EPE007 EK2.02 - Reactor Trip

Knowledge of the interrelations between a reactor trip and the following: (CFR 41.7 / 45.7)

Breakers, relays and disconnects ....

Given the following:

- The plant is at 100% power
- Maintenance and Testing of “A” Reactor Trip Breaker is in progress
- The “A” Reactor Trip Bypass Breaker has been placed in service
- The “A” Reactor Trip Breaker has been removed from service
- A transient condition exists requiring a reactor trip
- The OATC depresses the manual Reactor trip pushbutton

Which ONE of the following describes the plant response?

The “A” Reactor Trip Bypass Breaker opens due to actuation of its ____(1)____ and the “B” Reactor Trip Breaker opens due to actuation of its ____(2)____.

A. (1) UV trip
(2) shunt trip ONLY

B. (1) shunt trip
(2) UV and shunt trip

C. (1) shunt trip
(2) UV trip ONLY

D. (1) UV trip
(2) UV and shunt trip

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the "A" reactor trip breaker will receive both an UV and a shunt trip actuation. This is plausible because the trip breaker receives an UV trip actuation.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the "A" reactor trip bypass breaker does not receive a shunt trip unless the pushbutton is depressed locally at the panel. Plausible because this trip is actuated by a pushbutton at the panel.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. This is incorrect because the "A" reactor trip bypass breaker does not receive a shunt trip unless the pushbutton is depressed locally at the panel. This is plausible because this trip is actuated by a pushbutton at the panel.

Answer D Discussion

Correct. 1st part correct, 2nd part correct. According to Technical Specifications Bases 3.3.1 Reactor Protection System (RPS) Instrumentation (p B 3.3-6 & B 3.3-7; Rev 0) BACKGROUND Reactor Trip Switchgear, when the required logic matrix combination is completed, the RPS relay logic output voltage signal is removed, the undervoltage coils are de-energized, the breaker trip lever is actuated by the de-energized undervoltage coil, and the RTBs and bypass breakers are tripped open. This allows the shutdown rods and control rods to fall into the core. In addition, to the de-energization of the undervoltage coils, each RTB is also equipped with a shunt trip device that is energized to trip the breaker open upon receipt of a reactor trip signal from the RPS relay logic.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the interrelationship between a reactor trip manual pushbutton and the components used to trip the reactor trip and reactor trip bypass breakers.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must demonstrate knowledge of the components used to trip the reactor trip and reactor trip bypass breakers when the manual reactor trip pushbutton is depressed, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	RPS-001 4

Development References

Technical Specifications Bases 3.3.1 Reactor Protection System (RPS) Instrumentation
10 CFR 55.41.7

Student References Provided

EPE007 EK2.02 - Reactor Trip

Knowledge of the interrelations between a reactor trip and the following: (CFR 41.7 / 45.7)

Breakers, relays and disconnects ....

Remarks/Status

7/17/15 Developed from bank question RPS-001 4

7/20/15 Reviewed by exam supervisor

11/19/15 AOM-SHIFT approved question for 60 day submittal.

APE008 2.1.30 - Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)
APE008 GENERIC
Ability to locate and operate components, including local controls. (CFR: 41.7 / 45.7)

With the plant at 100% power an event occurs. **(SEE GIVEN CONDITIONS ON NEXT PAGE)**

(1) Which ONE of the following describes the action(s) required to complete the immediate actions?

After verification of the immediate actions the CRS directs you to contact an Auxiliary Operator to open the supply breaker for RC-535, PORV BLOCK valve.

(2) Which ONE of the following identifies the MCC that provides power to RC-535, PORV BLOCK valve?

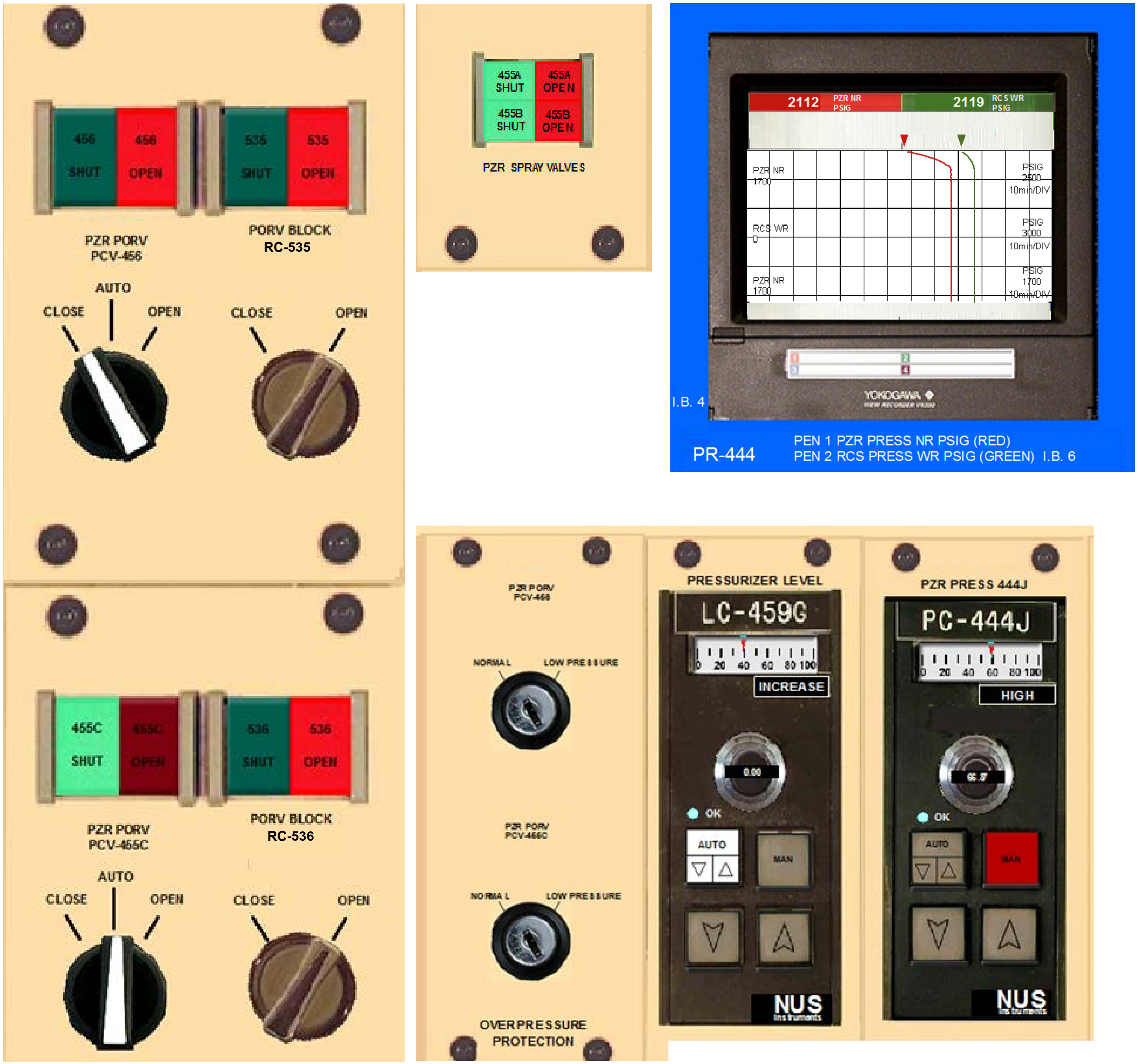
A. (1) Close RC-535 ONLY
(2) MCC-5

B. (1) Close RC-535 ONLY
(2) MCC-6

C. (1) Close RC-535 and control pressurizer heaters and normal PZR spray valves
(2) MCC-6

D. (1) Close RC-535 and control pressurizer heaters and normal PZR spray valves
(2) MCC-5

Question 2 Given Conditions



General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. This is incorrect because step 3 of AOP-019 is also an immediate action step to control pressurizer heaters and normal PZR spray to restore RCS pressure and MCC-5 is the other emergency train MCC power supply. This is plausible because closing a PORV block valve for a stuck open PORV is immediate action step 2.b rno action. In addition, most redundant emergency safeguards components have one component powered from MCC-5 and the other train component powered from MCC-6. For PORV block valves both are powered from MCC-6.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because step 3 of AOP-019 is also an immediate action step to control pressurizer heaters and normal PZR spray to restore RCS pressure. This is plausible because closing a PORV block valve for a stuck open PORV is immediate action step 2.b rno action.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. 1st part, according to AOP-019 (p3&4; Rev 20) Steps 2 & 3, with given conditions which show PCV-456 open with switch in the close position and pressurizer pressure less than the PORV setpoint of 2335 psig the next correct action IAW AOP-019 is to apply step 2.b rno action, IF any PZR PORV cannot be closed, THEN close its PORV BLOCK valve. The associated PORV block valve for PCV-456 is RC-535. The last immediate action of AOP-019 step 3 is, Control the Normal PZR Spray Valves AND PZR Heaters to Restore RCS Pressure to the Desired Control Band. 2nd part, according to EDP-003 (p29; Rev 68) PORV Block valves RC-535 and RC-536 power supplies are both MCC-6.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because MCC-5 is the other emergency train MCC power supply and not the power supply for the PORV block valves. This is plausible because most redundant emergency safeguards components have one component powered from MCC-5 and the other train component powered from MCC-6. For PORV block valves both are powered from MCC-6.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to locate and operate components, including local controls as related to a Pressurizer Vapor Space Accident. This is accomplished by giving conditions for a stuck open PZR PORV requiring knowledge of the required immediate actions related to this event at the RTGB and knowledge of the location of the power supplies for the breakers associated with the PZR PORV Block Valves. Technical Specifications LCO 3.4.11 Condition B for one PORV inoperable and not capable of being manually cycled required action B.2 requires remove power from the associated block valve within 1 hour.

Basis for Hi Cog

The question is at the Analysis cognitive level because the operator must analyze the given indications of pressurizer pressure being less than the PZR PORV setpoint and lowering combined with the indication of PZR PORV PCV-456 indicating open with its control switch in the closed position and from this information determine that PCV-456 failed to close and was attempted to be closed during performance of the immediate actions, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

Technical Specifications LCO 3.4.11 Amendment No. 203
AOP-019 (Rev 20)
EDP-003 (Rev 68)
10 CFR 55.41.7

Student References Provided

APE008 2.1.30 - Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)

APE008 GENERIC

Ability to locate and operate components, including local controls. (CFR: 41.7 / 45.7)

Remarks/Status

7/20/15 New question developed

7/20/15 Reviewed by Exam Supervisor, with 2 Editorial Enhancements 1) Unless AOP-019 and AOP-025 are identical, may need to include a picture of pressure indicators to aid in diagnosis; 2) add RC-535 nomenclature to the stem

9/10/15 Exam team response, IA of both AOP-019 and AOP-025 are identical to support the correct answer choice, therefore a pressure indicator is NOT required. RC-535 nomenclature was already in the stem following the first instance, added to the second instance in "(2)" question statement.

9/30/15 question picture edited to show controller in manual with 60% demand to drive the answer for ALL required immediate actions, not just the PORV.

11/25/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 3 3 **C**

EPE009 EA1.10 - Small Break LOCA

Ability to operate and monitor the following as they apply to a small break LOCA: (CFR 41.7 / 45.5 / 45.6)

Safety parameter display system ....

Given the following:

- The plant is at 100% power
- “A” CV Spray pump is out of service for maintenance

Subsequently:

- A SBLOCA occurred at 0930 coincident with a Loss of Offsite Power
- “B” EDG tripped immediately after starting
- At 1000, the crew is performing the actions of EOP-E-1, LOSS OF REACTOR OR SECONDARY COOLANT with the following current plant conditions:
  - CV pressure: 11 psig and rising slowly
  - CV Sump level: 178 inches and rising
  - CV radiation level: 0.5 R/hr
  - “A” Loop Cold Leg temperature: 338 °F
  - “B” Loop Cold Leg temperature: 425 °F
  - “C” Loop Cold Leg temperature: 427 °F

Which ONE of the following correctly completes the statements below?

CSF-5 Containment critical safety function status tree color is ____(1)____.

CSF-4 Integrity critical safety function status tree color is ____(2)____.

A. (1) Yellow
(2) Yellow

B. (1) Yellow
(2) Orange

C. (1) Orange
(2) Yellow

D. (1) Orange
(2) Orange

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the conditions of CV pressure greater than 10 psig with no CV Spray pumps running results in an orange path for CSF-5 Containment. This is plausible because the given conditions for CSF-4 Integrity result in a Yellow path due to an RCS cold leg temperature dropped greater than 100 °F in last 60 minutes along with one RCS cold leg temperature between 325 °F and 355 °F. CSF-5 Containment does contain a Yellow path which would be possible if the conditions were different, example if CV radiation was 5 R/hr or greater vice 0.5 R/hr which was given.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. This is incorrect because the conditions of CV pressure greater than 10 psig with no CV Spray pumps running results in an orange path for CSF-5 Containment. CSF-4 Integrity conditions result in a yellow path due to an RCS cold leg temperature dropped greater than 100 °F in last 60 minutes with one RCS cold leg temperature between 325 °F and 355 °F. This is plausible because if an RCS loop cold leg temperature was below 325 °F vice 355 °F, CSF-4 Integrity would be orange. CSF-5 Containment does contain a Yellow path which would be possible if the conditions were different, example if CV radiation was 5 R/hr or greater vice 0.5 R/hr which was given.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to CSFST, Critical Safety Function Status Trees (p 6-8; Rev 7) , CSF-4 Integrity yellow path directing operators to go to FRP-P.2 are met due to an RCS cold leg temperature dropped greater than 100 °F in the last 60 minutes with one RCS cold leg below 355 °F but greater than 325 °F. CSF-5 Containment orange path directing operators to go to FRP-J.1 are met due to CV pressure greater than 10 psig combined with no spray pumps running. No spray pumps are running due to ‘A’ CV Spray pump out of service for maintenance and ‘B’ CV Spray pump will not start due to no power available due to Loss Of Offsite Power combined with ‘B’ EDG tripping.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because CSF-4 Integrity conditions result in a yellow path due to an RCS cold leg temperature dropped greater than 100 °F in last 60 minutes with one RCS cold leg temperature between 325 °F and 355 °F. This is plausible because CSF-5 Containment orange path directing operators to go to FRP-J.1 are met due to CV pressure greater than 10 psig combined with no spray pumps running. If an RCS loop cold leg temperature was below 325 °F vice 355 °F, CSF-4 Integrity would be orange.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to monitor and analyze plant parameters given in the Safety parameter display system during a SBLOCA Event. The given parameters are related to the parameters monitored by SPDS.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must analyze bits of information, plant conditions and determine correct color level of the CSFST, in order to answer the question.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
CSFST, Rev. 7 10 CFR 55.41.10	

EPE009 EA1.10 - Small Break LOCA

Ability to operate and monitor the following as they apply to a small break LOCA: (CFR 41.7 / 45.5 / 45.6)

Safety parameter display system ....

Remarks/Status

7/27/15 New Question developed

8/3/15 Reviewed SAT by Exam Supervisor

11/19/15 AOM-SHIFT approved question for 60 day submittal.

EPE011 EK3.15 - Large Break LOCA

Knowledge of the reasons for the following responses as the apply to the Large Break LOCA: (CFR 41.5 / 41.10 / 45.6 / 45.13)

Criteria for shifting to recirculation mode ....

Given the following:

- With the plant at 100% power a Large Break LOCA occurs
- Containment pressure rises and peaks at 34.5 psig within 20 seconds

Which ONE of the following identifies the criteria for entry into ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, AND what is the basis for this criteria?

A. When the RWST lowers to 27%, ONLY;
So that core flow is maintained during the re-alignment to the Recirculation Mode.

B. When EITHER the RWST lowers to 27% **OR** the CV Sump level reaches 354 inches;
So that core flow is maintained during the re-alignment to the Recirculation Mode.

C. When the RWST lowers to 27%, ONLY;
So that Containment pressure is maintained less than design limits during the re-alignment to the Recirculation Mode.

D. When EITHER the RWST lowers to 27% **OR** the CV Sump level reaches 354 inches;
So that Containment pressure is maintained less than design limits during the re-alignment to the Recirculation Mode.

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to the Entry Conditions of ES-1.3 (p2 of 39; Rev 0), the procedure is entered from Step 18 of E-1 on low RWST Level, Step 9 of ECA-2.1 on Low RWST Level and other procedure and Foldout Pages whenever the RWST reaches the Switchover Setpoint. According to the E-1 Foldout Page (Rev 4) the switchover setpoint is 27% in the RWST. According to the E-1 Background Document (p36 of 58; Rev 4) the reason for this criteria is to ensure that so that core flow is maintained during the re-alignment to the Recirculation Mode.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because CV Sump Level is NOT considered in the criteria to enter ES-1.3. This is plausible because once entry into ES-1.3 is made, CLR cannot be aligned unless establishing 354 inches in the CV Sump is possible; and the operator may incorrectly believe that it is this criteria that is more binding.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because maintaining Containment pressure less than design limits during the re-alignment to the Recirculation Mode is NOT the reason for the established criteria for entry into ES-1.3. This is plausible because at step 5 of ES-1.3 the operator will reduce ECCS flow and leave both one SI Pump and one CV Spray pump running. Coupled with the information given in the conditions regarding a sever/extreme challenge to the Containment Critical Safety Function, the operator may incorrectly believe that Containment Pressure is more of a concern that Core Cooling.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of the reasons for the criteria for shifting to recirculation mode as it applies to the Large Break LOCA.

Basis for Hi Cog

The question is at the memory cognitive level because the operator must bits of information about the major strategies, including why a major transition is made at a specific plant condition, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

E-1 Basis Document (p36 of 58; Rev 4)
E-1 Foldout Page (Rev 4)
ES-1.3 (p2 of 39; Rev 0)
10 CFR 55.41.10

Student References Provided

EPE011 EK3.15 - Large Break LOCA
Knowledge of the reasons for the following responses as the apply to the Large Break LOCA: (CFR 41.5 / 41.10 / 45.6 / 45.13)
Criteria for shifting to recirculation mode ....

Remarks/Status

7/28/15 New question developed

8/3/15 Reviewed by Exam Supervisor with Editorial Enhancements, 1) In stem change "reason" to "basis"; 2) Distractor B & D, need to make "or" bold or underline

9/10/15 Exam team incorporated changes as discussed, OR is capital and bold.

11/19/15 In references, changed "E-1 Background Document" to "E-1 Basis Document" (Little)

11/19/15 AOM-SHIFT approved question for 60 day submittal.

APE022 AA2.03 - 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)
Failures of flow control valve or controller . . . .

Given the following:

- The plant is at 100% power, when the following annunciators alarm in the control room:
  - APP-001-B4, RCP SEAL INJECTION HI/LO FLOW
  - APP-001-B6, LP LTDN LN HI TEMP
  - APP-001-D6, LP LTDN HI PRESS
  - APP-001-E6, LP LTDN RELIEF HI TEMP

Which ONE of the following identifies the cause of these alarms?

A. Seal Injection Filter clogged

B. HCV-121, Charging Flow Valve failed closed

C. TCV-144, NRHX Temperature Control Valve failed closed

D. CVC-204A, Letdown Line Isolation Stop Valve failed closed

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5 B

General Discussion

Answer A Discussion

Incorrect. This is incorrect because Seal Injection Filter clogging will not affect Letdown temperature or pressure negatively. It will result in an increased charging flow through the Regenerative Heat Exchanger. This is plausible because it will result in APP-001-B4 alarming on low seal injection flow.

Answer B Discussion

Correct. According to OP-301-1 (p 126 & 136; Rev 64) Caution prior to Step 19 states, If charging flow is significantly less than letdown flow, letdown temperature may rise rapidly and could cause Annunciators APP-001-B6 and APP-001-A6. Caution prior to Step 6.6.4.2 states, If sufficient charging flow is not maintained the potential for lifting the letdown relief is elevated. According to OP-301 (p 9; Rev 112) Step 5.7.4 states, Flow may be diverted to the Reactor Coolant Pump seals as HIC-121 is throttled closed.
HCV-121 closed results in all charging flow going to the RCP seals resulting in APP-001-B-4 alarming. HCV-121 closing isolates cooling to the Regenerative Heat Exchanger resulting in letdown line high temperature and pressure resulting in RTGB alarms APP-001-B6, D6 and E6.

Answer C Discussion

Incorrect. This is incorrect because closed will not affect RCP seal injection flow. This is plausible because it will result in a letdown high temperature alarm APP-001-A6, LTDN FLOW HI TEMP DEMIN BYPD.

Answer D Discussion

This is incorrect because CVC-204A closed will not affect RCP seal injection flow to cause all the alarms listed. This is plausible because CVC-204A closing will isolate letdown flow path downstream of the Regenerative Heat Exchanger. This would result in lifting of letdown pressure relief valve causing annunciator APP-001-E6 to alarm. Additionally with letdown isolated, PZR level will begin to rise above programmed level, then causing the Charging pump that is running in auto to slow down and would reduce the flow to the RCP Seals, and could cause APP-001-B4 to alarm due to LO FLOW.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to interpret RTGB annunciators and determine the cause to be Charging Flow Valve (HCV-121) being closed which resulted in a loss of charging line flow.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must put together bits of information and analyze this information to determine the cause, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

OP-301-1 Rev. 64
OP-301 Rev. 112
ST-021 Rev. 3a
APP-001 Rev. 60
10 CFR 55.41.7

Student References Provided

APE022 AA2.03 - 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)

Failures of flow control valve or controller . . . .

Remarks/Status

8/10/15 New question developed

9/8/15 Exam Supervisor review with Editorial comment, 1) Should we give them Charging Pump status in auto?

9/10/15 Exam team response is that if the candidates are not told otherwise then the plant operates as expected, and the running charging pump at 100% should be in auto and assumed as such.

11/19/15 AOM-SHIFT approved question for 60 day submittal.

APE025 2.4.47 - Loss of Residual Heat Removal System (RHRS)

APE025 GENERIC

Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. (CFR: 41.10 / 43.5 / 45.12)

Given the following:

- A plant cooldown is in progress
- The “A” RHR Train is in service
- At 0700 RCS temperature was 130°F, and the cooldown rate was adjusted for a constant 50°F/hour

Subsequently, the following is observed:

Time	RCS Temp
0715	145
0730	161
0745	178

- RHR flow is 3000 gpm
- FCV-605, RHR HX BYPASS, controller demand is 60%
- HCV-758, RHR HX OUTLET FLOW TO COLD LEGS, controller demand is 100%
- RCS pressure has been controlled between 350-375 psig during this time

Which ONE of the following correctly completes the statements below?

1) The cause of the observed condition is a loss of ____(1)____ flow through the RHR HX.

2) If the current heat up rate trend continues as it has for the last 45 minutes, by 0800 the Technical Specification RCS Heat up limit ____(2)____ be exceeded.

(REFERENCES PROVIDED)

A. (1) CCW
(2) will

B. (1) RHR
(2) will

C. (1) CCW
(2) will not

D. (1) RHR
(2) will not

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to ST-003 (p16; Rev 4a) RHR flows through the tubes and CCW flow around the tubes of the RHR HX. The indications provided show that flow exists in the RHR System and that the RHR HX Outlet valve is fully OPEN. However, RCS temperature is rising at an increasing rate. Consequently, CCW flow must have been interrupted to the RHR HX. The current trend in RCS temperature is rising at an increasing rate. The trend developing is a 15°F rise in the first 15 minutes, 16°F rise in the second 15 minutes, and 17°F rise in the third 15 minutes. If this trend does not change, by 0800 the RCS will be expected to rise by 18°F, which will yield a 66°F heat up since 0700. During the cooldown the operator is recording cooldown rates every fifteen minutes on Attachment 1 of GP-007. P&L 3.4 of GP-007 (p7 of 149; Rev 101) indicates that TS LCO 3.4.3 states, RCS pressure, RCS temperature, and RCS Heatup and Cooldown rates shall be maintained within the limits specified in Figures 3.4.3-1 and 3.4.3-2, and a note is provided prior to this stating that this Figure is located in the Curve Book. Clearly, this Figure will be available to the operator during the cooldown evolution. With this Figure available, the operator will conclude that the allowable heatup rate is 60°F in one hour, and conclude that TS limit will be exceeded.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because RTGB indications show that there is full RHR flow through the "A" RHR HX. This is plausible because the operator may incorrectly interpret the RTGB indications, the controller demand positions, as some controllers at RNP are reverse acting and would therefore require a 0% demand signal to be open (Which is what the KA is requiring the operator to do).

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the current trend shows that the RCS Heatup will be 62°F heat up since 0700. This is plausible because the operator may incorrectly interpret the RCS trend or use Figure 3.4.3-1 (Which is what the KA is requiring the operator to do).

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. This is accomplished by placing the operator in a situation where an RCS cooldown is in progress and RHR cooling is subsequently lost. The operator will be required to evaluate typical RTGB indications and diagnose which fluid flow through the RHR HX has been lost. Then, the operator will be required to identify the trend on the RCS temperature rise (X, X+1, X+2, etc), and predict what the temperature will be at a specific future time. The operator is provided with a reference (That would normally be available during an RCS cooldown) that will identify the maximum permissible Heat Up Rate.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall or use a reference to determine bits of information (flowpaths through the RHR HX, RCS TS Heatup rate) and then use this information when evaluating RCS temperature trends to predict and outcome, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References
ST-003 (p16; Rev 4a) 10 CFR 55.41.10

Student References Provided
Figure 3.4.3-1

APE025 2.4.47 - Loss of Residual Heat Removal System (RHRS)

APE025 GENERIC

Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. (CFR: 41.10 / 43.5 / 45.12)

Remarks/Status

8/13/15 New question developed

9/8/15 Exam Supervisor reviewed SAT, however the 6th bullet requires an editorial change, correct the nomenclature for HCV-758.

CORRECTED.

11/19/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 7 7 **B**

APE027 AK2.03 - Pressurizer Pressure Control System (PZR PCS) Malfunction
Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: (CFR 41.7 / 45.7)
Controllers and positioners ....

Given the following:

- The plant is at 100% power
- All Pressurizer heaters are energized
- RCS pressure is 2270 psig and rising

Which ONE of the following completes the statement below?

Based on plant conditions and no operator action taken, ___(1)___ failed low and ____(2)____, PZR PORV, **WILL** cycle open and closed.

A. (1) PT-444
(2) PCV-455C

B. (1) PT-444
(2) PCV-456

C. (1) PT-445
(2) PCV-456

D. (1) PT-445
(2) PCV-455C

ILC15 RNP SRO NRC Examination QUESTION 7 | 7 | B

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because PT-444 failing low will prevent PCV-455C from opening, PCV-455C requires an open signal from PT-444 at 2335 psig. This is plausible because PT-444 is the transmitter that provides a comparison signal for PZR pressure controller PC-444J to control PZR pressure in AUTO and PCV-455C receives a signal from PT-444.

Answer B Discussion

Correct. According to AOP-025 Basis Document (p 14; Rev 24) Section C-Pressurizer Transmitter Failure, PT-444 is used for automatic control of PZR heaters and sprays and also PCV-455C. PT-445 is used for control of PCV-456. PT-444 failed low: Indicated pressure would be low causing PZR heaters to energize. PZR spray and PCV-455C could not respond to the actual pressure increase that would occur.

Answer C Discussion

Incorrect. 1St part wrong, 2nd part correct. This is incorrect because PT-445 is not the transmitter that provides a comparison signal to PZR pressure controller PC-444J for controlling PZR pressure. This is plausible because PT-445 is a PZR pressure transmitter that provides a signal to operate PCV-456.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. This is incorrect because PT-445 is not the transmitter that provides a comparison signal to PZR pressure controller PC-444J for controlling PZR pressure and PT-444 failing low will prevent PCV-455C from opening. This is plausible because PT-445 is a PZR pressure transmitter that provide a signal to operate a PZR PORV and PCV-455C is a PZR PORV.

Basis for meeting the KA

The KA is matched because the operator must demonstrate an understanding of the system response to a malfunction of pressurizer pressure control. This is demonstrated by failure of PT-444 which provides a comparison signal for PZR pressure controller PC-444J and the effect on the PZR PORVs.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must put together bits of information to determine the effect on plant pressure, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	027 AK 2.03 1

Development References	Student References Provided
AOP-025 Basis Document, RTGB INSTRUMENT FAILURE, Rev. 24 10 CFR 55.41.7	

APE027 AK2.03 - Pressurizer Pressure Control System (PZR PCS) Malfunction

Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: (CFR 41.7 / 45.7)

Controllers and positioners ....

Remarks/Status

7/16/15 Bank question used for RO 7

7/27/15 Reveiwed by Exam Supervisor with Editorial Enhancement comment, 1) May need to add more to the stem to help clarify that the PZR PORV operation may not be tied to the transmitter failure.

9/10/15 Exam team response is that they have enough information to correctly answer the question. With the transmitter failed low, the PORV cycling will not be the one associated with the failed transmitter.

11/19/15 AOM-SHIFT approved question for 60 day submittal.

EPE029 EK2.06 - Anticipated Transient Without Scram (ATWS)
Knowledge of the interrelations between the ATWS and the following: (CFR 41.7 / 45.7)
Breakers, relays, and disconnects ....

Given the following:

- An ATWS has occurred
- Immediate Actions of FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS, are in progress

Which ONE of the following correctly completes the statements below?

The MINIMUM number of breakers in the Rod Drive MG Set Room that will need to be opened to trip the reactor locally is ____(1)____.

The MINIMUM number of breakers in the 4 KV Room that will need to be opened to trip the reactor locally is ____(2)____.

A. (1) one
(2) one

B. (1) one
(2) two

C. (1) two
(2) one

D. (1) two
(2) two

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because both MG Sets must be deenergized to trip the reactor locally from the 4KV Room. This is plausible because the reactor can be tripped locally by opening only one Reactor Trip Breaker and opening one MG Set Motor Input Breaker will trip one Rod Drive MG Set.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to FRP-S.1 (p 3; Rev 22) Step 1 rno, requires opening BOTH MG Set Generator Output breakers or BOTH MG Set Motor Input Breakers. According to ST-007, Rod Control System (p 4; Rev.4) Each MG Set has the capacity to meet the power requirements of the entire system. Normally, the MG set are operated in parallel so that a loss of one MG set does not cause a dropped control rod. If the reactor trip breakers open, power is lost to all four power cabinets and, therefore, to the CRDMs. Without current flow, the stationary coils deenergize and the stationary latches disengage allowing the rods to drop into the core by gravity.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. This is incorrect because opening only one reactor trip breaker will trip the reactor and both MG Sets must be deenergized to trip the reactor locally from the 4KV Room. This is plausible because the reactor can be tripped locally by opening only one Reactor Trip Breaker and opening one MG Set Motor Input Breaker will trip one Rod Drive MG Set.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because opening only one reactor trip breaker will trip the reactor. This is plausible because the reactor can be tripped locally by opening only one Reactor Trip Breaker and opening both MG Set Motor Input Breaker will trip the reactor.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the interrelations between an ATWS and breakers associated with tripping the reactor.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recallt bits of information, specifically the electrical distribution to supply power to the control rods and the breakers to open to remove that power, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

FRP-S.1 Rev. 22
ST-007 Rev. 4
10 CFR 55.41.7

Student References Provided

EPE029 EK2.06 - Anticipated Transient Without Scram (ATWS)

Knowledge of the interrelations between the ATWS and the following: (CFR 41.7 / 45.7)

Breakers, relays, and disconnects ....

Remarks/Status

7/27/15 New question developed

8/3/15 Reviewed by Exam Supervisor SAT

11/19/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination **QUESTION 9** 9 **D**

EPE038 EK1.04 - Steam Generator Tube Rupture (SGTR)
Knowledge of the operational implications of the following concepts as they apply to the SGTR: (CFR 41.8 / 41.10 / 45.3)
Reflux boiling ....

Given the following:

- A major accident has occurred
- One S/G has experienced a tube rupture
- The core is being cooled by reflux cooling

Which ONE of the following correctly completes the statements below?

1) The operator must take action to ensure ____(1)____ in order to promote reflux cooling.

2) Reflux cooling will occur in the ruptured S/G as long as the ruptured S/G ____(2)____ remains less than that of the RCS.

A. (1) water levels are maintained in the intact S/Gs
(2) pressure

B. (1) the intact S/Gs are fully depressurized
(2) pressure

C. (1) the intact S/Gs are fully depressurized
(2) temperature

D. (1) water levels are maintained in the intact S/Gs
(2) temperature

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because Reflux cooling will occur in the ruptured S/G as long as the ruptured S/G temperature, not pressure, remains less than that of the RCS. This is plausible because the operator may mis-understand how Reflux Boiling works and/or when evaluating whether or not the Steam Generators are required as a secondary heat sink in FRP-H.1 the pressures of both the RCS and intact S/Gs are considered.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and C.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because reflux occurs independently of secondary side pressure control. This is plausible because EOP-ECA-1.1, a potential procedure to deal with a SGTR, and subsequent large break LOCA, contains actions to depressurize the intact S/Gs to atmosphere in an effort to promote any kind of core cooling.

Answer D Discussion

Correct. 1st part correct, 2nd part correct. According to EOP-ECA-1.1-BD (p 63; Rev 2), EOP Step 35 KNOWLEDGE: If the RCS is not full of liquid at this time, it is especially important to keep the secondary system adequately full of water to promote reflux cooling. Reflux cooling is the mechanism by which steam that is generated in the RCS enters the S/G tubes and is condensed by the cold water on the S/Gs secondary side. This liquid then remains in the primary system and promotes cooling. According to LP LOF016R, (p89; Rev 0), refluxing is a heat and mass transfer process. Some of the steam produced by the core is condensed in the steam generator tubes, flows back down the hot legs to the core, thus transferring energy from the core to the steam generators. Refluxing will continue until the RCS temperature drops below the steam generator temperature, resulting in a loss of condensation.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of operational implications (need to feed S/Gs, Ruptured S/G can function as a heat sink if temperature below that of RCS) of reflux boiling as it applies to the SGTR.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must demonstrate an understanding of the phenomenon of Reflux Cooling/Boiling, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

EOP-ECA-1.1-BD (p 63; Rev 2)
LOF016R, (p89; Rev 0)
10 CFR 55.41.5

Student References Provided

EPE038 EK1.04 - Steam Generator Tube Rupture (SGTR)
Knowledge of the operational implications of the following concepts as they apply to the SGTR: (CFR 41.8 / 41.10 / 45.3)
Reflux boiling ....

Remarks/Status

8/5/15 Bank question 038 EK1.04 1 used.

8/12/15 Reviewed by Exam Supervisor with Editorial Enhancement comment, 1) Revise last bullet in stem to make information regarding SI flow more obvious (don not use old rev?)

9/11/15 discussed with Exam Supervisor, changed SI to ECCS to make more apparent that there is no flow into the core.

11/17/15 Fleet reviewed determined question could potentially be unsat due to possibly having 2 correct answers. Revised to eliminate that problem.

11/19/15 AOM-SHIFT approved question for 60 day submittal.

APE040 AK1.05 - Steam Line Rupture

Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture: (CFR 41.8 / 41.10 / 45.3)

Reactivity effects of cooldown ....

Given the following:

- The plant is at 100% RTP
- A Main Steam Line Break occurs on the 72" header
- A Main Steam Line Isolation Signal is generated

Which ONE of the following correctly completes the statements below?

(1) The Main Steam Isolation Signal was generated as a result of ____(1)____.

(2) The reactivity effects due to this event are more severe when ____(2)____.

A. (1) Hi steam line ΔP
(2) RCS Boron = 200 ppm

B. (1) Hi steam line ΔP
(2) RCS Boron = 1200 ppm

C. (1) Hi steam line flow with a low Tave or low steam line press
(2) RCS Boron = 200 ppm

D. (1) Hi steam line flow with a low Tave or low steam line press
(2) RCS Boron = 1200 ppm

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the location of the steam line break will cause all steam line pressures to lower at the same rate, and therefore not cause a Hi steam line delta P. This is plausible because the high steam line delta P signal generates a safety injection signal.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A & D.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to FRP-S.1-BD (p 21; Rev 22) Step 12, An uncontrolled cooldown of the RCS is indicated by either an uncontrolled RCS temperature reduction of an uncontrolled S/G pressure reduction. Such an RCS cooldown could add a significant amount of positive reactivity to the core, depending on the current value of the moderator temperature coefficient. According to Westinghouse Owners Group Emergency Response Guideline E-2 Faulted Steam Generator Isolation (p 2; Rev 2) the return to criticality for cooldown events concern is highest near the end of core life when Moderator Temperature Coefficient is most negative. According to ST-048 (p 4 & 5; Rev 4) a break downstream of the MSIV's results in a Hi steam line flow with low Tave or low steam line press safety injection safety injection signal and a main steam isolation signal. Hi Steam Flow (37.25% flow at no load to 20% load, increases linearly to 109% at full load) detected by at least one sensor on two of three steam lines, coincident with low Tavg (543°F) or low steam line pressure (614 psig), generates a Safety Injection signal and closes all MSIVs. Two flow controllers on each steam line are used to sense high steam line flow. This circuit is designed to detect steam line breaks downstream of the MSIVs.

Steam Line Pressure measurement is utilized for steam line break protection. Low steam line pressure (614 psig) in two of three main steam lines or Low Tavg (543°F) in two of three loops, coincident with high steam line flow in two-of-three main steam lines, will initiate the Steam Line Isolation and Safety Injection signals. This is to protect against: a steam line break downstream of the main steam check valves, a feed line break, and/or an inadvertent opening of a SG safety. In addition, each steam line pressure measurement is compared with a main steam header pressure measurement to determine if a high steam line differential pressure exists. A coincidence of two-of-three steam line differential pressures (100 psid) in any one steam line, that is, steam line pressure lower than main steam header pressure, will initiate a Safety Injection signal. With a break on the 72" header all the steam lines and the header will be effected and subject to the same pressures, therefore the safeguards trip that will occur is the Hi Steam Line Flow coincident with Low Tavg or Steam Line Pressure.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because End of Life has a higher MTC than BOL. This is plausible because low power has more mass in S/G to boil off resulting in larger cool down and MTC at BOL may have a positive MTC.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the operational implications of the reactivity effects of cooldown as related to a Steam Line Rupture in particular plant conditions which result in the most severe reactivity event.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must put together bits of information and analyze this information , in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	MNS #3569

Development References

FRP-S.1-BD Rev 22
ST-048 Rev 4
Westinghouse Owners Group Emergency Response Guideline E-2 Rev 2
10 CFR 55.41.14

Student References Provided

APE040 AK1.05 - Steam Line Rupture

Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture: (CFR 41.8 / 41.10 / 45.3)

Reactivity effects of cooldown ....

Remarks/Status

8/5/15 Bank question MNS #3569 used

8/12/15 Reviewed by Exam Supervisor, SAT

11/20/15 rewrote question based on input from operations to better meet KA and make the question less GFES.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 11 11 **A**

APE054 AA1.03 - Loss of Main Feedwater (MFW)
Ability to operate and / or monitor the following as they apply to the Loss of Main Feedwater (MFW):(CFR 41.7 / 45.5 / 45.6)
AFW auxiliaries, including oil cooling water supply ....

Given the following:

- The plant is at 100% power, when a loss of both MFW pumps and Service Water occurs
- CST level is 12% and rapidly lowering
- The SDAFW pump is out of service
- The crew is implementing EOP-ES-0.1, REACTOR TRIP RESPONSE

Which ONE of the following is required IAW OP-402, AUXILIARY FEEDWATER SYSTEM to supply the OIL COOLER for operation of the “B” MDAFW pump under these conditions?

A. Fire Water

B. Potable Water

C. Deepwell Water

D. Component Cooling Water

General Discussion

Answer A Discussion

Correct. According to OP-402 (p49; Rev 96) Note before Step 8.4.2.2.d states, when Deepwell Water is being supplied to the AFW Pumps, the MDFAFW Pumps should have cooling water to the oil coolers and sealing water to the seals supplied from the Firemain VIA direction from the EOP Network. If this is NOT done, lube oil temperature should NOT exceed 140°F (IAW Tech Manual) AND no damage to the seals will occur. According to AOP-022 (p24; Rev 35) Caution before Step 19 states, Normal cooling water supply to MOTOR DRIVEN AFW PUMP B is unavailable. Pump operation prior to establishing emergency cooling could result in pump damage. Step 19 states to align Emergency Cooling Water to MOTOR DRIVEN AFW PUMP B using Attachment 2 while continuing With this procedure. Attachment 2 provides instructions for aligning Fire Water via hoses to provide cooling water to the MDAFW Pumps.

Answer B Discussion

Incorrect. This is incorrect because IAW OP-402 and AOP-022 cooling water is supplied to the "B" MDAFW Pump via Fire Water System under these plant conditions. This is plausible because Potable Water can be aligned for cooling other plant pump bearings such as SI pump thrust bearings.

Answer C Discussion

Incorrect. This is incorrect because IAW OP-402 and AOP-022 cooling water is supplied to the "B" MDAFW Pump via Fire Water System under these plant conditions. This is plausible because Deepwell pumps do provide a water supply to the suction of the MDAFW Pumps.

Answer D Discussion

Incorrect. This is incorrect because IAW OP-402 and AOP-022 cooling water is supplied to the "B" MDAFW Pump via Fire Water System under these plant conditions. This is plausible because some plant pumps are provided cooling from the CCW System.

Basis for meeting the KA

The KA is matched because the operator must demonstrate an understanding of the operation of the MDAFW pumps related to the water supply for oil cooler when Service Water is unavailable.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall from memory knowledge of the alternate cooling supply for the MDAFW pumps when Service Water is unavailable, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	AFW-015 1

Development References

OP-402 Rev. 96
EOP-E-0 Rev. 6
AOP-022 Rev. 35
10 CFR 55.41.7

Student References Provided

APE054 AA1.03 - Loss of Main Feedwater (MFW)

Ability to operate and / or monitor the following as they apply to the Loss of Main Feedwater (MFW):(CFR 41.7 / 45.5 / 45.6)

AFW auxiliaries, including oil cooling water supply ....

Remarks/Status

8/11/15 Bank question AFW-015 1 used.

9/8/15 Reviewed by Exam Supervisor SAT

11/19/15 AOM-SHIFT approved question for 60 day submittal.

EPE055 EK3.02 - Loss of Offsite and Onsite Power (Station Blackout)
Knowledge of the reasons for the following responses as the apply to the Station Blackout : (CFR 41.5 / 41.10 / 45.6 / 45.13)
Actions contained in EOP for loss of offsite and onsite power ....

Given the following:

- The crew is implementing EOP-ECA-0.0, LOSS OF ALL AC POWER, mitigating an Extended Loss of AC Power (ELAP)
- A depressurization of all S/G's was initiated at 10:00
- The following timeline of events is observed:

Time	S/G Pressures	Pzr Level
10:15	500 psig	13%
10:45	190 psig	0%

Which ONE of the following correctly completes the statements below?

1) The EARLIEST time at which the depressurization is required to be stopped is ____(1)____.

2) The reason the depressurization is stopped is to ____(2)____.

A. (1) 1015
(2) prevent injection of accumulator nitrogen into the RCS

B. (1) 1045
(2) ensure that no reactor head voiding will occur

C. (1) 1015
(2) ensure that no reactor head voiding will occur

D. (1) 1045
(2) prevent injection of accumulator nitrogen into the RCS

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the operator is directed to depressurize the S/Gs to 290 psig regardless of the condition of Pzr Level. This is plausible because the operator may incorrectly believe that Pressurizer level must be maintained greater than 14% or on-scale.

Answer B Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because at time 10:15 the pressurizer level falls below 14%, which was previously checked in the last step before the depressurization. This is plausible because Rx Head voiding is specifically identified in a series of Cautions and Notes prior to initiating the S/G depressurization. A note is provided stating that "PRZR level may be lost AND Reactor Vessel upper head voiding may occur due to depressurization of S/Gs. Depressurization should NOT be stopped to prevent these occurrences." The operator may misunderstand the notes and cautions, and believe that the loss of RCS inventory and PZR level less than 14% is reason to stop the depressurization.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and B.

Answer D Discussion

Correct. 1st part correct, 2nd part correct. According to ECA-0.0 (p34 of 104; Rev 4), the operator is directed to DEPRESSURIZE Intact S/G's To 290 PSIG IF RCP Seal Cooling Is Lost. Prior to this the operator is cautioned that S/G pressures should NOT be lowered to LESS THAN 190 psig to prevent injection of SI Accumulator nitrogen into the RCS. Additionally, a Note is provided to alert the operator that PRZR level may be lost AND Reactor Vessel upper head voiding may occur due to depressurization of S/Gs. Depressurization should NOT be stopped to prevent these occurrences. Consequently the earliest time that the depressurization should be stopped is 1045, and the reason for stopping the depressurization is to prevent injection of SI Accumulator nitrogen into the RCS.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the reason for stopping the S/G depressurization, a Major Action Item in ECA-0.0, before RCS pressure reaches 190 psig.

Basis for Hi Cog

The question is at the Comprehensive/Analysis cognitive level because the operator must recall the reason for a Caution in ECA-0.0, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References
ECA-0.0 (p34 of 104; Rev 4) 10 CFR 55.41.10

Student References Provided

EPE055 EK3.02 - Loss of Offsite and Onsite Power (Station Blackout)

Knowledge of the reasons for the following responses as the apply to the Station Blackout : (CFR 41.5 / 41.10 / 45.6 / 45.13)

Actions contained in EOP for loss of offsite and onsite power ....

Remarks/Status

7/17/15 Bank question EPP-001-03 030 used

7/20/15 Reviewed by Exam Supervisor, with Editorial Comment, 1) What is the benefit from asking the exact pressure? Is this required to be known from memory?

9/10/15 Exam team response, they are choosing between 2 exact pressures, which they should be able to easily determine the reason between the selection of one over the other in the procedure in question.

9/29/15 changed question to new question.

11/05/15 discussed with the NRC chief examiner as one of the early submission items. The following Recommendations were made:

- Remove unnecessary information from current initial conditions. We can discuss specifics.
- Give two times (30 minutes apart) with S/G pressure and pressurizer level. For the first time, have pressurizer level less than 14%. For the second time, have S/G pressure at 190 psig and pressurizer level going off scale low.
- Ask: IAW ECA-0.0, what is the earliest time that the S/G depressurization is required to be stopped AND the reason for stopping the depressurization (preventing injection of accumulator nitrogen into the RCS or ensuring that no Reactor Vessel upper head voiding will occur).

11/09/15 question was revised based on the above comments.

11/19/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination **QUESTION 13** 13 **D**

APE056 AA2.11 - Loss of Offsite Power
Ability to determine and interpret the following as they apply to the Loss of Offsite Power: (CFR: 43.5 / 45.13)
Operational status of service water booster pump ....

Given the following:

- The plant is at 100% power when a loss of off-site power occurs
- Fifteen seconds later an SI actuation occurred due to a Large Break LOCA

Which ONE of the following correctly completes the statements below?

The BOP will expect to see the SW Booster Pumps started on the ____(1)____.

SW Booster Pump suction pressure ____(2)____ have to be at least 30 psig for the SW Booster Pump to start.

A. (1) Blackout Sequencer
(2) does

B. (1) Blackout Sequencer
(2) does NOT

C. (1) SI Sequencer
(2) does

D. (1) SI Sequencer
(2) does NOT

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. This is incorrect because the blackout sequencer did start, however, the SW Booster Pumps won't be started until 20 seconds after the blackout signal. Since an SI will occur due to the LBLOCA, the SI sequencer takes over. The SW Booster Pumps will start on the SI Sequencer. Plausible since the Blackout sequencer does start the SW Booster Pumps. Suction pressure does not matter for the SI sequencer. Plausible because suction pressure needs to be >30 psig for the SW Booster Pumps to start on the blackout sequencer.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the blackout sequencer did start, however, the SW Booster Pumps won't be started until 20 seconds after the blackout signal. Since an SI will occur due to the LBLOCA, the SI sequencer takes over. The SW Booster Pumps will start on the SI Sequencer. Plausible since the Blackout sequencer does start the SW Booster Pumps. Suction pressure does not need to be 30 psig to start on the SI sequencer. Plausible because the SI sequencer does not need to be > 30 psig to start the SW Booster Pump.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the SW Booster Pumps do get started on the SI Sequencer however Suction pressure does not need to be > 30 psig to start the SW Booster Pump on the SI Sequencer. This is plausible because if the SW Booster Pump suction pressure would be required to be > 30 psig to be started by the Blackout Sequencer.

Answer D Discussion

Correct. 1st part correct, 2nd part correct. According to ST-006 (p30-31&39-41; Rev 4), on a LOOP both EDGs start and load onto Buses E-1 and E-2 in 10 seconds. If there was not a subsequent SI the SW Booster Pumps require a SW Pump running and Service Water Header Pressure of 30 psig to start. The "A" SW Pump starts at 20 seconds on the Blackout Sequencer and the "B" SW Pump starts at 25 seconds on the Blackout Sequencer. Since the SI actuation occurred 15 seconds after the LOOP the EDGs have already started and loaded onto emergency buses E-1 and E-2 however, the SW Pumps and therefore the SW Booster Pumps have not yet started on the Blackout Sequencer. When the SI actuation occurs after the Blackout Sequencer, the Blackout Sequencer stops wherever it is, and the SI sequence starts at the beginning. Once the SI actuation occurs with power to buses E-1 and E-2 at 20 seconds "A" and "C" SW Pumps start on their respective SI Train and either SW Pump will supply a start signal to both SW Booster Pumps without requiring the minimal pressure of 30 psig on the SW Header.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to interpret plant conditions to determine the operational status of SW Booster Pumps for a LOOP combined with a subsequent LOCA.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must put together bits of information and analyze this information to determine how the SW Booster Pumps would respond for the given plant conditions, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	056 AA1.15 1

Development References

ST-004 Rev. 5a
ST-006 Rev. 4
10 CFR 55.41.7

Student References Provided

APE056 AA2.11 - Loss of Offsite Power

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

Operational status of service water booster pump ....

