZR .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 35

35

D

SYS008 K2.02 - Component Cooling Water System (CCWS)
Knowledge of bus power supplies to the following: (CFR: 41.7)
CCW pump, including emergency backup .....

Given the following Unit 1 conditions:

Initial conditions:
- Time = 1200
- Reactor power = 100%

Current conditions:
- Time = 1201
- Switchyard isolation occurs
- CT1 lockout occurs

Which ONE of the following states the:

1) time required following the Reactor trip for the CC pumps to regain power?

2) source of power provided to the CC pumps?

A. 1. 21 seconds
   2. 1XO and 1XP

B. 1. 21 seconds
   2. 1XL and 1XN

C. 1. 31 seconds
   2. 1XO and 1XP

D. 1. 31 seconds
   2. 1XL and 1XN

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2011B ONS SRO NRC Examination QUESTION 35

35

D

General Discussion

Reworded the stem and re-arranged answers

Answer A Discussion

Incorrect: Power from XL & XN. Time = 31 sec. Plausible because XO and XP are also 600v supplies to vital equipment. 21 sec plausible because MFBMP and Load shed add up to 21 seconds.

Answer B Discussion

Incorrect: Time = 31 sec. Plausible because MFBMP and Load shed add up to 21 seconds if the transfer to standby time is neglected.

Answer C Discussion

Incorrect: Power from XL & XN. Plausible because XO and XP are also 600v supplies to vital equipment.

Answer D Discussion

Correct: SWYD isolate, KHU emergency start, MFBMP (20 sec) followed by a load shed (1sec) and a transfer to standby (10 sec) occurs for a total of 31 seconds.

Basis for meeting the KA

Requires knowledge of power supplies to CC pumps and how they are powered following a blackout.

Basis for Hi Cog

Requires analyzing plant data and determining the power switching logic response to regain power to MFB's.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	NRC 2007 Retest Q35

Development References	Student References Provided
Obj EL-PSL R14 Power supplies, PNS-PSL	

SYS008 K2.02 - Component Cooling Water System (CCWS)
Knowledge of bus power supplies to the following: (CFR: 41.7)
CCW pump, including emergency backup .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 36

36

B

SYS010 K5.01 - Pressurizer Pressure Control System (PZR PCS)
Knowledge of the operational implications of the following concepts as the apply to the PZR PCS: (CFR: 41.5 / 45.7)
Determination of condition of fluid in PZR, using steam tables .....

Given the following Unit 3 conditions:

Initial conditions:
- Reactor power = 100%
- Switchyard Isolation occurs

Current Conditions:
- Natural Circulation established
- RCS pressure = 2155 psig
- Tcold = 550°F stable
- Pressurizer level = 220" stable
- Pressurizer temperature = 628°F

1) The Pressurizer is __(1)__.

2) Pressurizer Heater Bank #2 (Groups B & D) heaters are __(2)__.

Which ONE of the following completes the statements above?

A. 1. saturated
   2. energized

B. 1. subcooled
   2. energized

C. 1. saturated
   2. NOT energized

D. 1. subcooled
   2. NOT energized

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2011B ONS SRO NRC Examination QUESTION 36

36

B

General Discussion

Answer A Discussion

Incorrect. First part is plausible since it would be correct for normal Pzr temperatures. With RCS pressure, Tcold, and Pzr level at their normal values it is plausible to believe that the Pzr is in its normal state of saturated. Second part is correct.

Answer B Discussion

Correct. With RCS pressure at 2150 psig, saturation temperature for that pressure is approximately 648 degrees F. With the Pressurizer temp at 628 degrees, the Pzr is subcooled. Bank 2 heaters are used in the Pzr saturation recovery circuit. As long as RCS pressure is at least 20 psig from saturation pressure of the Pzr these heaters would be energized. Additionally, the heaters are fed from 1X8 which do not load shed therefore even following the Switchyard isolation, the heaters would be energized since the Pzr is subcolled by about 350 psig.

Answer C Discussion

Incorrect. First part is plausible since it would be correct for normal Pzr temperatures. With RCS pressure, Tcold, and Pzr level at their normal values it is plausible to believe that the Pzr is in its normal state of saturated. Second part is plausible since RCS pressure is at 2155 therefore is the Pzr were actually saturated the Bank 2 heaters would be OFF since they turn off at 2150 psig.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible even as it relates to the first part based on the fact that a Switchyard isolation has occurred which makes it plasuible that iven if the Pzr were subcooled the heaters would not be on.

Basis for meeting the KA

This question requires determining that the Pzr is Subcooled using steam tables.

Basis for Hi Cog

Requires calculations and use of steam tables.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj. PNS-PZR R22,29 PNS-Pzr	

SYS010 K5.01 - Pressurizer Pressure Control System (PZR PCS)

Knowledge of the operational implications of the following concepts as the apply to the PZR PCS: (CFR: 41.5 / 45.7)

Determination of condition of fluid in PZR, using steam tables .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 37

37

A

SYS010 K6.01 - Pressurizer Pressure Control System (PZR PCS)
Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: (CFR: 41.7 / 45.7)
Pressure detection systems .....

Which ONE of the following failure combinations will result in 1RC-1 (Pzr Spray Valve) failing OPEN when in Automatic?

A. 1A and 1B NR RCS pressure failed HIGH

B. 1B and 1C NR RCS pressure failed HIGH

C. 1C and 1D NR RCS pressure failed HIGH

D. 1D and 1E NR RCS pressure failed HIGH

2011B ONS SRO NRC Examination QUESTION 37

37

A

General Discussion

Answer A Discussion

Correct. Median selected NR RCS pressure is used to feed 1RC-1 automatic operation. The circuit uses A, B, and E RPS NR pressure signals therefore if both A and B had failed high, 1RC-1 would respond by opening when in automatic.

Answer B Discussion

Incorrect. Plausible since there is a combination of 2 RPS NR RCS pressure signals that if failed high will result in 1RC-1 failing open in automatic.

Answer C Discussion

Incorrect. Plausible since there is a combination of 2 RPS NR RCS pressure signals that if failed high will result in 1RC-1 failing open in automatic.

Answer D Discussion

Incorrect. Plausible since there is a combination of 2 RPS NR RCS pressure signals that if failed high will result in 1RC-1 failing open in automatic.

Basis for meeting the KA

Requires knowledge of the effect that a malfunction of RCS NR pressure signals will have on operation of 1RC-1 (pressurizer spray valve).

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
IC-RCI R61 IC-RCI	

SYS010 K6.01 - Pressurizer Pressure Control System (PZR PCS)

Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: (CFR: 41.7 / 45.7)

Pressure detection systems .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 38

38

D

SYS012 A2.02 - Reactor Protection System (RPS)

Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.5)

Loss of instrument power .....

Given the following Unit 1 conditions:

- Reactor power = 100%
- 1A RPS Thot RTD power supply is lost

Which ONE of the following describes:

1) ALL RPS trips affected by the failure?

2) the actions preferred in accordance with OP/1/A/1105/014 (Control Room Instrumentation Operation And Information)?

REFERENCE PROVIDED

A. 1. RCS High Outlet Temperature ONLY
   2. Place MANUAL TRIP Keyswitch in "TRIP".

B. 1. RCS High Outlet Temperature ONLY
   2. Place affected RPS Channel MANUAL BYPASS keyswitch in "BYP".

C. 1. RCS High Outlet Temperature and RCS Variable Low Pressure
   2. Place MANUAL TRIP Keyswitch in "TRIP".

D. 1. RCS High Outlet Temperature and RCS Variable Low Pressure
   2. Place affected RPS Channel MANUAL BYPASS keyswitch in "BYP".

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2011B ONS SRO NRC Examination QUESTION 38

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D

General Discussion

We have 4 RPS channels. TS 3.3.1 only requires 3 to be operable. OP/1105/014 gives guidance on what to do if problems arise with RPS channels.

Answer A Discussion

Incorrect. First part is plausible since it is the only trip function in RPS with high temperature in its name. Second part is plausible since it would be correct if this were a "required" RPS channel. However only 3 RPS channels are required IAW TS 3.3.1 and since there are no other conditions given, the channel with the failed NI would be considered not required.

Answer B Discussion

Incorrect. Incorrect. First part is plausible since it is the only trip function in RPS with high temperature in its name.Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is plausible since it would be correct if this were a "required" RPS channel. However only 3 RPS channels are required IAW TS 3.3.1 and since there are no other conditions given, the channel with the failed NI would be considered not required.

Answer D Discussion

Correct. The High Outlet Temperature trip uses Thot directly to determine if the trip setpoint has been reached. The Variable Low Pressure trip uses Thot in the formula to caculate the low pressure trip:

11.14Thot - 4706

Since this is NOT a required channel, 1105/014 directs (per a note saying it is preferred) placing the channel in Manual Bypass is correct.

Basis for meeting the KA

Requires ability to precinct the impact of a loss of power supply to a power range NI and the ability to use the procedure to determine the correct actions to take based on the failure.

Basis for Hi Cog

Requires analyzing plant conditions and determining the correct actions based on guidance in a procedure.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References
Obj IC-NI R28 ADM-ITS R8 ADM-PIS R3 OP/1105/14 IC-NI ADM-ITS ASM-PIS

Student References Provided
OP/1105/014 Encl 4.7

SYS012 A2.02 - Reactor Protection System (RPS)

Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.5)

Loss of instrument power .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 39

39

D

SYS012 K1.06 - Reactor Protection System (RPS)

Knowledge of the physical connections and/or cause effect relationships between the RPS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)

T/G .....

Given the following Unit 3 conditions:

- Reactor power = 31% decreasing
- Main Turbine trips

Which ONE of the following describes the plant response to the Main Turbine trip?

A. Reactor will automatically runback to 20% power and stabilize

B. Reactor will automatically runback to 15% power and stabilize

C. Reactor will trip and TBV's will use Turbine Header Pressure error as controlling signal

D. Reactor will trip and TBV's will use SG Outlet Pressure error as controlling signal

---

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2011B ONS SRO NRC Examination QUESTION 39

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D

General Discussion

Answer A Discussion

Incorrect. Plausible since a runback would occur if power were < 27.75% and 20% is the runback setpoint for a runback for Both Generator Breakers Open,

Answer B Discussion

Incorrect. Plausible since a runback would occur if power were < 27.75% and 15% is the runback setpoint for a Maximum Runback via the pushbutton on the LCP.

Answer C Discussion

Incorrect. Plausible since a Rx trip would occur and Turbine Header Pressure error is the normal control signal for the Turbine Bypass Valves.

Answer D Discussion

Correct. Once above 29.75% the Turbine to Rx RPS trip is activated. Since power is 31% the trip would be active therefore the Rx would trip. When the Turbine trips the Turbine bailey station will trip to Hand which results in transferring control of the TBV's from Turbine Header Pressure error to OTSG Outlet Pressure error.

Basis for meeting the KA

Requires knowledge of the cause and effect relationship between a T/G trip and an RPS trip.

Basis for Hi Cog

Requires analyzing plant conditions and then applying those conditions to knowledge of RPS and ICS operations

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

Obj STG-ICS R3, R10 IC-RPS R3
STG-ICS Chptr 2&3
IC-RPS

Student References Provided

SYS012 K1.06 - Reactor Protection System (RPS)
Knowledge of the physical connections and/or cause effect relationships between the RPS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)
T/G .....

401-9 Comments:

Remarks/Status

2011B ONS SRO NRC Examination QUESTION 40

40

A

SYS013 K2.01 - Engineered Safety Features Actuation System (ESFAS)
Knowledge of bus power supplies to the following: (CFR: 41.7)
ESFAS/safeguards equipment control .....

Given the following Unit 1 conditions:

Initial conditions:
- Reactor power = 100%
- 1KVIB Panelboard de-energized

Current conditions:
- MSLB inside the Reactor Building occurs
- Lowest RCS pressure = 1137 psig
- Reactor Building Pressure peaked at 32 psig

Which ONE of the following describes ALL ES Actuation Logic Channels that have actuated?

