EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

1 **ID: RE10008-AA1.08-01** **Points: 1.00**

Unit 1 is at 100% power.

- 1RY455A, PZR PORV, fails OPEN and CANNOT be closed.

While monitoring PZR and PRT parameters, POSITIVE indication that the PRT rupture disk has just relieved, would be 1TI-463, PORV TEMP, ___(1)___ and 1TI-468, PRT TEMP, ___(2)___.

A. (1) LOWERING
(2) LOWERING

B. (1) LOWERING
(2) RISING

C. (1) RISING
(2) LOWERING

D. (1) RISING
(2) RISING

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 1

A - Correct: LOWERING and LOWERING are correct. PRT temperature will be approaching saturation conditions at 100 psig. It will drop to containment saturation conditions for current containment pressure when the rupture disks on the PRT relieve. There is a PRT Temp meter, pressure meter, and level meter which is monitored on the 1PM05J. PZR PORV relief line temp will drop as the PRT de-pressurizes.

B - Plausible: LOWERING is correct, RISING is incorrect. PRT TEMP will initially rise at the onset of the PORV failing open and it is a plausible misconception that PRT temperature will continue to rise.

C - Plausible: RISING is incorrect, LOWERING is correct. PORV TEMP will initially rise at the onset of the PORV failing open and it is a plausible misconception that PORV temperature will continue to rise.

D - Plausible: RISING and RISING are incorrect. PORV TEMP will initially rise at the onset of the PORV failing open and it is a plausible misconception that PORV temperature will continue to rise. PRT TEMP will initially rise at the onset of the PORV failing open and it is a plausible misconception that PRT temperature will continue to rise.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RE10008-AA1.08-01
System ID	2088413
User ID	RE10008-AA1.08-01
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	**Modified from Bank ID 177724**	**Difficulty**	**3.0**
Technical Reference and Revision #	**M-60 Sht 5, Rev. AP M-60 Sht 6, Rev. AN Pressurizer LP (I1-RY-XL-01) Rev. 7c, Page 16.**		
Training Objective	**S.RY1-15, STATE the internal design pressure of the PRT. DISCUSS how the PRT is protected from exceeding this pressure.**		
Previous NRC Exam Use	**None**		

References Provided	**None**
K/A Justification	**This question meets the KA because the examinee must monitor the change in PRT/PZR parameters (level and temperature) during a vapor space LOCA to determine if the PRT rupture disc has relieved.**
SRO-Only Justification	**Not applicable**
Additional Information	**Modified condition in stem and all answers.**

Braidwood Bank ID 177724:
Unit 1 is at 100% power.
- 1RY455A, PZR PORV, fails OPEN and CANNOT be closed.
Which ONE of the following is a positive indication that the PRT rupture disk has relieved?

A. PZR level LOWERING.
B. PZR PORV relief line temperature RISING.
C. PRT temperature LOWERING.
D. PRT level RISING.

K/A Links

APE.008.AA1.08	Safety Function: 3	Tier 1	Group 1
Ability to operate and / or monitor the following as they apply to the Pressurizer Vapor Space Accident: (CFR 41.7 / 45.5 / 45.6)			
PRT level pressure and temperature		RO Imp: 3.8	SRO Imp: 3.8

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

2	ID: RE10009-EK3.13-02	Points: 1.00

An RCS LOCA has occurred on Unit 1.

- The crew entered 1BwEP-0 "REACTOR TRIP OR SAFETY INJECTION."
- RCS pressure is 1400 psig.
- BOTH SI pumps could NOT be started.
- High head SI flow (1FI-917) is 300 gpm.

(1) RCPs will be ...

(2) What is the reason for this action?

A. (1) TRIPPED.
(2) Excessive depletion of RCS inventory leading to severe core uncovery would result if the RCPs were LEFT RUNNING throughout the event.

B. (1) TRIPPED.
(2) Excessive depletion of RCS inventory leading to severe core uncovery would result if the RCPs were TRIPPED later in the event.

C. (1) LEFT RUNNING.
(2) Maintain forced circulation flow.

D. (1) LEFT RUNNING.
(2) Raise RCS subcooling.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 2

A – Plausible: Tripped is correct, if left running throughout the event is incorrect. The RCPs would be tripped with the provided indications. Part 2 is plausible because if continued RCP operation could be guaranteed, it would be desirable to leave them running due to lower peak cladding temperatures. However, this cannot be guaranteed.

B – Correct: Tripped and tripped later in the event are correct. The RCPs would be tripped with the provided indications. In a SBLOCA, RCPs are tripped early to minimize inventory loss that could lead to core uncovery if RCPs were tripped later in the event. All other answers are plausible, but the main concern during a SBLOCA is the excessive depletion of RCS inventory. If it could be guaranteed that the RCPs would remain running throughout the entire event, then it would be desirable to leave them running. However, this cannot be guaranteed.

C – Plausible: Left running and maintain forced circulation flow are incorrect. It is desirable to leave RCPs running to maintain forced circulation flow in several events, such as a steam generator tube rupture, and would be desirable to leave RCPs running in this event if it could be guaranteed that they would remain running throughout the entire event. However, this is incorrect because RCPs are not left running with the provided indications as continued RCP operation cannot be guaranteed.

D – Plausible: Left running and raise RCS subcooling are incorrect. RCPs are not left running with the provided indications. It is desirable to leave RCPs running to raise RCS subcooling in several events, and it would be desirable to leave RCPs running in this event if it could be guaranteed that they would remain running throughout the entire event. However, this is incorrect because continued RCP operation cannot be guaranteed, and the RCPs must therefore be tripped to minimize RCS mass loss.

Question Information

Topic	RE10009-EK3.13-02
System ID	2088418
User ID	RE10009-EK3.13-02
Time to Complete	2
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	**Bank**	**Difficulty**	**2.5**
Technical Reference and Revision #	**RCP TRIP/RESTART, Rev. 3, Page 8 RCP Trip/Restart (I1-EP-XL-01A) Rev. 5.a Page 4.**		
Training Objective	**T.EP01A-O1-A DISCUSS the operation of the Reactor Coolant Pumps in terms of: RCP Trip Criteria**		
Previous NRC Exam Use	**None**		

References Provided	**None**
K/A Justification	**This question meets the KA because the examinee must determine that RCPs are to be tripped given SBLOCA parameters and determine the reason for tripping the RCPs.**
SRO-Only Justification	**Not applicable**
Additional Information	**None**

K/A Links

EPE.009.EK3.13	Safety Function: 3	Tier 1	Group 1
Knowledge of the reasons for the following responses as the apply to the small break LOCA: (CFR 41.5 / 41.10 / 45.6 / 45.13)			
Stopping the affected RCP		RO Imp: 3.4	SRO Imp: 3.7

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

3	ID: RE10011-EK2.02-03-A	Points: 1.00

Unit 1 has experienced an RCS LOCA combined with a Loss of Offsite Power from 100% power.

- RCS pressure is 100 psig.

Which of the following is the ORDER that the ECCS pumps will start and provide flow to the RCS?

A. 1. RH
2. CV
3. SI

B. 1. CV
2. RH
3. SI

C. 1. CV
2. SI
3. RH

D. 1. RH
2. SI
3. CV

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 3

A – Plausible: This is the correct order for starting ECCS pumps after a loss of offsite power with SI reset in 1BwEP ES-1.3, TRANSFER TO COLD LEG RECIRCULATION UNIT 1. The examinee may plausibly conclude this is the correct sequence due to the note in 1BwEP ES-1.3.

B – Plausible: The ESF sequencer will start the CV pump first. The examinee may conclude the RH pumps are started before the SI pumps due to the note from 1BwEP ES-1.3 which alters the order of ECCS pump operation from the sequencer and incorrectly apply this logic after the CV pump start.

C – Correct: With a loss of offsite power and SI, the ECCS pumps will start on the ESF sequencer. The sequencing order and timing for the ECCS pumps are CV at 0 sec., SI at 5 sec. and RH at 10 sec.

D – Plausible: The RH pumps are started first, after a loss of offsite power with SI reset in

1BwEP ES-1.3, TRANSFER TO COLD LEG RECIRCULATION UNIT 1. The examinee may plausibly conclude this is the correct sequence due to the note in 1BwEP ES-1.3 and that the next pump started would be in the order of the sequencer (SI).

Question Information

Topic	RE10011-EK2.02-03
System ID	2104774
User ID	RE10011-EK2.02-03-A
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	**Bank**	**Difficulty**	**2.0**
Technical Reference and Revision #	**20E-1-4030EF01, Rev. V ECCS lesson plan (I1-EC-XL-01) Rev. 5d Page 43.**		
Training Objective	**S.EC1-09-A DESCRIBE the Sequence of Events that occur on a Safety Injection to include: Which pumps start**		
Previous NRC Exam Use	**2011 NRC Exam Question #3**		

References Provided	**None**
K/A Justification	**The question meets the K/A, requires examinee knowledge of interrelation between a large break LOCA and ECCS pumps.**
SRO-Only Justification	**Not applicable**
Additional Information	**None**

K/A Links

EPE.011.EK2.02	Safety Function: 3	Tier 1	Group 1
Knowledge of the interrelations between the and the following Large Break LOCA: (CFR 41.7 / 45.7)			
Pumps		RO Imp: 2.6*	SRO Imp: 2.7*

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

4	ID: RE10015-K1.04-04	Points: 1.00

Unit 1 is at 26% power.

- Steam Dumps are in the TAVE mode.
- Main Turbine load is 252 Mw.
- IMPULSE PRESS OUT and MW OUT are selected on DEH Operation Panel Graphic 5501.
- Rod Bank Select Switch is in MANUAL.
- The 1C RCP TRIPS.

A Reactor Trip DOES NOT occur, and NO operator actions are taken.

(1) Steady state to steady state, total RCS LOOP FLOW will lower...

(2) STEAM FLOW in the UNAFFECTED loops will...

A. (1) but remain greater than 3/4 full flow.
(2) LOWER.

B. (1) but remain greater than 3/4 full flow.
(2) RISE.

C. (1) to slightly less than 3/4 full flow.
(2) LOWER.

D. (1) to slightly less than 3/4 full flow.
(2) RISE.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 4

A – Plausible: TOTAL RCS loop flow will remain greater than 3/4 full flow is correct. Unaffected loop steam flow will lower is incorrect. This would be the correct answer if the stem asked for unaffected loop steam pressure.

B – Correct: Rx power will remain constant due to constant steam demand. Reverse flow through the affected loop will raise flow in each of the unaffected loops. Lower RCS flow (less heating) in the affected loop will drop steam pressure and steam flow in the affected loop and subsequently raise steam flow in the unaffected loops also dropping steam pressure in them.

C – Plausible: TOTAL RCS loop flow lowering to less than 3/4 full flow is incorrect. Unaffected loops steam flow will drop is incorrect. This would be the correct answer if the stem asked for core flow vice loop flow and steam pressure of the unaffected loop.

D – Plausible: TOTAL RCS loop flow lowering to less than 3/4 full flow is incorrect. Unaffected loop steam flow will rise is correct. This would be the correct answer if the stem asked for core flow vice loop flow.

Question Information

Topic	RE10015-K1.04-04
System ID	2104775
User ID	RE10015-K1.04-04
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	RCP Lesson Plan (I1-RC-XL-02) Rev. 5d, Page 40.		
Training Objective	S.RC2-07-B ANALYZE and PREDICT the effect that a loss of (a) Reactor Coolant Pumps will have on the following: Steam generator parameters		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must evaluate the operational implications in an idle loop at power, its effect on RCS loop flow, and SG Pressure during a reactor coolant pump malfunction (trip).
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

APE.015/017.AK1.04	Safety Function: 4	Tier 1	Group 1
Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow): (CFR 41.8 / 41.10 / 45.3)			
Basic steady state thermodynamic relationship between RCS loops and S/Gs resulting from unbalanced RCS flow		RO Imp: 2.9	SRO Imp: 3.1*

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

5	ID: RE10022-G2.4.2-05	Points: 1.00

Unit 2 is at 100% power.

- An electrical fault has caused 2CV8324A, CHG TO REGEN HX 2A ISOL VLV, to close.

No additional operator actions are taken.

2BwEP-0, REACTOR TRIP OR SAFETY INJECTION UNIT 2, will be entered due to a reactor trip from...

A. OT∆T.

B. High PZR Level.

C. Low PZR Pressure.

D. CNMT High Pressure SI.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 5

A – Plausible: OT∆T is incorrect. The OT∆T calculated trip setpoint changes, as PZR pressure lowers the setpoint lowers. Plausibly correct if normal letdown did not isolate due to the interlock between 2CV8324A and 2CV8389A, LTDN TO REGEN HX 2A ISOL VLV.

B – Correct: High PZR Level is correct. With no other operator actions, normal charging and letdown isolated, PZR level will rise until reaching the High PZR Level trip setpoint (≥92%). This will occur due to charging through the RCP seals and the minimum bias of 52 gpm with charging control in automatic.

C – Plausible: Low PZR Pressure is incorrect. The Low PZR Pressure reactor trip occurs at ≤ 1885 psig. Plausibly correct if normal letdown did not isolate causing pressurizer level and pressure to lower (interlock between 2CV8324A and 2CV8389A, LTDN TO REGEN HX 2A ISOL VLV).

D – Plausible: CNMT High Pressure SI is incorrect. The CNMT high pressure SI reactor trip would be generated at ≥ 3.4 psig in containment. Plausible misconception that the rising PZR level will cause PZR pressure to rise to the PORV relief setpoint. This would cause a relief to the PRT. The PRT would then depressurize to containment when the rupture discs relieve to containment. However, this is incorrect because the PZR spray valves will throttle as PZR pressure rises to prevent this trip from occurring.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RE10022-G2.4.2-05
System ID	2088512
User ID	RE10022-G2.4.2-05
Time to Complete	2
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	3.0
Technical Reference and Revision #	20E-2-4030CV27, Rev. B CVCS Lesson Plan (I1-CV-XL-01) Rev. 9, Page 37.		
Training Objective	S.CV1-17-C PREDICT how each of the following supported systems will be impacted by CVCS failures (after the listed system has been taught): Pressurizer		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must predict which automatic reactor trip will occur causing an entry into an EOP (2BwEP-0) in a loss of reactor coolant makeup (loss of normal charging) scenario.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

GE.4.0.APE.022	Safety Function: 2	Tier 1	Group 1
Loss of Reactor Coolant Makeup		RO Imp:	SRO Imp:
P2.4.2	Safety Function: 2	Tier 3	Group
Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions. (CFR: 41.7 / 45.7 / 45.8)		RO Imp: 4.5	SRO Imp: 4.6

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links
- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

6	ID: RE10025-AA2.01-06	Points: 1.00

Unit 2 is in MODE 5.

- RCS temperature is 100˚F.
- Pressurizer Level is 50%.
- The 2A RH train is in shutdown cooling.
- The 2B RH train is in STANDBY.

- The 2A RH pump amps are fluctuating between 50 to 60 amps.
- The 2A RH pump flow is fluctuating between 4500 to 5000 gpm.

The crew will enter __(1)__, and __(2)__ to correct the issue.

A. (1) 2BwCA-1.3, SUMP BLOCKAGE CONTROL ROOM GUIDLINE UNIT 2
(2) IMMEDIATELY trip the 2A RH pump to prevent damage

B. (1) 2BwCA-1.3, SUMP BLOCKAGE CONTROL ROOM GUIDLINE UNIT 2
(2) take manual control of 2RH618, HX 1A BYP FLOW CONT VLV, to reduce flow

C. (1) 2BwOA PRI-10, LOSS OF RH COOLING UNIT 2
(2) IMMEDIATELY trip the 2A RH pump to prevent damage

D. (1) 2BwOA PRI-10, LOSS OF RH COOLING UNIT 2
(2) take manual control of 2RH618, HX 1A BYP FLOW CONT VLV, to reduce flow

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 6

A – Plausible: 2BwCA-1.3 and immediately trip the 2A RH pump are incorrect. 2BwCA-1.3 would be correct if this issue occurred following the establishment of cold leg recirc. This is a plausible selection as fluctuating RH pump amps are entry criteria for the procedure. The 2A RH pump amps are fluctuating near the red band. This would be correct if the 2A RH pump flow was reduced and did not stabilize parameters.

B – Plausible: 2BwCA-1.3 is incorrect, take manual control of 2RH618 to reduce system flow is correct. 2BwCA-1.2 would be correct if this issue occurred following the establishment of cold leg recirc. This is a plausible selection as fluctuating RH pump amps are entry criteria for the procedure.

C – Plausible: 2BwOA PRI-10 is correct, immediately trip the 2A RH pump is incorrect. This would be correct if the 2A RH pump flow was reduced and did not stabilize parameters.

D – Correct: 2BwOA PRI-10 and Take manual control of 2RH618 to reduce flow are correct. Per 2BwOA PRI-10 the first mitigative strategy performed is to reduce RH pump flow. The crew should attempt to stabilize RH system operation prior to tripping the running RH pump and continuing to further mitigating actions.

Question Information

Topic	RE10025-AA2.01-06
System ID	2088532
User ID	RE10025-AA2.01-06
Time to Complete	2
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.8
Technical Reference and Revision #	2BwOA PRI-10, Rev. 107, Page 2 _BwOA PRI-10 Lesson Plan (I1-OA-XL-20) Rev. 13, Page 2.		
Training Objective	T.OA20-05 DESCRIBE the actions necessary to stabilize the plant following the Loss of RH Cooling.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must interpret the running RH pump amperage and determine the correct mitigative strategy per 2BwOA PRI-10, LOSS OF RH COOLING UNIT 2.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

APE.025.AA2.01	Safety Function: 4	Tier 1	Group 1
Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: (CFR: 43.5 / 45.13)			
Proper amperage of running LPI/decay heat removal/RHR pump(s)		RO Imp: 2.7	SRO Imp: 2.9

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

7	ID: RE10026-AA1.05-07	Points: 1.00

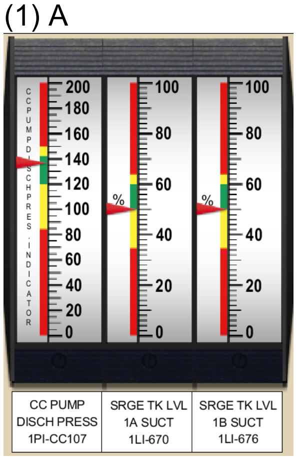
Unit 1 is at 100% power.

The crew has entered 1BwOA PRI-6, COMPONENT COOLING MALFUNCTION UNIT 1, and is performing Attachment B, ABNORMAL CC SURGE TANK LEVEL.

- The field supervisor has reported a 2 gpm leak in the 1A CC Pump discharge piping.
- Unit 1 CC parameters currently indicate as shown below:

The NEXT, AUTOMATIC CC surge tank makeup will initiate when CC parameters indicate ___(1)___ from ___(2)___.

(1) A



(1) B

A. (1) A
(2) PW

B. (1) A
(2) WM

C. (1) B
(2) PW

D. (1) B
(2) WM

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 7

A – Plausible: 50% is correct, PW is incorrect. 50% is the correct level for the next automatic makeup to the CC surge tank, given the conditions in the stem. PW would be correct if level was as shown in graphic A (50%).

B – Correct: 50% and WM are correct. The initial CC surge tank level given in the stem is 52%. At 50% the WM makeup valve, 1CC183, will open to restore CC surge tank level and close at 55%.

C – Plausible: 45% is incorrect, PW is incorrect. At 45% the PW (primary water) makeup valve, 1CC182, will open to restore CC surge tank level and close at 55%. However, since the level given in the stem is 52%, the next automatic CC surge tank makeup will occur from the WM (demin water) source at 50%. 45% and PW would be correct if the initial level was as shown in graphic A (50%).

D – Plausible: 45% is incorrect, WM is correct. At 45% the PW (primary water) makeup valve, 1CC182, will open to restore CC surge tank level and close at 55%. 45% would be correct if the initial level were as shown in graphic A (50%).

Question Information

Topic	RE10026-AA1.05-07
System ID	2088597
User ID	RE10026-AA1.05-07
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.8
Technical Reference and Revision #	BwAR 1-2-E4, Rev. 1E3 Component Cooling Water System Lesson Plan (I1-CC-XL-01) Rev. 5a, page 12.		
Training Objective	S.CC1-09 IDENTIFY the normal and emergency make-up water sources to the CC system.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the K/A because the examinee must monitor the current CC surge tank level indication and determine the next automatic level control response, during a loss of CCW event.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

APE.062.AA1.05	Safety Function: 4	Tier 1	Group 1
Ability to operate and / or monitor the following as they apply to the Loss of Nuclear Service Water (SWS): (CFR 41.7 / 45.5 / 45.6)			
The CCWS surge tank, including level control and level alarms, and radiation alarm		RO Imp: 3.1	SRO Imp: 3.1

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

8	ID: RE10027-AK3.01-08	Points: 1.00

Unit 2 is at 100% power.

- The PZR PRESS CONT CH SELECT switch at 2PM05J is in the CH-455/456 position.
- 2PT-455, PZR PRESS failed to 2450 psig.

The RO will...

A. place 2PK-455A, MASTER PZR PRESS CONT, in manual to prevent opening of the pressurizer safety valves.

B. place 2PK-455A, MASTER PZR PRESS CONT, in manual to prevent lifting of the pressurizer PORVs.

C. place the PZR PRESS CONT CH SELECT switch to CH-457/458 to prevent the RCS from reaching DNB condition.

D. place the PZR PRESS CONT CH SELECT switch to CH-457/458 to allow 2RY456 to auto close.

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 8

Unit 2, 7300 controls question.

A – Plausible: place 2PK-455A, MASTER PZR PRESS CONT, in manual to prevent opening of the pressurizer safety valves is incorrect. Pressurizer safety valves will not open on lowering pressure. This would be correct if 2PT455 had failed to 1700 PSIG which would energize all pressurizer heaters and cause actual pressure to rise.

B – Plausible: place 2PK-455A, MASTER PZR PRESS CONT, in manual to prevent lifting of the pressurizer PORVs, is incorrect. Per 2BwPR 2-12-RY, if a PZR PRESS channel fails high an operable channel will be selected. This would be correct if 2PT455 had failed to 1700 PSIG which would energize all pressurizer heaters and cause actual pressure to rise.

C – Plausible: place the PRESS CONT CH SELECT switch to CH-457/458 to prevent the RCS from reaching DNB condition, is correct. lowering pressurizer pressure will result in RCS DNB condition.

D – Plausible: place the PRESS CONT CH SELECT switch to CH-457/458 to allow 2RY456 to auto close, is incorrect. Since PORV 2RY456 will not open, it will not have to be reclosed. This would be correct if 2PT456 failed high.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RE10027-AK3.01-08
System ID	2106292
User ID	RE10027-AK3.01-08
Time to Complete	1
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.5
Technical Reference and Revision #	2BwPR 2-12-RY, Rev. 2 Bwd Big note RY-2 rev. 9		
Training Objective	3D.RY-02-A		
Previous NRC Exam Use	Braidwood 2011 NRC Exam #7		

References Provided	None
K/A Justification	The question meets the K/A, requires examinee knowledge of reason for taking manual control of pressurizer spray valves and closing them by selecting an operable pressurizer pressure channel. Failing 2PT-455 high will de-energize all pressurizer heaters and open pressurizer spray and PORV valves resulting in RCS pressure lowering.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

APE.027.AK3.01	Safety Function: 3	Tier 1	Group 1
Knowledge of the reasons for the following responses as they apply to the Pressurizer Pressure Control Malfunctions: (CFR 41.5,41.10 / 45.6 / 45.13)			
Isolation of PZR spray following loss of PZR heaters		RO Imp: 3.5*	SRO Imp: 3.8

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

9	ID: RE10038-K1.03-09	Points: 1.00

Unit 1 was at 100% reactor power.

A Steamline break inside containment caused a SGTR in the 1D S/G.

- The 1A and 1C RCPs tripped on overcurrent after the main generator tripped.
- The 1B and 1D RCPs were tripped by the crew on low RCS pressure.
- The crew has transitioned to 1BwCA-3.1, SGTR WITH LOSS OF REACTOR COOLANT - SUBCOOLED RECOVERY DESIRED UNIT 1.
- The crew is performing step 24, CHECK RCP STATUS.
- RCS cold leg temperatures are 420˚F and slowly lowering.
- RVLIS head/plenum levels are 31%/100%.

When ALL conditions have been met to start an RCP, the crew will initially start the 1B RCP, rather than the 1D RCP, to...

A. prevent a pressurized thermal shock.

B. provide RCS pressure control.

C. refill the reactor vessel head.

D. prevent inadvertent criticality.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 9

A – Plausible: prevent a pressurized thermal shock is incorrect. Per the basis of 1BwFR-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION UNIT 1, step 6, CHECK IF ECCS FLOW CAN BE TERMINATED, an RCP is started to decrease the likelihood of a PTS condition. The examinee could plausibly conceive that since a large cooldown has occurred that PTS could be a concern (>100˚F in 1 hour).

B – Plausible: Provide RCS pressure control is incorrect. Restarting either the 1D or 1C RCP would provide spray flow and allow for RCS pressure control through 1RY455B and 1RY455C. Plausible misconception that 1RY455B, PZR SPRAY VLV, is fed from the 1B loop and therefore will provide pressure control.

C – Plausible: refill the reactor vessel head is incorrect. 1BwFR-I.3, RESPONSE TO VOIDS IN REACTOR VESSEL UNIT 1, starts an RCP at step 9 to attempt to collapse a void in the reactor head. The conditions given in the stem indicate that a void has occurred in the reactor head.

D – Correct: prevent inadvertent criticality is correct. The natural circulation cooldown of the

RCS could have allowed a significant volume of non-borated water to enter the 1D loop. Per the caution just prior to step 17 and 24 of 1BwCA-3.1, an RCP is not started in the affected loop to prevent an inadvertent criticality.

Question Information

Topic	RE10038-K1.03-09
System ID	2088613
User ID	RE10038-K1.03-09
Time to Complete	4
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.3
Technical Reference and Revision #	1BwCA-3.1, Rev. 301, Page 19 CA-3.1, 3.2, 3.3 Lesson Plan (I1-CA-XL-04) Rev. 12, Page 14.		
Training Objective	T.CA4-01-C Given a step, note or caution from _BwCA-3.1, 3.2, 3.3, EXPLAIN the basis of that step, note, or caution		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the K/A because the examinee must have knowledge of the operational implications of performing a natural circ cooldown during a SGTR casualty and the impact to follow on sections of the procedure (starting an RCP).
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

EPE.038.EK1.03	Safety Function: 3	Tier 1	Group 1
Knowledge of the operational implications of the following concepts as they apply to the SGTR: (CFR 41.8 / 41.10 / 45.3)			
Natural circulation		RO Imp: 3.9	SRO Imp: 4.2

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

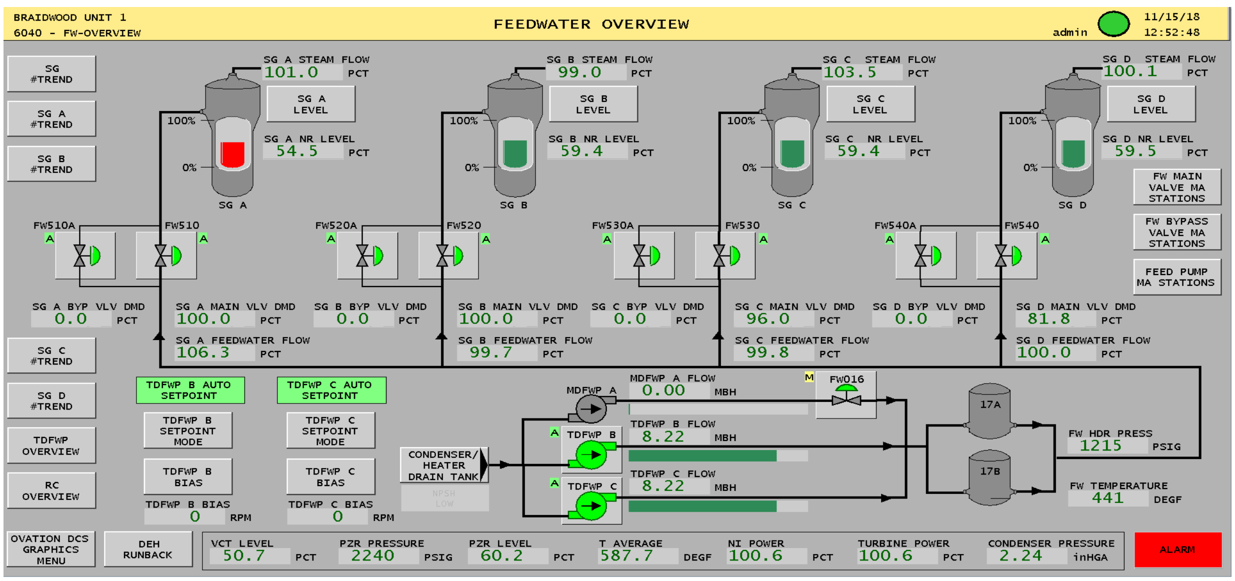
10	ID: RE10054-AK1.01-10	Points: 1.00

Unit 1 is at 100% power.

The following annunciators have just alarmed:

- 1-1-A2, CNMT DRAIN LEAK DETECT FLOW HIGH
- 1-10-E4, OVATION SYSTEM TROUBLE
- 1-10-E5, OVATION ALTERNATE ACTION

The RO reviews OWS graphic 6040, FW OVERVIEW, and notes the following:



The crew will...

1. Reduce Unit 1 Turbine Loading
2. Trip Unit 1 Reactor
3. Initiate Safety Injection
4. Actuate Main Steamline Isolation

A. 1 ONLY.

B. 2 ONLY.

C. 2 and 3 ONLY.

D. 2, 3, and 4.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 10

A – Plausible: Trip unit 1 reactor only is incorrect. The indications provided shows the containment leak detection flow high alarm in, coupled with the 1A SG level at 54.5 % and 106.3% feed flow in the 1A SG. These conditions are indicative of a feedline break in containment, requiring a reactor trip. Incorrect because tripping the reactor, initiating SI and MSI are all high-level actions to mitigate the event in progress.

B – Plausible: Reduce turbine loading only is incorrect. BwOA INST-2, OPERATION WITH A FAILED INSTRUMENT CHANNEL UNIT 1, Attachment E, NARROW RANGE SG LEVEL CHANNEL FAILURE, Step 2 RNO has actions to reduce turbine load. The examinee may plausibly conclude the narrow range SG level shown has been caused by a failed instrument and actions are needed to reduce power to less than 100%.

C – Plausible: Trip the reactor and initiate SI only is incorrect. The indications provided shows the containment leak detection flow high alarm in, coupled with the 1A SG level at 54.5 % and 106.3% feed flow in the 1A SG. These conditions are indicative of a feedline break in containment, requiring a reactor trip. The examinee may plausibly conclude that only a reactor trip and SI is required to address this casualty since MSI does not close FWIVs. Incorrect because tripping the reactor, initiating SI and MSI are all high-level actions to mitigate the event in progress.

D – Correct: Trip the reactor, SI and MSI is correct. The indications provided shows the containment leak detection flow high alarm in, coupled with the 1A SG level at 54.5 % and 106.3% feed flow in the 1A SG. These conditions are indicative of a feedline break in containment. The crew will trip the reactor, initiate SI and main steam isolation (MSI) as high-level actions to mitigate the event in progress.

Question Information

Topic	RE10054-AK1.01-10
System ID	2088986
User ID	RE10054-AK1.01-10
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	3.3
Technical Reference and Revision #	1BwEP-2, Rev. 300, Page 13 1BwEP-0, Rev. 303, Page 5 _BwEP-2 Faulted Steam Generator Isolation Lesson Plan (I1-EP-XL-03), Rev. 14, Page 6.		
Training Objective	T.EP03-04 Given a set of plant conditions, DIAGNOSE and ANALYZE a faulted steam generator.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must have knowledge of the operational implications of a loss of main feedwater caused by a MFW line break which depressurizes the SG into containment.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

APE.054.AK1.01	Safety Function: 4	Tier 1	Group 1
Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): (CFR 41.8 / 41.10 / 45.3)			
MFW line break depressurizes the S/G (similar to a steam line break)	RO Imp: 4.1	SRO Imp: 4.3	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

11	ID: RE10055-G2.4.6-11	Points: 1.00

Unit 1 has experienced an extended Loss of All AC Power.

- The crew is performing 1BwCA-0.0, LOSS OF ALL AC POWER, Attachment B, EXTENDED LOSS OF ALL AC POWER RESPONSE.
- Step 10, DEPRESSURIZE ALL INTACT SGs TO 260 PSIG, is in progress.

What mitigation strategy is met by depressurizing the SGs?

A. Minimize RCS inventory loss.

B. Maximize Aux. Feed flow rates.

C. Prevent lifting PZR safety valves.

D. Minimize S/G tube differential pressure.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 11

A – Correct: Minimize RCS inventory loss is correct. Per the WOG background document for CA-0.0, the basis for depressurizing the SGs is to reduce RCS temperature and pressure to reduce RCP seal leakage and minimize RCS inventory loss. Per the ERG background document for ECA-0.0, operator action is taken to reduce SG pressures prior to allowing them to reach the SG safety setpoints to minimize the RCS inventory loss from imminent RCP seal failure.

B – Plausible: Maximize Aux. Feed flow rates is incorrect. The 1B AF pump is designed with adequate pump head pressure (990 gpm at 1450 psig) to overcome SG pressures up to the SG safety setpoints, therefore there is no reason to depressurize to raise flow. The examinee may plausibly conclude pressure is lowered to fill the S/Gs like BwEP-3 where the RCS is depressurized to refill the PZR.

C – Plausible: Prevent lifting PZR safety valves is incorrect. With the RCP seal leakage anticipated during this event, pressurizer level and pressure will be dropping and not challenging the pressurizer safety setpoints. The examinee may plausibly conclude RCS pressure is rising due to the lack of decay heat removal. This would cause a corresponding rise in pressure as the PZR bubble is compressed.

D – Plausible: Minimize S/G tube differential pressure is incorrect. During a SGTR event, steam is dumped to cooldown and eventually depressurize the RCS, however S/G tube DP is not a primary concern during an loss of all AC event since the RCS pressure will be dropping due to the seal leakage. The examinee plausibly conclude RCS pressure has lowered below S/G

Pressure, due to the potential for an RCS LOCA through the RCP seals, and the DP must be reduced. The design limit for DP across the SG tubes is 1600 psid primary to secondary, and 670 psid secondary to primary.

Question Information

Topic	RE10055-G2.4.6-11
System ID	2094518
User ID	RE10055-G2.4.6-11
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	BD-CA-0.0, Rev. 302, Page 125 Loss of All AC Power Lesson Plan (I1-CA-XL-01), Page 4.		
Training Objective	T.CA1-04, DISCUSS the purpose and overall mitigative strategy of the _BwCA-0 series procedures.		
Previous NRC Exam Use	2016 Braidwood NRC Exam #60 2011 Braidwood NRC Exam #11		

References Provided	None
K/A Justification	This question meets the KA because the examinee must have a knowledge of the EOP mitigation strategy being accomplished by depressurizing the SGs.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

GE.4.0.EPE.055	Safety Function: 6	Tier 1	Group 1
Loss of Offsite and Onsite Power (Station Blackout)		RO Imp:	SRO Imp:
P2.4.6	Safety Function: 6	Tier 3	Group
Knowledge of EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)		RO Imp: 3.7	SRO Imp: 4.7

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

12	ID: RE10056-AA2.17-12	Points: 1.00

Unit 1 is at 100% power.

Unit 2 is at 13% reactor power with a unit start up in progress.
- U-2 Main Generator preps for synchronization are in progress.

A Unit 2 SAT fault results in a loss of off-site power on Unit 2.
- 2BwEP ES-0.1, REACTOR TRIP RESPONSE UNIT 2, is in progress to crosstie Non-ESF buses to ESF buses.

For Unit 2, the most time critical reason for re-energizing a Non-ESF bus is to...

A. re-establish positive RCS pressure control.

B. re-establish positive RCS inventory control.

C. prevent Main Generator hydrogen from escaping.

D. prevent over-heating of WS cooled Non-ESF equipment.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 12

A – Correct: re-establish positive RCS pressure control is correct. The background document for 2BwEP ES-0.1 gives examples of non-ESF loads that may need to be repowered for long term recovery as air compressor and pressurizer heaters. Operating experience (INPO OE12279) has shown that the loss of pressurizer heaters can lead to lowering of RCS pressure and a low pressurizer pressure SI. Because of this, the restoration steps of 2BwEP ES-0.1 are prioritized with restoring pressurizer heaters first.

B – Plausible: re-establish positive RCS inventory control is incorrect. Instrument and station air will be available from the SACs supplied by Unit 1 (U1 and U0) which have low pressure auto start interlocks if necessary. Therefore, RCS inventory control from charging and letdown will remain available. The examinee may plausibly conceive that the NON-ESF busses must be restored to provide station/instrument air since power will be lost to the unit 2 SAC and the 0C WS pump which provides cooling to the other SACs. This would be correct if all offsite power was lost to the station and the ABT to the UATs did not function.