Remarks/Status

8/11/15 Bank question 056 AA1.15 1 used.

9/8/15 Reviewed by Exam Supervisor, SAT

11/19/15 AOM-SHIFT approved question for 60 day submittal.

APE057 AA2.15 - Loss of Vital AC Electrical Instrument Bus
Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: (CFR: 43.5 / 45.13)
That a loss of ac has occurred ....

Given the following:

- The plant is operating at 100% power
- A Startup Transformer lockout occurs

Which ONE of the following describes how Instrument Buses 1 and 4 will respond to this event?

A. Both Instrument Buses 1 and 4 will de-energize

B. Instrument Bus 1 will remain energized;
Instrument Bus 4 will momentarily de-energize until the Emergency Diesel Generator re-powers the associated Emergency Bus

C. Instrument Bus 4 will remain energized;
Instrument Bus 1 will momentarily de-energize until the Emergency Diesel Generator re-powers the associated Emergency Bus

D. Both Instrument Buses 1 and 4 will remain energized

General Discussion

Answer A Discussion

Incorrect. This is incorrect because MCC-5 supplies power directly to Instrument Bus 1, and it is still energized. This is plausible because if a Station Blackout were to occur, both Buses 1 and 4 will de-energize, and/or if this event occurred in Mode 3 when both Bus 2 and 3 were being powered by the SUT, both Buses 1 and 4 will de-energize.

Answer B Discussion

Correct. According to ST-039 (p15; Rev 4b) during normal power operation 4KV Buses 1, 2, 4 and 5 are supplied via the UAT, and 4KV Bus 3 is supplied via the SUT. Consequently, when the SUT Lockout occurs, Bus 3 will be de-energized. When Bus 3 is de-energized, 480V Bus E-2 will de-energize causing the B DG to start and re-power Bus E-2. During the time that E-2 is de-energized, Instrument Bus 4, which is normally powered from MCC-6, will be de-energized as well. According to ST-016 (p52; Rev 4) if undervoltage occurs on one or both emergency buses the bus will isolate by opening and locking out normal supply and tie breakers. Load shedding will occur with the exception of MCC-5, -10, and -16 for E1 and MCC-6, -9, and -18 for E2. The EDG will start and sequence loads back on to the emergency bus. According to AOP-024-BD (p3 of 62; Rev 41), Buses 1 and 4 are supplied directly from MCC-5 and 6 (480V Emergency Buses), and Buses 2 and 3 are supplied from battery backed inverters. Consequently, if MCC-6 is de-energized, Instrument Bus 4 will also be de-energized.

Answer C Discussion

Incorrect. This is incorrect because MCC-5 supplies power directly to Instrument Bus 1, and it is still energized, and MCC-6 supplies power directly to Instrument Bus 4, and it is de-energized. This is plausible because the operator may incorrectly believe that at 100% power the SUT powers Bus 2 and the UAT powers Bus 3. If so, one would conclude that this is correct.

Answer D Discussion

Incorrect. This is incorrect because MCC-6 supplies power directly to Instrument Bus 4, and it is de-energized. This is plausible because the operator may incorrectly believe these two buses are powered by a DC Bus, via an Inverter, such as, or rather than Instrument Bus 2 and 3.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to determine that a loss of ac has occurred as it applies to a Loss of Vital AC Instrument Bus. In this case the operator must identify the status of two instrument Buses after an SUT lockout (Loss of AC).

Basis for Hi Cog

The question is at the Comprehensive/Analysis cognitive level because the operator must recall the normal power supply to Instrument Buses 1&4, and then use this information to predict an outcome, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

ST-039 (p15; Rev 4b)
ST-016 (p52; Rev 4)
AOP-024-BD (p3 of 62; Rev 41)
10 CFR 55.41.7

Student References Provided

APE057 AA2.15 - Loss of Vital AC Electrical Instrument Bus

Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: (CFR: 43.5 / 45.13)

That a loss of ac has occurred ....

Remarks/Status

7/28/15 New question developed

8/5/15 Reveiwed by Exam Supervisor, as UNSAT for Job-Link and Minutia, with following comments, 1) These alarms are not on the inverter, does this meet the K/A?; 2) Do we require operators to know APPs from memory?

8/12/15 Reviewed by Fleet NRC Exam Writer, with following comment, 1) Question may better match the K/A if conditions are in Mode 5 with a loss of offsite power, and a 2 by 2 is created contrasting IB 3 & IB 4 and if the WILL / WILL NOT be energized.

9/11/15 discussed RNP site specific equipment and the inability to meet the KA based on the lack of alarms and indications in the control room with the NRC Chief Examiner. The NRC Chief Examiner randomly selected APE057 AA2.15 as a replacement KA.

New question developed.

11/19/15 AOM-SHIFT approved question for 60 day submittal.

APE058 AA1.02 - Loss of DC Power

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

Static inverter dc input breaker, frequency meter, ac output breaker, and ground fault detector ....

Given the following:

- The plant is at 100% power
- A loss of MCC-A (DC Bus A) occurs

Which ONE of the following correctly completes the statements below?

Instrument Bus 2 and 7 will ____(1)____.

Subsequently, DC Bus A is restored, and the crew is restoring Inverter A.

IAW OP-601, DC SUPPLY SYSTEM, to start up Inverter A, the operator will close the ____(2)____.

A. (1) de-energize
(2) DC Input Breaker first, then the AC Output breaker

B. (1) de-energize
(2) AC Output breaker first, then the DC Input Breaker

C. (1) remain energized
(2) DC Input Breaker first, then the AC Output breaker

D. (1) remain energized
(2) AC Output breaker first, then the DC Input Breaker

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to ST-016 (p31; Rev 4), Instrument Bus 2 is powered from the "A" Battery Bus through a 7.5KVA inverter (Inverter A). The inverter converts a 125Vdc supply to a 120Vac, single-Ø, 60 HZ output and provides a very reliable AC power source for the instrument Bus. According to OP-601 (p22-23; Rev 58) and Figures 36 and 50 of ST-016 (p32 and 44; Rev 4) the Inverter DC Input Breaker and AC Output Breaker are manually operated breakers with no automatic functions, and the DC input breaker is closed first, then the AC output breaker.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the Inverter A Breakers are closed DC breaker first, then AC breaker second. This is plausible because the operator may incorrectly believe that these breakers are closed in the reverse order.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the inverter supplies 60 Hz AC power. This is plausible because the rod control system uses 58.3 Hz as the frequency for that system.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and D.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to monitor, by identifying the expected Inverter DC input and AC output breaker position, when the DC power supply is lost to the Inverter.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall bits of information, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

ST-016 (p31-32 & 44; Rev 4)
OP-601 (p22-23; Rev 58)
EPP-26 Background Document (p3 of 11; Rev 16)
10 CFR 55.41.7

Student References Provided

APE058 AA1.02 - Loss of DC Power

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

Static inverter dc input breaker, frequency meter, ac output breaker, and ground fault detector ....

Remarks/Status

7/29/15 New question developed.

8/5/15 Reviewed by Exam Supervisor, SAT

8/12/15 Reviewed by Fleet NRC Exam Writer, with following editorial comments, 1) Second bullet is diagnosis, considering replacing with a breaker tripped open, as that would be more appropriate and the operate then is required to diagnose.; 2)Consider a question around the inverter indications keying on the "monitor" part of the K/A.

11/20/15 rewrote question based on input from operations on a different direction we could go for "operate/monitor" of this system.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 16 16 **C**

WE04 2.4.46 - LOCA Outside Containment
WE04 GENERIC
Ability to verify that the alarms are consistent with the plant conditions. (CFR: 41.10 / 43.5 / 45.3 / 45.12)

Given the following:

- The plant was at 100% power when a reactor trip and SI occurred
- The crew has entered EOP-E-1, LOSS OF REACTOR OR SECONDARY COOLANT
- The crew suspects a LOCA outside containment on RHR-754A, RHR PUMP "A" DISCHARGE

Consider the following RTGB Annunciators:

1. APP-001-E4, RHR PIT A HI LEVEL
2. APP-036-H1, WDBRP TROUBLE
3. APP-036-D8, PROCESS MONITOR HI RAD

IAW EOP-E-1, which ONE of the following identifies the additional RTGB Annunciators that would be ILLUMINATED to confirm the suspected location of this LOCA?

A. 1, ONLY

B. 1 and 3, ONLY

C. 2 and 3, ONLY

D. 2, ONLY

General Discussion

Answer A Discussion

Incorrect. This is incorrect because APP-001-E4, RHR PIT A HI LEVEL will not alarm (The leak location is in pipe alley, not the RHR pit). This is plausible because the operator may incorrectly believe that the discharge valve of the RHR pump is located in the RHR pump PIT where the pump's suction valve is located.

Answer B Discussion

Incorrect. This is incorrect because APP-001-E4, RHR PIT A HI LEVEL, will NOT alarm because the RHR-754A discharge valve of the pump is in pipe alley. This is plausible because the operator may incorrectly believe that the discharge valve of the RHR pump is located in the RHR pump PIT where the pump's suction valve is located.

Answer C Discussion

Correct. According to Drawing 5379-1484 Sheet 1 of 1 (Sheet 1 of 1; Rev 42) the RHR-754A, RHR PUMP "A" DISCHARGE valve is in pipe alley, with a remote operator to allow operation from the Gas Analyzer room. When the leakage occurs from this location, the floor drains will direct water to the Aux bldg. "A" Sump, According to Drawing 5379-0920 sheet 1 of 8 (Sheet 1 of 8; Rev 49). According to EOP-E-0 (p 20; Rev 6) Step 20 and EOP-E-1 (p 17; Rev 6) Step 16, the following conditions in the Aux building are checked and evaluated to determine if a LOCA outside containment is occurring;
- R-3, PASS PANEL AREA,
- R-4, CHARGING PUMP ROOM,
- R-6 SAMPLING ROOM,
- RI-14C, Plant Effluent NG-LO,
- LI-615A, RHR PIT "A" LEVEL INDICATOR,
- LI-615B, RHR PIT "B" LEVEL INDICATOR,
- Aux Bldg Sump Tank "A" and
- Aux Bldg Sump Tank "B".

Therefore, with the leak in the Aux Bldg, in pipe alley, APP-036-H1 will alarm due to APP-011-13, Sump Tank "A" HI-LO LEVEL on the WASTE DISPOSAL BORON RECYCLE PANEL (LEFT PANEL). APP-036-D8 PROCESS MONITOR HI RAD would be in alarm if any of those indicated Area Monitors were affected by the leak based on size and its location.

Answer D Discussion

Incorrect. This is incorrect because APP-036-D8, PROCESS MONITOR HI RAD would alarm if any of the area monitors listed in EOP-E-1 reach their alarm setpoints. This is plausible because the operator may not believe that the LOCA would cause area radiation monitors to alarm, if they believed that the inventory loss was not of high enough activity to cause the alarms. (i.e. if the water out the break was RWST and not RCS as would be the case in a LOCA outside containment)

Basis for meeting the KA

The KA is matched because the operator must demonstrate the Ability to verify that the alarms are consistent with the plant conditions during a LOCA Outside Containment. This is accomplished by providing the operator with a set of plant conditions reflecting a LOCA Outside Containment and also providing a group of potential alarms to consider. Then, the operator is required to choose which alarms will occur, confirming their ability verify that the alarms are consistent with the plant conditions during a LOCA Outside Containment.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information, and use this information to predict an outcome in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

Drawing 5379-1484 Sheet 1 of 1 (Sheet 1 of 1; Rev 42)
Drawing 5379-0920 Sheet 1 of 8 (Sheet 1 of 8; Rev 49)
APP-001-D7 (p3, & 40 of 62; Rev 60)
APP-036-D7, D8 & H1 (p37-39 & 65 of 98; Rev 88)
APP-011-13 (p3 & 15; Rev 18)
EOP-E-0 (p 20; Rev 6) Step 20
EOP-E-1 (p 17; Rev 6) Step 16
10 CFR 55.41.4

Student References Provided

ILC15 RNP SRO NRC Examination **QUESTION 16** 16 **C**

WE04 2.4.46 - LOCA Outside Containment
WE04 GENERIC
Ability to verify that the alarms are consistent with the plant conditions. (CFR: 41.10 / 43.5 / 45.3 / 45.12)

Remarks/Status

8/11/15 New question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

9/8/15 Reviewed by Operations SRO, with Editorial comment, recommend changing "intersystem LOCA through" to just "leakage past" in the stem to avoid confusion. Additionally the crew would be in EOP-E-1 and not be able to get to ECA-1.2 based on leak loacation.

9/10/15 Exam team incorporated recommended changes.

9/30/15 changed question to new question.

11/5/15 discussed with NRC chief examiner as one of the early submittal items. He stated the second part question appears to be asking procedure transition criteria, which is SRO knowledge. Question is Unsatisfactory due to license level mismatch. Also, I am not sure that a leak in this location would always cause an APP-036-D7 alarm. The FSAR states that an alarm in this location would most likely be VCT or RWST water because there are so many check valves downstream. The R-4 alarm setpoint is 50 millirem per hour. Did or can you validate on the simulator? Why ask or mention D8, since it is given in all four answer choices?

11/9/15 exam team reevaluated the alarms and plausibility for a LOCA outside containment in the location that was presented in the stem. The team determined that there were better alarm indications that could indicate the LOCA outside containment that a question could be written too. Changed question to reflect.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

WE05 EK3.4 - Loss of Secondary Heat Sink

Knowledge of the reasons for the following responses as they apply to the (Loss of Secondary Heat Sink)
(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:

- The reactor was tripped from 100% power due to a loss of MFW
- A spurious SI has actuated
- RCS Pressure - 2300 psig
- All S/G pressures - 1050 psig
- S/G WIDE RANGE levels are as follows:
  - WIDE RANGE: A - 10%,
  - WIDE RANGE: B - 15%,
  - WIDE RANGE: C - 9%
- AFW flow is indicating 0 gpm
- A RED condition exists on CSF-3, Heat Sink
- EOP-E-0, REACTOR TRIP OR SAFETY INJECTION, Immediate Actions are complete and have just been verified

Which ONE (1) of the following correctly completes the statement below?

The crew should ____(1)____ because ____(2)____.

A. (1) remain in EOP-E-0 until directed to transition out
(2) the "B" S/G is still a viable Heat Sink

B. (1) remain in EOP-E-0 until directed to transition out
(2) rules of usage require continuing in EOP-E-0

C. (1) immediately go to FRP-H.1, RESPONSE TO A LOSS OF SECONDARY HEAT SINK
(2) RCS Bleed and Feed is required

D. (1) immediately go to FRP-H.1, RESPONSE TO A LOSS OF SECONDARY HEAT SINK
(2) RCS Bleed and Feed can still be avoided

General Discussion

Answer A Discussion

Incorrect. This is incorrect because the "B" Steam Generator is NOT a viable Heat Sink. This is plausible because it is the only Steam Generator that is above the Feed and Bleed threshold of less than13%, and the operator may incorrectly believe that it substantiates remaining in EOP-E-0.

Answer B Discussion

Correct. According to OMM-22 (p13 & 16 of 56; Rev 45) Step 5.2.c, EOP-E-0 is the normal entry point for the EOPs, and according to Step 52.t, Each EOP ends with either a specific transition to another EOP, if further Operator guidance is required, or with the plant being maintained in a steady-state condition. Under the stated conditions E-0 is still in progress, and must be completed until a transition is directed. Note that a transition to FRP-H.1 will be made if steps 5-8 of EOP-E-0 are ineffective at restoring a Secondary Heat Sink. On the other hand, if Steps 5-8 are able to establish at least 300 gpm of feedwater flow to the Steam Generators, then the crew will continue in EOP-E-0 and not make the transition to FRP-H.1.

Answer C Discussion

Incorrect. This is incorrect because the EOP rules of usage do not permit an immediate transition to FRP-H.1 under the stated plant conditions (i.e. EOP-E-0 complete through Step 4 with an SI actuated). This is plausible because if the operator were in FRP-H.1, an RCS Bleed and Feed would be required.

Answer D Discussion

Incorrect. This is incorrect because the EOP rules of usage do not permit an immediate transition to FRP-H.1 under the stated plant conditions (i.e. EOP-E-0 complete through Step 4 with an SI actuated). This is plausible because the operator may incorrectly believe that Bleed and Feed criteria have not been met, but are close, and could be avoided if the operator were in FRP-H.1.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of the reasons for the EOP transitions (An RO/SRO function) as they apply to the Loss of Secondary Heat Sink and the assurance that procedures are adhered to and the limitations in the facilities license and amendments are not violated. The License requires adherence to the Quality Assurance Program which requires that the plant be operated under all conditions by approved procedures.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must apply known rules of EOP usage, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	FR-H.1-2 006

Development References

OMM-22 (p13 & 16 of 56; Rev 45)
10 CFR 55.41.10

Student References Provided

WE05 EK3.4 - Loss of Secondary Heat Sink

Knowledge of the reasons for the following responses as they apply to the (Loss of Secondary Heat Sink)
(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.

Remarks/Status

8/10/15 Modified question FR-H.1-2

8/25/15 During review of SO#78 it was noted that there was a similar RO question. Both RO#17 and SO#78 need to be review to ensure no overlap and double jeopardy.

9/8/15 Reviewed by Exam Supervisor, SAT

9/9/15 Exam team reviewed both questions for the concern above, and determined that the information that the questions are testing is NOT overlap, and should not be double jeopardy.

11/19/15 AOM-SHIFT approved question for 60 day submittal.

WE11 EK1.1 - Loss of Emergency Coolant Recirculation

Knowledge of the operational implications of the following concepts as they apply to the (Loss of Emergency Coolant Recirculation) (CFR: 41.8 / 41.10 / 45.3)

Components, capacity, and function of emergency systems.

Given the following:

- The plant has tripped from 100% power due to a LOCA
- The crew is operating in EOP-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION
- RWST level is at 16%
- RWST Makeup has been established IAW Supplement P, EMERGENCY MAKEUP TO THE RWST
- The only ECCS Pump drawing on the RWST is the “A” SI Pump and pump flow has been adjusted to 150 gpm

Which ONE of the following correctly completes the statements below?

1) The EARLIEST that the “A” SI Pump must be stopped is when the RWST Level lowers to ____(1)____.

2) Assuming these conditions remain the same, it is expected that over the next 4 hours the RWST level will ____(2)____.

A. (1) 9%
(2) rise

B. (1) 9%
(2) lower

C. (1) 13%
(2) rise

D. (1) 13%
(2) lower

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the RWST will not rise over the next 4 hours. This is plausible because the operator may incorrectly believe that the Supplement P flow rate is higher than it actually is (The Makeup System is limited in capacity only because of the need to keep the RWST Boron concentration higher).

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to the ECA-1.1 (Foldout Page Item 2 and p1; Rev 2), which is in effect from the start of the procedure, if the RWST level lowers to 9% the SI Pump will need to be stopped. Additionally, the body of the procedure (p4 & 23; Rev 2) directs the operator to check RWST level less than 9%, and if so, directs that all pumps taking suction from the RWST be stopped. According to Supplement P of EOP-Supplements (p64 of 81; Rev 2) Step 11& 12, the RWST flowrate will be 84.25 gpm, which is ≈40 gpm lower than the RWST outflow. Consequently, the RWST level will lower over the next 4 hours by about 9600 gallons.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the earliest that the "A" SI Pump must be stopped is 9%. This is plausible because According to the ECA-1.1 Foldout Page Item #3 if the CST lowers to 13% it must be re-filled (The operator may confuse the Tank Levels).

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of the operational implications of components (RWST Low-Low Setpoint) and capacity (Makeup System when delivering to the RWST) of emergency systems as they apply to the Loss of Emergency Coolant Recirculation.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must compare one flowrate to another and predict an outcome, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

ECA-1.1 (Foldout Page Item 2, p1,4&23; Rev 2)
EOP-Supplements (p64 of 81; Rev 2)
10 CFR 55.41.7

Student References Provided

WE11 EK1.1 - Loss of Emergency Coolant Recirculation

Knowledge of the operational implications of the following concepts as they apply to the (Loss of Emergency Coolant Recirculation)
(CFR: 41.8 / 41.10 / 45.3)

Components, capacity, and function of emergency systems.

Remarks/Status

8/12/15 New question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

11/21/15 AOM-SHIFT approved question for 60 day submittal.

APE005 AK2.02 - Inoperable/Stuck Control Rod

Knowledge of the interrelations between the Inoperable / Stuck Control Rod and the following: (CFR 41.7 / 45.7)

Breakers, relays, disconnects, and control room switches ....

Given the following:

- The plant is at 50% power
- During the performance of OST-011, ROD CLUSTER CONTROL EXERCISE & ROD POSITION INDICATION, ONE Control Bank “B” rod is 17 steps below the rest of the bank
- The crew is performing the steps to realign the rod IAW AOP-001, MALFUNCTION OF REACTOR CONTROL SYSTEM

Which ONE of the following correctly completes the statements below?

1) IAW AOP-001, OPEN the Control Bank “B” lift coil switch(es) for ____(1)____.

2) Realign the rod using the ____(2)____ position of the rod bank selector switch.

A. (1) the misaligned rod ONLY
(2) CB B

B. (1) the misaligned rod ONLY
(2) M (MANUAL)

C. (1) all but the misaligned rod
(2) CB B

D. (1) all but the misaligned rod
(2) M (MANUAL)

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect becauseAOP-001 directs the operator to open the lift disconnect switches for all the rods in the affected bank except for the rod that is to be recovered. This is plausible because if it were desired not to move the affected rod but move the other rods in the affected bank, this action would then be correct.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to AOP-001 (p 50 & 52; Rev 33) Steps 40 & 42.b, Place Lift Coil Disconnect Switches for all rods in the affected bank, EXCEPT the misaligned rod, in the OFF position. Select the affected bank with the ROD BANK SELECTOR Switch.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because AOP-001 directs placing the Rod Bank Selector Switch in the affected bank position. This is plausible because normally Control Bank "B" rods are moved in the M (MANUAL) position during normal system operation.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the interrelationship between lift coil disconnect switches and rod bank selector switch positions required for recovery of a misaligned control rod.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall from memory the required lift disconnect switch and bank selector switch position for recovering a Control Bank "B" misaligned rod IAW AOP-001, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	005 AK2.02 1

Development References

AOP-001 Rev. 33
10 CFR 55.41.10

Student References Provided

APE005 AK2.02 - Inoperable/Stuck Control Rod

Knowledge of the interrelations between the Inoperable / Stuck Control Rod and the following: (CFR 41.7 / 45.7)

Breakers, relays, disconnects, and control room switches ....

Remarks/Status

8/12/15 Used Bank Question 005 AK2.02 1

9/8/15 Reviewed by Exam Supervisor, SAT

11/21/15 AOM-SHIFT approved question for 60 day submittal.

APE028 AK1.01 - Pressurizer (PZR) Level Control Malfunction

Knowledge of the operational implications of the following concepts as they apply to Pressurizer Level Control Malfunctions: (CFR 41.8 / 41.10 / 45.3)

PZR reference leak abnormalities ....

Given the following:

- The plant is at 100% power
- Pressurizer level transmitter LT-459 is selected for control
- The reference leg for LT-459 develops a slow leak

LT-459, CH I PRZR LEVEL
LT-460, CH II PRZR LEVEL

Which ONE of the following describes the correct PZR LEVEL instrument response?

	LT-459	LT-460
A.	Increases	Decreases
B.	Decreases	Remains the same
C.	Increases	Remains the same
D.	Decreases	Increases

General Discussion

Answer A Discussion

Correct. According to RNP-LOF0020R, Sensors and Detectors, Rev0, Pg 101, a reference leg leak will cause LT-459 to see a rising level and LT-460 will lower due to the Charging Pump slowing down due to input from LT-459.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See C & D.

Answer C Discussion

Incorrect. This is incorrect because LT-460 would not remain the same. Plausible because response for LT-459 is correct and operator must understand system response for controlling level channel.

Answer D Discussion

Incorrect. This is incorrect because the LT-459 indication increases for the given failure. Plausible if the operator does not understand reference leg leaks verses variable leg leaks. The LT-460 response would be correct if LT-459 did lower. Charging pump speed would rise therefore PZR level would rise.

Basis for meeting the KA

The KA is matched because the operator must demonstrate that they understand the effect the PZR reference leak has on both the transmitter that the leak is on, and the plant due to the inventory loss.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must determine which transmitter is effected and determine the effects that both that channel and the controlling channel will have on the plant in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	028 AK1.01 1

Development References	Student References Provided
RNP-LOF0020R, Sensors and Detectors, Rev0, Pg 101 10 CFR 55.41.7	

APE028 AK1.01 - Pressurizer (PZR) Level Control Malfunction

Knowledge of the operational implications of the following concepts as they apply to Pressurizer Level Control Malfunctions: (CFR 41.8 / 41.10 / 45.3)

PZR reference leak abnormalities ....

Remarks/Status

7/17/15 Used Bank question 028 AK1.01 1

7/23/15 Reviewed by Exam Supervisor, with Editorial Enhancement comment, 1) Add Noun name for LT-459 to Stem.

9/11/15 Exam team made change as proposed.

11/19/15 AOM-SHIFT approved question for 60 day submittal.

APE032 AA2.02 - Loss of Source Range Nuclear Instrumentation

Ability to determine and interpret the following as they apply to the Loss of Source Range Nuclear Instrumentation: (CFR: 43.5 / 45.13)

Expected change in source range count rate when rods are moved ....

Given the following:

- A reactor startup is being commenced
- Source Range count rate (CR_0) prior to rod withdrawal is as follows:
  - N31: 3.0E+001 cps
  - N32: 3.0E+001 cps

The crew has completed the MINIMUM number of doublings to allow taking the reactor critical IAW GP-003, NORMAL PLANT STARTUP FROM HOT SHUTDOWN TO CRITICAL.
The OATC is getting ready to pull to criticality when the following indications are observed:

- N31: 2.4E+002 cps
- N32: 1.2E+002 cps

Which ONE of the following correctly completes the statement below?

1) IAW GP-003, Source Range Channel ____(1)____ is indicating AS EXPECTED.

2) When the Source Range Channel with the unexpected reading is removed from service per the appropriate OWP, the reactor startup ____(2)____ continue.

A. (1) N31
(2) may

B. (1) N31
(2) may not

C. (1) N32
(2) may

D. (1) N32
(2) may not

ILC15 RNP SRO NRC Examination QUESTION 21 21 **B**

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because startup cannot continue. This is plausible because the operator may incorrectly believe that the startup may continue with one SR Channel OOS.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to GP-003 (p44; Rev 105) a Note prior to Step 8.2.28 states that the approach to criticality should take approximately four doublings of the indicated Reference Count Rate (CR0) under ideal conditions. The target count rate is intended to serve as a known stable reactivity state suitable for data taking and criticality predictions. In practice, the operator pulls rods and stabilizes at the third doubling, and then pulls to criticality. Based on this, the Source Range countrate should be 240 cps (2.4E002) when at the third doubling [1st doubling 60 cps, 2nd doubling 120 cps, 3rd doubling 240 cps]. With N32 reading half of the expected value at criticality, N32 is reading unexpectedly. According to GP-003 (p13; Rev 105) Step 5.4.8, The following requirements apply to the Source Range Nuclear Instruments when in MODE 2 below P-6: (ITS Table 3.3.1-1 item 4). IF one Source Range channel becomes inoperable, THEN immediately suspend operations involving positive reactivity additions, Also reference ITS 3.3.1, Required Action I.1.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because Channel N31 is reading as expected. This is plausible because the operator may incorrectly believe that the expected countrate change at the time of criticality takes place in three doublings, rather than 4.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to interpret indication for a failed SR NI channel during a reactor startup and determine the required action for this condition.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and use this information to diagnose a failed SR NI channel, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
GP-003 (p13 and 44; Rev 105) 10 CFR 55.41.7	

APE032 AA2.02 - Loss of Source Range Nuclear Instrumentation

Ability to determine and interpret the following as they apply to the Loss of Source Range Nuclear Instrumentation: (CFR: 43.5 / 45.13)

Expected change in source range count rate when rods are moved ....

Remarks/Status

8/18/15 Modified Bank question NIS-012 3

9/8/15 Reviewed by Exam Supervisor, with editorial comment, 1) Why would it fail to 3 cps? Need to make the reading after failure more realistic.

9/11/15 Exam team discussed with exam supervisor and changed failure reading to be consistent with the bottom of the scale.

11/17/15 Fleet review determined that the question as written doesn't really hit the KA, and is a difficult KA to write a question to. The exam team wrote a new question to better meet the KA.

11/21/15 AOM-SHIFT approved question for 60 day submittal.

APE033 AK3.01 - Loss of Intermediate Range Nuclear Instrumentation

Knowledge of the reasons for the following responses as they apply to the Loss of Intermediate Range Nuclear Instrumentation: (CFR 41.5,41.10 / 45.6 / 45.13)

Termination of startup following loss of intermediate range instrumentation ....

Given the following:

- A Reactor startup is in progress
- Based on the following indications, the startup has been placed on hold:
  - N-35 = 5 x 10^{-9} amps
  - N-36 = 1 x 10^{-11} amps
  - N-31 and N-32 are 120 cps

Which ONE of the following is the reason for placing the startup on hold?

A. N-35 is over compensated

B. N-36 is over compensated

C. N-35 is under compensated

D. N-36 is under compensated

General Discussion

Answer A Discussion

Incorrect. This is incorrect because overcompensation of the IR signal causes a reduction of the IR signal output. However, N-35 is reading high as compared to SR NIs. This is plausible because N-35 is the IR NI channel that is not in alignment with the SR NI channel indications.

Answer B Discussion

Incorrect. This is incorrect because N-36 is indicating correctly as compared to SR NI indications. This is plausible because N-36 is reading lower than N-35 and therefore if SR NI indication was reading higher and in alignment with N-35, then this would be the correct answer.

Answer C Discussion

Correct. According to ST-010 (p 24; Rev 3) Overcompensation of the IR signal can occur if the compensating voltage is set too high causing a reduction of the IR signal out. Undercompensation of the IR signal occurs when the compensation voltage is set too low causing an increase of the IR signal out. Overcompensation causes the IR output signal to be nonconservative. According to LOF0020R (p 153; Rev.0) Figure 49 shows Source Range and Intermediate Range indications such that 120 CPS SR indication is approximately 1 x 10-11 amps IR indication.

Answer D Discussion

Incorrect. This is incorrect because N-36 is indicating correctly as compared to SR NI indications. This is plausible because undercompensation of an IR NI is the cause of these conditions and N-36 can fail by this method.

Basis for meeting the KA

The KA is matched because the startup has been terminated due to a malfunction (i.e. in effect a loss) of an intermediate range instrument. The applicant must have knowledge of the reasons for the "loss" of the intermediate range instrument to determine the correct response.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because it requires more than one mental step. The applicant must first recall from memory the relationship of SR indication and IR indication at various power levels. The applicant must then determine which of the IR channels in malfunctioning from the indications provided and the reason for the malfunctioning indication.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	NIS-010 10

Development References

ST-010 Rev. 3
LOF0020R Rev. 0
GP-003 Rev.105
10 CFR 55.41.7

Student References Provided

APE033 AK3.01 - Loss of Intermediate Range Nuclear Instrumentation

Knowledge of the reasons for the following responses as they apply to the Loss of Intermediate Range Nuclear Instrumentation: (CFR 41.5,41.10 / 45.6 / 45.13)

Termination of startup following loss of intermediate range instrumentation ....

Remarks/Status

7/21/15 Used Bank question NIS-010 10

8/5/15 Reviewed by Exam Supervisor, UNSAT with following comment, 1) 50 cps on SRNI does not align to 5 X 10 -11amps. Need to change this to be more realistic since this could result in 2 correct answers.

9/8/15 Operations SRO reviewed question, concurs that the SRNI and N-36 readings do not align, which could cause the candidates to conclude that both IRNIs are undercompensated.

9/11/15 exam team incorporated change to make the SRNI readings correspond more closely to the properly compensated IRNI reading.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

APE060 AK2.01 - Accidental Gaseous-Waste Release

Knowledge of the interrelations between the Accidental Gaseous Radwaste Release and the following: (CFR 41.7 / 45.7)

ARM system, including the normal radiation-level indications and the operability status ....

Given the following:

- An accidental gaseous radwaste release is in progress
- R-1, Control Room Area Radiation Monitor, alarms
- R-1 is indicating 8.62E-2 mR/hr and stable

Which ONE of the following correctly completes the statements below?

1) R-1 ____(1)____ operating properly.

2) When R-1 alarms, the CR HVAC will automatically shift to the Emergency ____(2)____ Mode.

A. (1) is
(2) Recirculation

B. (1) is
(2) Pressurization

C. (1) is NOT
(2) Recirculation

D. (1) is NOT
(2) Pressurization

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B & C.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because this radiation level is normal, and no alarm should have occurred. This is plausible because the operator may incorrectly interpret the exponential reading of the instrument, and incorrectly conclude that the Control Room reading is higher than it actually is.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because when R-1 alarms it automatically shifts to the Emergency Pressurization Mode. This is plausible because this is one of three modes of system operation (Normal, Emergency Pressurization, and Emergency Recirculation) and the operator could incorrectly believe that when the alarm occurs, the system shifts to the Emergency Recirculation Mode.

Answer D Discussion

Correct. 1st part correct, 2nd part correct. According to ST-019 (p12; Rev 4) the R-1 detector range is from .01 mrem/hr to 107 mrem/hour. The indicated reading is .0862 mrem/hour. According to OST-20 (p23 of 61; Rev 55) the R-1 reading is recorded by the operator every 12 hours, and would be expected to be known by the operator. Since the alarm has occurred, and radiation levels are normal, the operator will conclude that R-1 is not working properly. According to ST-036 (p 10; Rev 4a) Emergency Pressurization initiates upon High Radiation (i.e. Alarm occurs) or Safety Injection signal.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the interrelations between the Accidental Gaseous Radwaste Release and R-1 (Control Room Area Rad monitor), including the normal radiation-level indications and the operability status. This is accomplished by creating conditions in which R-1 has alarmed pre-maturely with normal radiation levels indicated, and requiring the operator to identify whether or not the instrument is operating properly.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall bits of information, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

ST-019 (p12; Rev 4)
OST-20 (p23 of 61; Rev 55)
ST-036 (p 10; Rev 4a)
10 CFR 55.41.11

Student References Provided

APE060 AK2.01 - Accidental Gaseous-Waste Release

Knowledge of the interrelations between the Accidental Gaseous Radwaste Release and the following: (CFR 41.7 / 45.7)

ARM system, including the normal radiation-level indications and the operability status ....

Remarks/Status

8/18/15 New question developed.

9/8/15 Reviewed by Exam Supervisor, UNSAT, not required to know R-1 setpoint from memory.

9/8/15 Operations SRO reviewed question, UNSAT same comment as above.

9/14/15 edited the first part of the question to make the contrast between the normal RM reading which should be knowledge from memory, and based on a reading of such, with the channel in alarm is it operating correctly?

11/21/15 AOM-SHIFT approved question for 60 day submittal.

APE067 AA1.09 - Plant Fire On Site

Ability to operate and / or monitor the following as they apply to the Plant Fire on Site: (CFR 41.7 / 45.5 / 45.6)

Plant fire zone panel (including detector location) ....

Given the following:

- The plant is operating at 100% power
- The following is observed on the Fire Alarm Console: **(SEE GIVEN CONDITIONS ON NEXT PAGE)**
- The Fire Brigade has been alerted
- An evacuation of the fire area has been performed

Which ONE of the following correctly completes the statements below?

1) It is expected that the automatic water suppression system ____(1)____ actuate for this fire event.

2) Based on this fire event, the entry conditions ____(2)____ met for DSP-001, DEDICATED SHUTDOWN DIAGNOSTIC.

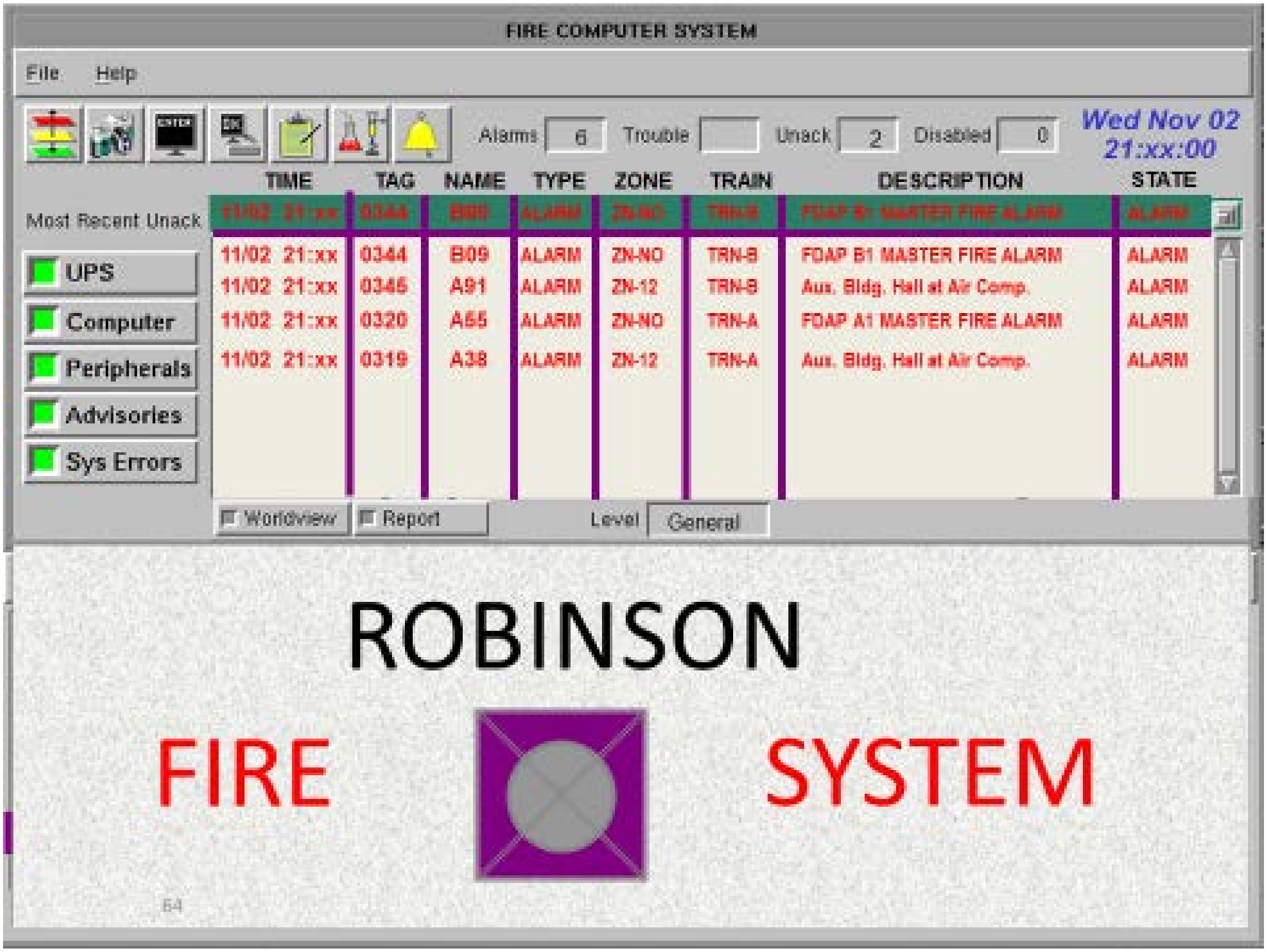
A. (1) will
(2) are

B. (1) will
(2) are NOT

C. (1) will NOT
(2) are

D. (1) will NOT
(2) are NOT

Question 24 Given Conditions



General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to APP-044 (p60 of 398; Rev 28) The automatic Water Suppression System will actuate if the opposite train fire alarm is present. According to DSP-001 (p2 of 26; Rev 14), any fire that has the potential to damage plant components/controls and/or their power/control cables when Tavg is greater than 200°F, will require DSP-001 to be implemented. According to AOP-041 (p7 of 28; Rev 7) Step 8, if this fire alarm is in the Auxiliary Building, then DSP-001 will need to be implemented while AOP-041 is being carried out.

Answer B Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because DSP-001 must be implemented. This is plausible because there are some areas of the plant for which this procedure does not need to be implemented, such as the Fuel or Radwaste buildings.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the automatic Water Suppression System will actuate. This is plausible because there are conditions (i.e. only one train actuated) under which the auto system would not be expected to actuate.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Ability to monitor the Fire Alarm Console (FAC) as it applies to the Plant Fire on Site, including detector location. This is accomplished by requiring that the operator observe a Screen Shot of the FAC Screen showing alarms in specific locations within the plant, and then answering questions relating to what has been observed. The 2nd part of the question in particular demonstrates their ability to associate a detector location with the need to implement a specific procedure (i.e. DSP-001).

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must interpret a Screen Shot of the FAC Screen showing alarms in specific locations within the plant, and then answering questions relating to what has been observed, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

APP-044 (p60 of 398; Rev 28)
AOP-041 (p7 of 28; Rev 7)
DSP-001 (p2 of 26; Rev 14)
10 CFR 55.41.4

Student References Provided

APE067 AA1.09 - Plant Fire On Site

Ability to operate and / or monitor the following as they apply to the Plant Fire on Site: (CFR 41.7 / 45.5 / 45.6)

Plant fire zone panel (including detector location) ....

Remarks/Status

8/11/15 New question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

9/17/15 Exam team moved the picture of the FAC to a reference page, to fit the entire question and answer choices on the same page.

11/21/15 AOM-SHIFT approved question for 60 day submittal.

APE068 AK3.12 - Control Room Evacuation
Knowledge of the reasons for the following responses as they apply to the Control Room Evacuation: (CFR 41.5,41.10 / 45.6 / 45.13)
Required sequence of actions for emergency evacuation of control room ....

Given the following:

- With the plant at 100%, a confirmed bomb threat has been received
- The caller specified that the bomb was located in the Control Room
- The following timeline of events is recorded:

2110 The Control Room was evacuated after all appropriate actions were taken

2145 A Control operator in the Charging Pump Room informs the SM that:
- N51 reads 3.0E5 cps and is slowly lowering
- Pressurizer pressure is 2225 psig
- Pressurizer level is 35%
- The “A” Charging Pump is operating

Which ONE of the following correctly completes the statements below?

IAW Attachment 1 of AOP-004, CONTROL ROOM INACCESSIBILITY, the operator will raise Pressurizer level to at LEAST greater than ____(1)____, and then stop the running Charging Pump.

The basis for this action is to ____(2)____.

A. (1) 60%
(2) prevent exceeding the Charging Pump starting duty limitations

B. (1) 60%
(2) ensure that the reactor is subcritical

C. (1) 86%
(2) ensure that the reactor is subcritical

D. (1) 86%
(2) prevent exceeding the Charging Pump starting duty limitations

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General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B & D.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the plant conditions require raising level to 86%. This is plausible because the procedure has the operator check the SG levels at 60% in Attachment 3.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to AOP-004 (p11-12 of 32; Rev 25) the operator will be directed to establish 1 Charging Pump ONLY, and then be directed to check the Source Range < 105 cps. Since Source Range cps are above this level, the operator will go to the RNO, and proceed to Step 17; which will direct the operator to raise the quantity of borated water in the RCS by raising Charging Pump speed and stop the running charging pump after PRZR level is > 86%.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the reason the procedure allows PRZR level to be adjusted to >86% to address the reactivity issue. This is plausible because on subsequent steps where the operator is controlling PZR level, they do so by starting and stopping of the charging pump. There is a note that reminds the operator of the starting duty limitations on the charging pumps prior to the continuous action step, however this is not the basis for the high end of the level band, and the procedure in fact has the operator select a different charging pump on subsequent starts to prevent challenging starting duty limitations. The operator could confuse this note as a basis for the high end of the level band.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of the reasons for the required sequence of actions for pressurizer level control in Attachment 1 of AOP-004 based on plant conditions.

Basis for Hi Cog

The question is at the Comprehensive/Analysis cognitive level because the operator must recall a step in a sequence of steps or the reason for the step in order to answer the question correctly

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
AOP-004 (p11-12 of 32; Rev 25) 10 CFR 55.41.10	

APE068 AK3.12 - Control Room Evacuation

Knowledge of the reasons for the following responses as they apply to the Control Room Evacuation: (CFR 41.5,41.10 / 45.6 / 45.13)

Required sequence of actions for emergency evacuation of control room ....

Remarks/Status

8/4/15 New question developed.

8/11/15 Reviewed by Exam Supervisor, Editorial Enhancement commments,1) Need to specify location of fire in the stem. If the fire is in the control room, would they be in DSP-002 instead of AOP-004? Would this change the correct answer?

9/11/15 Exam team discussed with Exam Supervisor and changed first bullet into 2 bullets to avoid procedure use direction and possibility for a second answer choice to be correct.

9/30/15 new question developed.

11/17/15 Fleet review indicated that there were plausibility issues with the answer that were to avoid a water solid condition, as if that were the case, then why would we be filling the PZR to "AT LEAST" or a "MINIMUM" Found another piece in the procedure to contrast that with.

12/1/15 question edited to address concern AOM-shift had with possible high-miss.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

APE076 AA2.04 - High Reactor Coolant Activity

Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: (CFR: 43.5 / 45.13)

Process effluent radiation chart recorder..

Given the following:

- The plant is at 100% power
- The R-9, Letdown Line Area, indication on Radiation Monitoring System Recorder RR-1 is slowly rising

Which ONE of the following correctly completes the statements below?

1) The cause of the RMS alarm is ____(1)____.

2) If the trend continues, it is expected that ____(2)____.

A. (1) High RCS Activity
(2) RR-1 will alarm BEFORE the R-9 ratemeter

B. (1) A letdown line leak in Containment
(2) RR-1 will alarm BEFORE the R-9 ratemeter

C. (1) High RCS Activity
(2) the R-9 ratemeter will alarm BEFORE RR-1

D. (1) A letdown line leak in Containment
(2) the R-9 ratemeter will alarm BEFORE RR-1

ILC15 RNP SRO NRC Examination QUESTION 26

26 **A**

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to OMM-14 (p9 of 21; Rev 51) Step 8.3.3, the basis for R-9 (Failed Fuel Monitor) setpoint is that the setpoint is set low enough to detect a small leak in the fuel rods in time to begin corrective action and clean-up. According to AOP-005-BD (p15 of 29; Rev 32), states that the reason that E&C is called when R-9 is in alarm is because RCS activity may have been the cause of the R-9 alarm condition, and that the step provides instruction for sampling the RCS for activity. According to OMM-14 (p6 of 21; Rev 51), P&L 5.1, the RR-1 alarm setpoints are chosen at 1.5 times the base-line value to allow RR-1 RMS channel to alarm before the respective ratemeter.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because R-9 is an area monitor that is located outside Containment. This is plausible because AOP-005 identifies R-9 as the Letdown Line Monitor, and the operator may incorrectly believe that it is associated with the letdown line in Containment.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the R-9 ratementer setpoint is 3000 mr/hr corresponding which is low enough to detect a small leak in the fuel rods in time to begin corrective action and clean-up, and the RR-1 alarm setpoint is set 1.5 times above the baseline value to ensure that it alarms prior to the ratemeter. This is plausible because the operator may not know the basis for the RR-1 Alert level setpoints.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to determine and interpret the process effluent radiation chart recorder as it applies to High Reactor Coolant Activity. This is accomplished by requiring the operator to analyze a rising trend in the recorder for R-9 (An Area Monitor, monitoring a process [letdown flow radioactivity level]) and identify the cause, and then identify which will provide the first indication of the trend (Which is the Recorder).

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must demonstrate an understanding of the significance of a rising trend on R-9, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	076 AA2.01 001

Development References

OMM-14 (p6 and 9 of 21; Rev 51)
AOP-005-BD (p15 of 29; Rev 32)
10 CFR 55.41.11

Student References Provided

APE076 AA2.04 - High Reactor Coolant Activity

Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: (CFR: 43.5 / 45.13)

Process effluent radiation chart recorder.......................................

Remarks/Status

8/4/15 Modified Bank Question 076 AA2.01 001

8/11/15 Reviewed by Exam Supervisor, Editorial Enhancement comment, 1) Eliminated 2 Distractors due to a "True/False" condition, prior to even reading the stem.

9/30/15 removed the term sonalert, as operators do not commonly use this term.

11/19/15 AOM-SHIFT approved question for 60 day submittal.

WE09 2.1.20 - Natural Circulation Operations
WE09 GENERIC
Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)

Given the following:

- EOP-ECA-0.1. LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED has been implemented
- The crew is checking for Natural Circulation with the following conditions:
  - RCS subcooling based on CETs are 33 °F and stable
  - CETC are 555°F and stable
  - S/G pressures are stable at 900 psig
  - RCS Hot Leg temperatures are 555 °F and stable
  - RCS Cold Leg temperatures are 545 °F and slowly rising
  - S/G NR levels are 21% and stable

Which ONE of the following correctly completes the statements below?

Based on the indications above, Natural Circulation flow ____(1)____ been established.
IAW EOP-ECA-0.1, the Operators will ____(2)____.