A. 1, 3, 5, 7

B. 2, 4, 6, 8

C. 1, 5, 7 ONLY

D. 2, 6, 8 ONLY

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2011B ONS SRO NRC Examination QUESTION 40

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A

General Discussion

Answer A Discussion

Correct. KVIB provides power to the even digital channels. With KVIB de-energized, the even channels cannot actuate. Since RB pressure has exceeded its actuation setpoint of 10 psig, all ES channels should have actuated however since the even channels cannot actuate due to loss of power, channels 1, 3, 5, and 7 will have actuated.

Answer B Discussion

Incorrect. Plausible since this would be correct if KVIA were de-energized instead of KVIB.

Answer C Discussion

Incorrect. Plausible since RCS pressure has not reached the LPI injection setpoint of 550 psig and the power supplys to the Actuation Logic channels is split based on odd and even channels. Channel 1&2 RCS pressure setpoint has already been reached therefore under the misconception that ES channels 3 and 4 (LPI) only actuate on low RCS pressure this would be correct however exceeding 3.0 psig in RB pressure results in actuating ES 1-6.

Answer D Discussion

Incorrect. Plausible since RCS pressure has not reached the LPI injection setpoint of 550 psig and the power supplys to the Actuation Logic channels is split based on odd and even channels. Channel 1&2 RCS pressure setpoint has already been reached therefore under the misconception that ES channels 3 and 4 (LPI) only actuate on low RCS pressure this would be correct however exceeding 3.0 psig in RB pressure results in actuating ES 1-6. KVIB does impact only the even ES logic channels.

Basis for meeting the KA

Discussed KA with Chief Examiner. Determined that question on either control power or power to ES digitals would match.

Requires knowledge of ES powers components power supplies.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj IC-ES R2, R26 IC-ES	

SYS013 K2.01 - Engineered Safety Features Actuation System (ESFAS)
Knowledge of bus power supplies to the following: (CFR: 41.7)
ESFAS/safeguards equipment control .....

401-9 Comments:	Remarks/Status

D

2011B ONS SRO NRC Examination QUESTION 41

41

SYS013 K5.02 - Engineered Safety Features Actuation System (ESFAS)
Knowledge of the operational implications of the following concepts as they apply to the ESFAS: (CFR: 41.5 / 45.7)
Safety system logic and reliability .....

Given the following Unit 1 conditions:

Initial conditions:
- Reactor power = 25%
- 1A MSLB inside the RB occurs

Current conditions:
- "1A" NR RB pressure = 2.9 psig
- "1B" NR RB pressure = 3.1 psig
- "1C" NR RB pressure = FAULTED

Which ONE of the following states ALL ES Instrument Channels (if any) that have sent an actuation signal to ES Actuation Logic Channels 1-6?

A. 1C1 and 1C2 ONLY

B. 1B1 and 1B2 ONLY

C. 1B1, 1B2, 1C1, and 1C2

D. NONE

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2011B ONS SRO NRC Examination QUESTION 41

41

D

General Discussion

Answer A Discussion

Incorrect. Plausible since the required TS setpoint for RB pressure is < 4 psig so it is plausible to believe that the 1B Voters have NOT actuated and that only the Voters with the faulted input would be actuated. Additional plausibility comes from the operation of the OLD ES Analog channels where each channel operated independently of the others inputs.

Answer B Discussion

Incorrect. Plausible since this would be correct based on the old ES analog channel logic where each channel operates independently of the other channels inputs.

Answer C Discussion

Incorrect. Plausible since the B inputs are > setpoint and it would be plausible to believe that a faulted signal would result in the conservative action of actuating the output of the associated Voters.

Answer D Discussion

Correct.

Input pressure in Engineering Units is compared to a 'Comparator' setpoint of 3.0 psig.
If the signal is FAULTED, it is blocked from use in any other location in the system other than the functional trip statalarm.
UNFAULTED signals are then compared to the other (2) instrument channel inputs. The 2.MAX is calculated and used for the 2.MAX selection for actuation and to the other two instrument channels.

Basis for meeting the KA

Requires knowledge of the Operational implications of the ES system logic.

Basis for Hi Cog

Requires analyzing RB pressure inputs in context of the ES actuation logic to determine the status of the ES Voters.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj IC-ES R21, R23 IC-ES	

SYS013 K5.02 - Engineered Safety Features Actuation System (ESFAS)
Knowledge of the operational implications of the following concepts as they apply to the ESFAS: (CFR: 41.5 / 45.7)
Safety system logic and reliability .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 42

42

D

SYS022 K1.01 - Containment Cooling System (CCS)

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

SWS/cooling system .....

Which ONE of the following would result in the 1B RBCU being NOT Operable in accordance with Limits and Precautions of OP/1/A/1104/015 (Reactor Building Cooling System).

A. Switch in OFF

B. 1XS2 de-energized

C. RBCU Dampers misaligned

D. LPSW inlet and outlet flow = 500 gpm

2011B ONS SRO NRC Examination QUESTION 42

42

D

General Discussion

Answer A Discussion

Incorrect. Plausible since it is reasonable to believe that the RBCU would not start with the switch in the OFF position. Additionally plausible since the MDEFWP's will not start if EFDW is actuated with their swithces in the OFF position.

Answer B Discussion

Incorrect. Plausible since it is logical to believe that 1XS2 is in the power chain for the 1B RBCU and that if 1XS2 were de-energized the RBCU could not perform its function and would therefore be inoperable. The unique power supply arrangement (see below) for the RBCU's also makes it plausible that the limits and precautions of the operating procedure would provide guidance on the impact of operability.

A RBCU Fan Motor
1.Supplied directly from X8 600V load center
2.□Isolation breaker between X8 and fan motor is physically located in XS1 MCC but is not connected electrically to XS1.
3.□Old supply was XS1 but due to heavy electrical loads on XS1, several incidents occurred where a fan motor fault tripped entire XS1 MCC.
4.□Modification electrically bypassed XS1 but left isolation breaker physically located there.
B RBCU Fan Motor
1. Supplied from XS3 600V MCC
2.□Due to fewer loads on XS3, problem with "A" RBCU electrical supply was not a problem with "B".
C RBCU Fan Motor
1.□Supplied directly from X9 600V load center
2.□Old supply was XS2, but due to same problems as with "A" RBCU, supply was moved to X9 with the isolation breaker physically remaining in XS2 cabinets.

Answer C Discussion

Incorrect. Plausible since there are specific desired damper positions when the 1B RBCU is operating that is based on which RBCU's are actually in service therefore it would be plausible to believe they would affect the RBCU's ability to distribute cool air as designed and therefore impact its operability.

Answer D Discussion

Correct. L&P specifies that LPSW flow to each RBCU must be > 550 gpm Inlet Flow or ≥750 gpm Outlet Flow to meet flow requirements of SLC 16.9.12.

Basis for meeting the KA

Requires knowledge of the cause/effect relationship between RBCU's and LPSW.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj PNS-RBC R1,14,15 PNS-RBC	

SYS022 K1.01 - Containment Cooling System (CCS)
Knowledge of the physical connections and/or cause-effect relationships between the CCS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)
SWS/cooling system .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 42 42 **D**

C

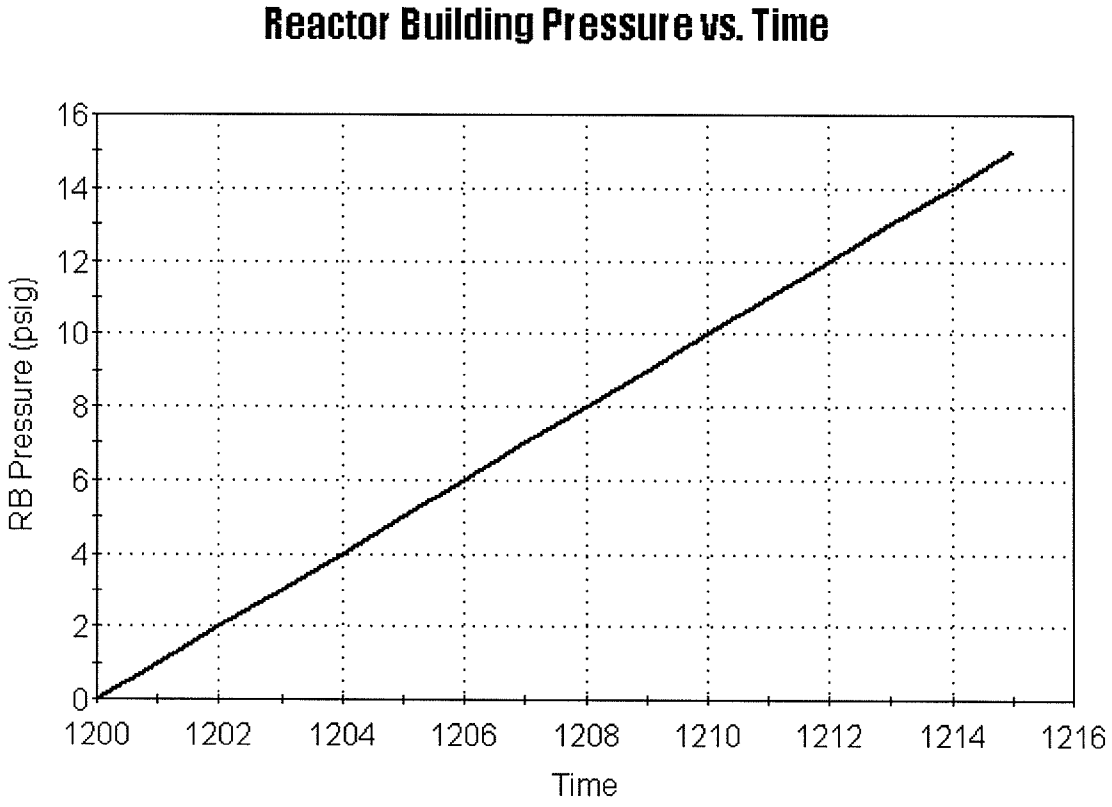
2011B ONS SRO NRC Examination QUESTION 43

43

SYS026 A3.01 - Containment Spray System (CSS)
Ability to monitor automatic operation of the CSS, including: (CFR: 41.7 / 45.5)
Pump starts and correct MOV positioning .....

Given the following Unit 1 conditions:

- Reactor power = 100%
- SBLOCA occurs
- RB Pressure response as indicated below



Which ONE of the following states the EARLIEST time at which the Reactor Building Spray system will AUTOMATICALLY actuate?

A. 1203

B. 1204

C. 1210

D. 1215

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2011B ONS SRO NRC Examination QUESTION 43

43

C

General Discussion

Answer A Discussion

Incorrect. Plausible since 3 psig is the actual setpoint for ES 1-6 on high RB pressure.

Answer B Discussion

Incorrect. Plausible since 4 psig is the Tech Spec setpoint for ES 1-6 on high RB pressure.

Answer C Discussion

Correct. 10 psig is the actual ES actuation setpoint for ES channels 5&6

Answer D Discussion

Incorrect. Plausible since 15 psig is the Tech Spec required setpoint for ES channels 5&6,

Basis for meeting the KA

Requires the ability to monitor the automatic actuation of RB spray. Implicit in the ability to monitor automatic operation of equipment would be knowing when the equipment should automatically operate.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
OBJ IC-ES R1, R14 IC-ES	

SYS026 A3.01 - Containment Spray System (CSS)
Ability to monitor automatic operation of the CSS, including: (CFR: 41.7 / 45.5)
Pump starts and correct MOV positioning .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 44

44

D

SYS039 A1.05 - Main and Reheat Steam System (MRSS)

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MRSS controls including: (CFR: 41.5 / 45.5)

RCS T-ave .....

Given the following Unit 3 conditions:

- Reactor tripped from 100% power
- A feedwater transient occurred
- RCS temperature = 532°F slowly increasing

Which ONE of the following would result in stabilizing RCS temperature at approximately 532°F?