C – Plausible: prevent Main Generator hydrogen from escaping is incorrect. Although power will be lost to the air side and hydrogen side seal oil pumps and loss of generator hydrogen has the potential to be a serious plant problem, the seal oil system will remain in operation via the back-up oil supplied from the bearing oil pump which is powered from ESF bus 131X. This would be correct if the bearing oil pump failed.

D – Plausible: prevent over-heating of WS cooled Non-ESF equipment is incorrect. WS will be available from the WS pumps supplied by Unit 1 (0A and 0B) which have low pressure auto start interlocks if necessary. The examinee may plausibly conceive that the loss of the 0C WS pump will require restoration of the non esf bus to prevent damage to WS cooled components like the main generator and station air compressors. This would be correct if all offsite power was lost to the station and the ABT to the UATs did not function.

Question Information

Topic	RE10056-AA2.17-12
System ID	2094974
User ID	RE10056-AA2.17-12
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.5
Technical Reference and Revision #	BD-EP ES-0.1, Rev. 301, Page 21 _BwOA ELEC-4 Lesson Plan (I1-OA-XL-04), Rev. 10a, Page 18		
Training Objective	T.OA04-10 ANALYZE a given set of plant conditions and DETERMINE the required actions to: Maintain And Control Primary Plant Pressure.		
Previous NRC Exam Use	Braidwood 2011 NRC Exam #12.		

References Provided	None
K/A Justification	This question meets the KA because it requires the examinee have the ability to determine that during the conditions provided PZR heaters do not have power during a loss of offsite power. This will eventually lead to a loss of RCS pressure control and is the primary reason for restoring the NON-ESF bus.
SRO-Only Justification	Not applicable
Additional Information	Task No: R-OA-005

K/A Links

APE.056.AA2.17	Safety Function: 6	Tier 1	Group 1
Ability to determine and interpret the following as they apply to the Loss of Offsite Power: (CFR: 43.5 / 45.13)			
Operational status of PZR backup heaters		RO Imp: 3.4	SRO Imp: 3.6

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

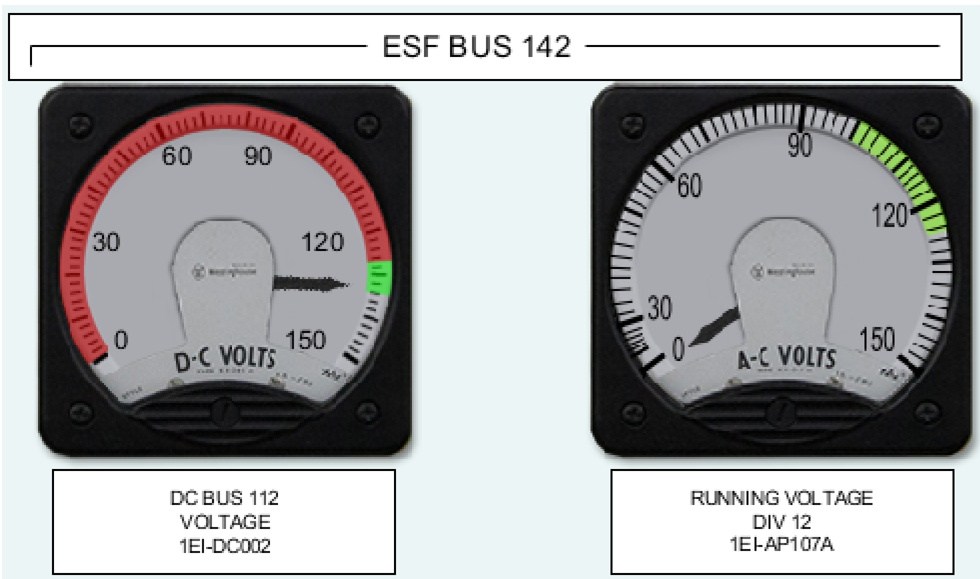
Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

13	ID: RE10058-AA1.03-13	Points: 1.00

Unit 1 is at 100% power.

- Annunciator 1-22-E10, 125 VDC BUS 112/114 VOLT LOW, alarm is FAST FLASHING.
- The following indications are noted:



DC BUS __(1)__ was lost and ACB 1421, BUS TIE 142/144 __(2)__ capable of being closed from the MCR, assuming all applicable interlocks are satisfied.

A. (1) 112 and 114
(2) is

B. (1) 112 and 114
(2) is NOT

C. (1) 114 ONLY
(2) is

D. (1) 114 ONLY
(2) is NOT

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 13

A – Plausible: A loss of DC bus 112 would be indicated by MCB DC BUS 112 voltage indicating 0 VDC. Control power for breaker 1421 is delivered from the ESF DC bus 112. The examinee may plausibly conclude that the DC bus voltmeter indicates 0 volts as indicated by the Running Voltage Div 12 meter and that DC bus 112 was lost. Control power is available to ACB 1421. This would be correct if the DC voltmeter shown indicated 0 VDC.

B – Plausible: 112 & 114 and is NOT are incorrect. This would be correct if the DC voltmeter shown indicated 0 volts. Control power for breaker 1421 is delivered from the ESF DC bus 112. The examinee may plausibly conclude that the DC bus voltmeter indicates 0 volts as indicated by the Running Voltage Div 12 meter which reads 0.

C – Correct: With the given indications (Annunciator 1-22-E10, 125 VDC BUS 112/114 VOLT LOW, alarm is FAST FLASHING and voltage present on DC bus 112 voltmeter), DC bus 114 has lost power. ACB 1421 gets control power from the ESF DC Source (DC Bus 112) therefore it will maintain control power.

D – Plausible: 114 ONLY is correct, is NOT is incorrect. This would be correct if the stem asked for a breaker from bus 144 (i.e. 1442 bkr).

Question Information

Topic	RE10058-AA1.03-13
System ID	2094986
User ID	RE10058-AA1.03-13
Time to Complete	1
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	3.0
Technical Reference and Revision #	20E-1-4030AP35, Rev. P 20E-1-4030AP39, Rev. U _BwOA ELEC-1 Lesson Plan (I1-OA-XL-01), Rev. 10b, Page 3.		
Training Objective	T.OA01-07 ANALYZE a given set of plant conditions and DETERMINE if the bus lost was an ESF or Non-ESF bus.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must demonstrate the ability to monitor vital and battery bus components to determine which DC bus was lost and the status of control power to remotely operate ACB 1421.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

APE.058.AA1.03	Safety Function: 6	Tier 1	Group 1
Ability to operate and / or monitor the following as they apply to the Loss of DC Power: (CFR 41.7 / 45.5 / 45.6)			
Vital and battery bus components		RO Imp: 3.1	SRO Imp: 3.3

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

14	ID: RE10062-AK3.03-14	Points: 1.00

BOTH Units are at 100% power.

- A loss of ALL AC occurs on Unit 1.
- A loss of off site power occurs on Unit 2.
- The 2B SX pump tripped on overcurrent.

- Unit 2 has implemented 2BwCA-0.3, RESPONSE TO OPPOSITE UNIT LOSS OF ALL AC POWER.
- Unit 1 has implemented 1BwCA-0.0, LOSS OF ALL AC POWER, and a limited cross-tie has been established with Unit 2.
- Operators are preparing to perform 1BwCA-0.0 Attachment C, ALTERNATE SX COOLING.

Per Attachment C of 1BwCA-0.0, the DE-ENERGIZED RCFC trains on BOTH units must be locally ISOLATED to…

A. maximize SX system pressure to the running DG to ensure proper cooling.

B. maximize SX flow through the running RCFC to maintain containment cooling.

C. prevent runout of the running SX pump when it is aligned to Unit 1.

D. prevent exceeding thermal loading limits on the Unit 1 to Unit 2 cross-tie cabling.

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 14

A – Plausible: isolating RCFCs will raise SX system pressure. Since unit 1 has experienced a loss of all AC, the examinee may plausibly conclude that cooling water supply to the diesel generator is of the highest importance. This would be correct if the stem asked for actions that would raise SX system pressure.

B – Plausible: isolating one RCFC train will raise SX system flow to the operating RCFC. This action will maintain containment cooling. The examinee may plausibly conclude that an RCFC train is isolated to maximize flow through the other train. This would be correct if the stem asked for actions that affected RCFC flow.

C – Correct: Per the background document the basis for step 1 of attachment C ensures RCFC flow paths are isolated to prevent runout during single SX pump operation.

D – Plausible: isolating RCFC flow paths would lower cross-tie current and thermal loading, however SX pump is the first load started and pump current will not challenge cross-tie cabling thermal limits. Cross-tie current is adjusted by throttling SX to CC Hx valves after isolating RCFCs and cross tie via CC HXs complete. The examinee may plausibly conclude that the limited crosstie condition would challenge the cross tie cable ratings. Blackout study assumes 5702 KW load on one DG with one SX pump running in limited cross-tie mode. This would be correct if the stem asked for actions that limited crosstie current.

Question Information

Topic	RE10062-AK3.03-14
System ID	2095506
User ID	RE10062-AK3.03-14
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	BD-CA-0.0, Rev. 301, Page 177.		
Training Objective	T.CA1-06 Given a step, note or caution from _BwCA-0 series procedures, EXPLAIN the basis of that step, note, or caution.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets KA since it requires knowledge of the reasons for guidance actions contained in EOP for Loss of nuclear service water. This question is RO level because it can be answered using system knowledge of the capacity of the SX pump.
SRO-Only Justification	Not Applicable
Additional Information	Task No: R-CA-009

K/A Links

APE.062.AK3.03	Safety Function: 4	Tier 1	Group 1
Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: (CFR 41.4, 41.8 / 45.7)			
Guidance actions contained in EOP for Loss of nuclear service water	RO Imp: 4.0	SRO Imp: 4.2	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

15	ID: RE10065-AA2.08-15	Points: 1.00

Unit 1 is at 100% power.

- Normal charging is aligned to the 1B RC loop.
- 1A Regenerative HX is in service.

A malfunction results in isolation of Instrument Air to Unit 1 Containment.

Annunciator 1-7-A2, RCP SEAL WTR INJ FLTR ΔP HIGH, is in alarm due to the position of…

A. 1CV182, CHG HDR BACK PRESS CONT VLV.

B. 1CV8324A, CHG TO REGEN HX ISOL VLV.

C. 1CV8146, CHG TO RC LOOP 1B ISOL VLV.

D. 1CV8105, CHG LINE CNMT ISOL VLV.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 15

A – Plausible: 1CV182, CHG HDR BACK PRESS CONT VLV is incorrect. 1CV182 is outside Containment so it would not lose air. A failure of 1CV182 will affect seal injection parameters. The examinee may plausibly conclude that if 1CV182 failed it would cause the given annunciator. This would be correct if the question asked for the charging flow high annunciator.

B – Correct: 1CV8324A, CHG TO REGEN HX ISOL VLV is correct. 1CV8324A fails closed on loss of instrument air to containment. This directs all charging flow through the seal injection flowpath causing Annunciator 1-7-A2 to alarm.

C – Plausible: 1CV8146, CHG TO RC LOOP 1B ISOL VLV is incorrect. 1CV8146 will lose air and will fail open. This would lower the flow resistance to charging and affect seal injection parameters. This would be correct if the question asked for the charging flow high annunciator.

D – Plausible: 1CV8105, CHG LINE CNMT ISOL VLV, is incorrect. This would be correct if the 1CV8105 was an AOV and failed closed. 1CV8105 is automatically closed by an SI signal and would cause charging to be isolated resulting in a potential for excess seal DP bringing in the annunciator if only this valve operated.

Question Information

Topic	RE10065-AA2.08-15
System ID	2095051
User ID	RE10065-AA2.08-15
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	20E-1-4030CV24, Rev. K CVCS Lesson Plan (I1-CV-XL-01), Rev. 15a, Page 49.		
Training Objective	S.CV1-16-E PREDICT how CVCS/plant parameters will respond to the following: Loss of IA.		
Previous NRC Exam Use	Braidwood 2013 NRC Exam #55		

References Provided	None
K/A Justification	This question meets the K/A because the examinee must determine the failure mode of associated valves and if that failure mode would result in the subject annunciator.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

APE.065.AA2.08	Safety Function: 8	Tier 1	Group 1
Ability to determine and interpret the following as they apply to the Loss of Instrument Air: (CFR: 43.5 / 45.13)			
Failure modes of air-operated equipment		RO Imp: 2.9*	SRO Imp: 3.3

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

16	ID: RE10077-AK2.06-16	Points: 1.00

Unit 1 is at 100% power.

- A grid disturbance has lowered ESF bus 141 & 142 voltage to 3850 volts.

With NO operator action and constant bus voltage, the ESF buses will de-energize ___(1)___ and reactor power will ___(2)___ over the following 10 minutes.

A. (1) immediately
(2) rise

B. (1) immediately
(2) remain constant

C. (1) approximately 5 minutes from now
(2) rise

D. (1) approximately 5 minutes from now
(2) remain constant

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 16

A – Plausible: When the degraded voltage relay timer is timing out and an SI occurs, the degraded voltage relay will immediately trip and cause a loss of bus voltage causing the bus 141 and 142 4KV feed breakers to open, start the 1A and 1B DGs and all 4KV ESF loads would sequence on. Reactor power would rise due to the 1A AF pump starting on the sequencer and injecting colder water into the steam generators. This would be correct if bus voltage lowered to 2870 volts.

B – Plausible: This would be correct if bus voltage lowered to 2870 volts on bus 142 only. After the degraded voltage relay timer has timed out, the 1A and 1B DGs will start, close onto the esf busses and all 4KV ESF loads will sequence on. Reactor power will remain constant is incorrect. Plausible because other significant loads, such as the 1A SI, 1A RH, and 1B AF pumps, do not start on bus undervoltage.

C – Correct: Approximately 5 minutes later and rise is correct. Since no SI signal is present the degraded voltage relay will time out at 5 minutes, since bus voltage is still less than 3987 VAC the relay will trip all bus feed breakers. This will cause a UV condition on bus 141 and 142 which, in turn, will cause both the 1A and 1B DGs to auto sync onto the ESF busses. The sequencer will auto start all loads except the SI and RH pumps since no SI signal is present. Reactor power will rise due to the 1A AF pump starting on the sequencer and injecting colder water into the steam generators.

D – Plausible: Approximately 5 minutes later is correct, reactor power remaining constant is incorrect. Reactor power will remain constant is incorrect. Plausible because other significant loads, such as the 1A SI, 1A RH, and 1B AF pumps, do not start on bus undervoltage.

Question Information

Topic	RE10077-AK2.06-16
System ID	2095074
User ID	RE10077-AK2.06-16
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	3.0
Technical Reference and Revision #	TRM 2.0.b, Rev. 95, Page 4 _BwOA ELEC-4 Lesson Plan, Rev. 10a, Page 1.		
Training Objective	T.OA04-01 DISCUSS the purpose and overall mitigative strategy of 1BwOA ELEC-4, Loss of Offsite Power.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must predict the effect the grid disturbance will have on the ESF buses and the change in reactor power resulting from this condition.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

APE.077.AK2.06	Safety Function: 6	Tier 1	Group 1
Knowledge of the interrelations between Generator Voltage and Electric Grid Disturbances and the following: (CFR: 41.4, 41.5, 41.7, 41.10 / 45.8)			
Reactor power		RO Imp: 3.9	SRO Imp: 4.0

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

17	ID: RE100WE11-G2.2.3-17	Points: 1.00

Both Units are at 100% power.

A large earthquake has occurred near Wilmington, IL.

- An RCS LOCA has occurred on BOTH UNITS.
- UNIT 1 CNMT pressure is 8.1 psig and slowly lowering.
- UNIT 2 CNMT pressure is 5.3 psig and slowly lowering.

Falling debris has caused a loss of emergency coolant recirculation on BOTH UNITS.

- The crew has entered 1BwCA-1.1 and 2BwCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION.
- Step 10, CHECK INTACT SG LEVELS, is in progress on BOTH UNITS.
- All SG NR levels are 9% and slowly rising on BOTH UNITS.

The crew is required to maintain a minimum AF flowrate, until at least ONE SG NR level indicates GREATER than a MINIMUM of __(1)__ on UNIT 1 and __(2)__ on UNIT 2.

A. (1) 10%
(2) 14%

B. (1) 10%
(2) 34%

C. (1) 31%
(2) 14%

D. (1) 31%
(2) 34%

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 17

A – Plausible: 10 and 14% is incorrect. This would be correct if both containments were not adverse, 8.1 and 5.3 psig containment pressures are adverse on both units.

B – Plausible: 10 and 34% is incorrect. This would be correct if only unit 2 were adverse, 8.1 and 5.3 psig containment pressures are adverse on both units.

C – Plausible: 31% and 14% is incorrect. This would be correct if only unit 1 were adverse, 8.1 and 5.3 psig containment pressures are adverse on both units.

D – Correct: 31% and 34% is correct. Per step 10 RNO of 1/2BwCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION UNIT 1/2, total feed flow must be maintained >

500 GPM until SG NR level indicates > 31/34% in at least one SG with containment adverse.

Question Information

Topic	RE100WE11-G2.2.3-17
System ID	2095080
User ID	RE100WE11-G2.2.3-17
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.3
Technical Reference and Revision #	1/2 BwCA-1.1, Rev. 301, Page 9		
Training Objective	T.CA2-07 Given a set of plant conditions requiring action from Operator Action OR Continuous Action Summary page(s) for _BwCA 1.1, DETERMINE those actions.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must select the minimum SG NR level for Unit 2 from options that include the values for Unit 1. This is RO knowledge since it is a continuous action step.
SRO-Only Justification	Not Applicable
Additional Information	None

K/A Links

P2.2.3	Safety Function: 6	Tier 3	Group
(multi-unit license) Knowledge of the design, procedural, and operational differences between units. (CFR: 41.5 / 41.6 / 41.7 / 41.10 / 45.12)	RO Imp: 3.8	SRO Imp: 3.9	
GE.4.5.E11	Safety Function: 4	Tier 1	Group 1
Loss of Emergency Coolant Recirculation	RO Imp:	SRO Imp:	

Associated Objective(s)

	2019 NRC Exam

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

18	ID: RE100WE05-EK2.2-18	Points: 1.00

A reactor trip and SI have occurred from full power on Unit 1.

- The minimum AF flowrate CANNOT be established to the S/Gs.
- The crew entered 1BwFR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.
- RCS pressure stabilized, at 100 psig, 2 minutes after the reactor trip.
- ALL S/G pressures are 900 psig and stable.

Currently, secondary heat sink restoration is ___(1)___, because ___(2)___.

A. (1) NOT required
(2) RCS cooldown rate limits were exceeded.

B. (1) NOT required
(2) SGs will no longer function as a heat sink.

C. (1) required
(2) SGs will contribute to core cooling via reflux boiling.

D. (1) required
(2) SGs will contribute to core cooling via two phase natural circulation.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 18

A – Plausible: Not required is correct and RCS cooldown rate limits were exceeded is incorrect. The RCS would have a saturation temp of 338˚F at this pressure which would violate RCS cooldown rate limits.

B – Correct: Not required and SGs will no longer function as a heat sink are correct. Secondary heat sink restoration is not required since RCS pressure is lower than SG pressure. The SGs will no longer act as a heat sink for the RCS and the break flow is adequate to remove decay heat from the core.

C – Plausible: required and SGs will contribute to core cooling via reflux boiling are incorrect. This would be correct if RCS pressure were higher than SG pressure.

D – Plausible: required and SGs will contribute to core cooling via two phase natural circulation is incorrect. This would be correct if RCS pressure were higher than SG pressure.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RE100WE05-EK2.2-18
System ID	2095088
User ID	RE100WE05-EK2.2-18
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.5
Technical Reference and Revision #	BD-FR-H.1, Rev. 300, Page 6.		
Training Objective	T.FR03-03 Given a step, note or caution from _BwFR-H.1, H.2, H.3, H.4, H.5 EXPLAIN the basis of that step, note, or caution.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have knowledge of the heat removal systems (i.e. RCS, SGs) and how those will be utilized to remove decay heat in a loss of secondary heat sink scenario.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

4.5.E05.EK2.2	Safety Function: 4	Tier 1	Group 1
Knowledge of the interrelations between the (Loss of Secondary Heat Sink) and the following: (CFR: 41.7 / 45.7)			
Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.		RO Imp: 3.9	SRO Imp: 4.2

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

19	ID: RE20001-AA1.03-19	Points: 1.00

Unit 1 is conducting a startup following a refueling outage.

1BwGP 100-3, POWER ASCENSION 5% TO 100 %, is in progress.

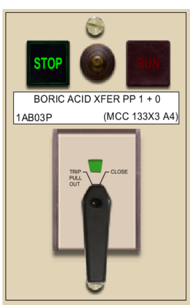
- Unit 1 reactor power is 2.3%.
- The Unit 1 NSO is raising power by withdrawing control rods.

A malfunction in the IN-HOLD-OUT switch causes the outward demand signal for control rods to remain locked in.

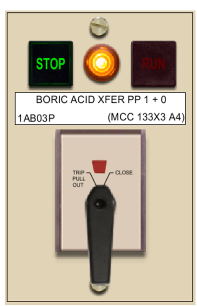
- The Unit 1 NSO performs 1BwPR 1-10-RD, ROD CONTROL MALFUNCTION PROMPT RESPONSE.
- The Unit 1 reactor does not trip and the crew enters 1BwFR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS UNIT 1.
- The Unit 1 SRO has ordered the BOP to perform step 4, INITIATE EMERGENCY BORATION OF THE RCS.

What switch position shows the maximum concentration boric acid flow being delivered, via 1CV8104, EMER BORATION VALVE, after the completion of step 4?

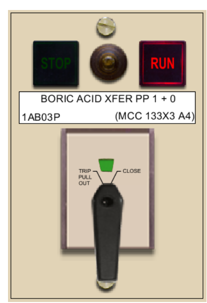
1)



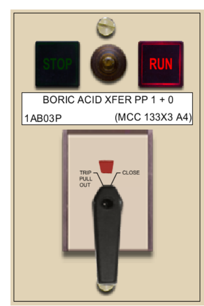
2)



3)



4)



A. 1

B. 2

C. 3

D. 4

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 19

A – Plausible: This switch configuration shows the boric acid transfer pump in the normal standby configuration. The examinee may plausibly conclude that the CV pump, with suction aligned to the RWST, is utilized before the boric acid transfer pump in 1BwFR-S.1. This would be correct if the question asked for the maximum supply capacity of boric acid.

B – Plausible: This switch configuration shows that the boric acid transfer pump was started and then tripped. The examinee may not notice the switch configuration mismatch between the indicating lights (green stop lit) and the target (red flag above switch). The examinee may select this because the target for the switch is red, indicating that it was taken to the start position and plausibly conclude that the CV pumps are now delivering the boric acid flow.

C – Plausible: This switch configuration shows that the boric acid transfer pump auto started on a VCT makeup demand signal. The examinee may fail to notice the switch configuration mismatch between the indicating lights (red run lit) and the target (green flag above switch). The examinee may select this because the run indicating light is lit meaning the BA pump is running.

D – Correct: The boric acid transfer pump was started with the control switch as indicated by the agreement between the indicating lights (red run lit) and the target (red flag above switch). This is the required action per step 4 of 1BwFR-S.1 action/expected response column.

Question Information

Topic	RE20001-AA1.03-19
System ID	2095117
User ID	RE20001-AA1.03-19
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.5
Technical Reference and Revision #	1BwFR-S.1, Rev. 301 , Page 4 BD-FR-S.1, Rev. 301, Page 9 FR-S.1, S.2, Lesson Plan (I1-FR-XL-01) Rev. 9, Page 6.		
Training Objective	T.FR01-04 Given a step, note or caution from an S-series procedure step, EXPLAIN the basis of that step, note, or caution.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must determine the correct boric acid control switch configuration to inject the maximum amount of negative reactivity as fast as possible per the basis of step 3 in 1BwFR-S.1 during a continuous rod withdrawal casualty.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

APE.001.AA1.03	Safety Function: 1	Tier 1	Group 2
Ability to operate and / or monitor the following as they apply to the Continuous Rod Withdrawal: (CFR 41.7 / 45.5 / 45.6)			
Boric acid pump control switch		RO Imp: 3.4	SRO Imp: 3.2

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

20	ID: RE20024-AK3.02-20	Points: 1.00

Unit 2 is at 100% power.

SAT 242-1 has developed a fault and tripped.
- Bus 258 failed to ABT.
- The NSO noted DRPI for control rod H-8 indicates 192 steps with all other rod bottom lights lit.
- All RCS cold leg temperatures are 555˚F and stable.

The Crew performed all immediate actions of 2BwEP-0, REACTOR TRIP OR SAFETY INJECTION UNIT 2, and transitioned to 2BwEP ES-0.1, REACTOR TRIP RESPONSE UNIT 2.
- Step 2, CHECK SHUTDOWN REACTIVITY STATUS, is in progress.
- The SRO has directed the Unit 2 NSO to emergency borate.

Emergency boration was directed to...

A. ensure VCT boron concentration remains higher than the RCS.

B. compensate for the positive reactivity due to the current RCS cold leg temperature.

C. compensate for the positive reactivity due to the DRPI indicated position of control rod H-8.

D. raise shutdown margin for the subsequent natural circulation cooldown.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 20

A – Plausible: Ensure VCT boron concentration remains higher than the RCS is incorrect. This would be correct for the basis of step 26 of BwEP-3, the boric acid flow controller would be set to the maximum for a steam generator tube rupture this ensure auto makeup, to the VCT, will be greater than RCS boron concentration. The examinee may plausibly conclude emergency boration is required to maintain VCT boron concentration.

B – Correct: Per the basis for step 2 in BD-EP ES-0.1, emergency boration is initiated with no RCPs running to conserve CST level and maintain reactivity control during the subsequent natural circulation cooldown. SAT 242-1 faulted and bus 258 failed to ABT to the UAT. This caused the reactor trip and will result in no RCPs running requiring a natural circ cooldown.

C – Plausible: compensate for the current RCS cold leg temperature is incorrect. Step 1 of 2BwEP ES-0.1 requires emergency boration to be initiated if RCS Tave drops to less than 545˚F (35 gal from the BAST for each 1˚F below 545˚F). The examinee may plausibly conclude emergency boration should be initiated if temperature drops below no load (557˚F). This would be correct for a reactor trip without a loss of offsite power and RCS cold leg temperature less than 545˚F).

D – Plausible: compensate for the DRPI indicated position of control rod H-8 is incorrect. Step 2 of 2BwEP ES-0.1 directs emergency borating 1200 gal from the BAST if two or more rods are not fully inserted. This would be correct if 2 rods were not fully inserted and any RCP was running.

Question Information

Topic	RE20024-AK3.02-20
System ID	2095166
User ID	RE20024-AK3.02-20
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.3
Technical Reference and Revision #	BD-EP ES-0.1, Rev. 300, Page 13 BwEP-0 Lesson Plan (I1-EP-XL-01), Rev. 18, Page 37		
Training Objective	T.EP01-03 Given a step, note or caution from _BwEP-0, _BwEP ES-0.0, 0.1, 0.2, 0.3, 0.4, EXPLAIN the basis of that step, note or caution.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must know the reason emergency boration is initiated per 2BwEP ES-0.1.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

APE.024.AK3.02	Safety Function: 1	Tier 1	Group 2
Knowledge of the reasons for the following responses as they apply to the Emergency Boration: (CFR 41.5,41.10 / 45.6 / 45.13)			
Actions contained in EOP for emergency boration		RO Imp: 4.2	SRO Imp: 4.4

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

21	ID: RE20059-AK2.01-21	Points: 1.00

Which of the following Process Radiation Monitors has an INTERLOCK FUNCTION designed to prevent an accidental offsite LIQUID radwaste release?

A. 1PR02J, RCFC SX OUTLET

B. 0PR09J, UNIT 0 CC HEAT EXCHANGER OUTLET RAD MONITOR

C. 0PR10J, STATION BLOWDOWN RAD MONITOR

D. 0PR41J, CONDENSATE POLISHER SUMP DISCHARGE RAD MONITOR

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 21

A – Plausible: 1PR02J is incorrect. The 1PR02J is a liquid effluent rad monitor. However, it does not have an interlock function.

B – Plausible: 0PR09J is incorrect. The 0PR09J is a liquid rad monitor in the CC system (downstream of the unit 0 CC HX) and does have an interlock function (closes 1/2CC017). However, Per RETS 2.2-1a, RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION, this rad monitor is credited for preventing an accidental gaseous release vice a liquid release. The examinee may plausibly conclude that since the 0PR09J is a liquid monitor, its function is to prevent an offsite liquid rad release.

C – Plausible: 0PR10J is incorrect. The 0PR10J is a liquid rad monitor in the station blowdown line with no interlock function. The examinee may plausibly conclude this monitor has an interlock function like the 0PR01J which closes 0WX353 and 0WX896.

D – Correct: The interlock function of the 0PR41J is to trip the condensate polisher sump pumps and shut down regeneration sluicing operations. Per RETS 2.2-1a, RADIOLOGICALLY LIQUID EFFLUENT MONITORING INSTRUMENTATION, this monitor is credited with providing automatic termination of a liquid release.

Question Information

Topic	RE20059-AK2.01-21
System ID	2095532
User ID	RE20059-AK2.01-21
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.3
Technical Reference and Revision #	UFSAR 11.5.2.3.8, Rev. 9, Page 14 Radiation Monitors Lesson Plan (I1-AR-XL-01), Rev. 6a, Page 28.		
Training Objective	S.AR1-04-B11 STATE the interlocks associated with the AR/PR system and purpose of each including: b) 10) Condensate Clean-up Area		
Previous NRC Exam Use	Byron 2003 NRC Exam # 59		

References Provided	None
K/A Justification	This question meets the K/A since the examinee must have knowledge of radioactive-liquid monitors and their interlock functions designed to prevent an accidental liquid radwaste release.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

APE.059.AK2.01	Safety Function: 9	Tier 1	Group 2
Knowledge of the interrelations between the Accidental Liquid Radwaste Release and the following: (CFR 41.7 / 45.7)			
Radioactive-liquid monitors		RO Imp: 2.7	SRO Imp: 2.8

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

22	ID: RE20061-AK1.01-22	Points: 1.00

Area Radiation Monitors 1AR20/21, HI RANGE CONTAINMENT RADIATION MONITORS, are utilized during accident conditions, because 1AR20/21 contain...

A. an ion chamber with a high level of sensitivity to detect RCS leakage as required by Technical Specifications.

B. an ion chamber that can read high radiation, to determine adverse containment conditions.

C. a NaI scintillation detector with high sensitivity which has installed insulation to allow for operation during a Design Basis Accident.

D. a NaI scintillation detector which can discriminate in areas with high background radiation and initiates a Containment Vent Isolation.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 22

A – Plausible: an ion chamber is incorrect. The range of the detector prevents detection of minor leakage. The RCS leakage detection Rad Monitors per Tech Specs are AR-11 and AR-12. An examinee may plausibly conclude that the AR-20/21 detector is like the AR-11/12 (a GM tube for RCS leak detection/CNMT fuel handling incident detectors). This would be correct if the AR-11/12 was used in the stem.

B – Correct: AR-20 and AR-21 contain an Ion Chamber with a range of 10E-0 to 10E-8 R/hr. These instruments are designed and qualified to function post-LOCA and operate in the containment post-accident environment.

C – Plausible: a NaI scintillation detector is incorrect. This would be correct if the PR-11C (U-1 CNMT atmosphere iodine detector) was used in the stem.

D – Plausible: a NaI scintillation detector is incorrect. This would be correct if the PR-11B (U-1 CNMT atmosphere gas detector) was used in the stem.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RE20061-AK1.01-22
System ID	2095608
User ID	RE20061-AK1.01-22
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.3
Technical Reference and Revision #	UFSAR Table 12.3-3, Rev. 79, Page 33 AR-1 Big note, Rev. 11.		
Training Objective	S.AR1-02-B DISCUSS the principles of operation of the following AR/PR detectors: b. Ion Chamber.		
Previous NRC Exam Use	2011 Kewaunee NRC Exam # 22		

References Provided	None
K/A Justification	This question meets the KA since the examinee must know they type of detector used for the AR20/21, its operational use, and limitations.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

APE.061.AK1.01	Safety Function: 7	Tier 1	Group 2
Knowledge of the operational implications of the following concepts as they apply to Area Radiation Monitoring (ARM) System Alarms: CFR 41.8 / 41.10 / 45.3)			
Detector limitations		RO Imp: 2.5*	SRO Imp: 2.9?

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.8 Components, capacity, and functions of emergency systems.

23	ID: RE20067-G2.1.25-23	Points: 1.00

There has been a fire verified in Fire Zone 3.3C-1, 1D-45/1D-46, UNIT 1 UPPER CABLE SPREADING ROOM.

Which set of instruments will be treated as suspect for Steam Generator Pressure, under these conditions?

A. 1PI-0514A AND 1PI-0524B

B. 1PI-0515A AND 1PI-MS193

C. 1PI-0525A AND 1PI-MS194

D. 1PI-0535A AND 1PI-0546A

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 23

A – Correct: Per BwOP FP-100-T25 the lined-out instruments are to be considered suspect. Both 1PI0514A AND 1PI0-524B are to be considered suspect.

B – Plausible: 1PI-0515A AND 1PI-MS193 is incorrect. Both indications are for steam generator pressure but would be available. This would be correct if the instruments listed and not lined out, were to be considered suspect (disregard step 17 on page 11).

C – Plausible: 1PI-0525A AND 1PI-MS194 is incorrect. Both indications are for steam generator pressure but would be available. This would be correct if the instruments listed and not lined out, were to be considered suspect (disregard step 17 on page 11).

D – Plausible: 1PI-0535A AND 1PI-0546A is incorrect. Both indications are for steam generator pressure but would be available. This would be correct if the instruments listed and not lined out, were to be considered suspect (disregard step 17 on page 11).

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RE20067-G2.1.25-23
System ID	2095612
User ID	RE20067-G2.1.25-23
Time to Complete	4
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	OPEN
Status:	Active

Comments

NRC Exams Only			
Question Type	Modified from Byron ID 423525	**Difficulty**	3.0
Technical Reference and Revision #	BwOP FP-100T25, Rev. 14, Pages 12-13		
Training Objective	R-AM-040 Respond to a Plant Fire		
Previous NRC Exam Use	None		

References Provided	BwOP FP-100T25
K/A Justification	This question meets the KA since the examinee must interpret reference tables to determine the impact a fire would have on MCR indications.
SRO-Only Justification	Not applicable
Additional Information	Changed condition in stem and all answers.

Byron Vision ID 423525:
There has been a fire verified in Fire Zones 3.3C-1, 1D-45/1D-46.
Select the set of instruments that would be suspect for Pressurizer level under these conditions.

A. 1LI-0459A, 1LI-0459B and 1LI-0461
B. 1LI-0460A, 1LI-0460B and 1LI-RY034
C. 1LI-0459B, 1LI-0460A and 1LI-0461
D. 1LI-0459A, 1LI-0459B and 1LI-RY034

K/A Links

GE.4.0.APE.067	Safety Function: 8	Tier 1	Group 2
Plant fire on site		RO Imp:	SRO Imp:
P2.1.25	Safety Function: 8	Tier 3	Group
Ability to interpret reference materials, such as graphs, curves, tables, etc. (CFR: 41.10 / 43.5 / 45.12)		RO Imp: 3.9	SRO Imp: 4.2

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links
- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

24	ID: RE20068-AA2.07-24	Points: 1.00

Both Units are at 100% power.

A fire occurs and the main control room (MCR) requires IMMEDIATE evacuation per 1BwOA PRI-5, CONTROL ROOM INACCESSIBILITY UNIT 1.

(1) Prior to leaving the MCR the reactor trip _______ be verified.

(2) Pressurizer LEVEL indication at the remote shutdown panel (shown below) ...

A. (1) will
(2) will NOT require temperature correction.

B. (1) will
(2) WILL require temperature correction utilizing BwCB-1 FIGURE 31, PRESSURIZER LEVEL.

C. (1) will NOT
(2) will NOT require temperature correction.

D. (1) will NOT
(2) WILL require temperature correction utilizing BwCB-1 FIGURE 31, PRESSURIZER LEVEL.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 24

A – Correct: will and will NOT require temperature correction, are correct. Per the mitigating strategy of 1BwOA PRI-5 ONLY the reactor trip will be verified when an immediate evacuation of the MCR is required. Per 1BwGP 100-5 only the cold cal pressurizer level (1LT-462) is required to be corrected for pressurizer vessel liquid temperature.

B – Plausible: will is correct, WILL require temperature correction is incorrect. Temperature correction would be correct if the stem asked for monitoring the cold calibrated pressurizer level channel (1LT-462) during a normal shutdown per 1BwGP 100-5.

C – Plausible: will NOT is incorrect, will NOT require temperature correction is correct. This would be correct if the stem asked if the turbine trip will be verified during an immediate evacuation.