A. (1) has
(2) maintain current steam dump rate

B. (1) has
(2) maintain current S/G levels

C. (1) has NOT
(2) raise the rate of dumping steam

D. (1) has NOT
(2) raise S/G levels

General Discussion

The question is significantly modified because the given information for Steam Generator Pressure and RCS Cold Leg temperature have changed along with providing values for RCS Hot Leg temperature and S/G levels. In addition, the question has changed to a two part question, thus changing the required answers/distractors. According to NUREG-1021, ES-401 Section D.2.f, paragraph 1, bullet 4; to be considered a significantly modified question, at least one pertinent condition in the stem and at least one distractor must be changed from the original bank question. Changing the conditions in the stem such that one of the three distractors in the original question becomes the correct answer would also be considered a significant modification

Answer A Discussion

Incorrect. 1st part wrong, 2nd wrong. This is incorrect because RCS Cold Leg temperatures are not at saturation temperature for S/G pressure. This is plausible because if RCS Cold Leg Temperatures were at saturation temperature for the S/G pressure then the rate of dumping steam would be maintained at the current rate.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. This is incorrect because RCS Cold Leg temperatures are not at saturation temperature for S/G pressure. This is plausible because if RCS Cold Leg Temperatures were at saturation temperature for the S/G pressure then maintaining current S/Gs levels is an appropriate procedure action.

Answer C Discussion

Correct. According to EOP-ECA-0.1 (p 18; Rev 0) Step 17, requires dumping more steam from intact S/Gs if any of the following criteria are not met:

•CHECK RCS Subcooling based on Core Exit T/Cs – GREATER THAN 18 F [37 F]
•CHECK S/G pressures – STABLE OR LOWERING
•CHECK RCS Hot Leg temperatures – STABLE OR LOWERING
•CHECK Core Exit T/Cs – STABLE OR LOWERING
•CHECK RCS Cold Leg temperatures – AT SATURATION TEMPERATURE FOR S/G PRESSURE

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because RCS Cold Leg temperatures are not at saturation temperature for S/G pressure, therefore the procedure required action is to dump more steam from intact S/G(s) to establish Natural Circulation. This is plausible because S/G levels are required to be maintained during the cooldown of the RCS in accordance with EOP-ECA-0.1 Step 9.b.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to interpret plant conditions for establishing Natural Circulation and demonstrate knowledge of the required procedure actions to establish Natural Circulation when conditions are not met.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must analyze plant conditions and determine if Natural Circulation has been established and then determine the required procedure action(s) based upon this analysis, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	055 EK 1.02 1

Development References

EOP-ECA-0.1 Rev. 0
10 CFR 55.41.7

Student References Provided

WE09 2.1.20 - Natural Circulation Operations
WE09 GENERIC
Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)

Remarks/Status

7/22/15 Modified Bank question 055 EK1.02 1

7/28/15 Reviewed by Exam Supervisor, SAT

9/8/15 Operations SRO reviewed question, Editorial comment, 1) Make more obvious than SG not at saturation.

9/11/15 exam team discussed with OPS SRO that we will let the question go to validation as is, and determine if changes are required based on outcome.

12/1/15 question revised to provide realistic SG pressure and show not at or trending to saturation.

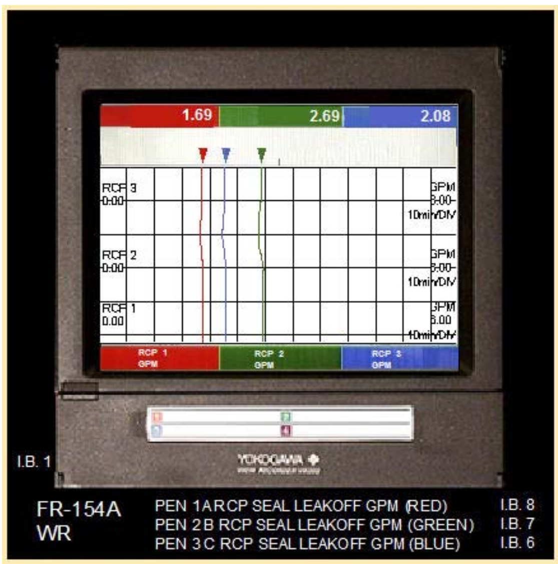
12/2/15 AOM-SHIFT approved question for 60 day submittal.

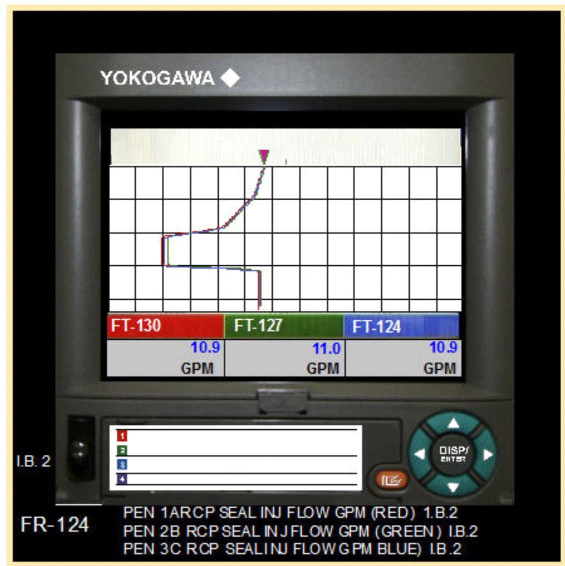
C

SYS003 A3.01 - Reactor Coolant Pump System (RCPS)
Ability to monitor automatic operation of the RCPS, including: (CFR: 41.7 / 45.5)
Seal injection flow ....

Given the following:

- The plant is operating at 100% power when an event occurs.
- Without any manual operator actions, the OATC observes the following:





Which ONE of the following identifies the event that has occurred?

A. A SBLOCA in containment has occurred.

B. LT-459, CH I PRZR LEVEL, has failed low.

C. A load rejection to 80% power has occurred.

D. Charging valve HIC-121, CHARGING FLOW, has failed shut.

General Discussion

Answer A Discussion

Incorrect. This is incorrect because in a SBLOCA, charging speed will increase to make up for the inventory loss in the RCS and try to keep pressurizer level on program level. This would result in a rise in seal injection flow, and depending on the size of the leak, would have seal injection flow stay higher than normal This is plausible because the transient would affect the seal injection flow.

Answer B Discussion

Incorrect. This is incorrect because the LT-459 failure in the low direction will cause the pressurizer level control system to believe that pressurizer level is lower than program and attempt to restore that level, speeding up the charging pump. This will cause seal injection flow to rise, and will only stabilize when the charging pump slows down when pressurizer level is on the new programed value. This is plausible because the level transmitter failure will cause charging pump speed to change, and affect seal injection flow.

Answer C Discussion

Correct. This is correct because the load rejection places a transient on the plant that initially causes an insurge into the pressurizer. In accordance with ST-021 CVCS (p102; Rev 3a) the charging pump speed will slow down in an attempt to lower inventory and keep pressurizer level on program. As the plant stabilizes the level control system will then speed up to keep the pressurizer level stable at the new program level for power following the load rejection. Seal injection flow lowers with the charging speed initially and then will rise back up to a value near its initial flow.

Answer D Discussion

Incorrect. This is incorrect because the normal charging line flow valve, HIC-121 failing shut will increase the pressure in the charging line, and thereby increase the amount of charging flow that will be supplied to the seal injection line (all charging flow diverted that way). This is plausible because it will affect seal injection flow and cause it to change, however it would go up. The operator may believe that location of HIC-121 in the flow path would cause seal injection flow to lower.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to monitor and interpret the RCP seal injection flow.

Basis for Hi Cog

The question is at the Analysis cognitive level because the operator must analyze the indications provided and make a determination as to the plant transient that cause the seal injection flow to change as indicated, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

ST-021 CVCS Rev 3a, pg 102
10 CFR 55.41.7

Student References Provided

SYS003 A3.01 - Reactor Coolant Pump System (RCPS)
Ability to monitor automatic operation of the RCPS, including: (CFR: 41.7 / 45.5)
Seal injection flow ....

Remarks/Status

7/29/15 New question developed.

9/8/15 Reviewed by Exam Supervisor, UNSAT, due to distractor D could be partially correct. For smaller leaks in the charging line, the CCPs will speed up to compensate, seal injection will return to almost the original value. Can we change "D" to either HCV-121 failed shut or Seal Injection filters are clogged?

9/8/15 Operations SRO reviewed question, requires further discussion.

9/11/15 exam team discussed with OPS SRO his concerns over the difficulty. It was agreed that changing distractor D to HIC-121 failing shut would eliminate the possibility of having 2 correct answers.

11/24/15 AOM-SHIFT approved question for 60 day submittal.

SYS003 K4.07 - Reactor Coolant Pump System (RCPS)
Knowledge of RCPS design feature(s) and/or interlock(s) which provide for the following : (CFR: 41.7)
Minimizing RCS leakage (mechanical seals) ....

Given the following:

- The plant is in Mode 3
- APP-003-E2, VCT HI/LO PRESS, has alarmed
- Actual VCT pressure is 15 psig

Which ONE of the following correctly completes the statement below?

If VCT pressure continues to lower, RCP #1 Seal Leakoff flow will ____(1)____ and RCP #2 Seal leakoff flow will ____(2)____.

A. (1) lower
(2) rise

B. (1) rise
(2) lower

C. (1) rise
(2) rise

D. (1) lower
(2) lower

ILC15 RNP SRO NRC Examination QUESTION 29

29

B

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. See C and D.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to the RCS Text (p16; Rev 6) the shaft seal section consists of three devices. They are the No. 1 controlled leakage, film riding face seal, and the No. 2 and 3 rubbing face seals. During normal system operation the charging pump(s) provide approximately 8 gpm injection flow to each RCP. The injection enters the pump between the thermal barrier and the pump bearing. The flow is then divided with approximately 5 gpm flowing down past the thermal barrier into the RCS and approximately 3 gpm flowing up past the pump bearing. The outlet from the No. 1 seal discharges to the Volume Control Tank (VCT). RCP No. 1 seal leak off flow is normally limited to 3.2 gpm for the purposes of meeting Appendix R (Fire Protection) and SBO (Station Black Out) requirements. The VCT maintains a back pressure of at least 15 psig to ensure a flow through the No. 2 seal. Because #1 and the #2 seal operate in close association with one another, the automatic adjustment of one will affect the other. When VCT pressure lowers, the differential pressure across the #1 Seal will rise, causing the seal leakoff flow to rise. When this occurs the flow to the #2 Seal from the #1 Seal will lower causing its leakoff flow to be lower.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the leakoff from the #2 Seal will lower. This is plausible because the operator may not understand how the Seal operates, and why it is important to maintain a minimum of 15 psig in the VCT.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the leakoff from the #1 Seal will rise. This is plausible because the operator may not understand how the Seal operates, and why it is important to maintain a minimum of 15 psig in the VCT.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the knowledge of an RCP seal package design feature (i.e. operate #1 Seal with a minimum backpressure) which if operated properly will limit RCP seal leakage.

Basis for Hi Cog

The question is at the Comprehensive cognitive level because the operator must demonstrate an understanding of how the RCP Seal Package works, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	003 K1.04 003

Development References	Student References Provided
RCS Text (p16; Rev 6) 10 CFR 55.41.7	

SYS003 K4.07 - Reactor Coolant Pump System (RCPS)

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

Minimizing RCS leakage (mechanical seals) ....

Remarks/Status

7/28/15 New question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

9/8/15 Operations SRO reviewed question, expressed concerned over the Safe Shutdown Seals system being new, how much has it been discussed with the class?

9/11/15 Exam team discussed with the OPS SRO and determined that we should let this go to validation.

9/29/15 changed question to one found in bank on RCP seals.

11/24/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination **QUESTION 30** 30 **C**

SYS004 K2.06 - Chemical and Volume Control System
Knowledge of bus power supplies to the following: (CFR: 41.7)
Control instrumentation ....

Given the following:

- The plant is operating at 100% power
- Due to RTGB indications the crew has entered AOP-024, LOSS OF INSTRUMENT BUS
- An Auto Makeup to the VCT has initiated on the loss of instrument bus

Which ONE of the following correctly completes the statement below?

The Auto makeup has occurred because VCT Level transmitter ____(1)____ has de-energized on a loss of Instrument Bus ____(2)____.

A. (1) LT-112
(2) 7

B. (1) LT-112
(2) 9

C. (1) LT-115
(2) 7

D. (1) LT-115
(2) 9

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because LT-112 does not control automakeups. This is plausible because the operator may incorrectly believe that this level transmitter is responsible for controlling the VCT level as it is only one of two level transmitters associated with that system.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer C Discussion

Correct. According to EDP-008 (p15 of 23; Rev 33) LT-115 is powered from Instrument Bus 7A. According to ST-021 (p34 of 136; Rev. 3a) LT-115 also provides inputs to LCV-115A (backup to LT-112, high level override), the VCT Automatic Makeup Control System, and the VCT HI/LO LVL alarm, APP-003-E3 (HI 48.6", LO 17.2"). On a failure of power to this level transmitter, the VCT level control system will see the VCT at 0 level and an auto makeup will commence.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because LT-115 is powered by Instrument Bus 7A. This is plausible because Bus 9 provides power to LT-112.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of bus power supplies to the primary VCT Level Control Instrument.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall a power supply in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

EDP-008 (p15 of 23; Rev 33)
ST-021 CVCS (p34 of 136; Rev 3a)
10 CFR 55.41.7

Student References Provided

SYS004 K2.06 - Chemical and Volume Control System
Knowledge of bus power supplies to the following: (CFR: 41.7)
Control instrumentation ....

Remarks/Status

8/4/15 New question developed.

9/8/15 Reviewed by Exam Supervisor, UNSAT, is the KA asking for the power supply to the components or is it asking about the power supplies to the actual instrument busses? Are the students required to know this from memory?

9/8/15 Operations SRO reviewed question, UNSAT, as there is no way that this should be information required from memory.

9/29/15 changed question to new question.

11/11/15 edited the question to isolate the power supply to the IB 7 vs 9.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

SYS005 A2.02 - Residual Heat Removal System (RHRS)
Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)
Pressure transient protection during cold shutdown ....

Given the following:

- A plant cooldown is in progress
- The “A” RHR Train is in service
- RCS temperature is 190°F
- RCS Pressure is 350 psig
- The RCS is in Solid Plant Operation

Subsequently, a transient occurs resulting in the following:

- RCS temperature rises to 195°F
- RCS Pressure rises to 420 psig
- PZR PORV PCV-456 indicates OPEN
- PZR PORV PCV-455C indicates CLOSED

The crew has entered AOP-019, MALFUNCTION OF RCS PRESSURE CONTROL.

Which ONE of the following correctly completes the statements below?

1) Based on plant conditions, both PORVs should have ____(1)____.

2) The operator will **FIRST** ____(2)____ to control or mitigate the consequences of this event.

A. (1) remained closed
(2) close PCV-456

B. (1) opened
(2) stop all Charging Pumps and RCPs

C. (1) opened
(2) operate PZR sprays and heaters to control pressure

D. (1) remained closed
(2) place the PCV-456 LTOPP Arming Switch to NORMAL

General Discussion

Answer A Discussion

Incorrect. This is incorrect because the setpoint for the PORVs opening in the LOW PRESSURE Mode is 400 psig, and both valves should have opened. This is plausible because the setpoint is temperature dependent and will rise as temperature rises. In the situation provided, a temperature rise has taken place so the operator may incorrectly believe that the setpoint is higher than 420 psig. If so, the operator would conclude that both valves should have remained CLOSED. If the operator believed that the valves should have remained CLOSED, it is reasonable that the operator would believe that a required action is to CLOSE the failed OPEN PORV.

Answer B Discussion

Correct. According to ST-059 (p31; Rev 4), LTOPP control is required to be activated when the RCS is cooled down below 365ºF, to minimize Pressurized Thermal Shock (PTS) concerns. The LTOP controller uses the lowest of TE-410, TE-420 and TE-430 to determine RCS temperature and pressure as sensed by PT-500 and PT-501. The lift setpoint is variable based upon auctioneered low RCS temperature. At an RCS temperature of 365ºF, the pressure setpoint is 400 psig. The setpoint of the Comparators PC-502 and PC-503 are raised as RCS temperature is increased. The setpoint will not lower below 400 psig. Consequently, under the current plant conditions, BOTH PORVs should have OPENED. According to AOP-019 (p3 of 33; Rev 20), Step 1, the operator will check the LTOPP Arming Switches in NORMAL. Since they are in the LOW PRESSURE position, the operator will perform the RNO which directs them to Stop all Charging Pumps and RCPs.

Answer C Discussion

Incorrect. This is incorrect because Operate Pzr sprays and heaters to control pressure is not an expected action in these plant conditions (Solid Plant Ops). This is plausible because this would be the required action if the plant were NOT in SOLID Plant Operation.

Answer D Discussion

Incorrect. This is incorrect because the setpoint for the PORVs opening in the LOW PRESSURE Mode is 400 psig, and both valves should have opened. This is plausible because the setpoint is temperature dependent and will rise as temperature rises. In the situation provided, a temperature rise has taken place so the operator may incorrectly believe that the setpoint is higher than 420 psig. If so, the operator would conclude that both valves should have remained CLOSED. If the operator believed that the valves should have remained CLOSED, it is reasonable that the operator would believe that a required action is Place the PCV-456 LTOPP Arming Switch to NORMAL in an attempt to Close PCV-456.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to predict the impacts of a pressure transient protection during cold shutdown on the RHR System (Which in Solid Plant Operation Includes the LTOPs), and based on this, use AOP-019 to correct, control, or mitigate the consequences.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall how the LTOP works, predict whether or not it should be working under the current plant conditions, and identify what actions need to be taken based on the transient, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	

Development References

ST-059 (p31; Rev 4)
AOP-019 (p3 of 33; Rev 20)
10 CFR 55.41.7

Student References Provided

SYS005 A2.02 - Residual Heat Removal System (RHRS)

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

Pressure transient protection during cold shutdown ....

Remarks/Status

8/4/15 New question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

11/24/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 32 32 **B**

SYS005 K6.03 - Residual Heat Removal System (RHRS)
Knowledge of the effect of a loss or malfunction on the following will have on the RHRS: (CFR: 41.7 / 45.7)
RHR heat exchanger ....

Given the following:

- “A” Train RHR is in service
- Instrument Air pressure lowers to 50 psig

Which ONE of the following correctly completes the statement below?

RCS temperature will INITIALLY ____(1)____, and RHR System Flow will INITIALLY ____(2)____.

A. (1) Rise
(2) Rise

B. (1) Rise
(2) Lower

C. (1) Lower
(2) Lower

D. (1) Lower
(2) Rise

ILC15 RNP SRO NRC Examination QUESTION 32

32

B

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because system flow will lower. This is plausible because the operator may incorrectly believe that FCV-605 will fail OPEN.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to ST-003 (p19-20; Rev 4a) HCV-758, RHR Loop Temperature Control valve, will fail closed on a Loss of Instrument Air; and HCV-605, RHR Loop Flow Control Valve, will fail closed on a Loss of Instrument Air. Consequently, both valves will fail closed under the stated plant conditions. The purpose of HCV-758 is to control the rate of temperature changing during RCS Heat up/Cooldown. Consequently, if this valve fails CLOSED, the Heat Exchanger is essentially removed from service, and the RCS Temperature will start to rise. The purpose of HCV-605 is to maintain specified flow rate in RHR loop. However, on a loss of air, the valve will fail CLOSED and all system flow will stop.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the RCS Temperature will initially rise when flow through the RHR HX is stopped. This is plausible because the operator may incorrectly believe that HCV-758 fails OPEN on a loss of Air.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and C. This is plausible because the operator may incorrectly believe that both HCV-758 and HCV-605 fail OPEN on a loss of Air.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of the effect of a loss RHR heat exchanger will have on the RHRS. This is accomplished by requiring the operator to identify that the RCS Temperature will rise initially when RHR flow through the RHR HX is stopped.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and then apply this information to stated condition, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	

Development References

ST-003 (p19-20; Rev 4a)
10 CFR 55.41.4

Student References Provided

SYS005 K6.03 - Residual Heat Removal System (RHRS)
Knowledge of the effect of a loss or malfunction on the following will have on the RHRS: (CFR: 41.7 / 45.7)
RHR heat exchanger ....

Remarks/Status

8/5/15 New question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

9/8/15 Operations SRO reviewed question, commented if an leak with IA pressure lowering to 50 PSIG was run on the simulator to observe effects?

9/11/15 Exam team discussed with OPS SRO that the 50 PSIG is low enough to cause effects on the RHR TCV and FCV as presented.

11/24/15 AOM-SHIFT approved question for 60 day submittal.

SYS006 A1.13 - Emergency Core Cooling System (ECCS)

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

Accumulator pressure (level, boron concentration) ....

Given the following:

- The plant is at 100% RTP
- The following timeline is observed:

TIME	"A" SI accumulator pressure	"A" SI accumulator level
1108	637 psig	68 percent
1111	646 psig	70 percent
1114	660 psig	75 percent

Which ONE of the following correctly completes the statement below?

The EARLIEST time at which an RTGB annunciator alarm would occur is at time ____(1)____, due to ____(2)____ reaching its alarm setpoint.

A. (1) 1111
(2) APP-002-A4, SI ACCUM A HI/LO LVL

B. (1) 1114
(2) APP-002-B4, SI ACCUM A HI/LO PRESS

C. (1) 1111
(2) APP-002-B4, SI ACCUM A HI/LO PRESS

D. (1) 1114
(2) APP-002-A4, SI ACCUM A HI/LO LVL

ILC15 RNP SRO NRC Examination QUESTION 33 33 **C**

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the APP-002-A4, SI ACCUM A HI/LO LVL will not alarm until 75%. This is plausible because the APP discusses that if level has risen greater than 70 GALLONS, not due to an addition from the RWST, that action needs to be taken IAW ITS 3.5.1.4. The operator may confuse these numbers and determine that the 70 is for percent of level and the alarm setpoint.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the earliest time that an alarm would be received is time 1111. This is plausible if the operator incorrectly believes that the APP-002-B4, SI ACCUM A HI/LO PRESS alarms at 660 psig, which is the high end of the ITS LCO 3.5.1 limit.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to APP-002-B4 (p19; Rev 70) the accumulator high pressure alarm setpoint is 646 PSIG. At time 1111, the "A" SI accumulator reaches that setpoint. According to APP-002-A4 (p7; Rev 70) the accumulator high level alarm setpoint is 75% and the level at time 1111 is only 70%. Therefore this is the earliest time that an alarm would be received and that alarm would be due to pressure.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. This is incorrect because the alarm setpoint for the accumulator pressure would have been reached at time 1111. This is plausible because SI accumulator level reaches its alarm setpoint of 75% at this time, and the operator may incorrect believe that the pressure has not reached an alarm setpoint yet.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to monitor changes in the accumulator pressure instrumentation by demonstrating knowledge of the cause of the alarm and the alarm setpoints.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall the alarm setpoints for the accumulator high pressure alarm and the high level alarm, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

APP-002-A4 p7 Rev 70
APP-002-B4 p19 Rev70
10 CFR 55.41.7

Student References Provided

SYS006 A1.13 - Emergency Core Cooling System (ECCS)

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

Accumulator pressure (level, boron concentration) ....

Remarks/Status

7/29/15 Used Bank question SI-009 1.

9/8/15 Reviewed by Exam Supervisor, SAT

12/1/15 switched the level and pressure columns.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

SYS006 K5.01 - Emergency Core Cooling System (ECCS)
Knowledge of the operational implications of the following concepts as they apply to ECCS: (CFR: 41.5 / 45.7)
Effects of temperatures on water level indications ....

Given the following:

- The plant was at 100% power when a LOCA occurs inside Containment

Which ONE of the following correctly completes the statements below?

1) While operating in the EOP Network, the LOWEST pressure in which “Adverse” containment values will be used is ____(1)____.

2) Based on containment temperature, level detectors with wet reference legs will indicate____(2)____ than the actual level.

A. (1) 4 psig
(2) lower

B. (1) 4 psig
(2) higher

C. (1) 10 psig
(2) lower

D. (1) 10 psig
(2) higher

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because reference legs will become less dense due to the temperature rise of the containment atmosphere in which they are in. The lower density will cause the D/P sensed to be smaller and the level indicated to be higher than actual, NOT lower. This is plausible because the operator may incorrectly recall the way in which the D/P cell uses the reference and variable leg densities to indicate level.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to OMM-022 (p 5; Rev 45) Definition 2, Adverse Containment Conditions: If the CV pressure is greater than or equal to 4 psig, then adverse containment conditions exist. When adverse setpoints are provided, they will be enclosed by brackets [ ]. According to LOF0020R (p 99; Rev 0) Section 4.6, Temperature variations can significantly affect the level measurement accuracy. An increase in ambient temperature will cause the density of the reference leg to decrease. This will result in a lower D/P sensed by the D/P cell and indicated level will be greater than actual level. Any pressure variations in the environment are felt on both sides of the open vessel DP level instrument and subsequently cancel each other. The dry and wet reference leg level detectors are only exposed to system pressure and therefore are not affected.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because 4 psig is the CV pressure when exceeded adverse values will be used. This is plausible because 10 psig is the CV pressure when exceed will actuate Containment Spray and Phase "B" isolation.

Basis for meeting the KA

The KA is matched because the operator must demonstrate a knowledge of how the containment adverse conditions (temperature) will effect water level indications.

Basis for Hi Cog

The question is at the Memory level because the operator must recall the value at which adverse containment numbers are used, and the operation of a D/P cell in a level measurement instrument.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	PATH-1-003 4

Development References

OMM-022 Rev. 45
LOF0020R Rev. 0
10 CFR 55.41.10

Student References Provided

SYS006 K5.01 - Emergency Core Cooling System (ECCS)
Knowledge of the operational implications of the following concepts as they apply to ECCS: (CFR: 41.5 / 45.7)
Effects of temperatures on water level indications ....

Remarks/Status

8/12/15 Modified bank question PATH-1-003 4

9/8/15 Reviewed by Exam Supervisor, SAT

11/17/15 Fleet review determined that we did not hit the intent of the KA. The second part of the question was changed to make the question a better KA match.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

SYS007 K3.01 - Pressurizer Relief Tank/Quench Tank System (PRTS)
Knowledge of the effect that a loss or malfunction of the PRTS will have on the following: (CFR: 41.7 / 45.6)
Containment ....

Given the following:

- The plant is at 100% power
- Containment pressure is 0.2 psig
- Containment temperature is 94°F

Subsequently:

- A load rejection results in a reactor trip
- Following the trip, a Pressurizer Safety valve opens, and will NOT reseat
- The PRT rupture disks function as designed
- Containment pressure is rising at 0.1 psig every 5 minutes
- Containment temperature is rising at 2°F every 5 minutes

Assuming these conditions remain constant, which ONE of the following identifies the Containment Technical Specifications LCOs that will be affected one hour from now?

A. Both LCO 3.6.4, Containment Pressure, and LCO 3.6.5, Containment Air Temperature, will be exceeded.

B. Only LCO 3.6.4, Containment Pressure, will be exceeded.

C. Only LCO 3.6.5, Containment Air Temperature, will be exceeded.

D. Neither LCO 3.6.4, Containment Pressure, nor LCO 3.6.5, Containment Air Temperature, will be exceeded.

ILC15 RNP SRO NRC Examination QUESTION 35

35 **B**

General Discussion

Answer A Discussion

Incorrect. This is incorrect because LCO 3.6.5 will be exceeded at 65 minutes. This is plausible because the operator may not know the Containment Air Temperature LCO, and be unable to successfully solve the problem.

Answer B Discussion

Correct. According to LCO 3.6.4 (p3.6-13; Amendment 176) the Containment pressure is limited to 1.0 psig during Modes 1-4. According to LCO 3.6.5 (p3.6-14; Amendment 176) the Containment temperature is limited to 120°F during Modes 1-4. Since the Containment pressure is rising at 0.1 psig every five minutes, it will reach the LCO limit in 45 minutes. Since the Containment temperature is rising at 2°F every five minutes, it will reach the LCO limit in 65 minutes.

Answer C Discussion

Incorrect. This is incorrect because the reverse is true. This is plausible because the operator may not know the either the Containment Pressure or the Containment Air Temperature LCO, and be unable to successfully solve the problem.

Answer D Discussion

Incorrect. This is incorrect because LCO 3.6.4 will be exceeded at 45 minutes. This is plausible because the operator may not know the Containment Pressure LCO, and be unable to successfully solve the problem.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of the effect that a loss the PRTS (Rupture Disk Releases) will have on the Containment (i.e. TS Limits are challenged).

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and then use the information to predict an outcome, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

LCO 3.6.4 (p3.6-13; Amendment 176)
LCO 3.6.5 (p3.6-14; Amendment 176)
10 CFR 55.41.10

Student References Provided

SYS007 K3.01 - Pressurizer Relief Tank/Quench Tank System (PRTS)
Knowledge of the effect that a loss or malfunction of the PRTS will have on the following: (CFR: 41.7 / 45.6)
Containment ....

Remarks/Status

7/29/15 New question developed

8/12/15 Reviewed by Fleet NRC Exam Writer, with the following comment, 1) question may be too hard as currently written.

9/8/15 Reviewed by Exam Supervisor, SAT.

11/24/15 AOM-SHIFT approved question for 60 day submittal.

SYS008 A4.01 - Component Cooling Water System (CCWS)
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5)
CCW indications and controls ....

Given the following:

T= 1305:10

- A loss of off-site power has occurred concurrent with a reactor trip
- The crew enters EOP-E-0, REACTOR TRIP OR SAFETY INJECTION

T= 1307:40

- Immediate actions of EOP-E-0 are complete
- The following parameters are noted:
    - RCS pressure is 2110 psig
    - SG pressures are all 910 psig and lowering slowly
    - CV pressure is 0.7 psig and rising slowly

Which ONE (1) of the following describes the CCW Pump indication available in the control room?

A. "B" and "C" CCW Pump RED indicating lights are LIT.
"A" CCW Pump GREEN indicating light is LIT.

B. All 3 CCW Pump RED indicating lights are LIT.

C. "B" and "C" CCW Pump GREEN indicating lights are LIT;
"A" CCW Pump RED indicating light is LIT.

D. "B" and "C" CCW Pump RED indicating lights are LIT;
"A" CCW Pump GREEN and RED indicating lights are EXTINGUISHED.

General Discussion

Answer A Discussion

Correct. According to ST-013 (p52; Rev 1) during a Loss of Offsite Power, all three CCW pumps are load shed from their respective buses. CCW pumps "B" & "C" which are supplied from emergency bus E1 and E2 will trip on bus undervoltage via the 27 Bus Undervoltage Relays, and CCW pump "A" will trip when the undervoltage trip device of the feeder breaker senses the loss of voltage on the DS bus. On Train A, CCW Pump "B" will auto restart after 30 seconds via the safeguards sequencer blackout (LOOP) logic after Emergency Diesel Generator "A" output breaker closes. On Train B, CCW Pump "C" - auto restart after 30 seconds via the safeguards sequencer blackout (LOOP) logic after Emergency Diesel Generator "B" output breaker closes. Consequently, the "B" and "C" CCW Pump Red status lights will be LIT. According to ST-056 (p53; Rev 5) the DS Bus which powers the "A" CCW Pump will be energized ≈95 seconds after the under voltage condition detected on the DS bus occurs. Since the "A" CCW load shed on the undervoltage condition on the DS Bus, it will only start if an AUTO start signal occurs to this pump. According to ST-013 (p52; Rev 1), CCW Pump "A" will auto start on low CCW pressure, with power available on the bus. However, the low pressure condition in the CCW System would have cleared at the 30 second point when the "B" and "C" CCW Pumps auto-started on the Blackout Sequencer signal. Consequently, the "A" CCW Pump Green status light will be LIT.

Answer B Discussion

Incorrect. This is incorrect because the "A" CCW Pump is NOT running. This is plausible because it would be correct if an SI and/or CV Spray signal existed.

Answer C Discussion

Incorrect. This is incorrect because the "B" and "C" CCW Pumps are running. This is plausible because the all-pumps OFF condition is a direct result of the LOOP, and the operator may incorrectly believe that no additional automatic actions occur with these pumps based on plant conditions.

Answer D Discussion

Incorrect. This is incorrect because the "A" CCW Pump Green light will be LIT. This is plausible because the operator may correctly believe that the "A" CCW Pump is OFF, but incorrectly believe that it does not have Control Power to the breaker.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to monitor CCW Pump motor breaker status lights at the RTGB.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and then use this information to predict an outcome, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	008 A4.01 1

Development References

ST-013 (p52; Rev 1)
ST-056 (p53; Rev 5)
10 CFR 55.41.7

Student References Provided

SYS008 A4.01 - Component Cooling Water System (CCWS)
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5)
CCW indications and controls ....

Remarks/Status

8/26/15 Used Bank question 008 A4.01 1

9/8/15 Reviewed by Exam Supervisor, with editorial comments, 1)most of the information in the stem is not needed; 2) need to add a statement that all auto systems operated as designed.

9/8/15 Operations SRO reviewed question, comment was "Time?"

9/11/15 Exam team discussed with reviewers that Times are given and the information in the stem is required to ensure the operator candidate can evaluate if a SI has occurred.

11/24/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 37

37

C

SYS010 K6.04 - 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)
PRT ....

The plant is at 100% power when the following occurs:

- A load rejection results in a PZR PORV actuation
- The PORV will not fully seat
- The depressurization led to a reactor trip and safety injection
- PZR pressure reduces to 1400 psig and stabilizes
- Safety Valve tailpiece temperature indicates 338°F with the PRT at 100 psig

Which ONE of the following correctly completes the statements below?

When the PRT rupture disc ruptures, the Safety Valve tailpiece temperature will ____(1)____.
The rate of RCS depressurization will ____(2)____ when that occurs.

A. (1) rise
(2) increase

B. (1) rise
(2) remain the same

C. (1) lower
(2) increase

D. (1) lower
(2) remain the same

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because when the rupture discs rupture, the constant enthalpy in the throttling process will be evident by a lowering temperature in the tailpiece, as the pressure that the PORV is relieving too is now lower. This is plausible because the operators may believe that with the disc rupture, increased flow of steam out of the PZR PORV due to less resistance to that flow will result in higher temperatures in the line. This misconception is what led operators at TMI to believe that they did not have a PORV relieving.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A & D.

Answer C Discussion

Correct. Ist part correct, 2nd part correct. According to GFES LOF0012R (p 90 Rev.0) the throttling process is a constant enthaply process, that was not clearly recognized by operators during the event at Three Mile Island. As the enthalpy remains constant in this process, we find that the downstream pressure is what determines the temperature in that point in the system. That constant pressure line is then followed to the saturation line and indicates the temperature that the Safety Valve tailpiece will indicate. For 100 psig, (115 psia) right before the rupture discs rupture, that temperature will be 338 degrees F. Once that disc ruptures and the pressure downstream is then released to the CV, the constant enthalpy line will then be extended to that new lower pressure, and the tailpiece will indicate a lower temperature. According to LOF0014R (p96 Rev.0) flow is calculated as proportional to the square of the D/P in the system. This concept applies for break flow as well. When the rupture discs rupture, the D/P will increase, therefore the RCS depressurization rate will increase as well.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because once the PRT discs rupture, the pressure in the PRT will be reduced to close to what CV ambient is. The flow out of the open PORV will increase as it is proportional to the square root of the D/P. This is plausible because the operator may believe that in a constant throttling process, which is what this is, the rate of depressurization is also constant.

Basis for meeting the KA

The KA is matched because the operator must demonstrate their knowledge of how a blown rupture disk (malfunction) in the PRT will affect the PZR pressure control system, specifically the indicated tail piece temperatures and the rate of RCS depressurization.

Basis for Hi Cog

The question is at the Comprehension cognitive level because the operator must understand the thermodynamic processes in a throttling process, analyze conditions, a then determine how those indications will change when a loss of the PRT (rupture disc ruptures) occurs, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References
GFES LOF0012R 10 CFR 55.41.14

Student References Provided

SYS010 K6.04 - 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)

PRT ....

Remarks/Status

7/28/15 Used Bank question ZG-THERMO CHAP 3-008 1

8/12/15 Reviewed by Fleet NRC Exam Writer, and provided the following comments, 1) PSIA conversion as a plausible distractor is sometimes not accepted, specifically by our chief examiner; 2) another plausible distractor would be the SAT temp for 1400 PSIG, the same mistake TMI made.

9/8/15 Reviewed by Exam Supervisor, SAT

11/17/15 Fleet review indicate that the question as written did not hit the KA. The question was rewritten to ask for the operators knowledge of

what happens to the PZR when the PRT rupture discs rupture (effect due to PRT loss).

11/24/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 38 38 **D**

SYS012 A3.06 - Reactor Protection System (RPS)
Ability to monitor automatic operation of the RPS, including: (CFR: 41.7 / 45.5)
Trip logic ....

Which ONE of the following identifies a condition which will cause an automatic reactor trip?

A. RCP bus frequency reads 58.0 Hz when THREE Power Range channels read 5% RTP.

B. Flow in ONE Reactor Coolant Loop reads 91% when ALL Power Range channels read 35% RTP.

C. ONE Intermediate Range NI channel reads 1 x10E-6 AMPS when TWO Power Range channels read 15% RTP.

D. ONE Source Range NI channel reads 5 x10E5 CPS when TWO Intermediate Range NI channels read 9 x10E-11 AMPS.

General Discussion

Answer A Discussion

Incorrect. This is incorrect because below P-7 (10% Turbine Power) the TWO LOOP LO FLOW TRIP is blocked . This is plausible because if all RCP bus frequencies are less than 58.2Hz then all RCPs would be expected to trip and the student may believe that all RCPs being tripped would result in a Reactor Trip even below P-7.

Answer B Discussion

Incorrect. This is incorrect because below P-8 (40% Reactor Power) the ONE LOOP LO FLOW TRIP is blocked. This is plausible because the flow given is below the LO FLOW TRIP setpoint but you would require two loops to have low flow for the trip to occur.

Answer C Discussion

Incorrect. This is incorrect because IR TRIP is normally blocked by the operator by procedure when the reactor power is above 10%, but the current equivalent power at which the trip occurs is actually 25%. This is plausible because the IR level given is approaching the current equivalency for the trip setpoint for the IR TRIP.

Answer D Discussion

Correct. According to ST-011 RPS (p20; Rev 5) Chapter 4, Instrumentation, Reactor Trips, 1. Source Range, the SR TRIP will occur above 1 x105 CPS. This trip can be blocked when 1 out of 2 IR channels are above 1 x10-10 AMPS, but for the conditions listed the IR is still below that value.

Basis for meeting the KA

The KA is matched because the operator must demonstrate understanding of the various trip signals that the Reactor Protection System will initiate a reactor trip on.

Basis for Hi Cog

The question is at the Analysis cognitive level because the operator must analyze each of the conditions in each answer choice, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	RPS-006 37

Development References	Student References Provided
ST-011 RPS Rev 5 10 CFR 55.41.7	

SYS012 A3.06 - Reactor Protection System (RPS)

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

Trip logic ....

Remarks/Status

7/20/15 Used Bank question RPS-006 37

9/8/15 Reviewed by Exam Supervisor, with editioral comments, 1) change "a reactor trip" to "an automatic reactor trip"; 2) re arrange distractors to have shortest on top, longest on bottom.

9/8/15 Incorporated Exam Supervisors comments.

11/24/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 39 39 **B**

SYS012 K1.05 - 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)

ESFAS ....

Given the following:

- With the plant at power a safety injection actuation occurs
- The Feedwater Isolation OVRD/RESET key switches are placed in OVRD/RESET

Which ONE of the following identifies the Feedwater System components that are AVAILABLE for operation?

A. The Feed Reg Valves are available;
The Feed Reg Bypass Valves are available.

B. The Feed Reg Valves are NOT available;
The Feed Reg Bypass Valves are available.

C. The Feed Reg Valves are available;
The Feed Reg Bypass Valves are NOT available.

D. The Feed Reg Valves are NOT available;
The Feed Reg Bypass Valves are NOT available.

General Discussion

Answer A Discussion

Incorrect. This is incorrect because the Feed Reg Valves cannot be opened. This is plausible because the operator may not know how the FWIS circuit functions.

Answer B Discussion

Incorrect. This is incorrect because the Feed Reg Valves cannot be opened. This is plausible because the operator may not know how the FWIS circuit functions.

Answer C Discussion

Correct. According to ST-027 (p37-38; Rev 6) the feedwater isolation circuitry is a portion of the safeguards system that isolates water flow from the main feedwater system to the steam generators under certain conditions (2/3 Hi Hi steam generator level and safety injection). There are three key operated switches on the RTGB that are used to reset and/or override the Feedwater Isolation signals (2/3 Hi-Hi steam generator level and safety injection). Placing the Feedwater Isolation OVRD/RESET key switches in the OVRD/RESET position would allow the main feedwater pumps to be started and the feedwater regulating bypass valves to be opened. The main feedwater regulating valves would still remain isolated, and will remain isolated until the reactor trip breakers are closed.

Answer D Discussion

Incorrect. This is incorrect because the Feed Reg Valves cannot be opened. This is plausible because the operator may not know how the FWIS circuit functions.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of the physical connections and/or cause effect relationships between the RPS and the Feedwater Isolation Signal (ESFAS).

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall what conditions are needed to re-open the FRVs after a FWIS based on SI actuation, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
ST-027 (p37-38; Rev 6) 10 CFR 55.41.7	

SYS012 K1.05 - 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)

ESFAS ....

Remarks/Status

7/29/15 new question developed.

8/12/15 reviewed by Fleet NRC Exam writer, with the following comments; 1) Typical ">2 part question". Better to ask in traditional 2 X 2 format. i.e. FRV are/are not, contrasted with something else.

9/2/15 revised question to make it a 2 X 2 contrasting the FRV and FRV bypass availability.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

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 ....

Which ONE of the following correctly completes the statements below regarding the Containment Spray Actuation logic scheme?

The MINIMUM number of Containment Pressure channels that must sense pressure greater than the Hi-Hi pressure setpoint to generate an automatic Containment Spray Actuation is ____(1)____.

The Containment Spray Actuation bistables are ____(2)____ to actuate.

A. (1) Two
(2) Energize

B. (1) Two
(2) De-energize

C. (1) Four
(2) Energize

D. (1) Four
(2) De-energize

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and D.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the MINIMUM number of pressure channels is four (2 in each 2/3 scheme). This is plausible because the 4 psig Hi Containment Pressure signal is simply 2 of 3 logic, and requires a MINIMUM of Two. The operator may not know that the Hi-Hi Containment Pressure uses a different logic scheme.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to ST-024 (p22; Rev 4) CS Actuation will automatically occur when a Containment Hi-Hi Pressure signal is sensed at 10 psig. According to ST-024 (p19; Rev 4) There are nine (9) transmitters located in the Aux. Bldg. near the IVSW tank area. Three are used for the (2 out of 3) HI pressure SI signal at 4 psig (PC-951B, 953B, & 955B) and six supply the HI-HI pressure signal actuation at 10 psig (PC-950, 951A, 952, 953A, 954 & 955A). These six transmitters are arranged in a 2 of 3 logic scheme, taken twice. Consequently, a MINIMUM four pressure transmitters will be needed to actuate to auto actuate Containment Spray. According to ST-024 (p23; Rev 4) Containment pressure bistables for spray actuation are energize-to-actuate. This differs from other ESF actuations. The purpose is to minimize the possibility for an inadvertent spray signal due to power interruption.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the bistables are energize-to actuate. This is plausible because all of the other ESF bistables are De-energize to function, and the operator may incorrectly believe that the Containment Spray Actuation scheme is similar.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of the operational implications of the safety system logic (2/3 taken twice vs. 2/3) and reliability (energize v. de-energize to actuate) as they apply to the Containment Spray Auto Actuation (ESFAS).

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall bits of information regarding the Containment Spray Actuation logic scheme in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

ST-024 (p19, 22& 23; Rev 4)
10 CFR 55.41.7

Student References Provided

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 ....

Remarks/Status

7/20/15 new question developed.

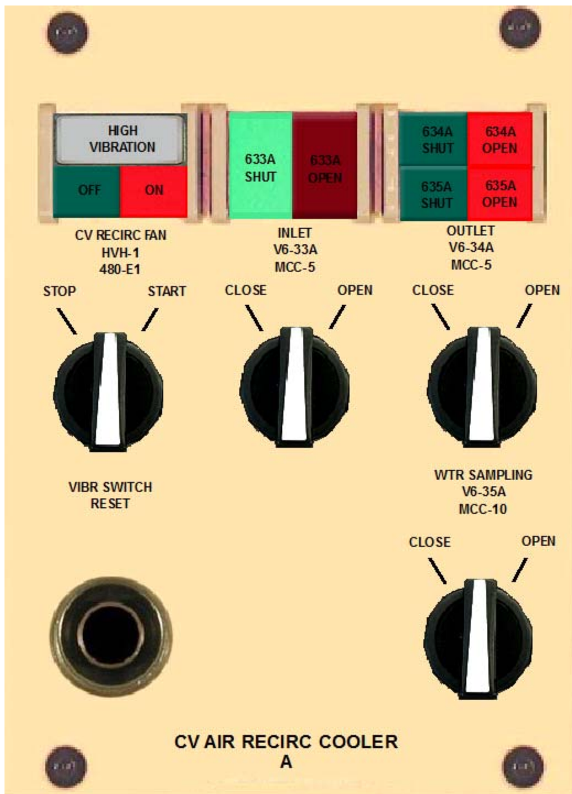
9/8/15 Reviewed by Exam Supervisor, SAT

11/24/15 AOM-SHIFT approved question for 60 day submittal.

SYS022 A4.04 - Containment Cooling System (CCS)
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
Valves in the CCS ....

Given the following:

- The plant is operating at 100% power
- The Service Water valve alignment for HVH-1 (CV Recirc Fan A) is as shown below



Which ONE of the following identifies the operational restrictions, if any, placed on HVH-1?

A. HVH-1 may run continuously, there are no restrictions.

B. HVH-1 may operate for brief periods of up to 15 minutes.

C. HVH-1 must immediately be secured and cannot be run under these conditions.

D. HVH-1 may be started in emergencies ONLY, but it must run for at least 15 minutes before shutdown.

General Discussion

Answer A Discussion

Incorrect. This is incorrect because HVH-1 may NOT run continuously when there is no SW flow to the Motor. This is plausible because the operator may incorrectly diagnose the fact that SW flow has been stopped to the Fan Motor. For instance, if V6-35A was closed, rather than V6-33A, this would be correct.

Answer B Discussion

Correct. According to OP-921 (p8 of 56; Rev 55) Caution prior to Step 6.1.1.2, states that "Continuous operation of HVH-1, 2, 3, or 4 fan motor without cooling water to the fan motor may result in damage to the fan motor. However, HVH-1, 2, 3, or 4 may be operated for brief periods of up to 15 minutes without cooling water to the fan motor per ESR 95-00700."

Answer C Discussion

Incorrect. This is incorrect because HVH-1 may be run under situation where there is no SW flow to the Motor. This is plausible because prolonged periods of operation will result in damage to the fan motor.

Answer D Discussion

Incorrect. This is incorrect because when started under these conditions, the fan cannot run longer than 15 minutes. This is plausible because restriction would be appropriate under certain starting duty requirements. For instance, if the fan has been started two times in the last hour and was run at least 15 minutes and stopped in one of these runs, then one additional start is allowed with NO waiting period. The operator may confuse the restrictions.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the Ability to monitor the CCS Valves in the control room.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must analyze indicated conditions and based on that apply precautions and limitations, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

OP-921 (p8 of 56; Rev 55)
10 CFR 55.41.9

Student References Provided

SYS022 A4.04 - Containment Cooling System (CCS)
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
Valves in the CCS ....

Remarks/Status

7/20/15 new question developed

9/8/15 Reviewed by Exam Supervisor, SAT

9/8/15 Operations SRO reviewed question, recommended showing the picture with the fan 'ON' to eliminate confusion.

9/11/15 exam team will change picture to show HVH-1 in ON, but distractor D may need to be changed.

9/14/15 exam team changed picture, no changes required to distractors/answer choices.

11/24/15 AOM-SHIFT approved question for 60 day submittal.

SYS026 A2.08 - Containment Spray System (CSS)

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

Safe securing of containment spray when it can be done) ....

Given the following:

- At 12:00 a LOCA occurred inside containment causing automatic actuation of the CV Spray System
- At 12:05 CV pressure peaked at 15 PSIG
- CV pressure since peaking has been lowering at 0.2 PSIG per minute at a constant rate.

Assuming the rate of pressure decrease remains constant, which ONE of the following correctly completes the statement below?

IAW EOP-E-1, LOSS OF REACTOR OR SECONDARY COOLANT, the EARLIEST the Containment Spray Pumps can be stopped is between ____(1)____.

Prior to stopping the CV Spray pumps and placing the system in a normal alignment, the operator is directed to ____(2)____.