A. TBV's MUST be manually adjusted to maintain Turbine Header Pressure = 885 psig

B. Turbine Header Pressure setpoint knob on the Turbine Master set to 885 psig

C. Turbine Header Pressure setpoint knob on the Turbine Master set to 835 psig

D. Turbine Header Pressure setpoint knob on the Turbine Master set to 760 psig

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2011B ONS SRO NRC Examination QUESTION 44

44

D

General Discussion

Answer A Discussion

Incorrect. Plausible for 2 reasons:

1. The setpoint knob that controls THP setpoint is located on the Turbine Master Bailey station. Since the Rx and Turbine have tripped, the Turbine Master has tripped to HAND and it would be plausible to believe that with the Turbine Master in HAND the setpoint knob would not be able to control TBV's. That is because once the Turbine Master trips to HAND, the TBV's begin using SG Outlet pressure as their controlling signal (but it does still compare SG Outlet pressure to THP setpoint for control.

2. The setpoint knob only goes as low as 600 psig therefore it would be plausible to believe that since RCS temperature is significantly below its normal value, the setpoint knob would not be able to be used to control at this low temperature due to being off scale low.

Answer B Discussion

Incorrect. Plausible since this setpoint is the equivalent to 532 degrees however with the Rx tripped there is a 125 psig bias added to setpoint and therefore requiring the setpoint knob to be set 125 psig below the desired header pressure.

Answer C Discussion

Incorrect. Plausible since this setpoint would equate to having a 50 psig bias applied to the THP setpoint and that is correct when the Turbine Master in hand and the TBV's closed.

Answer D Discussion

Correct, with the Rx tripped a 125 psig bias has been added to THP setpoint. Controlling THP at saturation pressure for RCS temperature is required to stabilize temp therefore considering the 125 psig bias, the setpoint would have to be 760 psig to control THP at 885 psig.

Basis for meeting the KA

Requires predicting RCS temperature response to operation of main steam system controls.

Basis for Hi Cog

Requires using steam tables and mathematical calculations to determine correct setpoint.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj STG-ICS R10 STG-ICS	

SYS039 A1.05 - Main and Reheat Steam System (MRSS)

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MRSS controls including: (CFR: 41.5 / 45.5)

RCS T-ave .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 45

45

B

SYS059 K3.02 - Main Feedwater (MFW) System
Knowledge of the effect that a loss or malfunction of the MFW will have on the following: (CFR: 41.7 / 45.6)
AFW system .....

Given the following Unit 3 conditions:

Initial conditions:
- Time = 1200
- Reactor power = 100%
- 3B MDEFWP switch in "AUTO 2"
- 3A MDEFWP switch in "AUTO 1" for testing

Current conditions:
- Time = 1201
- BOTH Main Feedwater pumps trip
- 3MS-87 (MS to TDEFDWP Control) fails closed

Which ONE of the following describes ALL Emergency Feedwater Pumps operating at Time = 1202 assuming NO operator actions?

A. TDEFWP and 3A MDEFWP

B. TDEFWP and 3B MDEFWP

C. 3A MDEFWP ONLY

D. 3B MDEFWP ONLY

2011B ONS SRO NRC Examination QUESTION 45

45

B

General Discussion

Answer A Discussion

Incorrect. TDEFWP is correct however in Auto 1, only dryout protection will start the MDEFWP and that occurs due to low SG level. 1 minute after a Rx trip, SG levels will still be well into the Operating Range.

Answer B Discussion

Correct. The TDEFWP still has Aux Steam available and would therefore auto start and the MDEFWP in Auto 2 will also auto start when MFWPs are lost.

Answer C Discussion

Incorrect. TDEFWP not starting is plausible since the Main Steam supply to the TDEFWP is not available due to the failure of 3MS-87 however Aux Steam is still available. In Auto 1, only dryout protection will start the MDEFWP and that occurs due to low SG level. 1 minute after a Rx trip, SG levels will still be well into the Operating Range.

Answer D Discussion

Incorrect. TDEFWP not starting is plausible since the Main Steam supply to the TDEFWP is not available due to the failure of 3MS-87 however Aux Steam is still available. 3B MDEFWP would start.

Basis for meeting the KA

Requires knowledge of the effect that a loss of both Main Feedwater pumps will have on Emergency Feedwater pumps.

Basis for Hi Cog

Requires analyzing plant conditions and applying the analysis to the starting logic for Emergency Feedwater pumps.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj. CF-EF R12, R20, R22	

SYS059 K3.02 - Main Feedwater (MFW) System
Knowledge of the effect that a loss or malfunction of the MFW will have on the following: (CFR: 41.7 / 45.6)
AFW system .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 46

46

C

SYS061 K6.02 - Auxiliary / Emergency Feedwater (AFW) System
Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: (CFR: 41.7 / 45.7)
Pumps .....

Given the following Unit 1 conditions:

Initial conditions:
- Reactor power = 100%
- TDEFWP tagged out for repair
- BOTH Main Feedwater pumps trip

Current conditions
- Rule 3 initiated
- RCS pressure = 2310 psig decreasing
- 1A MDEFWP will not start

Which ONE of the following describes actions required by the EOP to mitigate this event?

A. Initiate HPI Forced Cooling

B. Initiate Condensate Booster Pump feed

C. Align the 1B MDEFWP to feed BOTH SG's

D. Align alternate units EFDW to feed the 1A SG

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2011B ONS SRO NRC Examination QUESTION 46

46

C

General Discussion

Answer A Discussion

Incorrect, Plausible since with RCS pressure > 2300, this would be correct if the 1B MDEFWP had also failed. Plausibility comes from the fact that there has been a loss of a significant portion of the EFDW system and RCS pressure has exceeded 2300 psig.

Answer B Discussion

Incorrect. Plausible since this would be correct if all EFDW had been lost and RCS pressure was < 2300 psig. Plausibility comes from the fact that there has been a loss of a significant portion of the EFDW system and CBP feed would be the next desired source if all EFDW had been lost and RCS pressure were still below 2300 psig.

Answer C Discussion

Correct. Initial steps in Encl. 5.9 (Extended EFDW Operations) will align the single MDEFWP to feed both SG's.

Answer D Discussion

Incorrect. Plausible since using an alternate units EFDW to feed is one of the options if all EFDW is lost.

Basis for meeting the KA

Per Chief Examiner, pumps lost should be EFDWP's to match KA. Requires knowledge of the effect of a loss of the TDEFWP and one MDEFWP has on the remaining MDEFWP

Basis for Hi Cog

Requires analyzing plant conditions and applying the analysis to ensure correct procedure direction.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

Obj EAP-LOHT R26
EAP-LOHT
Rule 3
EOP Encl. 5.9

Student References Provided

SYS061 K6.02 - Auxiliary / Emergency Feedwater (AFW) System
Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: (CFR: 41.7 / 45.7)
Pumps .....

401-9 Comments:

Remarks/Status

2011B ONS SRO NRC Examination QUESTION 47

47

B

SYS062 A1.01 - AC Electrical Distribution System

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ac distribution system controls including: (CFR: 41.5 / 45.5)

Significance of D/G load limits .....

Given the following plant conditions:

- Loss of Offsite power
- 230KV Yellow Bus locked out
- Breaker SK1 failed OPEN
- CT-4 supplying all 3 units MFB's

Which ONE of the following is the HIGHER load allowed without exceeding load limits provided in AP/11 (Recovery From Loss of Power) Encl. 5.1A (CT-4 Overload Limits)?

REFERENCE PROVIDED

A. 10 MW, 6 MVAR

B. 17 MW, 13 MVAR

C. 19 MW, 11.5 MVAR

D. 20.5 MW, 8 MVAR

2011B ONS SRO NRC Examination QUESTION 47

47

B

General Discussion

Answer A Discussion

Incorrect. Plausible since this data results in being closest to the Limit with NO Forced Cooling line and would be a correct choice if no forced cooling of the transformer oil were indicated.

Answer B Discussion

Correct. This data results in being the closest to the SK breaker curve without exceeding it.

Answer C Discussion

Incorrect. Plausible since this data would be correct if you assumed that the area outside the last curve was the acceptable operation portion. Plausible since there is no clear label identifying it as an unacceptable region and therefore an understanding of the load limits is required to determine it unacceptable.

Answer D Discussion

Incorrect. Plausible since this would be correct if the SK breaker had not failed.

Basis for meeting the KA

Per Chief Examiner OK to ask about CT-4 load limits.

Basis for Hi Cog

Requires ability to use a complex curve.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj EAP-APG R9 AP/11 Encl 5.1A EAP-AP11	AP/11 Encl 5.1A

SYS062 A1.01 - AC Electrical Distribution System

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ac distribution system controls including: (CFR: 41.5 / 45.5)

Significance of D/G load limits .....

401-9 Comments:	Remarks/Status

C

2011B ONS SRO NRC Examination QUESTION 48

48

SYS062 K4.10 - AC Electrical Distribution System
Knowledge of ac distribution system design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)
Uninterruptable ac power sources .....

Unit 1 initial conditions:

- Reactor power = 100%
- 1DCA Bus Voltage = 125 VDC
- 1DCB Bus Voltage = 126 VDC
- 2DCA Bus Voltage = 127 VDC
- 2DCB Bus Voltage = 127 VDC

Current conditions:

- 1XS1 incoming feeder breaker trips

Based on the above conditions, which ONE of the following is correct regarding the DC power systems assuming no operator actions are taken?

A. 1DCA will be powered from the standby charger

B. 1DCB loads will be powered from Battery 1CB

C. 1KX Inverter will be powered from 1DCB

D. 1DIC Inverter will be powered from 1DCB

2011B ONS SRO NRC Examination QUESTION 48

48

C

General Discussion

Re-arranged answers

Answer A Discussion

Incorrect: the standby charger will not automatically power 1DCA. Plausible because the standby charger can be manually aligned to supply 1DCA.

Answer B Discussion

Incorrect: DCB is not powered from 1XS1. The Battery Charger will be supplying DCB and the battery. Plausible because if 1XS2 were de-energized, B would be correct.

Answer C Discussion

Correct: Upon a loss of 1XS1, Battery Charger 1CA de-energizes. Battery 1CA automatically picks up DC bus DCA. Essential Inverters (KX, KI and KU) are powered from DCA or DCB (whichever has the higher potential). Vital DC Buses (DIA, DIB, DIC, DID) are powered from their unit or the alternate unit (whichever has the higher potential).

Answer D Discussion

Incorrect: 1DIC is supplied from the alternate unit (higher potential). Plausible because 1DIC would be supplied from 1DCB if it had the higher potential.

Basis for meeting the KA

Question requires knowledge of a design feature which provides uninterruptable AC power to the panelboard by way of maintaining DC input to KX inverter.

Basis for Hi Cog

Requires analyzing system conditions and detailed knowledge of how the system works.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2007 NRC Q41

Development References	Student References Provided
Obj EL-DCD R3 EL-DCD	

SYS062 K4.10 - AC Electrical Distribution System

Knowledge of ac distribution system design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)

Uninterruptable ac power sources .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 49

49

B

SYS063 A4.03 - DC Electrical Distribution System
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
Battery discharge rate .....

Given the following plant conditions:

Initial conditions:
- All three units Reactor power = 100%

Current conditions:
- All Unit's 4160v Main Feeder Busses are de-energized
- Unit 1, 2, and 3 EOP Blackout tabs in progress

Based on the above conditions, which ONE of the following describes the required status of Unit 2 Essential Inverters per the EOP Enclosure 5.38 (Restoration of Power) and why?

Unit 2's Essential Inverters...

A. are de-energized to prevent inverter damage.

B. are de-energized to extend available battery life.

C. remain energized to provide power to ES channels.

D. remain energized to provide control power to 4160v.

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2011B ONS SRO NRC Examination QUESTION 49

49

B

General Discussion

Re-arranged answers

Answer A Discussion

Incorrect: Incorrect but plausible in that inverters could be damaged due to high current as input voltages start to decrease.