D – Plausible: will NOT and WILL require temperature correction are incorrect. This would be correct if the stem asked if the turbine trip will be verified during an immediate evacuation. Temperature correction would be correct if the stem asked for monitoring the cold calibrated pressurizer level channel (1LT-462) during a normal shutdown per 1BwGP 100-5.

Question Information

Topic	RE20068-AA2.07-24
System ID	2095620
User ID	RE20068-AA2.07-24
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	3.0
Technical Reference and Revision #	1BwOA PRI-5, Rev. 109, Page 3 Control Room Inaccessibility (_BwOA PRI-5) Lesson Plan, Rev. 8, Page 10 1BwGP 100-5, Rev. 58, Page 49		
Training Objective	T.OA16-01 DESCRIBE the purpose and overall mitigative strategy of 0/1OA PRI-5, Control Room Inaccessibility		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must have the ability to determine and interpret PZR level during a control room evacuation scenario.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

APE.068.AA2.07	Safety Function: 8	Tier 1	Group 2
Ability to determine and interpret the following as they apply to the Control Room Evacuation: (CFR: 43.5 / 45.13)			
PZR level		RO Imp: 4.1	SRO Imp: 4.3

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

25	ID: RE2WE14-EA1.1-25	Points: 1.00

Unit 1 CS actuated during a RCS LOCA.

- 1CS007A, PUMP 1A HDR ISOL VALVE, remained CLOSED with the 1A CS pump running.
- The 1A CS pump control switch (C/S) was JUST placed in PULL OUT.

What is the SEQUENCE of MINIMUM Control Room actions required to initiate 1A CS train flow to containment?

A. Immediately place the 1A CS test switch in "test", open 1CS007A, then place the 1A CS pump C/S in after-trip.

B. Immediately open 1CS007A, then place the 1A CS pump C/S in after-trip.

C. Wait 30 seconds, place the 1A CS test switch in "test", open 1CS007A, then place the 1A CS pump C/S in after-trip.

D. Wait 30 seconds, open 1CS007A, then place the 1A CS pump C/S in after-trip.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 25

A – Plausible: Immediately place the 1A CS test switch in "test", open 1CS007A, then place the 1A CS pump C/S in after-trip. is incorrect. The examinee may confuse the interlocks between the 1CS007A and the 1CS019A causing them to believe the test switch must be placed in test and that no time delay interlock is present for opening 1CS007A.

B – Plausible: Immediately open 1CS007A, then place the 1A CS pump C/S in after-trip is incorrect. The examinee may confuse the interlocks between the 1CS007A and the 1CS019A causing them to believe that no time delay interlock is present for opening 1CS007A.

C – Plausible: wait 30 seconds, place the 1A CS test switch in "test", open 1CS007A, then place the 1A CS pump C/S in after-trip is incorrect. The examinee may confuse the interlocks between the 1CS007A and the 1CS019A causing them to believe the test switch must be placed in test.

D – Correct: wait 30 seconds, open 1CS007A, then place the 1A CS pump C/S in after-trip. 1CS007A is interlocked with the pump breaker, preventing opening until 30 seconds after the pump breaker opens.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RE2WE14-EA1.1-25
System ID	2095624
User ID	RE2WE14-EA1.1-25
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	1BwEP-0, Rev. 303, Page 45 Containment Spray Big Note (CS-1), Rev. 15.		
Training Objective	S.CS1-08-C DESCRIBE the interlocks associated with the CS Pumps and the following valves: c. CS007 CS Pump Discharge Isolation Valves.		
Previous NRC Exam Use	2013 Braidwood NRC Exam # 69		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have the ability to monitor and perform manual actions for the CS system, while meeting all interlock features, during a high containment pressure casualty.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

4.5.E14.EA1.1	Safety Function: 5	Tier 1	Group 2
Ability to operate and / or monitor the following as they apply to the (High Containment Pressure) (CFR: 41.7 / 45.5 / 45.6)			
Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	RO Imp: 3.7	SRO Imp: 3.7	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links
- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

26	ID: RE2WE15-EK3.2-26	Points: 1.00

An RCS LOCA occurred on Unit 2.

- Containment pressure peaked above the CS actuation setpoint and is currently 3.5 psig and stable.
- Due to containment floor water level, the crew has just entered 2BwFR-Z.2, RESPOND TO CONTAINMENT FLOODING UNIT 2.
- Step 1, TRY TO IDENTIFY AND ISOLATE UNEXPECTED SOURCE OF WATER TO CNMT SUMP, is in progress.

Water from the __(1)__ is NOT included in the accident analysis for containment flooding AND Step 1 must be performed to __(2)__.

A. (1) Condensate Storage Tank
(2) verify containment isolation and heat removal capabilities.

B. (1) Condensate Storage Tank
(2) prevent critical systems and components, required for the recovery, from being damaged.

C. (1) Refueling Water Storage Tank
(2) verify containment isolation and heat removal capabilities.

D. (1) Refueling Water Storage Tank
(2) prevent critical systems and components, required for the recovery, from being damaged.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 26

A – Plausible: Condensate Storage Tank is correct, verify containment isolation and heat removal capabilities is incorrect. The examinee may confuse the purpose of BwFR-Z.2 with the purpose of BwFR-Z.1, RESPONSE TO HIGH CONTAINMENT PRESSURE, which is to verify containment isolation and heat removal capabilities.

B – Correct: Condensate Storage Tank and prevent critical systems and components, required for the recovery, from being damaged is correct. The input from the CST is not considered in the Braidwood maximum water level calculation per the FSAR attachment D3.6.11 which is different from most plants. The high water level could render vital equipment inoperable due to not being designed for submersion.

C – Plausible: Refueling Water Storage Tank and verify containment isolation and heat removal capabilities are incorrect. The examinee may confuse the purpose of BwFR-Z.2 with the purpose of BwFR-Z.1, RESPONSE TO HIGH CONTAINMENT PRESSURE, which is to verify containment isolation and heat removal capabilities.

D – Plausible: Refueling Water Storage Tank is incorrect, prevent critical systems and components, required for the recovery, from being damaged is correct. The examinee may plausibly conclude the excess water is from the RWST. The second part is correct.

Question Information

Topic	RE2WE15-EK3.2-26
System ID	2095647
User ID	RE2WE15-EK3.2-26
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	3.5
Technical Reference and Revision #	BD-FR-Z.2, Rev. 300, Page 4 BwFR-Z series lesson plan (I1-FR-XL-05), Rev. 10, Page 9		
Training Objective	T.FR05-03 Given a step, note or caution from _BwFR-Z.1, Z.2, Z.3, EXPLAIN the basis of that step, note, or caution.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have knowledge of the containment flooding sources and the reason it is critical to isolate them.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

4.5.E15.EK3.2	Safety Function: 5	Tier 1	Group 2
Knowledge of the reasons for the following responses as they apply to the (Containment Flooding) (CFR: 41.5 / 41.10, 45.6, 45.13)			
Normal, abnormal and emergency operating procedures associated with (Containment Flooding).	RO Imp: 2.8	SRO Imp: 3.1	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

27	ID: RE2WE03-EK2.2-27	Points: 1.00

An RCS LOCA has occurred on Unit 1.

- The crew is preparing to conduct a post-LOCA cooldown and depressurization.
- CETCs are 537°F and slowly rising.
- RCS pressure is 1400 psig and stable.
- PZR level is 58% and stable.
- Total ECCS flow is 900 gpm.

Performing an RCS cooldown of 100°F over the next hour, with no change in the ECCS lineup, will cause ECCS flow to __(1)__ and RCS pressure to __(2)__.

A. (1) lower
(2) lower

B. (1) lower
(2) rise

C. (1) rise
(2) lower

D. (1) rise
(2) rise

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 27

A – Plausible: lower is incorrect, lower is correct. The examinee may plausibly conclude that the rising CETC temperature trend will cause ECCS flow to lower during the cooldown. Rising CETC temperature will raise RCS system pressure which would lower ECCS flow. However, the cooldown will cause these temperatures and pressures to lower. This would be correct if the cooldown was not performed. The second part is correct.

B – Plausible: lower, rise is incorrect. The examinee may plausibly conclude that the rising CETC temperature trend will cause ECCS flow to lower during the cooldown and RCS pressure to rise. This would be correct if a cooldown was not performed.

C – Correct: Rise, Lower is correct. As RCS temperature goes down, PZR level will drop causing the steam bubble to expand and RCS pressure to lower. Since both the SI pumps and CV pumps are centrifugal pumps, their flow rates will rise as their head drops.

D – Plausible: rise is correct, rise is incorrect. The examinee may plausibly conclude the CETC temperature rising trend will cause RCS pressure to rise. This would be correct if a cooldown was not performed.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RE2WE03-EK2.2-27
System ID	2095658
User ID	RE2WE03-EK2.2-27
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.5
Technical Reference and Revision #	Small Break LOCA Lesson Plan, Rev. 6a, Page 6.		
Training Objective	T.EP02B-04 Describe the overall response of the reactor coolant system, in terms of RCS pressure, water inventory, and temperature, to a small cold leg break.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have knowledge of the interrelations between a post LOCA cooldown and depressurization, the ECCS system, decay heat removal, and the proper operations of these systems.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

4.5.E03.EK2.2	Safety Function: 4	Tier 1	Group 2
Knowledge of the interrelations between the (LOCA Cooldown and Depressurization) and the following: (CFR: 41.7 / 45.7)			
Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	RO Imp: 3.7	SRO Imp: 4.0	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

28	ID: RS10003-A1.06-28	Points: 1.00

Unit 1 is at 20% power.

- PZR pressure is 2205 psig and lowering.
- 1RY455B, PZR SPRAY VALVE, is open and IS NOT responding in manual OR auto control.
- All other PZR system components are operating as designed.

The _____ RCP, will have to be secured to mitigate this event.

A. 1A

B. 1B

C. 1C

D. 1D

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 28

A – Plausible: 1A RCP is incorrect. The examinee may plausibly conclude the driving head for the 1RY455B is developed across the 1A RCP. The mismatched nomenclature and reverse order of the valve numbering make it plausible the examinee would choose this.

B – Plausible: 1B RCP is incorrect. The examinee may plausibly conclude the driving head for the 1RY455B is developed across the 1B RCP. The mismatched nomenclature and reverse order of the valve numbering make it plausible the examinee would choose this.

C – Plausible: 1C RCP is incorrect. The examinee may plausibly conclude the driving head for the 1RY455B is developed across the 1C RCP. The mismatched nomenclature and reverse order of the valve numbering make it plausible the examinee would choose this. This would be the correct answer if the 1RY455C failed open.

D – Correct: The 1D RCP will be stopped given the information in the stem. 1RY455B develops its driving head across the 1D RCP. Therefore, it must be stopped to minimize the available spray flow and stop further pressure reduction.

Question Information

Topic	RS10003-A1.06-28
System ID	2095668
User ID	RS10003-A1.06-28
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Comments

NRC Exams Only			
Question Type	Modified from 2018 Braidwood NRC Exam # 85	**Difficulty**	2.0
Technical Reference and Revision #	1BwOA INST-2, Rev. 111, Page 19 Reactor Coolant Pump Lesson Plan (I1-RC-XL-02), Rev. 5d, Page 24		
Training Objective	S.RY1-08-C DISCUSS the operation of the Pressurizer Spray and Auxiliary Spray systems, including: c. Sources and Driving Forces of the sprays.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must be able to select which RCP will be secured to stop the lowering pressure trend due to the excess spray flow condition given in the stem.
SRO-Only Justification	Not applicable
Additional Information	Modified by changing condition in the stem and all answers to make RO level.

2018 Braidwood NRC Exam question #85:
Unit 1 is at 20% power.
 PZR pressure is 2205 psig and lowering.
 1RY455C, PZR Spray Valve, is open and NOT responding in manual NOR in auto control.
 All other PZR system components are operating as designed.
The Unit Supervisor will direct the crew to…
A. manually trip the reactor, enter 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION, and STOP the 1C RCP.
B. manually trip the reactor, enter 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION, and STOP the 1D RCP.
C. STOP the 1C RCP per BwOP RC-2, SHUTDOWN OF A RCP, and verify all PZR heaters energized.
D. STOP the 1D RCP per BwOP RC-2, SHUTDOWN OF A RCP, and verify all PZR heaters energized.

K/A Links

SF4.003.A1.06	Safety Function: 4	Tier 2	Group 1
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RCPS controls including: (CFR: 41.5 / 45.5)			
PZR spray flow	RO Imp: 2.9	SRO Imp: 3.1	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

29	ID: RS10004-K6.13-29	Points: 1.00

Unit 1 is at 100% power.

- BORATE is selected on the RMCS MODE SELECT SWITCH.

After the MAKEUP CONT SWITCH is taken to the START position, ___(1)___ would indicate a FAILURE of a valve to be in its required position.

This would cause RCS temperature to trend ___(2)___ than expected, without a failure.

A. (1) 1CV110A, BORIC ACID TO BLNDR VLV - CLOSED
(2) higher

B. (1) 1CV110B, BORIC ACID BLNDR TO CHG PMPS VLV - OPEN
(2) lower

C. (1) 1CV111A, PW TO BORIC ACID BLNDR VLV - CLOSED
(2) higher

D. (1) 1CV111B, BORIC ACID BLNDR TO VCT VLV - CLOSED
(2) lower

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 29

A – Correct: 1CV110A CLOSED and higher are correct. With the mode selector switch in BORATE, 1CV110A should throttle open when the makeup control switch is taken to start. If it were to stay closed boric acid would not be mixed with PW, would a dilution and higher RCS temperature than expected.

B – Plausible: 1CV110B OPEN is incorrect. 1CV110B is normally closed with the mode selector switch in BORATE. The examinee may confuse the borate with the alt dilute positions. In alt dilute 1CV110B would be open. A novice applicant may confuse the 1CV110B with the 1CV110A (VCT side of BA blender with source side) and conclude that RCS temperature would be lower.

C – Plausible: 1CV111A closed is incorrect. 1CV111A is normally open with the mode selector switch in BORATE. The examinee may confuse the borate with the dilute position. In dilute, the 1CV111A would be throttled. This would cause RCS temperature to be higher than expected if it were a boration.

D – Plausible: 1CV111B closed is incorrect. 1CV111B is normally open with the mode selector switch in BORATE. The examinee may confuse the borate with the dilute position. In dilute, the

1CV111B would be closed. A novice applicant may confuse the 1CV111B with the 1CV111A (VCT side of BA blender with source side) and conclude that RCS temperature would lower.

Question Information

Topic	RS10004-K6.13-29
System ID	2095673
User ID	RS10004-K6.13-29
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Modified from Beaver Valley 2007 NRC Exam # 27.	**Difficulty**	2.5
Technical Reference and Revision #	BwOP CV-5, Rev. 31, Page 12 CV-3a Big Note, Rev. 0		
Training Objective	S.CV2-07-C EXPLAIN the pure water and boric acid flowpaths (as applicable) through the RMCS, and the reason for each flowpath, for the following system conditions: c. Dilution.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must have knowledge of the RMCS mode selector switch controls and the expected valve positions for the dilute function.
SRO-Only Justification	Not Applicable
Additional Information	Modified condition in the stem and all answers.

Beaver Valley 2007 NRC Exam # 27:
The Unit is operating at 100% power with all systems in their at-power, NSA configurations. Alternate Dilute is selected on the Makeup Mode Selector Switch. Which of the following valve positions would indicate a failure of a valve to be in its required position after the Boric Acid Makeup Control Switch is taken to the START position?
1. [2CHS*FCV113A] -"Boric Acid to Boric Acid Blender" -Closed
2. [2CHS*FCV1 13B] -"Boric Acid Blender Discharge to Charging Pumps" -Open
3. [2CHS*FCV1 14A] -"Primary Grade Water to Boric Acid Blender" -Open
4. [2CHS*FCV1 14B] -"Boric Acid Dilute Injection to Volume Control Tank" -Closed
A. 1 and 3 only.
B. 2 only.
C. 2 and 4 only.
D. 4 only.

K/A Links

SF1.004.K6.13	Safety Function: 1	Tier 2	Group 1
Knowledge of the effect of a loss or malfunction on the following CVCS components: (CFR: 41.7 / 45.7)			
Purpose and function of the boration/dilution batch controller		RO Imp: 3.1	SRO Imp: 3.3

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

30	ID: RS10005-K5.09-30	Points: 1.00

Unit 1 is conducting a plant shutdown for a refueling outage.

- RCS cold leg temperatures are 340°F.
- RCS boron concentration is 1590 ppm.
- RCS pressure is 345 psig.
- 1A RH train boron concentration is 1250 ppm.
- 1B RH train is aligned for injection.

Placing the 1A RH train in shutdown cooling with NO additional operator action would cause ...

A. a reduction in shutdown margin.

B. an inadvertent entry into Mode 3.

C. boron plateout on the 1A RH HX.

D. RCS temperature and pressure to rapidly lower.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 30

A – Correct: A reduction in shutdown margin is correct. Since 1A RH train boron concentration is 1250 ppm, placing it online would reduce the RCS boron concentration, and therefore lower SDM.

B – Plausible: an inadvertent entry into Mode 3 is incorrect. Placing an RH train online would tend to reduce RCS temperature, not raise it. Therefore, entering Mode 3 due to placing more cooling online is not a concern. The examinee may plausibly conclude Mode 3 is entered at 330°F, and that the additional RH train may cause temperature to lower. T/S 3.4.12 utilizes 330°F in the note to allow for SI and CV pump re-alignment making this a plausible misconception.

C – Plausible: Boron plate-out on the 1A RH HX is incorrect. Boron plate-out is a concern when a high boron concentration comes into contact with a heat source. The examinee may plausibly conclude the difference in boron concentration between the RCS and the 1A RH train may cause boron to come out of solution and plate on the 1A RH HX.

D – Plausible: One RH train cannot cause temperature to RAPIDLY lower, and would not significantly reduce pressure, especially with a bubble in the pressurizer. The examinee may plausibly conclude that the increased cooling capacity of the 2nd RH train would cause a significant temperature and pressure reduction.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RS10005-K5.09-30
System ID	2095674
User ID	RS10005-K5.09-30
Time to Complete	2
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.5
Technical Reference and Revision #	BwOP RH-6, Rev. 59, Page 6		
Training Objective	3C.RH-03-A Describe plant parameters and system response to placing the RH System in the shutdown cooling mode of operation.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have knowledge of the operational implications of placing an additional RH train in shutdown cooling with differing boron concentrations.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF4.005.K5.09	Safety Function: 4	Tier 2	Group 1
Knowledge of the operational implications of the following concepts as they apply the RHRS: (CFR: 41.5 / 45.7)			
Dilution and boration considerations		RO Imp: 3.2	SRO Imp: 3.4

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

31	ID: RS10006-K5.04-31	Points: 1.00

Per the mitigating strategy of 1BwFR-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION UNIT 1, the probability of brittle fracture occurring can be reduced by...

A. terminating ECCS injection AND maintaining RCS pressure constant.

B. terminating ECCS injection AND lowering RCS pressure.

C. initiating a normal RCS cooldown AND maintaining RCS pressure constant.

D. initiating a normal RCS cooldown AND lowering RCS pressure.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 31

A – Plausible: terminating ECCS injection is correct, maintaining RCS pressure constant is incorrect. 1BwFR-P.1 includes steps that will maintain RCS pressure stable at different times (Step 22). An examinee may confuse the use of PZR heaters to stabilize RCS pressure with the following cooldown steps that will lower RCS pressure. This would raise subcooling and be desirable in many other accident scenarios. Per the background document for step 22, RCS pressure is stabilized to allow for a saturated pressurizer to aid in long-term pressure control, it does not reduce the risk of brittle fracture.

B – Correct: Per the mitigating strategy of 1BwFR-P.1 terminating ECCS injection and lowering RCS pressure will occur. This will minimize the probability that brittle fracture will occur to the reactor vessel wall.

C – Plausible: initiating a normal RCS cooldown and raising RCS pressure is incorrect. 1BwFR-P.1 includes steps that will initiate an RCS cooldown and maintain RCS pressure stable at different times (Step 24 for the cooldown, Step 22 for stabilizing RCS pressure). However, it will not direct raising RCS pressure or performing a normal RCS cooldown. An examinee may confuse the use of PZR heaters to stabilize RCS pressure with the raising of RCS pressure or establishing a restricted RCS cooldown ($\leq$ 50˚F in a one-hour period) with performing a normal RCs cooldown ($\leq$ 100˚F in a one-hour period). This would raise subcooling and be desirable in many other accident scenarios. An examinee may confuse the use of PZR heaters to stabilize RCS pressure with the following cooldown steps that will lower RCS pressure. This would raise subcooling and be desirable in many other accident scenarios. Per the background document for step 22, RCS pressure is stabilized to allow for a saturated pressurizer to aid in long-term pressure control, it does not reduce the risk of brittle fracture.

D – Plausible: initiating a normal RCS cooldown is incorrect, lowering RCS pressure is correct. 1BwFR-P.1 includes steps that will initiate an RCS cooldown (Step 24). However, it will not direct performing a normal RCS cooldown. An examinee may confuse establishing a restricted RCS cooldown ($\leq$ 50˚F in a one-hour period) with performing a normal RCS cooldown ($\leq$ 100˚F in a one-hour period).

Question Information

Topic	RS10006-K5.04-31
System ID	2095691
User ID	RS10006-K5.04-31
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	3.0
Technical Reference and Revision #	BD-FR-P.1, Rev. 300 Functional Restoration Procedures (P.1-P.2) lesson plan (I1-FR-XL-04), Rev. 9, Page 4-5		
Training Objective	T.FR04-01 DISCUSS the purpose and overall mitigative strategy of the P-SERIES functional restoration procedures.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have knowledge of the operational implications of brittle fracture and how its probability is minimized, by terminating ECCS injection, restricting the subsequent RCS cooldown and lowering RCS pressure.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF2.006.K5.04	Safety Function: 2	Tier 2	Group 1
Knowledge of the operational implications of the following concepts as they apply to ECCS:(CFR: 41.5/45.7)			
Brittle fracture, including causes and preventative actions	RO Imp: 2.9	SRO Imp: 3.1	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

32	ID: RS10006-A2.05-32	Points: 1.00

A LOCA has occurred on Unit 2, the crew has just completed 2BwEP ES-1.3, TRANSFER TO COLD LEG RECIRCULATION UNIT 2.

- 2A and 2B RH pump ammeters are oscillating between 20 and 60 amps.

Entry criteria for 2BwCA-1.3, SUMP BLOCKAGE CONTROL ROOM GUIDELINE UNIT 2, ___(1)_ met AND ECCS flow ___(2)___ be reduced.

A. (1) is
(2) will

B. (1) is
(2) will NOT

C. (1) is NOT
(2) will

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

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 25

A – Correct: Entry criteria for 2BwCA-1.3 are met with 2A and 2B RH pump ammeters and discharge pressures oscillating. Per the mitigating strategy of 2BwCA-1.3, ECCS flow will be reduced to a minimum.

B – Plausible: IS is correct, will NOT is incorrect. The high level action summary for 2BwCA-1.3 states to maintain optimum emergency coolant flow. An examinee may plausibly conclude this to mean maintain ECCS flow vice reduce ECCS flow.

C – Plausible: is NOT is incorrect, will is correct. The only provided indication in the stem is oscillating RH pump ammeter indication. An examinee may conclude that oscillating discharge pressure is required in conjunction with the oscillating current indication.

D – Plausible: is NOT and will NOT are incorrect. The only provided indication in the stem is oscillating RH pump ammeter indication. An examinee may conclude that oscillating discharge pressure is required in conjunction with the oscillating current indication. The high level action summary for 2BwCA-1.3 states to maintain optimum emergency coolant flow. An examinee may plausibly conclude this to mean maintain ECCS flow vice reduce ECCS flow.

Question Information

Topic	RS10006-A2.05-32
System ID	2095692
User ID	RS10006-A2.05-32
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.3
Technical Reference and Revision #	2BwCA-1.3, Rev. 302, Page 1.		
Training Objective	T.CA2A-02 ANALYZE a given set of plant conditions and DETERMINE if entry into _BwCA-1.3 is required.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must be able to determine if entry criteria for 2BwCA-1.3 are met due to improper RH pump amperage and if ECCS flow will be reduced to mitigate this condition.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF2.006.A2.05	Safety Function: 2	Tier 2	Group 1
Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 45.5)			
Improper amperage to the pump motor		RO Imp: 3.4	SRO Imp: 3.5

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

33	ID: RS10007-K3.01-33	Points: 1.00

A reactor trip has occurred on Unit 1 from 100% power.
• 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION UNIT 1, is in progress.
• ONE PZR safety valve has stuck partially open.
• PRT pressure rises to approximately 50 psig and then rapidly lowers.
• Containment pressure is POSITIVE 0.1 psig and RISING at 0.1 psig per minute.

Which of the following describes:
(1) How the PRT rupture discs operated.
(2) At the current rate, the Containment Pressure Tech Spec UPPER limit will be reached in...

A. (1) The PRT rupture disks operated as designed.
(2) 7 minutes.

B. (1) The PRT rupture disks operated as designed.
(2) 9 minutes.

C. (1) At least one PRT rupture disk operated EARLIER than designed.
(2) 7 minutes.

D. (1) At least one PRT rupture disk operated EARLIER than designed.
(2) 9 minutes.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 33

A – Plausible: The PRT rupture disks operated as designed and 7 minutes is incorrect. The PRT rupture discs operated as designed, is plausible since the design basis discharge to the PRT would result in a pressure of 50 psig. An examinee may recall the design basis discharge to PRT parameters and make this selection. 7 minutes would be the time required to reach the alarm setpoint (+0.8 psig) of 0-31-D10, CNMT INTERNAL PRESS HIGH LOW. An examinee may recall the setpoint of 0-31-D10, and calculate the time to this value. This also correlates to the indicating band of 1PDI-VP236 turning to yellow.

B – Plausible: The PRT rupture disks operated as designed is incorrect, 9 minutes is correct. The PRT rupture discs operated as designed is plausible since the design basis discharge to the PRT would result in a pressure of 50 psig. An examinee may recall the design basis discharge to PRT parameters and make this selection.

C – Plausible: At least one PRT rupture disk operated EARLIER than designed is correct, 7 minutes is incorrect. 7 minutes would be the time required to reach the alarm setpoint (+0.8 psig) of 0-31-D10, CNMT INTERNAL PRESS HIGH LOW. An examinee may recall the setpoint of 0-31-D10, and calculate the time to this value. This also correlates to the indicating band of 1PDI-VP236 turning to yellow.

D – Correct: The PRT rupture disks ruptures at 100 psig to protect the PRT. The provided indications showed that the PRT rupture discs relieved at 50 psig. According to Technical Specification LCO 3.6.4, the upper Technical Specification Containment Pressure limit is 1.0 psig. Since initial pressure was positive 0.1 psig, and Containment pressure is rising at .1 psig, the limit will be reached in 9 minutes.

Question Information

Topic	RS10007-K3.01-33
System ID	2095730
User ID	RS10007-K3.01-33
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Modified from 2013 Catawba NRC Exam #34	**Difficulty**	2.5
Technical Reference and Revision #	Technical Specification 3.6.4, Amendment 165, Page 1. Pressurizer Lesson Plan, Rev. 7c, Page 15.		
Training Objective	S.RY1-15 STATE the internal design pressure of the PRT. DISCUSS how the PRT is protected from exceeding this pressure.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must have knowledge of how a malfunction of the PRT rupture disc will impact Containment tech spec entry.
SRO-Only Justification	Not applicable
Additional Information	Changed conditions in the stem and all answers.

2013 Catawba NRC Exam # 34:
Given the following Unit 2 conditions:
• From 100% power, a reactor trip occurred.
• The crew is performing EP/2/A/5000/E-0 (Reactor Trip or Safety Injection).
• ONE PZR safety valve has stuck partially open.
• PRT pressure rises to approximately 50 psig and then rapidly decreases.
• Containment pressure is NEGATIVE 0.2 psig and increasing at 0.1 psig per minute.
Which ONE of the following describes:
(1) How the PRT rupture discs operated.
(2) What is the LEAST amount of time it will be before the Containment pressure Tech Spec upper limit is reached?
A. (1) At least one PRT rupture disc operated EARLIER than designed.
(2) 1 minute
B. (1) At least one PRT rupture disc operated EARLIER than designed.
(2) 5 minutes
C. (1) The PRT rupture discs operated as designed.
(2) 1 minute
D. (1) The PRT rupture discs operated as designed.
(2) 5 minutes.

K/A Links

SF5.007.K3.01	Safety Function: 5	Tier 2	Group 1
Knowledge of the effect that a loss or malfunction of the PRTS will have on the following: (CFR: 41.7 / 45.6)			
Containment		RO Imp: 3.3	SRO Imp: 3.6

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

34	ID: RS10008-K2.02-34	Points: 1.00

Unit 1 is at 100% power.

- The 1A CC pump is running.
- The 1B CC pump is in standby with its C/S is in NAT, in preparation for an upcoming OOS placement.
- The U-0 CC pump is in standby, aligned to bus 142 with its C/S in NAT.

- Breaker 1412 is inadvertently opened from the MCR.

With NO further operator action, ONE minute later, what is the status of the CC pumps?

	U-0 pump	1A pump	1B pump
A.	running	running	running
B.	stopped	running	stopped
C.	stopped	running	running
D.	stopped	stopped	running

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 35

A – Plausible: running, running, running, is incorrect. This would be correct if the U-0 pump also started on low system pressure, however that feature is blocked unless the 1B pump is in PTL.

B – Plausible: stopped, running, stopped is incorrect. This would be correct if the low pressure start feature was blocked by the DG carrying the bus in emergency mode. This feature does exist however it is train specific and the 1A DG will not block the pumps being supplied by bus 142.

C – Correct: Upon the inadvertent trip of 1412 breaker, bus 141 will de-energize and the undervoltage relays will strip the bus loads and start the 1A DG. Four seconds after a low CC pressure condition is reached, the 1B CC pump will start on a low system pressure signal. The U-0 pump will be blocked from starting because the 1B pump C/S is not in PTL. The 1A DG will start and re-energize bus 141. Twenty seconds after the bus is re-energized the 1A CC pump will restart on the ESF sequencer.

D – Plausible: stopped, stopped, running is incorrect. This would be correct if the examinee concludes that the 1B CC pump starts on low pressure and then normal system pressure blocks the 1A pump from restarting on the sequencer, like the CS auto start interlock. This interlock only allows the CS pump to start on the sequencer between 15-18 seconds and after 40 seconds. With the 1B CC pump running, the autostart interlock for the 1A would not be met.

Question Information

Topic	RS10008-K2.02-34
System ID	2095731
User ID	RS10008-K2.02-34
Time to Complete	1
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.8
Technical Reference and Revision #	20E-0-4030CC01/2, Rev. U CC system lesson plan (I1-CC-XL-01) Rev.5a		
Training Objective	S.CC1-06 DISCUSS the condition required to enable an "auto" start of the common '0' CC pump.		
Previous NRC Exam Use	2011 Braidwood NRC Exam # 36		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have knowledge of the bus power supplies to the CCW pumps, including the emergency backup.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF8.008.K2.02	Safety Function: 8	Tier 2	Group 1
Knowledge of bus power supplies to the following: (CFR: 41.7)			
CCW pump, including emergency backup		RO Imp: 3.0*	SRO Imp: 3.2*

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

35	ID: RS20010-K1.03-35	Points: 1.00

Unit 2 is at 50% power.

- PZR PRESS CONT CH SELECT switch is in the PT-457/PT-458 position.
- 2PK-455A, Master PZR Pressure Controller POTENTIOMETER setting fails from its normal setting to the equivalent of 9.0.

RCS pressure will INITIALLY...

A. LOWER to the low PZR pressure reactor trip setpoint.

B. LOWER and stabilize ABOVE the low PZR pressure reactor trip setpoint.

C. RISE to the high PZR pressure reactor trip setpoint.

D. RISE and stabilize BELOW the high PZR pressure reactor trip setpoint.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 35

Unit 2, 7300 controls question.

A – Plausible: LOWER to the low PZR pressure reactor trip setpoint, is incorrect. This would be correct if 2PT457 failed high. In this condition, the PZR sprays and 1RY455A would open and the PZR heaters would turn off, causing pressure to lower to the low PZR press reactor trip setpoint.

B – Plausible: LOWER and stabilize ABOVE the low PZR pressure reactor trip setpoint, is incorrect. This would be correct if the pot failed to a value of 3.0. A value of 3.0 would correlate to controlling at 1940 psig which is above the reactor low pressure trip setpoint of 1885.

C – Plausible: RISE to the high PZR pressure reactor trip setpoint, is incorrect. This would be correct if 2PT457 failed low. All heaters would energize and pressure would rise. The ch select switch is in the 457/458 position, the low pressure interlock signal for 2RY456 is not made up and the lift signal for 2RY455A is failed low, therefore no PZR PORVs will open.

D – Correct: RISE and stabilize BELOW the high PZR pressure reactor trip setpoint. The normal PZR master controller auto setting is 6.688 (on a scale of 1-10, 1700#-2500#) representing a setpoint of 2235 psig. If the controller fails to an equivalent of 9.0, it will try to control pressure at 2420 psig, which is above the high press Rx trip setpoint of 2385 psig. All PZR heaters will energize and the spray valves will close. Pressure will then rise until 2RY456 opens at ~2315 psig.

Question Information

Topic	RS20010-K1.03-35
System ID	2106483
User ID	RS20010-K1.03-35
Time to Complete	4
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Modified from vision ID 1267968	**Difficulty**	3.3
Technical Reference and Revision #	20E-2-4031RY27, Rev. E Big Note RY-2, Rev. 10		
Training Objective	S.RY1-21-E Given various plant conditions, PREDICT how the Pressurizer system/plant will respond to the following pressurizer instrument or controller failure assuming no operator action: Master Pressure Controller High/Low		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	The question meets the K/A because the candidate must know how a malfunction in the PZR PCS affects the actual RCS pressure.
SRO-Only Justification	Not applicable
Additional Information	Modified by changing conditions in the stem to make previous distractor D the correct answer.

Vision ID 1267968:
Given:
- Unit 1 is at 50% power, normal alignment.
- PZR Pressure Control Channel Select switch is in the "PT-455/PT-456" position.

The following occurs:
- 1PK-455A, Master PZR Pressure Controller "potentiometer" setting fails from its normal setting to the equivalent of 3.0.

With the above conditions and NO operator action, RCS pressure will INITIALLY...
A. LOWER to the low PZR pressure reactor trip setpoint.
B. LOWER and stabilize ABOVE the low PZR pressure reactor trip setpoint.
C. RISE to the high PZR pressure reactor trip setpoint.
D. RISE and PZR pressure will be controlled near 2315-2335 psig by a PZR PORV.
Answer: B

K/A Links

SF3.010.K1.03	Safety Function: 3	Tier 2	Group 1
Knowledge of the physical connections and/or cause-effect relationships between the PZR PCS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)			
RCS		RO Imp: 3.6	SRO Imp: 3.7

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

36	ID: RS20010-K6.03-36	Points: 1.00

Unit 2 is at 50%.

- RCS Pressure is 2235 psig.
- Group D Backup Heaters are ENERGIZED.
- Group C Variable Heaters are ENERGIZED.

- 2PK-455B, SPRAY VLV 2RY455B CONT, fails to 100% output.
- No operator actions are taken.

The reactor will...

A. trip on LOW pressurizer pressure.

B. trip on HIGH pressurizer pressure.

C. NOT trip due to pressurizer heaters stabilizing pressurizer pressure.

D. NOT trip due to PZR Pressure Master Controller preventing valve movement.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 36

Unit 2, 7300 controls question.

A – Correct: trip on LOW pressurizer pressure is correct. The failure would cause spray valve 2RY455B to fully open. This will cause pressure to lower until a reactor trip occurs.

B – Plausible: trip on HIGH pressurizer pressure is incorrect. This would be the correct answer for a reverse acting controller 100% output would then fully close 2RY455B.

C – Plausible: NOT trip due to pressurizer heaters stabilizing pressurizer pressure, is incorrect. This would be the correct answer if the failure of 2PK-455B had not occurred. In that condition pressure would rise and the spray valves would open to reduce pressure.

D – Plausible: NOT trip due to PZR Pressure Master Controller preventing valve movement. The spray valve slave controllers "pass through" the master controller signal. The examinee may plausibly conclude that the individual spray valve cannot be operated independently of the master controller, since many fail over controls exist on Unit 1 (ovation) preventing failures from affecting plant controls.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RS20010-K6.03-36
System ID	2106491
User ID	RS20010-K6.03-36
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	**2.8**
Technical Reference and Revision #	20E-2-4031RY27, Rev. E Big Note RY-2, Rev.		
Training Objective	S.RY1-10-D DISCUSS the operation of both the Pressurizer Power Operated Relief Valves and Pressurizer Safety Valves, including: d. Design Basis.		
Previous NRC Exam Use	2016 Prairie Island NRC Exam #35		

References Provided	None
K/A Justification	This question meets the KA because the examinee must have knowledge of the effect of a PZR spray malfunction will have on the PZR PCS.
SRO-Only Justification	Not Applicable
Additional Information	None

K/A Links

SF3.010.K6.03	Safety Function: 3	Tier 2	Group 1
Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: (CFR: 41.7 / 45.7)			
PZR sprays and heaters		RO Imp: 3.2	SRO Imp: 3.6

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

37	**ID: RS10012-G2.1.31-37**	**Points: 1.00**

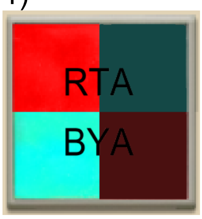
Unit 2 is at 100% power.