A. (1) 12:25 and 12:35
(2) reset containment spray AND phase B

B. (1) 12:25 and 12:35
(2) reset containment spray ONLY

C. (1) 12:55 and 13:05
(2) reset containment spray AND phase B

D. (1) 12:55 and 13:05
(2) reset containment spray ONLY

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the pressure requirement to secure the pumps is containment pressure less than 4 PSIG. This is plausible because the student may incorrectly believe that the pressure drop to less than 10 PSIG in containment, the pressure at which a Spray signal is actuated, is the value at which the Containment spray system can be secured. If the operator candidate calculates the time to less than 10 PSIG they will arrive at a time of 12:30.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to EOP-E-1 (p11; Rev 4) Step 12, the containment spray pumps can be stopped when the containment pressure is less than 4 PSIG. The operator will calculate that the time the containment pressure is less than 4 PSIG based on the current rate of decrease is 55 minutes. Therefore 13:00 is the earliest time that pressure would have been reduced to less than 4 PSIG. According to EOP-E-1 (p11 of 26; Rev. 6) Step 12 d. has the operator reset the containment spray signal by placing the CONTAINMENT SPRAY Key Switch to OVRD/RESET and RETURN to NORMAL, AND RESET Containment Isolation Phase B, prior to securing the CV Spray pumps.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the operator has to reset the containment spray signal by placing the CONTAINMENT SPRAY Key Switch to OVRD/RESET and RETURN to NORMAL, AND RESET Containment Isolation Phase B, prior to securing the CV Spray pumps. This is plausible because the operator may only believe that the containment spray key switch is required to be reset prior to securing the pumps.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to determine the CV pressure at which the CV spray pumps can be secured, calculate the time to reach that pressure, and understand the procedural requirements to safely secure the CV spray pumps.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must calculate the time at which the CV pressure will be less than the value at which the CV spray pumps can be secured and understand what must be reset to safely secure those pumps, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
EOP-E-1, pg 11 Rev 4 10 CFR 55.41.7	

SYS026 A2.08 - Containment Spray System (CSS)

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

Safe securing of containment spray when it can be done) ....

Remarks/Status

7/22/15 new question developed

9/8/15 Reviewed by Exam Supervisor, SAT

9/11/15 OPS SRO reviewed the question, with Editorial comments, that the 41 minute time may be a high miss part of this question. Consider making the question a 2 X 2 with the CV pressure <4 and <10 and the time 41 min and some other number.

9/30/15 consider changing rate at which pressure is lowering to 0.3 psig.

12/1/15 question modified to remove pyschometric flaws.

12/1/15 add to last bullet prior to securing the spray pumps and closing discharge valves.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 43 43 **B**

SYS039 A1.10 - 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)

Air ejector PRM ....

Given the following:

- The plant is at 100% power
- The crew entered AOP-035, S/G TUBE LEAK
- The crew has initiated Attachment 5, R-15 Monitoring
- Current S/G Tube leakrate based on the R-15 reading is 40 gpd
- The leakrate has risen steadily over the last four hours
- The leakage cannot be isolated to one Steam Generator

Which ONE of the following correctly completes the statement below?

The LOWEST change in the S/G leakrate that will require a plant shutdown be initiated IAW AOP-035 is an ADDITIONAL ________ ?

A. 20 gpd

B. 40 gpd

C. 60 gpd

D. 80 gpd

ILC15 RNP SRO NRC Examination QUESTION 43

43

B

General Discussion

Answer A Discussion

Incorrect. This is incorrect because there will be no plant shutdown required if SG Tube leakage rises to 60 gpd. This is plausible because AOP-035 actually has three gpd SG Tube Leakrates that require action (30, 75 and 100); and the operator may incorrectly believe that 60 gpd is one of them.

Answer B Discussion

Correct. According to Attachment 5 of AOP-035 (p67 of 69; Rev 29), there are two Continuous Actions based on SG Tube Leakage that will require a plant shutdown. The first is step 20, and the second is Step 22. Step 20 checks the SG Tube Leakage greater than 100 gpd, and Step 22 checks the SG Tube Leakage greater than 75 gpd. Each of these steps requires a plant shutdown to be initiated. Because of this, if the SG Tube leakage rises by an additional 40 gpd the actions associated with CA Step 21 will be required.

Answer C Discussion

Incorrect. This is incorrect because even though a plant shutdown will be required if SG Tube Leakage rises an additional 60 gpd, this is not the LOWEST change requiring a plant shutdown. This is plausible because AOP-035 actually has three gpd SG Tube Leakrates that require action (30, 75 and 100); and the operator may incorrectly believe that 100 gpd is lowest requiring a plant shutdown.

Answer D Discussion

Incorrect. This is incorrect because even though a plant shutdown will be required if SG Tube Leakage rises an additional 80 gpd, this is not the LOWEST change requiring a plant shutdown. This is plausible because AOP-035 actually has three gpd SG Tube Leakrates that require action (30, 75 and 100); and the operator may incorrectly believe that 120 gpd is one of them.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to monitor changes in parameters to SG tube leakage limits associated with operating R-15 (Air Ejector Monitor).

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall bits of information (SG Leakrates requiring plant shutdowns within AOP-035), in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

AOP-035 (p67 of 69; Rev 29)
10 CFR 55.41.10

Student References Provided

SYS039 A1.10 - 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)

Air ejector PRM ....

Remarks/Status

7/27/15 new question developed

9/8/15 Reviewed by Exam Supervisor, SAT

11/25/15 AOM-SHIFT approved question for 60 day submittal.

SYS059 K4.02 - Main Feedwater (MFW) System
Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)
Automatic turbine/reactor trip runback ....

Given the following:

- The plant is operating at 100% power
- An inadvertent actuation of the Feedwater Isolation Signal (FWIS) occurs

Which ONE of the following describes how this actuation affects the Reactor and the Main Turbine?

A. BOTH the Reactor and the Main Turbine receive trip signals directly from the FWIS.

B. The Reactor receives a trip signal directly from the FWIS, and causes a Main Turbine trip.

C. The Main Turbine receives a trip signal directly from the FWIS and the Reactor will trip because the Main Turbine tripped with power above P-8.

D. NEITHER the Reactor nor the Main Turbine receive trip signals directly from the FWIS. However, the Reactor will trip on plant conditions created by the FWIS actuation and cause a Main Turbine trip.

General Discussion

Answer A Discussion

Incorrect. This is incorrect because the reactor does not receive an automatic trip signal directly from FWIS. This is plausible because the operator may incorrectly believe that it does.

Answer B Discussion

Incorrect. This is incorrect because the reactor does not receive an automatic trip signal directly from FWIS. This is plausible because the operator may incorrectly believe that the reactor does not receive an automatic trip signal directly from FWIS, and that the Main Turbine does NOT. If this were so, the Rx Trip would generate a main Turbine Trip.

Answer C Discussion

Correct. According to ST-006 (p28; Rev 4) Step when the FWIS is received it will shut all of the feedwater regulating valves, feedwater bypass valves, feedwater block valves, and trip the Main Feedwater Pumps and the Turbine. According to ST-011 (p19; Rev 5) when the Main Turbine Trips with reactor power higher than P-8, a Rx Trip signal will be generated.

Answer D Discussion

Incorrect. This is incorrect because the Main Turbine does receive an automatic trip signal directly from FWIS. This is plausible because the operator may incorrectly believe that it does NOT. If this were so, a Rx Trip signal would be generated on the plant conditions created by the FWIS (Lo-Lo S/G Level), and a Main Turbine Trip signal would be generated by the Rx Trip.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of MFW design feature(s) and/or interlock(s) (i.e. FWIS) which provide for an automatic turbine/reactor trip.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must simply recall what component manipulations are generated when an FWIS actuation occurs, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

ST-006 (p28; Rev 4)
ST-011 (p19; Rev 5)
10 CFR 55.41.7

Student References Provided

SYS059 K4.02 - Main Feedwater (MFW) System

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

Automatic turbine/reactor trip runback ....

Remarks/Status

7/30/15 new question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

11/25/15 AOM-SHIFT approved question for 60 day submittal.

SYS061 K5.01 - Auxiliary / Emergency Feedwater (AFW) System

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

Relationship between AFW flow and RCS heat transfer ....

Given the following:

- With the plant at 100% power, an ATWS event occurred
- The crew entered FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION - ATWS
- All SG Narrow Range levels are OFF-Scale LOW
- Total AFW flow is 200 gpm

Which ONE of the following identifies the action required, if any, necessary to ensure that the MINIMUM conditions are established for maintaining a Secondary Heat Sink IAW FRP-S.1?

A. Raise total AFW flow by at least 100 gpm.

B. Raise total AFW flow by at least 250 gpm.

C. Raise total AFW flow by at least 400 gpm.

D. No further action is required, a Secondary Heat Sink currently exists.

General Discussion

Answer A Discussion

Incorrect. This is incorrect because a total feed flow of 600 gpm is required under the current plant conditions to establish an adequate Secondary Heat Sink. This is plausible because a normal adequate Secondary Heat sink is defined in part as total Feed Flow of 300 gpm.

Answer B Discussion

Incorrect. This is incorrect because a total feed flow of 600 gpm is required under the current plant conditions to establish an adequate Secondary Heat Sink. This is plausible because a normal adequate Secondary Heat sink is defined in part as total Feed Flow of 300 gpm, and the operator may incorrectly believe that because of the ATWS event an additional 150 gpm is required.

Answer C Discussion

Correct. According to CSF-3 of CSFST (p5 of 9; Rev 7) under normal conditions a Secondary Heat Sink is defined as at least one S/G Narrow Range Level > 9% [18%] or total FW flow > 300 gpm. However, an ATWS event presents the operator with a unique challenge. According to FR-S.1 (p8 of 30; Rev 22) Step 10, with all S/G Narrow Range Levels <9%, the operator is directed to establish 600 gpm total feed flow to the S/Gs until at least one S/G narrow Range Level is > 9%. According to the FR-S.1 Background Document (p19 of 44; Rev 22) this is done because ATWS analyses have shown that the specified AFW flow (discharge flow of two motor driven AFW pumps at S/G design pressure or 600 gpm) is acceptable to adequately remove the heat generated from power operation prior to reactor shutdown. If AFW flow is not greater than the specified value, it is important to raise AFW flow in order to maintain secondary heat sink. Consequently, AFW flow must be raised an additional 400 gpm.

Answer D Discussion

Incorrect. This is incorrect because a Secondary Heat Sink does NOT exist. This is plausible because there is some AFW flow, and the operator may incorrectly believe that this AFW flow equates to an adequate Secondary Heat Sink.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of the operational implications of the relationship between AFW flow and RCS heat transfer as it applies to an ATWS Event in which there is inadequate level in the S/G to ensure that a Secondary Heat Sink is established. Under these conditions the operator must know that AFW must be raised above that which is normally required to adequately remove heat.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall a piece of information (i.e. need a minimum of 600 gpm during ATWS Event); and then use that information under a given set of plant conditions to predict an outcome, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

CSF-3 of CSFST (p5 of 9; Rev 7)
FR-S.1 (p8 of 30; Rev 22) Step 10
FR-S.1 Background Document (p19 of 44; Rev 22)
10 CFR 55.41.10

Student References Provided

SYS061 K5.01 - Auxiliary / Emergency Feedwater (AFW) System

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

Relationship between AFW flow and RCS heat transfer ....

Remarks/Status

7/28/15 new question developed

9/8/15 Reviewed by Exam Supervisor, SAT, but with comment, Add "IAW FRP-S.1" to ensure there is no confusion between this procedure and the CSFST.

9/8/15 Incorporated Exam Supervisors comments.

9/8/15 Operations SRO reviewed question, the values put us right at 600 GPM, and FRP-S.1 states > 600 GPM, which may be splitting hairs but

could cause confusion.

11/25/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 46 46 **C**

SYS062 K1.04 - AC Electrical Distribution System

Knowledge of the physical connections and/or cause-effect relationships between the ac distribution sys- tem and the following systems : (CFR: 41.2 to 41.9)

Off-site power sources ....

Given the following:

- The plant is at 100% power
- A reactor trip has occurred

Which ONE of the following identifies the breakers which will automatically CLOSE one minute after the reactor trip?

Breaker nomenclature:

52/10	4KV BUS 1-2 TIE BKR
52/12	START-UP TRANSFORMER TO 4KV BUS 2
52/17	START-UP TRANSFORMER TO 4KV BUS 3
52/19	4KV BUS 3-4 TIE BKR

A. 52/10 and 52/12

B. 52/10 and 52/17

C. 52/12 and 52/19

D. 52/17 and 52/19

General Discussion

Answer A Discussion

Incorrect. This is incorrect because 52/10 will not automatically close (Already is CLOSED). This is plausible because the operator may incorrectly believe that initially Breakers 52/17 and 52/19 were closed supplying Bus 3 and 4 from the SUT; and that upon Main Generator lockout, all that is needed is for the SUT to re-power Busses 1 & 2. If so, the operator would believe that 52/10 and 52/12 would auto close.

Answer B Discussion

Incorrect. This is incorrect because neither breaker will automatically close (Both are already is CLOSED). This is plausible because the operator may incorrectly believe that initially Breakers 52/12 is closed and 52/17 is open supplying Bus 2 from the SUT (And buses 1, 3, 4 and 5 are powered from the UAT); and that upon Main Generator lockout, the SUT must re-power Busses 1, by 52/10 closing & 3 and 4 by 52/17 closing with 52/19 already closed. If so, the operator would believe that 52/10 and 52/17 would auto close.

Answer C Discussion

Correct. According to ST-039 (p15&48; Rev 4b) during normal power operation 4KV Buses 1, 2, 4 and 5 are supplied via the UAT, and 4KV Bus 3 is supplied via the SUT. A reactor and/or turbine trip actuation (with or without a concurrent SI signal) will initiate a fast, dead bus transfer of loads from the UAT to the SUT after a 60 second time delay (provided at least 1 generator breaker, 52/8 or 52/9, is closed during the 60 second period). The transfer operation automatically trips breakers 52/7 and 52/20 while breakers 52/12 & 52/19 are simultaneously closed. The transfer is initiated by tripping either lockout relay 86P or 86BU (which will occur after the 60 second delay).

Answer D Discussion

Incorrect. This is incorrect because 52/17 will not automatically close (Already is CLOSED). This is plausible because the operator may incorrectly believe that initially Breakers 52/12 and 52/10 were closed supplying Bus 1 and 2 from the SUT (And buses 3, 4 and 5 are powered from the UAT); and that upon Main Generator lockout, the SUT must re-power Bus 3, by 52/17 closing & Bus 4 by 52/19 closing. If so, the operator would believe that 52/17 and 52/19 would auto close.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the physical connections to off-site power sources (4kV breakers 52/10, 12, 17, 19, & 20), as well as a cause-effect relationship between the ac distribution system and off-site power sources is required (230kV switchyard breaker protection scheme leading to trip of main generator).

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and use the information to predict an outcome, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	062 K1.04 001

Development References
ST-039 (p15&48; Rev 4b) 10 CFR 55.41.4

Student References Provided

SYS062 K1.04 - AC Electrical Distribution System

Knowledge of the physical connections and/or cause-effect relationships between the ac distribution sys- tem and the following systems : (CFR: 41.2 to 41.9)

Off-site power sources ....

Remarks/Status

7/19/15 used bank question from previous NRC exam

9/8/15 Reviewed by Exam Supervisor, SAT

9/8/15 Operations SRO reviewed question, commented that he doesn't like the question. Is there anything we can ask on Fast Bus XFER?

9/29/15 used a bank question on fast bus xfer to replace question.

11/25/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 47 47 **B**

SYS062 K2.01 - AC Electrical Distribution System
Knowledge of bus power supplies to the following : (CFR: 41.7)
Major system loads ....

Given the following:

- The plant is at 100% power
- Breaker 52/20, UNIT AUX TO 4KV BUS 4 BKR, trips on fault

Which ONE of the following correctly completes the statement below?

Circulating Water pump(s) __________ lost power.

A. “A" & "B" have

B. "B" & "C" have

C. "A" & "C" have

D. "B" ONLY has

ILC15 RNP SRO NRC Examination QUESTION 47

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B

General Discussion

Answer A Discussion

Incorrect. This is incorrect because the "A" CW pump is powered from 4KV bus 1 which will remain energized. This is plausible because all the CW pumps are powered from 4KV busses.

Answer B Discussion

Correct. According to OP-603 (p179; Rev 123) the electrical distribution system startup lineup lists the CW pump 'B' breaker on 4160V Bus 4 and CW pump 'C' breaker on 4160V Bus 5.

Answer C Discussion

Incorrect. This is incorrect because the "A" CW pump is powered from 4KV bus 1 which will remain energized. This is plausible because the operator may recall that the loss of power to 4KV bus 4 will also cause a loss of 4KV bus 5, and all the CW pumps are powered from 4KV busses, but may confuse which pump is powered from which bus.

Answer D Discussion

Incorrect. This is incorrect because breaker 52/24 supplies power to 4kV bus 5 from 4kV bus 4. CW pumps "B" power from 4kV bus 4 loses power, and because 4kV bus 5 also loses power, CW pump "C" is also lost.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the CW pumps power supplies.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must remember which busses have lost power when the 4KV 4 bus feeder breaker trips and CW pumps powered from those busses, and the operation of 52/24, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	

Development References

OP-603 p179
CWD B-190628-SH01344
10 CFR 55.41.7

Student References Provided

SYS062 K2.01 - AC Electrical Distribution System
Knowledge of bus power supplies to the following : (CFR: 41.7)
Major system loads ....

Remarks/Status

7/23/15 used bank question 062 K2.01 1

9/8/15 Reviewed by Exam Supervisor, UNSAT, as the second part of the question gives a clue to the answer of the first part. Recommend removing second part of question, changing "pumps" to "pump(s)" in first part and first distractor to ""B" ONLY"

9/11/15 Exam team changed question based on exam supervisor comments above.

11/25/15 AOM-SHIFT approved question for 60 day submittal.

SYS063 A3.01 - DC Electrical Distribution System

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

Meters, annunciators, dials, recorders, and indicating lights ....

Given the following:

- The plant is in Mode 6
- “A” EDG is under clearance
- “A” and “B” battery chargers are in service
- “A-1” and “B-1” battery chargers are in standby

Subsequently, a loss of the STARTUP TRANSFORMER occurs.

Which ONE of the following identifies the annunciator response on APP-036 over the FIRST MINUTE following the STARTUP TRANSFORMER loss?

A. BATT CHARGER B/B-1 TROUBLE alarms and then clears, ONLY

B. BATT CHARGER A/A-1 TROUBLE alarms and remains in alarm
BATT CHARGER B/B-1 TROUBLE alarms and remains in alarm

C. BATT CHARGER B/B-1 TROUBLE alarms and remains in alarm, ONLY

D. BATT CHARGER A/A-1 TROUBLE alarms and remains in alarm
BATT CHARGER B/B-1 TROUBLE alarms and then clears

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D

General Discussion

Answer A Discussion

Incorrect. This is incorrect because the BATT CHARGER A/A-1 TROUBLE alarm will alarm and remain in as power is not restored due to the 'A' EDG being under clearance. The BATT CHARGERs are designed to automatically restart following power restoration. This is plausible because the BATT CHARGER B/B-1 alarm will alarm in this event.

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Answer B Discussion

Incorrect. This is incorrect because the BATT CHARGER B/B-1 TROUBLE alarm will clear once power is restored to the E-2 busses from the 'B' EDG. The BATT CHARGERs are designed to automatically restart following power restoration. This is plausible because the candidate may believe that the BATT CHARGER needs to be re-set, causing the alarm to remain locked in. The STANDBY BATT CHARGER will be tripped on the AC INPUT FAILURE (APP-036-D1/ D2) which the candidate may believe causes the alarm to stay in until the charger is manually reset.

Answer C Discussion

Incorrect. This is incorrect because the BATT CHARGER A/A-1 TROUBLE alarm will also alarm and remain in as power is not restored due to the 'A' EDG being under clearance. The BATT CHARGERs are designed to automatically restart following power restoration. This is plausible because the BATT CHARGER B/B-1 alarm will alarm in this event.

Answer D Discussion

Correct. According to APP-036-D1/D2 (p27, 30; Rev 88) BATT CHARGER A/A-1 TROUBLE or BATT CHARGER B/B-1 TROUBLE is received following a Loss of Off-Site Power (LOOP), the In Service Battery Charger will automatically restart. The annunciator may alert to momentary DC overvoltage condition during the battery charger start. The IN SERVICE BATT CHARGER should restart and the TROUBLE alarm will clear at that point.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to interpret the annunciators received when AC Input power is lost to the BATT CHARGERS and subsequently restored.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must analyze the plant conditions given and determine the annunciators that would be received based on those conditions, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

APP-036-D1/D2
10 CFR 55.41.7

Student References Provided

SYS063 A3.01 - DC Electrical Distribution System

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

Meters, annunciators, dials, recorders, and indicating lights ....

Remarks/Status

8/13/15 new question developed.

9/8/15 Reviewed by Exam Supervisor, SAT.

9/8/15 Operations SRO reviewed question, Editorial comments, 1) Can we add all the Auxiliaries on the SUT; 2) OR can we bold "Plant in MODE 6"

11/25/15 AOM-SHIFT approved question for 60 day submittal.

SYS064 A2.18 - 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)

Consequences of premature opening of breaker under load ....

Given the following:

- The plant is at 100% power
- OST-401-1, EDG "A" SLOW SPEED START testing is in progress
- Current "A" EDG load is 2500 KW

Subsequently, a Loss of Offsite Power (LOOP) occurs and the operator observes:

- Bus E-1 is de-energized
- EDG "A" stops

Which ONE of the following correctly completes the statement below?

1) EDG "A" tripped on overspeed because ____(1)____.

2) When attempting to restart EDG "A" IAW OP-604, DIESEL GENERATORS "A" AND "B", the Parallel Switch must be placed in the ____(2)____ position.

A. (1) The EDG "A" Output Breaker opened on overcurrent
(2) ISOL

B. (1) The EDG "A" Output Breaker opened on overcurrent
(2) PARALLEL

C. (1) The 480V E-1 Normal Supply Breaker (52/18B) tripped on Bus E-1 undervoltage
(2) ISOL

D. (1) The 480V E-1 Normal Supply Breaker (52/18B) tripped on Bus E-1 undervoltage
(2) PARALLEL

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to OP-604 (p115 of 323; Rev 109) a Caution in Section 8.4.1, states that "If a Loss Of Offsite Power (LOOP) occurs while the Diesel Generator is operating in parallel, the Diesel Generator's output breaker may trip due to overload. Either the amptector at the breaker panel or the overcurrent relay at the generator panel could trip the breaker. The diesel engine may trip due to overspeed when the output breaker opens at full load." According to Step 8.4.1.3, the operator is directed to place the Parallel Switch in the ISOL position to restart EDG "A".

Answer B Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because according to Step 8.4.1.3, the operator is directed to place the Parallel Switch in the ISOL position to restart EDG "A". This is plausible because the switch is a two-position Switch, and the operator may not know the significance of each position.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because according to ST-006 (p41; Rev 4) with the EDG Output Breaker closed, the E-1 undervoltage scheme is isolated, and furthermore, with the EDG powering the Bus, voltage on E-1 will be retained even after the LOOP. This is plausible because under normal circumstances (i.e. EDG is in standby) the undervoltage scheme on E-1 will operate and open the Normal Supply Breaker to E-1.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to predict what will happen to the EDG system if the output breaker is opened prematurely. This is accomplished by providing the operator with the indications that would be expected on an LOOP with the EDG paralleled to its associated Bus, and then requiring the operator to identify what caused the expected conditions (If the operator can identify what caused expected results, the operator can also predict the expected results if a cause is proposed).

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall the consequences of opening an output breaker with a generator still loaded, and remember the value to which the generator must be unloaded, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

OP-604 (p115 of 323; Rev 109)
ST-006 (p41; Rev 4)
10 CFR 55.41.7

Student References Provided

SYS064 A2.18 - 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)

Consequences of premature opening of breaker under load ....

Remarks/Status

8/11/15 new question developed

9/8/15 Reviewed by Exam Supervisor, UNSAT, based on the second part of the question does not meet the K/A, part two of the question must be related to the first part.

9/8/15 Operations SRO reviewed question, DSRO won't know part 2. Agree UNSAT.

9/30/15 validator comments confirmed above, question changed to new question.

11/25/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 50 50 **D**

SYS064 K2.02 - Emergency Diesel Generator (ED/G) System
Knowledge of bus power supplies to the following: (CFR: 41.7)
Fuel oil pumps ....

Which ONE of the following supplies power to the “A” and “B” EDG Fuel Oil Transfer Pumps?

A. MCC-10 and MCC-9 respectively

B. MCC-9 and MCC-10 respectively

C. MCC-6 and MCC-5 respectively

D. MCC-5 and MCC-6 respectively

General Discussion

Answer A Discussion

Incorrect. This is incorrect because MCC-5 and MCC-6 are the power supplies for the EDG Fuel Oil Transfer Pumps. This is plausible because MCC-10 is in the same area as MCC-5 and MCC-9 is in the same area of MCC-6. In addition, the power supplies for the EDG Fuel Oil Transfer Pumps are from MCCs.

Answer B Discussion

Incorrect. See A.

Answer C Discussion

Incorrect. This is incorrect because MCC-6 supplies the "B" EDG Fuel Oil Transfer Pump and MCC-5 supplies the "A" EDG Fuel Oil Transfer Pump. This is plausible because MCC-5 and MCC-6 both supply the EDG Fuel Oil Transfer pumps.

Answer D Discussion

Correct. According to EDP-003, MCC Buses (p 26 & 32; Rev 68) EDG Fuel Oil Transfer Pump "A" is listed as a load on MCC-5 and EDG Fuel Oil Transfer Pump "B" is listed as a load on MCC-6.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the power supplies of the EDG Fuel Oil Transfer Pumps.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall from memory the power supplies for the EDG Fuel Transfer Pumps, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	EDG-003 5

Development References

EDP-003
10 CFR 55.41.7

Student References Provided

SYS064 K2.02 - Emergency Diesel Generator (ED/G) System
Knowledge of bus power supplies to the following: (CFR: 41.7)
Fuel oil pumps ....

Remarks/Status

8/4/15 used bank question EDG-003 5

9/8/15 Reviewed by Exam Supervisor, SAT.

11/25/15 AOM-SHIFT approved question for 60 day submittal.

SYS073 A4.01 - Process Radiation Monitoring (PRM) System
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
Effluent release ....

Given the following:

- The reactor is at 100%
- The crew is performing a containment vacuum relief IAW OP-921, CONTAINMENT AIR HANDLING
- R-12, CV AIR OR PLANT STACK, NOBLE GAS, alarms

V12-12, CV VAC RELIEF
V12-13, CV VAC RELIEF
APP-036-D7, AREA MONITOR HI RAD
APP-036-D8, PROCESS MONITOR HI RAD

Which ONE of the following correctly completes the statements below?

(1) The crew would expect to see ____(1)____ annunciator flashing.

(2) Due to the conditions above, ____(2)____ will automatically close.

A. (1) APP-036-D7
(2) V12-12 & V12-13 ONLY

B. (1) APP-036-D8
(2) V12-12 & V12-13 ONLY

C. (1) APP-036-D7
(2) V12-12, V12-13 & the CV Intake Damper

D. (1) APP-036-D8
(2) V12-12, V12-13 & the CV Intake Damper

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51

D

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Answer B Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the CV Intake Damper closes as well. This is plausible because in actuality R-12 alarming auto closes V12-12 and 13 ONLY, and these valves closing will close the damper; and the operator may not know this.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because R-12 is a process monitor not an area monitor. This is plausible because the radiation monitor system consists of both area and process monitors where at least one of each include automatic functions (i.e. R-1, an area monitor has a control function), and the operator may not know this.

Answer D Discussion

Correct. 1st part correct, 2nd part correct. According to ST-019 (p7; Rev 4) R-12 is a process monitor. According to ST-019 (p68; Rev 4) and ST-037 (p36; Rev 3) when R-12 enters the alarm condition, the CV Purge Supply and Exhaust Valves, and the Vacuum relief Valves (V12-12 and V12-13) will automatically close. According to ST-037 (p36; Rev 3) the Outdoor Air Makeup system has an air motor operated damper that opens when the containment purge fan HVE-1A or HVE-1B is started or when the Vacuum Relief system is energized. According to OP-921 (p38 of 56; Rev 55) Step 6.4.2.6, V12-12 and V12-13 are opened for this procedure. When these valves are opened, the Containment Damper will open as well. When R-12 alarms, a signal will be sent to close V12-12 and 13, and when these valves close the Containment Damper will close as well

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to monitor an effluent release in the control room, as evidenced by predicting what valves will close on an R-12 alarm.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information, and then use this information to predict how the Containment Purge System will respond overall, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2013 NRC exam

Development References

ST-019 (p7 & 68; Rev 4)
ST-037 (p36; Rev 3)
OP-921 (p38 of 56; Rev 55)
10 CFR 55.41.11

Student References Provided

SYS073 A4.01 - Process Radiation Monitoring (PRM) System
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
Effluent release ....

Remarks/Status

7/19/15 used bank question 2013 NRC exam

9/8/15 Reviewed by Exam Supervisor, SAT

11/25/15 AOM-SHIFT approved question for 60 day submittal.

SYS073 2.4.9 - Process Radiation Monitoring (PRM) System
SYS073 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:

- RHR has just been placed in service IAW GP-007, PLANT COOLDOWN FROM MODE 3 TO MODE 5
- RCS temperature: 248°F
- RCS pressure: 349 psig

Subsequently:

- The crew has just entered AOP-005, RADIATION MONITORING SYSTEM, due to a valid alarm on R-12, CV AIR & Plant Vent Particulate
- The crew has determined that R-12 is alarming due to an RCS leak

Which ONE of the following is the correct method for implementing plant procedures to mitigate this event?

AOP-016, EXCESSIVE PRIMARY PLANT LEAKAGE

A. Complete AOP-005 in its entirety, THEN Go to AOP-016

B. Perform BOTH AOP-005 and AOP-016 concurrently

C. When directed exit AOP-005, and Go to AOP-016

D. Immediately exit AOP-005, and Go to AOP-016

General Discussion

Answer A Discussion

Incorrect. This is incorrect because AOP-005 Attachment 12 Step 13 states, Go to AOP-016, Excessive Primary Plant Leakage, while continuing with this procedure. This is plausible because the last step of the main body of AOP-005 directs transition to procedure and step in effect.

Answer B Discussion

Correct. According to AOP-005, Attachment 12 (p 32; Rev 32) Step 13, Go to AOP-016, Excessive Primary Plant Leakage, while continuing with this procedure.

Answer C Discussion

Incorrect. This is incorrect because AOP-005 Attachment 12 Step 13 states, Go to AOP-016, Excessive Primary Plant Leakage, while continuing with this procedure. This is plausible because AOP-005 directs the operator to Go to AOP-016.

Answer D Discussion

Incorrect. This is incorrect because AOP-005 Attachment 12 Step 13 states, Go to AOP-016, Excessive Primary Plant Leakage, while continuing with this procedure. This is plausible because the crew would meet the entry conditions for entry into AOP-016 based upon the given information that R-12 is alarming due to an RCS leak.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the mitigation strategy for a loss of coolant accident when shutdown as it relates to implementation of the abnormal operating procedure for radiation monitoring.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall from memory how AOP-005 and AOP-016 are implemented, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	AOP-005-08 12

Development References	Student References Provided
AOP-005 Rev. 32 10 CFR 55.41.10	

SYS073 2.4.9 - Process Radiation Monitoring (PRM) System

SYS073 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)

Remarks/Status

8/18/15 modified bank question AOP-005-08 12

9/8/15 Reviewed by Exam Supervisor, SAT but with following comment, ensure that the AOP-016 is the correct procedure based on plant conditions given in the stem.

9/8/15 exam team verified that AOP-016 is the correct procedure chioce.

9/8/15 Operations SRO reviewed question, concerned that when AOP-005 kicks out to AOP-016 it is pretty much the end of AOP-005. While technically concurrent at that point, close enough to lead to confusion.

11/25/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 53 53 **D**

SYS076 K1.15 - 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)

FPS ....

Which ONE of the following identifies components normally cooled by Service Water that can be cooled by the Fire Water System during an emergency?

A. The Circulating Water Pumps and the Control Room HVAC Cooling Units, ONLY.

B. The Motor Driven AFW Pumps and the Control Room HVAC Cooling Units, ONLY.

C. The Circulating Water Pumps, the Control Room HVAC Cooling Units AND the SI Pump Thrust Bearings.

D. The Motor Driven AFW Pumps, the Control Room HVAC Cooling Units AND the SI Pump Thrust Bearings.

General Discussion

Answer A Discussion

Incorrect. This is incorrect because it includes the Circulating Water Pumps, and does NOT include the AFW and SI Pumps. This is plausible because Attachment 5 of AOP-022 is provided to supply emergency cooling water to the Circulating Water Pumps, however the cooling medium is the Potable Water System. Additionally, the operator may incorrectly believe that the AFW and SI Pumps are cooled by the Primary Water Pumps in an emergency.

Answer B Discussion

Incorrect. This is incorrect because it does NOT include the SI Pumps. This is plausible because the SI Pumps can be supplied by the Primary Water Pumps, and the operator may incorrectly believe that this is the ONLY source that can supply cooling to the SI Pumps.

Answer C Discussion

Incorrect. This is incorrect because it includes the Circulating Water Pumps, and does NOT include the AFW Pumps. This is plausible because Attachment 5 of AOP-022 is provided to supply emergency cooling water to the Circulating Water Pumps, however the cooling medium is the Potable Water System. Additionally, the operator may incorrectly believe that the AFW are cooled by the Primary Water Pumps in an emergency (It is actually the SI Pumps that are provided cooling by the PW Pumps).

Answer D Discussion

Correct. According to AOP-22-BD (p31; Rev 35) Attachment 1 provides instructions to locally align emergency cooling to the SI Pumps from the Fire Water System, PRIMARY WATER PUMP A, or PRIMARY WATER PUMP B; Attachment 2 provides instructions to locally align emergency cooling to the MDAFW Pump associated with the leaking SW Header from the Fire Water System.; and Attachment 3 aligns emergency cooling water to Control Room HVAC WCCU-1A and WCCU-1B from the Fire Water System.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of the physical connections between the SWS and the FPS.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must simply recall which components, normally cooled by Service Water, can be cooled by the Fire Water System in an emergency, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
AOP-22-BD (p31; Rev 35) 10 CFR 55.41.4	

SYS076 K1.15 - 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)

FPS ....

Remarks/Status

7/29/15 new question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

11/25/15 AOM-SHIFT approved question for 60 day submittal.

SYS078 K3.03 - Instrument Air System (IAS)
Knowledge of the effect that a loss or malfunction of the IAS will have on the following: (CFR: 41.7 / 45.6)
Cross-tied units ....

Given the following:

- The plant is at 100% power
- "D" IA Compressor is running
- Station Air Compressor is running

Subsequently:

- IA Header pressure is 79 PSIG and lowering
- The crew is implementing AOP-017, LOSS OF INSTRUMENT AIR

SA-5, STATION AIR TO INST AIR CROSS CONNECT
SA-220, SA TO IA CROSS CONNECT BYPASS FILTER ISOLATION
SA-221, SA TO IA CROSS CONNECT BYPASS FILTER ISOLATION

Which ONE of the following correctly completes the statements below?

1) IAW AOP-017, the PREFERRED method to cross connect IA from Station Air is by opening ____(1)____ .

2) IA will no longer be used to supply Breathing Air to ____(2)____.

A. (1) SA-5
(2) minimize IA loads ONLY

B. (1) SA-5
(2) minimize IA loads and prevent harm to users of Breathing Air

C. (1) SA-220 and SA-221
(2) minimize IA loads ONLY

D. (1) SA-220 and SA-221
(2) minimize IA loads and prevent harm to users of Breathing Air

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General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. This is incorrect because SA-220 and SA-221 is the preferred flow path directed by AOP-017 to pass air through a filter to remove contaminants prior to passing into oil free IA Header. Station Air is oil lubricated, even though it is filtered and directed through Air Dryer "D" it is not for breathing air. Therefore, the RC Personnel must be notified to stop use of the Breathing Air System to prevent potential harm to users of Breathing Air. This is plausible because SA-5 would be opened if SA-220 and SA-221 could not be open IAW AOP-017 and stopping the use of Breathing Air does reduce the air load on the IA System.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because SA-220 and SA-221 is the preferred flow path directed by AOP-017 to pass air through a filter to remove contaminants prior to passing into oil free IA Header. This is plausible because SA-5 would be opened if SA-220 and SA-221 could not be open IAW AOP-017.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because Station Air is oil lubricated, even though it is filtered and directed through Air Dryer "D" it is not for breathing air. Therefore, the RC Personnel must be notified to stop use of the Breathing Air System to prevent potential harm to users of Breathing Air. This is plausible because stopping the use of Breathing Air does reduce the air load on the IA System.

Answer D Discussion

Correct. According to AOP-017-BD (p 5&7; Rev 42) Step 8 Note and Step 12, the preferred step is addressed in the left column of this procedure (Open SA-220, SA-221). This will allow the Service Air to pass through a filter to remove contaminants prior to passing into oil free Instrument Air Header. The RNO addresses the alternate method which is to open cross connect valve SA-5; this agrees with the intent expressed in OP-905, Instrument & Station Air System which states: "SA-5 should not be used to interconnect the Station Air with the Instrument Air Systems unless the filter is unavailable and no other source of Instrument Air is available." The Station Air Compressor is oil lubricated and is therfore not to be used for breathing air. Therefore, the RC Personnel must be notified to stop use of the Breathing Air. Also the need to stop the use of breathing air is due to the reduction of air pressure.

Basis for meeting the KA

NOTE: At one time Unit 1 and Unit 2 Air Systems could be cross connected, however with the decommissioning of Unit 1 this practice has been terminated. Cross-tied units refers to cross-tying IA and/or Station Air Systems. The KA is matched because the operator must demonstrate knowledge of the affect that cross connecting the Station Air System with the IA system will have on the Breathing Air System.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall why SA-220 and SA-221 are preferred flow path and the reasons why Breathing Air is not used when Station Air is cross connected with IA, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

AOP-017-BD Rev. 42
10 CFR 55.41.7

Student References Provided

SYS078 K3.03 - Instrument Air System (IAS)

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

Cross-tied units ....

Remarks/Status

8/17/15 new question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

11/25/15 AOM-SHIFT approved question for 60 day submittal.

SYS103 2.1.7 - Containment System

SYS103 GENERIC

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

Given the following:

- At T=0 min, the plant experienced multiple faulted SGs in Containment
- At T=8 min, the crew has transitioned to, and is implementing, FRP-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK, due to an ORANGE condition on RCS Integrity
- CV Spray Flow is 0 gpm

The following observations are made at subsequent times:

T=10 min	Containment pressure is 10 psig, 2 HVH units running
T=20 min	Containment pressure is 22 psig, 1 HVH unit running
T=30 min	Containment pressure is 30 psig, 0 HVH units running
T=40 min	Containment pressure is 42 psig, 0 HVH units running

Which ONE of the following identifies the EARLIEST time at which the operator would be required to suspend FRP-P.1 and enter FRP-J.1, RESPONSE TO HIGH CONTAINMENT PRESSURE?

A. T=10 min

B. T=20 min

C. T=30 min

D. T=40 min

General Discussion

Answer A Discussion

Incorrect. This is incorrect because these conditions will only result in an Orange condition on Containment, which will not permit the transition to FRP-J.1. This is plausible because an Orange condition exists and the operator may incorrectly believe that Containment is a higher priority than Integrity. If so, this would the earliest time of transition to FRP-J.1.

Answer B Discussion

Incorrect. This is incorrect because these conditions will only result in an Orange condition on Containment, which will not permit the transition to FRP-J.1. This is plausible because an Orange condition exists and the operator may incorrectly believe that Containment is a higher priority than Integrity. If not, conditions have degraded since T=10, and the operator may incorrectly believe that and Orange condition developed between T=10 and T=20, and that Containment is a higher priority than Integrity; or that a Red condition has developed on Containment. If so, this would the earliest time of transition to FRP-J.1.

Answer C Discussion

Incorrect. This is incorrect because these conditions will only result in an Orange condition on Containment, which will not permit the transition to FRP-J.1. This is plausible because an Orange condition exists and the operator may incorrectly believe that Containment is a higher priority than Integrity. If not, conditions have degraded since T=20, and the operator may incorrectly believe that and Orange condition developed between T=20 and T=30, and that Containment is a higher priority than Integrity; or that a Red condition has developed on Containment. If so, this would the earliest time of transition to FRP-J.1.

Answer D Discussion

Correct. According to OMM-22 (p26 of 56; Rev 45) Step 5.2.6.l, if any ORANGE terminus is encountered, the operator is expected to monitor all of the remaining trees and if no RED-condition is encountered, suspend any EOP in progress and perform the FRP required by the ORANGE terminus. If during the performance of an ORANGE-condition FRP, any RED-condition or higher priority ORANGE-condition arises, then the RED or higher priority ORANGE condition is to be addressed first, and the original ORANGE-condition FRP suspended. According to OMM-22 (p25 of 56; Rev 45) the six Status Trees are always evaluated in the following sequence (order of priority): (1) Subcriticality (S), (2) Core Cooling (C), (3) Heat Sink (H), (4) Integrity (P), (5) Containment (J), (6) Inventory (I). Since Integrity is a higher priority than Containment, in order for the operator to transition to FRP-J.1, a Red condition is required to exist on Containment. According to CSFST [CSF-5, Containment] (p8 of 9; Rev 7) the only condition that will yield a Red condition is Containment Pressure greater than 42 psig. Consequently the earliest time of transition to FR-J.1 is T=40.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to evaluate plant performance in the Containment and make operational judgments (When is FRP-J.1 entry required) based on operating characteristics (Sequential loss of cooling equipment), reactor behavior (Containment pressure is rising), and instrument interpretation (CV spray flow, pressure instrumentation).

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information, and then use this information to predict an outcome (When is transition required) in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

OMM-22 (p25-26 of 56; Rev 45)
CSFST [CSF-5, Containment] (p8 of 9; Rev 7)
10 CFR 55.41.10

Student References Provided

SYS103 2.1.7 - Containment System

SYS103 GENERIC

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

Remarks/Status

8/18/15 new question developed

9/8/15 Reviewed by Exam Supervisor, SAT

9/8/15 Operations SRO reviewed question, Editorial comment, would we need to give the HVH units?

12/1/15 question modified to remove doubt as to whether or not the crew would stay in FRP-P.1, or believe they would immediately leave.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

SYS001 K6.13 - Control Rod Drive System
Knowledge of the effect of a loss or malfunction on the following CRDS components: (CFR: 41.7/45.7)
Location and operation of RPIS ....

With the plant at 100%, the crew has entered AOP-001, MALFUNCTION OF REACTOR CONTROL SYSTEM **(SEE GIVEN CONDITIONS ON NEXT PAGE)**

Which ONE of the following correctly completes the statements below?

AOP-001 was entered due to ____(1)____. The CRS directs I&C personnel to go to the ____(2)____ to investigate the cause.

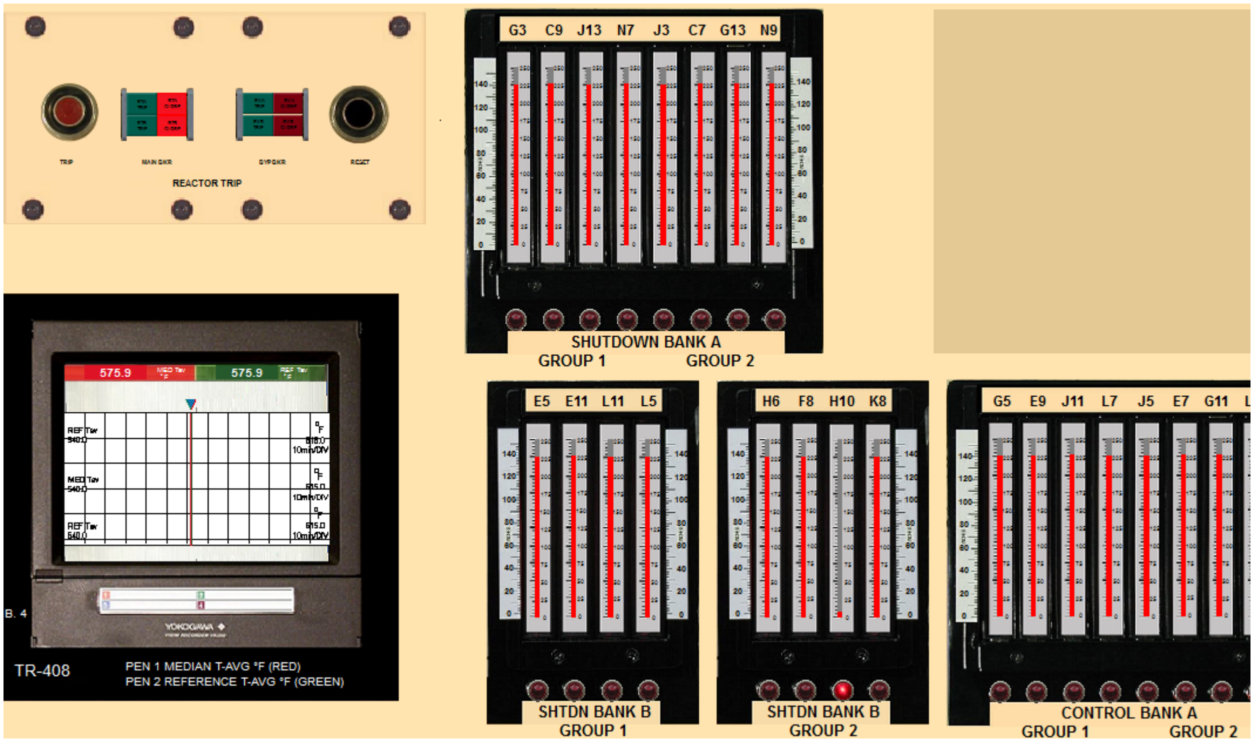
A. (1) a dropped control rod
(2) 1BD Power Cabinet in the Rod Control Room

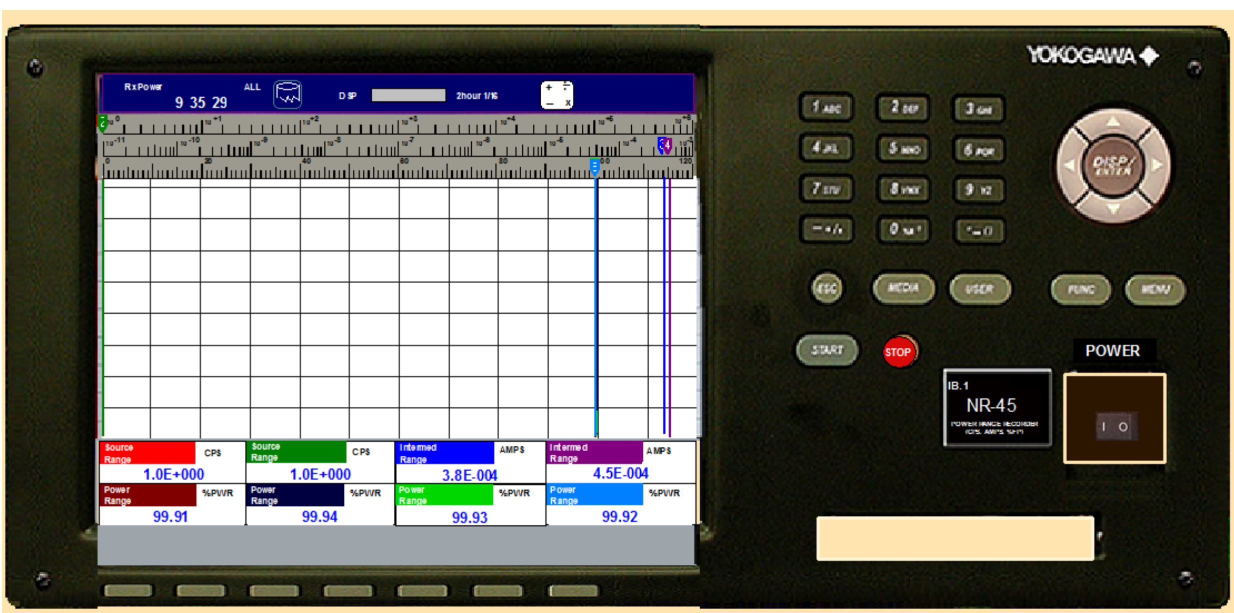
B. (1) a dropped control rod
(2) Logic Cabinet in the Rod Control Room

C. (1) an IRPI failure
(2) IRPI System Rack in the Unit 2 Cable Spread Room

D. (1) an IRPI failure
(2) IRPI System Rack in the Hagan Room

Question 56 Given Conditions





General Discussion

Answer A Discussion

Incorrect. This is incorrect because there was no indication of a prompt drop on reactor power indications. The second part is incorrect because this is the wrong Power Cabinet. This is plausible because the IRPI indication failure is the same as a dropped rod and would be correct if there was a prompt drop in reactor power. The second part is plausible because I&C would be sent to a power cabinet. (The distractor uses a wrong power cabinet to ensure distinction between the second part of this distractor and the second part of the B distractor.)

Answer B Discussion

Incorrect. This is incorrect because there was no indication of a prompt drop on reactor power indications. This is plausible because the IRPI indication failure is the same as a dropped rod and would be correct if there was a prompt drop in reactor power. The second part is a correct cabinet to investigate for a rod control failure and associated location if it was a dropped rod.

Answer C Discussion

Correct. According to AOP-001 (p 6; Rev 33) Step 14, Determine the status of IRPI as follows:
a. Analyze the below indications for an IRPI problem:
•IRPI Indication
oIndicator off-scale High OR Low with NO flux effects
•Dropped Rod Indication with no flux changes
According to ST-009 (p 4; Rev 5), The IRPI System rack mounted electronic equipment is located in the RPI Racks in the Unit 2 Cable Spread Room (Computer Room).

Answer D Discussion

Incorrect. This is incorrect because the IRPI System rack is located in Unit 2 Cable Spread Room. This is plausible because other system racks such as RPS racks are located in the Hagan Room.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the effect of a failure of IRPI for a control rod and the location of IRPI equipment.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must analyze plant indications and determine the cause, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

AOP-001 Rev. 33
ST-009 Rev. 5
10 CFR 55.41.7

Student References Provided

SYS001 K6.13 - Control Rod Drive System
Knowledge of the effect of a loss or malfunction on the following CRDS components: (CFR: 41.7/45.7)
Location and operation of RPIS ....