Answer B Discussion

Correct: Essential Inverters KI, KU, & KX DC input breakers are opened to extend battery life per direction given from the EOP SBO tab (Encl. 5.38 and tab Step 2.38)

Answer C Discussion

Incorrect: Plausible if ES Channels (are vital loads from KVIA,B,C,D) are confused with essential loads (from KI, KU, KX); vital loads must be differentiated from essential loads

Answer D Discussion

Incorrect: Plausible if control power (ex. for breakers, switches, etc) are incorrectly assumed to be essential inverter loads. Additionally plausible since control power for 4160V breaker operation is maintained during a blackout.

Basis for meeting the KA

Requires knowledge of required actions within procedures and the ability to monitor battery discharge rate as a function of loads remaining on the battery. Additionally, de-energizing the inverters is in fact "operating" the battery discharge rate.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	NRC 2009 Q48

Development References	Student References Provided
EAP-BO R8 EAP-BO EOP Encl 5.38 and 5.32	

SYS063 A4.03 - DC Electrical Distribution System

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

Battery discharge rate .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 50

50

D

SYS064 A2.09 - Emergency Diesel Generator (ED/G) System

Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Synchronization of the ED/G with other electric power supplies .....

Given the following plant conditions:

- Switchyard isolation has occurred
- AP/11 (Recovery from Loss of Power) in progress
- Power has been restored to Unit 1&2's Main Feeder Buses from Keowee Unit 1 via the overhead power path
- MANUAL synchronization of KHU to the grid is in progress

The PCB-8 Sync Check pushbutton __(1)__ prevent out of phase closure of PCB-8 and the __(2)__ will be used to adjust Line side Potential to match Bus side Potential.

Which ONE of the following completes the statement above?

A. 1. will
   2. Speed Changer Motor

B. 1. will
   2. Auto Voltage Adjuster

C. 1. will NOT
   2. Speed Changer Motor

D. 1. will NOT
   2. Auto Voltage Adjuster

2011B ONS SRO NRC Examination QUESTION 50

50

D

General Discussion

Answer A Discussion

Incorrect. First part is plausible since the Sync Check pushbutton is held depressed when syncing across PCB-8 to enable the syncrosocope. It is therefore reasonable to assume that due to the major expense that would be incurred if out of sync closure occurred, the sync check provided protection against that event. Second part is plausible since the Speed Changer Motor is used to adjust sync scope direction and speed in preparation for syncing to grid.

Answer B Discussion

Incorrect. First part is plausible since the Sync Check pushbutton is held depressed when syncing across PCB-8 to enable the syncrosocope. It is therefore reasonable to assume that due to the major expense that would be incurred if out of sync closure occurred, the sync check provided protection against that event. Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is plausible since the Speed Changer Motor is used to adjust sync scope direction and speed in preparation for syncing to grid

Answer D Discussion

Correct. The PCB-8 Sync Check pushbutton is depressed to enable the syncroscope. The Sync Check provides indication only and does not afford protection against out of phase closure of PCB-8. The Auto Voltage Adjuster is used to match Line side and Bus side voltages prior to closing PCB-8,

Basis for meeting the KA

Requires the ability to predict operation of the KHU sync curcuits and controls while syncing the KHU to another electrical power supply.

Basis for Hi Cog

Requires detailed knowledge of systems and procedure to integrate the two in performing synchronization activities.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
EAP-APG R9 AP/11 Encl 5.3	

SYS064 A2.09 - Emergency Diesel Generator (ED/G) System

Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Synchronization of the ED/G with other electric power supplies .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 51

51

C

SYS073 K4.01 - Process Radiation Monitoring (PRM) System
Knowledge of PRM system design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)
Release termination when radiation exceeds setpoint .....

__(1)__ will automatically terminate a GWD tank release if it's setpoint is reached.

__(2)__ is used to purge 1RIA-37 and/or 1RIA-38 once the GWD tank release is completed.

Which ONE of the following completes the statements above?

A. 1. ONLY 1RIA-37
   2. Instrument Air

B. 1. ONLY 1RIA-37
   2. Nitrogen

C. 1. 1RIA-37 and 1RIA-38
   2. Instrument Air

D. 1. 1RIA-37 and 1RIA-38
   2. Nitrogen

2011B ONS SRO NRC Examination QUESTION 51

51

C

General Discussion

Answer A Discussion

Incorrect. First part is plausible since both RIA 37 and 38 are monitoring GWD tank releases and other process RIA's that monitor common things only actuated the associated interlocks from one of the RIA's. For example, both RIA 48 and 49 monitor RB environment however only RIA-49 performs the automatic interlock function. Second part is correct.

Answer B Discussion

Incorrect. First part is plausible since both RIA 37 and 38 are monitoring GWD tank releases and other process RIA's that monitor common things only actuated the associated interlocks from one of the RIA's. For example, both RIA 48 and 49 monitor RB environment however only RIA-49 performs the automatic interlock function. Second part is plausible since Nitrogen is an inert gas that is commonly used as part of insturment calibrations and is a gas that is commonly used at ONS.

Answer C Discussion

Correct. Both RIA 37 and RIA 38 will perform the actions of isolating a GWD tank release if its setpoint is reached and once the release is completed, Instrument Air is used to purge the remaining waste gas out of the lines associated with the RIA.

Answer D Discussion

incorrect. First part is correct. Second part is plausible since Nitrogen is an inert gas that is commonly used as part of insturment calibrations and is a gas that is commonly used at ONS.

Basis for meeting the KA

Requires knowledge of design features (RIA interlocks) that provide for automatic termination of a waste gas tank release if their setpoints are exceeded

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj. RAD-RIA R2, R3	

SYS073 K4.01 - Process Radiation Monitoring (PRM) System

Knowledge of PRM system design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)

Release termination when radiation exceeds setpoint .....

401-9 Comments:	Remarks/Status

D

2011B ONS SRO NRC Examination QUESTION 52

52

SYS076 A4.02 - Service Water System (SWS)
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
SWS valves .....

Given the following Unit 1 conditions:

- Main Steam Line break has occurred
- Reactor Building pressure = 6 psig increasing
- Restoration of LPSW to RCP motors is required

Which ONE of the following describes the MINIMUM steps required to open BOTH 1LPSW-6 and 1LPSW-15?

A. Select MANUAL for EITHER Channel 5 or Channel 6 using pushbutton on 1UB2 then operate valves using switches on 1VB2 under the RZ modules

B. Select MANUAL for BOTH Channels 5 AND Channel 6 using pushbuttons on 1UB2 then operate valves using switches on 1VB2 under the RZ modules

C. Select MANUAL for EITHER channel 5 or Channel 6 using pushbutton on 1UB2 then operate valves using switches on 1UB2

D. Select MANUAL for BOTH Channels 5 AND Channel 6 using pushbuttons on 1UB2 then operate valves using switches on 1UB2

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2011B ONS SRO NRC Examination QUESTION 52

52

D

General Discussion

This is testing the new Digital RPS/ES which has just been installed during the most recent Unit 1 outage.

Answer A Discussion

Incorrect. The first part is plausible since both valves are on both Channel 5 and 6. Second part is plausible since with the installation of the new Digital ES/RPS, Switches for many of the containment isolation valves have been added under the RZ modules.

Answer B Discussion

Incorrect. Although both channels must be taken to manual, the switches are located on UB2. Second part is plausible since with the installation of the new Digital ES/RPS, Switches for many of the containment isolation valves have been added under the RZ modules.

Answer C Discussion

Incorrect. The first part is plausible since both valves are on both Channel 5 and 6. Second part is correct,

Answer D Discussion

Correct. Both valves are on both ES channel 5 and 6 therefore both digital channels must be taken to manual. Switches for the valves are now located on UB2.

Basis for meeting the KA

Requires the ability to manually operate SWS valves following an ES actuation on high RB pressure.

Basis for Hi Cog

Requires understanding of logic requirements regarding manual control of ES components and knowledge of new location for control switches.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj IC-ES R16 IC-ES	

SYS076 A4.02 - Service Water System (SWS)

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

SWS valves .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 53

53

D

SYS076 K1.20 - Service Water System (SWS)

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

AFW .....

Which ONE of the following is the cooling medium for the Motor Driven Emergency Feedwater pump motors?

A. RCW

B. CCW

C. HPSW

D. LPSW

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2011B ONS SRO NRC Examination QUESTION 53

53

D

General Discussion

Answer A Discussion

Incorrect. Plausible since RCW does provide cooling to various secondary components (ex. HDP's).

Answer B Discussion

Incorrect. Plausible since CCW does provide cooling to various secondary components (ex. TDEFWP).

Answer C Discussion

Incorrect. Plausible since RCW does provide cooling to various secondary components (ex. Primary IA compressor).

Answer D Discussion

Correct. LPSW provides cooling to the MDEFWP motors.

Basis for meeting the KA

Requires knowledge of the physical connection between EFDW and LPSW.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj CF-EF R6 CF-EF	

SYS076 K1.20 - Service Water System (SWS)

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

AFW .....

401-9 Comments:	Remarks/Status

C

2011B ONS SRO NRC Examination QUESTION 54

54

SYS078 2.1.32 - Instrument Air System (IAS)
SYS078 GENERIC
Ability to explain and apply system limits and precautions. (CFR: 41.10 / 43.2 / 45.12)

Which ONE of the following will result in the automatic shutdown of a running Backup Instrument Air Compressor in accordance with Limits and Precautions of OP/1/A/1106/027 (Compressed Air System)?

A. Compressor in "STD-BY 1" and IA pressure reaches 93 psig increasing

B. Compressor in "BASE" and IA pressure reaches 100 psig increasing

C. Anytime compressor is running and its discharge air temperature exceeds 425°F

D. Anytime compressor is running and delta T of inlet vs. outlet air temperature exceeds 100°F

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2011B ONS SRO NRC Examination QUESTION 54

54

C

General Discussion

Answer A Discussion

Incorrect. Plausible since this is the starting pressure for compressors in Standby 1..

Answer B Discussion

Incorrect. Plausible since this is the pressure at which the compressor unloads but it does not trip.

Answer C Discussion

Correct. A temperature switch in each compressor discharge line closes if discharge air temperature exceeds 425°F which shuts off the compressor regardless of control switch position.

Answer D Discussion

Incorrect. Plausible since this is guidance provided in the Limits and Precautions of the Compressed Air procedure (1106/27) however it is regarding the Sullair Service Air compressors.

Basis for meeting the KA

Requires the ability to apply the limit on compressor discharge line temperature and explain the consequences of exceeding the limit.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

Obj SSS-IA R8, R9
SSS-IA
OP-1106-027 L&P's

Student References Provided

SYS078 2.1.32 - Instrument Air System (IAS)
SYS078 GENERIC
Ability to explain and apply system limits and precautions. (CFR: 41.10 / 43.2 / 45.12)

401-9 Comments:

Remarks/Status

2011B ONS SRO NRC Examination QUESTION 55

55

B

SYS103 A1.01 - Containment System

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the containment system controls including: (CFR: 41.5 / 45.5)

Containment pressure, temperature, and humidity .....

Which ONE of the following describes the MINIMUM combination of Reactor Building Spray and Reactor Building Cooling trains required to maintain Reactor Building temperature and pressure within design limits following a LOCA from 100% power?

A. One RBS train and One RBCU

B. One RBS train and Two RBCUs

C. Two RBS trains and Two RBCUs

D. Two RBS trains and Three RBCUs

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2011B ONS SRO NRC Examination QUESTION 55

55

B

General Discussion

Answer A Discussion

Incorrect. Plausible since it is the norm for many safety systems to need two trains to perform it safety function.

Answer B Discussion

Correct. Three cooling trains must be available to cool the RB atmosphere following an accident. (e.g. 1 RBS Train and 2 RBCUs). Assuming single failure criteria on both the RBS and the RBC systems, one RBS train and two RBCUs would be available in an accident. During an accident, a minimum of two RBCUs and one RBS train are required to maintain containment pressure and temperature following a LOCA. Additionally, the one RBS train is also required to remove iodine from containment atmosphere and maintain concentrations below those assumed in the safety analysis.