2BwOSR 3.3.1.4-1, UNIT TWO SSPS, REACTOR TRIP BREAKER, AND REACTOR TRIP BYPASS BREAKER SURVEILLANCE (TRAIN A) is in progress.

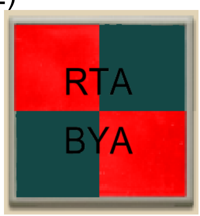
- The EO has racked the Train A Reactor Trip Bypass Breaker to the TEST position and has just completed step F.2.2.c, AT 2RD05E CLOSE THE TRAIN A REACTOR TRIP BYPASS BREAKER (BYA).

Which of the following indications at 2PM05J reflect the current status?

1)

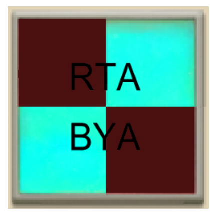


2)



3)

4)



A. 1

B. 2

C. 3

D. 4

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 37

A – Plausible: 1 is incorrect. With the BYA racked to the test position the indicating lights will have power. However, this configuration shows the RTA as red and BYA as green. This configuration is opposite of the correct configuration of RTA being green and BYA being red. The examinee may confuse the indications given and select this answer, since they are opposite.

B – Plausible: 2 is incorrect. With the BYA racked to the test position the closed indicating lights will have power. However, this configuration shows RTA as red and BYA as red. The indication for BYA is correct for the condition in the stem. The indication for RTA is incorrect. This answer would be correct if performance of 2BwOSR 3.3.1.4-1, section 3.8.e had occurred.

C – Correct: 3 is correct. With the BYA racked to the test position the indicating lights will have power and the red indicating light will be lit (BYA closed). This answer shows this configuration.

D – Plausible: 4 is incorrect. With the BYA racked to the test position the indicating lights will have power. However, the green indicating light will not be lit (indicates BYA is open). The dark board / green board concept is frequently misunderstood by novice applicants and could cause them to select this answer. This answer would be correct if the EO had not closed the breaker.

Question Information

Topic	RS10012-G2.1.31-37
System ID	2095811
User ID	RS10012-G2.1.31-37
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.5
Technical Reference and Revision #	2BwOSR 3.3.1.4-1, Rev. 043		
Training Objective	R-RP-007 Perform SSPS/Reactor Trip and Bypass Breaker Surveillance from the MCR.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have the ability to determine if control room indications reflect the desired plant lineup for the reactor protection system during testing.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

GS.3.0.SF7.012	Safety Function: 7		Tier 2	Group 1
Reactor Protection System		RO Imp:		SRO Imp:
P2.1.31	Safety Function: 7		Tier 3	Group
Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup. (CFR: 41.10 / 45.12)		RO Imp: 4.6		SRO Imp: 4.3

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

38	ID: RS10013-K6.01-38	Points: 1.00

Unit 1 is at 100% reactor power.

- Containment pressure transmitter 1PT934 has failed.

The following TSLB status is noted:

- CNMT Press HI PB934B- LIT
- CNMT Press HI-2 PB934C- LIT
- CNMT Press HI-3 PB934A - DARK

The coincidence logic, for automatically actuating containment spray, is CURRENTLY...

A. 1 of 2.

B. 2 of 2.

C. 1 of 3.

D. 2 of 3.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 36

A – Plausible: 1 of 2 is incorrect. This would be the correct answer if the stem asked for the coincidence logic for automatically actuating SI or MSI from these detectors. This coincidence scheme is frequently confused by novice applicants as 3 detectors feed into the SI and MSI functions while all 4 feed into the CS actuation feature.

B – Plausible: 2 of 2 is incorrect. This would be the correct answer if 1PT934 was placed in bypass for troubleshooting and if the stem asked for the coincidence logic for automatically actuating SI or MSI, a common practice when an instrument fails. This coincidence scheme is frequently confused by novice applicants as 3 detectors feed into the SI and MSI functions while all 4 feed into the CS actuation feature.

C – Plausible: 1 of 3 is incorrect. This would be the correct answer if the CS actuation bistable for 1PT934 was taken to trip (PB934A LIT) along with the SI and MSI bistables. This coincidence scheme is frequently confused by novice applicants as 3 detectors feed into the SI and MSI functions while all 4 feed into the CS actuation feature.

D – Correct: 2 of 3 is correct. The CS actuation system has a total of four detectors with 2 of 4 logic. When one detector fails, tech spec 3.3.2 requires bypassing the failed CS bistable. This removes the failed channel from the CS logic circuit and the logic now becomes 2 of the remaining 3 detectors.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RS10013-K6.01-38
System ID	2096113
User ID	RS10013-K6.01-38
Time to Complete	1
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.3
Technical Reference and Revision #	1BwOA INST-2, Rev. 111, Page 97-101 I1-EF-XL-01 rev. 5, ILT ESFAS lesson plan		
Training Objective	S.EF1-08 ANALYZE how those conditions are affected by any instrumentation, control circuit, or electrical power failure without the use of references.		
Previous NRC Exam Use	Braidwood NRC Exam 2009 Question # 11		

References Provided	None
K/A Justification	The question meets the K/A since it requires examinee knowledge of the effect a detector malfunction will have on ESF actuation.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF2.013.K6.01	Safety Function: 2	Tier 2	Group 1
Knowledge of the effect of a loss or malfunction on the following will have on the ESFAS: (CFR: 41.7 / 45.5 to 45.8)			
Sensors and detectors		RO Imp: 2.7*	SRO Imp: 3.1*

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

39	ID: RS10013-A4.02-39	Points: 1.00

Unit 1 RCS pressure is being RAISED following an outage.

As U1 RCS pressure RISES, the U1 PZR LOW PRESS SI BLOCK PERMISSIVE P11 Bypass Permissive Light on 1PM05J is expected to reset when indicated pressure on PZR pressure channels 455 and __(1)__ on 1PM05J reach __(2)__ psig.

A. (1) 457
(2) 1829

B. (1) 457
(2) 1930

C. (1) 458
(2) 1829

D. (1) 458
(2) 1930

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 39

A – Plausible: 457 is correct, 1829 is incorrect. 1829 psig is the SI actuation setpoint for low PZR pressure setpoint and will utilize pressure channel 457 to generate this function. If the stem asked with pressure lowering when would an SI occur, this would be a correct answer.

B – Correct: 457 and 1930 is correct. P-11 will reset when 2/3 Pressure channels are above 1930. Pressure channels 455, 456, and 457 provide the input to this function.

C – Plausible: 458 and 1829 are incorrect. Pressure channel 458 is utilized for the reactor low pressure trip and the low pressure SI actuation signals. This is commonly confused by novice applicants since only 3 pressure channels are used for this function and 4 are for the SI and reactor trip functions. 1829 psig is the SI actuation setpoint for low PZR pressure setpoint and will utilize pressure channel 457 to generate this function. If the stem asked with pressure lowering when would an SI occur, this would be a correct answer.

D – Plausible: 458 is incorrect, 1930 is correct. Pressure channel 458 is utilized for the reactor low pressure trip and the low pressure SI actuation signals. This is commonly confused by novice applicants since only 3 pressure channels are used for this function and 4 are used for the SI and reactor trip functions.

Question Information

Topic	RS10013-A4.02-39
System ID	2096114
User ID	RS10013-A4.02-39
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.8
Technical Reference and Revision #	20E-1-4031RY03, Rev Q 20E-1-4031RY04, Rev N 1BwGP 100-1, Rev. 35, Page 64		
Training Objective	S.EF1-06 DESCRIBE how and when Safety Injection can be blocked and/or reset.		
Previous NRC Exam Use	Braidwood 2004 NRC Exam # 39		

References Provided	None
K/A Justification	This question meets the KA since the examinee must be able to monitor the reset of the low pressurizer pressure SI signal from MCR indications.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF2.013.A4.02	Safety Function: 2	Tier 2	Group 1
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)			
Reset of ESFAS channels		RO Imp: 4.3	SRO Imp: 4.4

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links
- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

40	ID: RS10022-A3.01-40	Points: 1.00

Unit 1 is at 100% reactor power.

- The 1A, 1B and 1C RCFCs are running in high speed with the 1D RCFC in standby.
- A reactor trip and Safety Injection occur due to high containment pressure.

After the SI occurs, what will be the automatic response of the RCFCs?

A. ALL RCFCs start immediately in low speed.

B. 1A, 1B and 1C RCFCs start immediately in low speed, and the 1D RCFC starts 20 seconds later in low speed.

C. 1A, 1B and 1C RCFCs start 20 seconds later in low speed, and the 1D RCFC starts immediately in low speed.

D. ALL RCFCs start 20 seconds later in low speed.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 40

A – Plausible: ALL RCFCs start immediately in low speed is incorrect. No time delay exists for manually starting the low speed RCFCs from a standby condition. The examinee may recall being able to start the low speed RCFCs from standby without delay and make this selection.

B – Plausible: 1A, 1B and 1C RCFCs start immediately in low speed, and the 1D RCFC starts 20 seconds later in low speed is incorrect. The examinee may recall being able to start the high speed RCFCs from standby without delay, assume the down shifting RCFCs will start without delay and that the delay is only on the standby RCFC.

C – Plausible: 1A, 1B and 1C RCFCs start 20 seconds later in low speed, and the 1D RCFC starts immediately in low speed is incorrect. The examinee may recall being able to start the low speed RCFCs from standby without delay and that a time delay exists when transferring from high to low speed and make this selection.

D – Correct: The RCFC low speed breaker control circuit contains a 20 second time delay relay which is energized whenever an auto start signal (SI) is generated. The time delay relay contact is only in the standby (auto) start path of the circuit. The 1A-C RCFC high speed breakers will trip on the SI and the 20 second timer will begin counting to close the low speed breakers. The 1D RCFC time will begin counting on SI and will close the low speed breaker 20 seconds later.

Question Information

Topic	RS10022-A3.01-40
System ID	2096118
User ID	RS10022-A3.01-40
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.8
Technical Reference and Revision #	20E-1-4030VP01 rev. O. (Also VP03,VP05 and VP07 also show same TDR for those respective RCFC low speed).		
Training Objective	S.VP1-06 DESCRIBE the operation of the Reactor Containment Fan Coolers during normal operation. COMPARE/CONTRAST this with operation during Loss of Coolant Accident conditions.		
Previous NRC Exam Use	2016 Braidwood NRC Exam # 20		

References Provided	None
K/A Justification	This question meets the KA because the examinee must be able to monitor the automatic operation of the RCFCs during a safeguards initiation.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF5.022.A3.01	Safety Function: 5	Tier 2	Group 1
Ability to monitor automatic operation of the CCS, including: (CFR: 41.7 / 45.5)			
Initiation of safeguards mode of operation		RO Imp: 4.1	SRO Imp: 4.3

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

41	ID: RS10026-K4.08-41	Points: 1.00

An SI actuated due to an RCS LOCA on Unit 1.

- While aligning for Cold Leg Recirculation, the CS pumps were stopped due to an inadequate RWST level.
- All train A & B ECCS pumps have been restarted.
- Both 1SI8811A/B, CNMT SUMP ISOL VALVES, are open.

What additional valve must be OPENED to start the 1A CS pump using the 1A CS pump control switch?

A. 1CS007A, PP 1A HDR ISOL VALVE

B. 1CS009A, PP 1A SUMP SUCT VALVE

C. 1CS010A, EDUC 1A INLET FLOW CONT VALVE

D. 1CS019A, EDUC 1A SPRAY ADD VALVE

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 41

A – Plausible: 1CS007A must be open in order for the 1A CS pump to deliver flow to containment. However, this valve opened automatically on the CS actuation signal. This would be the correct answer if the stem asked which valve must be opened to deliver flow to the CS rings.

B – Correct: In order to satisfy interlocks during the above condition, 1CS009A and 1SI8811A (given in stem) must be open.

C – Plausible: 1CS010A is given an open signal by K643 during a CS actuation, K643 also sends an open signal to 1CS019A and 1CS007A. K644 and the stem mounted limit switch from 1CS019A send the signal to start the 1A CS pump. The examinee may select this distractor if they confuse the auto start interlocks and relay monitor lights with the manual start interlocks.

D – Plausible: 1CS019A is required to be open for an auto start of the 1A CS pump on a CS actuation. This would be the correct answer if the stem asked for an auto start.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RS10026-K4.08-41
System ID	2096152
User ID	RS10026-K4.08-41
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.5
Technical Reference and Revision #	1BwEP ES-1.3, Rev. 300 20E-1-4030CS01, Rev. V		
Training Objective	S.CS1-08-A DESCRIBE the interlocks associated with the CS Pumps and the following valves: a. CS009 Containment Sump Suction Isolation Valves.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have knowledge of the CS pump suction isolation valves and their response during an SI with an RWST Low-2 / low-3 condition.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF5.026.K4.08	Safety Function: 5	Tier 2	Group 1
Knowledge of CSS design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)			
Automatic swapover to containment sump suction for recirculation phase after LOCA (RWST low-low level alarm)		RO Imp: 4.1*	SRO Imp: 4.3*

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

42	ID: RS10026-A2.05-42	Points: 1.00

Unit 1 was at 100% power.

An RCS LOCA occurred.

- Containment pressure is 22 psig.
- BOTH CS Pumps are running and delivering flow to containment.

While performing 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION, step 14, CHECK IF CS IS REQUIRED, the NSO notices the following conditions:

- 1FI-CS013 & 1FI-CS014, CS EDUCTOR SUCTION FLOWS, are both 130 gpm and stable.
- 1FI-CS015 & 1FI-CS016, CS EDUCTOR ADDITIVE FLOWS, are both 0 gpm and stable.

(1) What is/are the consequence(s) of the above conditions if left uncorrected?
(2) What action(s) will the NSO perform?

A. (1) Iodine retention in the containment sump will be lower.
(2) dispatch operators to locally verify 1CS046A/B, CS EDUCTOR 1A/B SPRAY ADD UPST ISOL, are BOTH OPEN.

B. (1) Iodine retention in the containment sump will be lower.
(2) verify 1CS010A/B, CS EDUCTOR INLET FLOW CONTROL VALVES, are BOTH OPEN.

C. (1) Containment radiation levels will be higher.
(2) dispatch operators to locally verify 1CS035A/B, CS EDUCTOR 1A/B INLT ISOL, are BOTH OPEN.

D. (1) Containment radiation levels will be higher.
(2) verify 1CS019A/B, CS EDUCTOR SPRAY ADDITIVE VALVES, are BOTH OPEN.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 42

A – Correct: CS eductor additive flow at 0 gpm is indicative of CS add tank being isolated and NaOH addition not occurring. With no NaOH addition, Iodine absorption is less than assumed in FSAR and Iodine concentration in Cnmt sump would be lower. 1BwEP-0 step 14.f RNO directs dispatching operators to verify CS add tank alignment if CS eductor add flow <5gpm (1CS046A/B would be checked in this step).

B – Plausible: Iodine retention is correct and the 1CS010A/B would already be open with both CS pumps running and eductor suction flow indicated. This would be correct if the eductor suction flow was low.

C – Plausible: Cnmt rad levels would be higher, but the CS eductor is properly aligned based on eductor suction flow indication. The 1CS035A/B are checked in the lineup of the eductor suction flow path. This is plausible if the eductor suction flow path line up is confused with the eductor additive flow path. This would be correct if the eductor suction flow was 0 gpm.

D – Plausible: Cnmt rad levels would be higher, but 1CS019A/B would already be open with both CS pumps running and eductor suction flow indicated. This is plausible if the eductor suction flow path line up is confused with the eductor additive flow path. This would be correct if the CS pump had not been running.

Question Information

Topic	RS10026-A2.05-42
System ID	2096156
User ID	RS10026-A2.05-42
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	Tech Spec Basis 3.6.7, Rev. 112 1BwEP-0, Rev. 303, Page 10-11		
Training Objective	S.CS1-04 DISCUSS how the addition of Sodium Hydroxide (NaOH) to the containment spray water stream acts to remove elemental iodine (I_2) from the containment atmosphere following a loss of primary coolant accident.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets KA because it requires the examinee to analyze CS add system malfunction, predict the impacts of the malfunction, and determine actions necessary to correct the malfunction.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF5.026.A2.05	Safety Function: 5	Tier 2	Group 1
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)			
Failure of chemical addition tanks to inject		RO Imp: 3.7	SRO Imp: 4.1

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

43	ID: RS10039-A1.03-43	Points: 1.00

1BwGP 100-1, PLANT HEATUP, is in progress following a refueling outage.

- ALL MSIVs are CLOSED.
- The Unit 1 NSO is warming up the Main Steam System, using the MSIV bypass valves, with the following indications:

Time	TAVE (˚F)	Main Steam Header Pressure (psig)
0800 (t=0)	200	10
0900	255	20
1000	300	40
1100	340	110
1200	235	80

Which of the following indicates the required operator actions and why?

A. Close the MSIV bypass valves, ONLY the RCS cooldown limit was exceeded.

B. Close the MSIV bypass valves, ONLY the main steam line heat-up limit was exceeded.

C. Close the MSIV bypass valves, BOTH RCS and main steam line limits were exceeded.

D. Leave MSIV bypass valves open, NO RCS or main steam line limits were exceeded.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 43

A – Correct: The RCS cooldown of 105˚F is greater than the allowable 100˚F in any 1 hour period. This action is required to be performed within 30 minutes per TS 3.4.3.

B – Plausible: Close the MSIV Bypass Valves is correct, MS heat-up limits is incorrect. Per BwOP MS-9T1, Main steam line heatup, the rate is greater than normal but less than the limit. The examinee may incorrectly interpret the graph in BwOP MS-9T1 and determine allowable steamline heatup limits have been exceeded.

C – Plausible: Close the MSIV Bypass Valves is correct, BOTH RCS and MS heat-up limits is incorrect. Per BwOP MS-9T1, Main steam line heatup, the rate is greater than the normal curve but less than the limit. The examinee may incorrectly interpret the graph in BwOP MS-9T1 and determine allowable steamline heatup limits have been exceeded.

D – Plausible: Leave MSIV bypass valves open; NO RCS or main steam line limits were exceeded is incorrect. An examinee would select this distractor if they have a conceptual error and assume TS 3.4.3 only applies in modes 1, 2, & 3, as with many other TS (i.e. 3.4.9, 3.4.10, 3.5.1, 3.5.2, etc.).

Question Information

Topic	RS10039-A1.03-43
System ID	2096159
User ID	RS10039-A1.03-43
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	OPEN
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.5
Technical Reference and Revision #	TS 3.4.3, Amendment 98 U-1 PTLR, Rev. 8 BwOP MS-9T1		
Training Objective	S.RC1-12-B As applicable to Reactor Coolant System: b. STATE and APPLY one hour or less LCO/TRM Action Statements.		
Previous NRC Exam Use	2001 Watts Bar Exam # 72		

References Provided	BwOP MS-9T1
K/A Justification	This question meets the KA since the examinee must demonstrate the ability to monitor indications associated with the primary system temperature indications, during a main steam system warm up, and take the appropriate actions based on these indications.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF4.039.A1.03	Safety Function: 4	Tier 2	Group 1
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)			
Primary system temperature indications, and required values, during main steam system warm-up		RO Imp: 2.6	SRO Imp: 2.7

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

44	ID: RS10059-K4.08-44-A	Points: 1.00

Unit 1 is at 95% power.

- The 1B and 1C Main Feed Pumps are running.
- Annunciator 1-16-B1, FW PUMP 1B TRIP, is in alarm.

An automatic start of 1FW01PA, FW PUMP 1A, __(1)___ occur and the 1FW530, FW REG VLV, demand will __(2)__.

A. (1) will
(2) rise

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

C. (1) will NOT
(2) rise

D. (1) will NOT
(2) remain the same

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 44

Unit 2, 7300 controls question (distractors are unit 2 responses).

A – Correct: will and rise is correct. The ovation control system will perform an automatic start of the 1A MFP once enabled. This occurs after 1120 MW per 1BwGP 100-3T1.

B – Plausible: will is correct, remain the same is incorrect. Remain the same would be correct on unit 1 at 100% power. At 100% power the 1FW530 is full open and during an autostart of the 1A MFP, the demand signal will remain the same as the 1A MFP begins to provide forward feed flow. An examinee may recall the normal full power response for the 1FW530 and select this distractor.

C – incorrect: will NOT is incorrect, rise is correct. This would be the correct answer for Unit 2 at 100% since the MFPs run on a DP program, the FRVs are throttled at 100% power and would get a rising demand signal if a MFP trips.

D – Plausible: will NOT and remain the same are incorrect. Will not would be correct on unit 2. Remain the same would be correct on unit 1 at 100% power. At 100% power the 1FW530 is full open and during an autostart of the 1A MFP, the demand signal will remain the same as the 1A MFP begins to provide forward feed flow. An examinee may recall the normal full power response for the 1FW530 and select this distractor.

Question Information

Topic	RS10059-K4.08-44
System ID	2106545
User ID	RS10059-K4.08-44-A
Time to Complete	2
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.8
Technical Reference and Revision #	1BwGP 100-3T1, Rev. 023 SG Water Level Control System (I1-FW-XL-01), Rev. 5		
Training Objective	T.GP03-02 DESCRIBE the power ascension sequence as described throughout the procedure by the Flowchart in 1BwGP 100-3, Power Ascension.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have knowledge of FRV operation (SF-FF mismatch) to select the correct answer.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF4.059.K4.08	Safety Function: 4	Tier 2	Group 1
Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)			
Feedwater regulatory valve operation (on basis of steam flow, feed flow mismatch)	RO Imp: 2.5	SRO Imp: 2.7	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

45	ID: RS10059-A1.03-45	Points: 1.00

Per 1BwGP 100-3, POWER ASCENSION 5 PERCENT TO 100 PERCENT, what is the approximate steam flow from a SG, when the FW Bypass Reg Valves (1FW510A/520A/530A and 540A) automatically close?

A. 5%.

B. 10%.

C. 20%.

D. 30%.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 45

A – Plausible: 5% is plausible since the unit 2 MFW system allows tempering flow only to the SG less than 5%.

B – Plausible: 10% is plausible since this is the max power level the startup feedwater pump can go to.

C – Plausible: 20% is plausible since this is the approximate steam dump demand when the main generator is synchronized.

D – Correct: This is the power limit 1BwGP 100-3 states as the approximate power level where feed flow is transferred from the FW Bypass valves to the Main FW Reg Valves.

Question Information

Topic	RS10059-A1.03-45
System ID	2096683
User ID	RS10059-A1.03-45
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Modified from 2014 Braidwood NRC Exam # 26	**Difficulty**	3.3
Technical Reference and Revision #	1BwGP 100-3, Rev. 077, Page 16		
Training Objective	S.CD1-010-C SUMMARIZE operation limitations associated with the following component and situation: c. Feed Reg Valves And Feed Reg Bypass Valves vs Flow Requirements.		
Previous NRC Exam Use	2014 Braidwood NRC Exam # 26		

References Provided	None
K/A Justification	This question meets the K/A since the examinee must have knowledge of reactor power limits associated with 1 feedwater pump operation and FW Bypass valve limitations.
SRO-Only Justification	Not applicable
Additional Information	Changed stem to reflect ovation modification install, which made previous distractor D the correct answer.

2014 Braidwood NRC Exam # 26:
Of the following, what is the approximate turbine power level when feed flow is transferred from FW Bypass Reg Valves (1FW510A/520A/530A and 540A) to the FW Reg Valves (1FW510/520/530 and 540) , per 1BwGP 100-3, Power Ascension?

A. 5%.
B. 10%.
C. 20%.
D. 30%.

K/A Links

SF4.059.A1.03	Safety Function: 4	Tier 2	Group 1
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MFW controls including: (CFR: 41.5/45.5)			
Power level restrictions for operation of MFW pumps and valves.	RO Imp: 2.7*	SRO Imp: 2.9*	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

46	ID: RS10061-K5.05-46	Points: 1.00

A Unit 2 heatup is in progress per 2BwGP 100-1, PLANT HEATUP.

- RCS temperature is 300°F and slowly rising.

With the above conditions, feed flow should be maintained in the...

A. main feed line to prevent the 2FW079A-D, FW FLOW CHECK VLV, from failing closed.

B. main feed line to prevent water hammer in the main feedwater nozzle.

C. tempering feed line to prevent water hammer in the auxiliary feedwater nozzle.

D. main feed line to prevent water hammer in the steam generator feedwater preheater.

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 46

A – Plausible: 2BwGP 100-3 contains a precaution that states "When feedwater temperature to the steam generators is less than 250°Fand the 2FW079 check valves are open, it is possible the check valves could fail closed as feedwater temperature drops. To minimize the potential for this occurrence do not hold reactor power between 2% and 12% unless permission from the Shift Manager has been received." In the above condition reactor power is not between 2% and 12%, so the condition is not applicable.

B – Plausible: Water hammer prevention system (WHPS) interlocks of flow and purge permissives on the unit 2 main feedwater isolation valves designed to prevent main feedline water hammer conditions. However, these would not be applicable during a plant heatup.

C – Correct: Per 2BwGP 100-1, Limitation and Action E.7 "Whenever RCS temperature is >250°F, flow should be maintained through the Auxiliary Feed Nozzle, to prevent water hammer, which could result from intermittent flow".

D – Plausible: there is a Water Hammer Prevention System (WHPS) on unit 2 that is designed to prevent SG preheater section water hammer. However, the system is based upon SG parameters vs. feedline flow.

Question Information

Topic	RS10061-K5.05-46
System ID	2096698
User ID	RS10061-K5.05-46
Time to Complete	1
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.3
Technical Reference and Revision #	2BwGP 100-1 rev 038 page 12		
Training Objective	T.GP01-01 STATE the bases for each Prerequisite, Precaution, Limitation, Caution and Note of _BwGP 100-1, Plant Heatup.		
Previous NRC Exam Use	2016 Braidwood NRC Exam # 24		

References Provided	None
K/A Justification	The question meets the K/A, it requires the examinee to have knowledge of the feed flow requirements, and their operational implications, to prevent water hammer in the auxiliary feedwater nozzle.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF4.061.K5.05	Safety Function: 4	Tier 2	Group 1
Knowledge of the operational implications of the following concepts as the apply to the AFW: (CFR: 41.5 / 45.7)			
Feed line voiding and water hammer		RO Imp: 2.7	SRO Imp: 3.2

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

47	ID: RS10062-K4.02-47	Points: 1.00

Unit 1 is at 20% power.

- A fault occurs on 6.9KV Bus 159 which results in a bus lockout.

The RCP 1D breaker will trip on...

A. undervoltage and the reactor will trip.

B. undervoltage and the reactor will NOT trip.

C. underfrequency and the reactor will trip.

D. underfrequency and the reactor will NOT trip.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 47

A – Plausible: undervoltage is correct, the reactor will trip is incorrect. This would be the correct answer if the power level in the stem was >30% or if 2 of the 6.9 kv busses tripped.

B – Correct: The lockout (all supply breakers to 159 trip) on bus 159 will create an undervoltage condition (<4920 volts). This will cause all load breakers to automatically trip causing the 1D RCP breaker to trip. Since power is < P-8 (30%) the reactor will not trip.

C – Plausible: underfrequency and the reactor will trip are incorrect. The underfrequency trip relay requires a voltage to actuate. With a sudden loss of voltage the relay will not be able to actuate even though frequency is lost at the same time. This is a common misconception for novice applicants since there is a loss of frequency and voltage. If an underfrequency trip condition (vice bus lockout) were to exist on 2 of 4 busses, for 0.4 sec, this would be the correct answer.

D – Plausible: underfrequency is incorrect, the reactor will not trip is correct. The underfrequency trip relay requires a voltage to actuate. With a sudden loss of voltage the relay will not be able to actuate, even though frequency is lost at the same time. This is a common misconception for novice applicants, since there is a loss of frequency and voltage.

EXAMINATION ANSWER KEY
2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RS10062-K4.02-47
System ID	1131395
User ID	RS10062-K4.02-47
Time to Complete	1
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.8
Technical Reference and Revision #	20E-1-4030RC04, Rev. X 1BwEP-0, Rev. 303, Page 1 Big Note AC-6, Rev 20		
Training Objective	S.RC2-08-A EXPLAIN the interrelationship between the following signals or actuations and the operation of the Reactor Coolant pumps: a. RCP bus undervoltage.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since it requires knowledge of design features of the AC distribution system regarding circuit breaker automatic trips.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF6.062.K4.02	Safety Function: 6	Tier 2	Group 1
Knowledge of ac distribution system design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)			
Circuit breaker automatic trips		RO Imp: 2.5	SRO Imp: 2.7

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

48	ID: RS10063-K3.02-48	Points: 1.00

Unit 2 is at 100% power.

The 2A SI Pump is running to fill SI Accumulators.

The 2A SI Pump control power fuses BLOW.
- A Unit 2 loss of offsite power occurs 10 seconds later.
- ACB 2413, 2A DG Feed to 4KV Bus 241, has just CLOSED.

If NO operator actions are taken, the 2A SI pump will...

A. START 5 seconds after ACB 2413 CLOSES.

B. START IMMEDIATELY after ACB 2413 CLOSES.

C. REMAIN OFF after ACB 2413 CLOSES and CAN be started from the MCR.

D. REMAIN OFF after ACB 2413 CLOSES and CANNOT be started from the MCR.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 48

A – Plausible: START 5 seconds after ACB 2413 CLOSES is incorrect. This would be the correct response for a UV condition on bus 241 with an SI signal present.

B – Correct: START IMMEDIATELY after ACB 2413 CLOSES is correct. Control power is lost to the 2A SI pump prior to the UV on bus 241. Therefore, the 2A SI pump breaker will remain closed and the pump will start immediately after ACB 2413 closes.

C – Plausible: REMAIN OFF after ACB 2413 CLOSES AND CAN be started from the MCR is incorrect. This would be the correct response for a UV condition on bus 241 without an SI signal and no failure of the control power fuses.

D – Plausible: REMAIN OFF after ACB 2413 CLOSES and CANNOT be started from the MCR is incorrect. This would be the correct response if the 2A SI pump were off prior to the UV condition on bus 241.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RS10063-K3.02-48
System ID	2096714
User ID	RS10063-K3.02-48
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.8
Technical Reference and Revision #	20E-2-4030SI01, Rev. H		
Training Objective	S.EC1-14 Given a set of plant conditions, PREDICT how those conditions are affected by any instrumentation, control circuit, or electrical power failure without the use of references.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must have knowledge of the effect that a loss of DC control power will have on the SI pump.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF6.063.K3.02	Safety Function: 6	Tier 2	Group 1
Knowledge of the effect that a loss or malfunction of the DC electrical system will have on the following: (CFR: 41.7 / 45.6)			
Components using DC control power		RO Imp: 3.5	SRO Imp: 3.7

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

49	ID: RS10064-K2.01-49	Points: 1.00

Unit 1 is at 100% power.

- The 1A DG #1 air compressor is out of service.
- The 1A DG #2 air compressor started to re-pressurize the air receiver.
- ACB 1412, SAT 142-1 Feed to 4KV Bus 141, is inadvertently tripped.

What is the expected response of the 1A DG #2 air compressor?

A. Remain running until the air receiver reaches 235 psig.

B. Stop running and restart as soon as Bus 141 is re-energized.

C. Stop running and restart when the 1A DG reached 280 RPM.

D. Stop running and restart 70 seconds later to allow the sequencer to start the vital loads.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 49

A – Plausible: remained running until the air receiver reached 235 psig is incorrect. This would be correct if the air compressor was powered from bus 142.

B – Correct: stop running and restart as soon as Bus 141 is re-energized is correct. When bus 141 loses power, the 1A DG #2 air compressor will stop, the air receiver pressure will drop to provide the starting air to the DG. When the DG gets to rated speed and is powering the bus, in approximately 10 seconds, the 1A DG #2 air compressor will start when power is restored to bus 141 since air pressure will have dropped to below the 210 psig setpoint.

C – Plausible: stopped running and restarted when the 1A DG reached 280 RPM is incorrect. Both fuel oil transfer pumps get a start signal at 280 rpm. This would be the correct answer if the question related to the fuel oil transfer pumps.

D – Plausible: stopped running and restarted 70 seconds later to allow the sequencer to start the vital loads is incorrect. Is plausible since the ATWS Mitigation System (AMS) to start the AF Pump is bypassed for 70 seconds to allow the DG sequencer to complete before it can send a start signal to the AF Pump, examinee could assume that there is a similar delay for the DG air compressor.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RS10064-K2.01-49
System ID	2096730
User ID	RS10064-K2.01-49
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	20E-1-4030DG10, Rev. H		
Training Objective	S.DG1-02-E DISCUSS the function and operation of the following diesel generator auxiliary support system: e. Starting Air		
Previous NRC Exam Use	2014 Braidwood NRC Exam # 32		

References Provided	None
K/A Justification	Meets K/A, examinee must have knowledge of the bus power supply to the DG air compressor.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF6.064.K2.01	Safety Function: 6	Tier 2	Group 1
Knowledge of bus power supplies to the following: (CFR: 41.7)			
Air compressor		RO Imp: 2.7*	SRO Imp: 3.1

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

50	ID: RS10064-K3.01-50	Points: 1.00

Unit 1 is at 100% reactor power.

An RCS LOCA has occurred.

- 1BwEP ES-1.4, TRANSFER TO HOT LEG RECIRCULATION UNIT 1, has just been completed.

A fault develops on SAT 142-2.

- The 1A DG trips on overspeed.

With no operator actions, this will cause flow to the ___(1)___ RCS HOT leg to be reduced due to the status of the ___(2)___.

A. (1) 1A
(2) 1A CV pump

B. (1) 1A
(2) 1A SI pump

C. (1) 1C
(2) 1A CV pump

D. (1) 1C
(2) 1A SI pump

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 50

A – Plausible: A is correct, 1A CV pump is incorrect. The 1A CV pump will not have power due to the failure of the 1A DG and ECCS flow will be reduced. However, the CV pump discharge is not aligned to the RCS hot legs in 1BwEP ES-1.4. This would be the correct answer if the question asked for cold legs.

B – Correct: A and 1A SI pump are correct. SI has been reset and 1BwEP ES-1.4 is complete which will re-align the 1A SI pump discharge to the A & D RCS hot legs. Since the 1A DG tripped on overspeed the 1A SI pump will not provide flow to its aligned discharge path.

C – Plausible: C and 1A CV pump are incorrect. The flow from the 1A SI pump is directed to the A & D hot legs. Train configuration (A/D, or A/C loop pairs) between different systems is a frequently misunderstood concept for a novice applicant. The 1A CV pump will not have power due to the failure of the 1A DG and ECCS flow will be reduced. However, the CV pump discharge is not aligned to the RCS hot legs in 1BwEP ES-1.4. This would be the correct answer if the question asked for cold legs.

D – Plausible: C is incorrect, 1A SI pump is correct. The flow from the 1A SI pump is directed to the A & D hot legs. Train configuration (A/D, or A/C loop pairs) between different systems is a frequently misunderstood concept for a novice applicant.

Question Information

Topic	RS10064-K3.01-50
System ID	2096785
User ID	RS10064-K3.01-50
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	3.5
Technical Reference and Revision #	1BwEP ES-1.4, Rev. 300 Big note ECCS-2 Rev. 11		
Training Objective	S.EC1-14 Given a set of plant conditions, PREDICT how those conditions are affected by any instrumentation, control circuit, or electrical power failure without the use of references.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since knowledge of the effect that a loss of the 1A DG will have on a system controlled by the automatic loader (CV/SI pumps).
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF6.064.K3.01	Safety Function: 6	Tier 2	Group 1
Knowledge of the effect that a loss or malfunction of the ED/G system will have on the following: (CFR: 41.7 / 45.6)			
Systems controlled by automatic loader		RO Imp: 3.8*	SRO Imp: 4.1

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

51	ID: RS10073-K1.01-51	Points: 1.00

A high rad signal on 2PR08J, S/G BLOWDOWN LIQUID RADIATION MON DETECTOR, will close the...

A. 2SD002A, S/G 2A UPPER BD ISOL.

B. 2SD005A, S/G 2A BD SAMPLE ISOL.

C. 2PS179A, S/G 2A BD SAMPLE VLV LINE TO 0PS01J INLT ISOL.

D. 0WX119A, CONDENSATE STO TANKS INLT HDR ISOL FROM BD DEMIN 0A.

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 51

A – Plausible: 2SD002A, S/G 2A UPPER BD ISOL is incorrect. The 2SD002A is in the SG blowdown system but is automatically closed by a phase A signal not a high rad signal.