Remarks/Status

7/28/15 New question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

11/29/15 AOM-SHIFT approved question for 60 day submittal.

SYS002 K4.01 - Reactor Coolant System (RCS)

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

Filling and draining the RCS ....

Given the following:

- GP-001, FILL AND VENT OF THE REACTOR COOLANT SYSTEM, is in progress
- The crew is preparing to start an RCP to sweep gases in support of venting the RCS
- The PZR is at 100%
- S/G secondary water temperatures are 52°F greater than RCS cold leg temperatures

Which ONE of the following correctly completes the statements below?

1) IAW GP-001, the FIRST method used to reduce the delta T between the S/G and the RCS cold leg temperatures is to ____(1)____ .

2) This is done ____(2)____ when a RCP is started.

A. (1) drain and fill the S/G's
(2) to ensure number 1 seal delta P remains > 210 psid

B. (1) ADJUST HIC-758, RHR HX DISCH FLOW
(2) to ensure number 1 seal delta P remains > 210 psid

C. (1) drain and fill the S/G's
(2) to prevent a low temperature overpressure event

D. (1) ADJUST HIC-758, RHR HX DISCH FLOW
(2) to prevent a low temperature overpressure event

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57

D

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Answer B Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the reason for the delta T limitation is to prevent a low temperature overpressure event when the RCP is started. This is plausible because maintaining number 1 seal delta P > 210 psid is a requirement anytime a RCP is running.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because GP-001 directs use of HIC-758 to attempt to heat up the RCS first. This is plausible because draining and filling S/Gs is the second method used IAW GP-001.

Answer D Discussion

Correct. 1st part correct, 2nd part correct. According to GP-001 (p 74; Rev 68) Step 6.5.25, if any S/G temperature is more than 50°F above its associated Loop Cold Leg temperature, THEN perform the following: a. Adjust HIC-758 (RHR HX DISCH FLOW), to raise RCS temperature within the allowable heatup rates. B. IF RCS temperature can not be raised sufficiently to achieve a 50°F or less differential temperature, THEN perform the following: (2) Cool the S/Gs by filling and draining per the following:
-OP-402, Auxiliary Feedwater System, for filling
-OP-406, Steam Generator Blowdown/Wet Layup System, for draining
According to OP-101 (p 12; Rev 74) Step 5.2.1.3, to avoid an overpressure transient, an RCP shall NOT be started when the RCS is water solid and any steam generator temperature is 50°F greater than the temperature of the RCS.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the RCS design feature related to filling and venting the RCS in that the S/G secondary water temperature must be within 50°F of the RCS cold leg temperatures prior to starting a RCP to prevent a low temperature overpressure event.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall from memory the methods used in GP-001 to equalize S/G secondary water temperature with RCS cold leg temperature prior to starting a RCP and the reason for this requirement, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	GP-001-03 15

Development References
GP-001 Rev. 68 OP-101 Rev. 74 10 CFR 55.41.10

Student References Provided

SYS002 K4.01 - Reactor Coolant System (RCS)
Knowledge of RCS design feature(s) and/or interlock(s) which provide for the following : (CFR: 41.7)
Filling and draining the RCS ....

Remarks/Status

8/17/15 used bank question GP-001-03 15

9/8/15 Reviewed by Exam Supervisor, with Editorial comment, 1) Add "PZR is at 100%

9/11/15 exam team incorporated change as proposed by exam supervisor.

11/29/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 58

58 B

SYS011 A1.02 - Pressurizer Level Control System (PZR LCS)

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

Charging and letdown flows ....

Given the following:

- The plant is at 35% power and stable
- The “A” Charging Pump is running in AUTO
- The “B” Charging Pump is running in MANUAL and adjusted to 50% output on Charging Pump Speed Controller SC-151
- Letdown flow is 105 gpm

Subsequently:

- Letdown flow is lowered 45 gpm
- Reactor power is lowered to 30% and stabilized
- Pressurizer Level lowers to, and has stabilized at 31.5%

Which ONE of the following correctly completes the statements below?

1) The Pressurizer Level Control System ____(1)____ operating as expected for these plant conditions.

While Letdown was being lowered APP-003-F3, CHG PMP LO SPEED, alarmed.

2) According to OP-301, CHEMICAL AND VOLUME CONTROL SYSTEM, the operator will be required to adjust the speed of the ____(2)____ Charging Pump to clear this alarm?

A. (1) is
(2) “A”

B. (1) is
(2) “B”

C. (1) is NOT
(2) “A”

D. (1) is NOT
(2) “B”

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the "B" Charging Pump is in Manual and must be adjusted. This is plausible because with the current Charging Pump arrangement it is the "A" Charging Pump causing the low speed alarm, and the operator may incorrectly believe that the speed of this pump needs to adjusted.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to OP-301 (p20 of 140; Rev 112), the Pressurizer Program Level ramps linearly between zero and 100% power. With Rx power at 0% (Tavg 547°F), Pressurizer level is 22.2%, and with Rx power at 100% (Tavg 575.9°F), Pressurizer level is 53.3%. Consequently, when power is lowered to 30%, Pressurizer level will stabilize at 31.5%.
([53.3%-22.2% level]/100% power x 30% power) + 22.2% level = 31.5% level
According to OP-301 (p29-30 of 140; Rev 112) IF the CHG PMP LO SPEED alarm
(APP-003-F3) is actuated, THEN GO TO an earlier section of OP-301. According to OP-301 (p24 of 140; Rev 112) IF the CHG PMP LO SPEED alarm (APP-003-F3) is actuated from the Charging Pump on automatic control with two Charging Pumps running, THEN PERFORM the following: REDUCE the second Charging Pump speed in manual to clear the alarm.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the PLCS is operating exactly as expected. This is plausible because the programmed band at 30% is between 22.2-53.3%, and the operator could predict an incorrect value of the linearly varying programmed Pressurizer level. Additionally, if the stabilized value of Pressurizer Level were changed to 34%, this would be correct.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the Ability to monitor changes in parameters to prevent exceeding design limits (programmed Pzr Level) associated with operating the charging and letdown flow controls. In this case the operator must demonstrate knowledge of the allowable band for the Pressurizer Programmed Level and predict what the level should be when power is adjusted, and then identify which Charging Pump speed must be adjusted during the process of reducing normal letdown flow.

Basis for Hi Cog

The question is at the Comprehensive Analysis cognitive level because the operator must recall bits of information, and use the information to predict an outcome (correct programmed level) and determine required actions (Which Charging Pump speed to adjusted) in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

OP-301 (p20, 24, 29-30 of 140; Rev 112)
10 CFR 55.41.10

Student References Provided

SYS011 A1.02 - Pressurizer Level Control System (PZR LCS)
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR LCS controls including: (CFR: 41.5 / 45.5)
Charging and letdown flows ....

Remarks/Status

8/19/15 new question developed.

9/8/15 Reviewed by Exam Supervisor, UNSAT with following comment, 1) All bands are allowable, since they are w/in the 6-20. Need to use "minimum" and "maximum" in the stem to prevent this.

9/8/15 Operations SRO reviewed question, commented that question should be rewritten as the crew will still attempt to maintain 8-13 GPM

9/11/15 exam team edited the question to add MINIMUM and MAXIMUM in front of "allowed flows" since we are looking for the band

10/14/15 due to validation issues with the use of the expanded band, this question was changed to move away from that.

11/29/15 AOM-SHIFT approved question for 60 day submittal.

SYS014 K5.01 - Rod Position Indication System (RPIS)
Knowledge of the operational implications of the following concepts as they apply to the RPIS: (CFR: 41.5 / 45.7)
Reasons for differences between RPIS and step counter ....

Given the following:

- With the plant at 100% power, a grid disturbance caused a load rejection to 80%
- On Control Bank D, a Group 1 rod failed to move with the group

Which ONE of the following describes the relative comparison of the various rod position indications and the reason?

A. IRPI, ERFIS and Bank D Group 1 Step Counter are all higher than the Bank D Group 2 Step counter because the affected rod failed to move.

B. IRPI and the Bank D Group 1 Step Counter are higher than ERFIS for the affected rod and the Bank D Group 2 Step Counter because the affected rod failed to move.

C. IRPI and ERFIS for the affected rod are matched and indicate higher than both Bank D Group Step Counters because Group Step Counters are driven by bank demand.

D. IRPI indicates higher than ERFIS for the affected rod and both Bank D Group Step Counters because ERFIS is driven by individual demand and the Group Step Counters by bank demand.

ILC15 RNP SRO NRC Examination QUESTION 59

59

C

General Discussion

Answer A Discussion

Incorrect. This is incorrect because IRPI and ERFIS will be matched but higher than the group step counters. This is plausible because the affected rod will actually be higher than group 2 control rods.

Answer B Discussion

Incorrect. This is incorrect because IRPI and ERFIS will be matched and higher than both group step counters. This is plausible because the affect rod will actually be higher than group 2 control rods

Answer C Discussion

Correct. According to ST-009 (p 1; Rev 5), the Rod Control System provides the operator with a "demand rod bank position" (step counters) and not actual individual rod positions. The Individual Rod Position Indication (IRPI) system provides an actual position information for each control rod.

Answer D Discussion

Incorrect. This is incorrect because IRPI feeds ERFIS. This is plausible because IRPI for the affected control rod will actually be higher than the other rods in its group and the other group.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the response of IRPI versus step counter indication for a misaligned control rod.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must analyze the effect on IRPI and step counter indications for a misaligned rod during a load rejection event, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	014 K5.01 1

Development References

ST-009 Rev. 5
10 CFR 55.41.7

Student References Provided

SYS014 K5.01 - Rod Position Indication System (RPIS)

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

Reasons for differences between RPIS and step counter ....

Remarks/Status

7/27/15 used bank question 014 K5.01 1

9/8/15 Reviewed by Exam Supervisor, SAT

11/29/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 60 60 **C**

SYS017 A4.01 - In-Core Temperature Monitor (ITM) System
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
Actual in-core temperatures ....

Given the following:

- The crew is performing FRP-C.1, RESPONSE TO INADEQUATE CORE COOLING

Which ONE of the following correctly completes the statements below?

1) IAW FRP-C.1 the crew will monitor ____(1)____ for inadequate core cooing conditions.

2) The MINIMUM temperature at which transition to SACRM-1, SEVERE ACCIDENT CONTROL ROOM MANAGEMENT INITIAL RESPONSE, is required with available RCP's running is ____(2)____.

A. (1) loop RTD's
(2) greater than 1200°F and rising

B. (1) loop RTD's
(2) greater than 2300°F and rising

C. (1) Core Exit TC's
(2) greater than 1200°F and rising

D. (1) Core Exit TC's
(2) greater than 2300°F and rising

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because FRP-C.1 directs use of Core Exit TC's for monitoring temperature. This is plausible because loop RTD temperatures are provided on the ICCM Panel and hot leg temperatures are used in later steps of FRP-C.1 to ensure RCS pressure is less than the shutoff head of the RHR pump as a check that core cooling has been restored prior to exiting the procedure. 1200°F is the correct temperature.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to FRP-C.1-BD (p 14; Rev 56) Step 6, check Core Exit T/Cs - Less than 1200°F, to check if excessive core exit temperatures, symptomatic of an inadequate core cooling condition, still exist. According to FRP-C.1-BD (p 42; Rev 56) Step 22, if the operator enters this step and core exit T/C temperatures are greater than 1200°F and rising and RCPs are running in all available RCS cooling loops, the operator should transition to the SAMGs. This condition indicates that all attempts to restore core cooling have failed and core damage cannot be prevented and the operator should go to SAMGs.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because 1200°F and rising is the minimum temperature IAW FRP-C.1 which core damage cannot be prevented. This is plausible because 2300°F is the maximum temperature range for core exit T/C's.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to monitor in-core temperatures in the control room. This is accomplished by the candidate determining which parameter is monitored for adequate core cooling IAW FRP-C.1.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall from memory what parameter is monitored in FRP-C.1 to determine inadequate core cooling conditions exist or not and at what temperature above which core damage may occur if core cooling cannot be restored, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	017 A1.01 1

Development References	Student References Provided
FRP-C.1-BD Rev. 56 10 CFR 55.41.10	

SYS017 A4.01 - In-Core Temperature Monitor (ITM) System

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

Actual in-core temperatures ....

Remarks/Status

8/17/15 used bank question 017 A1.01 1

9/8/15 Reviewed by Exam Supervisor, SAT

9/8/15 Operations SRO reviewed question, Editorial, can we change the stem statement 2) to ask at what temp would we transition to SAMGs?

11/29/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 61 61 **A**

SYS027 K2.01 - Containment Iodine Removal System (CIRS)
Knowledge of bus power supplies to the following: (CFR: 41.7)
Fans ....

Which ONE (1) of the following is the power supply for HVE-3, CV Air Iodine Removal Fan?

A. MCC-5

B. MCC-6

C. MCC-9

D. MCC-10

ILC15 RNP SRO NRC Examination QUESTION 61

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A

General Discussion

Answer A Discussion

Correct. According to EDP-003 (p23 of 68; Rev 68) HVE-3 is powered from MCC-5.

Answer B Discussion

Incorrect. This is incorrect because HVE-3 is powered from MCC-5. This is plausible because HVE-3 & 4 don't have train designators, and there is no convention at RNP that odd numbers are 'A' Train.

Answer C Discussion

Incorrect. This is incorrect because HVE-3 is powered from MCC-5. This is plausible because MCC-9 is vital power for Train B, fed from MCC-6. Many safety-related components are fed from these "secondary" MCCs, such as AFW valves, Service Water valves, etc.

Answer D Discussion

Incorrect. This is incorrect because HVE-3 is powered from MCC-5. This is plausible because MCC-10 is vital power from Train A, fed from MCC-5.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of bus power supplies to HVE-3.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must simply recall the power supply to HVE-3 in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	2014 NRC exam

Development References

EDP-003 (p23 of 68; Rev 68)
10 CFR 55.41.8

Student References Provided

SYS027 K2.01 - Containment Iodine Removal System (CIRS)
Knowledge of bus power supplies to the following: (CFR: 41.7)
Fans ....

Remarks/Status

7/19/15 used bank question from 2014 NRC exam

9/8/15 Reviewed by Exam Supervisor, SAT, but commented that we could change it to a fan that's power supply is more readily known.

9/9/10 discussed with exam team and reviewed 2014 NRC exam scores. Question did well on 2014 exam. Decided to leave unchanged.

9/8/15 Operations SRO reviewed question, Editorial comment, is there a more common fan?

11/29/15 AOM-SHIFT approved question for 60 day submittal.

SYS029 2.1.23 - Containment Purge System (CPS)
SYS029 GENERIC
Ability to perform specific system and integrated plant procedures during all modes of plant operation. (CFR: 41.10 / 43.5 / 45.2 / 45.6)

Consider the following plant evolutions:

1. A Containment Entry is being made at power
2. Core Alterations are taking place with the Equipment Hatch removed

Which ONE of the following identifies the evolutions, if any, in which Containment Purge MUST be in operation IAW OP-921, CONTAINMENT AIR HANDLING?

A. 1 ONLY

B. 2 ONLY

C. BOTH 1 and 2

D. NEITHER 1 NOR 2

ILC15 RNP SRO NRC Examination QUESTION 62

62

B

General Discussion

Answer A Discussion

Incorrect. This is incorrect because CV purge is not required for Containment Entry at power. This is plausible because the operator may incorrectly believe that CV purge is necessary to maintain habitability requirements for emergency entry of CV at power.

Answer B Discussion

Correct. According to Technical Specification LCO 3.9.7, Containment Purge Filter System (p3.9-11; Amendment 195), the Containment Purge Filter System shall be OPERABLE and operating during movement of recently irradiated fuel assemblies in containment. According to GP-010 (p78 of 88; Rev 87), Attachment 10.7, IF Core Alterations or movement of irradiated fuel in Containment AND the equipment hatch is removed, THEN ENSURE CV Purge and Filter System is in operation with ventilation isolation from R-11 and R-12 defeated.

Answer C Discussion

Incorrect. This is incorrect because CV purge is not required for Containment Entry at power. This is plausible because the operator may incorrectly believe that CV purge is necessary to maintain habitability requirements for emergency entry of CV at power.

Answer D Discussion

Incorrect. See A and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the Ability to perform specific system and integrated plant procedures during all modes of plant operation. This is accomplished by requiring the operator to identify when specific procedure OP-921 must be used to place CV Purge in operation during Refueling, Plant Cooldown and At Power evolutions.

Basis for Hi Cog

The question is at the Memory because the operator must recall bits of information (when Containment Purge System is required to be in operation), in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

LCO 3.9.7 (p3.9-11; Amendment 195)
GP-010 (p78 of 88; Rev 87)
10 CFR 55.41.10

Student References Provided

SYS029 2.1.23 - Containment Purge System (CPS)
SYS029 GENERIC
Ability to perform specific system and integrated plant procedures during all modes of plant operation. (CFR: 41.10 / 43.5 / 45.2 / 45.6)

Remarks/Status

8/18/15 used bank question G2.3.9 2

9/8/15 Reviewed by Exam Supervisor, UNSAT, as operators are not required to memorize exact procedure steps.

9/8/15 Operations SRO reviewed question, agree UNSAT, too much memory, would be high miss.

9/14/15 new question developed to replace.

9/30/15 based off all validators feedback, the plant with normal do this while it is not required by procedure for the accumulator venting. Therefore the question was changed to a 2 by and evolution 3 removed.

11/29/15 AOM-SHIFT approved question for 60 day submittal.

SYS033 K3.02 - Spent Fuel Pool Cooling System (SFPCS)

Knowledge of the effect that a loss or malfunction of the Spent Fuel Pool Cooling System will have on the following: (CFR: 41.7 / 45.6)
Area and ventilation radiation monitoring systems ....

Given the following:

- A leak has occurred on the Spent Fuel Pit Heat Exchanger
- No fuel handling activities are in progress
- SFP level is 36 feet 6 inches and lowering slowly

Which ONE of the following correctly completes the statements below?

1) ____(1)____ will provide indication of rising radiation levels due to lowering SFP level.

2) When R-21, Fuel Handling Building Upper Level noble gas monitor alarms ____(2)____ will automatically trip.

A. (1) R-5, Spent Fuel Pit Area
(2) HVE-15

B. (1) R-5, Spent Fuel Pit Area
(2) HVE-15A

C. (1) R-30, Fuel Handling Building Lower Level
(2) HVE-15

D. (1) R-30, Fuel Handling Building Lower Level
(2) HVE-15A

General Discussion

Answer A Discussion

Correct. 1st part correct. 2nd part correct. According to AOP-005-BD (p 9; Rev 32) Attachment 5 Step 4 basis, low level in the Spent Fuel Pit may be the cause of the Radiation Monitor Alarm. Attachment 5 of AOP-005 is for Area Monitor R-5, Spent Fuel Pit Area. Therefore, lowering level in SFP may result in rising area radiation levels which will be detected by R-5. According to systems LP-19 RMS Rev 4. and APP-010-E7, HVE-14/15 AIR FLOW LOST/OVLD a high alarm on R-21 will result in a trip of HVE-15..

Answer B Discussion

Incorrect. 1st part correct. 2nd part incorrect. 1st part, According to AOP-005-BD (p 9; Rev 32) Attachment 5 Step 4 basis, low level in the Spent Fuel Pit may be the cause of the Radiation Monitor Alarm. Attachment 5 of AOP-005 is for Area Monitor R-5, Spent Fuel Pit Area. Therefore, lowering level in SFP may result in rising area radiation levels which will be detected by R-5. 2nd part incorrect, this is plausible because HVE-15A is the charcoal filtered fan that serves the spent fuel pool. However, it is only run during fuel handling activities or during testing of the ventilation system. A high alarm on R-21 will not result in a trip of HVE-15A if running. Reference systems LP-19 RMS Rev 4. This is plausible if the candidate incorrectly determines that a high alarm on R-21 will result in a trip of either HVE-15 or HVE-15A.

Answer C Discussion

Incorrect. 1st part wrong. 2nd part correct. This is incorrect because R-5 monitors the area radiation levels for the SFP. This is plausible because R-30 monitors ventilation exhaust from the Fuel Handling Building Lower Level in the area below the SFP by the Gas Decay Tanks. The SFP Heat Exchanger is at the same elevation as the Gas Decay tanks in the Fuel Handling Building.

Answer D Discussion

Incorrect. 1st part wrong. 2nd part wrong. See B & C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge (which rad monitors monitor what areas/processes) of lowering level in SFP due to a SFP Cooling System malfunction.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall from memory which area radiation monitor will provide indication of a lowering level in the SFP and which process monitor will monitor a leak from the SFP Heat Exchanger.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

AOP-005-BD Rev. 32
ST-019 Rev. 4
10 CFR 55.41.4

Student References Provided

SYS033 K3.02 - Spent Fuel Pool Cooling System (SFPCS)

Knowledge of the effect that a loss or malfunction of the Spent Fuel Pool Cooling System will have on the following: (CFR: 41.7 / 45.6)

Area and ventilation radiation monitoring systems ....

Remarks/Status

8/12/15 new question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

9/8/15 Operations SRO reviewed question, may be missed due to the R-20 part of question, changed to contrast a different concept.

11/29/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 64 64 **A**

SYS035 A2.05 - Steam Generator System (S/GS)

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

Unbalanced flows to the 5/Gs ....

Given the following:

- The plant is operating at 100% power
- The SDAFW Pump is OOS

Subsequently:

- A large Steam Break occurs inside Containment on the “B” Steam Generator
- V2-16A, AFW Header Discharge Valve, has failed CLOSED
- The “B” MDAFW Pump trips on auto-start

Which ONE of the following correctly completes the statements below?

Without operator action a Secondary Heat Sink ____(1)____ be established.

IAW EOP-E-0 Foldout Criteria, when the operator does take action, the operator will ____(2)____.

A. (1) will
(2) isolate AFW flow to the “B” S/G

B. (1) will
(2) reduce AFW flow in the “B” S/G to 60 gpm

C. (1) will NOT
(2) isolate AFW flow to the “B” S/G

D. (1) will NOT
(2) reduce AFW flow in the “B” S/G to 60 gpm

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to ST-042 (p7, 10 & 14; Rev 5), on the trip both MDAFW Pumps will auto start, the AFW Header Discharge will auto open, and the AFW control valves are preset to control flow at 325 gpm from each pump. When the "B" MDAFW Pump trips, 325 gpm of AFW flow will be delivered to the "B" and "C" S/G ("A" S/G Iso valve failed CLOSED) via the "A" MDAFW Pump, however because the pressure in the "B" S/G is lower than that of the "C" S/G, all, or most of the AFW flow will enter the "B" S/G (unbalanced flows). According to EOP-E-0 (p19 of 38; Rev 6) Step 17, a heat sink is defined as (1) Total AFW flow to S/G(s) ‑ GREATER THAN 300 GPM or (2) S/G Narrow Range level in at least one S/G ‑ GREATER THAN 9%. Since there is a total of 325 gpm of AFW flow, a heat sink will exist. According to Item #2 of the EOP-E-0 Foldout Page (pFoldout; Rev 6), The Faulted S/G Criteria will require the operator to take action after Step 5. Accordingly, IF ANY S/G pressure is lowering in an uncontrolled manner OR has completely depressurized, AND ANY S/G is NOT Faulted (Which is the case); the operator will RESET SI, and CLOSE AFW Header Discharge Valve for Faulted S/G(s): V2‑16B (S/G B). The operator will then PERFORM Supplement D, Deenergizing AFW Valves For AFFECTED S/G, and MAINTAIN total feed flow GREATER THAN 300 gpm to the "C" S/G UNTIL the "C" S/G Narrow Range level is GREATER THAN 9% [18%].

Answer B Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the operator will isolate AFW flow to the "B" S/G based on the EOP-E-0 Foldout Page Item #2. This is plausible because if all three S/Gs were depressurizing the operator would be directed to reduce AFW flow to 60 gpm per S/G as the only means available to control the cooldown rate; and the operator may incorrectly believe that it applies here. If so, the operator would reduce the "B" S/G flow to 60 gpm and allow the remaining AFW flow making up the Heat Sink, to flow into the "C" S/G.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because an AFW flow of greater than 300 gpm creates a Heat Sink, and this will occur without operator action (even though the AFW flow all or mostly flowing into a Faulted S/G). This is plausible because the operator may not know the 300 gpm threshold, or incorrectly believe that the Heat Sink cannot be defined by a Faulted S/G.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability predict the impacts of the unbalanced flows to the S/Gs on whether or not a Secondary Heat Sink exists; and then use the EOP-E-0 Foldout Page to correct, control, or mitigate the consequences.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and analyze plant conditions to determine the required actions, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

ST-042 (p7, 10 & 14; Rev 5)
EOP-E-0 (p19 & Foldout; Rev 6)
10 CFR 55.41.10

Student References Provided

SYS035 A2.05 - Steam Generator System (S/GS)

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

Unbalanced flows to the 5/Gs ....

Remarks/Status

8/19/15 new question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

9/8/15 Operations SRO reviewed question, commented that it is technically correct, but does that make it a good question? Lot of memorization.

9/30/15 changed question out with new question.

11/29/15 AOM-SHIFT approved question for 60 day submittal.

SYS068 K1.07 - Liquid Radwaste System (LRS)
Knowledge of the physical connections and/or cause effect relationships between the Liquid Radwaste System and the following systems:
(CFR: 41.2 to 41.9 / 45.7 to 45.8)
Sources of liquid wastes for LRS ....

Which ONE of the following discharges to the Reactor Coolant Drain Tank?

A. Charging pump seals

B. RCV-609, CC SURGE TANK VENT

C. CVC-203 A/B, LETDOWN RELIEF VALVES

D. CVC-389, EXCESS LETDOWN DIVERSION

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65

D

General Discussion

Answer A Discussion

Incorrect. This is incorrect because the charging pumps seals drain to the AUX BLDG Sump Tank which drains to the WHUT. This is plausible because this is another tank in the Liquid Rad Waste System.

Answer B Discussion

Incorrect. This is incorrect because RCV-609 drains to the WHUT. This is plausible because this is another tank in the Liquid Rad Waste System.

Answer C Discussion

Incorrect. This is incorrect because CVC-203 A/B relieve to the PRT. This is plausible because this is another tank in the Liquid Rad Waste System.

Answer D Discussion

Correct. According to ST-023 (p8; Rev 2) and ST-021 (p81, Rev 3a) the Excess Letdown diversion is sent to the RCDT via CVC-389.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of the physical connections into the RCDT.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must simply recall where the Letdown Excess Valve diverts to in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	2013 NRC exam

Development References

ST-023 (p8; Rev 2)
ST-021 (p81, Rev 3a)
10 CFR 55.41.3

Student References Provided

SYS068 K1.07 - Liquid Radwaste System (LRS)

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

Sources of liquid wastes for LRS ....

Remarks/Status

7/19/15 used bank question used on 2013 NRC exam

9/8/15 Reviewed by Exam Supervisor, SAT

9/8/15 Operations SRO reviewed question, Editorial comments, can be aligned? Normally and fails to VCT?

11/29/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 66

66

C

GEN2.1 2.1.29 - GENERIC - Conduct of Operations

Conduct of Operations

Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc. (CFR: 41.10 / 45.1 / 45.12)

Which ONE of the following correctly completes the statements below?

IAW OPS-NGGC-1303, VERIFICATION PRACTICES, guidance for waiving Independent Verification (IV) requirements states that the IV may be waived if the operators were expected to ____(1)____ to complete the verification.

In these cases, _____(2)_____ Verification will be used as an alternative to Independent Verification.

A. (1) be in an area where the dose rate is greater than 100 mrem/hour
(2) Concurrent

B. (1) receive a total exposure of greater than 10 mrem
(2) Concurrent

C. (1) receive a total exposure of greater than 10 mrem
(2) Functional

D. (1) be in an area where the dose rate is greater than 100 mrem/hour
(2) Functional

General Discussion

Answer A Discussion

Incorrect. 1st part wrong. 2nd part wrong. See B and D.

Answer B Discussion

Incorrect. 1st part correct. 2nd part wrong. This is incorrect because the alternative verification method, when waiving an Independent Verification requirement is a Functional Verification (A Concurrent Verification would leave the operators no better off with respect to exposure). This is plausible because the Functional and Concurrent Verifications are two additional types of verification, and the operator may not know the difference between the two.

Answer C Discussion

Correct. 1st part correct. 2nd part correct. According to OPS-NGGC-1303 (p18 of 29; Rev 12) an Independent Verification may be waived if excessive radiation exposures would result. As a guideline, an exposure of greater than 10 mrem to conduct the INDEPENDENT/CONCURRENT VERIFICATION would be considered excessive. Individual situations should be determined on a case-by-case basis by the respective supervisor. In these situations, an alternate means such as FUNCTIONAL VERIFICATION not involving radiation exposure (such as observing process parameters) should be utilized.

Answer D Discussion

Incorrect. 1st part wrong. 2nd part correct. This is incorrect because the criteria is NOT dose rate based. This is plausible because dose rate and exposure are closely related concepts, and the operator may incorrectly believe that the waiver criteria is based on doserate, rather than total exposure.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of how to conduct component lineups that require Independent Verifications; specifically under what conditions these requirements may be waived, and alternatives.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall bits of information, and then utilize this information to analyze a set of conditions and predict an outcome, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
OPS-NGGC-1303 (p18 of 29; Rev 12) 10 CFR 55.41.10	

GEN2.1 2.1.29 - GENERIC - Conduct of Operations

Conduct of Operations

Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc. (CFR: 41.10 / 45.1 / 45.12)

Remarks/Status

7/30/15 new question developed

9/8/15 Reviewed by Exam Supervisor, SAT

9/8/15 Operations SRO reviewed question, verify that OPS-NGGC-1303 is still a valid procedure.

9/10/15 exam team verified OPS-NGGC-1303 is still valid.

11/29/15 AOM-SHIFT approved question for 60 day submittal.

GEN2.1 2.1.36 - GENERIC - Conduct of Operations
Conduct of Operations
Knowledge of procedures and limitations involved in core alterations. (CFR: 41.10 / 43.6 / 45.7)

Given the following plant conditions:

- The plant is in MODE 6 for refueling operations

- Core alterations are in progress

Which ONE (1) of the following completes the statements below?

IAW LCO 3.9.2, NUCLEAR INSTRUMENTATION, ___(1)___ source range neutron flux monitor(s) shall be OPERABLE.

NI-51 and NI-52, ___(2)___ capable of providing audible indication inside CV.

A. (1) one
(2) are

B. (1) two
(2) are

C. (1) one
(2) are NOT

D. (1) two
(2) are NOT

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D

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Answer B Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because NI-51 and NI-52(PAM Monitors) are NOT capable of providing audible indication inside the CV. This is plausible if the candidate incorrectly believes that the PAM monitors, NI-51 and NI-52 provide the exact same indications that the NI-31 or NI-32 can provide, however only NI-31 or NI-32 can provide the audible indication inside the CV.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because two SR NI's shall be OPERABLE per ITS 3.9.2. This is plausible if the candidate incorrectly believes that only one is required, since the control room also has the N51 and N52 (PAM Monitors) available for indication.

Answer D Discussion

Correct. 1st part correct, 2nd part correct. According to Technical Specification LCO 3.9.2 (p3.9-2; Amendment 190), Two source range neutron flux monitors shall be OPERABLE during Mode 6. According to ST-010 (p2, 8, 11 and 19; Rev 3), the NIS consists of ten independent channels: Two SR Channels (N31 and N32), two IR Channels, four PR Channels, and two R.G. 1.97 Channels. The R.G 1.97 (N51 and N52) channels, or PAM instruments, include both Source and Wide Range channels. The N31 and N32 have audible count rate available in the CV, while the N51 and N52 do not.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of procedures (Tech Specs with < 1 hour ACTION statements) and limitations (minimum number of Source Range Instruments needed to conduct Core Alterations) involved in core alterations.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall bits of information in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	G2.1.40 1

Development References

TS LCO 3.9.2 (p3.9-2; Amendment 190)
ST-010 (p2, 8, 11 and 19; Rev 3)
10 CFR 55.41.10

Student References Provided

GEN2.1 2.1.36 - GENERIC - Conduct of Operations
Conduct of Operations
Knowledge of procedures and limitations involved in core alterations. (CFR: 41.10 / 43.6 / 45.7)

Remarks/Status

7/19/15 new question developed.

9/8/15 Reviewed by Exam Supervisor, SAT, but with the comment/question, are RO candidates required to memorize ITS actions?

9/8/15 exam team response, yes they are less than one hour action statements.

9/8/15 Operations SRO reviewed question, similar comment, is the below the line info RO required?

9/10/15 exam team response remains that < one hour action statements are RO required knowledge.

12/1/15 AOM-Shift found an appropriate bank question to replace this.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 68 68 **B**

GEN2.1 2.1.45 - GENERIC - Conduct of Operations
Conduct of Operations
Ability to identify and interpret diverse indications to validate the response of another indication. (CFR: 41.7 / 43.5 / 45.4)

Given the following:

- A plant startup is in progress IAW GP-005, POWER OPERATION
- NIS Power Indication is 50%
- ERFIS Net MWe is 342 MWe

Which ONE of the following indications would require the crew to stop the startup and stabilize reactor power and perform OST-010, POWER RANGE CALORIMETRIC DURING POWER OPERATION DAILY?

A. Tavg is 562.8°F

B. Loop ΔT is 33°F

C. MWe Net Recorder is 336 MWe

D. Calorimetric reactor power is 51.5%

General Discussion

Answer A Discussion

Incorrect. This is incorrect because Tavg is not a redundant Reactor Power indication per Attachment 1 of GP-005. This is plausible because Tavg is programmed via control rod movement to vary linearly with reactor power between 0% and 100%. This value of Tavg is indicative of ≈54% power when on program. However, it could be a Tavg indicative of 50% power that is 1.3°F higher than program.

Answer B Discussion

Correct. According to Precaution & Limitation 12 of GP-005 (p7 of 156; Rev 128), all indications of reactor power level listed on Attachment 1, Reactor Power Redundant Indications should be monitored and compared during the power level changes. Indications such as core ΔT, and turbine first-stage pressure should be compared to NI indications at least once per 10% during the power level changes. If all indications do not agree within 5% of each other during power level changes, then Reactor Power should be stabilized, OST-010, Power Range Calorimetric During Power Operation (ERFIS) performed, and plant management contacted for further instructions. According to Attachment 1 of GP-005 (p127 of 156; Rev 128) Average Reactor Power, Loop ΔT, 1st Stage Pressure and Net Mwe Max are redundant indications. At 50% power, Core ΔT is 28.5°F and varies linearly to 100% power. Consequently, with an NIS Power Range indication of 50%, it would be expected that Loop ΔT is approximately 28.5°F. Since actual Loop ΔT is 33°F, and 15% higher than expected, the crew must stabilize plant power and perform OST-10.

Answer C Discussion

Incorrect. This is incorrect because this is only 6 MWe different from the ERFIS Net MWe indication, and Attachment 1 indicates that the ERFIS and Net recorder normally indicate a 6 Mwe difference. This is plausible because the operator may not know about the Note and incorrectly believe that the difference is too large.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the OST is required to be performed when there is a 5% difference in redundant indications during plant manuevering in OP-105 or GP-005. This is plausible because the operator may incorrectly believe that the OST is required for a difference criteria of only 1.5%, which would be true under steady state conditions.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the Ability to identify and interpret diverse indications to validate the response of NIS Power Range instruments during a reactor startup. This is accomplished by requiring that the operator choose a parameter indicating at a specific value, which would require stabilizing reactor power and performing a calibration of the NIS PR instruments.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and use the information to predict an outcome, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References
GP-005 (p7, 127 of 156; Rev 128) 10 CFR 55.41.10

Student References Provided

GEN2.1 2.1.45 - GENERIC - Conduct of Operations

Conduct of Operations

Ability to identify and interpret diverse indications to validate the response of another indication. (CFR: 41.7 / 43.5 / 45.4)

Remarks/Status

7/14/15 new question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

9/8/15 Operations SRO reviewed question, why did we reference OP-105 vice GP-005?

11/5/15 GP-005 is referenced.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination **QUESTION 69** 69 **A**

GEN2.2 2.2.38 - GENERIC - Equipment Control

Equipment Control

Knowledge of conditions and limitations in the facility license. (CFR: 41.7 / 41.10 / 43.1 / 45.13)

Given the following:

- The plant is at 100% power
- The FWUFM System has been OOS for five days

Subsequently:

- An AO reports a steam leak near the Main Steam Isolation Valves
- The following indications are noted in the Control Room:
  - Tavg is LOWERING
  - Steam flow and feed flow have RISEN
  - A Power Limit Warning alarm on ERFIS has been received
  - Reactor power is slowly RISING

Which ONE of the following identifies the MAXIMUM thermal power limit allowed by the operating license under these conditions?

A. 2300 MWt

B. 2307 MWt

C. 2339 MWt

D. 2346 MWt

General Discussion

Answer A Discussion

Correct. According to OMM-001-2 (p16; Rev 92) Step 5.2.3, Diverse indications of Reactor power should be monitored at all times to ensure the Reactor is operated at less than or equal to 2339 MW thermal when the FWUFM System is in service and 2300 MW thermal when FWUFM is not in service as required by TRM 3.25 limitation. Also according to OMM-001-2 (p18/19; Rev 92) Step 5.2.7/11, when a Power Limit Warning alarm has been received, or plant indications show an actual transient condition, action shall be taken to maintain reactor power less than or equal to 2339 MWt using the Valve Position Limiter. However, because the FWUFM System is OOS, this limit must be adjusted to 2300.

Answer B Discussion

Incorrect. This is incorrect because with an alarm present and a transient condition the steady state allowance of 100.3% maximum power level is not permitted. This is plausible because this power level would be consistent with 100.3 % of the FWUFM OOS power limit.

Answer C Discussion

Incorrect. This is incorrect because the FWUFM System is OOS which limits maximum power to 2300 MWt. This is plausible because it is 100% RTP identified in the Operating License.

Answer D Discussion

Incorrect. This is incorrect because FWUFM System is OOS which limits maximum power to 2300 MWt. This is plausible because it is 100% RTP identified in the Operating License, and under steady state conditions OMM-001-2 permits power at any given time to be 100.3%, or 2346 MWt.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of both the License Power Level (2339 MWt) Limit and the Condition that the plant must operate within the confines of the Technical Specifications (In this case the TRM). In the case presented, the operator must select the maximum power permitted under the stated plant conditions (In the TRM and OMM).

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information (max license power level and conditions permitted) and then apply this information to stated plant conditions in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	035 K5.01 001

Development References

OMM-001-2 (p16, 18/19; Rev 92) Step 5.2.3, 7 and 11
10 CFR 55.41.10

Student References Provided

GEN2.2 2.2.38 - GENERIC - Equipment Control
Equipment Control
Knowledge of conditions and limitations in the facility license. (CFR: 41.7 / 41.10 / 43.1 / 45.13)

Remarks/Status

7/14/15 modified bank question 035 K5.01 001

9/8/15 Reviewed by Exam Supervisor, with editorial comments, 1) stem has information not needed to answer question; 2) need to verify initial conditions are accurate {can we be <2300Mwt and still be @ 100% RTP? (have to be less than 2300 Mwt when FWUFM OOS for 24 hours)}

9/8/15 Operations SRO reviewed question, stated in response to Exam Supervisor comment that YES, they adjust NI to 100% at 2300 NWt per the TRM.

11/29/15 AOM-SHIFT approved question for 60 day submittal.

GEN2.2 2.2.39 - GENERIC - Equipment Control

Equipment Control

Knowledge of less than or equal to one hour Technical Specification action statements for systems. (CFR: 41.7 / 41.10 / 43.2 / 45.13)

Given the following:

- The plant is at 100% power
- It has been determined that LCO 3.2.3, Axial Flux Difference is outside the target band.

Which ONE of the following correctly completes the statement below?

IAW Technical Specification LCO 3.2.3 ACTION.......

(1) Restore AFD to within target band within ___(1)___.

(2) If AFD cannot be restored within target band within the allowable time, Reduce THERMAL POWER to < 90% RTP or 0.9 APL, whichever is less, within an additional ___(2)___.

A. (1) 15 minutes
(2) 15 minutes

B. (1) 15 minutes
(2) 1 hour

C. (1) 30 minutes
(2) 15 minutes

D. (1) 30 Minutes
(2) 1 hour

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to Tech Spec LCO 3.2.3 ACTION Condition A (p3.2-8; Amendment 176), the operator must restore AFD to within target band within 15 minutes. According to ACTION Condition B, if the Required Action and associated Completion Time of Condition A not met, the operator must If AFD cannot be restored Reduce THERMAL POWER to < 90% RTP or 0.9 APL, whichever is less, within 15 minutes.

Answer B Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because 1 hour is too long. This is plausible because the RO candidate recognizes that they are responsible for all TS ACTION that is 1 hour or less, and there are many ACTIONs required by Tech Specs within 1 hour.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because 30 minutes is too long. This is plausible because the RO candidate recognizes that they are responsible for all TS ACTION that is 1 hour or less, and Condition C of LCO 3.2.3 has a 30 minute ACTION.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of less than or equal to one hour Technical Specification action statements such as LCO 3.2.3.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must simply recall bits of information in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

Tech Spec LCO 3.2.3 ACTION Condition A&B (p3.2-8; Amendment 176)
10 CFR 55.41.10

Student References Provided

GEN2.2 2.2.39 - GENERIC - Equipment Control
Equipment Control
Knowledge of less than or equal to one hour Technical Specification action statements for systems. (CFR: 41.7 / 41.10 / 43.2 / 45.13)

Remarks/Status

7/20/15 new question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

9/8/15 Operations SRO reviewed question, RO level knowledge, below the line ITS info?

9/10/15 exam team response is that < 1 hour tech spec action items are RO required knowledge.

11/29/15 AOM-SHIFT approved question for 60 day submittal.

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:

- The plant is in Refueling Mode and Core Alterations are in progress
- The Refueling SRO reports that a fuel assembly was accidently dropped from the manipulator crane and has landed on top of the core area

Subsequently:

- AOP-013, FUEL HANDLING ACCIDENT, has been entered
- CV Particulate Radiation Monitor R-11 reading is stable
- CV Noble Gas Radiation Monitor R-12 reading is increasing

Which ONE of the following correctly completes the statements below?

IAW AOP-013…

An evacuation of from the Containment Vessel ____(1)____ required.

The initiation of OMM-033, IMPLEMENTATION OF CV CLOSURE, ____(2)____ required.

A. (1) is
(2) is

B. (1) is
(2) is NOT

C. (1) is NOT
(2) is

D. (1) is NOT
(2) is NOT

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to AOP-013 (p3 of 13; Rev 32) step 1, personnel evacuation from containment is required. Step 4 of AOP-013 has the operator determine if implementation of CV closure is required based on rising indication or alarm on either R-11 or R-12, which is given information.

Answer B Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because initiation of OMM-33 is required. This is plausible is the operator incorrectly concludes that both R-11 and R-12 are required to be rising or in alarm. However, step 4 directs to the operator to check R-11 AND R-12 and if EITHER is rising or in alarm, CV closure IAW OMM-033 is required.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because an evacuation is required. This is plausible because the operator may incorrectly conclude that fuel handling personnel are to remain in the area to store fuel in a safe location. This is based on wording in the AOP-013 basis document for step 1 which states "Consideration was given to provide instructions for any refueling activities to store fuel in some safe location. However, it is considered that too many unknowns are possible which may place personnel in danger of exposure. Systems and structures as designed provide for safe locations of fuel. Also, most likely, the fuel being handled was the one that is involved in the accident. Therefore, the first priority is to protect personnel in the affected area".

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements (in this case an evacuation or prohibition of entry), and fuel handling responsibilities (what actions are required in the event of a fuel handling accident). This is accomplished by requiring that the operator identify whether or not establishing Containment Closure is required in response to rising indications or alarms on the involved radiation monitors.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall bits of information in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	AOP-013-03 10

Development References

AOP-005 (p7&9 of 61; Rev 32)
AOP-005-BD (p5&7 of 29; Rev 32)
10 CFR 55.41.10

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)

Remarks/Status

7/15/15 modified bank question 076 G2.4.26 001

9/8/15 Reviewed by Exam Supervisor, UNSAT, as RO's are not required members of the fire brigade AND SRO's will not qualify for fire brigade until after license class is complete.

9/14/15 exam team drafted new question that would meet the KA.

12/1/15 AOM-Shift recommended replacement bank question.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

GEN2.3 2.3.4 - GENERIC - Radiation Control
Radiation Control
Knowledge of radiation exposure limits under normal or emergency conditions. (CFR: 41.12 / 43.4 / 45.10)

Given the following:

- An operator has been assigned work in the radiologically controlled area
- The dose rate in the area is 500 mR/hr
- The operator has a current yearly dose of 0.5 Rem TEDE

Which ONE of the following identifies the MAXIMUM time that the operator can perform work BEFORE reaching the Duke Energy Annual Administrative Dose Limit without receiving an extension?

A. 1 hour

B. 3 hours

C. 4 hours

D. 7 hours

General Discussion

Answer A Discussion

Incorrect. This is incorrect because 3 hours of work are permitted. This is plausible because this would be correct if the operator incorrectly believed that the Admin Limit was 1 Rem Annually.

Answer B Discussion

Correct. According to PD-RP-ALL-0001 (p17 of 57; Rev 3) the Table associated with Step 5.2.2.1 states that the Duke Energy Annual Administrative Dose Limit is 2 Rem Annually. There is an allowable exposure of 1500 mrem before the Admin Limit is reached. This would permit the operator to work for 3 hours before the limit is reached.

Answer C Discussion

Incorrect. This is incorrect because 3 hours of work are permitted. This is plausible because this would be correct if the operator incorrectly believed that the Admin Limit was 2.5 Rem Annually.

Answer D Discussion

Incorrect. This is incorrect because 3 hours of work are permitted. This is plausible because this would be correct if the operator incorrectly believed that the Admin Limit was 4 Rem Annually.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of radiation exposure limits under normal conditions, specifically with respect to local administrative TEDE limits.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall a bit of information (Annual Dose Limit) and use this information to predict an outcome, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	G2.3.4 1

Development References	Student References Provided
PD-RP-ALL-0001 (p17 of 57; Rev 3) 10 CFR 55.41.12	

GEN2.3 2.3.4 - GENERIC - Radiation Control

Radiation Control

Knowledge of radiation exposure limits under normal or emergency conditions. (CFR: 41.12 / 43.4 / 45.10)

Remarks/Status

7/20/15 used bank question G2.3.4 1

9/8/15 Reviewed by Exam Supervisor, SAT

11/29/15 AOM-SHIFT approved question for 60 day submittal.

GEN2.4 2.4.11 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Knowledge of abnormal condition procedures. (CFR: 41.10 / 43.5 / 45.13)

Given the following:

- A plant cooldown is in progress
- RCS Temperature is 430°F
- RCS pressure is 725 psig
- The SI Accumulators have been isolated

Subsequently, an RCS leak occurs and the operating crew enters AOP-016, EXCESSIVE RCS LEAKAGE.

Which ONE of the following correctly completes the statements below?

(1) AOP-016 will ensure that a MINIMUM of ____(1)____ Charging Pumps are running with their speed adjusted to maximum.

(2) If Pressurizer level is lowering uncontrollably with maximum charging flow, under the current plant conditions the crew would transition to ____(2)____.

A. (1) Two
(2) AOP-033, SHUTDOWN LOCA

B. (1) Two
(2) EOP-E-0, REACTOR TRIP OR SAFETY INJECTION

C. (1) Three
(2) AOP-033, SHUTDOWN LOCA

D. (1) Three
(2) EOP-E-0, REACTOR TRIP OR SAFETY INJECTION

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to AOP-016 (p4-6; Rev 23) Steps 6-11, the operator will attempt to start two Charging Pumps, if available, and establish maximum charging flow. Also according to AOP-016 (p6-7; Rev 23) Steps 15-16 and 18-19, the operator will check Pzr level lowering with maximum charging flow, and if so, check RCS pressure and temperature to select a recover procedure. Since RCS pressure is less than 1000 psig, the status of the SI Accumulators must be checked. Since the SI Accumulators are isolated, the crew will transition to AOP-033.

Answer B Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the crew will transition to AOP-033. This is plausible because if the SI Accumulators were unisolated, or pressure were greater than 1000 psig, the transition would be made to EOP-E-0.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because only two charging pumps will be started in the initial steps (prior to transition to AOP-033) of AOP-016. This is plausible because if the crew directly entered AOP-033 and bypassed entry into AOP-016, the crew would be directed to start all three Charging Pumps if available.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of abnormal condition procedures such as the number of Charging Pumps started in AOP-016 and the entry conditions for AOP-033.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and use this information to select the correct mitigation procedure, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
AOP-016 (p4-7; Rev 23) 10 CFR 55.41.10	

GEN2.4 2.4.11 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Knowledge of abnormal condition procedures. (CFR: 41.10 / 43.5 / 45.13)

Remarks/Status

7/20/15 new question developed.

9/8/15 Reviewed by Exam Supervisor, with editorial comment, in stem change "shutdown" to "cooldown"

9/10/15 OPS SRO reviewed the question and recommended changing the stem to have RCS Temp at 340 degrees.

9/11/15 exam team made changes as proposed.

11/29/15 AOM-Shift recommended changes in conditions to be more realistic. Temp 430F and pressure 725 psig

11/29/15 AOM-SHIFT approved question for 60 day submittal.