Answer C Discussion

Incorrect. Plausible since it is common for Tech Specs to require one more train of a system than is required for safety function and since both of these systems are contained in the same Tech spec it would be Plausible to believe that 4 of the 5 available trains were required to perform the safety function.

Answer D Discussion

Incorrect. Plausible since this is the miniumum requirments to meet the Tech Spec LCO requirments when in MODE 1. Plausibility is also added since there are other systems at ONS where Tech Specs only requires the minimum required to perform safety functions.

Basis for meeting the KA

Requires ability to predict the response of containment temperature and pressure based on various RBS and RBCU combinations. More specifically it requires predicting how Containment temperature and pressure will respond to a LOCA based on operability of containment systems.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj PNS-BS R16 PNS-BS	

SYS103 A1.01 - Containment System

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the containment system controls including: (CFR: 41.5 / 45.5)

Containment pressure, temperature, and humidity .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 56

56

B

SYS001 K6.02 - Control Rod Drive System
Knowledge of the effect of a loss or malfunction on the following CRDS components: (CFR: 41.7/45.7)
Purpose and operation of sensors feeding into the CRDS .....

Given the following Unit 1 conditions:

- Reactor power = 100%
- Control Rod Relative Position Indication (RPI) NOT available

Which ONE of the following is NOT available?

A. Group In Limit and Out Limit indications

B. Rod Misalignment Correction

C. RPS Trip Confirm signal

D. Asymmetric Rod alarm

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2011B ONS SRO NRC Examination QUESTION 56

56

B

General Discussion

Answer A Discussion

Incorrect. Plausible since initiating the Group In or Out Limit indication would require knowing the Control Rod positions and it is plausible to believe that this relies on RPI however it has its own separate set of switches to make the determination.

Answer B Discussion

Correct. Rod Misalignment Correction causes withdraw commands to result in some selected rods in a group not moving to achieve alignment within 1%. For example if Group 7, Rod 1 is low by 2%, it will move alone for the first 1% of withdrawal until it is within 1% of the Group Average, then all Group 7 rods will move out together. If Group 7 Rod 1 is high by 2%, then rods 2-8 will move outward for 1% of travel and then rod 1 will join in outward movement once it is within 1% of Group Average. The logic uses RPI indication (so a stuck rod has no effect on commands).

Answer C Discussion

Incorrect. Plausible since it is reasonable to believe that a trip confirmed signal would be a result of verifying all control rods have inserted and therefore it is plausible to believe that losing a portion of control rod position circuitry could result in losing the ability to determine if a Trip Confirm signal should be sent to ICS.

Answer D Discussion

Incorrect. Plausible since the Asymmetric Rod alarm requires knowing the position of the associated control rods and therefore it is plausible to believe that losing the RPI indication would result in the Asymmetric rod alarm being not available.

Basis for meeting the KA

Requires knowledge of the effect of a loss of control rod position sensors has on the Control Rod Drive system.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj IC-CRI R29,30 IC-CRI	

SYS001 K6.02 - Control Rod Drive System

Knowledge of the effect of a loss or malfunction on the following CRDS components: (CFR: 41.7/45.7)

Purpose and operation of sensors feeding into the CRDS .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 57

57

B

SYS002 K4.07 - Reactor Coolant System (RCS)
Knowledge of RCS design feature(s) and/or interlock(s) which provide for the following : (CFR: 41.7)
Contraction and expansion during heatup and cooldown.. .....

Given the following Unit 1 conditions:

- Reactor in MODE 3
- RCS heatup in progress
- 1HP-14 (LDST Bypass) in "Bleed"
- 1HP-16 is closed

1) The HIGHER LDST level (inches) that will automatically return 1HP-14 to "normal" is __(1)__

2) While 1HP-14 is in the "Bleed" position there __(2)__ flow through the Letdown Filters.

Which ONE of the following completes the statements above?

A. 1. < 40"
   2. is

B. 1. < 40"
   2. is NOT

C. 1. < 55"
   2. is

D. 1. < 55"
   2. is NOT

2011B ONS SRO NRC Examination QUESTION 57

57

B

General Discussion

Answer A Discussion

Incorrect. First part is correct. Second part is plausible since letdown flow normally goes through the Letdown Filters in route to the LDST however with 1HP-14 in BLEED, the filters are bypassed and letdown is routed to the A BHUT.

Answer B Discussion

Correct. LDST at <40 inches will return HP-14 to the "NORMAL" position if it is in the "BLEED" position. Letdown flow normally goes through the Letdown Filters in route to the LDST however with 1HP-14 in BLEED, the filters are bypassed and letdown is routed to the 1A BHUT.

Answer C Discussion

Incorrect. First part is plausible since 55" is the Lo Lo LDST level alarm setpoint. Second part is plausible since letdown flow normally goes through the Letdown Filters in route to the LDST however with 1HP-14 in BLEED, the filters are bypassed and letdown is routed to the A BHUT.

Answer D Discussion

Incorrect. First part is plausible since 55" is the Lo Lo LDST level alarm setpoint. Second part is correct.

Basis for meeting the KA

Requires knowledge of an interlock which provides for the expansion of RCS during heatup.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj PNS-HPI R8 PNS-HPI HPI Bleed drawing	

SYS002 K4.07 - Reactor Coolant System (RCS)
Knowledge of RCS design feature(s) and/or interlock(s) which provide for the following : (CFR: 41.7)
Contraction and expansion during heatup and cooldown.. .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 58

58

D

SYS015 A1.07 - Nuclear Instrumentation System (NIS)

Ability to predict and/or monitor changes in parameters to prevent exceeding design limits) associated with operating the NIS controls including: (CFR: 41.5 . 45.5)

Changes in boron concentration .....

Given the following Unit 1 conditions:

Time = 1200
- Reactor power = 50% stable
- Control Rod Group 7 = 95% withdrawn
- Inadvertent RCS de-boration is in progress

Time = 1215
- Group 7 = 85% withdrawn

Time = 1230
- Group 7 = 30% withdrawn

Time = 1245
- Group 6 = 95% withdrawn

Time = 1300
- Group 6 = 35% withdrawn

Which ONE of the following is the EARLIEST time that the minimum Shutdown Margin is NOT available?

REFERENCE PROVIDED

A. 1215

B. 1230

C. 1245

D. 1300

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2011B ONS SRO NRC Examination QUESTION 58

58

D

General Discussion

Answer A Discussion

Incorrect. Plausible since this is the first point that indicates being outside the Steady State Operating Band which is at 87% on Gp 7 however this is not the minimum SDM curve.

Answer B Discussion

Incorrect. Plausible since this is the correct answer if using the SDM curve for 1 inoperable control rod however since there is no indication of an inoperable control rod this is the wrong curve.

Answer C Discussion

Incorrect. Plausble since this point indicates entering the Restricted region of the rod curve however this does not mean that the minimum SDM has been lost, this indicates that rods are not within limits assumed in the Safety Analysis for plant operations.

Answer D Discussion

Correct. Using the 4 pumps no inoperable rod curve, this is the first point that has entered the Unacceptable Operation region of the curve.

Basis for meeting the KA

Per Chief Examiner, systems/components responding to neutron error will match KA. Requires the ability to predict when NIS controls (control rods) will exceed design Shutdown Margin limits due to an inadvertent deboration.

Basis for Hi Cog

The second part of this question requires more than one mental step to determine the direction of rod travel.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
SNO-LSU R33 COLR rod curves	Rod curves

SYS015 A1.07 - Nuclear Instrumentation System (NIS)

Ability to predict and/or monitor changes in parameters to prevent exceeding design limits) associated with operating the NIS controls including: (CFR: 41.5 . 45.5)

Changes in boron concentration .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 59

59

D

SYS016 K3.06 - Non-Nuclear Instrumentation System (NNIS)
Knowledge of the effect that a loss or malfunction of the NNIS will have on the following: (CFR: 41.7 / 45.6)
AFW system .....

Given the following Unit 3 conditions:

- Reactor power = 100%
- BOTH of the 3A Steam Generator Operating Range levels fail HIGH

Which ONE of the following describes consequences of the level instrument failures?

A. Main Feedwater controls both SG levels at 25" SU range

B. 3A Main Feedwater pump trips, 3A MDEFWP controls 3A SG at 30" XSUR, and 3B Main Feedwater pump controls 3B SG level at 25" ~~XSUR~~ SU RANGE.

C. BOTH Main Feedwater pumps trip, ONLY the MDEFWP's start, and control both SG levels at 30" XSUR

D. BOTH Main Feedwater pumps trip, ALL EFDW pumps start, and control both SG levels at 30" XSUR

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2011B ONS SRO NRC Examination QUESTION 59

59

D

General Discussion

Answer A Discussion

Incorrect. Plausible since the level given would be correct following a Rx trip with Main Feedwater available. There is a high SG level trip of the Main Turbine which would occur and therefore make it plausible to either not recognize that the hi SG level indications would trip BOTH main FDW pumps or believe it took hi level indication on both SG's to trip the main Feedwater pumps. Also plausible to believe that the 3A SG would trip only the 3A MFDWP and the 3B MFDWP would control SG levels. Believing that the MFDWP's are train specific following a Rx trip is plausible since the MS side of the SG's do become train specific following a Rx trip by way of the MSSV's closing.

Answer B Discussion

Incorrect. Plausible since the High SG level would trip the turbine and therefore the Rx. In that case it would be reasonable to believe that the 3A MFDWP feeds the 3A SG and the 3B MFDWP feeds the 3B SG since the MS line side of the SG's are in fact separated into trains following a trip by way of the MSSV's closing. In that context, it is plausible to believe that the 3A MFDWP would trip if the 3A SG had hi level indications. That would lead to the conclusion that the 3A MDEFWP would start and the level given is the correct level used by EFDW when controlling SG levels.

Answer C Discussion

Incorrect. Plausible since SG dryout protection will only actuate the MDEFWP's so if the candidate had the misconception that the hi SG level indications caused only the MDEFWP's to start following the trip of the MFDW pumps it would lead to this choice. The level given is correct for EFDW.

Answer D Discussion

Correct. The Hi SG level trip is a 2/2 circuit that trips BOTH Main Feedwater pumps on hi level in either SG. When both MFDWP's trip, all available EFDWP's will start and EFDW will control SG levels at 30" XSUR.

Basis for meeting the KA

Requires knowledge of the effect that a malfunction of SG level instrumentation will have on the Emergency Feedwater system.

Basis for Hi Cog

Requires analyzing plant conditions and failures and applying that knowledge to determine the impact of the failures on a different system.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj CF-FPT R8 CF-EF R20, R22 CF-FPT CF-EF	

SYS016 K3.06 - Non-Nuclear Instrumentation System (NNIS)

Knowledge of the effect that a loss or malfunction of the NNIS will have on the following: (CFR: 41.7 / 45.6)

AFW system .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 60

60

A

SYS029 A4.04 - Containment Purge System (CPS)
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
Containment evacuation signal .....

Given the following Unit 1 conditions:

- Reactor in MODE 5
- Reactor Building Purge in progress

Which ONE of the following is the most complete list of interlocks that will automatically occur as a result of a 1RIA-45 (Normal Vent Gas) HIGH Alarm?

A. Trip the Main Purge Fan ONLY

B. Trip the Main Purge Fan AND close 1LWD-2 ONLY

C. Trip the Main Purge Fan AND activate the RB Evacuation Alarm ONLY

D. Trip the Main Purge Fan, close 1LWD-2, AND activate the RB Evacuation Alarm

---

2011B ONS SRO NRC Examination QUESTION 60

60

A

General Discussion

Answer A Discussion

Correct. 1RIA-45 HIGH alarm will trip the Main Purge Fan if it is running.

Answer B Discussion

Incorrect. Closing 1LWD-2 is plausible since the RIA-45 alarm would be indiciative of issues inside the Reactor Building and isolating the RB normal sump is a logical step in containing the activity. Additionally, it would be correct for RIA-49.