B – Plausible: 2SD005A, S/G 2A BD SAMPLE ISOL is incorrect. The 2SD005A is in the SG blowdown system but is automatically closed by a phase A signal not a high rad signal.

C – Correct: 2PS179A, S/G 2A BD SAMPLE VLV LINE TO 0PS01J INLT ISOL is correct. The 2PR08J is interlocked with the 2PS179A-D and will close these valves on a hi rad or operate failure.

D – Plausible: 0WX119A, CONDENSATE STO TANKS INLT HDR ISOL FROM BD DEMIN 0A is incorrect. This would be the correct answer if the stem asked for the interlock associated with the 0PR016J. This valve is in the SG blowdown system (after the blowdown demins) and isolates the return to the CST.

Question Information

Topic	RS10073-K1.01-51
System ID	2096818
User ID	RS10073-K1.01-51
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.5
Technical Reference and Revision #	20E-0-4030PR07, Rev. P 20E-2-4030PS24, Rev. G		
Training Objective	S.AR1-04-B-03 STATE the interlocks associated with the AR/PR system and purpose of each including: 3) Steam Generator Blowdown Steam Generator Blowdown.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have knowledge of the physical connection and cause-effect relationship between the PRM and the system served by PRMs.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF7.073.K1.01	Safety Function: 7	Tier 2	Group 1
Knowledge of the physical connections and/or cause- effect relationships between the PRM system and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)			
Those systems served by PRMs		RO Imp: 3.6	SRO Imp: 3.9

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

52	ID: RS10073-A4.03-52	Points: 1.00

The purpose of performing a source check on a radiation monitor is to verify __(1)__ operability and if the check source fails, RMS will indicate an __(2)__.

A. (1) detector
(2) operate failure

B. (1) detector
(2) equipment failure

C. (1) ONLY RM-80
(2) operate failure

D. (1) ONLY RM-80
(2) equipment failure

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 52

A – Correct: detector and operate failure is correct. The source check feature ensures detector operability. If this check fails, the rad monitor will issue an operate failure which will display as dark blue on RMS.

B – Plausible: detector is correct, equipment failure is incorrect. Light blue on RMS indicates an equipment failure condition and can be caused by many equipment failures (i.e. a monitor equipment failure or loss of flow control). This is a frequently misunderstood condition by novice applicants since there is little interaction with rad monitors in this state.

C – Plausible: ONLY RM-80 is incorrect, operate failure is correct. The RM-80 is the device, at the rad monitor, that houses the CPU and memory board and interfaces with the detector. It also processes the status of the monitor and transmits this information to the RM-23 and RMS. A novice applicant may select this answer since the RM-80 is a vital component in the rad monitor system.

D – Plausible: ONLY RM-80 and equipment failure are incorrect. The RM-80 is the device, at the rad monitor, that houses the CPU and memory board and interfaces with the detector. It also processes the status of the monitor and transmits this information to the RM-23 and RMS. A novice applicant may select this answer since the RM-80 is a vital component in the rad monitor system. Light blue on RMS indicates an equipment failure condition and can be caused by many equipment failures (i.e. a monitor equipment failure or loss of flow control). This is a frequently misunderstood condition by novice applicants since there is little interaction with rad monitors in this state.

Question Information

Topic	RS10073-A4.03-52
System ID	2096821
User ID	RS10073-A4.03-52
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Modified from Byron vision ID 677620	**Difficulty**	**2.8**
Technical Reference and Revision #	BwOP AR/PR-11A10, Rev. 6 Radiation Monitors LP (I1-AR-XL-01), Rev. 6a, Page 39.		
Training Objective	S.AR1-08 EXPLAIN the purpose and operation of the source check in an AR/PR Monitor.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have the ability to monitor a rad monitor source check and the indications of unsuccessful completion of a source check, from the MCR .
SRO-Only Justification	Not applicable
Additional Information	Modified stem and all part 2 answers.

Byron vision ID 677620:

The purpose of performing a source check on a radiation monitor is to verify ______ operability and is initiated by ______.

A. RM-80; manual means only
B. detector; manual means only
C. RM-80; manual or automatic means
D. detector; manual or automatic means

Correct answer: D.

K/A Links

SF7.073.A4.03	Safety Function: 7	Tier 2	Group 1
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)			
Check source for operability demonstration		RO Imp: 3.1	SRO Imp: 3.2

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

53	ID: RS10076-G2.2.38-53	Points: 1.00

Unit 1 is at 100% power.

Unit 2 is DEFUELED during a refueling outage.

- The 1A and 2B SX pumps are RUNNING.
- The 1B SX pump is in STANDBY.
- The 2A SX pump is OOS for maintenance.
- The 2B SX pump TRIPS on overcurrent.
- The 1B SX pump is STARTED.

Conditions of LCO 3.7.8, ESSENTIAL SERVICE WATER SYSTEM, are...

A. NOT met on Unit 1 ONLY.

B. NOT met on Unit 2 ONLY.

C. NOT met on BOTH Unit 1 and Unit 2.

D. MET on BOTH Unit 1 and Unit 2.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 53

A – Correct: NOT met on Unit 1 ONLY is correct. LCO 3.7.8 requires "One opposite-unit SX train for unit-specific support", the conditions in the stem have both Unit 2 SX pumps inoperable.

B – Plausible: NOT met on Unit 2 ONLY is incorrect. LCO 3.7.8 is only applicable in modes 1-4. This would be the correct answer if the outage and online unit were reversed. The applicability of LCO 3.7.8, in various plant conditions, is frequently misunderstood by novice applicants.

C – Plausible: NOT met on BOTH Unit 1 and Unit 2 is incorrect. This would be the correct answer if Unit 2 was in mode 1-4. The applicability of LCO 3.7.8, in various plant conditions, is frequently misunderstood by novice applicants.

D – Plausible: MET on BOTH Unit 1 and Unit 2 is incorrect. This would be the correct answer if only one Unit 2 SX pump were inoperable or if both units were in mode 5. The applicability of LCO 3.7.8, in various plant conditions, is frequently misunderstood by novice applicants.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RS10076-G2.2.38-53
System ID	2096829
User ID	RS10076-G2.2.38-53
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.8
Technical Reference and Revision #	TS 3.7.8, Amendment 193 TS 3.7.9, Amendment 189		
Training Objective	S.SX1-12-A As applicable to the Essential Service Water System: a. RECOGNIZE LCO/TRM entry conditions.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have knowledge of the limitations and conditions of the facility license for a given service water (SX system) configuration.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

GS.3.0.SF4.SEC.076	Safety Function: 4	Tier 2	Group 1
Service Water System (SWS)		RO Imp:	SRO Imp:
P2.2.38	Safety Function: 4	Tier 3	Group
Knowledge of conditions and limitations in the facility license. (CFR: 41.7 / 41.10 / 43.1 / 45.13)		RO Imp: 3.6	SRO Imp: 4.5

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

54	ID: RS10078-K2.01-54	Points: 1.00

Both Units are at 100% power.

- A loss of offsite power has occurred on both units.

An EO will be dispatched to reset the UV lockout device (486-SAC1) for the Unit 0 Station Air Compressor (U0 SAC) at bus ___(1)___.

A. 144

B. 143

C. 243

D. 244

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 54

A – Correct: 143 is correct. Per 20E-1-4006C the power supply for the U0 SAC is 143.

B – Plausible: 144 is incorrect. This would be correct if the stem asked for the unit 1 SAC. The SACs receive power from 143, 144, and 244. The WS pumps receive power from 143, 144, and 243.

C – Plausible: 243 is incorrect. The power supply configuration between the SACs and the WS pumps is frequently confused by the novice applicant. This would be the correct answer if the stem asked for the power supply to the 0C WS pump. The SACs receive power from 143, 144, and 244. The WS pumps receive power from 143, 144, and 243.

D – Plausible: 244 is incorrect. This would be the correct answer if the stem asked for the power supply to the U2 SAC. The power supply configuration between the SACs and the WS pumps is frequently confused by the novice applicant. The SACs receive power from 143, 144, and 244. The WS pumps receive power from 143, 144, and 243.

Question Information

Topic	RS10078-K2.01-54
System ID	2096839
User ID	RS10078-K2.01-54
Time to Complete	1
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Modified from Byron 2015 LORT bank vision ID 422077	**Difficulty**	2.8
Technical Reference and Revision #	20E-1-4006C, Rev. M 20E-2-4006D, Rev. M		
Training Objective	S.AP1-12-B LIST the loads supplied by the following buses b. 141, 142 143, 144, 241, 242, 243, and 244.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since it requires knowledge of the power supplies to the station air compressors. Braidwood station does NOT have separate instrument air compressors, therefore loss of the station air compressors is equivalent, in importance and function to the same KA the NRC assigns to instrument air compressors (2.7).
SRO-Only Justification	Not applicable
Additional Information	Modified condition in stem and all answers.

Byron 2015 LORT bank vision ID 422077:

The power supplies for Station Air Compressor 1 and Station Air Compressor 0 are:

A. 1: 4160v Bus 144; 0: 4160v bus 143.

B. 1: 4160v Bus 143; 0: 4160v bus 144.

C. 1: 4160v Bus 144; 0: 4160v bus 243.

D. 1: 4160v Bus 144; 0: 4160v bus 244.

Correct answer: A.

K/A Links

SF8.078.K2.01	Safety Function: 8	Tier 2	Group 1
Knowledge of bus power supplies to the following: (CFR: 41.7)			
Instrument air compressor		RO Imp: 2.7	SRO Imp: 2.9

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

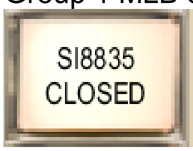
55	ID: RS10103-A3.01-55	Points: 1.00

Unit 1 is at 100% reactor power.

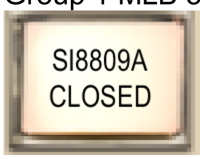
- Annunciator 1-5-B7, CNMT PHASE A ISOLATION, is in alarm.
- SER point 0017, CNMT PHASE A ISOLATION TRAIN A, is printed.

Which of the status lights listed below would be LIT as a DIRECT result of the Phase A SIGNAL?

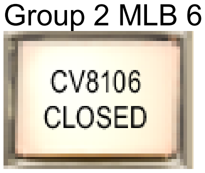
A. Group 1 MLB 5, light 6.3:



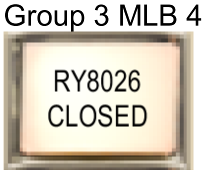
B. Group 1 MLB 5, light 8.4:



C. Group 2 MLB 6, light 1.3:



D. Group 3 MLB 4, light 7.1:



Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 55

A – Plausible: Group 1 MLB-5, light 6.3 is incorrect. 1SI8835 is not a phase A valve but is a containment isolation valve per TS 3.6.3. A novice examinee may confuse containment isolation valves and valves that receive a phase A signal to operate.

B – Plausible: Group 1 MLB-5, light 8.4 is incorrect. 1SI8809A is not a phase A valve but is a containment isolation valve per TS 3.6.3. A novice examinee may confuse containment isolation valves and valves that receive a phase A signal to operate.

C – Plausible: Group 2 MLB-6, light 1.3 is incorrect. 1CV8106 is not a phase A valve but is a containment isolation valve per TS 3.6.3. A novice examinee may confuse containment isolation valves and valves that receive a phase A signal to operate.

D – Correct: Group 3 MLB-4, light 5.4 is correct. 1RY8026 is a Phase A valve and will get a closed signal as a direct result of the Train A phase A isolation.

Question Information

Topic	RS10103-A3.01-55
System ID	2096848
User ID	RS10103-A3.01-55
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.8
Technical Reference and Revision #	1BwOA PRI-13, Rev. 100, Table A.		
Training Objective	S.PC1-06-A LIST the setpoints for, and alarm/interlock functions of the following signal: PHASE A ISOLATION		
Previous NRC Exam Use	2006 Byron NRC Exam # 55		

References Provided	None
K/A Justification	This question meets the KA since it requires the examinee to monitor the automatic operation of a phase A containment isolation.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF5.103.A3.01	Safety Function: 5	Tier 2	Group 1
Ability to monitor automatic operation of the containment system, including: (CFR: 41.7 / 45.5)			
Containment isolation		RO Imp: 3.9	SRO Imp: 4.2

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

56	ID: RS20001-K6.02-56	Points: 1.00

Unit 2 is at 88% power.

- Reactor power is rising.
- Tave is 3°F below Tref.
- Pressurizer pressure rising.
- Pressurizer level rising.

Which of the following would INITIALLY cause these indications?

A. Uncontrolled rod withdrawal.

B. Impulse Channel 2PT-505 fails HIGH.

C. Failed OPEN SG safety valve.

D. Power range channel N-43 fails HIGH.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 56

Unit 2, 7300 controls question.

A – Plausible: Uncontrolled rod withdrawal is incorrect. This would be the correct answer if Tave were greater than Tref.

B – Correct: Impulse Channel 2PT-505 fails HIGH is correct. This will cause Tref to be greater than Tave and generate an outward rod demand.

C – Plausible: Failed OPEN SG safety valve is incorrect. Although a rise in steam flow will raise reactor power. This would be correct if PZR press and level were lowering.

D – Plausible: Power range channel N-43 fails HIGH is incorrect. This is plausible since PR N-43 failing high would cause indicated reactor power to rise. This would be correct if PZR press and level were lowering.

Question Information

Topic	RS20001-K6.02-56
System ID	2106577
User ID	RS20001-K6.02-56
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Modified from vision ID 1138155	**Difficulty**	3.0
Technical Reference and Revision #	BwAR 2-14-E1, Rev 012. Big Note RD-2a, Rev. 0.		
Training Objective	S.RD1-20 Given a Rod Control operating mode and a set of plant conditions, PREDICT how the Rod Control System/Plant/ will respond to any Rod Control System instrumentation, control circuit, or electrical power failure.		
Previous NRC Exam Use	2014 Braidwood NRC Exam #57		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have knowledge of the operation of sensors feeding into the CRDS.
SRO-Only Justification	Not Applicable
Additional Information	Modified conditions in stem to make previous distractor B the correct answer.

Vision ID 1138155:
Unit 2 is at 88% power.
- Reactor power is rising.
- Tave is greater than Tref.
- Pressurizer pressure rising.
- Pressurizer level rising.

Which of the following would, INITIALLY, cause these indications?
A. Uncontrolled rod withdrawal.
B. Impulse Channel 2PT-505 fails HIGH.
C. Failed OPEN SG safety valve.
D. Power range channel N-43 fails HIGH.
Answer: A

K/A Links

SF1.001.K6.02	Safety Function: 1	Tier 2	Group 2
Knowledge of the effect of a loss or malfunction on the following CRDS components: (CFR: 41.7/45.7)			
Purpose and operation of sensors feeding into the CRDS	RO Imp: 2.8	SRO Imp: 3.3	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

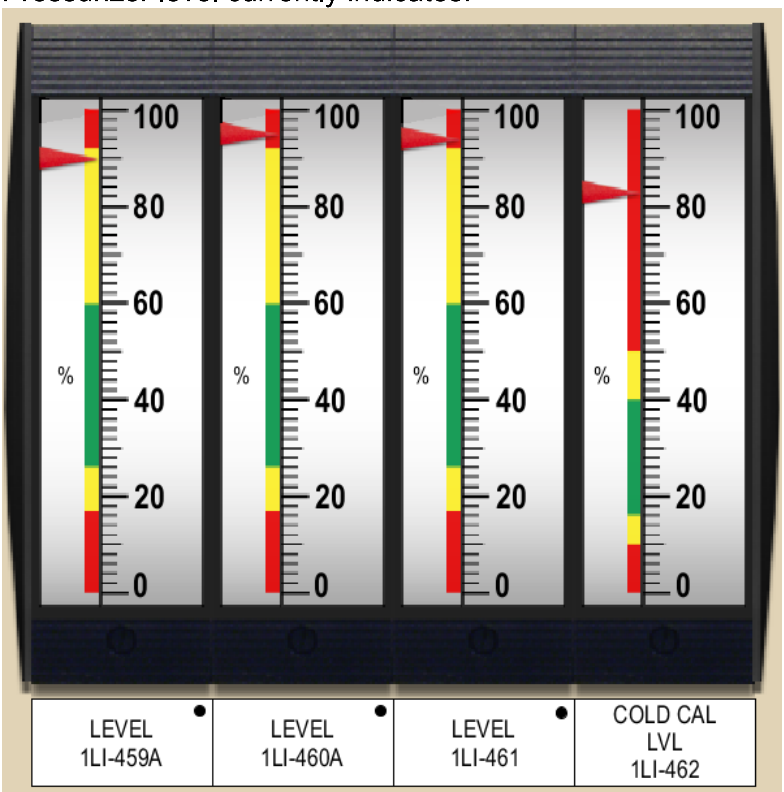
57	ID: RS20011-G2.4.4-57	Points: 1.00

Unit 1 is at 15% reactor power following a refueling outage.

- The 1A CV Pump is running.

A failure has caused 1CV121, CENT CHG PMPS FLOW CONT VLV, to OPEN and it cannot be closed.

Pressurizer level currently indicates:



The FIRST ACTION the NSO will take is...

A. inform the U1 SRO that 1LT-459 has failed ONLY.

B. trip the Unit 1 reactor and perform immediate actions of 1BwEP-0.

C. bypass 1CV121 per BwOP CV-27, CV VALVE BYPASS OPERATIONS.

D. establish excess letdown per BwOP CV-15, EXCESS LETDOWN OPERATIONS.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 57

A – Plausible: inform the U1 SRO that 1L-459 has failed, is incorrect. 1LT-459 does indicate differently than the other two channels making this a plausible action the examinee could select.

B – Correct: trip the Unit 1 reactor and verify reactor trip is correct. 2/3 PZR levels being >92% is direct entry criteria for 1BwEP-0 and the reactor should be tripped.

C – Plausible: bypass 1CV121 per BwOP CV-27, CV VALVE BYPASS OPERATIONS is incorrect. The condition in the stem was cause by excess charging. This would be the correct answer if indicated pressurizer level was lower than the reactor trip setpoint (i.e.70%).

D – Plausible: establish excess letdown per BwOP CV-15, EXCESS LETDOWN OPERATIONS is incorrect. The condition in the stem was cause by excess charging. The purpose of BwOP CV-15, EXCESS LETDOWN OPERATIONS, is to allow for the maintenance of pressurizer level when normal letdown is unavailable. This would be the correct answer if normal letdown was lost and could not be restored.

Question Information

Topic	RS20011-G2.4.4-57
System ID	2096900
User ID	RS20011-G2.4.4-57
Time to Complete	4
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	**3.0**
Technical Reference and Revision #	1BwEP-0, Rev. 303, Page 1.		
Training Objective	T.EP01-06 ANALYZE a given set of plant conditions and DETERMINE if entry into _BwEP-0, is required.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because it requires the examinee to recognize entry conditions to an emergency procedure (1BwEP-0) given a pressurizer level control issue. This is RO level since it requires only procedure entry criteria or purpose to answer.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

GS.3.0.SF2.011	Safety Function: 2	Tier 2	Group 2
Pressurizer Level Control System (PZR LCS)		RO Imp:	SRO Imp:
P2.4.4	Safety Function: 2	Tier 3	Group
Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures. (CFR: 41.10 / 43.2 / 45.6)		RO Imp: 4.5	SRO Imp: 4.7

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

58	ID: RS20014-A4.02-58	Points: 1.00

Unit 2 is at 75% reactor power.

- The crew is recovering a dropped CBD control rod (M-12), per 2BwOA ROD-3, DROPPED OR MISALIGNED ROD UNIT 2.
- Step 15, PREPARE AFFECTED ROD BANK FOR ROD RECOVERY, is in progress.

During the rod recovery, the RO will place the ROD BANK SELECT switch in the __(1)__ position and 2SI-412, ROD SPEED, will indicate __(2)__ SPM.

A. (1) MAN
(2) 48

B. (1) MAN
(2) 64

C. (1) CBD
(2) 48

D. (1) CBD
(2) 64

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 58

A – Plausible: MAN is incorrect, 48 is correct. MAN will be selected by the RO at the onset of the dropped rod event to prevent further outward rod motion.

B – Plausible: MAN and 64 are incorrect. MAN will be selected by the RO at the onset of the dropped rod event to prevent further outward rod motion. A rod speed indication of 64 SPM would be displayed if the bank select switch was taken to a shutdown bank group (SBD vice CBD).

C – Correct: CBD and 48 is correct. Per 1BwOA ROD-3 the affected bank should be selected and rod speed should indicate 48 SPM when CBD is selected.

D – Plausible: CBD is correct, 64 is incorrect. . A rod speed indication of 64 SPM would be displayed if the bank select switch was taken to a shutdown bank group (SBD vice CBD).

Question Information

Topic	RS20014-A4.02-58
System ID	2096910
User ID	RS20014-A4.02-58
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.8
Technical Reference and Revision #	2BwOA ROD-3, Rev. 106, Page		
Training Objective	S.RD1-18 DISCUSS the steps involved in recovering a dropped rod.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since it requires the examinee to be able to manually operate the control rod bank select switch and monitor the expected indications from this manipulation.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF1.014.A4.02	Safety Function: 1	Tier 2	Group 2
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)			
Control rod mode-select switch		RO Imp: 3.4	SRO Imp: 3.2

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

59	ID: RS20041-A3.03-59	Points: 1.00

2BwGP 100-3, POWER ASCENSION 5% TO 100%, in progress following a forced outage.

- Tave is 557°F and stable.
- The Main Turbine is on the turning gear in preparation for turbine latch.
- Steam Dumps are in the STM PRESS mode.

2PT-507, S/G HDR PRESS, fails HIGH.

Steam flow will INITIALLY __(1)__, until Tave is controlled at __(2)__.

A. (1) lower
(2) 550˚F

B. (1) lower
(2) 561˚F

C. (1) rise
(2) 550˚F

D. (1) rise
(2) 561˚F

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 59

Unit 2, 7300 controls question.

A – Plausible: lower is incorrect, 550˚F is correct. Lower would be the correct answer if 2PT-507 failed low. This would cause all steam dumps to close lowering steam flow.

B – Plausible: lower and 561˚F are incorrect. This would be the correct answer if 2PT-507 failed low. In that condition the steam dumps would fail closed causing a reduction in steam flow. This would occur until Tave reached 561˚F when the SG PORVS would open.

C – Correct: rise and 550˚F are correct. 2PT-507 failing high will raise the output from the controller and open all of the steam dumps. This will cause steam flow to rise until Tave lowers to 550˚F when the P-12 interlock will close the steam dumps. The steam dumps will cycle at 550˚F until manual operation is taken.

D – Plausible: rise is correct, 561˚F is incorrect. 561˚F would be correct if the steam flow lowered due to 2PT-507 failing low or if the P-12 interlock is mis-understood and the examinee assumes that it must be reset for the steam dumps to open again.

Question Information

Topic	RS20041-A3.03-59
System ID	2106592
User ID	RS20041-A3.03-59
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Modified from 2011 Farley NRC Exam # 31	**Difficulty**	2.8
Technical Reference and Revision #	20E-2-4030MS08, Rev. K. Steam Dumps Lesson Plan (I1-DU-XL-01), Rev. 7, Page 15		
Training Objective	S.DU1-11 Given an operating Mode and/or various plant conditions, PREDICT how the Steam Dump System and/or supported systems will be impacted by various Steam Dump instrumentation, control circuit, or electrical power failures, without the use of references.		
Previous NRC Exam Use	2011 Farley NRC Exam # 31		

References Provided	None
K/A Justification	This question meets the KA since the examinee must demonstrate the ability to monitor automatic operation of the steam dumps with an instrument failure and the expected indication for steam flow as a result.
SRO-Only Justification	Not applicable
Additional Information	Modified by changing conditions in the stem and all answers.

2011 Farley NRC Exam # 31:
Unit 2 is at 12% power with the following conditions:
At 10:00:
• Tavg is 550°F and stable.
Steam Dumps are in the STM PRESS mode.
• PK-464, STM HDR PRESS controller, is in AUTO.
At 10:05:
PT-464, STM HDR PRESS, fails HIGH.
Which one of the following completes the statements below, with no operator action?
Steam flow will increase and then (1)
PK-464, STM HDR PRESS controller, will (2)
(1) (2)
A. stabilize at 40% steam flow remain in AUTO
B” decrease to zero shift to MANUAL at 543° F
C. decrease to zero remain in AUTO
D. stabilize at 40% steam flow shift to MANUAL at 543°F

K/A Links

SF4.041.A3.03	Safety Function: 4	Tier 2	Group 2
Ability to monitor automatic operation of the SDS, including: (CFR: 41.7 / 45.5)			
Steam flow	RO Imp: 2.7	SRO Imp: 2.8	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

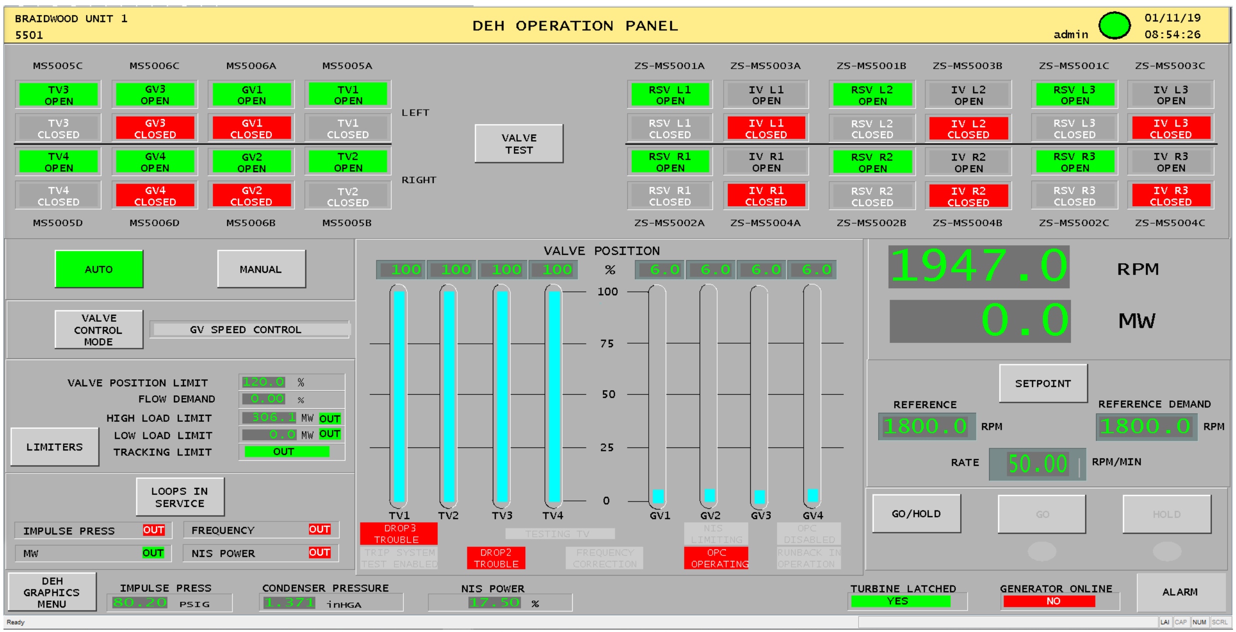
Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

60	ID: RS20045-A2.17-60	Points: 1.00

Unit 1 is at 16% reactor power following a refueling outage.

- The BOP is performing a Main Turbine roll up per 1BwGP 100-3, POWER ASCENSION 5% TO 100%.
- While raising main turbine speed to 1700 RPM, a malfunction occurs in the DEHC system and results in the following indications on ovation graphic 5501:



The GVs are operating in __(1)__ valve control and per BwAR 1-18-B2, ELECTRICAL OVERSPEED TURB TRIP, the __(2)___ will be tripped to address this failure.

A. (1) single
(2) turbine ONLY

B. (1) single
(2) reactor and turbine

C. (1) sequential
(2) turbine ONLY

D. (1) sequential
(2) reactor and turbine

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 60

A – Correct: single and turbine only are correct. All GVs are indicating the same position, therefore, they are operating in single valve control. Per BwAR 1-18-B2 the electrical overspeed trip setpoint has been exceeded and the turbine has not tripped. Since power is < P-8 the turbine should be tripped.

B – Plausible: single is correct, reactor and turbine is incorrect. This would be the correct answer if power was >30%.

C – Plausible: sequential is incorrect, turbine only is correct. This would be the correct answer if GV1-3 were opened more than GV4.

D – Plausible: sequential and reactor and turbine are incorrect. This would be the correct answer if GV1-3 were opened more than GV4 and if power was >30%.

Question Information

Topic	RS20045-A2.17-60
System ID	2096954
User ID	RS20045-A2.17-60
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.8
Technical Reference and Revision #	BwAR 1-18-B2.		
Training Objective	S.EH1-33 LIST all turbine trips and setpoints, and EXPLAIN how exceeding a trip setpoint results in a turbine trip.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must predict what the result of a electrohydraulic control failure will have and use the correct procedure to mitigate the malfunction.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF4.045.A2.17	Safety Function: 4	Tier 2	Group 2
Ability to (a) predict the impacts of the following malfunctions or operation on the MT/G system; and (b) based on those predictions, use procedures to correct, control,or mitigate the consequences of those malfunctions or operations: (CFR: 41.5/43.5/45.3/45.5)			
Malfunction of electrohydraulic control		RO Imp: 2.7*	SRO Imp: 2.9*

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

61	ID: RS20055-K3.01-61	Points: 1.00

Unit 1 at 40% power.

Which of the following valve failures would significantly degrade U-1 Main Condenser Vacuum?

A. 1GS044A, HOTWELL LVL CONT VLV, fails OPEN.

B. 1CB113A, CONDENSATE BOOSTER PMP 1A RECIRC VLV, fails OPEN.

C. 1OG007A, 1A CONDENSER WATER BOX PRIMING TANK OUTLET VALVE, fails OPEN.

D. 1WG074, U-1 FEEDWATER PUMP SEAL WATER COLLECTION TANK LCV, fails CLOSED.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 61

A – Correct: 1GS044A is correct. Will result in a loss of loop seal and direct path from the OG header to main condenser.

B – Plausible: 1CB113A is incorrect. 1CB113A is normally closed but may be open at this power level to better control heater drain tank level. The examinee may plausibly conclude that the recirc flow will lower condenser vacuum by adding partially heated water (from GS condenser and SJAE condenser) to the main condenser or that gland water flow will be significantly affected.

C – Plausible: 1OG007A is incorrect. water box priming tanks outlet valve failing open may allow some water into the priming system or air into the upper water box region. The examinee may plausibly conclude that the air entering the upper water box region would significantly affect condenser vacuum.

D – Plausible: 1WG074 is incorrect. 1WG074 failing closed would raise level in the seal water collection tank until it overflowed to atmosphere. The examinee may plausibly conclude that this will affect the main feed pump seals, therefore degrading condenser vacuum.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RS20055-K3.01-61
System ID	2096976
User ID	RS20055-K3.01-61
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	M-35 Sht 5C, Rev. AF 1BwOA SEC-3, Rev. 108		
Training Objective	S.GS1-06-C DISCUSS the operation of the Gland Sealing Steam System with a failure of the following pressure regulators: a. Supply header regulator.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	Question meets KA - question requires examinee to analyze effect of malfunction in the GS (CARS) system on the main condenser.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF4.055.K3.01	Safety Function: 4	Tier 2	Group 2
Knowledge of the effect that a loss or malfunction of the CARS will have on the following: (CFR: 41.7 / 45.6)			
Main condenser		RO Imp: 2.5	SRO Imp: 2.7

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

62	ID: RS20056-K1.03-62	Points: 1.00

Unit 1 is at 100% power.

In accordance with 1BwGP 100-3, POWER ASCENSION, Unit 1 Main Condenser Hotwell level control is selected to the ________(1)________ side where the CB pump recirculation and FW High Pressure cleanup physical connections are located.

This method of control uses the ________(2)________.

A. (1) WEST (1LI-CD089)
(2) lowest controlling side to prevent cavitation of the CD pumps.

B. (1) WEST (1LI-CD089)
(2) highest controlling side to prevent damage to the LP Turbines.

C. (1) EAST (1LI-CD042)
(2) lowest controlling side to prevent cavitation of the CD pumps.

D. (1) EAST (1LI-CD042)
(2) highest controlling side to prevent damage to the LP Turbines.

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 62

A – Plausible: West is incorrect, lowest controlling side to prevent cavitation of the CD pumps is correct. This would be the correct answer if at a lower power level in the stem. This side is selected at low power since the MFW and CB recircs are open and level will read higher on the side where the recircs return to the condenser.

B – Plausible: West and highest controlling side to prevent damage to the LP Turbines are incorrect. West would be correct if at a lower power level in the stem. This side is selected at low power since the MFW and CB recircs are open and level will read higher on the side where the recircs return to the condenser. Prevent damage to the LP turbines is plausible since a condenser overfill could result in damage to the LP turbines.

C – Correct: The overriding basis for selecting East versus West for hotwell level control is to control on the side that is lower to ensure that the lowest hotwell level present in the condenser does not jeopardize $NPSH_A$ for the CD pumps. The FW HP cleanup return and CB/FW recirculations connect on the East side of the hotwell, whereas the FW heater returns connect on the West side. At low power levels, the CB & FW recirculation valves are often open, and the FW HP cleanup is used, causing the East side to naturally be higher (due to more flow inputs) at low power. Also, at low power, there is minimal flow through the FW heaters (entering the West side). This results in a higher hotwell level on the East side at low power. At high power level (as in the problem), the West side will be higher as there is significant FW heater return flow (entering the West side) and no CB recirc or FW High pressure cleanup (which inputs on the East side). The East side will therefore be lower at high power levels and is therefore selected as the controlling side at high power.

D – Plausible: East is correct, highest controlling side to prevent damage to the LP turbines is incorrect. Prevent damage to the LP turbines is plausible since a condenser overfill could result in damage to the LP turbines.

Question Information

Topic	RS20056-K1.03-62
System ID	2096982
User ID	RS20056-K1.03-62
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.8
Technical Reference and Revision #	1BwGP 100-3, Rev. 77, Page 6		
Training Objective	S.CD2-02 LIST the Controls, Instrumentation and Alarms available to the Control Room operator for the Condensate Makeup System.		
Previous NRC Exam Use	2013 Braidwood NRC Exam # 8		

References Provided	None
K/A Justification	Meets K/A, requires examinee knowledge of the physical connections between CD and FW system and operational effect on hotwell level control, including potential consequence of improper control selection.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF4.056.K1.03	Safety Function: 4	Tier 2	Group 2
Knowledge of the physical connections and/or cause-effect relationships between the Condensate system and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)			
MFW		RO Imp: 2.6*	SRO Imp: 2.6

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.4 Secondary coolant and auxiliary systems that affect the facility.

63	ID: RS20071-K5.04-63	Points: 1.00

The crew has just completed a dilution of a Gas Decay Tank (GDT) that had both Hydrogen and Oxygen concentrations more than 5%.

Chemistry has resampled the GDT after release and reports the following concentrations:
- Hydrogen: 4.1 %
- Oxygen: 2.3%

Which of the following describes the required operator action, if any, and the reason for that action?

A. does NOT have to be diluted again because ONLY the Oxygen concentration is within limits.

B. does NOT have to be diluted again because BOTH the Hydrogen and Oxygen concentrations are within limits.

C. must be diluted again based ONLY on the Oxygen concentration.

D. must be diluted again based on BOTH high Hydrogen and Oxygen concentrations.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 63

A – Plausible: Incorrect because the requirement to dilute the GDT is based on both Hydrogen and Oxygen concentrations. Plausible because the GDT must be diluted and the reason is in part because of the Oxygen concentration.

B – Plausible: Incorrect because the requirement to dilute the GDT is based on both Hydrogen and Oxygen concentrations. Plausible because the GDT must be diluted and the reason is in part because of the Hydrogen concentration.

C – Plausible: Incorrect because the GDT has to be diluted based on both Hydrogen and Oxygen concentrations. Plausible because if taken separately, both Hydrogen and Oxygen concentrations are in limits.

D – Correct: Correct per the reference and the discussion above. The GDT must be diluted again based on both Hydrogen and Oxygen
concentrations.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RS20071-K5.04-63
System ID	2096985
User ID	RS20071-K5.04-63
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	BwOP GW-5, Rev. 13, Page 2		
Training Objective	S.GW1-10-A As applicable to the Gaseous Radwaste System: a. RECOGNIZE LCO/TRM entry conditions.		
Previous NRC Exam Use	2009 Turkey Point NRC Exam # 65		

References Provided	None
K/A Justification	This question meets the KA because it requires knowledge of the operational implication of hydrogen/oxygen concentrations and their limits.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF9.071.K5.04	Safety Function: 9	Tier 2	Group 2
Knowledge of the operational implication of the following concepts as they apply to the Waste Gas Disposal System: (CFR: 41.5 / 45.7)			
Relationship of hydrogen/oxygen concentrations to flammability	RO Imp: 2.5	SRO Imp: 3.1	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

64	ID: RS20072-K4.01-64	Points: 1.00

Unit 1 in MODE 6.