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D

GEN2.4 2.4.25 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Knowledge of fire protection procedures. (CFR: 41.10 / 43.5 / 45.13)

Given the following:

- The plant is at 100% power
- The Control Room receives a confirmed report of a fire in the Unit 2 Cable Spread Room (Fire Zone 19) at 0730

Which ONE of the following correctly completes the statements below?

(1) IAW AOP-041, RESPONSE TO FIRE EVENT, the operator must ____(1)____.

(2) The LATEST time that this action may be complete is ____(2)____.

A. (1) close both Pressurizer PORV Block Valves (RC-535 and RC-536), ONLY
(2) 0740

B. (1) close both Pressurizer PORV Block Valves (RC-535 and RC-536), ONLY
(2) 0745

C. (1) close both Pressurizer PORV Block Valves (RC-535 and RC-536) AND place the PCV-455C and 456 Isolate Switches to the ISOLATE position
(2) 0745

D. (3) close both Pressurizer PORV Block Valves (RC-535 and RC-536) AND place the PCV-455C and 456 Isolate Switches to the ISOLATE position
(4) 0740

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D

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the Pzr PORV Block valves must be closed as well. This is plausible because according to the AOP-041 Background Document the PZR PORV block valves are closed based on defense in depth; and the operator may incorrectly believe that it is only needed to isolate the PORV circuits.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and C.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because 0740 is the LATEST time that this action may be complete and still meet the requirements of the NOTE prior to Step 3. This is plausible because the operator may incorrectly confuse Time Critical Tasks completion times with 15 minutes, rather than 10 minutes. (restoring RCP seal cooling or isolate seals before restoration of charging if 15 min elapsed)

Answer D Discussion

Correct. 1st part correct, 2nd part correct. According to AOP-041 (p4 of 28; Rev 7) Step 3&4, if there is a confirmed fire in Fire Zone 19 the operator is directed to Place the PCV-455C and 456 Isolate Switches to the ISOLATE position AND close both Pressurizer PORV Block valves (RC-535 and RC-536) within 10 minutes.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of the actions contained within the fire protection procedures (AOP-041).

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and use this information to predict an outcome, in order to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
AOP-041 (p4 of 28; Rev 7) 10 CFR 55.41.10	

GEN2.4 2.4.25 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Knowledge of fire protection procedures. (CFR: 41.10 / 43.5 / 45.13)

Remarks/Status

7/16/15 new question developed.

9/8/15 Reviewed by Exam Supervisor, UNSAT, based on K/A not met, question is asked on an AOP, not a Fire Protection Procedure.

9/11/15 exam team discussed with the exam supervisor that the question is asked on a procedure that mitigates a fire, and believes the KA is matched. Question unchanged at this time.

11/5/15 discussed with NRC chief examiner as one of the early submission items. He recommended a number of things that should apply throughout the exam. 1st, whenever possible, state IAW a procedure. 2nd, if something is the same in all four of the answer choices, move it to the stem and reword the question to a "required/not required" format for the other answer part.

11/9/15 added IAW a procedure as per the chief examiners comments. The answer and distractor choices need to remain as is, since the two part is an action, and a time required to complete it. If we take the first part, that is common to all answer choices out, then it cues the candidate that the action must be done, in order for there to be a time to complete it.

11/29/15 AOM-SHIFT approved question for 60 day submittal.

GEN2.4 2.4.31 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Knowledge of annunciator alarms, indications, or response procedures. (CFR: 41.10 / 45.3)

Given the following:

- The plant has tripped from 100% power
- The crew has entered EOP-E-0, REACTOR TRIP OR SAFETY INJECTION
- The BOP is verifying automatic safety injection actuation

IAW Attachment 1, AUTO ACTION VERIFICATION, which ONE of the following identifies two RTGB Annunciators whose status is required to be checked?

A. APP-001-C1, RCP THERM BAR COOL WTR HI FLOW; and
APP-002-F7, INSTR AIR HDR LO PRESS

B. APP-001-C1, RCP THERM BAR COOL WTR HI FLOW; and
APP-008-F7, SOUTH SW HDR LO PRESS

C. APP-036-D2, BATT CHARGER B/B-1 TROUBLE; and
APP-002-F7, INSTR AIR HDR LO PRESS

D. APP-036-D2, BATT CHARGER B/B-1 TROUBLE; and
APP-008-F7, SOUTH SW HDR LO PRESS

ILC15 RNP SRO NRC Examination QUESTION 75

75

D

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because APP-001-C1 is not checked as part of Attachment 1. This is plausible because it is checked in the body of EOP-E-0, at Step 10, as one of two means to check RCP Seal Cooling.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because APP-002-F7 is not checked as part of Attachment 1. This is plausible because it is checked in the body of EOP-E-0, at Step 25, when restoring Instrument Air to containment.

Answer D Discussion

Correct. 1st part correct, 2nd part correct. According to Attachment 1 of EOP-E-0 (p33; Rev 6) Step 15, the operator is directed to check APP-036-D2, BATT CHARGER B/B-1 TROUBLE extinguished as a means to check the Battery Chargers are energized. According to Attachment 1 of EOP-E-0 (p30; Rev 6) Step 7.c, the operator is directed to check APP-008-F7, SOUTH SW HDR LO PRESS extinguished as a means to check the proper operation of the service water system.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of annunciator alarms use in the EOPs, specifically the annunciators used in EOP-E-0.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall bits of information to answer the question correctly.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References
EOP-E-0 (p30 and 33; Rev 6) 10 CFR 55.41.10

Student References Provided

GEN2.4 2.4.31 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Knowledge of annunciator alarms, indications, or response procedures. (CFR: 41.10 / 45.3)

Remarks/Status

7/16/15 modified bank question 022 AA2.03

9/8/15 Reviewed by Exam Supervisor, UNSAT, question does not need to be this difficult to satisfy a generic K/A.

9/14/15 new question developed to better meet the KA. Exam team, Supervisor and OPS SRO concur on changes.

11/17/15 Fleet review determined that we did not write a question that met the KA, as it did not apply to the Emergency plan or procedures. The exam team wrote a new question to meet the KA.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

EPE029 EA2.06 - Anticipated Transient Without Scram (ATWS)
Ability to determine or interpret the following as they apply to a ATWS : (CFR 43.5 / 45.13)
Main turbine trip switch position indication ....

Given the following:

- With the plant at 100% power a Feedwater Isolation Signal occurs
- Safety Injection actuates
- The crew is implementing FRP-S.1, RESPONSE TO NUCLEAR GENERATION-ATWS, due to a failure of the reactor to trip.

Which ONE of the following correctly completes the statement below?

IAW the FRP-S.1 basis document, the Turbine Stop Valves must be CLOSED within ____(1)____ of event initiation in order to ____(2)____.

A. (1) 30 seconds
(2) allow plant heatup to add negative reactivity

B. (1) 30 seconds
(2) maintain S/G inventory

C. (1) 60 seconds
(2) maintain S/G inventory

D. (1) 60 seconds
(2) allow plant heatup to add negative reactivity

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the verification of auto SI response cannot occur prior to Steps 3-5 of FRP-S.1 which mitigate the consequences of the ATWS, the more significant challenge. This is plausible because FRP-S.1 is designed to check the auto SI response within the confines of the procedure, and the operator may think that these actions may be taken anytime that the operator is NOT performing Immediate Actions.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to FRP-S.1-BD (p9 of 44; Rev 22) the turbine is tripped to prevent an uncontrolled cooldown of the RCS due to steam flow that the turbine would require. For an ATWS event where a loss of normal feedwater has occurred, analyses have shown that a turbine trip is necessary (within 30 seconds) to maintain S/G inventory. According to FRP-S.1-BD (p15 of 44; Rev 22) it is possible to make a transition to this procedure without having performed the verification of automatic SI actions in EOP‑E‑0. This verification is started after Steps 1 through 5 of FRP‑S.1 since the first five steps deal directly with ATWS mitigation while the EOP‑E‑0 actions deal with system alignment for design basis events. According to a Note prior to Step 1 of FRP-S.1 (p3&6 of 30; Rev 22), Steps 1 and 2 are IMMEDIATE ACTION steps. The SI verification is NOT implemented until Step 6, and should not be performed during the performance of steps 3-5 of FRP-S.1.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the Main Turbine must be tripped during the LOF ATWS event within 30 seconds. This is plausible because it is a short time period and a reasonable time period in which a BOP could take the action.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and C.

Basis for meeting the KA

NOTE: The facility does not have a main turbine trip switch position indication. Rather the turbine is tripped manually by the operator using a single pushbutton, and then monitoring the Turbine Stop/Governor Valve position indication to determine whether or not the Turbine is tripped. The KA is matched because the operator must demonstrate the ability to identify indications of a Turbine Trip within the proper time frame on a Loss-of-Feedwater ATWS.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must demonstrate an understanding of when an automatic response Attachment can be performed within FRP-S.1, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because the 2nd part of the question cannot be answered solely by knowing system knowledge, immediate operator actions, plant parameters that require direct entry into EOPs, or knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure; AND requires the operator to demonstrate knowledge of when to implement attachments including how to coordinate these items with procedure steps.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

FRP-S.1-BD (p9&15 of 44; Rev 22)
FRP-S.1 (p3&6 of 30; Rev 22)
10 CFR 55.43.5

Student References Provided

EPE029 EA2.06 - Anticipated Transient Without Scram (ATWS)
Ability to determine or interpret the following as they apply to a ATWS : (CFR 43.5 / 45.13)
Main turbine trip switch position indication ....

Remarks/Status

8/25/15 new question developed.

9/8/15 reviewed by Exam Supervisor, SAT

9/9/15 Fleet NRC exam writter reviewed question and specified that we could be skirting the KA and have 2 unrelated (a "tack-on") questions in our 2 part. Recommended we ask for relief on this KA based on KA statement and the equipment at RNP. (Push button vs. turbine trip switch)

9/11/15 per phone conversation with the NRC Chief Examiner, he requested that we send him the question to look over and analyze our concerns with trying to meet this KA at the SRO level and the equipment differences with respect to the KA statement.

9/14/15 per phone con with the NRC Chief Examiner, the exam team and the NRC agreed on proposed changes as follows. 1) the NRC Chief Examiner did think that our 2nd part was indeed a tack on, and that we should change it to information out of the WOG basis document, as he stated that it would be considered SRO only required knowledge. Recommended contrasting S/G inventory with allow plant HU to insert negative reactivity for the reasons for the time limit in part one of the question, from the basis document.; 2) NRC Chief Examiner agreed that the plant equipment here would be fine to meet the KA.
All agreed that the tie of both parts of the question to the same specific step statement of the basis document makes for a better question.

11/29/15 AOM-SHIFT approved question for 60 day submittal.

EPE038 2.4.47 - Steam Generator Tube Rupture (SGTR)
EPE038 GENERIC
Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. (CFR: 41.10 / 43.5 / 45.12)

Given the following:

- The crew is in EOP-E-3, STEAM GENERATOR TUBE RUPTURE, has completed tube rupture mitigation in the "C" S/G and is now selecting a recovery procedure
- Letdown is in service
- The RCPS are NOT available
- The Main Condenser is NOT available
- The Shift Manager has indicated that:
  - The recovery procedure should minimize radiation release
  - The potentiality for voiding in the RCS must be avoided during the recovery
  - Time is not a factor during the recovery

The following indications are observed:
- S/G "C" level is 86% and rising
- PZR level is 67% and stable

Which ONE of the following correctly completes the statement below?

Based on the current plant conditions the CRS will direct the crew to ____(1)____, and select ____(2)____ as the recovery procedure.

REFERENCES PROVIDED

A. (1) reduce charging flow, ONLY
(2) EOP-ES-3.2, POST−SGTR COOLDOWN USING BLOWDOWN

B. (1) reduce charging flow, ONLY
(2) EOP-ES-3.3, POST−SGTR COOLDOWN USING STEAM DUMP

C. (1) reduce charging flow and initiate aux spray to lower RCS pressure
(2) EOP-ES-3.2, POST−SGTR COOLDOWN USING BLOWDOWN

D. (1) reduce charging flow and initiate aux spray to lower RCS pressure
(2) EOP-ES-3.3, POST−SGTR COOLDOWN USING STEAM DUMP

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the E-3 Table designed to minimize RCS-to-S/G leakage during a SGTR requires that both charging flow be reduced and Aux Spray be initiated. This is plausible because if Pzr level were > 73% this would be correct.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to EOP-E-3-BD (p88-89; Rev 7) Step 31, both the pressurizer and ruptured steam generator inventories must be taken into account to minimize RCS to secondary leakage. The operator must continuously adjust RCS pressure and charging flow to control pressurizer and ruptured steam generator inventories. This step provides guidance for performing these actions in the form of a table. In general, steam generator level provides a more direct and more accurate indication of leakage between the primary and secondary than RCS and steam generator pressure indications. While instrument inaccuracies may lead to some primary to secondary leakage, such leakage will be contained provided RCS and ruptured steam generator pressures are maintained below the steam generator steam line PORV setpoint pressure. Based on this, according to EOP-E-3 (p32&47 of 52; Rev 7) the operator will determine that based on Ruptured S/G and Pzr levels, the operator will reduce charging flow and initiate Aux Spray to lower RCS pressure. According to EOP-E-3- BD (p129 of 147; Rev 7), each of the alternate methods have their advantages and limitations. In general, post-SGTR cooldown using backfill is the preferred method since it minimizes radiological releases and facilitates processing of contaminated primary coolant. However, this process will be slow, particularly if no RCP is running. In addition, the chemistry of the secondary side water should be considered with respect to potential boron dilution and adverse effects on primary system components prior to initiating backflow of secondary side fluid. The S/G blowdown method also minimizes radiological releases. In addition, boron dilution and adverse secondary side water chemistry effects are eliminated. However, the storage and processing capabilities of the blowdown system are limited, and, similar to the backfill method, RCS depressurization is likely to proceed slowly. The third alternate method requires steam release from the ruptured steam generator. This method provides the fastest means of depressurizing the RCS which may be important particularly if feedwater supply is limited. However, the radiological consequences must be considered particularly if steam dump to condenser is unavailable. In addition, if water exists in the steamline, steam release may cause water hammer effects resulting in damage to secondary side equipment. Consequently, this method should not be used if water may exist in the main steamlines. With this in mind, EOP-ES-3.2 is correct choice.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because ES-3.3 cannot be used under the stated conditions (The recovery procedure should minimize radiation release, The Main Condenser is NOT available, Time is not a factor during the recovery). This is plausible because this procedure of one of three potential recovery procedures (limited to two by question design) that will be implemented based on plant conditions.

Basis for meeting the KA

The KA is matched because the operator must demonstrate ability to recognize the trends (Ruptured S/G level is rising) during SGTR and use control room references and take the appropriate action.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must use a Table correctly to determine action to take, and consider advantages and disadvantages of specific recovery procedures and select between two, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing system knowledge, immediate operator actions, plant parameters that require direct entry into EOPs, or knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure; AND requires the operator to assess plant conditions and then select a procedure or section of a procedure to mitigate, recover, or with which to proceed. (i.e. select between EOP-ES-3.2 and EOP-ES-3.3)

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References	Student References Provided
EOP-E-3-BD (p88-89 &129 of 147; Rev 7) EOP-E-3 (p32&47 of 52; Rev 7) 10 CFR 55.43.5	EOP-E-3 Handout 3

EPE038 2.4.47 - Steam Generator Tube Rupture (SGTR)
EPE038 GENERIC

ILC15 RNP SRO NRC Examination QUESTION 77

77 **C**

Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. (CFR: 41.10 / 43.5 / 45.12)

Remarks/Status
8/26/15 new question developed. 9/8/15 reviewed by Exam Supervisor, SAT 9/9/15 reviewed by Fleet NRC Exam writer, commented that the SRO only statement loses it usefulness if we don't make more of an effort to modify them and make them more specific to the question that we are justifying. 9/15/15 Handout was listed below as the reference provided, as it was previously omitted. 11/29/15 AOM-SHIFT approved question for 60 day submittal.

APE054 2.4.9 - Loss of Main Feedwater (MFW)
APE054 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:

- The plant is at 5%, when a plant transient occurs, resulting in the running MFW pump tripping
- Containment Pressure is 6 psig
- No AFW pumps are running nor can they be started from the RTGB
- S/G WR levels:
  - "A" S/G: 9%
  - "B" S/G: 15%
  - "C" S/G: 17%

IAW FRP-H.1, which ONE of the following correctly completes the statements below?

1) RCS bleed and feed is ____(1)____.

2) The CRS will direct the crew to ____(2)____.

A. (1) required
(2) initiate SI and open both PZR PORVs

B. (1) required
(2) initiate SI, open all RCS vent valves

C. (1) NOT required
(2) attempt to start the AFW pumps locally

D. (1) NOT required
(2) depressurize the S/Gs to inject Condensate flow

General Discussion

Answer A Discussion

Correct. According to FRP-H.1 (p 3; Rev 29) Step 2, CHECK if RCS Bleed AND Feed is required: a. CHECK S/G Wide Range level in ANY Two S/Gs - Less than 13% [16%]. Given containment pressure greater than 4 psig, adverse values are used. "A" and "B" S/Gs WR levels are both less than 16% and therefore RCS Bleed and Feed is initiated by initiating SI and opening both PORVs IAW FRP-H.1 Steps 12 - 15.

Answer B Discussion

Incorrect. This is incorrect because the RCS vent valves are not required to be open as the bleed path. This is plausible because the RCS vent valves would be opened as a bleed path if either PORV flow path could not be established.

Answer C Discussion

Incorrect. This is incorrect because the conditions exist requiring RCS Bleed and Feed. This is plausible because if adverse containment conditions did not exist RCS Bleed and Feed conditions would not be met and efforts are continued to restore feedwater not to interfere with commencing RCS Bleed and Feed.

Answer D Discussion

Incorrect. This is incorrect because the conditions exist requiring RCS Bleed and Feed. This is plausible because if adverse containment conditions did not exist RCS Bleed and Feed conditions would not be met and efforts are continued to restore feedwater not to interfere with commencing RCS Bleed and Feed. Depressurizing the S/Gs to inject Condensate flow is a method of restoring feedwater flow.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the mitigation strategy for a loss of feedwater flow during a SBLOCA at low power.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must analyze given plant conditions to determine the correct mitigation strategy, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing system knowledge, immediate operator actions, plant parameters that require direct entry into EOPs, or knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure; AND requires the operator to assess plant conditions and then select a section of a procedure to mitigate, recover, or with which to proceed.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	FRP-H.1-001 2

Development References

FRP-H.1 Rev. 29
OMM-022 Rev. 45
10 CFR 55.43.5

Student References Provided

APE054 2.4.9 - Loss of Main Feedwater (MFW)
APE054 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)

Remarks/Status

8/25/15 used bank question FRP-H.1-001 2

9/8/15 reviewed by Exam Supervisor, SAT

9/9/15 reviewed by Fleet NRC Exam writer, was concerned that the Bleed and Feed was on a Foldout page. There is no Foldout page in the FRP and should not be an issue.

9/15/15 distractor B may have a subset issue with the A answer. Corrected by adding only to the A(2) answer choice.

11/29/15 AOM-SHIFT approved question for 60 day submittal.

EPE055 EA2.06 - Loss of Offsite and Onsite Power (Station Blackout)
Ability to determine or interpret the following as they apply to a Station Blackout : (CFR 43.5 / 45.13)
Faults and lockouts that must be cleared prior to re- energizing buses .....

Given the following:

- A Station Blackout has occurred from 100% power
- The crew is performing actions of EOP-ECA-0.0, LOSS OF ALL AC POWER
- Immediate actions are complete
- Offsite power is available to re-energize the SUT
- APP-009-B5, MAIN TRANSF FAULT TRIP, alarm is ILLUMINATED.

Subsequently:

- 480V Bus E-1 is restored with EDG "A"
- Containment pressure is 0.5 psig
- RCS Subcooling is 15°F and stable
- Pressurizer level is 19% and stable
- No Safety Injection equipment has automatically started or re-positioned

EOP-ECA-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED
EOP-ECA-0.2, , LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED
86P, GENERATOR LOCKOUT RELAY, PRIMARY
86BU, GENERATOR LOCKOUT RELAY, BACKUP

Which ONE of the following correctly completes the statements below?

1) APP-009-B5 is an indication that the ____(1)____ lockout is tripped.

2) IAW ECA-0.0, the CRS will transition to ____(2)____.

A. (1) 86P
(2) EOP-ECA-0.1

B. (1) 86P
(2) EOP-ECA-0.2

C. (1) 86BU
(2) EOP-ECA-0.1

D. (1) 86BU
(2) EOP-ECA-0.2

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because transition to EOP-ECA-0.2 is required when RCS Subcooling is < 18°F. This is plausible because the operator may not know the criteria requiring transition to ECA-0.2.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to EOP-ECA-0.0 (p53; Rev 4) Step 39, after electrical power is restored to an ESF Bus, the operator is directed to select between one of two recovery based on plant conditions. If (1) RCS Subcooling based on CETs is <18°F [37°F], (2) Pzr Level is < 14% [31%], or (3) the SI pumps have actuated on restoration of power, the operator will select EOP-ECA-0.2. If none of these conditions exist, the operator will select EOP-ECA-0.1. Since subcooling is < 18°F, the operator will select EOP-ECA-0.2. According to Attachment 1 of APP-009-B5 (p60 of 61; Rev 56) this alarm is indicative of the 86P operating. Consequently, the 86P must be reset.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because APP-009-B5 is indicative of the 86P operating. This is plausible because according to Attachment 1 of APP-009-B5 (p60 of 61; Rev 56) there are two alarms on APP-009 that would be indicative of the 86BU operation, if they were in alarm.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the Ability to determine or interpret faults and lockouts that must be cleared prior to re-energizing buses as they apply to a Station Blackout. This is accomplished by providing the operator with a specific alarm on APP-009, and requiring that they identify whether this alarm is indicative of the 86P or 86BU operating.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information (lockouts required to be reset based on Alarms, criteria in EOP-ECA-0.0 to select a recovery procedure), and then use the information to select a recovery procedure, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing system knowledge, immediate operator actions, plant parameters that require direct entry into EOPs, or knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure; AND requires the operator to Assess plant conditions and then select a procedure to mitigate, recover, or with which to proceed.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	055 EA2.06 SRO 002

Development References

EOP-ECA-0.0 (p53; Rev 4)
APP-009-B5 (p60 of 61; Rev 56)
10 CFR 55.43.5

Student References Provided

EPE055 EA2.06 - Loss of Offsite and Onsite Power (Station Blackout)

Ability to determine or interpret the following as they apply to a Station Blackout : (CFR 43.5 / 45.13)

Faults and lockouts that must be cleared prior to re- energizing buses .....

Remarks/Status

8/25/15 used bank question 2013 NRC exam

9/8/15 reviewed by Exam Supervisor, SAT

9/9/15 reviewed by Fleet NRC exam writter. Recommended keeping the procedure with the number instead of leaving orphaned numerals in our answer choices. Incorporated the change.

9/15/15 reviewed by OPS SRO, commented that we may be expecting the operators to memorize the generator lockouts with this question.

9/22/15 exam team review, dicussed second part of question. Can the second part of the question be asked such that we are asking if the main generator lockout relay needs to be reset prior to restoring power?

12/1/15 exam team revised to another bank question found that meets the KA.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

APE058 2.2.22 - Loss of DC Power
APE058 GENERIC
Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2)

Given the following:

- The plant tripped from 100% power when the "B" DC Bus de-energized.
- EPP-27, LOSS OF DC BUS "B", has been entered.
- The “B” battery and the in-service battery charger are determined to be damaged.

Which ONE of the following completes the statements below?

1) Generator Output Breakers OCBs 52/8 AND 52/9 ____(1)____.

Within four hours of the failure:
- The plant is at normal operating temperature and pressure
- The standby battery charger is aligned to energize DC Bus “B” to nominal voltage, while repair efforts continue

2) IAW Technical Specification 3.8, Electrical Power Systems, operability of DC Bus "B" ____(2)____ restored.

A. (1) must be tripped locally
(2) is

B. (1) must be tripped locally
(2) is NOT

C. (1) will trip on Generator Lockout
(2) is

D. (1) will trip on Generator Lockout
(2) is NOT

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because both the Battery and the Charger must be OPERABLE, and the battery damage has NOT been repaired. This is plausible because in Modes 5 & 6, only the battery or the Charger is required to be OPERABLE. In other words, if the plant were in Mode 5, this would be correct.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to EPP-27 (p3 of 30; Rev 18) Step 2, the operator will be required to notify the Load dispatcher that the Switchyard OCBs 52/8 and 52/9 have failed to trip, and to dispatch a maintenance crew to open these breakers because they have no control power to open. According to Tech Spec LCO 3.8.4 Basis (p3.8.40; Rev 0), an OPERABLE DC electrical power subsystem requires the battery and one of the two associated chargers to be operating and connected to the associated DC bus(es). Since the damaged battery has not been restored the "B" DC Train is inoperable.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the OCBs lost control power when "B" DC Bus de-energized. This is plausible because the operator may incorrectly believe that the control power for the OCBs comes from the "A" DC Bus.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to determine and interpret LCO 3.8.4 and 3.8.5 as they apply to the Loss of DC Power.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information, and use this information to predict an outcome, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing ≤ 1 hour TS/TRM action statements, the LCO information listed “above the line,” or by knowing the TS Safety Limits; AND requires the operator to demonstrate knowledge of the TS basis that is required to analyze TS required actions and terminology (i.e. definition of an OPERABLE DC electrical power subsystem in Modes 1-4).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	

Development References

EPP-27 (p3 of 30; Rev 18)
Tech Spec LCO 3.8.4 Basis (p3.8.40; Rev 0)
10 CFR 55.43.2

Student References Provided

APE058 2.2.22 - Loss of DC Power
APE058 GENERIC
Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2)

Remarks/Status

8/25/15 used bank question

9/8/15 reviewed by Exam Supervisor, SAT

9/9/15 reviewed by Fleet NRC exam writer, and comment that this looks like the two parts of this question may not be tied closely enough to each other.

9/15/15 OPS SRO reviewed and commented that perhaps the words "NORMAL OPERATING TEMPERATURE AND PRESSURE" might be better in bold. Exam team determined that it should not be necessary, but will look for validator comments on issues like these.

9/22/15 exam team discussed possibly bolding the AND in the third bullet of the given the following statement.

11/29/15 AOM-SHIFT approved question for 60 day submittal.

APE077 AA2.03 - Generator Voltage and Electric Grid Disturbances

Ability to determine and interpret the following as they apply to Generator Voltage and Electric Grid Disturbances: (CFR: 41.5 and 43.5 / 45.5, 45.7, and 45.8)

Generator current outside the capability curve............................

Given the following:

- The plant is operating at 100% power
- The "A" Emergency Diesel Generator is paralleled to Bus E-1 for periodic surveillance

Subsequently:

- The Load Dispatcher notifies the Shift Manager of a low frequency condition on the Grid
- The crew entered AOP-026, GRID INSTABILITY, and stabilized power at 98.5%
- The following conditions exist 1 minute after the load reduction:
  - Main Generator Frequency: 59.6 Hz and Stable
  - GEN Phase "A" and "B" Volts: 22 KV and Stable
  - GEN Phase "C" amps: 21.9 KA and Stable

Which ONE of the following correctly completes the statement below?

1) IAW AOP-026, the Generator output is ____(1)____.

2) Based on plant conditions, the CRS will direct ____(2)____.

REFERENCES PROVIDED

A. (1) acceptable
(2) a shutdown of the "A" Emergency Diesel Generator

B. (1) unacceptable
(2) a shutdown of the "A" Emergency Diesel Generator

C. (1) acceptable
(2) operators to align both the "A" and "B" Emergency Diesel Generators to power Bus E-1 and E-2 independent of 4160V Bus 2 and Bus 3

D. (1) unacceptable
(2) operators to align both the "A" and "B" Emergency Diesel Generators to power Bus E-1 and E-2 independent of 4160V Bus 2 and Bus 3

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to AOP-026 (p14; Rev 15) Step 46, the operator will be directed to MAINTAIN Main Generator Output As Follows: (1)Within the limits of the Main Generator Capability Curve 7.3, (2) AND Within the limits of Attachment 1, Maximum Generator MVA Output vs System Frequency, and (3) AND As recommended by the Load Dispatcher. Using Attachment 1, the operator will be required to calculate MVA as follows: MVA=1.73(GEN Phase A and B Volts)(GEN Phase C Amps). From given values, MVA = 833.514, which is in the acceptable region of the Curve with a given Frequency of 59.6 Hz. According to AOP-026-BD (p4 of 12; Rev 15A) no attempt is made to place the EDGs in service during a period of grid instability, unless the procedure was entered due to a single-phase open circuit condition. According to AOP-026 (p6 of 23; Rev 15) Step 8&9, if the EDG is paralleled to the Grid in a low frequency situation on the Grid, the EDG will be shutdown.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the Generator Output 1 minute after load reduction is acceptable. This is plausible because the operator may calculate the MVA incorrectly, or use Attachment 1 incorrectly.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the EDGs are not aligned to power the E-Buses during a low frequency condition on the electrical grid. This is plausible because the EDGs are aligned to power the E-Buses during a single-phase open circuit condition on the electrical grid.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Ability to determine that Generator current is either inside or outside the capability curve as it applies to Generator current.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and then use this information to predict an outcome, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing system knowledge, immediate operator actions, plant parameters that require direct entry into EOPs, or knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure; AND requires the operator to assess plant conditions and then select a section of a procedure to mitigate, recover, or with which to proceed (i.e. Actions taken with EDGs in low Grid frequency condition).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	MODIFIED	077 AA2.08

Development References

AOP-026 (p6 & 14; Rev 15)
AOP-026-BD (p4 of 12; Rev 15A)
10 CFR 55.43.5

Student References Provided

Attachment 1 of AOP-026

APE077 AA2.03 - Generator Voltage and Electric Grid Disturbances

Ability to determine and interpret the following as they apply to Generator Voltage and Electric Grid Disturbances: (CFR: 41.5 and 43.5 / 45.5, 45.7, and 45.8)

Generator current outside the capability curve............................

Remarks/Status

9/9/15 modified bank question 077 AA2.08

9/15/15 Fleet NRC exam writer reviewed the question and commented that this was a stretch KA meet. His concern is with the bullet in the stem that the load dispatcher is making the operability determination for you. The exam team discussed providing E-bus voltages in the stem to strengthen the plausibilty of the OPERABLE choice.

9/21/15 exam team used the simulator to verify the E bus voltages to add them to the stem for plausibility.

11/5/15 discussed with NRC chief examiner as one of the early submittal questions. He stated that the last bullet provides a direct cue that the qualified offsite circuit is INOPERABLE (inadequate voltage for a design basis event). This makes LOD = 1. and the question UNSAT.

11/9/15 question revised to improve the SRO only aspect.

11/29/15 AOM-SHIFT approved question for 60 day submittal.

APE001 AA2.02 - Continuous Rod Withdrawal
Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal : (CFR: 43.5 / 45.13)
Position of emergency boration valve ....

Given the following:

- The plant was at 17% power with power being raised IAW GP-005, POWER OPERATION
- The Control Bank "D" rods continued to withdraw after the RO released the rod drive switch
- At 14:40 the crew has completed immediate actions and is implementing FRP-S.1, RESPONSE TO NUCLEAR POWER GENERATION – ATWS

Which ONE of the following correctly completes the statements below?

1) FRP-S.1 directs alignment of the emergency boration flow path by ____(1)____, then starting the Boric Acid pump aligned for BLEND.

After emergency boration is commenced the following conditions exist:
- Power is in the Intermediate Range with a negative Startup Rate
- Control rods H-8, D-6 and K-14 are stuck out, all other rods indicate on the bottom
- The STA is performing a Manual Determination of Shutdown Margin Boron concentration, and is not yet complete

Subsequently:

15:00 Control Rod D-6 drops fully into the core
15:15 Chemistry reports the RCS boron concentration is 1975 ppm

2) The EARLIEST time that the crew can stop the emergency boration is ____(2)____ .

MOV-350, BA TO CHARGING PMP SUCT
FCV-113A, BA TO BLENDER
FCV-113B, BLENDED MU TO CHG SUCT

A. (1) opening MOV-350
(2) 15:00

B. (1) opening FCV-113A and FCV-113B
(2) 15:00

C. (1) opening MOV-350
(2) 15:15

D. (1) opening FCV-113A and FCV-113B
(2) 15:15

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General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because there is more than one control rod stuck out of the core. This is plausible because the operator may incorrectly believe that the criteria for terminating the emergency boration is a negative SUR with no more than two rods stuck out of the core.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A & D.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to FRP-S.1 (p 5; Rev 22) Step 4.b, ALIGN Boration Flow Path:
1) OPEN MOV-350, BA TO CHARGING PMP SUCT.
2) START Boric Acid Pump ALIGNED for BLEND.
According to FRP-S.1 (p 7&14; Rev 22) Step 8, CHECK if Reactor is Subcritical:
a. Power Range channels - LESS THAN 5 %
b. Intermediate Range channels - NEGATIVE STARTUP RATE
c. OBSERVE CAUTION prior to Step 18 and GO TO Step 18
From the given conditions for part two the operator will proceed to the caution before Step 18 and goes to step 18 which states, CHECK ARPI - Less than two Rods stuck out. From given information two control rods are stuck out therefore, the operator will implement caution before step 18 and Step 18 RNO b. CONTINUE RCS boration to achieve one of the following targets:
- RCS Boron, as determined by FMP-012, Manual Determination of Shutdown Margin Boron Concentration
OR
- RCS Boron is greater than or equal to 1950 ppm
OR
- No more than ONE rod is stuck out of the core
c. WHEN one of the above targets is reached, THEN PERFORM Step 19 (Stops Boration).
GO TO Step 20 (Resets SPDS and exits procedure).

Answer D Discussion

Incorrect. 1st part wrong, 2nd part right. This is incorrect because FRP-S.1 directs opening MOV-350 to provide emergency boration flow path. This is plausible because opening FCV-113A and FCV-113B provide the normal RCS boration flowpath.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to determine and interpret the required position of the emergency boration valve MOV-350 for a continuous rod withdrawal event which required entry into FRP-S.1.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must analyze plant conditions to determine the correct procedure required actions related to securing RCS boration, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing system knowledge, immediate operator actions, plant parameters that require direct entry into EOPs, or knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure; AND requires the operator to demonstrate knowledge of diagnostic steps and decision points in the EOPs (i.e. when to stop emergency boration).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References	Student References Provided
FRP-S.1 Rev. 22 10 CFR 55.43.5	

APE001 AA2.02 - Continuous Rod Withdrawal
Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal : (CFR: 43.5 / 45.13)
Position of emergency boration valve ....

Remarks/Status

8/31/15 new question developed

9/8/15 reviewed by Exam Supervisor SAT

9/11/15 discussed with the NRC Chief Examiner that this was a difficult KA to meet at the SRO and he agreed to look at the question. Sent to him for review.

9/14/15 NRC Chief Examiner discussed via phone con that we aren't too far off on this one, but was concerned that we could have 2 correct answers, as the FRP could have you continue the boration in either the procedure or EOP.

9/17/15 question significantly edited to improve the second part of the question.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

APE051 2.4.35 - Loss of Condenser Vacuum
APE051 GENERIC
Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects. (CFR: 41.10 / 43.5 / 45.13)

Given the following:

- The plant at 25% power
- The crew enters AOP-012, PARTIAL LOSS OF CONDENSER VACUUM OR CIRCULATING WATER PUMP TRIP, due to a trip of the “A” Circulating Water Pump
- Condenser backpressure is approaching the Restricted Region of the Condenser Backpressure Limit Curve

Which ONE of the following correctly completes the statements below?

1) IAW AOP-012, it ____(1)____ expected that an AO will be dispatched to complete Attachment 1, Local Actions, during the mitigation of this event.

2) IAW AOP-012, the CRS ____(2)____.

A. (1) is
(2) will direct a reactor trip and go to EOP-E-0, REACTOR TRIP OR SAFETY INJECTION

B. (1) is
(2) will direct a turbine trip and go to AOP-007, TURBINE TRIP BELOW P-8

C. (1) is not
(2) will direct a turbine trip and go to AOP-007, TURBINE TRIP BELOW P-8

D. (1) is not
(2) will direct a reactor trip and go to EOP-E-0, REACTOR TRIP OR SAFETY INJECTION

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because it is not expected that the CRS will dispatch an AO to perform Attachment 1 in this path of the procedure. This is plausible because the CRS will dispatch an AO to perform Attachment 1 if the procedure was entered on degrading Condenser backpressure without a loss of a CW Pump.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and C.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because AOP-007 will not be used to mitigate the removal of the Turbine from service. This is plausible because for all other plant conditions in which the Turbine must be removed from service with Rx power level below P-8 (40%), AOP-007 will be used.

Answer D Discussion

Correct. 1st part correct, 2nd part correct. According to AOP-012-BD (p3 of 16; Rev 32) the procedure is divided up into two paths, one for trip of a running Circulating Pump and one for a loss of vacuum without a pump trip. Although trip of a running Circulating Pump will cause a degradation of vacuum, the events have been separated to simplify transitions within the procedure and avoid repetitive steps that are cause dependent. The first path in the procedure (Steps 1-21) address the loss of a running CW Pump, and will result in tripping the Rx, tripping the turbine and implementing AOP-007, or mitigating the event and returning to the procedure step in effect. The direction to dispatch an AO to perform Attachment 1 is NOT located within this path. According to Steps 9-10 of AOP-012 (p5 of 29, Rev 32) a continuous action step is provided to take action to remove the Turbine from service (Step 10) if the Condenser backpressure approaches the Restricted Region of the Condenser Backpressure Limit Curve. If Rx power is greater than 10% (P-7), the CRS will trip the reactor and go to EOP-E-0. If the Rx power is less than 10% (P-7), the CRS will trip the Turbine and go to AOP-007. This departs from the normal usage of these two procedures. According to AOP-012-BD (p6 of 16; Rev 32), to get to this step, the determination has been made that the turbine needs to be tripped. If reactor power is greater than 10% (P-7) the Reactor will be tripped and transition to EOP-E-0, Reactor Trip or Safety Injection. With power less than 10% the turbine will be tripped and reactor control will be accomplished using AOP-007, Turbine Trip Without Reactor Trip Below P-8. EC 63785 changed the setpoint for the Turbine Trip/Reactor Trip from 10 % to 40%; however, prudent plant operations will trip the reactor at power greater than 10% due to the potential for a loss of normal decay heat removal via the steam dumps. If only the turbine is tripped, this procedure is continued to restore vacuum to allow steam dump use.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of whether or not local auxiliary operator tasks per a procedure Attachment must be performed when rising Condenser Backpressure is caused by a CW Pump trip.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must demonstrate an understanding of how turbine is removed from service in AOP-012 (an abnormal use of an AOP), in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing system knowledge, immediate operator actions, plant parameters that require direct entry into EOPs, or knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure; AND requires the operator to assess plant conditions and then select a procedure or section of a procedure to mitigate, recover, or with which to proceed, and demonstrate knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps. Specifically, the operator must know that because of the entry and exit conditions for the AOP, Attachment 1 will NOT be directed to be implemented; and the procedure directs a unique or abnormal use of AOP-007.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

AOP-012-BD (p3 and 6 of 16; Rev 32)
AOP-012 (p5 of 29, Rev 32)
10 CFR 55.43.5

Student References Provided

APE051 2.4.35 - Loss of Condenser Vacuum
APE051 GENERIC
Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects. (CFR: 41.10 / 43.5 / 45.13)

Remarks/Status

8/25/15 new question developed.

9/8/15 reviewed by Exam Supervisor, UNSAT, as knowing the required actions of an AOP attachment from memory is not required

9/15/15 discussed with Exam supervisor that the first part of the question can be answered by knowing the Vacuum pump seal water tank level requirements and gland seal steam pressure limits, so it really is not memorization of the attachment steps.

11/5/15 discussed with NRC chief examiner as one of the 10 early submission items. Comments are as follows: The question is not SRO only. SRO only knowledge should not be claimed for major mitigative strategy or AOP entry conditions. See Attachment 2 of ES-401.
Also, based on the wording of step 12 of AOP-012, the note prior to step 12, and the AOP-038 entry conditions, it appears that the SRO could perform a rapid power reduction if desired.
With no indication of condenser backpressure value or trend, how is going to a rapid power reduction plausible?
The question is Unsatisfactory because it is not SRO only.
Based on a review of your procedures, this could be a very hard K/A to satisfy at the SRO only level. We can discuss randomly selecting another K/A. Following discussion, we decided to take another try at this KA to the SRO level.

11/9/15 new question developed.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

APE061 AA2.03 - 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)
Setpoints for alert and high alarms ....

Given the following:

- Core Alterations are on-going IAW GP-010, REFUELING
- R-2, CV Low Range, alarms (HIGH LED is LIT)

Which ONE of the following correctly completes the statement below?

1) To determine the current R-2 setpoint the operator will use ____(1)____.

2) If R-2 was subsequently determined to be inoperable, the refueling SRO ____(2)____.

A. (1) Section 3.1, Monitor Alarm Setpoint Determination, of the Offsite Dose Calculation Manual (ODCM)
(2) MUST suspended Core Alterations immediately

B. (1) the Setpoint Change and Log Record of OMM-014, Radiation Monitor Setpoints
(2) MUST suspended Core Alterations immediately

C. (1) the Setpoint Change and Log Record of OMM-014, Radiation Monitor Setpoints
(2) may continue Core Alterations, provided that continuous HP Technician coverage is provided

D. (1) Section 3.1, Monitor Alarm Setpoint Determination, of the Offsite Dose Calculation Manual (ODCM)
(2) may continue Core Alterations, provided that continuous HP Technician coverage is provided

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General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because while Section 3.1 of the ODCM will identify the process used to determine what the setpoint of R-2 should be, it will not indicate the setpoint, and/or whether or not the setpoint has changed, which is always a possibility. This is plausible because Section 3.1 of the ODCM identifies the process used to determine the setpoint for R-2; and the operator may incorrectly believe that it identifies what the setpoint should be.

Answer B Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because there is no requirement to suspend Core Alterations due to an inoperable R-2. This is plausible because immediate suspension of Core Alterations is a typical Technical Specification ACTION for inoperable equipment during Refueling.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to OMM-014 (p7 of 21; Rev 51) Step 8.1.1, a Setpoint Log and Change Record, Attachment 10.1, is provided for maintaining an up-to-date setpoint record for all listed Area Radiation Monitors, Process Radiation Monitors, Accident Radiation Monitors, and the RMS Recorder. The setpoints for all Monitors and RMS Recorder points listed in Attachment 10.1 shall be checked AND logged quarterly. A copy of the completed Attachment 10.1 shall be maintained in the Control Room. WHEN periodic changes, due to changing plant conditions, are required, THEN setpoint adjustments shall be performed IAW OP-920 AND each change shall be documented on Attachment 10.1 when the change is made. According to Section 8.2 of GP-010 (p26 of 88; Rev 87) Attachment 10.7, Shiftly Checks, shall be completed at the beginning of each shift (during Refueling). According to Section 8.2 of GP-010 (p77 of 88; Rev 87) Attachment 10.7, the operator is required to ENSURE that R-2 is OPERABLE OR that there is Continuous Health Physics Technician coverage and a Portable Area Radiation Monitor in the CV Area.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and B.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the Ability to determine the current setpoints for alert and high alarms as they apply to the Area Radiation Monitoring (ARM) System Alarms.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information, and in the 2nd part of the question use this information top predict an outcome, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it deals directly with Containment SRO (i.e. Refuel floor SRO) responsibilities during Refueling, which are not shared by the RO, specifically ensuring the proper equipment/requirements are met in order to continue Core Alterations.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

OMM-014 (p7 of 21; Rev 51)
GP-010 (p26&77 of 88; Rev 87)
10 CFR 55.43.6

Student References Provided

APE061 AA2.03 - 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)

Setpoints for alert and high alarms ....

Remarks/Status

8/27/15 new question developed.

9/8/15 reviewed by Exam Supervisor, with editorial comments, 1) Information regarding R-2 alarm not needed; 2) change "correct" to "current" in statement one of stem

9/9/15 Fleet NRC exam writer commented that the question requires only RO knowledge to eliminate the first two distractors. The exam team discussed that the knowledge is related to the SRO's position on the refueling team.

9/17/15 Exam team further improved 2nd question part, and the distractors to better relate this to the SRO's duties as a refueling team member.

10/8/15 exam team changed the A & D distracters to improve plausibility.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

WE06 2.1.23 - Degraded Core Cooling
WE06 GENERIC
Ability to perform specific system and integrated plant procedures during all modes of plant operation. (CFR: 41.10 / 43.5 / 45.2 / 45.6)

Given the following:

- A LOCA has occurred and NO ECCS Pumps are operating
- The crew is implementing FRP-C.2, RESPONSE TO DEGRADED CORE COOLING
- While depressurizing all intact S/G's they receive a RED condition on CSF-4, Integrity
- RCS pressure is 200 psig

Which ONE of the following identifies the required implementation of procedures for this event?

FRP-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK

A. Remain in FRP-C.2 until completed, THEN transition to FRP-P.1

B. Transition to FRP-P.1 and perform until completed, THEN transition to FRP-C.2

C. Transition to FRP-P.1 and return to FRP-C.2 at Step 2 when it is determined that RCS Integrity does not exist

D. Transition to FRP-P.1 and initiate a soak, THEN perform FRP-C.2 actions that do not cooldown or raise RCS pressure until the soak is complete

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85

A

General Discussion

Answer A Discussion

Correct. According to FRP-C.2 (p12 of 25; Rev 18), a Caution prior to Step 12 alerts the operator that FRP-C.2 should be completed BEFORE transitioning to FRP-P.1. Since FRP-C.2 is an ORANGE Path procedure and FRP-P.1 is associated with the RED condition, the rules of CSFST usage would require immediate addressing of FRP-P.1. However, this is a noted exception. According to FRP-C.2-BD (p21 of 42; Rev 18) once the RCS is cooled/depressurized in the next step to the point at which the accumulators inject, the RCS cold leg temperature could be reduced such that a transition to FRP‑P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION, is required via the RED path of Status Tree CSF‑4. The operator would stop the cooldown after entering FRP‑P.1. While the operator is allowing the thermal shock to soak out, the core will continue to boil away the injected accumulator water and begin to uncover once again. Eventually, core exit temperatures and/or RVLIS level values could exist which would require the operator to transfer to FRP‑C.1, RESPONSE TO INADEQUATE CORE COOLING, via one of the RED paths on Status Tree CSF‑2. Thus, by going from this procedure to FRP‑P.1 and stopping the cooldown and soaking, a degraded core cooling condition could be allowed to deteriorate to an inadequate core cooling condition. Therefore, this caution will require the operator to complete this procedure to ensure core cooling even if a RED path condition occurs in the Integrity Status Tree, CSF‑4.

Answer B Discussion

Incorrect. This is incorrect because the Caution in FRP-C.2 prevents the transition to FRP-P.1 under the stated conditions. This is plausible because if the Caution did not exist, by rule of usage, this would be correct.

Answer C Discussion

Incorrect. This is incorrect because the Caution in FRP-C.2 prevents the transition to FRP-P.1 under the stated conditions. This is plausible because in many larger break LOCA events, FRP-P.1 is entered and exited at Step 2 because RCS Integrity does not exist.

Answer D Discussion

Incorrect. This is incorrect because the Caution in FRP-C.2 prevents the transition to FRP-P.1 under the stated conditions. This is plausible because Step 25 of FRP-P.1 will permit transition to other procedures during the soak as long as the crew does not cooldown or raise pressure.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to perform integrated plant procedures FRP-C.2 and FRP-P.1 correctly as they are related to degraded core cooling. This is significant in that it is a known exception to the rules of usage.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must demonstrate an understanding of the caution in FRP-C.2, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing system knowledge, immediate operator actions, plant parameters that require direct entry into EOPs, or knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure; AND requires the operator to assess plant conditions and then select a procedure to mitigate, recover, or with which to proceed. This is accomplished by selecting an exception to the procedural rules of usage in the specific case of implementing FRP-C.2, an Orange condition procedure, when a higher priority Red condition becomes applicable.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	MODIFIED	G2.4.22 001

Development References

FRP-C.2 (p12 of 25; Rev 18)
FRP-C.2-BD (p21 of 42; Rev 1
10 CFR 55.43.5

Student References Provided

WE06 2.1.23 - Degraded Core Cooling
WE06 GENERIC
Ability to perform specific system and integrated plant procedures during all modes of plant operation. (CFR: 41.10 / 43.5 / 45.2 / 45.6)

Remarks/Status

8/25/15 new question developed.

9/8/15 Reviewed by Exam Supervisor, SAT

9/15/15 Fleet NRC exam writer discussed that the wording in the stem, where ever possible use the supervisor's position or name. The exam

team will incorporate this as appropriate.

9/22/15 exam team modified bank question G2.4.22 001

11/29/15 AOM-SHIFT approved question for 60 day submittal.

SYS012 A2.05 - 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)

Faulty or erratic operation of detectors and function generators ....

Given the following:

- The crew is performing a plant startup and has stabilized power at 8%
- The following timeline of events occurs:

0810	The LEVEL TRIP switch is in the BYPASS position for testing Intermediate Range Channel N-35
0820	Intermediate Range Channel N-36 indication became erratic, fluctuating between 2x10^{-5} amps and 2x10^{-7} amps
0830	The LEVEL TRIP switch is returned to NORMAL for Intermediate Range Channel N-35
1000	The SM directs that power be raised to 30%

Which ONE of the following correctly completes the statements below?