Answer C Discussion

Incorrect. Plausible since activating the RB Evacuation Alarm is a logical step to take when activity increasing in the RB to the point of causing an RIA alarm. Additionally, this would be correct for RIA-49 which monitors RB environment.

Answer D Discussion

Incorrect. Closing LWD-2 and initiating the RB evacuation alarm are both plausible as described in B and C answer explanations.

Basis for meeting the KA

Requires the ability to determine if a Containment evacuation signal will be automatically generated during a RB Purge that causes an RIA-45 HIGH alarm. The ability to determine if the RB evacuation alarm should have alarmed demonstrates the ability to monitor Containment Evacuation signal from the control room.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj RAD-RIA R2,16, RAD-RIA	

SYS029 A4.04 - Containment Purge System (CPS)

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

Containment evacuation signal .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 61

61

A

SYS033 2.1.20 - Spent Fuel Pool Cooling System (SFPCS)
SYS033 GENERIC
Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)

Given the following plant conditions:

- Unit 1 BWST in purification
- Unit 1&2 Spent Fuel Pool level -.3 feet slowly decreasing
- AP/1-2/A/1700/035 (Loss of SFP Cooling and/or Level) initiated

Which ONE of the following states:

1) which unit's BWST can be used for SFP makeup in accordance with AP/35?

2) the HIGHEST SFP level (feet) at which the SF Cooling pumps will AUTOMATICALLY trip?

A. 1. Unit 1
   2. -2.5

B. 1. Unit 1
   2. -4.0

C. 1. Unit 2
   2. -2.5

D. 1. Unit 2
   2. -4.0

2011B ONS SRO NRC Examination QUESTION 61

61

A

General Discussion

Answer A Discussion

CORRECT. According to the NOTE associatd with step 4.13 of AP/35, to use either Unit 1 or Unit 2 BWST as a makeup source the associated BWST must already be aligned in its purification alignment. The SF Cooling pump auto trip on low SFP level setpoint is -2.5 feet.

Answer B Discussion

Incorrect. First part is correct. Second part is plausible since this is the level of the pump suction lines below the normal pool level.

Answer C Discussion

Incorrect. First part is plausible as it would be reasonable to assume that the BWST must NOT be aligned in another flowpath to be used as a makup source since you could believe that the intent of the guidance is to save the time it would take to re-align the BWST for use as a makup source. Second part is correct.

Answer D Discussion

Incorrect. First part is plausible as it would be reasonable to assume that the BWST must NOT be aligned in another flowpath to be used as a makup source since you could believe that the intent of the guidance is to save the time it would take to re-align the BWST for use as a makup source. Second part is plausible since this is the level of the pump suction lines below the normal pool level.

Basis for meeting the KA

Requires ability to determine which BWST should be used as it applies to makeup to the SFP during a loss of SFP level in accordance with procedural guidance provided in AP/35 and therefore requires the ability to interpret and execute the associated AP step.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj FH-SFC R22 FH-SFC	

SYS033 2.1.20 - Spent Fuel Pool Cooling System (SFPCS)
SYS033 GENERIC
Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 62

62

D

SYS056 A2.04 - Condensate System

Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Loss of condensate pumps .....

Given the following Unit 1 conditions:

- Reactor power = 80% stable
- 1A and 1B CBP operating

Current conditions:

- Time = 1200:00
- 1A CBP trips
- Feedwater Pump suction pressure = 225 psig slowly decreasing

Which ONE of the following describes the:

1) runback rate (%/min) inserted by ICS?

2) procedure that will be directed by the Procedure Director at Time = 1202:00 assuming Feedwater Pump suction remains approximately 220 psig?

A. 1. 15
   2. AP/1/A/1700/001 (Unit Runback)

B. 1. 15
   2. EOP

C. 1. 20
   2. AP/1/A/1700/001 (Unit Runback)

D. 1. 20
   2. EOP

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2011B ONS SRO NRC Examination QUESTION 62

62

D

General Discussion

Answer A Discussion

Incorrect. First part is plausible since there are ICS runbacks that incorporate the 15%/min runback rate. Second part is plausible since it would be correct for the first 90 seconds of the transient.

Answer B Discussion

Incorrect. First part is plausible since there are ICS runbacks that incorporate the 15%/min runback rate. Second part is correct,

Answer C Discussion

Incorrect. First part is correct. Second part is plausible since it would be correct for the first 90 seconds of the transient.

Answer D Discussion

Correct. With FDWP suction pressure < 235 psig, an ICS runback is initiated. The runback rate is 20%/min to a power level of 15% or until the low suction pressure clears. After 90 seconds, if FDWP suction pressure is still < 235 psig the FDWP's will trip which will trip the Rx and require entry into the EOP to mitigate the loss of main feedwater.

Basis for meeting the KA

Requires knowledge of the impact of a loss of Condensate Booster Pump and knowledge of the procedure that will be used to mitigate the event.

Basis for Hi Cog

Requires analyzing plant data to determine the Unit response and the procedure that will be used to mitigate the event.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj STG-ICS R3 EAP-SA R21, R24 EAP-SA STG-ICS Intro & Chptr 2	

SYS056 A2.04 - Condensate System

Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Loss of condensate pumps .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 63

63

A

SYS071 K5.04 - Waste Gas Disposal System (WGDS)

Knowledge of the operational implication of the following concepts as they apply to the Waste Gas Disposal System: (CFR: 41.5 / 45.7)

Relationship of hydrogen/oxygen concentrations to flammability .....

Which ONE of the following:

1) is the LOWER concentration of Hydrogen that would require actions to an isolated GWD tank in accordance with Limits and Precautions of OP/1-2/A/1104/18; Gaseous Waste Disposal System

2) describes the actions required if the lower limit on Hydrogen is exceeded?

A. 1. 3.1%
   2. Dilute the tank contents with Nitrogen

B. 1. 4.1%
   2. Dilute the tank contents with Nitrogen

C. 1. 3.1%
   2. Dilute the tank contents with CO2

D. 1. 4.1%
   2. Dilute the tank contents with CO2

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2011B ONS SRO NRC Examination QUESTION 63

63

A

General Discussion

Answer A Discussion

Correct. If H2 concentration exceeds 3% then 1104/18 will be used to dilute the tank with N2 to reduce the H2 concentration.

Answer B Discussion

Incorrect. First part is plausible since 4% is the actual lower flammability limit of H2 in air and is a recognizable threshold value from SLC 16.11.4. Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is plausible since CO2 is used to dilute the H2 concentration in the Main Electrical Generator and one of the main reasons it is used is to prevent H2 and O2 concentrations from reaching the flammability limit. Since CO2 is used in another system for basically the same reason it is a plausible distracter.

Answer D Discussion

Incorrect: First part is plausible since 4% is the actual lower flammability limit of H2 in air and is a recognizable threshold value from SLC 16.11.4. Second part is plausible since CO2 is used to dilute the H2 concentration in the Main Electrical Generator and one of the main reasons it is used is to prevent H2 and O2 concentrations from reaching the flammability limit. Since CO2 is used in another system for basically the same reason it is a plausible distracter.

Basis for meeting the KA

Requires knowledge of the operational implication of H2 approaching flammability limit in a GWD tank.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj WE-GWD R12, 13, 14, 16) WE-GWD	

SYS071 K5.04 - Waste Gas Disposal System (WGDS)

Knowledge of the operational implication of the following concepts as they apply to the Waste Gas Disposal System: (CFR: 41.5 / 45.7)

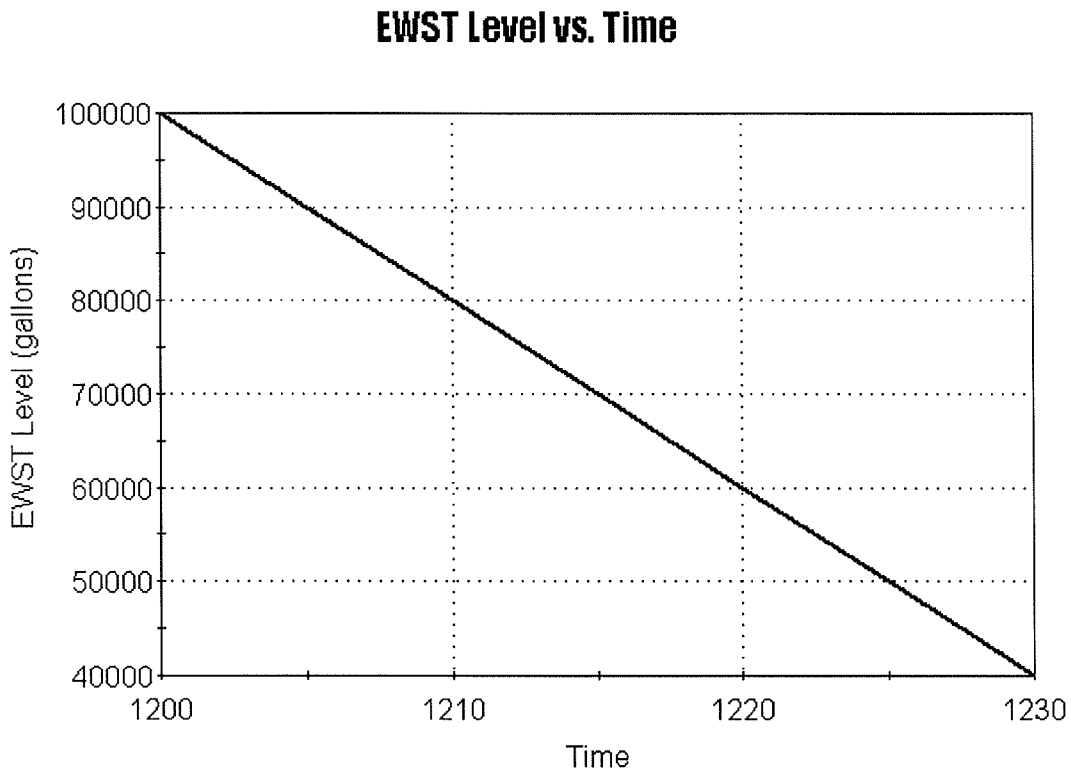
Relationship of hydrogen/oxygen concentrations to flammability .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 64 64 **B**

SYS086 A3.01 - Fire Protection System (FPS)
Ability to monitor automatic operation of the Fire Protection System including: (CFR: 41.7 / 45.5)
Starting mechanisms of fire water pumps .....

Which ONE of the following is the EARLIEST time that a start signal will be generated for an HPSW pump whose switch is in "BASE"?



A. 1225

B. 1220

C. 1210

D. 1205

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2011B ONS SRO NRC Examination QUESTION 64

64

B

General Discussion

Answer A Discussion

Incorrect. Plausible since 50,000 gal would be correct for a pump in "Standby"

Answer B Discussion

Correct. 60,000 gal EWST level is the setpoint for starting an HPSW pump in BASE. Time = 1220 corresponds to reaching 60,000 gal.

Answer C Discussion

Incorrect. Plausible since 80,000 gal is the setpoint for automatically stopping a running HPSW pump.

Answer D Discussion

Incorrect. Plausible since 90,000 is the setpoint for Normal Level indication (No amber or white light lit).