- 1VQ05C, CNMT MINI-FLOW PRG EXH FAN, is RUNNING.

If the detector for 1AR011J, CNMT FUEL HDLG INCIDENT RAD DETECTOR, fails HIGH...

A. 1VQ005A, MINI FLOW PRG EXH INSIDE ISOL VLV, will CLOSE.

B. 1VQ05C, CNMT MINI-FLOW PRG EXH FAN, will get a DIRECT trip signal from the 1AR11J.

C. UPWARD movement of the U1 Refueling Machine hoist will be inhibited.

D. 1PR035, CONTAINMENT PROCESS RAD MON INLET ISOLATION VALVE, will CLOSE.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 64

A – Correct: 1VQ005A is correct. 1AR11J - Containment Fuel Handling Incident Train A Initiates a TRAIN A Primary Containment Purge Isolation which closes: 1VQ001A & 1VQ002A Also initiates a TRAIN A Primary Containment Mini-Flow Purge Isolation which closes: 1VQ004A, 1VQ005A & 1VQ005C

B – Plausible: 1VQ05C is incorrect. 1VQ05C will trip during this isolation but the trip will be due to damper interlocks not a direct signal from the 1AR11J.

C – Plausible: U1 RFM upward hoist movement is incorrect. The 0AR39J is interlocked to prevent upward movement of the fuel handling building crane. An examinee could reasonably conclude that the refueling machine would have a similar interlock and select this distractor.

D – Plausible: 1PR035 is incorrect. This would be the correct answer if the 1PR11J were to fail high.

Question Information

Topic	RS20072-K4.01-64
System ID	2096988
User ID	RS20072-K4.01-64
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.5
Technical Reference and Revision #	20E-1-4030VQ10 Rev. F		
Training Objective	S.VP1-09-B DESCRIBE the normal and accident operation of the following Containment Purge subsystems: b. Mini-Flow Containment Purge.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because the examinee must have knowledge of the ARM system interlocks with a containment vent isolation and its operation.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF7.072.K4.01	Safety Function: 7	Tier 2	Group 2
Knowledge of ARM system design feature(s) and/or inter- lock(s) which provide for the following: (CFR: 41.7)			
Containment ventilation isolation		RO Imp: 3.3*	SRO Imp: 3.6*

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

65	ID: RS20086-A1.01-65	Points: 1.00

Which of the following, identifies ALL the Fire Protection Pumps that will be running, if FP system water pressure lowered to the pressure shown below:

(1) 0FP03PA, 0A MOTOR DRIVEN FIRE PUMP
(2) 0FP03PB, 0B DIESEL DRIVEN FIRE PUMP
(3) 0FP06A, 0A JOCKEY PUMP
(4) 0FP06B, 0B JOCKEY PUMP

A. 1 and 3 ONLY

B. 3 and 4 ONLY

C. 1, 3, and 4 ONLY

D. 1, 2, 3, and 4

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 65

A – Plausible: 1 and 3 ONLY is incorrect. The 0A fire pump and the 0A Jockey pump will be running, but so will the 0B Jockey pump. The examinee may have a conceptual misunderstanding and assume the fire pumps operate in pairs by train.

B – Plausible: 3 and 4 ONLY is incorrect. The 0A and 0B Jockey pumps will be running, but the 0A motor driven fire pump will be as well. This would be correct if the fire system pressure indicated 10 psig higher.

C – Correct: 1, 3, and 4 ONLY is correct. Jockey Pumps: 0A starts at 165 psig, 0B starts at 150 psig Fire Pumps: 0A starts at 135 psig, 0B starts at 120 psig.

D – Plausible: 1, 2, 3, and 4 is incorrect. The 0B Diesel driven fire pump will not be running. This would be correct if the fire system pressure indicated 10 psig lower.

Question Information

Topic	RS20086-A1.01-65
System ID	2096995
User ID	RS20086-A1.01-65
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	BwAR 0-38-B7, Rev. 7 BwAR 0-38-B8, Rev. 8 20E-0-4030FP04, Rev. G		
Training Objective	S.FP1-04A/B DISCUSS how the Water Fire Protection subsystem header is kept pressurized. Include: a. Jockey Pumps, b. Motor Driven Fire Pump.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because it requires the examinee to demonstrate the ability to monitor FP system pressure and predict which pumps should have auto started.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

SF8.086.A1.01	Safety Function: 8	Tier 2	Group 2
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with Fire Protection System operating the controls including: (CFR: 41.5 / 45.5)			
Fire header pressure		RO Imp: 2.9	SRO Imp: 3.3

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.5 Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.

66	ID: RG-2.1.42-66	Points: 1.00

In accordance with OU-AP-200, ADMINISTRATIVE CONTROLS DURING FUEL HANDLING ACTIVITIES FOR BYRON AND BRAIDWOOD, which of the following requires suspension of fuel assembly movements in containment?

A. Loss of one Gamma Metrics source range post accident neutron monitor.

B. Refueling cavity boron concentration drops by 40 ppm from yesterday's sample to today's sample.

C. Refueling cavity water level is 23' 6" above the top of the Reactor Vessel Flange.

D. Sustained winds of 30 mph are indicated on 0UR-EM001, WIND DIRECTION/SPEED RECORDER (LOWER ELEV).

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 66

A – Plausible: Loss of one Gamma Metrics source range post accident neutron monitor is incorrect. This would be correct if the failure resulted in less than 2 total indications between SRNI and gamma metrics PANM.

B – Correct: Refueling cavity boron concentration drops by 40 ppm from yesterday's sample to today's sample is correct, the limit is 20 ppm change maximum. Per OU-AP-200 section 4.5.1 and 4.8.9 list conditions that require suspension of core alterations. All choices are parameters that would be typically reported to or monitored by the NSO.

C – Plausible: Refueling cavity water level is 23' 6" above the top of the Reactor Vessel Flange is incorrect. This would be the correct selection if level were <23'.

D – Plausible: Sustained winds of 30 mph. is incorrect. This would be the correct selection of the wind speed were raised to >40 mph.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RG-2.1.42-66
System ID	2097035
User ID	RG-2.1.42-66
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	OU-AP-200, Rev. 022, Page 16		
Training Objective	T.AM12-10 Given a set of plant conditions during Fuel Handling operations, EVALUATE the conditions and DETERMINE required actions as outlined in OU-AP-200 Administrative Controls During Fuel Handling Activities For Byron and Braidwood.		
Previous NRC Exam Use	2009 Braidwood NRC Exam #67		

References Provided	None
K/A Justification	This question meets the KA since it requires knowledge of fuel movement procedures.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

P2.1.42	Safety Function: 8	Tier 3	Group
Knowledge of new and spent fuel movement procedures. (CFR: 41.10 / 43.7 / 45.13)	RO Imp: 2.5	SRO Imp: 3.4	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

67	ID: RG-2.1.1-67	Points: 1.00

Unit 2 has been tasked with performing a Semi Annual, Operational Risk surveillance, involving a turbine protection relay.

The evolution will involve the Unit 2 SRO, two Nuclear Station Operators, two Equipment Operators, and two EMD Technicians.

In accordance with HU-BR-1211, PRE-JOB BRIEFINGS, which is the LOWEST level briefing, the personnel above will attend, prior to conducting the surveillance?

A. Task Preview

B. Standard Pre-Job Briefing

C. Tailored Pre-Job Briefing

D. Heightened Level Awareness Briefing

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 67

A – Plausible: Task Preview is incorrect. This would be correct for a low risk and frequently performed activity.

B – Plausible: Standard PJB is incorrect. This would be the correct answer for a low risk and infrequent activity.

C – Plausible: Tailored PJB is incorrect. This would be the correct answer for a high risk and frequent activity.

D – Correct: HLA is correct. HU-BR-1211 section 4.1.5 HLA required for: -An activity screened as operational risk by the work control process that is scheduled for performance less frequently than quarterly (e.g., greater than 3 months). -Evolutions covered by either permanent or special procedures requiring the coordination on four or more people or multiple departments and one or more of the following: Has the potential to adversely affect electrical generation.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RG-2.1.1-67
System ID	2097039
User ID	RG-2.1.1-67
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	HU-BR-1211, Rev. 0, Page 11-12		
Training Objective	T.AM23-01 Describe the activities that require a: B. Heightened Level of Awareness Briefing		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since it requires knowledge of conduct of operations requirements for conducting a PJB.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

P2.1.1	Safety Function: 8	Tier 3	Group
Knowledge of conduct of operations requirements. (CFR: 41.10 / 45.13)	RO Imp: 3.8	SRO Imp: 4.2	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

68	ID: RG-2.1.21-68	Points: 1.00

Which of the following sources are authorized for verifying that a Braidwood Operating Procedure (BwOP) is the most current revision?

1. PassPort
2. Printed Outage Work Order Package
3. Electronic Document Management System (EDMS)

A. 1 and 2 ONLY.

B. 1 and 3 ONLY.

C. 2 and 3 ONLY.

D. 1, 2, and 3.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 68

A – Plausible: PassPort and Printed Outage Work Order Package is incorrect. Outage work order packages are printed in advanced and may contain BwOP's but they must be verified prior to use. EDMS is also an authorized source.

B – Correct: All BwOPs are Controlled Documents for which the content is revision controlled and distribution is controlled with copyholder receipt verified by Records Management. Per HU-AA-104-101 either passport or EDMS is acceptable to verify the revision of a procedure.

C – Plausible: Printed outage work order package is incorrect, EDMS correct. Outage work order packages are printed in advanced and may contain BwOP's but they must be verified prior to use. PassPort is also an authorized source.

D – Plausible: Passport is correct, Printed outage work order package is incorrect, EDMS correct. Outage work order packages are printed in advanced and may contain BwOP's but they must be verified prior to use.

Question Information

Topic	RG-2.1.21-68
System ID	2097090
User ID	RG-2.1.21-68
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.5
Technical Reference and Revision #	HU-AA-104-101, Rev. 5, Page 3		
Training Objective	T.AM04-16 DESCRIBE how to use the Operating Department procedures.		
Previous NRC Exam Use	2014 Quad Cities NRC Exam #67		

References Provided	None
K/A Justification	This question meets the KA because the examinee must determine the allowable sources to verify the correct revision of a procedure.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

P2.1.21	Safety Function: 8	Tier 3	Group
Ability to verify the controlled procedure copy. (CFR: 41.10 / 45.10 / 45.13)	RO Imp: 3.5*	SRO Imp: 3.6*	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

69	ID: RG-2.2.15-69	Points: 1.00

The 0C WS Pump (0WS01PC) is being returned to service from a scheduled maintenance window.

Per OP-AA-109-103, ESOMS CLEARANCE AND TAGGING, which of the following manipulations will be sequenced FIRST?

A. 0WS002C, 0C WS PMP MAN DISCH TO COMMON HEADER, OPEN

B. 0WS346, CLG WTR TO 0C WS PMP STRN DRAIN VLV, CLOSED

C. 2AP07EJ, NON ESS SERV WTR PUMP 0C BKR, RACKED IN

D. 0HS-WS003, WS PUMP 0C C/S, to NAT

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 69

A – Plausible: 0WS002C is incorrect. M-43 Sht. 1 will show that this valve should be opened to be in its normal alignment. Additionally, discharge valves should be sequenced after vents and drains. This would be correct if the OOS were being hung and it occurred after the power source step.

B – Correct: 0WS346 is correct. Per OP-AA-109-103, equipment vents and drains should be restored prior to any other components.

C – Plausible: 2PA07EJ is incorrect. Per OP-AA-109-103, power supplies will be restored after components. This would be correct if the question were asking for the component removed after the control switch while hanging a tagout.

D – Plausible: 0HS-WS0003 is incorrect. Per OP-AA-109-103, control switches will be restored last. This would be correct if the question were asking for the first manipulation.

Question Information

Topic	RG-2.2.15-69
System ID	2097110
User ID	RG-2.2.15-69
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	OPEN
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.5
Technical Reference and Revision #	OP-AA-109-103, Rev. 1, Page 24 M-43 Sht 1, Rev. BH		
Training Objective	T.AM33-08 STATE the proper C/O checklist order for performing a C/O on driving and driven equipment.		
Previous NRC Exam Use	None		

References Provided	M-43 Sht. 1
K/A Justification	This question meets the KA since the examinee must have the ability to determine the restoration configuration required, using M-43 Sht. 1, and the general guidelines for this restoration per OP-AA-109-103.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

P2.2.15	Safety Function: 8	Tier 3	Group
Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tag-outs, etc. (CFR: 41.10 / 43.3 / 45.13)	RO Imp: 3.9	SRO Imp: 4.3	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

70	ID: RG-2.2.41-70	Points: 1.00

Unit 0 Braidwood Station Electrical Schematics are designated by 20E-0-__(1)__ and relays are shown in the __(2)__ state on these prints.

A. (1) 4000 series
(2) DE-ENERGIZED

B. (1) 4000 series
(2) ENERGIZED

C. (1) 4030 series
(2) DE-ENERGIZED

D. (1) 4030 series
(2) ENERGIZED

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 70

A – Plausible: 4000 series is incorrect, DE-ENERGIZED is correct. The 4000 series prints are electrical series prints, however they are the key diagrams for the electrical busses.

B – Plausible: 4000 series and ENERGIZED are incorrect. The 4000 series prints are electrical series prints, however they are the key diagrams for the electrical busses. Schematic convention, for instrument sensing lines, is to show the system filled. This conventional mis-match could lead the examinee to determine electrical prints are drawn energized.

C – Correct: 4030 series and DE-ENERGIZED are correct. The 4030 series is where all electrical schematic prints are located and relays are shown in their DE-ENERGIZED state on these prints.

D – Plausible: 4030 series is correct, ENERGIZED is incorrect. Schematic convention, for instrument sensing lines, is to show the system filled. This conventional mis-match could lead the examinee to determine electrical prints are drawn energized.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RG-2.2.41-70
System ID	2098960
User ID	RG-2.2.41-70
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	OPEN
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.8
Technical Reference and Revision #	20E-0-4030AC01, Rev. E 20E-0-4007D, Rev G Intro to Print Reading Lesson Plan, Rev. 6a, Page 10		
Training Objective	A.BP1-02 Explain the print identification system used and purpose of each type of print.		
Previous NRC Exam Use	None		

References Provided	20E-0-4030AC01, Rev. E 20E-0-4007D, Rev G
K/A Justification	This question meets the KA because the examinee must have the ability to locate and interpret station electrical prints.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

P2.2.41	Safety Function: 8	Tier 3	Group
Ability to obtain and interpret station electrical and mechanical drawings. (CFR: 41.10 / 45.12 / 45.13)	RO Imp: 3.5	SRO Imp: 3.9	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

71	ID: RG-2.3.14-71	Points: 1.00

An RCS LOCA resulted in core damage on Unit 1.

Which of the following evolutions have the LOWEST potential for raising radiation levels in the AUXILIARY BUILDING?

A. Place one train of Unit 1 RH in service per BwOP RH-6, PLACING THE RH SYSTEM IN SHUTDOWN COOLING, without establishing RH letdown.

B. Restart one RCP per 1BwOA ESP-1, REACTOR COOLANT PUMP STARTUP DURING ABNORMAL CONDITIONS, without unisolating seal return.

C. Reestablish letdown per 1BwOA ESP-2, REESTABLISHING CV LETDOWN DURING ABNORMAL CONDITIONS.

D. Establish cold leg recirculation per 1BwEP ES-1.3, TRANSFER TO COLD LEG RECIRCULATION.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 71

A – Plausible: Place one train of Unit 1 RH in service per BwOP RH-6 is incorrect. Placing RH in service without establishing RH letdown will still spread the radiation levels into the aux building RH piping. This evolution will be required to cooldown the unit to cold shutdown making this a plausible distractor.

B – Correct: Restart one RCP per 1BwOA ESP-1 is correct. Starting an RCP during abnormal condition per 1BwOA ESP-1 with seal return not realigned to the VCT will not bring any of the primary coolant out of the containment building to the aux building.

C – Plausible: Re-establish letdown per 1BwOA ESP-2 is incorrect. Establishing letdown will bring highly contaminated primary coolant into the aux building. Establishing letdown returns pressurizer level control and cleanup path to the demineralizers to cleanup the coolant, making this a plausible distractor.

D – Plausible: Establish cold leg recirculation per 1BwEP ES-1.3 is incorrect. Cold leg recirculation brings highly contaminated coolant from the containment floor into the Aux building to recirculate it through the entire ECCS system in the Aux building. This activity will be performed if the RWST is depleted to the low 2 RWST level and will not be stopped for high radiation level, making this a plausible distractor.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RG-2.3.14-71
System ID	2099575
User ID	RG-2.3.14-71
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	Radiological Aspects of Core Damage (I1-MI-XL-13), Rev.3b, Page 8-9		
Training Objective	T.MI13-03 Identify possible release paths for radioactive material and identify plant areas normally used that may become high radiation areas during an accident because of radioactive releases.		
Previous NRC Exam Use	2018 Braidwood NRC Exam #73		

References Provided	None
K/A Justification	The examinee must discern evolutions that will significantly raise radiation levels in areas that are NOT normally high radiation areas, during a core damaging event.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

P2.3.14	Safety Function: 8	Tier 3	Group
Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities. (CFR: 41.12 / 43.4 / 45.10)	RO Imp: 3.4	SRO Imp: 3.8	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links
CFR: 41.12 Radiological safety principles and procedures.

72	ID: RG-2.3.15-72	Points: 1.00

A safety-related area radiation monitor can be operated from ___(1)___ and can be monitored from ___(2)___.

A. (1) its RM-23 and RMS
(2) ONLY its RM-23

B. (1) its RM-23 and RMS
(2) its RM-23 and RMS

C. (1) ONLY its RM-23
(2) ONLY its RM-23

D. (1) ONLY its RM-23
(2) its RM-23 and RMS

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 72

A – Plausible: its RM-23 and RMS, ONLY its RM-23 is incorrect. This is a frequently confused subject among novice applicants due to the difference between these controls in the simulator and the plant.

B – Plausible: its RM-23 and RMS, its RM-23 and RMS is incorrect. Safety related monitors cannot be operated from RMS. This is a frequently confused subject among novice applicants due to the difference between these controls in the simulator and the plant.

C – Plausible: ONLY its RM-23, and ONLY its RM-23 is incorrect. These rad monitors can also be monitored at RMS. This is a frequently confused subject among novice applicants due to the difference between these controls in the simulator and the plant.

D – Correct: ONLY its RM-23, its RM-23 and RMS is correct. Safety related monitors can only be operated at the associated RM-23. They can be monitored at both the RM-23 and RMS.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	RG-2.3.15-72
System ID	2099579
User ID	RG-2.3.15-72
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.5
Technical Reference and Revision #	BwOP AR/PR-6, Rev. 13, Page 3.		
Training Objective	S.AR1-03 DISCUSS the function of the following AR/PR components: b. RM-23.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have knowledge of radiation monitoring systems and where they can be operated.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

P2.3.15	Safety Function: 7	Tier 3	Group
Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. (CFR: 41.12 / 43.4 / 45.9)	RO Imp: 2.9	SRO Imp: 3.1	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.12 Radiological safety principles and procedures.

73	ID: RG-2.3.13-73	Points: 1.00

A Radiation Protection Technician records the following conditions while surveying a Demineralizer Valve room located in the Auxiliary Building RPA:

- General Area Radiation level in room is 64 mrem/hr.
- Contamination levels are 80 dpm/100cm² beta-gamma and 5 dpm/100cm² alpha.

In accordance with NISP-RP-004, NUCLEAR INDUSTRY STANDARD PROCESS RADIOLOGICAL POSTING AND LABELING, which of the following postings are required at the entrance to the Demineralizer Valve room?

A. Caution-Radiation Area ONLY

B. Caution-Radiation Area AND Caution-Contaminated Area

C. Caution-High Radiation Area AND Caution-Contaminated Area

D. Caution-High Radiation Area ONLY

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 73

A – Correct: Radiation area is correct. Per NISP-RP-004, area meets requirements for posting as rad area (4-80 mr/hr). Does not meet the contaminated area (> 1000dpm/100cm^2 beta gamma and > 20dpm/100cm^2 alpha) and does not meet the requirement for high rad area (80-800 mrem/hr).

B – Plausible: Caution-Radiation Area AND Caution-Contaminated Area is incorrect. This would be correct if contamination levels were $\geq$ 1000 dpm/100 cm².

C – Plausible: Caution-High Radiation Area AND Caution-Contaminated Area is incorrect. This would be correct if rad levels were $\geq$ 80 mrem/hr and contamination levels were $\geq$ 1000 dpm/100 cm².

D – Plausible: Caution-High Radiation Area ONLY is incorrect. This would be correct if rad levels were $\geq$ 80 mrem/hr.

Question Information

Topic	RG-2.3.13-73
System ID	2099589
User ID	RG-2.3.13-73
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.5
Technical Reference and Revision #	NISP-RP-004, Rev. 1, Page 9		
Training Objective	T.AM45-01-C State the definition and posting requirements for the following: 3. Radiation Area.		
Previous NRC Exam Use	2006 Braidwood NRC Exam #72		

References Provided	None
K/A Justification	This question meets the KA since it requires knowledge of radiological safety procedures for entry into areas accessed during the performance of normal operator duties.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

P2.3.13	Safety Function: 7	Tier 3	Group
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)	RO Imp: 3.4	SRO Imp: 3.8	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.12 Radiological safety principles and procedures.

74		**Points: 1.00**

Question withheld from public release due to security-related content.

K/A Links

P2.4.28	Safety Function: 7	Tier 3	Group
Knowledge of procedures relating to a security event (non-safeguards information). (CFR: 41.10 / 43.5 / 45.13)	RO Imp: 3.2	SRO Imp: 4.1	

75	ID: RG-2.4.23-75	Points: 1.00

Transient conditions exist.

- Several annunciators are lit.
- Events are in progess requiring operator actions.
- Several procedures are in use.
- A RED PATH condition exists for core cooling.
- All AC busses are energized.
- _-6-B7, RWST LEVEL LOW-2, is DARK.

The ______ series take precedence because they are designed to recover degraded safety functions rather than direct operator actions based upon a specific plant transient condition.

A. BwAR

B. BwEP

C. BwFR

D. BwOA

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 75

A – Plausible: BwAR is incorrect. Multiple annunciators are lit, therefore actions are required to be taken by the BwARs. However, those actions are suspended until completion of higher priority transient mitigation procedures.

B – Plausible: BwEP is incorrect, BwEPs are designed to mitigate transients requiring a reactor trip but are suspended upon entry of a BwFR in either RED or an ORANGE path. This would be correct if the RWST LEVEL LOW-2 annunciator was fast flashing and BwFR-H or C series were in effect, as direct entry to BwEP ES-1.3 is called for in these procedures.

C – Correct: BwFR is correct, Per BwAP 340-1 BwFR procedures suspend all actions in other procedures.

D – Plausible: BwOA is incorrect. BwOAs are designed to mitigate transients not requiring a reactor trip and are therefore of lower importance. With multiple annunciators being lit, it is likely that a BwOA would be applicable as most deal with transient conditions for the unit.

Question Information

Topic	RG-2.4.23-75
System ID	2099607
User ID	RG-2.4.23-75
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	RO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.8
Technical Reference and Revision #	BwAP 340-1, Rev. 30		
Training Objective	T.AM04-16 DESCRIBE how to use the Operating Department procedures.		
Previous NRC Exam Use	2016 Quad Cities NRC Exam #62		

References Provided	None
K/A Justification	This question meets the KA because it requires the examinee know the priority of emergency procedure implementation.
SRO-Only Justification	Not applicable
Additional Information	None

K/A Links

P2.4.23	Safety Function: 7	Tier 3	Group
Knowledge of the bases for prioritizing emergency procedure implementation during emergency operations. (CFR: 41.10 / 43.5 / 45.13)	RO Imp: 3.4	SRO Imp: 4.4	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.

76	ID: SE10007-EA2.06-76	Points: 1.00

Unit 2 was at 100% reactor power.

- Annunciator 2-11-A4, OPΔT RX TRIP, is fast flashing RED.
- DRPI indications are as shown:

The Unit 2 NSO then places the MAN RX TRIP switch at the 1PM05J to ACTUATE.

- Reactor power is now 4% and lowering rapidly.

The Shift Manager will...

A. NOT make a declaration.

B. Declare an Unusual Event.

C. Declare an Alert.

D. Declare a Site Area Emergency.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 76

A – Plausible: NOT make a declaration is incorrect. This would be correct if all rod bottom lights were LIT in the stem after the OPΔT trip alarmed. This is a frequently missed EAL for novice applicants and LORT crews.

B – Correct: Declare an Unusual Event is correct. Per EP-AA-1001 addendum 3, the reactor did not automatically trip but subsequent manual action was successful in shutting down the reactor. This meets the criteria for classification MU3.

C – Plausible: Declare an Alert is incorrect. This would be the correct answer if reactor power were $\geq$ 5% following manual actions.

D – Plausible: Declare a Site Area Emergency is incorrect. This would be the correct answer if reactor power were $\geq$ 5% following manual actions and either a C or H red path condition existed.

Question Information

Topic	SE10007-EA2.06-76
System ID	2101887
User ID	SE10007-EA2.06-76
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	OPEN
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.5
Technical Reference and Revision #	(Proprietary) EP-AA-1001 Addendum 3, Rev. 3, Page BW 2-5		
Training Objective	T.EP01-08 (SRO Only) ANALYZE a given set of plant conditions and DETERMINE the required actions per _BwEP-0, _BwEP ES-0.0, 0.1, 0.2, 0.3, 0.4		
Previous NRC Exam Use	None		

References Provided	EP-AA-1001 Addendum 3
K/A Justification	This question meets the KA since the examinee must determine if manual actions were successful in tripping the reactor and which EAL call will be made based on that determination.
SRO-Only Justification	Interpreting EAL thresholds is an SRO job function.
Additional Information	None

K/A Links

EPE.007.EA2.06	Safety Function: 1	Tier 1	Group 1
Ability to determine or interpret the following as they apply to a reactor trip: (CFR 41.7 / 45.5 / 45.6)			
Occurrence of a reactor trip		RO Imp: 4.3	SRO Imp: 4.5

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

77	ID: SE10029-G2.2.36-77	Points: 1.00

Unit 1 is at 100% power.

Date	Time	Status
6/3/19	0700	The 1A AF pump taken OOS for a motor bearing and pump impeller replacement.
6/5/19	0700	The 1B AF pump gear case was found to be leaking and could not be refilled.
6/5/19	1400	The 1B AF pump gear case was repaired.
6/5/19	1500	The 1B AF pump was declared operable.

(1) What is the LATEST time Unit 1 will be required to be in mode 3?

(2) After the 1B AF pump is declared operable on 6/5/19 at 1400, will the AF system be capable of providing the MINIMUM AF flow required by 1BwFR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS UNIT 1, if ALL SGs are BELOW their required levels?

A. (1) 6/5/19 at 1400
(2) Yes, because the minimum flow required is within the capacity of one AF pump.

B. (1) 6/5/19 at 1400
(2) No, because the minimum flow required is greater than the capacity of one AF pump.

C. (1) 6/6/19 at 1300
(2) Yes, because the minimum flow required is within the capacity of one AF pump.

D. (1) 6/6/19 at 1300
(2) No, because the minimum flow required is greater than the capacity of one AF pump.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 77

A – Plausible: 6/5/19 at 1400 and yes because the minimum flow required is within the capacity of one AF pump are incorrect. 6/5/19 at 1400 would be correct if LCO 3.0.3 was entered for the inoperability of the 1B AF pump (6/5/19 at 0700 + 7 hours = 6/5/19 at 1400). This would be required if both SI pumps were declared inoperable at the same time. However, the note for the required actions of TS 3.7.5 condition B states mode changes are suspended while both AF pumps are OOS. Yes, within the capacity of one AF pump would be correct if the stem asked for 1BwFR-H.1, RESPONS TO A LOSS OF SECONDARY HEAT SINK UNIT 1 or most other emergency procedures. 1BwFR-H.1 requires a minimum AF flow of 500 gpm. With SG levels below their required levels, the minimum AF flow per 1BwFR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS UNIT 1, is 900 gpm. One AF pump can only provide a net of 890 gpm to the SGs (990 gpm design - 100 gpm recirc flow). This value is further reduced by flow restricting orifices in each AF supply line downstream of the 1AF005A-D, which only allow 160 GPM per SG (640 gpm total) in the event of a rupture downstream of the AF005.

B – Plausible: 6/5/19 at 1400 is incorrect, no because the minimum flow required is greater than the capacity of one AF pump is correct. 6/5/19 at 1400 would be correct if LCO 3.0.3 was entered for the inoperability of the 1B AF pump (6/5/19 at 0700 + 7 hours = 6/5/19 at 1400). This would be required if both SI pumps were declared inoperable at the same time. The note for the required actions of TS 3.7.5 condition B states mode changes are suspended while both AF pumps are OOS.

C – Plausible: 6/6/19 at 1300 is correct, yes because the minimum flow required is within the capacity of one AF pump is incorrect. Yes, within the capacity of one AF pump would be correct if the stem asked for 1BwFR-H.1, RESPONS TO A LOSS OF SECONDARY HEAT SINK UNIT 1 or most other emergency procedures. 1BwFR-H.1 requires a minimum AF flow of 500 gpm. With SG levels below their required levels, the minimum AF flow per 1BwFR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS UNIT 1, is 900 gpm. One AF pump can only provide a net of 890 gpm to the SGs (990 gpm design - 100 gpm recirc flow). This value is further reduced by flow restricting orifices in each AF supply line downstream of the 1AF005A-D, which only allow 160 GPM per SG (640 gpm total) in the event of a rupture downstream of the AF005.

D – Correct: 6/6/19 at 1300 and no because the minimum flow required is greater than the capacity of one AF pump are correct. The LCO for the 1A AF pump expires 72 hours after entry then condition B is entered and mode 3 must be entered 6 hours later. 6/3/19 at 0700 + 78 hours (72 per condition A and 6 per condition B) = 6/6/19 at 1300. Per 1BwFR-S.1, RESPONSE TO NUCLEAR POWER GENERATION/ATWS UNIT 1, the minimum required AF flow is 900 gpm if all SGs are below their required levels. One AF train can provide 890 gpm net to the SGs (990 gpm design - 100 gpm recirc). This value is further reduced by flow restricting orifices in each AF supply line downstream of the 1AF005A-D, which only allow 160 GPM per SG (640 gpm total) in the event of a rupture downstream of the AF005.

Question Information

Topic	SE10029-G2.2.36-77
System ID	2101895
User ID	SE10029-G2.2.36-77
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	OPEN
Status:	Active

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	3.0
Technical Reference and Revision #	TS 3.7.5 Amendment 134		
Training Objective	S.AF1-11-C (SRO Only) Given applicable reference material, APPLY greater than one hour LCO/TRM Action Statements.		
Previous NRC Exam Use	None		

References Provided	TS 3.7.5
K/A Justification	This question meets the KA since it requires the ability to analyze the impact of a maintenance driven activity with a concurrent failure, on the status of LCOs and the ability of the system to meet AF system demand requirements during an ATWS with detailed knowledge of the ATWS procedure.
SRO-Only Justification	This question is SRO level because it requires the application of greater than one-hour TS conditions in accordance with the rules of application requirements and determination of generic LCO applicability (3.0.3).
Additional Information	None

K/A Links

GE.4.0.EPE.029	Safety Function: 1	Tier 1	Group 1
Anticipated Transient Without Scram (ATWS)	RO Imp:	SRO Imp:	
P2.2.36	Safety Function: 1	Tier 3	Group
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)	RO Imp: 3.1	SRO Imp: 4.2	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.2 Facility operating limitations in the technical specifications and their bases.

78	ID: SE1WE12-EA2.1-78	Points: 1.00

Unit 1 was tripped from full power and SI initiated when ALL SGs FAULTED inside Containment.

- Upon transition from 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION UNIT 1, to 1BwEP-2, FAULTED SG ISOLATION, a RED path is noted on the Containment critical safety function.
- 1BwFR-Z.1, RESPONSE TO HIGH CONTAINMENT PRESSURE, is implemented.
- The crew has throttled AF flow in accordance with 1BwFR-Z.1.

The actions of 1BwFR-Z.1 are complete and the crew is at step 7, RETURN TO PROCEDURE AND STEP IN EFFECT.

- The following status is noted on the CSF status trees:
  - Subcriticality: Green
  - Core Cooling: Green
  - Heat Sink: Red
  - Integrity: Orange
  - Containment: Red
  - Inventory: Yellow

The NEXT procedurally directed main control board COMPONENT MANIPULATION will be performed by...

A. 1BwFR-P.1, RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK CONDITION.

B. 1BwEP-2, FAULTED SG ISOLATION.

C. 1BwFR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.

D. 1BwFR-Z.1, RESPONSE TO HIGH CONTAINMENT PRESSURE.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 78

A – Plausible: return to and perform 1BwEP-2 is incorrect. 1BwEP-2 will be performed after all BwFR procedure actions are complete. This would be the correct answer if no other orange or red paths existed.

B – Plausible: perform 1BwFR-H.1 is incorrect. This would be correct if the crew had not taken the action to lower AF flow.

C – Correct: perform 1BwFR-P.1 is correct. Note in 1BwFR H.1 prior to step one: "If total feed flow is less than 500 GPM due to operator action, this procedure should NOT be performed." So 1BwFR H.1 will not be performed. 1BwFR Z.1 has already been performed, so don't need to do it again. Orange path exist for integrity, so 1BwEP-2 will not be returned to yet. 1BwFR P.1 will be entered and, since cooldown has already exceeded 100 deg. per hour, a soak will be required per step 23.

D – Plausible: return to the beginning of and reperform 1BwFR-Z.1 is incorrect. This is plausible since a red path condition still exists in containment safety function. The actions taken in 1BwFR-Z.1 could result in a slow decline in containment pressure after completion if no CS pumps are running. This could result in procedure completion with a red path condition still existing in this safety function.

Question Information

Topic	SE1WE12-EA2.1-78
System ID	2103857
User ID	SE1WE12-EA2.1-78
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	2.5
Technical Reference and Revision #	1BwFR-H.1, Rev. 300, Page 2		
Training Objective	T.FR04-04 (SRO ONLY) ANALYZE a given set of plant conditions during a imminent or anticipated pressurized thermal shock event, and select the proper section of a procedure or procedure transition to mitigate, recover, or with which to proceed.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must determine and interpret facility conditions and select the appropriate procedure during a uncontrolled depressurization of all SG accident.
SRO-Only Justification	This question is SRO level because it requires the examinee to assess facility conditions and select the appropriate procedure or section of a procedure to proceed.
Additional Information	None

K/A Links

4.5.E12.EA2.1	Safety Function: 4	Tier 1	Group 1
Ability to determine and interpret the following as they apply to the (Uncontrolled Depressurization of all Steam Generators) (CFR: 43.5 / 45.13)			
Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	RO Imp: 3.2	SRO Imp: 4.0	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

79	ID: SE10057-G2.1.32-79	Points: 1.00

Unit 1 is at 100% power.

- Instrument bus 113 is energized from its respective CVT.

Per the basis of the applicable technical specification, instrument inverter 113 is __(1)__ and entry to T.S. 3.8.9, DISTRIBUTION SYSTEMS OPERATING __(2)__ required.

A. (1) NOT OPERABLE
(2) is NOT

B. (1) NOT OPERABLE
(2) is

C. (1) OPERABLE
(2) is NOT

D. (1) OPERABLE
(2) is

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 79

A – Correct: NOT OPERABLE and entry to T.S. 3.8.9, DISTRIBUTION SYSTEMS OPERATING, is NOT required is correct. Per the basis of TS 3.8.7 condition an instrument inverter must be powering its associated instrument bus to be operable. When a required inverter is inoperable its associated AC instrument bus may be inoperable unless it is re-energized from its CVT.

B – Plausible: NOT OPERABLE is correct, and entry to T.S. 3.8.9, DISTRIBUTION SYSTEMS OPERATING, is required is incorrect. Per the basis of TS 3.8.7 condition an instrument inverter must be powering its associated instrument bus to be operable. Per the basis of TS 3.8.9, the CVT is an allowed source. Per LCO 3.0.6 "When a supported system LCO is not met solely due to a support system LCO not being met, the Conditions and Required Actions associated with this supported system are not required to be entered." Therefore, entry to TS 3.8.9 would not be warranted due solely to the inoperability of instrument inverter 113. LCO 3.0.6 application is a frequently mis understood concept among novice applicants. This would be correct if the 1B DG were inoperable (4 hours after the inoperability per T.S 3.8.1 condition B.3).