1) The EARLIEST time at which the CRS is required to suspend operations involving positive reactivity additions (except for minor boron changes associated with RCS inventory or temperature control) is ____(1)____.

2) The LATEST time at which Reactor power must be raised to greater than 10% to satisfy Technical Specifications is ____(2)____.

REFERENCE PROVIDED

A. (1) 0810
(2) 1020

B. (1) 0810
(2) 1030

C. (1) 0820
(2) 1020

D. (1) 0820
(2) 1030

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General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because positive reactivity additions must be suspended when two IR Channels are inoperable which is at 0820. This is plausible because the operator may incorrectly apply Condition G which becomes applicable at the N35 is in TEST.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to Table 3.3.1-1 of Tech Spec LCO 3.3.1 (p 3.3-13; Amendment 210) Function 3, Intermediate Range Neutron Flux, when >P-6 and <P-10, a minimum of two channels are required to be OPERABLE, and Conditions F and G are applicable. At 0810, IR N35 is inoperable due to testing and Condition F is required. At 0820, BOTH IR N35 and N36 are inoperable and Condition G is now required. Condition G states that the operator must Suspend operations involving positive reactivity additions Immediately. This is modified by a Note stating "Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed." Additionally, the CRS must reduce THERMAL Power to < P-6 within 2 hours. Therefore the earliest time that the operator must suspend all positive reactivity additions is when Both IR channels are inoperable at 0820. When N35 is removed from TEST at 0830, Condition G is no longer required to be completed, however, Condition F is, and Condition F requires the operator to either reduce THERMAL Power to < P-6 or > P-10 within 2 hours. Since the SM has decided to raise power to 30%, the CRS must be cognizant of the fact that Thermal Power must be greater than P-10 within the time that N36 became inoperable (0820).

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because Thermal Power must be raised to >P-10 (10%) in 2 hours (1020). This is plausible because the operator may incorrectly believe that F applies only when N35 is removed from TEST.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the Ability to (a) predict the impacts of 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 related to faulty or erratic operations of detectors. This is accomplished by the operator predicting the impact of having two Intermediate Range channels inoperable when power is between P-6 and P-10 and then applying Technical Specification requirements to mitigate the consequences of these malfunctions as it relates to erratic indications.

Basis for Hi Cog

The question is at the Comprehensive/Analysis cognitive level because the operator must recall bits of information and analyze this information by applying Technical Specifications LCO 3.3.1, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing ≤ 1 hour TS/TRM action statements, the LCO information listed "above the line," or by knowing the TS Safety Limits; AND requires the operator to apply the Required Actions in accordance with the rules of application (The operator needs to apply the action statement for LCO 3.3.1).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

Table 3.3.1-1 of Tech Spec LCO 3.3.1 (p 3.3-13; Amendment 210) Function 3
10 CFR 55.43.2

Student References Provided

Tech Spec LCO 3.3.1

SYS012 A2.05 - 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)

Faulty or erratic operation of detectors and function generators ....

Remarks/Status

9/2/15 new question developed

9/8/15 Reviewed by Exam Supervisor, UNSAT, as it does not meet the KA, does not reflect CHANNEL BYPASSING.

9/15/15 discussed with NRC Chief Examiner. The incorrect bypassing of a channel at RNP results in a plant trip in most cases. Trying to find an instrument that could be incorrectly bypassed, but not cause a trip, and then write a question to an SRO only level (most of these error scenarios would be RO knowledge) was very difficult and in the attempt that was made, could be tied back to a less than one hour tech spec, and thereby removing the SRO only plausibility. Replaced with 012 A2.05, randomly chosen by the Chief Examiner.

9/17/15 modified bank question NIS-012 8 for the new KA

9/30/15 new question was discussed with the NRC Chief Examiner. He believed there were plausibility issues with at least one of the distractors.

10/1/15 question has been updated, changed significantly, new question.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

SYS039 A2.03 - Main and Reheat Steam System (MRSS)

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

Indications and alarms for main steam and area radiation monitors (during SGTR) ....

Given the following initial plant conditions:

- The plant was at 100% power when a reactor trip and safety injection occurred
- At the time of the reactor trip Steam Line Radiation monitors were as follows:
  - R-31A, STEAM LINE RADIATION MONITOR: 0.9800 mR/hr
  - R-31B, STEAM LINE RADIATION MONITOR: 0.9879 mR/hr
  - R-31C, STEAM LINE RADIATION MONITOR: 7.6243 mR/hr
- The crew has just entered EOP-E-3,STEAM GENERATOR TUBE RUPTURE with the following conditions:
  - ALL MSIVs are closed
  - Containment pressure 0.8 psig
  - S/G Parameters:
    - “A” S/G pressure: 960 psig and lowering slowly
    - “B” S/G pressure: 960 psig and lowering slowly
    - “C” S/G pressure: 450 psig and lowering rapidly
    - “A” S/G NR Level: 22% and rising
    - “B” S/G NR Level: 7% and rising
    - “C” S/G NR Level: 7% and lowering
  - Feed flow has been secured to the “A” S/G

Which ONE (1) of the following correctly completes the statement below?

1) IAW EOP-E-3 the CRS is required to direct the crew to continue to feed ____(1)____ .

2) Based on plant conditions the CRS will transition out of EOP-E-3 to ____(2)____ .

EOP-ECA-3.1, SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY DESIRED
EOP-ECA-3.2, SGTR WITH LOSS OF REACTOR COOLANT: SATURATED RECOVERY DESIRED

A. (1) “B” S/G ONLY
(2) EOP-ECA-3.1

B. (1) “B” AND “C” S/Gs
(2) EOP-ECA-3.1

C. (1) “B” S/G ONLY
(2) EOP-ECA-3.2

D. (1) “B” AND “C” S/Gs
(2) EOP-ECA-3.2

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to EOP-E-3 (p 8,9&13; Rev 7) Caution before Step 4, If ANY Ruptured S/G is Faulted, feed flow to that S/G should remain isolated during subsequent recovery actions UNLESS needed for RCS cooldown. From given conditions the "C" S/G is both faulted and ruptured therefore feed water flow is secured to the "C" S/G.
According to EOP-E-3 Foldout page Item 2. SECONDARY INTEGRITY CRITERIA: IF ALL conditions listed below occur, THEN RESET SPDS AND GO TO EOP-E-2, FAULTED STEAM GENERATOR ISOLATION, Step 1.
- ANY S/G pressure is lowering in an uncontrolled manner OR has completely depressurized.
AND
- AFFECTED S/G has NOT been isolated.
AND
- AFFECTED S/G is NOT needed for RCS cooldown.
From given information the "C" S/G is faulted and ruptured. "A" and "B" S/G's are intact, therefore the crew will transition to EOP-E-2 from EOP-E-3 first.
According to EOP-E-2 (p 8; Rev 3) Step 6. CHECK Secondary Radiation: b. CHECK unisolated Secondary Radiation Monitors - HAVE REMAINED NORMAL
- R-31s, STEAMLINE RADIATION MONITORs
Step 6.b. RNO Actions: Perform the following: 2) Go to EOP-E-3, Steam Generator Tube Rupture Step 1. From given information the crew previously identified the "C" S/G as ruptured and faulted and transitioned to EOP-E-2 from EOP-E-3 to isolated the "C" S/G (faulted S/G). Once these actions are taken in EOP-E-2 the crew will transition bak to EOP-E-3 to mitigate the S/G tube rupture.
According to EOP-E-3 (p 10; Rev 7) Step 6, CHECK Ruptured S/G(s) Pressure - GREATER THAN 500 psig. The "C" S/G (ruptured and faulted) is less than 500 psig therefore the crew will perform the RNO actions for this step as follows:
PERFORM the following:
a. RESET SPDS.
b. GO TO EOP-ECA-3.1, SGTR With Loss Of Reactor Coolant: Subcooled Recovery Desired Step 1

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because a faulted/ruptured is NOT provided feed flow and is only fed if it is the only S/G available for RCS cooldown. This is plausible because if the ruptured S/G was not faulted the operator would continue feeding it until the desired narrow range level was reached.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because with the ruptured S/G pressure less than 500 psig requires transition to EOP-ECA-3.1. This is plausible because if the operator thought that this condition required a more rapid cooldown and depressurization then EOP-ECA-3.2 would be appropriate. EOP-ECA-3.2 is entered from EOP-ECA-3.1 when specific plant conditions exist that require RCS cooldown and depressurization at a fast rate than performed in ECA-3.1.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the Ability to (a) predict the impacts on indications and alarms for main steam and area radiation monitors (during SGTR) (i.e. shutdown or continue to monitor); and (b) based on predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations. This is accomplished by the operator analyzing given information (Steam Line Radiation Monitors indications and Steam Generator pressure) and determine the required procedures to mitigate the event (ruptured/faulted Steam Generator).

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must analyze a set of plant conditions and predict an outcome, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing system knowledge, immediate operator actions, plant parameters that require direct entry into EOPs, or knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure; AND requires the operator to Demonstrate knowledge of diagnostic steps and decision points in the EOPs that involve transitions to event specific sub-procedures or emergency contingency procedures. This is accomplished by the operator analyzing given information to determine the affected S/G is both ruptured and faulted. Once this is determined the operator must determine the correct sequence of procedures that will be used to mitigate this event (From EOP-E-3 to EOP-E-2 to isolate the faulted S/G then back to EOP-E-3 to take actions to mitigate the SGTR and then diagnose that the ruptured/faulted S/G conditions require transitioning to EOP-ECA-3.1).

ILC15 RNP SRO NRC Examination QUESTION 87

87 **A**

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	039 A2.03 SRO 1

Development References
EOP-E-3 Rev. 7 EOP-E-2 Rev. 3 10 CFR 55.43.5

Student References Provided

SYS039 A2.03 - Main and Reheat Steam System (MRSS)

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

Indications and alarms for main steam and area radiation monitors (during SGTR) ....

Remarks/Status

8/26/15 used bank question 039 A2.03 SRO 1

9/8/15 reviewed by Exam Supervisor, UNSAT, as the candidates are not required to know steps of procedure attachments from memory.

9/9/15 reviewed by Fleet NRC exam writer. The 2nd part is a different question. Need to replace with another item related to plant response.

9/21/15 exam team created new question as replacement.

11/5/15 discussed with NRC chief examiner as one of the early submittal items. The chief examiner graded this question as requiring editorial improvements as information in the stem was not required or could be deemed cueing or teaching in the stem. The exam team agreed that the information was not required for answering the question and furthermore would not hurt the question. Changes made in accordance with the recommended comments.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

SYS076 2.1.7 - Service Water System (SWS)
SYS076 GENERIC
Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. (CFR: 41.5 / 43.5 / 45.12 / 45.13)

Given the following:

- The plant is at 100% power
- The crew has just completed swapping Service Water Booster Pumps from “A” to “B” IAW OP-903, SERVICE WATER SYSTEM
- The following data was obtained after the pump swap:
  - HVH-1 – FI-1698A: 830 gpm
  - HVH-2 – FI-1698B: 810 gpm
  - HVH-3 – FI-1698C: 745 gpm
  - HVH-4 – FI-1689D: 805 gpm

Which ONE of the following correctly completes the statements below?

1) Entry into Technical Specification LCO 3.6.6, Containment Spray and Cooling Systems ____(1)____ required.

2) OP-903 states that the electrical analysis for the Service Water Booster Pump motors may be exceeded if total HVH Unit Service Water Flow exceeds ____(2)____.

A. (1) is NOT
(2) 4000 gpm

B. (1) is NOT
(2) 4220 gpm

C. (1) is
(2) 4220 gpm

D. (1) is
(2) 4000 gpm

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and D.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because HVH-3 flow being less than 750 gpm requires entry into Tech Spec LCO 3.6.6. This is plausible because the candidate may incorrectly determine the threshold for entry into LCO 3.6.6 for individual HVH unit flow to be 700 gpm. OP-903 states LCO 3.6.6 is entered if HVH unit flow is less than 800 gpm, this is to ensure the Tech Spec requirement of 750 gpm of cooling flow to the HVH coiling coil is met.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to OP-903 (p7; Rev 137) Step 3.0.10.a.(2), Total HVH Unit Service Water flow greater than 4220 gpm may exceed the electrical analysis for the Service Water Booster Pump motors and requires entry into Tech Spec LCO 3.8.9 in MODES 1,2,3 and 4, and Tech Spec LCO in MODES 5 and 6 and during movement of irradiated fuel assemblies. For this reason, individual HVH Unit Service Water flow should be established at greater than or equal to 800 gpm, but with total HVH Unit Service Water flow less than or equal to 4000 gpm. According to OP-903 (p29; Rev 137) Note before Step 6.2.1.4, Individual HVH Unit flow less than 800 gpm requires entry into Tech Spec 3.6.6 Action in MODES 1, 2, 3, and 4. With HVH-3 flow less than 800 gpm requires entry into Tech Spec LCO 3.6.6, total HVH Unit cooling water flow is less than 4000 gpm. According to LCO 3.6.6 (p 3.6-17; Amendment No.194) SR 3.6.6.3 Cooling water flow to each cooling unit is >750 gpm.

Answer D Discussion

Correct. 1st part correct, 2nd part wrong. This is incorrect because OP-903 states that the SWBP electrical analysis may be exceeded if total HVH flow exceeds 4220 gpm. This is plausible because OP-903 requires the operator to throttle total HVH Unit cooling water flow to less than or equal to 4000 gpm to prevent exceeding that.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to evaluate Service Water System instrumentation and make operational judgments based upon these indications.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall a Technical Specifications required value, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing ≤ 1 hour TS/TRM action statements, the LCO information listed "above the line," or by knowing the TS Safety Limits; AND requires the operator to apply the Required Actions and Surveillance Requirements in accordance with the rules of application.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	NEW	

Development References

OP-903 Rev. 137
Tech Spec LCO 3.6.6 Amendment No.194
10 CFR 55.43.2

Student References Provided

SYS076 2.1.7 - Service Water System (SWS)

SYS076 GENERIC

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

Remarks/Status

8/28/15 new question developed.

9/8/15 reviewed by Exam Supervisor, SAT

9/14/15 OPS SRO reviewed SAT.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

SYS078 A2.01 - Instrument Air System (IAS)

Ability to (a) predict the impacts of the following malfunctions or operations on the IAS; 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)

Air dryer and filter malfunctions ....

Given the following:

- A plant cooldown is in progress
- RCS temperature is 380°F
- "B" Instrument Air Compressor is in AUTO with the "B" Instrument Air Dryer in service
- "D" Instrument Air Compressor is operating
- "A" Instrument Air Compressor and "A" Instrument Air Dryer are out of service

Subsequently:

- The "D" Instrument Air Compressor trips, followed by the "B" Instrument Air Dryer clogging
- The crew has entered AOP-017, LOSS OF INSTRUMENT AIR
- RCS temperature is slowly rising
- IA header pressure is 40 psig and rising slowly

Which ONE of the following correctly completes the statements below?

1) Based upon current conditions, FCV-1740, Air Dryer Hi DP Flow Control valve ____(1)____ be open.

2) IAW AOP-017, the CRS will direct use of ____(2)____ as the preferred method to control RCS temperature.

Attachment 2, Nitrogen Alignment to Steam Line PORVs
Attachment 3, Manual Steam Dump of S/Gs

A. (1) will
(2) Attachment 2

B. (1) will NOT
(2) Attachment 2

C. (1) will
(2) Attachment 3

D. (1) will NOT
(2) Attachment 3

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to ST-017 (p 34; Rev 5), For instrument air, if low pressure is caused by frozen air dryers, then the normally closed self-contained flow control valve (FCV-1740) will automatically open at 80 psig to bypass the air dryers and send instrument or backup station air directly from air receiver to the headers.
According to G-190200 (sheet 2 of 10; Rev 33) Instrument & Station Air System Flow Diagram, shows FCV-1740 bypasses the "A" and "B" Instrument Air dryers to provide a flow path.
According to AOP-017-BD (p13 of 22; Rev 42), Step three (of Section B) provides guidance on the preferred methods to control RCS temperature at hot shutdown. The step assumes that the steam dumps may be used. If the steam dumps are not operable or available, then the operator is directed to use the Steam Line PORVS controlled by Instrument Air. Neither of these options will be available because IA header pressure is < 60 psig. According to AOP-017-BD (p4 of 22; Rev 42) with IA Header pressure less than 60 psig, plant valves will fail to operate as designed. Consequently, the operator will cool the RCS using other methods. According to AOP-017-BD (p13 of 22; Rev 42), if Instrument Air cannot control the PORVs, then the operator is directed to line up Nitrogen to the PORVs to control temperature. If Nitrogen is used, the operator must have an operator available to make this line up and it should be done in an expeditious manner.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because FCV-1740 will open automatically to bypass the “A” and “B” Instrument Air Dryers on a low pressure. This is plausible because the operator may incorrectly think that the conditions are not met that would open this valve and or is not in service due to the “A” Instrument Air Dryer not being in service.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. This is incorrect because AOP-017 step 3 lists the preferred order which is used to control temperature, with Attachment 2 listed before Attachment 3. This is plausible because attachment 3 is one of the methods listed in Step 3 of AOP-017 for controlling temperature.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Basis for meeting the KA

According to ES-401 (p6 of 50), when writing questions for K/As that test coupled knowledge or abilities (e.g., the A.2 K/A statements in Tiers 1 and 2 and a number of generic K/A statements, such as 2.4.1, in Tier 3), try to test both aspects of the K/A statement. If that is not possible without expending an inordinate amount of resources, limit the scope of the question to that aspect of the K/A statement requiring the highest cognitive level (e.g., the (b) portion of the A.2 K/A statements). Consequently, the KA is matched because the operator must demonstrate the ability to use procedures to correct, control or mitigate the consequences of a clogged IA filter.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and then use this information to select between two procedure Attachments, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing system knowledge, immediate operator actions, plant parameters that require direct entry into EOPs, or knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure; AND requires the operator to assess plant conditions and then select a section of a procedure to mitigate, recover, or with which to proceed (Attachment 2 vs. Attachment 3).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

AOP-017-BD (p4&13 of 22; Rev 42)
ST-017 Rev. 5
G-190200 Rev. 33
10 CFR 55.43.5

Student References Provided

SYS078 A2.01 - Instrument Air System (IAS)

Ability to (a) predict the impacts of the following malfunctions or operations on the IAS; 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)

Air dryer and filter malfunctions ....

Remarks/Status

9/1/15 new question developed.

9/8/15 reviewed by Exam Supervisor, UNSAT with the following comment, 1) "B" could be considered a correct answer also, since the letdown orifice shut and the CVCS Auto Makeup system is not operating properly. The crew could say the Loss of IA is affecting plant components and elect to trip the reactor.

9/9/15 The Fleet NRC exam writer reviewed the question and provided comments on another way we could go with this one. Suggested either the IA Dryer auto bypass valve and stpt and a procedure contrast between OP and AOP. Or a question on MSIV ITS implications.

9/10/15 exam team discussed that the concerns noted should not be an issue, as the initial conditions in the stem have the operator candidate past the worst point in the event and the IA air header pressure recovering.

9/14/15 OPS SRO reviewed question UNSAT, stating that you would not even be directed to ATT 4 with IA header pressure below 85 PSIG, verified with procedure, making our stem invalid.

9/21/15 new question developed.

11/5/15 discussed with the NRC chief examiner as one of the early submittal items. Comments are as follows: Need to remove the information in the bullet that states "causing IA Header pressure to slowly lower." The applicants should know that a clogged air dryer will cause pressure to lower.
The question does not really appear to be operational valid. We need to discuss the normal lineup of the instrument air system and how we would get in the situation proposed by the question.
The question does not really test the K/A, but can be pretty easily fixed. We can discuss.
Will need the appropriate IAW statement added to the question stem. Also, need to word question with regard to the fact that the use of attachment 2 or 3 is in a step that is based on order of preference.

11/9/15 questioned improved to present a plausible scenario, and improve the SRO only portion.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

SYS103 2.4.41 - Containment System
SYS103 GENERIC
Knowledge of the emergency action level thresholds and classifications. (CFR: 41.10 / 43.5 / 45.11)

Which ONE of the following identifies two Emergency Action Level (EAL) thresholds that indicate a LOSS of the Containment Barrier while operating in MODES 1 – 4?

A. Containment hydrogen concentration greater than 4%; AND
Containment pressure is greater than 10 psig with less than one full train of depressurization equipment operating.

B. Ruptured S/G that is also faulted outside of Containment; AND
A Containment pressure rise followed by a rapid unexplained Containment pressure drop.

C. Containment hydrogen concentration greater than 4%; AND
A Containment pressure rise followed by a rapid unexplained Containment pressure drop.

D. Ruptured S/G that is also faulted outside of Containment; AND
Containment pressure is greater than 10 psig with less than one full train of depressurization equipment operating.

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. See C and D.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to EPCLA-04 (p 228; Rev 13) Table F-1 Fission Product Barrier Matrix Loss of Containment Barrier column conditions are as follows:
1. Rapid unexplained Containment pressure drop following initial increase.
2. Following LOCA, Containment pressure or sump level response not consistent with LOCA conditions.
3. Ruptured S/G is also faulted outside of Containment.
4. Primary-to-secondary leakage > 10 gpm with non-isolable steam release from affected S/G to environment.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because Containment hydrogen concentration greater than 4% and rising EAL is identified as a Potential Loss. This is plausible because the pressure which the containment vessel is rated for resulting in a RED path CONTAINMENT CSFST. The operator may incorrectly believe that this EAL is identified as a LOSS of the Containment Barrier vice a potential loss of the Containment Barrier.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because Containment pressure is greater than 10 psig with less than one full train of depressurization equipment operating EAL is identified as a Potential Loss. This is plausible because this condition presents a severe challenge to the Containment Vessel as evidenced by the condition resulting in an ORANGE path on the CSFST. The operator may incorrectly believe that this EAL is identified as a Loss of the Containment Barrier.

Basis for meeting the KA

The KA is matched because the operator must demonstrate knowledge of the emergency action level thresholds and classifications associated with High Containment Pressure.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall bits of information (EALs that are Loss of Containment Barrier, EALs that are Potential Loss of Containment Barrier) to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it requires the operator to possess knowledge of emergency plan requirements of regulations imposed by 10CFR50.47, Emergency Plans.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	NEW	

Development References	Student References Provided
ECA-0.0 (p5&13 of 104; Rev 4) 10 CFR 55.43.1	

SYS103 2.4.41 - Containment System
SYS103 GENERIC
Knowledge of the emergency action level thresholds and classifications. (CFR: 41.10 / 43.5 / 45.11)

Remarks/Status

9/1/15 new question developed.

9/8/15 reviewed by Exam Supervisor, with Editorial comments, 1) In stem, spell out Containment Isolation; 2) which action statements are SROs required to know from memory?

9/14/15 reviewed by OPS SRO, UNSAT, as the LCO 3.0.3 time frames were applied incorrectly by the exam team, and led to answer choice 'C (2)' and distractor 'D (2)' being incorrect.

9/15/15 incorporated all comments, exam team must evaluate question again to determine if we still meet the KA to the SRO only level.

9/17/15 added the table for valves and procedure nomenclature, which was previously omitted.

9/22/15 OPS SRO will research a possible better way to ask a question to this KA, tie to the loss of power and attachment required to verify Phase A containment isolation has occurred.

9/22/15 exam team developed new question.

11/5/15 exam discussed with the NRC chief examiner this question as one of the early submittal items. After review of the question and reference material provided, the chief examiner determine that it was too difficult for the exam team to write a question to the SRO level for this KA. Randomly selected generic KA 2.4.41 for the SYS103 to replace it.

11/12/15 question written to the new KA.

12/1/15 question modified with recommended changes by AOM-shift.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

SYS015 A2.04 - Nuclear Instrumentation System (NIS)

Ability to (a) predict the impacts of the following malfunctions or operations on the NIS; 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)

Effects on axial flux density of control rod alignment and sequencing, xenon production and decay, and boron vs. control rod reactivity changes ....

Given the following:

- The plant was at 100% when Control Rod H-12 dropped
- The crew lowered reactor power IAW AOP-001
- During the load reduction, when reactor power was less than 90%, AFD went outside the Operating Band

Which ONE of the following correctly completes the statements below?

1) NI-41 and NI-43 will indicate ____(1)____ than NI-42 and NI-44 due to the Rod H-12 drop.

2) IAW AOP-001, the CRS is required to direct the restoration of AFD to within the target band by adjusting Control Rod position and RCS Boron concentration IAW OP-301,____(2)____.

- AOP-001, MALFUNCTION OF REACTOR CONTROL SYSTEM
- OP-301, CHEMICAL AND VOLUME CONTROL SYSTEM (CVCS)

REFERENCE PROVIDED

A. (1) higher
(2) ONLY

B. (1) lower
(2) and reduce load to less than or equal to 50%

C. (1) lower
(2) ONLY

D. (1) higher
(2) and reduce load to less than or equal to 50%

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. See C and D.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to Incore Detector Display on RTGB rod H-12 is in the vicinity of power range detectors NI-41 and NI-43 and therefore, when rod H-12 dropped flux on this side of the core lowered. Consequently, NI-42 and NI-44 will read higher. According to AOP-001 (p12; Rev 33) Step 11.b & c., b. Check AFD – WITHIN TARGET BAND. Given AFD outside the Operating Band implies it is outside the target band therefore, the operator takes the following RNO actions for Step 11.b:

•IF AFD is below the target band, THEN borate using OP-301, while withdrawing Control Rods to restore AFD to the target band.

•IF AFD is above the target band, THEN dilute using OP-301, while inserting Control Rods to restore AFD to the target band.

Step 11.c, Check AFD – Within Operating Band. Given AFD went outside the operating band therefore, the operator takes the following RNO actions for Step 11.c: IF AFD is outside the Operating Band, AND Power is less than 90% THEN use Attachment 1 to reduce load to less than or equal to 50% within 30 minutes.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because AFD went outside the Operating Band and therefore power must be reduced to less than 50% within 30 minutes. This is plausible because if AFD went outside the target band but did not exceed the operating band this would be correct.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because rod H-12 is in the vicinity of NI-41 and NI-43 therefore, when rod H-12 dropped the flux in the area of this rod lowered resulting in NI-41 and NI-43 indications lowering. This is plausible because if H-12 was on the other side of the core this would be correct.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to predict the impact on the Nuclear Instrumentation System from a control rod out of alignment (dropped) and determine the required procedures to correct for axial flux density being outside its operating band.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and analyze this information to determine how Power Range NIs will respond to a dropped control rod, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing system knowledge, immediate operator actions, plant parameters that require direct entry into EOPs, or knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure; AND requires the operator to assess plant conditions and then select a section of a procedure to mitigate, recover, or with which to proceed.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

Technical Reference(s):AOP-001 Rev. 33
FMP-009 Rev. 17
10 CFR 55.43.5

Student References Provided

Core location map

SYS015 A2.04 - Nuclear Instrumentation System (NIS)

Ability to (a) predict the impacts of the following malfunctions or operations on the NIS; 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)

Effects on axial flux density of control rod alignment and sequencing, xenon production and decay, and boron vs. control rod reactivity changes ....

Remarks/Status

8/26/15 new question developed.

9/8/15 reviewed by Exam Supervisor, UNSAT, as not information that an SRO should know from memory (exact core location of rods).

9/14/15 OPS SRO reviewed, added that the stem is confusing.

9/22/15 Exam team superviser and OPS SRO recommended removing "and 5 penalty points were accumulated" as it is not required to answer the question.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

SYS068 A2.02 - Liquid Radwaste System (LRS)

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

Lack of tank recirculation prior to release ....

Given the following:

- Waste Condensate Tank "C" is being prepared for release
- Tank pH was sampled and found to be too low

Which ONE of the following correctly completes the statements below?

1) IAW OP-705, WASTE LIQUID RELEASE AND RECIRCULATION, Waste Condensate Tank "C" is recirculated for a MINIMUM period of time to ensure ____(1)____.

2) pH must be adjusted to a MINIMUM of ____(2)____ before the tank is released.

A. (1) representative samples of radioactivity and pH
(2) > 5.0

B. (1) representative samples of radioactivity and pH
(2) > 6.0

C. (1) radioactive hot spots do not occur during the release
(2) > 5.0

D. (1) radioactive hot spots do not occur during the release
(2) > 6.0

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92

B

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because pH must be > 6.0. This is plausible because the operator may not know the significance of water with a pH of 5.0, and incorrectly believe that this is acceptable.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to OP-705 (p7 of 97; Rev 46), P&L 5.5, Waste Condensate Tanks must be recirculated for a minimum of one (1) hour AND sampled before a release permit is obtained. According to OP-705 (p 37; Rev 46) Step 8.2.4.13.a&b, a. IF the activity level is NOT acceptable for release AND the Chemistry Technician concurs, THEN N/A the remainder of this section AND GO TO OP-701 to transfer the affected tank to the WHUT. B. IF the pH is NOT acceptable for release, THEN N/A the remainder of this section, AND GO TO section of OP-705 for "Adjusting the pH level of Waste Condensate C, D or E" for the affected tank. According to EMP-006 (p41 of 56; Rev 34), the NPDES requires a pH of >6.0 to release a Waste Condensate Tank

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because both radioactivity and pH must be within required specifications prior to release of the tanks contents. Radioactive hot spots may occur even when tank is recirculated. This is plausible because anytime radioactive liquid is moved in a piping system radioactive hot spots may develop.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to predict the impact of operations on the Liquid Radwaste system due to lack of tank recirculation prior to release (i.e. identification of why there is a minimum recirculation time) and based on those predictions, use procedures to correct, control or mitigate the consequences of those operations.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall bits of information, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it requires the operator to possess knowledge of the NPDES.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	MODIFIED	068 A2.02 001

Development References
P-705 (p7 of 97; Rev 46) (p41 of 56; Rev 34) 10 CFR 55.43.1

Student References Provided

SYS068 A2.02 - Liquid Radwaste System (LRS)

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

Lack of tank recirculation prior to release ....

Remarks/Status

9/1/15 new question developed.

9/9/15 Fleet NRC exam writer reviewed question, commented that the SRO piece is weak. Stated that there was a previous RNP exam with a question written to this KA, 2009 ILC exam. Exam team located the question and it is in the reference folder for further discussion.

9/21/15 exam team used bank question 068 A2.02 001

9/22/15 Exam supervisor and OPS SRO both liked the first question better. Recommeded looking at possibly combining the first part of that question with the second part of this one to meet the KA tied to 10 CFR 55.43.1

9/22/15 exam team modified bank question 068 A2.02 001 to incorporate the previous question part one.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

SYS071 2.4.21 - Waste Gas Disposal System (WGDS)
SYS071 GENERIC
Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc. (CFR: 41.7 / 43.5 / 45.12)

Which ONE of the following correctly completes the statements below?

1) The TRM limitation on the quantity of radioactivity permitted in ____(1)____ Waste Gas Decay Tank(s) is $\leq$ 1.9 X 10^4 Curies noble gas.

2) The bases for TRM 3.21 is concerned with exposure to ____(2)____.

A. (1) each
(2) onsite personnel in the Control Room

B. (1) ALL
(2) onsite personnel in the Control Room

C. (1) each
(2) members of the public at the site boundary

D. (1) ALL
(2) members of the public at the site boundary

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the bases of TRM 3.21 is to minimize exposure to the public at the site boundary for this specific event not onsite personnel. This is plausible because there is a concern for control room personnel exposure during uncontrolled radiological releases.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to PLP-100 (p 3.21-1; Rev.0) TRMS 3.21, The quantity of radioactivity in each Waste Gas Decay Tank shall be limited to < 1.9 X 104 Curies noble gas (considered as Xe-133). According to PLP-100 (p B3.21-1; Rev 0) BASES B 3.21, The tanks included in this specification are those tanks for which the quantity of radioactivity contained is not limited directly or indirectly by another specification to a quantity that is less than the quantity that provides assurance that in the event of an uncontrolled release of the tank's contents, the resulting total body exposure to a member of the public at the nearest site boundary will not exceed 0.5 rem in an event of 2 hours duration.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the limit is for each Waste Gas Decay Tank. This is plausible because the student could think the activity limit was based upon the total activity of all Waste Gas Decay Tanks.

Basis for meeting the KA

This is a generic K/A on a system of limited scope, specific purpose system. We limited the knowledge required to satisfy the logic (i.e, ALL vs. EACH) vice parameter and logic.

The KA is matched because the operator must demonstrate knowledge of the parameters and logic used to assess the status of the safety function radioactivity release control as it related to the Waste Gas Disposal System.

Basis for Hi Cog

The question is at the Memory cognitive level because the operator must recall two separate bits of information, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing ≤ 1 hour TS/TRM action statements, the LCO information listed "above the line," or by knowing the TS Safety Limits; AND requires the operator to demonstrate knowledge of the TS basis that is required to analyze TS required actions and terminology.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	MODIFIED	071 G2.2.25 SRO 1

Development References	Student References Provided
PLP-100 Rev. 0 10 CFR 55.43.2	

SYS071 2.4.21 - Waste Gas Disposal System (WGDS)

SYS071 GENERIC

Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc. (CFR: 41.7 / 43.5 / 45.12)

Remarks/Status

9/8/15 modified bank question 071 G2.2.25 SRO 1

9/14/15 Exam supervisor and OPS SRO reviewed the question SAT.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

GEN2.1 2.1.45 - GENERIC - Conduct of Operations
Conduct of Operations
Ability to identify and interpret diverse indications to validate the response of another indication. (CFR: 41.7 / 43.5 / 45.4)

Given the following:

- The plant was at 35% power when a valid alarm on R-19 occurred
- The crew has just entered AOP-035, S/G TUBE LEAK
- Chemistry is sampling S/G's to determine primary to secondary leakage rate

Which ONE of the following correctly completes the statements below?

1) IAW AOP-035 the crew will use ____(1)____ as a reliable diverse indication to confirm the S/G tube leak.

Subsequently, Chemistry reports that the "B" S/G tube leakage rate is 0.071 gpm

2) IAW AOP-035, the CRS is required to initiate a plant shutdown and place the unit in MODE 3 within ____(2)____.

R-15, CONDENSER AIR EJECTOR GAS
R-19, A, B, C STEAM GENERATOR BLOWDOWN
R-24, A, B, C, MAIN STEAM LINE N-16

A. (1) R-15
(2) 3 hours

B. (1) R-15
(2) 6 hours

C. (1) R-24
(2) 3 hours

D. (1) R-24
(2) 6 hours

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to AOP-035 (p6-7; Rev 29) Step 17, with R-19 in alarm, there are methods available to use determine a leakrate, two of which are associated with the reading of other Radiation Monitors (R-24 and R-15). However, according to AOP-035-BD (p67&69 of 123; Rev 29), Radiation Monitor R-24 is not available when the plant is shutdown and is not a reliable indicator when less than 40% power. Consequently, R-15 must be used as the diverse indication. This can be accomplished by using the "Using R‑15 to Monitor for Low Level Primary to Secondary Leakage" of OP‑504, Condenser Air Removal, and then using CP‑014 Conversion Factors to correlate R‑15 to leakage. The leakrate is .071 gpm or ≈102 gpd, which requires a plant shutdown to Mode 3 within 3 hours in accordance with Step 20 of AOP-035 (p8-9 of 69; Rev 29).

Answer B Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because S/G tube leakage of greater than 100 gpd requires being in MODE 3 within 3 hours of declaring a PSAL-3 event IAW AOP-035. This is plausible because if S/G tube leakage was between 75 gpd and 100 gpd the plant would be required to be in MODE 3 within 6 hours of declaring a PSAL-3 event.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because R-24 is not a reliable indication of S/G tube leakage when power is less than 40%. This is plausible because R-24 may be used to determine S/G tube leakage rate when power is greater than 40%.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate ability to identify and interpret diverse indications to validate the response of another indication. This is done by evaluating which radiation monitor may be used to confirm that a S/G tube leak is occurring and the leakrate IAW AOP-035.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information, perform a calculation to determine S/G tube leakage rate in the units of gpd and apply AOP-035 actions, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing system knowledge, immediate operator actions, plant parameters that require direct entry into EOPs, or knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure; AND requires the operator to assess plant conditions and then select a section of a procedure (i.e. leakage greater than 100 gpd vs. leakage greater than 75 gpd/30 gpd) to mitigate, recover, or with which to proceed; and the action required. It also requires the operator to know information only available in the AOP Basis Document.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

AOP-035 (p6-9; Rev 29)
AOP-035-BD (p67&69 of 123; Rev 29)
10 CFR 55.43.5

Student References Provided

GEN2.1 2.1.45 - GENERIC - Conduct of Operations
Conduct of Operations
Ability to identify and interpret diverse indications to validate the response of another indication. (CFR: 41.7 / 43.5 / 45.4)

Remarks/Status

9/2/15 new question developed.

9/8/15 reviewed by Exam Supervisor, with the following Editorial comment, 1) Does the procedure say that <40% power that R-24 can be used for trending? If so, that would make distractor "C" potentially correct.

9/11/15 discussed sending this to the NRC chief examiner for his evaluation on our question and the attempt to hit the SRO only portion.

9/14/15 NRC Chief Examiner discussed some possible solutions to make the question stronger, and a better hit of the KA if we contrast directing the use of R-15 or R-24 to determine leak rate. Also recommended removing the "of declaring PSAL-X event" in each answer choice.

Exam team is working on question improvements, and will discuss on 9/16/15.

9/21/15 exam team edited question with recommended changes.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

GEN2.2 2.2.21 - GENERIC - Equipment Control
Equipment Control
Knowledge of pre- and post-maintenance operability requirements. (CFR: 41.10 / 43.2)

Given the following:

- The plant is operating at 100% power
- The "B" Emergency Diesel Generator is OOS
- Subsequently, the "A" MDAFW Pump is removed from service for corrective maintenance

Which ONE of the following correctly completes the statement below?

1) IAW Technical Specifications, the "B" MDAFW Pump is required be declared inoperable within ____(1)____.

2) Upon completion of the maintenance, ____(2)____ must be retested prior to being declared OPERABLE.

A. (1) 4 hours
(2) the "A" MDAFW pump only

B. (1) 4 hours
(2) both the "A" and the "B" MDAFW Pumps

C. (1) 12 hours
(2) both the "A" and the "B" MDAFW Pumps

D. (1) 12 hours
(2) the "A" MDAFW pump only

General Discussion

Answer A Discussion

Correct. 1st part correct, 2nd part correct. According to Technical Specification Basis 3.8.1 (pB3.8-7; Rev 0) Required Action B.2 is intended to provide assurance that a loss of offsite power, during the period that a DG is inoperable, does not result in a complete loss of safety function of critical systems. These features are designed with redundant safety related trains. This includes motor driven auxiliary feedwater pumps. The Completion Time for Required Action B.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both: (1) An inoperable DG exists; and (2) a required redundant feature on the other train (Train A or Train B) is inoperable. If at any time during the existence of this Condition (one DG inoperable) a required feature subsequently becomes inoperable, this Completion Time would begin to be tracked. In this Condition, the remaining OPERABLE DG and offsite circuit is adequate to supply electrical power to the onsite Distribution System. Thus, on a component basis, single failure protection for the required feature's function may have been lost; however, function has not been lost. The 4 hour Completion Time takes into account the OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 4 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low
probability of a DBA occurring during this period. Consequently, when the "A" MDAFW Pump is removed from service the "B" MDAFW Pump will be declared inoperable within four hours. According to the Technical Specification Basis SR 3.0.1 (B3.0-14; Rev 52), upon completion of maintenance, appropriate post maintenance testing is required to declare equipment OPERABLE. This includes ensuring applicable Surveillances are not failed and their most recent performance is in accordance with SR 3.0.2. Post maintenance testing may not be possible in the current MODE or other specified conditions in the Applicability due to the necessary unit parameters not having been established. In these situations, the equipment may be considered OPERABLE provided testing has been satisfactorily completed to the extent possible and the equipment is not otherwise believed to be incapable of performing its function. This will allow operation to proceed to a MODE or other specified condition where other necessary post maintenance tests can be completed. In the stated conditions (100% power), the post maintenance testing is possible and must be completed before declaring the "A" MDAFW Pump OPERABLE.

Answer B Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the "B" MDAFW Pump does not need to be retested to be declared OPERABLE because it did not undergo maintenance. This is plausible because the operator may incorrectly couple retesting to operability rather than maintenance.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and D.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the "B" MDAFW Pump must be declared inoperable within 4 hours, not within 12 hours. This is plausible because Condition A of TS LCO 3.8.1 identifies that the operator must declare required
feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable within 12 hours.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of pre- and post-maintenance operability requirements. The operator must identify the operability of the MDAFW Pumps when one is taken out for maintenance with the opposite train EDG already inoperable (Pre-Maintenance operability); and then identify whether or not the TS SR must be completed to restore operability to the MDAFW Pump that underwent maintenance (Post-Maintenance Operability).

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must demonstrate an understanding on how to implement the unique ACTION (B.2) associated with an EDG being inoperable during Modes 1-4, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing ≤ 1 hour TS/TRM action statements, the LCO information listed "above the line," or by knowing the TS Safety Limits; AND requires the operator to apply the Required Actions and Surveillance Requirements in accordance with the rules of application and demonstrate knowledge of the TS basis that is required to analyze TS required actions and terminology.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

Technical Specification Basis 3.8.1 (pB3.8-7; Rev 0)
Technical Specification Basis SR 3.0.1 (B3.0-14; Rev 52)
10 CFR 55.43.2

Student References Provided

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95

A

GEN2.2 2.2.21 - GENERIC - Equipment Control

Equipment Control

Knowledge of pre- and post-maintenance operability requirements. (CFR: 41.10 / 43.2)

Remarks/Status

9/1/15 new question developed.

9/10/15 Exam supervisor reviewed question, had the following comments. 1) is the last bullet in the stem required information to answer the question? 2) change the first fill in the blank statement to just "At time 2100 ___(1)___ " 3) those recommended changes are based on the feeling that this is trick question centered around whether or not you have to wait the 4 hrs.

9/22/15 OPS SRO and Exam team supervisor recommend making the TIME in the question one that is after the 4 hours, therefore changing the correct answer to both pumps inoperable. The last bullet of the given information wil be removed ("A" MDAFW Pump was tested successfully three weeks ago) to determine if that improves the way the question reads.

11/5/15 question revised such that the EDG is taken out of service second.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

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:

- The plant is operating at 100% power
- A review of maintenance records results in EDG "A" being declared inoperable due to having the wrong oil placed in the EDG during recent maintenance activities

Which ONE of the following correctly completes the statements below?

1) IAW Technical Specifications, the operator must verify the correct breaker alignment and indicated power availability for the offsite circuit within ____(1)____.

Subsequently, the following timeline of events occurs:

0400	The EDG “B” is declared inoperable
0400	The crew enters Technical Specification LCO 3.0.3
0500	A downpower is initiated
0900	Mode 3 is entered

2) Based on this, the LATEST time that the plant must be in Mode 4 by is ____(2)____.

A. (1) 1 hour and once per 12 hours thereafter
(2) 1500

B. (1) 1 hour and once per 12 hours thereafter
(2) 1700

C. (1) 12 hours and once per 24 hours thereafter
(2) 1500

D. (1) 12 hours and once per 24 hours thereafter
(2) 1700

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the crew has until 1700, 13 hours from 0400 (when LCO 3.0.3 was entered), to get to Mode 4. This is plausible because the crew got to Mode 3 2 hours earlier than allowed, the operator may incorrectly believe that the additional two hours to get to Mode 3 is forfeited, and that Mode 4 must be reached within 6 hours of entering Mode 3.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to TS LCO 3.8.1 (p3.8-1; Amendment 203), two diesel generators (DGs) capable of supplying the onsite emergency power distribution subsystem(s) during modes 1-4. When EDG "A" is declared inoperable, the operator must enter Condition B, which among other ACTION, requires that the operator verify the correct breaker alignment and indicated power availability for the offsite circuit within 1 hour and once per 12 hours thereafter. According to TS LCO 3.0.3 (p3.0-1; Amendment 232) when an LCO is not met and the associated ACTIONS are not met, an associated ACTION is not provided, or if directed by the associated ACTIONS, the unit shall be placed in a MODE or other specified condition in which the LCO is not applicable. Action shall be initiated within 1 hour to place the unit, as applicable, in: a. MODE 3 within 7 hours; b. MODE 4 within 13 hours; and c. MODE 5 within 37 hours. According to the Technical Specification Basis (pB3.0-4; Rev 28), the time limits of LCO 3.0.3 allow 37 hours for the unit to be in MODE 5 when a shutdown is required during MODE 1 operation. If the unit is in a lower MODE of operation when a shutdown is required, the time limit for reaching the next lower MODE applies. If a lower MODE is reached in less time than allowed, however, the total allowable time to reach MODE 5, or other applicable MODE, is not reduced. For example, if MODE 3 is reached in 2 hours, then the time allowed for reaching MODE 4 is the next 11 hours, because the total time for reaching MODE 4 is not reduced from the allowable limit of 13 hours. Therefore, if remedial measures are completed that would permit a return to MODE 1, a penalty is not incurred by having to reach a lower MODE of operation in less than the total time allowed. In the stated conditions, the crew is allowed 7 hours to get to Mode 3, and gets there in 5 hours. However, the total allowable time to reach MODE 4 is not reduced. Since the crew was allowed 13 hours to get to Mode at 0400, they are still allowed until 1700 at the latest to enter Mode 4.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the SR needs to be completed within 1 hour and once per 12 hours thereafter. This is plausible because the normal frequency of this surveillance is once per 12 hours, and there are two additional action items that must be completed within 24 hours..

Answer D Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and C.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and then use the information in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing ≤ 1 hour TS/TRM action statements, the LCO information listed "above the line," or by knowing the TS Safety Limits; AND requires the operator to apply the generic LCO requirements.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

TS LCO 3.8.1 (p3.8-1; Amendment 203)
TS LCO 3.0.3 (p3.0-1; Amendment 232)
Technical Specification Basis (pB3.0-4; Rev 28)
10 CFR 55.43.2

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)

Remarks/Status

9/1/15 new question developed.

9/14/15 Exam team supervisor and OPS SRO reviewed question SAT

12/2/15 question rewritten to better match the KA.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

GEN2.3 2.3.12 - GENERIC - Radiation Control

Radiation Control

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

Given the following:

- The Inside AO needs to enter a room during EOP implementation
- The TSC and OSC are NOT activated
- General dose rate levels in the room range from 25-45 mr/hr
- The survey map shows the following on contact readings:
  - Point 1 is 100 mr/hr at 30 cm
  - Point 2 is 500 mr/hr at 30 cm
  - Point 3 is 1100 mr/hr at 30 cm

Which ONE of the following correctly completes the statements below?

1) Based on the plant indications, the radiological posting required is ____(1)____.

2) Under the stated plant conditions, the ____(2)____ will grant access to this area.

A. (1) Very High Radiation Area
(2) RC Supervisor

B. (1) Very High Radiation Area
(2) Shift Manager / Site Emergency Coordinator

C. (1) Locked High Radiation Area
(2) RC Supervisor

D. (1) Locked High Radiation Area
(2) Shift Manager / Site Emergency Coordinator

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part wrong. See B and C.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the area must be posted as a LHRA. This is plausible because a VHRA is another radiologically controlled area, and the operator may incorrectly believe that the conditions stated would result in such a posting.

Answer C Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the SM or Site Emergency Coordinator as he will be called in this event will control access in the EOPs. This is plausible because according to OMM-001-2 the RC Supervisor will control access under normal circumstances.

Answer D Discussion

Correct. 1st part correct, 2nd part correct. According to Technical Specification 5.7.1 and 2 (p5.0-29&30; Amendment 212) each High Radiation Area in which the intensity of radiation is greater than 1000 mRem/hour at 30 centimeters (12 inches) from the radiation source or from any surface penetrated by the radiation, but less than 500 rads/hour at 1 meter from the radiation source or from any surface penetrated by the radiation shall be equipped with a locked door to prevent unauthorized access. According to AD-RP-ALL-2017 (p5-6 of 29; Rev 1), a room in which radiation levels are >1,000 mrem per hour at 30 centimeters from the radiation source is defined as a Locked High Radiation Area; and any area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 Rads (5 grays) in one hour at one meter from a radiation source or from any surface that radiation penetrates is defined as a Very High Radiation Area. Consequently, the area will posted as a LHRA. Because this is during the implementation of an EOP, according to OMM-001-2 (p49 of 61; Rev 92) Step 5.10.2.3, a set of LHRA keys is maintained in the Main Control Room under direct control of the SM for EMERGENCY USE ONLY.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of radiological safety principles (controlled area definitions/posting requirements & potential authorizers of access) pertaining to licensed operator duties such as access to locked high-radiation areas.

Basis for Hi Cog

The question is at the Comprehensive/Analysis cognitive level because the operator must recall bits of information (Definition of radiologically controlled areas), and compare this information to given conditions to predict an outcome, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it requires knowledge beyond that which can be answered solely by knowledge of radiological safety principles, and pertains to radiation hazards, specifically, analysis and interpretation of radiation readings as they pertain to selection of administrative, normal, abnormal or emergency procedures. In this case the operator must interpret radiation readings in a room and compare the readings to the definition of a LHRA as defined in Section 5 of the Technical Specifications; and then demonstrate that they understand that in an emergency they control access.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	G2.2.13 SRO 1

Development References

Technical Specification 5.7.1 and 2 (p5.0-29&30; Amendment 212)
AD-RP-ALL-2017 (p5-6 of 29; Rev 1)
OMM-001-2 (p49 of 61; Rev 92) Step 5.10.2.3
10 CFR 55.43.4

Student References Provided

GEN2.3 2.3.12 - GENERIC - Radiation Control

Radiation Control

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

Remarks/Status

9/2/15 used bank question G2.2.13 SRO 1

9/7/15 OPS SRO and Exam Team supervisor approved question.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

GEN2.3 2.3.14 - GENERIC - Radiation Control

Radiation Control

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

Given the following:

- A General Emergency has been declared
- The Dose Rate in Pipe Alley is 105 R/hr
- A 10-minute evolution in Pipe Alley is necessary to conduct repair and re-entry activities
- Two two-person teams have been briefed and are prepared to enter Pipe Alley to complete the task

Which ONE of the following correctly completes the statement below?