Basis for meeting the KA

Requires knowledge of what will auto start an HPSW pump. The ability to determine if the HPSW pump should have started is integral to the ability to monitor automatic operation of the pump.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj. SSS-HPW R5 SSS-HPW	

SYS086 A3.01 - Fire Protection System (FPS)

Ability to monitor automatic operation of the Fire Protection System including: (CFR: 41.7 / 45.5)

Starting mechanisms of fire water pumps .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 65

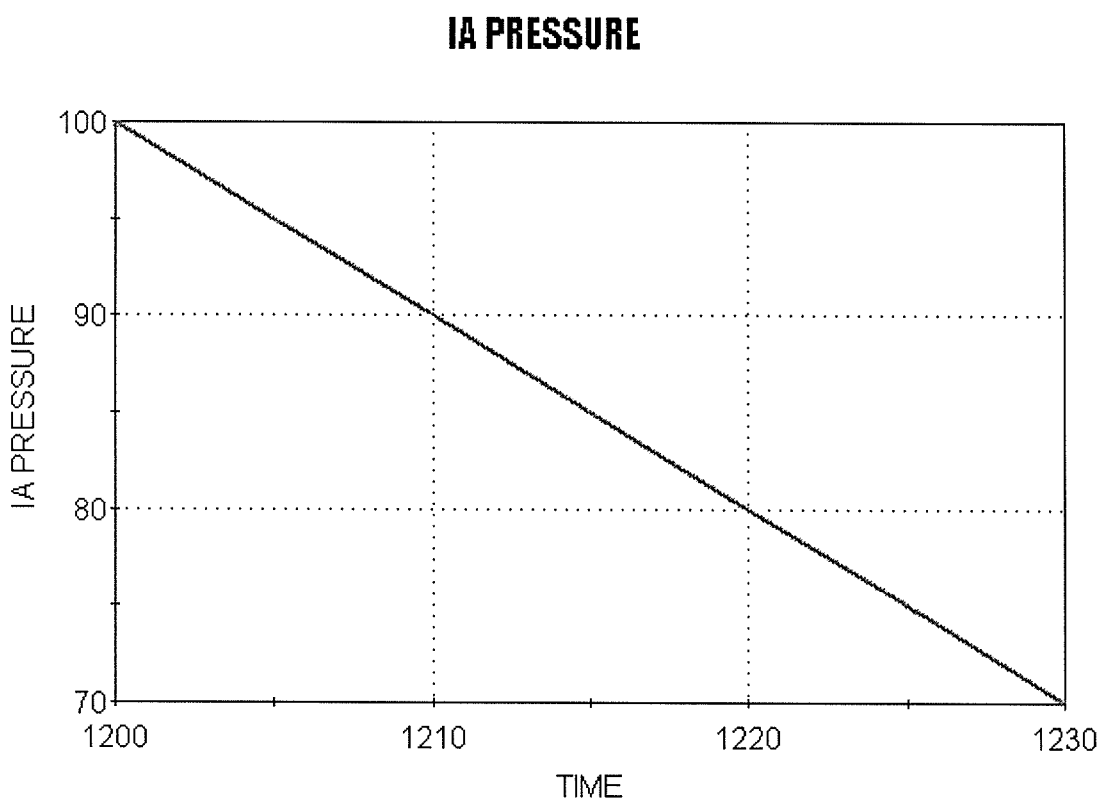
65

D

SYS079 K1.01 - Station Air System (SAS)

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

IAS .....



Based on the graph above, which ONE of the following describes the time at which SA-141 (SA to IA Controller) will automatically open?

A. 1207

B. 1210

C. 1212

D. 1215

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2011B ONS SRO NRC Examination QUESTION 65

65

D

General Discussion

Answer A Discussion

Incorrect: Plausible since 93 psig is the pressure at which the Backup IA compressors will start.

Answer B Discussion

Incorrect: Plausible since 90 psig is the pressure at which the Diesel Air Compressors will start

Answer C Discussion

Incorrect: Plausible sine 88 psig is the pressure at which the AIA compressors will start

Answer D Discussion

CORRECT: SA to IA Controller (SA-141) valve senses the IA system pressure and opens at 85 psig to allow service air into the IA system.

Basis for meeting the KA

Requires knowledge of automatic cross-connect between Service air and Instrument air systems.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	NRC 2009A Q64

Development References	Student References Provided
Obj SSS-IA R52	

SYS079 K1.01 - Station Air System (SAS)

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

IAS .....

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 66

66

A

GEN2.1 2.1.14 - GENERIC - Conduct of Operations

Conduct of Operations

Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trips, mode changes, etc. (CFR: 41.10 / 43.5 / 45.12)

Which ONE of the following lists of items will ALWAYS require a plant page (except for unanticipated automatic starts and emergency situations) in accordance with OMP 1-02 (Rules of Practice)?

A. Opening PCB-18
Closing PCB-18

B. ALL AP entries
Starting 1B1 RCP

C. Starting and stopping a 4160V Motor
Closing PCB-18

D. Starting and stopping 1B1 RCP
Starting a 4160V Motor

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2011B ONS SRO NRC Examination QUESTION 66

66

A

General Discussion

Answer A Discussion

Correct. Per OMP 1-2 both opening and closing of PCB's requires a plant page.

Answer B Discussion

Incorrect. First part is plausible since many AP's require a plant page when entered however not all do. The page is specified within the AP if required. Second part is correct.

Answer C Discussion

Incorrect. First part is plausible since starting a 4160V motor does require a plant page. Second part is correct.

Answer D Discussion

Incorrect. Starting RCP's requires a plant page but securing the RCP's do not. Second part is correct.

Basis for meeting the KA

Requires knowledge of specific criteria that require plant wide pages.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	ILT39 Audit & NRC 2009B Q66

Development References	Student References Provided
Obj ADM-OMP R57,58 ADM-OMP OMP 1-02	

GEN2.1 2.1.14 - GENERIC - Conduct of Operations

Conduct of Operations

Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trips, mode changes, etc. (CFR: 41.10 / 43.5 / 45.12)

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 67

67

A

GEN2.1 2.1.27 - GENERIC - Conduct of Operations
Conduct of Operations
Knowledge of system purpose and/or function. (CFR: 41.7)

Which ONE of the following describes the design purpose of the Main Feedwater and Main Turbine RPS Anticipatory trips?

A. Reducing the possibility of lifting the PORV

B. Reduce the possibility of lifting the Pressurizer Code relief valves

C. Serve as a backup to the RPS High RCS Pressure trip

D. Serve as a backup to the RPS High RCS Temperature trip

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2011B ONS SRO NRC Examination QUESTION 67

67

A

General Discussion

Answer A Discussion

Correct, the RPS anticipatory trips function are to reduce the possibility of lifting the PORV.

Answer B Discussion

Incorrect. Plausible since the Code relief valves on the pressurizer could be challenged by rapidly increasing RCS pressure and the anticipatory trips do increase the margin available to prevent the Code relief valves from lifting. Additionally plausible since the Code relief valves (and not the PORV) are credited to help prevent exceeding the RCS pressure Safety Limit therefore it would be plausible that the RPS trips were designed to help prevent getting to the Code RV's setpoint.

On the surface it may appear that there is a subset issue with A and B however that is not the case. If the

Answer C Discussion

Incorrect. Plausible since it would be an RPS High Pressure trip that would be most likely to trip the Rx in the event of a loss of Main FDW or Main Turbine if the two Anticipatory trips were not available.

Answer D Discussion

Incorrect. Plausible since either of the events would result in rapidly increasing RCS temperature therefore it is plausible to believe that the anticipatory trips were a backup to the High Temperature trips.

Basis for meeting the KA

Requires knowledge of the design purpose of RPS Anticipatory trips.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj IC-RPS R9 IC-RPS	

GEN2.1 2.1.27 - GENERIC - Conduct of Operations

Conduct of Operations

Knowledge of system purpose and/or function. (CFR: 41.7)

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 68

68

D

GEN2.1 2.1.5 - GENERIC - Conduct of Operations
Conduct of Operations
Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc. (CFR: 41.10 / 43.5 / 45.12)

Given the following plant conditions:

- Unit 1 Reactor power = 100%
- Unit 2 Reactor in MODE 3

In accordance with OMP 2-1 Attachment D (SSF Staffing Requirements), which ONE of the following:

1) states restrictions on the RO designated to man the SSF if required?

2) describes the minimum actions required for one of the designated SSF RO's to take a short trip to the station canteen?

A. 1. MUST remain in the Horseshoe area of the Control Room
   2. The RO must be relieved by another licensed operator that is NOT part of the minimum staffing before leaving the designated area

B. 1. MUST remain in the Horseshoe area of the Control Room
   2. A method of communication must be established to enable notification of the requirement to activate the SSF before leaving the designated area

C. 1. Can be anywhere inside the Control ROOM CAD doors
   2. The RO must be relieved by other licensed operator that is NOT part of the minimum staffing before leaving the designated area

D. 1. Can be anywhere inside the Control ROOM CAD doors
   2. A method of communication must be established to enable notification of the requirement to activate the SSF before leaving the designated area

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2011B ONS SRO NRC Examination QUESTION 68

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D

General Discussion

Answer A Discussion

Incorrect. First part is plausible as there are specific requirements where RO's must remain in the horseshoe area as described in Att B of OMP 2-1. Second part is plausible since it would be correct if both Units required the SSF to be operable and the Control Room were staffed with the minimum staffing under those conditions (4 RO's). Second part is plausible since it would be correct with minimum staffing if only one of the units were above MODE 4 and therefore only one unit required an SSF RO.

Answer B Discussion

Incorrect. First part is plausible as there are specific requirements where RO's must remain in the horseshoe area as described in Att B of OMP 2-1. Second part is correct,

Answer C Discussion

Incorrect. First part is correct. Second part is plausible since it would be correct if both Units required the SSF to be operable and the Control Room were staffed with the minimum staffing under those conditions (4 RO's). Second part is plausible since it would be correct with minimum staffing if only one of the units were above MODE 4 and therefore only one unit required an SSF RO.

Answer D Discussion

Correct. Per ATT D of AOM 2-1 the SSF RO must be between the CAD doors however when both units require the SSF RO, it is acceptable for one of the two SSF RO's to leave the control room area for short periods of time as long as a method of communication is established to enable notification of the requirement to man the SSF.

Basis for meeting the KA

Requires ability to use OMP 2-01 requirements regarding requirments placed on the RO designated as the SSF RO.

Basis for Hi Cog

Requires analyzing the status of Units 1 and 2 and then applying the requirements of OMP 2-01 to that analysis.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj ADM-OMP R5 ADM-OMP OMP 2-01 Attach. B & D	

GEN2.1 2.1.5 - GENERIC - Conduct of Operations

Conduct of Operations

Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc. (CFR: 41.10 / 43.5 / 45.12)

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 69

69

C

GEN2.2 2.2.12 - GENERIC - Equipment Control
Equipment Control
Knowledge of surveillance procedures. (CFR: 41.10 / 45.13)

Given the following Unit 1 conditions:

- Reactor power = 100%
- RO is performing PT/1/A/0600/001 (Periodic Instrument Surveillance)
- A Tech Spec required surveillance does not meet its acceptance criteria
- There is NOT an outstanding Surveillance Evaluation for the affected surveillance

Which ONE of the following describes ALL actions required (if any) to disposition the affected surveillance sign off block once Enclosure 13.12 (Surveillance Evaluation) has been initiated in accordance with PT/1/A/0600/001?

A. Leave the block empty

B. Put your initials in the block ONLY

C. Initial the block AND document that a Surveillance Evaluation is in effect

D. Put an asterisk (*) in the block and explain at the bottom of the page that a Surveillance Evaluation has been initiated

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C

General Discussion

Answer A Discussion

Incorrect. Plausible since the sign off block represents a step in the procedure and it is the normal operating practice to not sign off a step that has not been performed.

Answer B Discussion

Incorrect. Plausible since this is partially correct. Additionally, you are allowed to initial steps whose intent has been completed and it is plausible to believe that initiating the Surveillance Evaluation would represent performing the intent of the step since it will evaluate the operability of the associated equipment.

Answer C Discussion

Correct. Per instructions contained in the body of the enclosure of the procedure, once the Surveillance Evaluation has been initiated, record Surveillance Evaluation in effect and place your initials in the block.

Answer D Discussion

Incorrect. Plausible since this would be partially correct however the procedure specifies putting your initials in the block as well.