C – Plausible: OPERABLE is incorrect and entry to T.S. 3.8.9, DISTRIBUTION SYSTEMS OPERATING, is NOT required is correct. Per the basis of TS 3.8.9, the CVT is an allowed source. Therefore, a novice applicant may conclude that the inverter is operable per LCO 3.8.7. Per LCO 3.0.6 "When a supported system LCO is not met solely due to a support system LCO not being met, the Conditions and Required Actions associated with this supported system are not required to be entered." Therefore, entry to TS 3.8.9 would not be warranted due solely to the inoperability of instrument inverter 113. LCO 3.0.6 application is a frequently mis understood concept among novice applicants.

D – Plausible: OPERABLE is correct and entry to T.S. 3.8.9, DISTRIBUTION SYSTEMS OPERATING, is required is incorrect. Per the basis of TS 3.8.9, the CVT is an allowed source. Therefore, a novice applicant may conclude that the inverter is operable per LCO 3.8.7. Per LCO 3.0.6 "When a supported system LCO is not met solely due to a support system LCO not being met, the Conditions and Required Actions associated with this supported system are not required to be entered." LCO 3.0.6 application is a frequently mis understood concept among novice applicants. This would be correct if the 1B DG were inoperable (4 hours after the inoperability per T.S 3.8.1 condition B.3).

Question Information

Topic	SE10057-G2.1.32-79
System ID	2103858
User ID	SE10057-G2.1.32-79
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.5
Technical Reference and Revision #	B 3.8.7, Rev. 45, Page 2		
Training Objective	S.AP1-15-D, (SRO Only) DESCRIBE the Tech Spec bases.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since it requires the examinee to have the ability to apply system limitations (LCO) during a loss of a vital AC instrument bus.
SRO-Only Justification	This question is SRO only because it requires the examinee to determine operability, knowledge of the TS basis, and application of LCO 3.0.6, which are SRO level requirements.
Additional Information	None

K/A Links

GE.4.0.APE.057	Safety Function: 6		Tier 1	Group 1
Loss of Vital AC Electrical Instrument Bus		RO Imp:		SRO Imp:
P2.1.32	Safety Function: 6		Tier 3	Group
Ability to explain and apply system limits and precautions. (CFR: 41.10 / 43.2 / 45.12)		RO Imp: 3.8		SRO Imp: 4.0

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.2 Facility operating limitations in the technical specifications and their bases.

80	ID: SE1WE004-EA2.2-80	Points: 1.00

Unit 2 was at 100% power.

The crew manually tripped Unit 2 and initiated SI in response to a RCS LOCA.

- The crew transitioned to 2BwCA-1.2, LOCA OUTSIDE CONTAINMENT, with all ECCS pumps operating.
- The leak has been confirmed in the 2B RH and CS pump room.
- RCS temperature is 520˚F.
- The 2B RH pump is in PTL.

It has been determined that the following valves must be CLOSED to isolate the leakage:

- 2RH8716B, HX 2B XTIE VLV
- 2SI8809B, RH TO COLD LEG 2B & 2C ISOL VLV
- 2SI8812B, PP 2B SUCT FROM RWST ISOL VLV

Assume that the valves listed above remain closed for the duration of the event and continued plant cooldown.

The Unit Supervisor will declare BOTH ECCS trains inoperable…

A. however, 100% flow equivalent is available for the 2A ECCS train. Once MODE 4 is reached ECCS operability requirements are met.

B. however, 100% flow equivalent is available for the 2A ECCS train. Once MODE 4 is reached ECCS operability requirements are still NOT met.

C. causing entry into LCO 3.0.3. Once MODE 4 is reached ECCS operability requirements are met.

D. causing entry into LCO 3.0.3. Once MODE 4 is reached ECCS operability requirements are still NOT met.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 80

A – Plausible: however, 100% flow equivalent is available for the 2A ECCS train is incorrect. Once MODE 4 is reached ECCS operability requirements are met. is incorrect. The 2A RH pump will be able to deliver its design flow rate; however, it will not be able to deliver this flow to all 4 RCS cold legs. TS 3.5.2 condition B allows for two trains to be inoperable (i.e. 2A CV and 2B SI pumps inoperable) if 100% flow equivalent is available. This is a frequently confused topic by novice applicants.

B – Plausible: however, 100% flow equivalent is available for the 2A ECCS train is incorrect. Once MODE 4 is reached ECCS operability requirements are NOT met is correct. Once MODE

4 is reached ECCS operability requirements are met. is incorrect. The 2A RH pump will be able to deliver its design flow rate; however, it will not be able to deliver this flow to all 4 RCS cold legs. TS 3.5.2 condition B allows for two trains to be inoperable (i.e. 2A CV and 2B SI pumps inoperable) if 100% flow equivalent is available. This is a frequently confused topic by novice applicants.

C – Plausible: causing entry into LCO 3.0.3 is correct. Once MODE 4 is reached ECCS operability requirements are met is incorrect. Once MODE 4 is reached ECCS operability requirements are met. is incorrect. The 2A RH pump will be able to deliver its design flow rate, however, it will not be able to deliver this flow to all 4 RCS cold legs. TS 3.5.2 condition B allows for two trains to be inoperable (i.e. 2A CV and 2B SI pumps inoperable) if 100% flow equivalent is available. This is a frequently confused topic by novice applicants.

D – Correct: causing entry into LCO 3.0.3. Once MODE 4 is reached ECCS operability requirements are NOT met is correct. With the 2SI8809B, 2RH8716B and 2SI8812B closed, the 2B RH train (and therefore 2B ECCS train) is inoperable (2B RH pump is completely isolated). ECCS operability per LCO 3.5.2 bases (page B3.5.2-8) requires the ability to discharge into all four ECCS cold legs, which in this alignment cannot be accomplished by train A. As such, both trains are inoperable, AND there is NOT flow equivalence to a single ECCS train because 2A RH pump cannot discharge into all four RCS cold legs. This results in applicability of LCO 3.0.3. LCO 3.5.3 provides the operability requirements for ECCS in MODE 4. This LCO requires 1 charging and 1 RH pump, again capable of discharging into all 4 cold legs, therefore the ECCS requirements for MODE 4 are not met even though 1 CV and 1RH pump are capable of operating.

Question Information

Topic	SE1WE004-EA2.2-80
System ID	2103860
User ID	SE1WE004-EA2.2-80
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.5
Technical Reference and Revision #	T.S. 3.5.3, Amendment 176 B 3.5.3, Rev. 0		
Training Objective	S.EC1-15-D As applicable to the Emergency Core Cooling System: d. (SRO Only) DESCRIBE the Tech Spec bases.		
Previous NRC Exam Use	2013 Braidwood NRC Exam #87		

References Provided	None
K/A Justification	This question meets the K/A, because the examinee must determine operability status of the ECCS trains as a result of actions initiated to mitigate a LOCA outside containment IAW 2BwCA-1.2, LOCA OUTSIDE CONTAINMENT, then determine the ECCS operability status once MODE 4 is entered. In order to adhere to the license/Tech Spec requirements, the examinee must be able to ascertain the operability status of each ECCS train.
SRO-Only Justification	This question is SRO level because the examinee must determine application of LCO 3.0.3 and use knowledge of Technical Specification bases to determine operability of ECCS.
Additional Information	None

K/A Links

4.5.E04.EA2.2	Safety Function: 3	Tier 1	Group 1
Ability to determine and interpret the following as they apply to the (LOCA Outside Containment) (CFR: 43.5 / 45.13)			
Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.		RO Imp: 3.6	SRO Imp: 4.2

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

81	ID: SE1WE011-G2.1.7-81	Points: 1.00

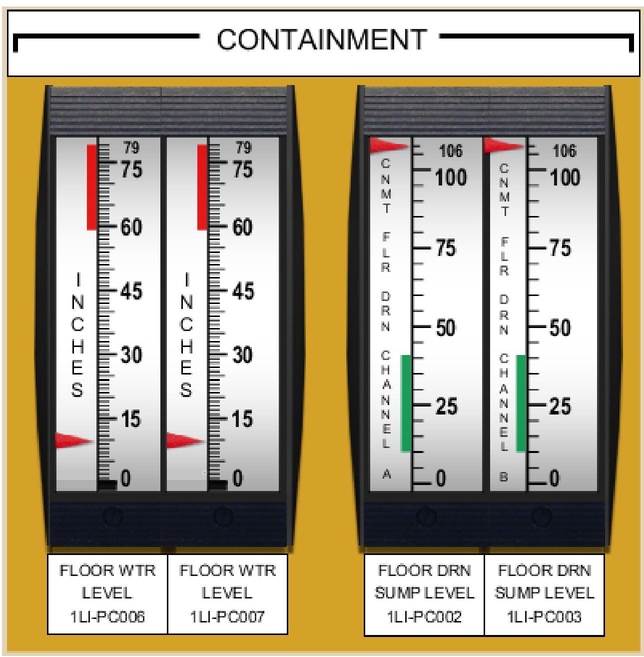
Unit 1 experienced an RCS LOCA from full power.

- 1A RH pump tripped and could NOT be started.
- 1B RH pump is running.

1BwEP ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, has just been entered.

- 1SI8811A, CNMT SUMP 1A ISOL VALVE, is closed.
- 1SI8811B, CNMT SUMP 1B ISOL VALVE, is open.
- CNMT pressure is 8 PSIG.

CNMT floor water level indicates as shown below:



The SRO will…

A. complete 1BwEP ES-1.3, Attachment A, MANUAL OPERATION OF CONTAINMENT SUMP ISOLATION VALVES, which will direct 1SI8811A to be manually OPENED.

B. transition to 1BwCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, due to the status of Cnmt floor water level.

C. complete 1BwEP ES-1.3, Attachment A, MANUAL OPERATION OF CONTAINMENT SUMP ISOLATION VALVES, which will leave 1SI8811A CLOSED.

D. transition to 1BwCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, due to the status of the RH pumps.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 81

A – Plausible: complete 1BwEP ES-1.3, Attachment A, MANUAL OPERATION OF CONTAINMENT SUMP ISOLATION VALVES, which will direct 1SI8811A to be manually OPENED is incorrect. This would be the correct answer for normal containment parameters and the 1A RH pump running.

B – Correct: transition to 1BwCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION due to the status of CNMT floor water level is correct. Step 2 of 1BwEP ES-1.3, determines if adequate level is in the ECCS RECIRC sump to establish the cold leg recirculation alignment. The criteria is 8 inches (normal containment) or 13 inches (adverse containment). In this case, the adverse containment value applies and transition to 1BwCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION is required. Otherwise if adequate level had been present (which some examinees will determine to be the case, as the value is above the normal containment value), the crew would continue to implement 1BwEP ES-1.3. Implementation of Attachment A would apply if the 1A RH pump were running in that case.

C – Plausible: complete 1BwEP ES-1.3, Attachment A, MANUAL OPERATION OF CONTAINMENT SUMP ISOLATION VALVES, which will leave 1SI8811A CLOSED is incorrect. This would be the correct answer for normal containment parameters.

D – Plausible: transition to 1BwCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, due to the status of the RH pumps is incorrect. This would be the correct answer if the 1B RH pump tripped or 1SI8811B could not be opened.

D – Plausible: transition to 1BwCA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION, due to the status of the RH pumps is incorrect. This would be the correct answer if the 1B RH pump tripped or 1SI8811B could not be opened.

Question Information

Topic	SE1WE011-G2.1.7-81
System ID	2103862
User ID	SE1WE011-G2.1.7-81
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	1BwEP ES-1.3, Rev. 300, Page 4		
Training Objective	T.EP02-11 (SRO ONLY) ANALYZE a given set of plant conditions during a loss of reactor or secondary coolant event, and select the proper section of a procedure or procedure transition to mitigate, recover, or with which to proceed		
Previous NRC Exam Use	2013 Braidwood NRC Exam #88		

References Provided	None
K/A Justification	Meets K/A, examinee must interpret instrument readings to assess plant conditions for loss of emergency coolant recirculation and select the correct procedure attachment or transition to proceed.
SRO-Only Justification	SRO level as examinee must assess plant conditions and select appropriate transition or procedure to continue.
Additional Information	None

K/A Links

GE.4.5.E11	Safety Function: 4	Tier 1	Group 1
Loss of Emergency Coolant Recirculation		RO Imp:	SRO Imp:
P2.1.7	Safety Function: 4	Tier 3	Group
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)		RO Imp: 4.4	SRO Imp: 4.7

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

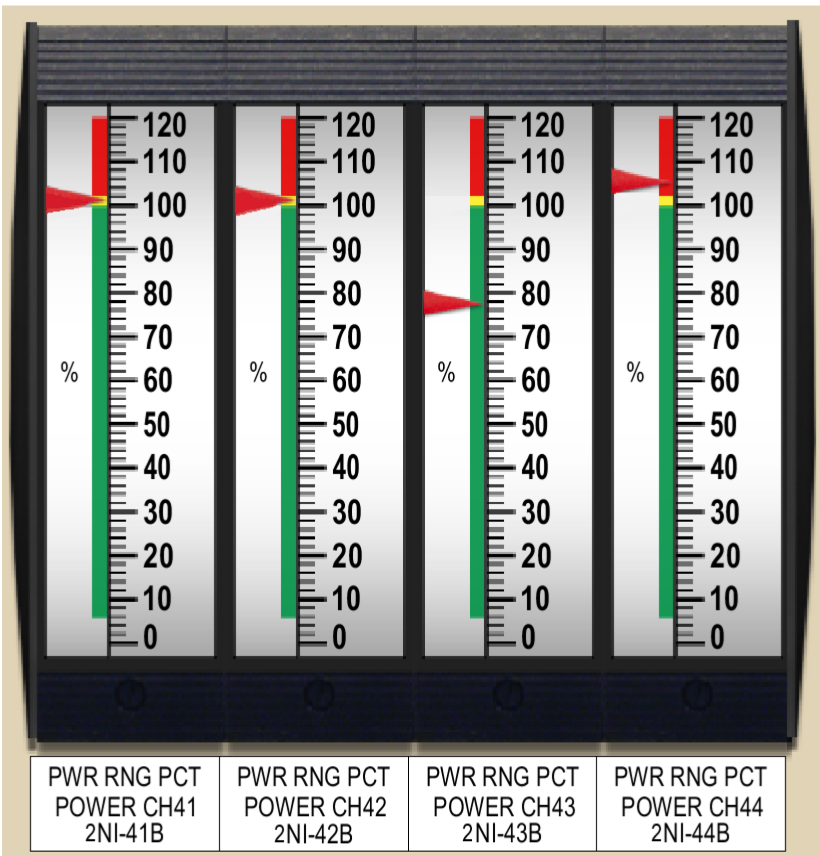
82	ID: SE20003-AA2.02-82	Points: 1.00

Unit 2 was at 100% power.

Multiple block 10 annunciators are in alarm.

- Auctioneered high Tave is 4°F BELOW Tref and stable.
- Control rods bank D automatically stepped OUT 3 steps and then STOPPED stepping.

Power Range NIs are stable as shown below.



The SRO will enter...

A. 2BwEP-0, REACTOR TRIP OR SAFETY INJECTION.

B. 2BwOA ROD-1, UNCONTROLLED ROD MOTION.

C. 2BwOA ROD-2, FAILURE OF RODS TO MOVE.

D. 2BwOA ROD-3, DROPPED OR MISALIGNED ROD.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 82

Unit 2, 7300 controls question (U-2 distractor).

A – Plausible: enter 2BwEP-0, REACTOR TRIP OR SAFETY INJECTION is incorrect. This would be correct if N-41 and 42 indicated 10% higher. An examinee may select this due to one NI being in the red with two others being in the yellow range on the meters shown.

B – Plausible: enter 2BwOA ROD-1, UNCONTROLLED ROD MOTION is incorrect. An examinee may select this, if they plausibly conclude that control rods stepped out 3 steps without a valid reason. This would be correct if Tave/Tref were <1.5°F or all NIs were indicating the same value.

C – Plausible: enter 2BwOA ROD-2, FAILURE OF RODS TO MOVE is incorrect. Rods are failing to move because of rod stop and C-11. This would be correct if N-43 indicated the same as N-41/42. Since auctioneered high NI is compared to Pimp (PT-505) and N-44 is higher than Tref, an inward rod motion would be demanded due to the power mismatch rate comparator output.

D – Correct: enter 2BwOA ROD-3, DROPPED OR MISALIGNED ROD is correct. All indications are consistent with a single dropped rod near N-43. The SRO must determine that the NI indications do not require a reactor trip though they are in the red band, that the Tave vs Tref rod control signal input does not require rod motion, and that the rod motion stopping does not require being addressed, without DRPI indication being given in the stem which would be direct entry to ROD-3. Therefore, the question cannot be answered with only systems knowledge (flowpath, logic, component location), knowledge of immediate actions, solely knowledge of entry conditions, or solely knowledge of mitigative strategy of procedures. This makes the question SRO level because of the assessment of plant conditions and selection of the appropriate procedure with which to proceed.

Question Information

Topic	SE20003-AA2.02-82
System ID	2103865
User ID	SE20003-AA2.02-82
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	2BwOA ROD-3, Rev. 107		
Training Objective	T.OA34-03 (SRO Only) ANALYZE a given set of plant conditions and DETERMINE the required actions per _BwOA ROD-3, Dropped or Misaligned Rod.		
Previous NRC Exam Use	2009 Braidwood NRC Exam #90		

References Provided	None
K/A Justification	The question meets the K/A, requires examinee ability to interpret a dropped rod using ex-core instruments (PRNI) and loop temperature measurements, which are signal inputs to the rod control system, to determine if rod motion is required.
SRO-Only Justification	The question is SRO level because it requires assessment of plant conditions and selection of the appropriate procedure with multiple entry conditions being met. This is not RO because multiple entry conditions are met. (see answer explanation)
Additional Information	None

K/A Links

APE.003.AA2.02	Safety Function: 1	Tier 1	Group 2
Ability to determine and interpret the following as they apply to the Dropped Control Rod: (CFR: 43.5 / 45.13)			
Signal inputs to rod control system		RO Imp: 2.7	SRO Imp: 2.8

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

83	ID: SE20051-G2.4.31-83	Points: 1.00

Unit 1 is at 50% reactor power, following a refueling outage.

- The 1C CW pump is OOS for motor testing.
- The 1B CW pump tripped on overcurrent.
- Condenser vacuum is 3.6" HgA and rising.
- 1CW001B, CIRCULATING WTR PMP 1B DISCH VLV, CANNOT be closed.

Per 1BwOA SEC-3, LOSS OF CONDENSER VACUUM UNIT 1, the SRO will...

A. direct the RO to trip the reactor and enter 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION UNIT 1 per step 1, CHECK CW SYSTEM.

B. direct the BOP to reduce turbine load as necessary to stabilize condenser pressure per step 1, CHECK CW SYSTEM.

C. direct the BOP to check DEHC - MW OUT SELECTED per step 2, MONITOR CONDENSER PRESSURE.

D. notify system engineering to track condenser pressure per step 2, MONITOR CONDENSER PRESSURE.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 83

A – Correct: direct the RO to trip the reactor and enter 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION UNIT 1 per step 1, CHECK CW SYSTEM is correct. With < 2 CW pumps running and the discharge valve for the tripped CW pump unable to close, step 1 RNO directs a reactor trip.

B – Plausible: direct the BOP to reduce turbine load as necessary to stabilize condenser pressure per step 1, CHECK CW SYSTEM is incorrect. This would be the correct answer if the CW pump discharge valve were closed.

C – Plausible: direct the BOP to check DEHC - MW OUT SELECTED per step 2, MONITOR CONDENSER PRESSURE. is incorrect. This would be the correct answer if the CW pump discharge valve closed and condenser pressure is >5.5" hga.

D – Plausible: notify system engineering to track condenser pressure per step 2, MONITOR CONDENSER PRESSURE is incorrect. This would be the correct answer if the CW pump discharge valve closed and condenser pressure was stable or lowering but >5.5" HgA.

Question Information

Topic	SE20051-G2.4.31-83
System ID	2103869
User ID	SE20051-G2.4.31-83
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	**3.0**
Technical Reference and Revision #	1BwOA SEC-3, Rev. 109, Page 2		
Training Objective	T.OA38-03 (SRO Only) ANALYZE a given set of plant conditions and DETERMINE the required actions per BwOA SEC-3, Loss of Condenser Vacuum.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must have knowledge of the indications and response procedures during a loss of condenser vacuum. The BwAR actions for 1-17-A3 are the same as the actions in BwOA SEC-3 for the correct answer.
SRO-Only Justification	This question is SRO level because it requires the examinee to have detailed knowledge of step 1 RNO actions to determine which procedure or section of a procedure with which to proceed.
Additional Information	None

K/A Links

GE.4.0.APE.051	Safety Function: 4	Tier 1	Group 2
Loss of Condenser Vacuum		RO Imp:	SRO Imp:
P2.4.31	Safety Function: 4	Tier 3	Group
Knowledge of annunciator alarms, indications, or response procedures. (CFR: 41.10 / 45.3)		RO Imp: 4.2	SRO Imp: 4.1

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

84	ID: SE2WE02-EA2.1-84	Points: 1.00

A stuck open PZR PORV caused a reactor trip and SI on Unit 1.

The PZR PORV could not be isolated.

1BwEP ES-1.1 "SI TERMINATION" is in progress.

- The crew has just completed step 4, REALIGN CENT CHG PUMP.
- When the FIRST CV pump was stopped, RCS pressure dropped 100 psig and is slowly lowering.
- PZR level is 100% and stable.

The SRO will ...

A. transition to 1BwEP ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION UNIT 1.

B. transition to 1BwEP-1, LOSS OF REACTOR OR SECONDARY COOLANT UNIT 1.

C. transition to 1BwFR-I.1, RESPONSE TO HIGH PRESSURIZER LEVEL UNIT 1.

D. continue and complete all steps of 1BwEP ES-1.1, SI TERMINATION UNIT 1.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 84

A – Correct: transition to 1BwEP ES-1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION UNIT 1 is correct. If RCS pressure is lowering at step 5 the RNO will direct a transition to 1BwEP ES-1.2.

B – Plausible: transition to 1BwEP-1, LOSS OF REACTOR OR SECONDARY COOLANT UNIT 1 is incorrect. This would be the correct answer if RCS subcooling were NOT acceptable at step 11.

C – Plausible: transition to 1BwFR-I.1, RESPONSE TO HIGH PRESSURIZER LEVEL UNIT 1 is incorrect. Entry conditions are satisfied for this BwFR making this a plausible distractor. However, this is a yellow path and therefore it will not be entered.

D – Plausible: continue and complete all steps of 1BwEP ES-1.1, SI TERMINATION UNIT 1 is incorrect. This would be the correct answer if RCS pressure were stable or rising and subcooling remained acceptable.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	SE2WE02-EA2.1-84
System ID	2103874
User ID	SE2WE02-EA2.1-84
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.5
Technical Reference and Revision #	1BwEP ES-1.1, Rev. 302, Page 3		
Training Objective	T.EP02-11 (SRO ONLY) ANALYZE a given set of plant conditions during a loss of reactor or secondary coolant event, and select the proper section of a procedure or procedure transition to mitigate, recover, or with which to proceed.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since it requires the ability to interpret facility conditions and select the appropriate procedure during a SI termination scenario.
SRO-Only Justification	This question is SRO only because it requires an analysis of plant conditions and selection of the proper procedure or section of a procedure to transition or continue with. This is detailed knowledge beyond the RO requirement for mitigating strategy.
Additional Information	None

K/A Links

4.5.E02.EA2.1	Safety Function: 3	Tier 1	Group 2
Ability to determine and interpret the following as they apply to the (SI Termination) (CFR: 43.5 / 45.13)			
Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	RO Imp: 3.3	SRO Imp: 4.2	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

85	ID: SE2WE09-G2.4.49-85	Points: 1.00

1BwEP ES-0.2, NATURAL CIRCULATION COOLDOWN UNIT 1, is in progress.

- The crew is performing step 6, INITIATE COOLDOWN TO 520˚F.

A failure occurs causing all steam dumps to FULLY OPEN, resulting in the following FAST FLASHING bypass - permissive panel lights:

- 1-BP-4.1, SI ACTUATED
- 1-BP-3.3, PZR LOW PRESS SI BLOCK PERMISSIVE
- 1-BP-5.4, TURBINE LOADING STOP C16
- 1-BP-4.5, LO-2 TAVE STM DUMP INTLK P12

The SRO will...

A. continue in 1BwEP ES-0.2 and direct the BOP to take manual control of 1PK-507 and reduce demand to 0%.

B. continue in 1BwEP ES-0.2 and direct the BOP to place BOTH steam dump interlock bypass switches to - BYPASS INTLK.

C. continue in 1BwEP ES-0.2 and direct the RO to place PZR PRESS SI RESET/BLOCK switches (A and B train) to - BLOCK.

D. transition to 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION, and direct the RO to place the SI switch to actuate at 1PM05J and 1PM06J.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 85

A – Plausible: continue in 1BwEP ES-0.2 and direct the BOP to take manual control of 1PK-507 and reduce demand to 0%, is incorrect. This would be the correct answer if the SI actuated BP light were not fast flashing.

B – Plausible: continue in 1BwEP ES-0.2 and direct the BOP to place BOTH steam dump interlock bypass switches to - BYPASS INTLK is incorrect. This action would be required to continue the cooldown below 550˚F and would be the correct answer with no failures existing.

C – Plausible: continue in 1BwEP ES-0.2 and direct the RO to place PZR PRESS SI RESET/BLOCK switches (A and B train) to - BLOCK, is incorrect. This action would be required to continue the cooldown below 550˚F and would be the correct answer with no failures existing if the crew were at step 10 vice step 6.

D – Correct: transition to 1BwEP-0, REACTOR TRIP OR SAFETY INJECTION, and direct the RO to place the SI switch to actuate at 1PM05J and 1PM06J is correct. Per the caution prior to step 1 of 1BwEP ES-0.2, if SI actuation occurs druing the performance of this procedure, 1BwEP-0 should be performed.

Question Information

Topic	SE2WE09-G2.4.49-85
System ID	2103889
User ID	SE2WE09-G2.4.49-85
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.0
Technical Reference and Revision #	1BwEP ES-0.2, Rev. 302, Page 2.		
Training Objective	T.EP01-08 (SRO Only) ANALYZE a given set of plant conditions and DETERMINE the required actions per _BwEP-0, _BwEP ES-0.0, 0.1, 0.2, 0.3, 0.4.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because it requires the ability to perform immediate operations of system components and controls (SI switch) without reference to the procedure.
SRO-Only Justification	This question is SRO level because it requires an analysis of plant conditions, selection of the appropriate procedure, and determination of the required actions per that procedure.
Additional Information	None

K/A Links

GE.4.3.E09	Safety Function: 4	Tier 1	Group 2
Natural Circulation Cooldown		RO Imp:	SRO Imp:
P2.4.49	Safety Function: 4	Tier 3	Group
Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (CFR: 41.10 / 43.2 / 45.6)		RO Imp: 4.6	SRO Imp: 4.4

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links
- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

86	ID: SS10004-A2.11-86	Points: 1.00

Unit 1 is at 50% power.

1IA066, IA INSIDE ISOL VLV, fails and slowly closes.

- The crew enters 1BwOA SEC-4, LOSS OF INSTRUMENT AIR.
- 1CV121, CV Pump Flow Control Valve, controller was taken to manual and throttled to reduce charging flow to 40 gpm.
- PZR pressure is 2275 psig and slowly rising.
- PZR level is 45% and slowly rising.
- VCT level is 50% and lowering.

Per 1BwOA SEC-4, which of the following would require an IMMEDIATE reactor trip?

A. Pressurizer level rises to 80%.

B. The operating CV pump is tripped.

C. Pressurizer pressure rises to 2350 psig.

D. Volume Control Tank level drops to 37%.

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 86

A – Plausible: Pressurizer level rises to 80% is incorrect. If PZR level reaches 80%, 1BwOA SEC-4 directs the CV pump to be tripped but not the reactor to be tripped. This would be correct if CC flow to the RCP thermal barrier was also lost since the RCPs would have a loss of all seal cooling.

B – Plausible: The operating CV pump is tripped is incorrect. If CC flow is maintained to the RCPs and RCP temperatures are monitored to not exceed limits, tripping the reactor is not required when no CV pump is running. This would be correct if CC flow to the RCP thermal barrier was also lost since the RCPs would have a loss of all seal cooling.

C – Correct: Pressurizer pressure rises to 2350 psig is correct. Since PZR pressure is 2275 psig and rising and with no instrument air available, PZR sprays will not be available to lower pressure. This means that PZR pressure will be maintained by the PZR PORVs. Per 1BwOA SEC-4 if you are unable to maintain PZR pressure less than 2335# using PZR heaters or sprays it directs the crew trip the reactor.

D – Plausible: Volume Control Tank level drops to 37% is incorrect. This would be correct if VCT level drops below 10%, CV pump suction is swapped to the RWST, and Tave cannot be maintained above 550°F.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	SS10004-A2.11-86
System ID	2103895
User ID	SS10004-A2.11-86
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.5
Technical Reference and Revision #	1BwOA SEC-4, Rev 106, Page 12		
Training Objective	T.OA39-03 (SRO Only) ANALYZE a given set of plant conditions and DETERMINE the required actions per 0/1BwOA SEC-4, Loss of Instrument Air.		
Previous NRC Exam Use	2016 Braidwood NRC Exam #92		

References Provided	None
K/A Justification	This question meets the KA because it requires the examinee to predict the impact to operations of the CVCS system due to an instrument air malfunction and based on that prediction use the appropriate procedure to mitigate the consequence of the malfunction.
SRO-Only Justification	The question is SRO level because it requires detailed knowledge of 1BwOA SEC-4 step 8.b RNO and when the transition to 1BwEP-0 is appropriate to mitigate the event.
Additional Information	None

K/A Links

SF1.004.A2.11	Safety Function: 1	Tier 2	Group 1
Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5/ 43/5 / 45/3 / 45/5)			
Loss of IAS		RO Imp: 3.6	SRO Imp: 4.2

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links
CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

87	ID: SE10005-G2.2.25-87	Points: 1.00

Unit 2 is in MODE 6.

- RCS temperature is 100°F.
- The reactor vessel head is removed.
- Reactor vessel water level is at 424.5 ft (24.5 ft above the reactor vessel flange).
- 2A RH train is in shutdown cooling.
- 2B RH train is in OOS.

2A RH pump amps are fluctuating between 0 to 50 amps.

- 2A RH pump flow is fluctuating between 0 to 500 gpm.

The following annunciator is LIT:

- 2-6-C1, RH PUMP 2A DSCH FLOW LOW

Given the conditions above, ___(1)___.

The bases for having ONLY one train of RH OPERABLE per Tech Spec 3.9.5, Residual Heat Removal (RHR) and Coolant Circulation - High Water Level, is that ___(2)___.

A. (1) a loss of instrument air occurred.
(2) on a loss of the RH system, with water level $\geq$ 23 ft above the reactor vessel flange, this volume of water provides backup decay heat removal.

B. (1) a loss of instrument air occurred.
(2) RH is ONLY utilized to provide adequate mixing of boron.

C. (1) 2RH8701A, RC LOOP 2A TO RH PP 2A SUCT ISOL VLV, is failing closed.
(2) on a loss of the RH system, with water level $\geq$ 23 ft above the reactor vessel flange, this volume of water provides backup decay heat removal.

D. (1) 2RH8701A, RC LOOP 2A TO RH PP 2A SUCT ISOL VLV, is failing closed.
(2) RH is ONLY utilized to provide adequate mixing of boron.

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 87

A – Plausible: loss of IA is incorrect, backup heat removal is correct. This is plausible since RH control valves are operated by air, but on a loss of instrument air the RH control valves will fail open and RH low flow alarm would not be in.

B – Plausible: loss of IA and ONLY mixing of boron are incorrect. Loss of IA is plausible since RH control valves are operated by air, but on a loss of instrument air the RH control valves will fail open and RH low flow alarm would not be in. The basis for TS 3.9.5 mentions the mixing of boron as one of the 3 reasons one RH train is required to be operable. However, it is not the

ONLY reason. This would be correct if the ONLY statement were removed.

C – Correct: 2RH8701A failing closed and heat removal is correct. With 2RH8701A failing closed the RH pump will have erratic amps and flow will be lowering. The bases for LCO 3.9.5 states that on a loss of the RH system decay heat removal from the core occurs by natural convection to the heat sink provided by the water above the core.

D – Plausible: 2RH8017A failing closed is correct, ONLY mixing of boron is incorrect. The basis for TS 3.9.5 mentions the mixing of boron as one of the 3 reasons one RH train is required to be operable. However, it is not the ONLY reason. This would be correct if the ONLY statement were removed.

Question Information

Topic	SE10005-G2.2.25-87
System ID	2103903
User ID	SE10005-G2.2.25-87
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	B 3.9.5, Rev. 105, Page 2		
Training Objective	S.RH1-12-D As applicable to the Residual Heat Removal System: d. (SRO Only) DESCRIBE the Tech Spec bases.		
Previous NRC Exam Use	2014 Braidwood NRC Exam #85		

References Provided	None
K/A Justification	This question meets the KA because the examinee must have knowledge of RHR system tech spec basis to determine the correct answer.
SRO-Only Justification	This question is SRO level because the examinee must understand the bases of why only one RH train is required per Tech Spec 3.9.5.
Additional Information	None

K/A Links

GS.3.0.SF4.PRI.005	Safety Function: 4	Tier 2	Group 1
Residual Heat Removal System (RHRS)		RO Imp:	SRO Imp:
P2.2.25	Safety Function: 4	Tier 3	Group
Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits. (CFR: 41.5 / 41.7 / 43.2)		RO Imp: 3.2	SRO Imp: 4.2

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.2 Facility operating limitations in the technical specifications and their bases.

88	ID: SS10008-A2.03-88	Points: 1.00

Unit 1 at 100% reactor power.

The crew is performing 1BwOA PRI-8, ESSENTIAL SERVICE WATER MALFUNCTION, due to both Unit 1 SX pumps being inoperable.

- Attempts to cross-tie Unit 2 SX to Unit 1 from the MCR failed. Local attempts are in progress.
- Annunciator 1-2-C5, CC HX OUTLET TEMP HIGH, alarms.
- The crew has entered 1BwOA PRI-6, COMPONENT COOLING MALFUNCTION.

The following annunciators alarm:

- 1-2-D5, CC PUMP SUCT TEMP HIGH
- 1-9-E2, LTDWN TEMP HIGH
- 1-2-A5, CC SURGE TANK LEVEL HIGH LOW
    - CC surge tank level is 66% and STABLE.

1BwOA PRI-6 step 4, CHECK CC SYSTEM TEMPERATURE, is in progress.

The SRO will…

A. go to 1BwOA PRI-6 Attachment A, LOSS OF COMPONENT COOLING, direct the crew to place all CC pumps in PTL, trip Unit 1 reactor, and trip all RCPs.

B. go to 1BwOA PRI-6 Attachment B, ABNORMAL CC SURGE TANK LEVEL, direct the crew to monitor CC surge tank level.

C. continue in 1BwOA PRI-6, direct the crew to monitor RCP motor bearing, pump bearing and seal water outlet temperatures.

D. continue in 1BwOA PRI-6, direct the crew to verify 1CV129 has diverted to the VCT.

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 88

A – Correct: go to 1BwOA PRI-6 Attachment A, direct the crew to place all CC pumps in PTL, trip Unit 1 reactor, and trip all RCPs is correct. Per step 4, if 1-2-D5 is lit go to attachment A. Attachment A places all CC pumps in PTL, trips the reactor and all RCPs.

B – Plausible: go to 1BwOA PRI-6 Attachment B, direct the crew to monitor CC surge tank level is incorrect. This would be the correct answer if 1-2-D5 were clear and the crew continues through to step 7 RNO.

C – Plausible: continue in 1BwOA PRI-6, direct the crew to monitor RCP motor bearing, pump bearing and seal water outlet temperatures is incorrect. This would be correct if 1-2-D5 were clear and the crew continues to step 5.

D – Plausible: continue in 1BwOA PRI-6, direct the crew to verify 1CV129 has diverted to the VCT is incorrect. This would be correct if 1-2-D5 were clear and the crew continues to step 6 RNO.

Question Information

Topic	SS10008-A2.03-88
System ID	2103923
User ID	SS10008-A2.03-88
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	3.5
Technical Reference and Revision #	1BwOA PRI-6, Rev. 110, Page 6		
Training Objective	T.OA17-03 (SRO Only) ANALYZE a given set of plant conditions and DETERMINE the required actions per 1BwOA PRI-6, CCW Malfunction.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since the examinee must be able to predict the impact of high CCW temperatures and based on that prediction, use procedures to mitigate the consequences of those malfunctions.
SRO-Only Justification	This question is SRO level because it requires the examinee to assess facility conditions and select the section of a procedure with which to proceed using detailed knowledge beyond overall mitigating strategy.
Additional Information	None

K/A Links

SF8.008.A2.03	Safety Function: 8	Tier 2	Group 1
Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, 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)			
High/low CCW temperature		RO Imp: 3.0	SRO Imp: 3.2

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

89	ID: SS10022-G2.2.40-89	Points: 1.00

Unit 1 is at 100% reactor power.