1) IAW EPOSC-04, EMERGENCY WORK CONTROL, the ____(1)____ can authorize performance of the evolution in Pipe Alley.

2) The MINIMUM number of two-person teams needed to be dispatched to complete the 10-minute evolution in Pipe Alley without exceeding any emergency exposure limits is ____(2)____.

A. (1) Site Emergency Coordinator
(2) one

B. (1) Site Emergency Coordinator
(2) two

C. (1) Radiological Control Director
(2) one

D. (1) Radiological Control Director
(2) two

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the minimum number of teams that have to enter is two. This is plausible because the operator may incorrectly believe that the limit is 25 Rem. If so, the operator would conclude that a MINIMUM of one two-person team must enter pipe-alley.

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to EPOSC-04 (p11&15 of 24; Rev 11) only the SEC can authorize ERO personnel to receive more than 5 REM TEDE in a year, and the emergency dose limits for activities taken to conduct repair and re-entry activities is 10 REM. Based on this, the 10 minute period will yield an exposure to each individual on the 1st team of 17.5 Rem (Which exceeds the allowable limits). Consequently, the minimum number of teams that have to enter is two.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because the RCD cannot approve the Emergency Dose Limits. This is plausible because the RCD is the highest ranking RC trained individual in the ERO, it is RC personnel who normally controls exposure limits, and the operator may incorrectly believe that it is they who must approve the emergency exposure limits.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of radiation hazards that may arise during emergency conditions or activities.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information (Authorizer of emergency limits, Limits), and use this information to solve a problem (Minimum # of teams that must be used), in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it requires knowledge beyond that which can be answered solely by knowledge of radiological safety principles, and pertains to radiation hazards, specifically, the approval to exceed allowable exposure limits associated with 10CFR20, as the Site Emergency Coordinator (an SRO ONLY function).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

EPOSC-04 (p11&15 of 24; Rev 11)
10 CFR 55.43.4

Student References Provided

GEN2.3 2.3.14 - GENERIC - Radiation Control

Radiation Control

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

Remarks/Status

9/2/15 modified bank question G 2.3.14 SRO 1

11/17/15 OPS SRO and Fleet review expressed concern with asking for a limit where the correct was "no limit" and the question arose, if you have "NON-volunteers" can you force them to enter a radiation field and receive that much exposure, even if limited to 25 R? To avoid these issues the question was changed.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 99 99 **C**

GEN2.4 2.4.30 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator. (CFR: 41.10 / 43.5 / 45.11)

Given the following:

- The plant is operating at 100% power
- At 0100, LCO 3.4.13, RCS OPERATIONAL LEAKAGE, was entered due to an 8 gpm leak from a crack on the spray line penetration weld at the PZR
- The crew commenced a shutdown at 0200
- The plant reached MODE 3 at 0545 when the OATC manually tripped the Rx as part of the plant shutdown per GP-006-1, NORMAL PLANT SHUTDOWN FROM POWER OPERATION TO HOT SHUTDOWN

Which ONE of the following correctly completes the statement below?

The plant must make a ____(1)____ notification to NRC with the notification time clock starting at ____(2)____.

REFERENCES PROVIDED

A. (1) 1-hour
(2) 0200

B. (1) 1-hour
(2) 0545

C. (1) 4-hour
(2) 0200

D. (1) 4-hour
(2) 0545

General Discussion

Answer A Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because a four-hour report, rather than a one-hour report, is required. This is plausible because prompt notifications of non-emergency events include both 1 and 4 hour reports.

Answer B Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer C Discussion

Correct. 1st part correct, 2nd part correct. According to Attachment 11.2 (p1 of 3) of AP-030 (p25 of 66; Rev 52) a Four-Hour notification is made under 10 CFR 50.72(b)(2)(i) is made on the initiation of any shutdown required by Tech Specs. Since the TS Shutdown was initiated at 0200, the four-hour notification must be made within four hours of 0200.

Answer D Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because the notification time clock starts at the initiation of the TS shutdown, not at the conclusion. This is plausible because RPS initiation (Manual or Auto) is also a 4-hour report, however, this does not include Trips which occur as part of planned evolutions in accordance with procedures.

Basis for meeting the KA

The KA is matched because the operator must demonstrate Knowledge of events related to system operation/status that must be reported to external agencies such as the NRC.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must demonstrate an understanding of how to use the non-emergency reportability Attachments in AP-030, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it requires the operator to possess knowledge of reportability requirements of regulations imposed by 10CFR50.72, Reportability Requirements.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	MODIFIED	G2.4.30 SRO001

Development References	Student References Provided
Attachment 11.2 (p1 of 3) of AP-030 (p25 of 66; Rev 52) 10 CFR 55.43.1	Attachments 11.1 and 11.2 of AP-030

GEN2.4 2.4.30 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator. (CFR: 41.10 / 43.5 / 45.11)

Remarks/Status

9/2/15 modified bank question G2.4.30 SRO001

9/5/15 OPS SRO and Exam Team supervisor approved question.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

ILC15 RNP SRO NRC Examination QUESTION 100 100 **B**

GEN2.4 2.4.46 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Ability to verify that the alarms are consistent with the plant conditions. (CFR: 41.10 / 43.5 / 45.3 / 45.12)

Given the following:

- The plant is at 100% power when the following annunciators alarm:
  - APP-001-C5, RCP Standpipe HI/LO LVL
  - APP-001-E2, RCP #1 SEAL LEAKOFF LO FLOW
- The crew has entered AOP-018, REACTOR COOLANT PUMP ABNORMAL CONDITIONS

Which ONE of the following correctly completes the statements below?

1) APP-001-C5, RCP Standpipe HI/LO LVL is due to ____(1)____.

Subsequently:

- Indicated "B" RCP #1 seal leakoff flow: 0.6 gpm
- Total calculated "B" RCP #1 seal leakoff flow: 6.5 gpm
- "B" RCP Bearing Temperatures are 130°F and stable
- "B" RCP #1 Seal Leakoff Temperature is 125°F and stable

2) IAW AOP-018 the CRS will direct the crew to continue to monitor RCP parameters and place the plant in MODE 3 within ____(2)____ using GP-006-1, NORMAL PLANT SHUTDOWN FROM POWER OPERATION TO HOT SHUTDOWN.

A. (1) high level
(2) 3 hours

B. (1) high level
(2) 8 hours

C. (1) low level
(2) 3 hours

D. (1) low level
(2) 8 hours

ILC15 RNP SRO NRC Examination QUESTION 100

100

B

General Discussion

Answer A Discussion

Incorrect. 1st part correct, 2nd part wrong. This is incorrect because AOP-018 step 14 RNO actions for the given conditions require the plant to be in MODE 3 within 8 hours. This is plausible because the operator may incorrectly recall the requirement to be in Mode 3 within 3 hours, which is another time requirement for placing the plant in MODE 3 (e.g. PSAL-3 requirements of AOP-035).

Answer B Discussion

Correct. 1st part correct, 2nd part correct. According to APP-001 (p 29; Rev 60) APP-001-C5, CAUSE: High 2. Failure of Reactor Coolant Pump Number 2 Seal. Low 1. Failure of Reactor Coolant Pump Number 3 Seal. According to APP-001 (p 44; Rev 60) APP-001-E2, CAUSE: 1. Excessive leakage of Number 2 Seal. According to AOP-018 (p 7; Rev 31) Step 12, CHECK Total RCP #1 Seal Flow – less than 0.8 GPM. From given information this flow is less than 0.8 GPM therefore the operator will continue to Step 13. According to AOP-018 (p 8; Rev 31) Step 13, CHECK plant status – MODE 1. From given conditions the plant is in Mode 1 therefore the operator continues to Step 14. According to AOP-018 (p 9; Rev 31) Step 14, CHECK ANY of the following conditions met:

•RCP Bearing Temperature - Greater Than 225°F
•RCP Bearing Temperature - Rising Towards 225°F
•RCP #1 Seal Leakoff Temperature - Greater Than 235°F
•RCP #1 Seal Leakoff Temperature - Rising Towards 235°F

From given conditions these conditions are not met therefore the operator will proceed to Step 14 RNO actions as follows:
PERFORM the following:
a. CONTINUE to monitor RCP Bearing Temperature, RCP Seal Leakoff Temperature, AND RCP Seal Leakoff Flow.
B. PLACE the Plant in Mode 3 within 8 hours using GP-006-1, Normal Plant Shutdown From Power Operation to Hot Shutdown.

Answer C Discussion

Incorrect. 1st part wrong, 2nd part wrong. See A and D.

Answer D Discussion

Incorrect. 1st part wrong, 2nd part correct. This is incorrect because APP-001-E2 would not alarm for a #3 Seal failure. This is plausible because APP-001-C5 alarms for both #2 and #3 RCP seal failures. In addition, APP-001-C5 alarms for low standpipe level caused by #3 Seal failing.

Basis for meeting the KA

The KA is matched because the operator must demonstrate the ability to verify that alarms are consistent with plant conditions. This is accomplished by evaluating the operator's knowledge of which annunciators will occur for #2 RCP seal failure as compared to if #3 RCP seal failed.

Basis for Hi Cog

The question is at the Comprehension/Analysis cognitive level because the operator must recall bits of information and analyze this information, in order to answer the question correctly.

Basis for SRO only

The question is SRO-ONLY because it cannot be answered solely by knowing system knowledge, immediate operator actions, plant parameters that require direct entry into EOPs, or knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure; AND requires the operator to assess plant conditions and then select a section of a procedure to mitigate, recover, or with which to proceed, in this case, whether the shutdown required is directed from AOP-018 or the ITS 3.4.4

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

APP-001 Rev. 60
AOP-018 Rev. 31
10 CFR 55.43.5

Student References Provided

GEN2.4 2.4.46 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Ability to verify that the alarms are consistent with the plant conditions. (CFR: 41.10 / 43.5 / 45.3 / 45.12)

Remarks/Status

9/8/15 new question developed.

911/15 during phone call with NRC chief examiner, this question was determined to be one of the handful that we would send over to see if we were off the mark on hitting the KA at the SRO only level. Follow up will be 9/14/15.

9/14/15 NRC chief examiner discussed the question with us, and gave us some direction to improve it. First, move away from the question that focus on the procedure section choice as it appears the wrong form of "affect" vs. "effect" may have been used in this procedure's latest revision. Contrast the answer choices with the mode change based on where the direction comes from instead, the AOP-018 or the ITS condition statement. Lastly, remove the "from #x RCP seal failure" from each of the distractors. Could be considered teaching in the stem. The exam team will incorporate these changes.

9/17/15 Exam team improved the 2nd statement and answer chioce distractors by adding to the stem what was taken away from each distractor.

9/22/15 Exam team supervisor doesn't like the way the 2 parts of this question tie together. The HIGH standpipe level and a LOW seal leak off flow do not seem to work together. OPS SRO will look at a better way to ask the second part of the question. Specifically BULLET 2 is a completely different failure indication.

9/22/15 exam team changed second set of bullets to make seal leakoffs match what they would actually do for the given seal failure.

12/2/15 AOM-SHIFT approved question for 60 day submittal.

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC

10 CFR 50.72 states that immediate reports shall be made to the NRC Operations Center of these Emergency Events via the NRC Emergency Telecommunications System (ETS) as specified in the Emergency Plan. 10 CFR 50.72 additionally identifies Non-Emergency Events which are to be reported within one-hour, four-hours, or eight hours to the NRC. ETS Telephones, which are identified, are located in the Control Room, the TSC, and the EOF. In the event that the ETS is not available, 10 CFR 50.72(a)(2) permits the use of commercial telephone.

EVENT	KEY WORDS	REQUIREMENT	EXAMPLES
NOTE: 10 CFR 50.72 recognizes the Emergency Plan and its four Emergency Classes of Unusual Event, Alert, Site Area Emergency and General Emergency.			
EMERGENCIES 10 CFR 50.72(a)(i) 10 CFR 30.32(i)(3)(viii) 10 CFR 40.31(i)(3)(viii) 10 CFR 72.75(a)	Emergency Unusual Event Alert Site Area Emergency General Emergency ISFSI	HBRSEP shall notify the NRC of the declaration of any of the Emergency Classes specified in the Emergency Plan. (See EPNOT-01)	– Declaration of an Unusual Event, Alert, Site Area Emergency, or General Emergency. – Discovery of an event that should have resulted in an Emergency Classification, but no emergency was declared. – Discovery that a declared emergency exceeded the Emergency Action Levels for a higher emergency declaration, but the higher classification was not declared.
ERDS ACTIVATION 10 CFR 50.72(a)(4)	ERDS Emergency	HBRSEP shall activate the ERDS as soon as possible but not later than one hour after declaring an Alert, Site Area Emergency, or General Emergency.	– An Alert, Site Area Emergency, or General Emergency is declared.
DEVIATION FROM TS (10 CFR 50.54(X)) 10 CFR 50.72(b)(1)	Deviation Departure License Condition	Any deviation from the TS authorized pursuant to 10 CFR 50.54(x).	– Intentional deviation from an approved plant procedure in order to preserve plant safety 10 CFR 50.54(x).

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC

HBRSEP shall immediately notify the NRC Operations Center via ETS as soon as practical and in all cases within one hour of the occurrence of any of the following:

EVENT	KEY WORDS	REQUIREMENT	EXAMPLES
SAFETY LIMIT, LIMITING SAFETY SYSTEM SETTING EXCEEDED 10 CFR 50.36(c)(1)(i)(A) UFSAR Section 17.3A, Paragraph 3.1.a	Safety Limit Limiting Safety System Setting	If any safety limit is exceeded, shut down the reactor. HBRSEP shall notify the NRC [within 1 hour via ETS per 10 CFR 50.72(a)(1), See Emergency Plan Procedures]. Operation must not be resumed until authorized by the NRC. NRC Region II must also be notified within 1 hour and the Vice President - Robinson Nuclear Plant within 24 hours	– The limits of TS Figure 2.1.1-1 are exceeded.
SAFETY SYSTEM DOES NOT FUNCTION AS REQUIRED 10 CFR 50.36(c)(1)(ii)(A)	ESF RPS Limiting Safety System Setting	HBRSEP shall notify the NRC if the automatic safety system [to correct an abnormal situation before a safety limit is exceeded] has been determined not to function as required.	– A failure mechanism is discovered that indicates that the RPS will not function to trip the reactor under certain required conditions.

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC - SECURITY SAFEGUARDS EVENTS

HBRSEP shall notify the NRC Operations Center via the ETS within one hour* after discovery of the safeguards events described as follows (10 CFR 73.71(b)(1)):

EVENT	KEY WORDS	REQUIREMENT	EXAMPLES
THEFT/UNLAWFUL DIVERSION OF SNM OR SPENT FUEL SHIPMENT 10 CFR 73.71(a)(1)	SNM Spent Fuel Security Safeguards	Any discovery of the loss of any shipment of SNM or spent fuel, and within one hour after recovery of or accounting for such lost shipment	– Shipment Emergency Event
THEFT/UNLAWFUL DIVERSION OF SNM 10 CFR 73.71(b)(1) 10 CFR 73, Appendix G, I(a)(1)	Theft of SNM Diversion Security Safeguards	Any event in which there is reason to believe that a person has committed or caused, or attempted to commit or cause, or has made a credible threat to commit or cause: (1) A theft or unlawful diversion of SNM	– Shipment Emergency Event
SABOTAGE OF PLANT EQUIPMENT 10 CFR 73.71(b)(1) 10 CFR 73, Appendix G, I(a)(2)	Sabotage Damage to Plant SNM Spent Fuel Security Safeguards	[Any event in which there is reason to believe that a person has committed or caused, or attempted to commit or cause, or has made a credible threat to commit or cause:] (2) Significant physical damage to a power reactor...or its equipment or carrier equipment transporting nuclear fuel or spent nuclear fuel, or to the nuclear fuel or spent fuel a facility or carrier possesses.	– Shipment Emergency Event – Security Event (AD-SY-ALL-0150)

* In response to NRC Bulletin 2005-02, RNP committed to make an accelerated call to the NRC within approximately 15 minutes following discovery of an imminent threat or attack against the station. The primary purpose is to allow for the NRC to timely notify other licensees of a potential common threat. The accelerated call should not be allowed to interfere with plant or personnel safety, physical security response, or notification of local law enforcement agencies. The information provided in the accelerated call can be limited to:

- Site name
- Emergency Classification – if already determined – do not delay call for the purpose of classifying
- Nature of the threat – briefly described, if known, including the type of attack (e.g., armed assault by land, water or aircraft) and the attack status (e.g., imminent, in progress, or repelled)

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC - SECURITY SAFEGUARDS EVENTS

HBRSEP shall notify the NRC Operations Center via the ETS within one hour* after discovery of the safeguards events described as follows (10 CFR 73.71(b)(1)):

EVENT	KEY WORDS	REQUIREMENT	EXAMPLES
UNAUTHORIZED TAMPERING WITH PLANT EQUIPMENT 10 CFR 73, Appendix G, I(a)(3)	Unauthorized Use Tampering Security System Safeguards	[Any event in which there is reason to believe that a person has committed or caused, or attempted to commit or cause, or has made a credible threat to commit or cause:] (3) Interruption of normal operation of HBRSEP through the unauthorized use of or tampering with its machinery, components, or controls including the security system.	– Security Event (AD-SY-ALL-0150)
ENTRY OF UNAUTHORIZED PERSON INTO PROTECTED OR VITAL AREA 10 CFR 73, Appendix G, I(b)	Unauthorized Entry Security Safeguards	An actual entry of an unauthorized person into a protected area, material access area, controlled access area, vital area, or transport.	– Security Event (AD-SY-ALL-0150)
FAILURE, DEGRADATION, OR DISCOVERED VULNERABILITY OF SAFEGUARD SYSTEM 10 CFR 73, Appendix G, I(c)	Degradation Vulnerability Safeguards Unauthorized Undetected Access Security	Any failure, degradation, or the discovered vulnerability in a safeguard system that could allow unauthorized or undetected access to a protected area, material access area, controlled access area, vital area or transport for which compensatory measures have not been employed.	– Procedure AD-SY-ALL-0150
INTRODUCTION OF CONTRABAND INTO VITAL OR PROTECTED AREA 10 CFR 73, Appendix G, I(d)	Contraband Unauthorized Security Safeguards	The actual or attempted introduction of contraband into a protected area, material process area, vital area, or transport.	– Contraband applies to items that could be used to commit radiological sabotage as defined in 10 CFR 73.2.

* See footnote on the previous page regarding a goal for a 15 minute call to the NRC in regard to an imminent security threat or attack.

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC - SOURCE, BYPRODUCT AND SNM HBRSEP shall immediately notify the NRC Operations Center via ETS, when:			
EVENT	**KEY WORDS**	**REQUIREMENT**	**EXAMPLES**
EXTERNAL EXPOSURE FROM BYPRODUCT, SOURCE, OR SNM (5X ANNUAL LIMIT) 10 CFR 20.2202(a)(1)	Byproduct Source SNM Exposure Dose Release Occupational	Notwithstanding any other requirements for notification, immediately notify the NRC of any event involving byproduct, source, or SNM possessed by HBRSEP that may have caused or threatens to cause any of the following conditions: 1. An individual to receive: (i) A total effective dose equivalent of 25 rems or more; or (ii) An eye dose equivalent of 75 rems or more; or (iii) A shallow dose equivalent to the skin or extremities of 250 rads or more; or 2. The release of radioactive material, inside or outside the restricted area, so that, had an individual been present for 24 hours, the individual could have received an intake five times the occupational annual limit on intake.	

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC - SOURCE, BYPRODUCT AND SNM

HBRSEP shall immediately notify the NRC Operations Center via ETS, when:

EVENT	KEY WORDS	REQUIREMENT	EXAMPLES
INTERNAL EXPOSURE FROM BYPRODUCT, SOURCE, SNM (>5X OCCUPATIONAL LIMIT) 10 CFR 20.2202(a)(2)	Intake Ingestion Release Source Byproduct SNM	The release of radioactive material, inside or outside the restricted area, so that, had an individual been present for 24 hours, the individual could have received an intake five times the occupational annual limit on intake.	

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC - ISFSI

HBRSEP shall immediately notify the NRC Operations Center via ETS, when:

EVENT	KEY WORDS	REQUIREMENT	EXAMPLES
ISFSI - ACCIDENTAL CRITICALITY OR LOSS OF SNM 10 CFR 72.74	ISFSI Criticality SNM Loss	The licensee shall notify the NRC Operations Center via ETS within one hour of discovery of accidental criticality or any loss of SNM.	– Unusually high radiation readings discovered in the vicinity of the ISFSI that could indicate possibility of a criticality event

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC - SNM SHIPMENTS

HBRSEP shall immediately notify the NRC Operations Center via ETS, when:

EVENT	KEY WORDS	REQUIREMENT	EXAMPLES
LOST OR UNACCOUNTED SHIPMENT OF SNM 10 CFR 70.52(b) 10 CFR 73.71(a)(1)	Shipment Loss SNM Spent Fuel Diversion Safeguards Security	HBRSEP shall notify the NRC Operations Center via the ETS within one hour after discovery of any loss of any shipment of SNM or spent fuel or any incident in which an attempt has been made, or is believed to have been made, to commit a theft or unlawful diversion of SNM.	– Shipment Emergency Event – Security Event (AD-SY-ALL-0150)
LOST OR UNACCOUNTED SHIPMENT OF SNM - RECOVERY 10 CFR 73.71(a)(1)	Recovery Accounting Shipment SNM Security Safeguards	HBRSEP shall notify the NRC Operations Center via the ETS within one hour after recovery of, or accounting for, any lost shipment of SNM.	

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC - FOLLOW-UP

With respect to the telephone notifications made under paragraphs (a) and (b) of 10 CFR 50.72 or paragraphs (a), (b), (c), or (d) of 10 CFR 72.75, in addition to making the required initial notification, HBRSEP shall during the course of the event immediately report:

EVENT	KEY WORDS	REQUIREMENT	EXAMPLES
FOLLOW-UP NOTIFICATION 10 CFR 50.72(c)(1) 10 CFR 72.75(f)(1)	Degradation Emergency Class Change Update Termination ISFSI	(i) any further degradation in the level of safety of the plant or ISFSI or other worsening conditions, including those that require the declaration of any of the Emergency Classes, if such a declaration has not been previously made, or (ii) any change from one Emergency Class to another, or (iii) a termination of the Emergency Class.	– Refer to EPNOT-01
FOLLOW-UP NOTIFICATION 10 CFR 50.72(c)(2) 10 CFR 72.75(f)(2)	Result Evaluation Effectiveness Unknown ISFSI	(i) the results of ensuing evaluations or assessments of plant or ISFSI conditions, (ii) the effectiveness of response or protective measures taken, and (iii) information related to plant or ISFSI behavior that is not understood.	
FOLLOW-UP NOTIFICATION 10 CFR 50.72(c)(3) 10 CFR 50.72.75(f)(3)	Open Continuous Communication ISFSI	Maintain an open, continuous communication channel with the NRC Operations Center upon request by the NRC.	– Refer to EPNOT-01

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC

IMMEDIATE (ONE HOUR) NOTIFICATIONS - NRC REGION II OFFICE

HBRSEP shall immediately notify the final delivery carrier and, by telephone and telegram, mailgram, or facsimile, the NRC Region II Office when:

EVENT	KEY WORDS	REQUIREMENT	EXAMPLES
THEFT/UNLAWFUL DIVERSION OF TRITIUM 10 CFR 30.55(c)	Incident Theft Tritium Attempt Security Safeguards	Any incident in which an attempt has been made or is believed to have been made to commit a theft of more than 10 curies of tritium (outside of spent fuel) at any one time or more than 100 curies of tritium in one calendar year	– 10 Curies of tritium discovered missing from the Chemistry Laboratory, and reason exists to suspect that the tritium was stolen
THEFT/UNLAWFUL DIVERSION OF SOURCE MATERIAL 10 CFR 40.64(c)	Incident Attempt Theft Diversion Source Security Safeguards	Any incident in which an attempt has been made or is believed to have been made to commit a theft or unlawful diversion of more than 15 pounds of Source Material at any one time or 150 pounds of Source Material in any one calendar year	– A source assembly is discovered missing from a new fuel shipment.
SHIPPING PACKAGE RADIOACTIVELY CONTAMINATED 10 CFR 20.1906(d)(1)	Contamination Shipment	Removable radioactive surface contamination exceeds the limits of 10 CFR 71.87	– New or Spent Fuel Shipment Cask arrives with surface contamination in excess of limits.
SHIPPING PACKAGE EXCEEDING EXTERNAL DOSE RATE LIMITS 10 CFR 20.1906(d)(2)	Radiation Dose Rate Shipment	External radiation levels exceeds of the limits of 10 CFR 71.47	– New or Spent Fuel Shipment Cask arrives with external radiation levels in excess of limits.

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC

IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC - FFD The NRC Region II Administrator must be notified immediately by telephone of the following:			
EVENT	**KEY WORDS**	**REQUIREMENT**	**EXAMPLES**
NRC EMPLOYEE NOT FIT FOR DUTY 10 CFR 26.77(c)	Alcohol Influence Substance NRC employee FFD Fitness for Duty	If HBRSEP has a reasonable belief that an NRC employee or NRC contractor may be under the influence of any substance, or is otherwise unfit for duty, the licensee or other entity may not deny access but shall escort the individual. In any such instance, the licensee or other entity shall immediately notify the Region II Administrator by telephone, followed by written notification (e.g., e-mail or fax) to document the oral notification. If the Region II Administrator cannot be reached, the licensee or other entity shall notify the NRC Operations Center.	
IMMEDIATE (ONE HOUR) NOTIFICATIONS TO THE NRC - IAEA The NRC Director, NRR or Director, NMSS must be notified immediately by telephone of the following:			
SURPRISE VISIT OF IAEA OFFICIAL 10 CFR 75.8(c)	IAEA International Atomic Energy Agency Credential	HBRSEP shall immediately communicate by telephone, within one hour with respect to the credentials of any person who claims to be an IAEA representative and shall accept written or electronic confirmation of the credentials from the NRC.	– If the IAEA representative's credentials have not been confirmed by the NRC, the licensee shall not admit the person until the NRC has confirmed the person's credentials. The licensee, shall notify the Commission promptly, by telephone, whenever an IAEA representative arrives at a facility or location without advance notification.

FOUR HOUR NOTIFICATIONS TO THE NRC

FOUR HOUR NOTIFICATIONS TO THE NRC

If not reported under paragraphs (a) or (b)(1) of 10 CFR 50.72, HBRSEP shall notify the NRC Operations Center via ETS as soon as practical and in all cases, within four hours of the occurrence of any of the following:

EVENT	KEY WORDS	REQUIREMENT	EXAMPLES
SHUTDOWN REQUIRED BY TS 10 CFR 50.72(b)(2)(i)	Shutdown TS Shutdown Power Reduction	The initiation of any shutdown required by the TS.	– Reactor is in MODEs 1 or 2 and the Control Room takes action to reduce power (i.e., negative reactivity insertion) in order to comply with a Required Action to be in MODE 3 within a Completion Time. Reduction in power for some other purpose than compliance with the shutdown requirement is not reportable. MODE changes required by TS when reactor is in MODEs 3, 4, or other non-power conditions, are not reportable. – If allowed outage time plus required shutdown time to MODE 3 is less than the expected restoration time of the LCO and power is reduced in anticipation of the required shutdown, the shutdown is reportable.
ECCS DISCHARGE INTO RCS 10 CFR 50.72(b)(2)(iv)(A)	ECCS Actuation Safety Injection	Any event that results or should have resulted in emergency core cooling system (ECCS) discharge into the reactor coolant system as a result of a valid signal except when the actuation results from and is part of a pre-planned sequence during testing or reactor operation.	– Manual or automatic Safety Injection System actuation in response to a valid signal that resulted in or should have resulted in discharge into the reactor coolant system.
RPS INITIATION (MANUAL/AUTOMATIC) DURING OPERATION 10 CFR 50.72(b)(2)(iv)(B)	RPS Actuation Reactor Protection System RPS Reactor Trip	Any event or condition that results in actuation of the reactor protection system (RPS) when the reactor is critical except when the actuation results from and is part of a pre-planned sequence during testing or reactor operation.	– Manual or automatic reactor trip from critical through RTP of 100%. Trips which occur as part of planned evolutions in accordance with procedures are not reportable.

FOUR HOUR NOTIFICATIONS TO THE NRC

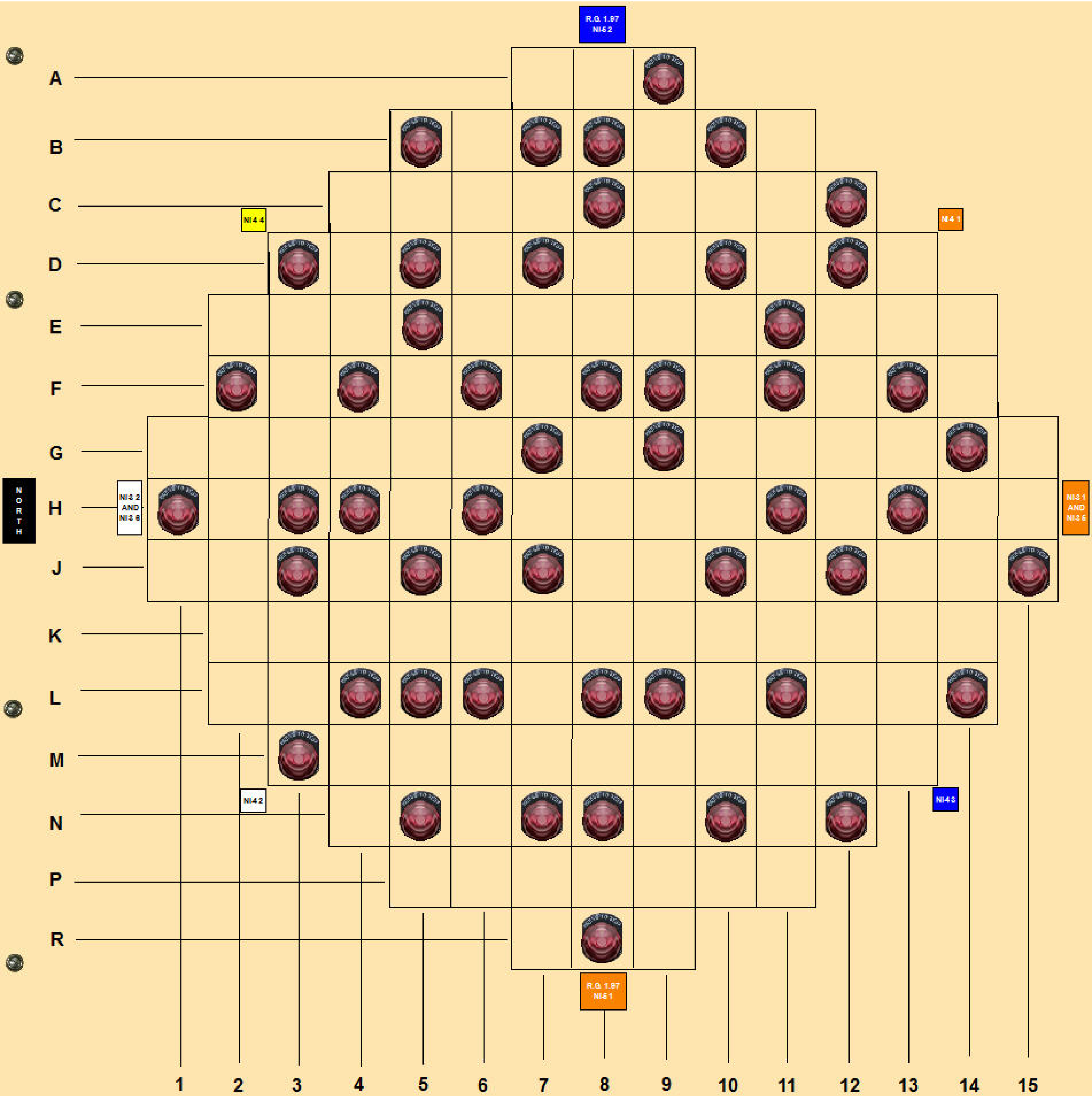
FOUR HOUR NOTIFICATIONS TO THE NRC			
If not reported under paragraphs (a) or (b)(1) of 10 CFR 50.72, HBRSEP shall notify the NRC Operations Center via ETS as soon as practical and in all cases, within four hours of the occurrence of any of the following:			
EVENT	**KEY WORDS**	**REQUIREMENT**	**EXAMPLES**
PRESS RELEASES AND GOVERNMENT NOTIFICATIONS 10 CFR 50.72(b)(2)(xi) 10 CFR 72.75(b)(2)	News Release Press Radio Television Fatality Environment Public Health and Safety Release ISFSI	Any event or situation, related to the health and safety of the public or on-site personnel, or protection of the environment, for which a news release is planned or notification to other government agencies has been or will be made. Such an event may include an on-site fatality or inadvertent release of radioactively contaminated materials. Licensees are required to notify the NRC within 4 hours of whichever of the following occurs first: – A plan to report to either the press or another government agency is approved by an individual authorized to make the final decision, or – A report has actually been made to the press or another government agency.	– Any News release concerning - A fatality, - Inadvertent release of radioactively contaminated materials to public areas - unusual or abnormal releases of radioactive effluents (See Attachment 11.14), or - Information associated with an Emergency Event except when the ERO is activated (EPNOT-01). – Notification to other government agencies concerning: - A fatality on site, - Health and safety of the public or site personnel, - Inadvertent release of radioactively contaminated materials to public areas, - Discovered endangered species kill. - Notifications to the National Response Center (EPA) related to Lake Robinson

FOUR HOUR NOTIFICATIONS TO THE NRC

FOUR HOUR NOTIFICATIONS TO THE NRC

HBRSEP shall notify the NRC Operations Center via ETS as soon as possible but not later than 4 hours after the discovery of any of the following events or conditions involving sources or spent fuel.

EVENT	KEY WORDS	REQUIREMENT	EXAMPLES
LOSS OR THEFT OF LICENSED MATERIAL (>1000X 10 CFR 20 LIMITS) 10 CFR 20.2201	Loss Theft Missing Licensed Radioactive Material Recovery	Immediately notify the NRC, after its occurrence becomes known, any lost, stolen, or missing licensed material in an aggregate quantity equal to or greater than 1,000 times the quantity specified in [10 CFR 20] Appendix C under such circumstances that it appears to HBRSEP that an exposure could result to persons in unrestricted areas. Follow-up written report required within subsequent 30 days. Note – If the lost, stolen, or missing source exceeds a "Quantity of Concern" as specified in HPP-018, then the NRC desires to be notified within 4 hours of any subsequent recovery of the source.	– A radiography source is discovered missing. The source is licensed to the radiography contractor. If the contractor does not make the required notification, HBRSEP should notify the NRC Operations Center via ETS.
ISFSI - DEPARTURE FROM LICENSE CONDITION 10 CFR 72.75(b)(1)	ISFSI Emergency Departure Deviation Health and Safety License Condition	An action taken in an emergency that departs from a condition or a technical specification contained in a license or certificate of compliance issued under 10 CFR 72 when the action is immediately needed to protect the public health and safety and no action consistent with license conditions or technical specifications that can provide adequate or equivalent protection is immediately apparent.	– Action taken in an emergency that departs from procedure that is deemed necessary to prevent releases or radiation doses to the public in excess of 10 CFR 20 limits (See AD-HU-ALL-0004).


R.G. 1.97
NI-5 2
A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
NI-4 4
NI-4 1
NORTH
NI-3 2 AND NI-3 6
NI-3 1 AND NI-3 5
NI-4 2
NI-4 3
R.G. 1.97
NI-5 1
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3.3 INSTRUMENTATION

3.3.1 Reactor Protection System (RPS) Instrumentation

LCO 3.3.1 The RPS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1-1.

ACTIONS

--NOTE--
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s).	Immediately
B. One Manual Reactor Trip channel inoperable.	B.1 Restore channel to OPERABLE status.	48 hours
	<u>OR</u>	
	B.2.1 Be in MODE 3.	54 hours
	<u>AND</u>	
	B.2.2 Open reactor trip breakers (RTBs).	55 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One channel or train inoperable.	C.1 Restore channel or train to OPERABLE status.	48 hours
	OR	
	C.2 Open RTBs.	49 hours
D. One Power Range Neutron Flux-High channel inoperable.	D.1.1 Place channel in trip.	6 hours
	AND	
	D.1.2 Reduce THERMAL POWER to ≤ 75% RTP.	12 hours
	OR	
	D.2.1 Place channel in trip.	6 hours
	AND	
	------------------NOTE----------------- Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable. ---	
	D.2.2 Perform SR 3.2.4.2.	Once per 12 hours
	OR	
	D.3 Be in MODE 3.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. One channel inoperable.	E.1	Place channel in trip.	6 hours
	OR		
	E.2	Be in MODE 3.	12 hours
F. THERMAL POWER > P-6 and < P-10, one Intermediate Range Neutron Flux channel inoperable.	F.1	Reduce THERMAL POWER to < P-6.	2 hours
	OR		
	F.2	Increase THERMAL POWER to > P-10.	2 hours
G. THERMAL POWER > P-6 and < P-10, two Intermediate Range Neutron Flux channels inoperable.	G.1	----------NOTE------------ Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed. ------------------------------	
		Suspend operations involving positive reactivity additions.	Immediately
	AND		
	G.2	Reduce THERMAL POWER to < P-6.	2 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
H. THERMAL POWER < P-6, one or two Intermediate Range Neutron Flux channels inoperable.	H.1	Restore channel(s) to OPERABLE status.	Prior to increasing THERMAL POWER to > P-6
I. One Source Range Neutron Flux channel inoperable.	I.1	--------NOTE--------- Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed. --------------------- Suspend operations involving positive reactivity additions.	Immediately
J. Two Source Range Neutron Flux channels inoperable.	J.1	Open RTBs.	Immediately
K. One Source Range Neutron Flux channel inoperable.	K.1	Restore channel to OPERABLE status.	48 hours
	<u>OR</u>		
	K.2	Open RTBs.	49 hours

(continued)

Table 3.3.1-1 (page 1 of 7)
Reactor Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT (1)
1. Manual Reactor Trip	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2. Power Range Neutron Flux						
a. High	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
b. Low	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
3. Intermediate Range Neutron Flux	1(b), 2(c)	2	F,G	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	[redacted]	[redacted]
	2(d)	2	H	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	[redacted]	[redacted]
4. Source Range Neutron Flux	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

(continued)

(1) A channel is OPERABLE with an actual Trip Setpoint value found outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint.

(2) The Nominal Trip Setpoint is as stated unless reduced as required by one or more of the following requirements: LCO 3.2.1 Required Action A.2.2; LCO 3.2.2 Required Action A.1.2.2; or LCO 3.7.1 Required Action B.2.

(a) With Rod Control System capable of rod withdrawal, or one or more rods not fully inserted.

(b) Below the P-10 (Power Range Neutron Flux) interlock.

(c) Above the P-6 (Intermediate Range Neutron Flux) interlock.

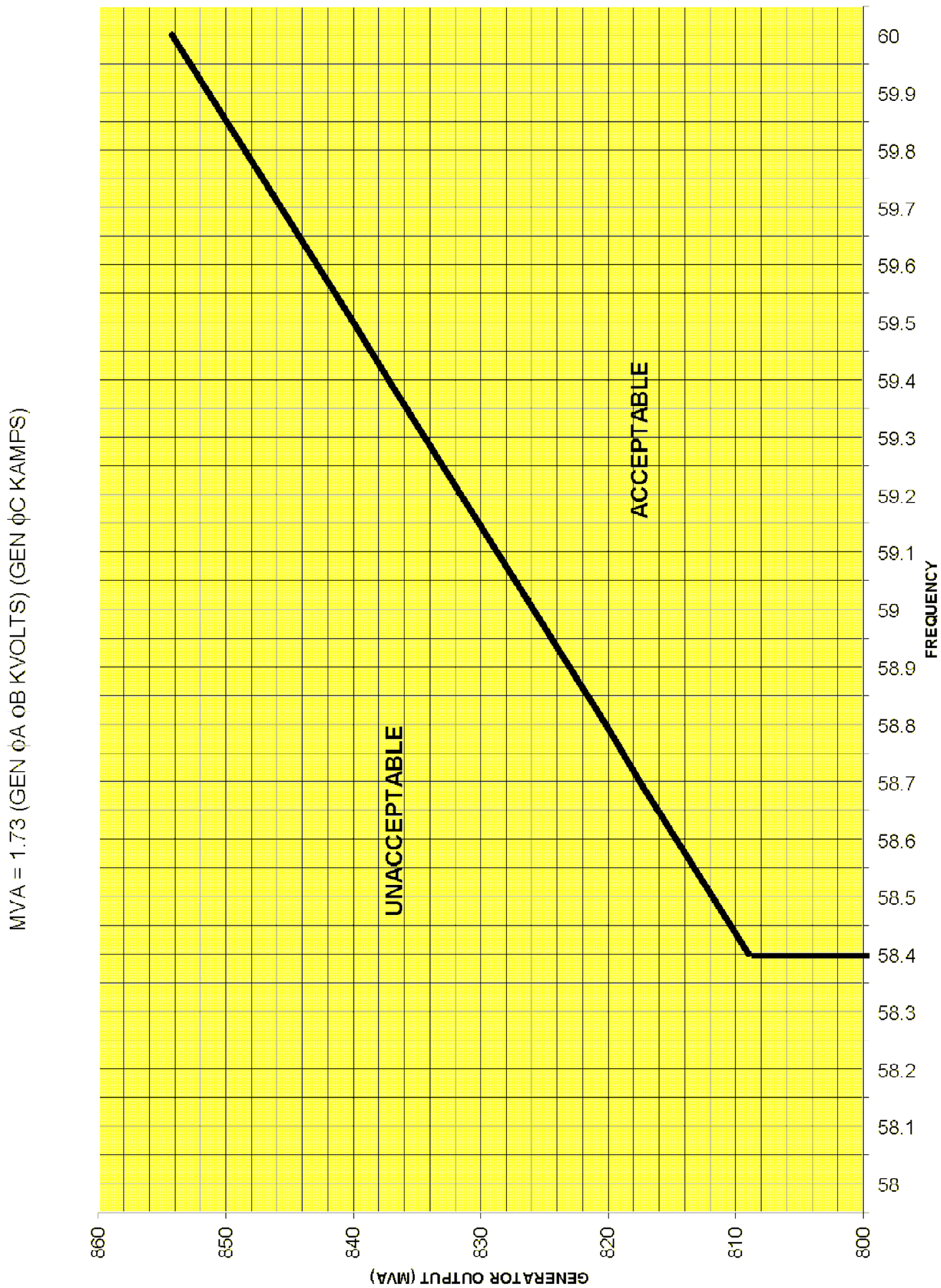
(d) Below the P-6 (Intermediate Range Neutron Flux) interlock.

(e) With the RTBs open. In this condition, source range Function does not provide reactor trip but does provide indication and alarm.

ATTACHMENT 1

MAXIMUM GENERATOR MVA OUTPUT vs SYSTEM FREQUENCY

(Page 1 of 1)



STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED

Attachment 3

RCS Pressure And Charging Flow Control Handout

(Page 1 of 1)

****

CAUTION

RCS AND Ruptured S/G(s) pressures must be maintained LESS THAN 1060 PSIG.

****

1. **CONTROL RCS Pressure AND Charging Flow To MINIMIZE RCS-To-Secondary Leakage:**

a. PERFORM appropriate action(s) from table below:

PZR Level	RUPTURED S/G(s) LEVEL		
	RISING	LOWERING	OFF SCALE HIGH
LESS THAN OR EQUAL TO 27% [44%]	• RAISE Charging flow • DEPRESSURIZE RCS using Step 1.c	RAISE Charging flow	• RAISE Charging flow • MAINTAIN RCS AND Ruptured S/G(s) pressures equal
BETWEEN 27% [44%] AND 50%	DEPRESSURIZE RCS using Step 1.c	TURN ON PZR Heaters	MAINTAIN RCS AND Ruptured S/G(s) pressures equal
BETWEEN 50% AND 73% [66%]	•DEPRESSURIZE RCS using Step 1.c •REDUCE Charging flow	TURN ON PZR Heaters	MAINTAIN RCS AND Ruptured S/G(s) pressures equal
GREATER THAN OR EQUAL TO 73% [66%]	REDUCE Charging flow	TURN ON PZR Heaters	MAINTAIN RCS AND Ruptured S/G(s) pressures equal

b. CHECK Ruptured S/G Pressure - LESS THAN 1060 PSIG

b. CONTROL Ruptured S/G pressure LESS THAN 1060 psig using Step 1.a.

c. USE Normal PZR Spray as necessary to depressurize RCS per Table in Step 1.a

c. IF Letdown is in service, THEN USE Aux PZR Spray per Supplement G, Establishing Aux PZR Spray.

IF Aux PZR Spray is NOT available OR effective, THEN USE one PZR PORV.

- END -

MATERIALS PROPERTIES BASE
CONTROLLING MATERIAL: Upper Shell Plate W10201-1
Limiting ART Values at 35 EFPY: 1/4T, 167°F
3/4T, 147°F

Curves applicable for heatup rates up to 60 ºF/Hr for Service period up to 35 EFPY.

Heatup Curves include +10ºF and -60 psig allowance For instrumentation error.

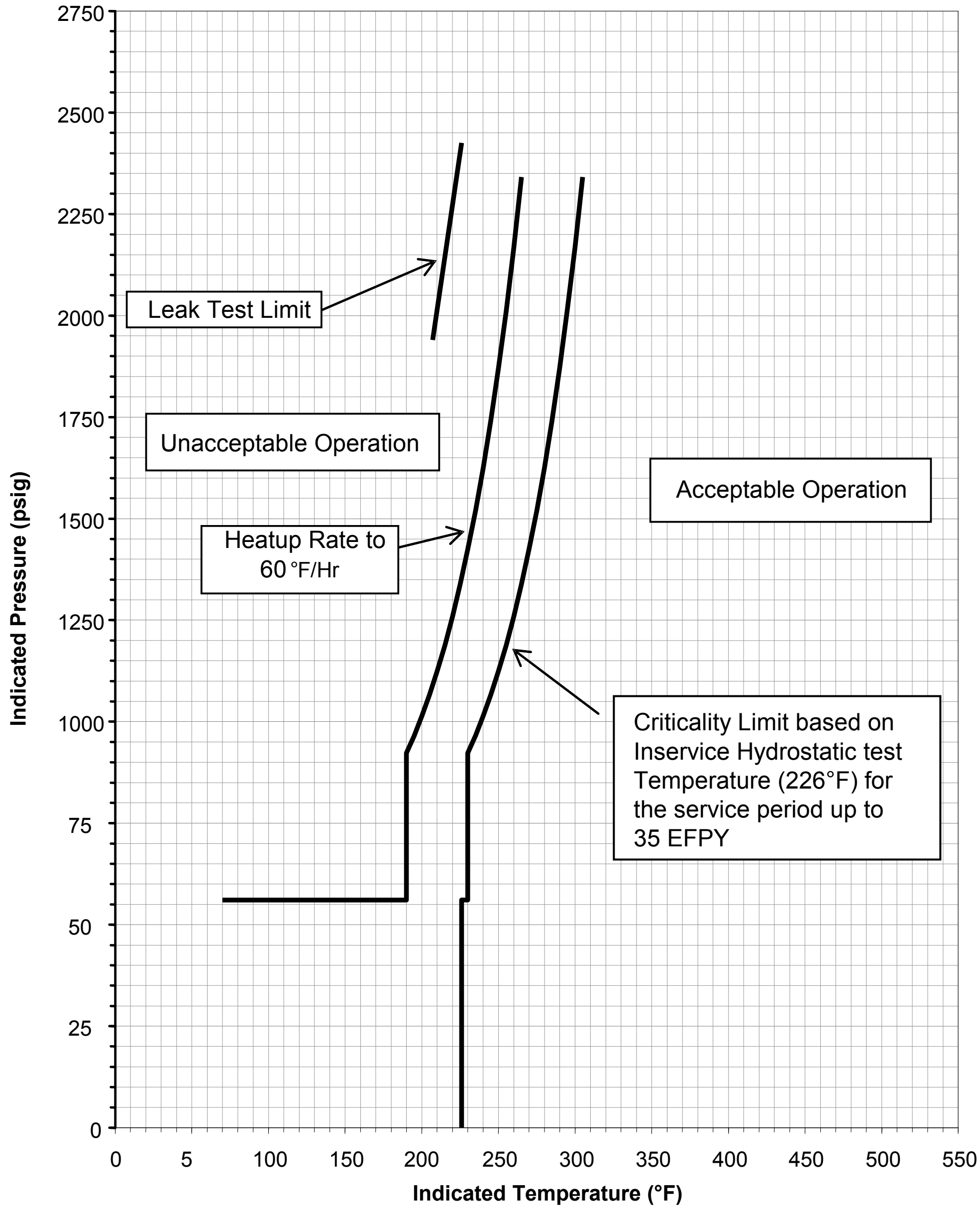


Figure 3.4.3-1
Reactor Coolant System Heatup Limits
Applicable Up to 35 EFPY