Basis for meeting the KA

Requires knowledge of PT/600/01 (Periodic Instrument Surveillance) and how to disposition surveillances that are not met.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
T&Q 2620001 PT/600/01 Encl MODE 1&2	

GEN2.2 2.2.12 - GENERIC - Equipment Control

Equipment Control

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

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 70

70

B

GEN2.2 2.2.13 - GENERIC - Equipment Control
Equipment Control
Knowledge of tagging and clearance procedures. (CFR: 41.10 / 45.13)

Which ONE of the following tags would be used for configuration control of 1HP-409 in accordance with NSD-500 (Red Tags/Configuration Control Tags)?

A. ~~Red Tag~~ MORT TAG

B. White Tag

C. OORT tag

D. CORT tag

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B

General Discussion

Answer A Discussion

Incorrect. Plausible since Red Tags are tags addressed in NSD 500 however they are used for personal safety.

Answer B Discussion

Correct. White tags are used for configuration control of components and systems

Answer C Discussion

Incorrect. Plausible since OORT tags are tags used in the field during equipment maintenance and are addressed by NSD 500. OORT tags are used to re-assign operations control of a component that is owned by Chemistry to Operations. Since the component in question is owned by Operations, an OORT tag is plausible since it begins with an "O" (for Operations).

Answer D Discussion

Incorrect. Plausible since CORT tags are tags that are use in the field during maintenance activities and are addressed by NSD 500. A CORT tag would be used to re-assign operational control of a component owned by operations to Chemistry. It is plausible to believe that a CORT tag is for configuration control since CORT tags are used on components where Operations is the Owner Control Group and Operations is the owner control group for HP-409.

Basis for meeting the KA

Requires generic knowledge of the tagging process defined by NSD 500

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj ADM-SD R6 NSD 500	

GEN2.2 2.2.13 - GENERIC - Equipment Control

Equipment Control

Knowledge of tagging and clearance procedures. (CFR: 41.10 / 45.13)

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 71

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B

GEN2.2 2.2.36 - GENERIC - Equipment Control

Equipment Control

Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations. (CFR: 41.10 / 43.2 / 45.13)

Given the following Unit 1 conditions:

- Reactor power = 100%

Which ONE of the following would result in a Tech Spec LCO being NOT met?

A. 1B Core Flood Tank pressure = 579 psig due to leakage

B. 1A RBCU breaker racked out for breaker repair

C. 1C LPI pump isolated for maintenance

D. 1B HPI pump switch in OFF for testing

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B

General Discussion

Answer A Discussion

Incorrect. Plausible since the low pressure alarm is at 585 psig however TS 3.5.1requires pressure > 575 psig

Answer B Discussion

Correct, when above MODE 3, TS 3.6.5 requires all 3 RBCU's be operable.

Answer C Discussion

Incorrect. Plausible since LPI pumps are ES required pumps per TS 3.5.3 however only the A and B LPI pumps are required.

Answer D Discussion

Incorrect. Plausible since it is reasonable to believe that with the pump switch in OFF the pump will not respond as required and while this will prevent the pump from starting on low seal injection flow, it does not prohibit the required auto start on an ES signal as required by TS 3.5.2

Basis for meeting the KA

Requires the ability to analyze component status based on maintenance and determine its impact on the requirements of various Tech Spec LCO's.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

Obj. ADM-ITS R8
TS 3.5.1
TS 3.6.5
TS 3.5.2
TS 3.5.3

Student References Provided

GEN2.2 2.2.36 - GENERIC - Equipment Control

Equipment Control

Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations. (CFR: 41.10 / 43.2 / 45.13)

401-9 Comments:

Remarks/Status

2011B ONS SRO NRC Examination QUESTION 72

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B

GEN2.3 2.3.5 - GENERIC - Radiation Control

Radiation Control

Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. (CFR: 41.11 / 41.12 / 43.4 / 45.9)

Which ONE of the following Area Radiation Monitors will sound a LOCAL alarm (do NOT include any associated Statalarms) to indicate increased radiation levels?

A. 1RIA-1 (Control Room Monitor)

B. 1RIA-15 (High Pressure Injection Pump Room Monitor)

C. 1RIA-17 ("B" Main Steam Line Monitor)

D. 1RIA-56 (High Range Stack Monitor)

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B

General Discussion

Answer A Discussion

Incorrect. Plausible since this is an area RIA monitor and most Area monitors provide a local alarm.

Answer B Discussion

Correct. 1RIA-15 has a local alarm.

Answer C Discussion

Incorrect. Plausible since this is an area RIA monitor and most Area monitors provide a local alarm.

Answer D Discussion

Incorrect. Plausible since this is an area RIA monitor and most Area monitors provide a local alarm.

Basis for meeting the KA

Requires ability to use a fixed radiation monitor and its alarm. The ability to determine whether or not a local alarm would sound to alert you of increasing radiation levels would be required as part of the ability to use effectively use the radiation monitor.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
Obj RAD-RIA R2 RAD-RIA	

GEN2.3 2.3.5 - GENERIC - Radiation Control

Radiation Control

Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. (CFR: 41.11 / 41.12 / 43.4 / 45.9)

401-9 Comments:	Remarks/Status

2011B ONS SRO NRC Examination QUESTION 73

73

A

GEN2.3 2.3.13 - GENERIC - Radiation Control

Radiation Control

Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (CFR: 41.12 / 43.4 / 45.9 / 45.10)

Given the following Unit 1 conditions:

- 1A GWD tank release in progress
- 1RIA-37 HIGH alarm actuates
- 1SA-8/B9 (Process Monitor Radiation High) actuates

Which ONE of the following describes the

1) automatic actions that will occur?

2) procedure that contains actions that must be performed prior to re-initiating the release?

A. 1. Closes the GWD tank outlet valves and isolates the Waste Gas Exhauster but does NOT trip the running GWD compressors
   2. OP/1-2/A/1104/018 (GWD System) ONLY

B. 1. Closes the GWD tank outlet valves, isolates the Waste Gas Exhauster, AND trips running GWD compressors
   2. OP/1-2/A/1104/018 (GWD System) ONLY

C. 1. Closes the GWD tank outlet valves and isolates the Waste Gas Exhauster but does NOT trip the running GWD compressors
   2. AP/18 (Abnormal Release of Radioactivity) and OP/1-2/A/1104/018 (GWD System) ONLY

D. 1. Closes the GWD tank outlet valves, isolates the Waste Gas Exhauster, AND trips running GWD compressors
   2. AP/18 (Abnormal Release of Radioactivity) and OP/1-2/A/1104/018 (GWD System) ONLY

2011B ONS SRO NRC Examination QUESTION 73

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A

General Discussion

Answer A Discussion

Correct. A HIGH alarm from RIA-37 will close all of the GWD tank outlet valves and isolate the Waste Gas Exhauster. The associated ARG will direct going to OP/1-2/A/1104/018 (GWD System) to provide additional guidance on what to do with the release that has now been terminated. The entry conditions for AP/18 are not met.

Answer B Discussion

Incorrect. First part is plausible since it is partially correct in that a HIGH alarm from RIA-37 will close all of the GWD tank outlet valves and isolate the Waste Gas Exhauster. Tripping the GWD compressors is plausible under the misconception that it is the GWD compressors that are provideing the driving force for the tank release. Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is plausible since for both RIA-54 (Turbine Building Sump) and RIA-45 (RB Purge), there are actions in AP/18 that must be performed prior to going to the associated OP to take actions to resume the release.

Answer D Discussion

Incorrect. First part is plausible since it is partially correct in that a HIGH alarm from RIA-37 will close all of the GWD tank outlet valves and isolate the Waste Gas Exhauster. Tripping the GWD compressors is plausible under the misconception that it is the GWD compressors that are provideing the driving force for the tank release. Second part is plausible since for both RIA-54 (Turbine Building Sump) and RIA-45 (RB Purge), there are actions in AP/18 that must be performed prior to going to the associated OP to take actions to resume the release.

Basis for meeting the KA

Requires knowledge of actions pertaining to license duties that are directed by a Radiological Safety Procedure (GWD system procedure) in response to radiation monitor alarms.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

Obj. EAP-APG R9 RAD-RIA R2
1SA8/B9
RAD-RIA
GWD drwg

Student References Provided

GEN2.3 2.3.13 - GENERIC - Radiation Control

Radiation Control

Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (CFR: 41.12 / 43.4 / 45.9 / 45.10)

401-9 Comments:

Remarks/Status

2011B ONS SRO NRC Examination QUESTION 74

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B

GEN2.4 2.4.16 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines. (CFR: 41.10 / 43.5 / 45.13)

Given the following Unit 1 conditions:

Initial conditions:

- Reactor power = 90% slowly decreasing
- SG Primary to Secondary leak rate = 6 gpm stable
- AP/1/A/1700/031 (Primary to Secondary Leakage) in progress
- Unit shutdown in progress

Current conditions

- Reactor power = 60% slowly decreasing
- SG Primary to Secondary leak rate = 28 gpm slowly increasing

Which ONE of the following describes the actions required in accordance with plant procedures?

A. Continue unit shutdown using AP/31

B. Exit AP/31 and go directly to SGTR tab

C. Exit AP/31, perform IMA's, then go to SGTR tab

D. Perform AP/31 in parallel with performing the SGTR tab

2011B ONS SRO NRC Examination QUESTION 74

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B

General Discussion

Answer A Discussion

Incorrect. Plausible since AP/31 would still be in effect if the leak rate were < 25 gpm and some AP's are self contained AP's that direct unit shutdowns and/or power decreases

Answer B Discussion

Correct. There is an IAAT in AP/31 that directs going tothe EOP if SG leak rate reaches 25 gpm. The entry conditions of the EOP direct going directly to the SGTR tab with leak rate > 25 gpm.

Answer C Discussion

Incorrect. Plausible since exiting AP/31 and entering the EOP is correct and this would be the correct EOP path for most EOP entries however entering while on line with a SG tube leak is a unique exception that requires going direclty to the SGTR tab.

Answer D Discussion

Incorrect. Plausible since most AP's are performed in parallel with the EOP when EOP entry is required.

Basis for meeting the KA

Requires knowledge of the hierarchy of the EOP vs. AP/31.

Basis for Hi Cog

Requires analyzing plant conditons and determining a course of action based on the analysis.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

Obj EAP-SA R21
AP31
EOP entry conditions
EAP-SA

Student References Provided

GEN2.4 2.4.16 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines. (CFR: 41.10 / 43.5 / 45.13)

401-9 Comments:

Remarks/Status

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75

D

GEN2.4 2.4.49 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (CFR: 41.10 / 43.2 / 45.6)

Given the following Unit 1 conditions:

Initial conditions:

- Reactor power = 100%
- Both Main Feedwater pumps trip

Current conditions:

- REACTOR TRIP pushbutton has been depressed
- Reactor power = 3% slowly decreasing

Which ONE of the following describes the NEXT action required in accordance with EOP Immediate Manual Actions?

A. PERFORM ~~GO TO~~ Rule 1

B. Align HPI Emergency Boration

C. Verify RCP seal injection available

D. Depress the Turbine TRIP pushbutton

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2011B ONS SRO NRC Examination QUESTION 75

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D

General Discussion

Answer A Discussion

Incorrect. Plausible since this would be correct if power level was > 5%.. Additional plausibility since there is a 1% power threshold for actions within Rule 2 therefore it is plausible to believe that if power is still > 1%, going to Rule 1 is required.

Answer B Discussion

Incorrect. Plausible since this is one of the first actions taken by Rule 1 during an ATWS. It is plausible to believe these actions are part of IMA's since it is in IMA's that the ATWS is diagnosed and aligning emergency boration is critical to the successful mitigation of the ATWS.

Answer C Discussion

Incorrect. Plausible since this is an action taken in IMA's however it is done after the main turbine is tripped.

Answer D Discussion

Correct. Since Rx power is < 5% the next action is to depress the Turbine Trip pushbutton.

Basis for meeting the KA

Requires the ability to perform EOP IMA's from memory.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

Obj EAP-SA R24
EOP-SA
IMA's of EOP

Student References Provided

GEN2.4 2.4.49 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (CFR: 41.10 / 43.2 / 45.6)

401-9 Comments:

Remarks/Status