Date	Time	Status
6/1/19	0700	1BwOSR 3.6.6.2, REACTOR CONTAINMENT FAN COOLER SURVEILLANCE is performed. U1 RCFC flows are as follows: 1A 2700 gpm 1B 2650 gpm 1C 2750 gpm 1D 2640 gpm
6/7/19	1100	1A CS pump UPPER motor oil reservoir is noted to be EMPTY. Attempts at refilling are UNSUCCESSFUL. The 1A CS pump is declared INOPERABLE.
6/7/19	1300	1BwOSR 3.6.6.3-1, SX SYSTEM FLOW BALANCE, is performed. ALL U1 RCFC flows are adjusted to 2850 gpm.
6/9/19	1600	The 1A RCFC trips on overcurrent.
6/9/19	2000	PMT on the 1A CS pump is complete, 1A CS pump is declared OPERABLE.

If the 1A RCFC is NOT repaired, the LATEST time Unit 1 MUST enter MODE 3 to comply with TS/TRM requirements is...

A. 1800 on 6/7/19.

B. 1300 on 6/8/19.

C. 1300 on 6/15/19.

D. 2200 on 6/16/19.

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 89

A – Plausible: 1800 on 6/7/19 is incorrect. This would be the correct answer if the 1A or 1C RCFC cooler flow was lower than the SR (condition E would apply).

B – Plausible: 1300 on 6/8/19 is incorrect. This would be the correct answer if the completion time, for condition A, was based on the initial entry of the LCO, 6/1/19 0700 + 7 days + 6 hours

= 1300 on 6/8/19.

C – Correct: 1300 on 6/15/19 is correct. 6/1/19 0700 + 14 days (brick wall) + 6 hours (3.6.6 cond. D comp. time) = 1300 on 6/15/19. 3.0.3 entry was NOT required. Condition A of 3.6.6 would be entered for the 1B and 1D RCFC flows being below 2660 gpm, subsequently Condition C of 3.6.6 would be entered due to the 1A CS pump inoperability.

D – Plausible: 2200 on 6/16/19 is incorrect. This would be the correct answer if the 1A CS pump were declared operable and the LCO were exited prior to the 1A RCFC tripping on 6/9/19 at 1600. 6/9/19 1600 + 7 days + 6 hours = 2200 on 6/16/19.

Question Information

Topic	SS10022-G2.2.40-89
System ID	2104498
User ID	SS10022-G2.2.40-89
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	OPEN
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	TS 3.6.6 Amendment 98		
Training Objective	S.CS1-13-C As applicable to the Containment Spray System: c. (SRO Only) Given applicable reference material, APPLY greater than one hour LCO/TRM Action Statements.		
Previous NRC Exam Use	None		

References Provided	T.S 3.6.6.
K/A Justification	This question meets the KA because it requires the ability to apply technical specifications for the containment cooling TS (3.6.6)
SRO-Only Justification	This question is SRO only because it requires the application of TS required actions (TS 3.6.6), surveillance requirements (SR 3.0.1) and rules of application (TS 1.3).
Additional Information	None

K/A Links

GS.3.0.SF5.022	Safety Function: 5	Tier 2	Group 1
Containment Cooling System (CCS)		RO Imp:	SRO Imp:
P2.2.40	Safety Function: 5	Tier 3	Group
Ability to apply Technical Specifications for a system. (CFR: 41.10 / 43.2 / 43.5 / 45.3)		RO Imp: 3.4	SRO Imp: 4.7

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.2 Facility operating limitations in the technical specifications and their bases.

90	ID: SS10039-A2.04-90-A	Points: 1.00

A Unit 2 Rx Trip has just occurred.

- The crew is performing 2BwEP ES-0.1, REACTOR TRIP RESPONSE UNIT 2, step 1, CHECK RCS TEMPERATURES.
  - 2TI-412, TAVE 2A is 587˚F
  - 2TI-422, TAVE 2B is 538˚F
  - 2TI-432, TAVE 2C is 538˚F
  - 2TI-442, TAVE 2D is 538˚F
- All RCP's are RUNNING.

(1) 2UI-500, STM DUMP DEMAND, will indicate ___.

(2) The SRO will direct the RO to perform an emergency boration of ___ gallons MINIMUM from the BAST.

A. (1) 100%
(2) 245

B. (1) 100%
(2) 735

C. (1) 0%
(2) 245

D. (1) 0%
(2) 735

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 90

Unit 2, 7300 controls question.

A – Correct: 100% and 245, is correct. The plant trip controller on U-2 uses the auctioneered high Tave and compares it with 557 to generate an error signal. A 30˚F difference will create a 100% demand signal. Per the RNO for step 1 emergency boration should occur. 7°F below 545°F (35 gal/°F) = 245 gal.

B – Plausible: 100% is correct, 735 gal is incorrect. 735 gal would be the correct boration amount from the RWST. 7°F below 545°F (105 gal/°F) = 735 gal.

C – Plausible: 0% is incorrect, 245 is correct. 0% is correct for Unit 1. The signal selector function for the steam dumps on U-1 utilizes the second highest tave signal. Therefore, the system would select 538°F and would output 0% demand.

D – Plausible: 0% and 735, are incorrect. 0% is correct for Unit 1. The signal selector function for the steam dumps on U-1 utilizes the second highest tave signal. Therefore, the system would select 538°F and would output 0% demand.   735 gal would be the correct boration amount from the RWST. 7°F below 545°F (105 gal/°F) = 735 gal.

Question Information

Topic	SS10039-A2.04-90
System ID	2106608
User ID	SS10039-A2.04-90-A
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.5
Technical Reference and Revision #	2BwEP ES-0.1, Rev. 300, Page 5 20E-2-4031MS14, Rev. F (proprietary) WNA-CB-00241-CCE, Rev. 3, Page 274 (Steam dump control, tavg 2 select) Big Note MS-4, Rev. 15		
Training Objective	T.EP01-08 (SRO Only) ANALYZE a given set of plant conditions and DETERMINE the required actions per _BwEP-0, _BwEP ES-0.0, 0.1, 0.2, 0.3, 0.4.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because it requires the examinee to use the procedure to mitigate the consequence of a malfunctioning steam dump.
SRO-Only Justification	This question is SRO level because it requires detailed knowledge of the procedure beyond mitigation strategy to answer.
Additional Information	None

K/A Links

SF4.039.A2.04	Safety Function: 4	Tier 2	Group 1
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)			
Malfunctioning steam dump		RO Imp: 3.4	SRO Imp: 3.7

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

91	ID: SS20002-G2.4.18-91	Points: 1.00

A SGTR has occurred on Unit 1, the crew is performing 1BwEP-3, STEAM GENERATOR TUBE RUPTURE UNIT 1.

- The ruptured S/G has been isolated.
- The RCS has been cooled down and depressurized.
- ECCS flow has been terminated.
- ALL RCPs are stopped.
- RVLIS head level is 100%.
- RCS pressure is 1050 psig.
- CETCs are 500 °F.
- PZR level is 61%.

When RCP support conditions are established, the US will direct the crew to…

A. start one RCP because natural circulation will NOT allow cooldown of the ruptured SG.

B. start one RCP because pressurized thermal shock concerns will lower.

C. NOT start an RCP because the rate of SG tube leakage will rise.

D. NOT start an RCP because pressurized thermal shock concerns will rise.

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 91

A – Plausible: start one RCP because natural circulation will NOT allow cooldown of the ruptured SG. This is plausible since the ruptured SG will be isolated and the examinee may have a conceptual misunderstanding leading them to infer that the SG wont cooldown.

B – Correct: start one RCP because pressurized thermal shock concerns will lower is correct. From the background document, it is desirable to start an RCP "to provide normal pressurizer spray and to ensure homogeneous fluid temperatures and boron concentrations. In addition to minimizing pressurized thermal shock and boron dilution concerns, this also aids in cooling the ruptured SG."

C – Plausible: NOT start an RCP because the rate of S/G tube leakage will rise is incorrect. Starting an RCP will result in a pressure transient in the RCS. An examinee could reasonably infer that this transient would lead to increased SG tube leakage.

D – Plausible: NOT start an RCP because pressurized thermal shock concerns will rise is incorrect. Starting an RCP will result in a pressure transient in the RCS. An examinee could reasonably infer that this transient would lead to increased risk of pressurized thermal shock.

Question Information

Topic	SS20002-G2.4.18-91
System ID	2104504
User ID	SS20002-G2.4.18-91
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.5
Technical Reference and Revision #	BD-EP-3, Rev. 302, Page 97		
Training Objective	T.EP04-08 (SRO Only) ANALYZE a given set of plant conditions and DETERMINE the required actions per _BwEP-3, _BwEP ES-3.1, 3.2 or 3.3.		
Previous NRC Exam Use	2014 Braidwood NRC Exam #99		

References Provided	None
K/A Justification	Meets K/A, examinee must knowledge of the bases for starting an RCP during 1BwEP-3.
SRO-Only Justification	SRO level because examinee must assess the plant conditions and have knowledge of the diagnostic steps and decision points in the EOPs. The SRO would be deciding if the RCP was going to be started. The SRO also must have specific knowledge of the content of the procedure versus just the procedure's overall mitigative strategy.
Additional Information	None

K/A Links

GS.3.0.SF2.002	Safety Function: 2	Tier 2	Group 2
Reactor Coolant System (RCS)		RO Imp:	SRO Imp:
P2.4.18	Safety Function: 2	Tier 3	Group
Knowledge of the specific bases for EOPs. (CFR: 41.10 / 43.1 / 45.13)		RO Imp: 3.3	SRO Imp: 4.0

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.1 Conditions and limitations in the facility license.

92	ID: SS20033-A2.01-92	Points: 1.00

A seismic event occurs causing a large crack in the spent fuel pool.

- The crew is performing 1BwOA REFUEL-2, REFUELING CAVITY OR SPENT FUEL POOL LEVEL LOSS, step 11, FILL THE SPENT FUEL POOL.
- All methods of providing borated water to the spent fuel pool have failed.

(1) If the spent fuel pool is completely refilled with unborated water, a MAXIMUM Keff of ____ will occur.

(2) Which water source will the Unit supervisor direct filling the spent fuel pool from NEXT?

A. (1) 0.99
(2) Fire Protection

B. (1) 0.99
(2) Primary Water

C. (1) 0.95
(2) Fire Protection

D. (1) 0.95
(2) Primary Water

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 92

A – Plausible: 0.99 and Fire Protection are incorrect. 0.99 Keff would be correct if the stem asked for the reactivity requirement when in MODES 3 through 5. Fire protection would be correct if all other demin sources failed.

B – Plausible: 0.99 is incorrect, Primary Water is correct. 0.99 Keff would be correct if the stem asked for the reactivity requirement when in MODES 3 through 5.

C – Plausible: 0.95 is correct, Fire Protection is incorrect. Fire protection would be correct if all other demin sources failed.

D – Correct: 0.95 and Primary Water are correct. Per the basis of TS 3.7.15, the criticality analysis for the spent fuel pool racks confirm that Keff will remain $\leq$ 0.95 if filled with unborated water. Per 1BwOA REFUEL-2 PW or demin water is used prior to using FP.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	SS20033-A2.01-92
System ID	2104507
User ID	SS20033-A2.01-92
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.5
Technical Reference and Revision #	1BwOA Refuel-2, Rev. 107, Page 16 B 3.7.15, Rev. 68, Page 3 BwOP FC-11 Rev. 40, Page 5		
Training Objective	S.FC1-07-D As applicable to the Spent Fuel Pool Cooling and Cleanup System: d. (SRO Only) DESCRIBE the Tech Spec bases.		
Previous NRC Exam Use	2014 Braidwood NRC Exam #82		

References Provided	None
K/A Justification	Meets K/A, examinee must evaluate Tech Spec action for inadequate boron concentration and understanding of the basis for Tech Spec required boron concentration, then determine the source to fill the spent fuel pool.
SRO-Only Justification	SRO level because examinee know the Tech Spec bases of 3.7.15. The SRO also must determine what source of water will be utilized to fill the spent fuel pool utilizing detailed knowledge of the procedure beyond mitigating strategy.
Additional Information	None

K/A Links

SF8.033.A2.01	Safety Function: 8	Tier 2	Group 2
Ability to (a) predict the impacts of the following malfunctions or operations on the Spent Fuel Pool Cooling 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)			
Inadequate SDM		RO Imp: 3.0	SRO Imp: 3.5

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

93	ID: SS20034-K1.02-93	Points: 1.00

Unit 2 is in mode 6, performing core offload.
- An irradiated fuel assembly has just been loaded into the fuel transfer cart on the reactor side.

A leak has developed in the operating RH train and reactor vessel water level is 423 ft (23 ft above reactor head flange) and slowly lowering.
- The crew enters 2BwOA REFUEL-2, REFUELING CAVITY OR SPENT FUEL POOL LEVEL LOSS UNIT 2, and directs the fuel handling supervisor to secure the fuel transfer system.
- The fuel handling supervisor completes the move of the fuel assembly to its designated location in the spent fuel pool per the move sheet.

Per the basis of technical specification 3.9.7, REFUELING CAVITY WATER LEVEL, the fuel handling supervisor ___(1)___ TS 3.9.7 because ___(2)___ is(are) designated as safe.

A. (1) complied with
(2) the fuel pool and reactor vessel

B. (1) complied with
(2) ONLY the fuel pool

C. (1) violated
(2) ONLY the reactor vessel

D. (1) violated
(2) the fuel transfer basket

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 93

A – Correct: complied with TS 3.9.7 because the basis allows for the completion of a fuel move to a safe location is correct. Per the basis of action A.1 of TS 3.9.7 the suspension of fuel movement shall not preclude completion of movement of a fuel assembly to a safe position.

B – Plausible: complied with TS 3.9.7 because ONLY the fuel pool is designated as a safe location is incorrect. The reactor vessel is also a safe location. 2BwOA REFUEL-2 will direct the crew to secure all fuel assemblies, place the refueling transfer cart in the fuel building and close the transfer tube isolation valve (2FH001). A novice applicant may interpret the follow-on procedure steps as requiring fuel only be transferred to the fuel pool if a move is in progress.

C – Plausible: violated TS 3.9.7 because ONLY the reactor is designated as a safe location is incorrect. The spent fuel pool is also a safe location. Since the fuel assembly is located inside containment, a novice applicant may conclude that the move should place the fuel assembly back in the reactor vessel.

D – Plausible: violated TS 3.9.7 because the transfer cart is designated as a safe location is incorrect. Per BwOA Refuel-2 step 4, all fuel assemblies will be secured in either the reactor vessel, spent fuel pool or dry cask MPC. The design basis for the refuel equipment states that it will not damage seismic category 1 equipment during a safe shutdown earthquake, a novice applicant may interpret this as meaning the transfer system is a safe location.

Question Information

Topic	SS20034-K1.02-93
System ID	2104510
User ID	SS20034-K1.02-93
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	3.0
Technical Reference and Revision #	B 3.9.7, Rev. 61, Page 2 2BwOA REFUEL-2, Rev. 107, Page 6		
Training Objective	S.FH1-10-D As applicable to the Fuel Handling System: d. (SRO Only) DESCRIBE the Tech Spec bases.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA because it requires knowledge of the physical connection and effect of a leak in the RH system on the use of the fuel handling system to comply with TS requried actions. With 1FH001, GATE VLV FOR TRANSFER CANAL, open, a leak in the RH system will lower both reactor cavity level and SFP. This will continue until the transfer cart is parked on the fuel building side and 1FH001 is closed. Then only reactor vessel level will lower.
SRO-Only Justification	This question is SRO only because it requires knowledge of the TS basis.
Additional Information	None

K/A Links

SF8.034.K1.02	Safety Function: 8	Tier 2	Group 2
Knowledge of the physical connections and/or cause- effect relationships between the Fuel Handling System and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)			
RHRS		RO Imp: 2.5	SRO Imp: 3.2

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links
- CFR: 43.2 Facility operating limitations in the technical specifications and their bases.

94	ID: SG-2.1.34-94	Points: 1.00

Unit 1 was operating at 100% power.

- 30 minutes ago, a feedwater malfunction caused the crew to perform a CD/FW RUNBACK from 100% power.
- All required chemistry samples are in progress.

Per the basis for TS 3.4.16, RCS SPECIFIC ACTIVITY, the RCS DOSE EQUIVALENT I-131 limit for this transient, is ___ μCi/gm.

A. 0.1

B. 1

C. 150

D. 603

Answer B

Answer Explanation

2019 Braidwood NRC Exam Question: # 94

A – Plausible: 0.1 is incorrect. This would be the correct answer for TS 3.7.3.

B – Correct: 1 is correct. B 3.4.16 the limit for RCS dose equivalent I-131 is 1.0 μCi/gm.

C – Plausible: 150 is incorrect. This is the TRM 3.4.b limit for RCS chlorides steady state (in ppb).

D – Plausible: 603 is incorrect. This would be the correct answer if asked for the XE-133 limit per SR 3.4.16.1.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	SG-2.1.34-94
System ID	2104646
User ID	SG-2.1.34-94
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	3.5
Technical Reference and Revision #	Tech Spec 3.4.16, Rev 165, Page 2		
Training Objective	T.OA36-06b (SRO Only) ANALYZE a given set of plant conditions pertaining to a Secondary Pump Trip and LOCATE and APPLY any applicable Technical Specification or Technical Requirements		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	The question meets the K/A because the candidate must have knowledge of chemistry limits to meet Tech Spec surveillance requirements.
SRO-Only Justification	The question is SRO level because it requires knowledge of the TS basis of 3.4.16 to answer.
Additional Information	None

K/A Links

P2.1.34	Safety Function: 8	Tier 3	Group
Knowledge of primary and secondary plant chemistry limits. (CFR: 41.10 / 43.5 / 45.12)	RO Imp: 2.7	SRO Imp: 3.5	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

95	ID: SG-2.1.4-95	Points: 1.00

BOTH Units are at 100% power.

Shift staffing is at the minimum DESIRED staffing level with the following exceptions:
- The WEC position is secured.
- The field supervisor is the STA.

The TWO assist NSOs returning from the RSDP are seriously injured when an Extraction Steam line ruptures in the Turbine Building and must be taken off-site for medical assistance.
- There are three hours until the scheduled shift change.

In accordance with BwAP 320-1, SHIFT STAFFING, which of the following is the MINIMUM action required to restore the TECH SPEC MINIMUM staffing?

A. Allow the current staffing to remain ONLY until shift change.

B. Demote the SM to an NSO position until the end of shift.

C. Initiate action to obtain ONLY ONE replacement NSO.

D. Initiate action to obtain TWO replacement NSOs.

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 95

A – Plausible: Allow the current staffing to remain until shift change is incorrect. The crew must obtain at least one operator by shift change, and question stem asks for minimum staffing. A novice applicant could conclude that since shift turnover is in 3 hours no actions are required.

B – Plausible: Demote the SM to an NSO position until the end of shift is incorrect. The crew must obtain at least one operator by shift change, and question stem asks for minimum staffing. A novice applicant may conclude that since the SM position is not listed in 10CFR50.54 tables, that they may be used to satisfy the unit RO position. This would be correct if another SRO could fill the SM role. A cascading demotion (SM to US, US to RO) was not utilized due to making unbalanced distractor lengths.

C – Correct: Initiate action to obtain ONLY ONE replacement NSO is correct. BwAP 320-1, desired shift staffing is 4 NSOs with both units in Mode 1-4. Tech Spec Minimum is 3 NSOs. Therefore, with 4 initially present and 2 injured, plant is 1 below Tech Spec minimum. Per TS 5.2.2 immediate action is required to be taken to restore shift minimum staffing within 2 hours.

D – Plausible: Initiate action to obtain TWO replacement NSOs is incorrect. The crew must obtain only one replacement NSO to attain tech spec minimum staffing. This would be correct if the stem asked to return to desired staffing levels.

EXAMINATION ANSWER KEY
2019 NRC SRO Exam (U-2 version)

Question Information

Topic	SG-2.1.4-95
System ID	2104649
User ID	SG-2.1.4-95
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	**3.5**
Technical Reference and Revision #	TS 5.2, Amendment 157, Page 2 10CFR50.54		
Training Objective	T.AM05-01 STATE the minimum shift manning requirements of _AP 320-1.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since it requires examinee knowledge of shift staffing requirements per 10CFR50.54 and BwAP 320-1.
SRO-Only Justification	This question is SRO level since it requires actions for not meeting administrative controls listed in Tech Spec section 5 (for shift staffing).
Additional Information	None

K/A Links

P2.1.4	Safety Function: 8	Tier 3	Group
Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, “no-solo” operation, maintenance of active license status, 10CFR55, etc. (CFR: 41.10 / 43.2)	RO Imp: 3.3	SRO Imp: 3.8	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.2 Facility operating limitations in the technical specifications and their bases.

96	ID: SG-2.2.1-96	Points: 1.00

Unit 1 is performing a reactor startup per 1BwGP 100-2, PLANT STARTUP, following a spurious reactor trip.

The NSO is performing step F.23, REACTOR STARTUP, and announces that the reactor is CRITICAL, with the following conditions:

- CBC DRPI - 24 STEPS.
- CBC Bank Demand - 26 STEPS.
- Annunciator 1-10-A6, ROD BANK LO-2 INSERTION LIMIT - LIT.
- The National Weather Service has issued a severe THUNDERSTORM WATCH for the area including Braidwood Station.

The SRO will...

A. allow the startup to continue and direct the NSO to stop rod withdrawal every 3 steps to observe reactivity effects.

B. allow the startup to continue and direct the NSO to perform a SDM calculation per 1BwOSR 3.1.1.1-2, UNIT ONE SHUTDOWN MARGIN SURVEILLANCE DURING OPERATION.

C. implement 1BwGP 100-2 Attachment A, CONTINGENCY FOR SUSPENDED REACTOR STARTUP, and direct the NSO to raise RCS boron concentration.

D. implement 1BwGP 100-2 Attachment C, CONTINGENCY FOR SEVERE WEATHER DURING REACTOR STARTUP, and direct the NSO to begin control bank insertion.

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 96

A – Plausible: allow the startup to continue and direct the NSO to stop rod withdrawal every 3 steps to observe reactivity effects, is incorrect. This would be the correct answer if criticality happened above the LO-2 insertion limit with no other complications.

B – Plausible: allow the startup to continue and direct the NSO to perform a SDM calculation per 1BwOSR 3.1.1.1-2, UNIT ONE SHUTDOWN MARGIN SURVEILLANCE DURING OPERATION, is incorrect. This would be the correct answer for getting the annunciator 1-10-A6 during full power operations.

C – Correct: implement 1BwGP 100-2 Attachment A, CONTINGENCY FOR SUSPENDED REACTOR STARTUP, and direct the NSO to raise RCS boron concentration, is correct. Per the caution prior to step F.26, if criticality occurs prior to the LO-2 RIL, GO TO Attachment A, contingency for a suspended reactor startup.

D – Plausible: implement 1BwGP 100-2 Attachment C, CONTINGENCY FOR SEVERE WEATHER DURING REACTOR STARTUP, and direct the NSO to begin control bank insertion, is incorrect. This would be correct if the NWS had issued a tornado warning in the area.

Question Information

Topic	SG-2.2.1-96
System ID	2104655
User ID	SG-2.2.1-96
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	3.0
Technical Reference and Revision #	1BwGP 100-2, Rev. 44, Page 31		
Training Objective	T.GP02-03 Given a set of plant conditions, DESCRIBE the system or component operational status directed by GP 100-2, Plant Startup.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since it requires the ability to perform pre-startup procedures including controls that affect reactivity.
SRO-Only Justification	This question is SRO only because it requires an assessment of plant conditions and selection of a procedure to mitigate or proceed, using a detailed knowledge beyond overall purpose.
Additional Information	None

K/A Links

P2.2.1	Safety Function: 8	Tier 3	Group
Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity. (CFR: 41.5 / 41.10 / 43.5 / 43.6 / 45.1)	RO Imp: 4.5	SRO Imp: 4.4	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.6 Procedures and limitations involved in initial core loading, alterations in core configuration, control rod programming, and determination of various internal and external effects on core reactivity.

97	ID: SG-2.2.21-97	Points: 1.00

The shift manager has assigned you to determine the post maintenance testing (PMT) requirements for an upcoming work package. The scope of the work is for EMD to perform a motor clean and inspect of the 2SI01PB, SI PUMP 2B. To perform this inspection the motor will be disassembled by removing access covers, the motor will be cleaned, and the covers will be re-installed.

Which of the following are required to satisfy the MINIMUM PMT requirements to declare the 2B SI pump OPERABLE, when returned to service?

Motor current, ______ will be required.

(1) Hi Potential Testing
(2) Alignment Check
(3) Rotation

A. and 1 ONLY

B. and 2 ONLY

C. and 3 ONLY

D. 1, 2, and 3

Answer A

Answer Explanation

2019 Braidwood NRC Exam Question: # 97

A – Correct: and 1 only is correct. Per the motors test matrix in MA-AA-716-012, A Hi pot test would be required in addition to the motor current.

B – Plausible: and 2 only is incorrect. This would be the correct answer if the motor was only uncoupled and then re-coupled.

C – Plausible: and 3 only is incorrect. This would be the correct answer if the motor was only determinated.

D – Plausible: 1, 2 and 3 is incorrect. This would be correct if the motor was replaced with a new motor.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	SG-2.2.21-97
System ID	2104663
User ID	SG-2.2.21-97
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-HIGH
Operator Discipline	LO-I
Open or Closed Reference	OPEN
Status:	Active

Comments

NRC Exams Only			
Question Type	New	**Difficulty**	2.5
Technical Reference and Revision #	MA-AA-716-012, Rev. 23, Page 42		
Training Objective	S-AM-141 Ensure Adequate Post-Maintenance Testing After Work Completion		
Previous NRC Exam Use	None		

References Provided	MA-AA-716-012, Attachment 1, Generic PMT matrix.
K/A Justification	This question meets the KA because it requires the examinee have knowledge of PMT requirements.
SRO-Only Justification	This question is SRO only since determining PMT requirements is an SRO job function.
Additional Information	None

K/A Links

P2.2.21	Safety Function: 8	Tier 3	Group
Knowledge of pre- and post-maintenance operability requirements. (CFR: 41.10 / 43.2)	RO Imp: 2.9	SRO Imp: 4.1	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.2 Facility operating limitations in the technical specifications and their bases.

98	ID: SG-2.3.4-98	Points: 1.00

Unit 1 has just experienced an RCS LOCA, fuel damage, and a significant breach in containment.

- You are the acting Station Emergency Director.
- EOF and TSC are NOT activated.
- Two maintenance personnel have volunteered to seal the containment breach.

You can authorize an emergency exposure up to...

A. 5 Rem TEDE

B. 10 Rem TEDE

C. 15 Rem TEDE

D. 25 Rem TEDE

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 98

A – Plausible: 5 Rem TEDE is incorrect. This would be the correct answer if the stem asked for the limit the site vice president may authorize to raise the administrative dose control level per RP-AA-203, section 4.2.

B – Plausible: 10 Rem TEDE is incorrect. This is plausible since it is TEDE limit used for protecting valuable property per RP-AA-203, table 2.

C – Plausible: 15 Rem TEDE incorrect. This is plausible since it is the limit for an adult occupational worker for LDE from RP-AA-203 table 1.

D – Correct: 25 Rem TEDE. Per EP-AA-113 and RP-AA-203 section 4.5.3, the SED may authorize up to 25 Rem TEDE. Higher authorizations are allowed but require the workers be fully aware of the risks involved, which was not given in the stem.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	SG-2.3.4-98
System ID	2104685
User ID	SG-2.3.4-98
Time to Complete	3
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Modified from LORT Bank ID 437087	**Difficulty**	3.0
Technical Reference and Revision #	RP-AA-203, Rev. 5, Page 7 EP-AA-113, Rev. 13, Page 8		
Training Objective	T.ZP1-14 DESCRIBE the responsibilities of the Station Emergency Director which may not be delegated.		
Previous NRC Exam Use	None		

References Provided	None
K/A Justification	This question meets the KA since it requires knowledge of emergency exposure limits.
SRO-Only Justification	This question is SRO level since the Station Emergency Director is an SRO job function.
Additional Information	Modified by changing condition of the stem from lifesaving to limiting release and changed 2 distractors.

Modified from LORT Bank ID 437087:
Unit 1 is at full power. Two IMs and an RP Tech entered containment to free a stuck incore detector and drive cable. About 100 feet of cable was manually pulled into the seal table area. The RP Tech observed rapidly rising radiation levels near the Multi-Pass transfer tube, and the maximum on-scale reading (1000 R/hr) was exceeded.
The RP Tech ordered the work stopped and the area evacuated. While exiting the area, one IM slipped off a ladder, fell near the seal table and was knocked unconscious.
The exposure guidelines for personnel who will be removing the injured IM are ...

A. 25 Rem TEDE and 250 Rem TODE.
B. 10 Rem TEDE and an additional 250 Rem TODE.
C. 25 Rem TEDE and an additional 250 Rem TODE.
D. 10 Rem TEDE and 250 Rem TODE.

K/A Links

P2.3.4	Safety Function: 8	Tier 3	Group
Knowledge of radiation exposure limits under normal or emergency conditions. (CFR: 41.12 / 43.4 / 45.10)	RO Imp: 3.2	SRO Imp: 3.7	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.4 Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions.

99	ID: SG-2.4.46-99	Points: 1.00

Unit 2 is at 100% reactor power.

- An alert alarm is noted on RMS for 2PR27J, SJAE RADIATION MONITOR.
- The crew enters 2BwOA SEC-8, STEAM GENERATOR TUBE LEAK.
- The SRO is attempting to determine the leak size and the affected SG to evaluate for Tech Spec entry conditions.
- At step 4, IDENTIFY LEAKING SG, the 2AR22J and 2AR23J, MAIN STEAMLINE RADIATION MONITORS, indicate NO discernable rise in radiation levels on any channel.

(1) An alternate method to evaluate WHICH SG is leaking is to ...
(2) The bases for MAXIMUM allowable Primary to Secondary leak rate is the leakage amount that ...

A. (1) check indications of 2PR08J, SG Blowdown Sample Radiation Monitor.
(2) can be detected within 15 minutes.

B. (1) check indications of 2PR08J, SG Blowdown Sample Radiation Monitor.
(2) would likely escalate to a tube rupture.

C. (1) obtain activity levels of N-16 monitor(s) from chemistry.
(2) can be detected within 15 minutes.

D. (1) obtain activity levels of N-16 monitor(s) from chemistry.
(2) would likely escalate to a tube rupture.

Answer D

Answer Explanation

2019 Braidwood NRC Exam Question: # 99

A – Plausible: check 2PR08J and detected within 15 minutes is incorrect. The 2PR08J rad monitor is not listed in 2BwOA SEC-8 to determine which SG is leaking as it typically monitors flow from all SG with blowdown flow aligned simultaneously. This is plausible because each steam generator has individual isolations valves. 15 minutes is a plausible distractor since it is the time limit for classification of MU6 for RCS leakage, which could be applicable depending on the size of the leak (> 25 GPM).

B – Plausible: check 2PR08J is incorrect and escalate to a tube rupture is correct. The 2PR08J rad monitor is not listed in 2BwOA SEC-8 to determine which SG is leaking as it typically monitors flow from all SG with blowdown flow aligned simultaneously. This is plausible because each steam generator has individual isolations valves. Can be detected within 1 hour is plausible

C – Plausible: obtain N-16 levels is correct and detected within 15 minutes is incorrect. 15

minutes is a plausible distractor since it is the time limit for classification of MU6 for RCS leakage, which could be applicable depending on the size of the leak (> 25 GPM).

D – Correct: obtain N-16 levels and escalate to a tube rupture are correct. The 2PR027J is typically a leading indicator of a small SGTL. Per 2BwOA SEC-8, alternate rad monitors for identifying which SG is leaking are: Main Steamline rad monitors (leak not large enough to detect on these given in stem), N-16 rad monitors (these are portable and can be moved from to each MS line to determine which SG is leaking.) Per TS 3.4.13 bases: The limit of 150 gallons per day per SG is based on the operational LEAKAGE performance criterion in NEI 97-06, Steam Generator Program Guidelines (Ref. 5). The Steam Generator Program operational LEAKAGE performance criterion in NEI 97-06 states, "The RCS operational primary to secondary leakage through any one SG shall be limited to 150 gallons per day." The limit is based on operating experience with SG tube degradation mechanisms that result in tube leakage. Leakage that exceeds this amount has been shown to have a high likelihood of degrading further to a steam generator tube rupture. The operational leakage rate criterion in conjunction with the implementation of the Steam Generator Program is an effective measure for minimizing the frequency of steam generator tube ruptures. Distractors are variations of either unidentified or identified leakage safety analysis and/or other rad monitors that would detect SG primary to secondary tube leakage.

Question Information

Topic	SG-2.4.46-99
System ID	2104697
User ID	SG-2.4.46-99
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	Difficulty	2.5
Technical Reference and Revision #	2BwOA Sec-8, Rev 109, Page 4 B 3.4.13, Rev 64 Page 5		
Training Objective	S.SG1-10-D As applicable to the Steam Generators: d. (SRO Only) DESCRIBE the Tech Spec bases.		
Previous NRC Exam Use	2016 Braidwood NRC Exam #85		

References Provided	None
K/A Justification	This question meets the K/A because requires the examinee have the ability to determine how to verify the rad monitor alarm is consistent with plant conditions.
SRO-Only Justification	The question is SRO level because it requires knowledge of Tech Spec bases and detailed procedural knowledge beyond mitigating strategy.
Additional Information	None

K/A Links

P2.4.46	Safety Function: 8	Tier 3	Group
Ability to verify that the alarms are consistent with the plant conditions. (CFR: 41.10 / 43.5 / 45.3 / 45.12)	RO Imp: 4.2	SRO Imp: 4.2	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links
- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

100	ID: SG-2.4.11-100	Points: 1.00

Unit 1 is in MODE 4 during a refuel outage.

- 1A RH train is in shutdown cooling mode.
- 1B RH Pump is OOS.
- The I/P converter for 1RH606, HX 1A FLOW CONT VLV, fails such that the valve goes full open.

The Unit 1 SRO has dispatched an equipment operator (EO) to install a temporary regulator with a pneumatic jumper around the failed I/P converter to re-enable RH temperature control.

The US will direct the EO to follow the pneumatic jumper installation instructions found in...

A. 1BwOA SEC-4, LOSS OF INSTRUMENT AIR.

B. 1BwOA ELEC-2, LOSS OF INSTRUMENT BUS.

C. 1BwOA PRI-5, CONTROL ROOM INACCESSIBILITY.

D. 1BwOA PRI-10, LOSS OF RH COOLING.

Answer C

Answer Explanation

2019 Braidwood NRC Exam Question: # 100

A – Plausible: 1BwOA SEC-4 is incorrect. It is a credible distractor because a loss of instrument air would also affect the RH flow control valves; however, the mitigation strategy is to secure the RH train and use alternate modes of cooling per PRI-10.

B – Plausible: 1BwOA ELEC-2 is incorrect. it is a credible distractor because it contains steps for loss of control power to the RH Hx flow control valves.

C – Correct: 1BwOA PRI-5 is correct. The installation instructions for pneumatic jumpers for RH system are found in 1BwOA PRI-5, Attachment C. This operation is in PRI-5 to allow cooldown of the plant to mode 5 while operating from the remote shutdown panel because there are no RH controls in the remote shutdown panel.

D – Plausible: 1BwOA PRI-10 is incorrect. It is a credible distractor because it contains mitigation strategies when RH cooling is lost. However, in this question, RH cooling would be maximized instead of lost.

EXAMINATION ANSWER KEY

2019 NRC SRO Exam (U-2 version)

Question Information

Topic	SG-2.4.11-100
System ID	2104745
User ID	SG-2.4.11-100
Time to Complete	0
Point Value	1.00
Site	BR
Operator Type - Cognitive Level	SRO-MEMORY
Operator Discipline	LO-I
Open or Closed Reference	CLOSED
Status:	Active

Comments

NRC Exams Only			
Question Type	Bank	**Difficulty**	3.0
Technical Reference and Revision #	1BwOA PRI-5, Rev. 109, Page 55		
Training Objective	T.OA16-03 (SRO Only) ANALYZE a given set of plant conditions and DETERMINE the required actions per 0/1OA PRI-5, Control Room Inaccessibility.		
Previous NRC Exam Use	2009 Braidwood NRC Exam #100		

References Provided	None
K/A Justification	The question meets the K/A, requires examinee knowledge of abnormal condition procedures.
SRO-Only Justification	The question is SRO level because it requires assessment of conditions and selection of appropriate procedure.
Additional Information	None

K/A Links

P2.4.11	Safety Function: 8	Tier 3	Group
Knowledge of abnormal condition procedures. (CFR: 41.10 / 43.5 / 45.13)	RO Imp: 4.0	SRO Imp: 4.2	

Associated Objective(s)

	2019 NRC Exam (U-2 Version)

Cross Reference Links

Table: EXELON Operations 10 CFR 55.41, 43, and 45 Links

- CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.